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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



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Señor

DIRECTOR DIVISIÓN DE NUEVAS CREACIONES

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

E.

S.

D.

Expediente No. **13 145221 TITULO:** SISTEMA MODULAR DE PANELES Y
ELEMENTOS ESTRUCTURALES TERMOPLÁSTICOS PARA CONTRUCCIONES
PREFABRICADAS. **SOLICITANTE:** INTEMPO SISTEMAS CONSTRUCTIVOS, S.A.
DE C.V

PRESNETACION DE OBJECCION

JUAN PABLO CADENA SARMIENTO, mayor de edad y vecino de esta ciudad,
identificado como aparece al pie de mi firma, obrando como apoderado de
INMUEBELES FERROMARTI S.A., con legítimo interés, y con el fin de llamar la
atención sobre la existencia de arte previo que afecta la patentabilidad de la solicitud
de la referencia, presento objección contra la solicitud de Patente de Modelo de
Utilidad de la referencia, con el fin que ésta sea negada.

ANTECEDENTES

El resumen de la presunta invención es del texto siguiente:

*"El sistema está conformado por paneles y elementos termoplásticos huecos
alargados de sección transversal rectilínea con troquelados laterales circulares*

distribuidos estratégicamente en forma lineal uniforme para permitir una comunicación interna e introducir elementos de refuerzo estructural entre paneles y los elementos, para ensamblar el sistema los paneles y los elementos se deslizan unos contra otros trabándose entre sí con gran precisión y así formar los muros verticales y la techumbre de la edificación.

Sistema modular constituido por un panel de forma sustancialmente regular comprende una pluralidad de costillas longitudinales y perpendiculares internas y que generan una pluralidad de cavidades internas sustancialmente rectangulares, comprendido dicho panel en un extremo lateral con una extensión de configuración en forma de gancho cuyas puntas se direccionan hacia la parte externa; el extremo lateral opuesto con una extensión de configuración en forma de contra-gancho cuya punta se direcciona hacia la parte interna en que se engarza al contorno extremo de dicho gancho del lado opuesto, las costillas internas presentan troquelados circulares distribuidos en forma estratégica y lineal”

Teniendo en cuenta que mi representada **INMUEBLES FERROMARTÍ, S. A. DE C. V.**, cuenta con amplia información en el sentido de que la correspondiente Solicitud de Patente de Modelo de Utilidad que nos ocupa no cumple entre otros con lo dispuesto por el Convenio de París para la Protección de la Propiedad Industrial; Tratado de Cooperación en Materia de Patentes; Tratado sobre el Derecho de Patentes de la Organización Mundial de la Propiedad Intelectual; Acuerdo sobre los Aspectos de los Derechos de Propiedad Intelectual relacionados con el Comercio; Decisión 486 del Régimen Común sobre Propiedad Industrial de la Comisión de la Comunidad Andina y la Decisión 344 del Régimen Común sobre Propiedad Industrial del Acuerdo de Cartagena, sobre la debida novedad, así como con nivel inventivo, se solicita que esta información sea recibida y considerada como documento de apoyo técnico para el examen de fondo que de dicha solicitud se realice por parte de esa autoridad.

En este sentido, es necesario tener en cuenta que para determinar que una invención es nueva y resultado de una actividad inventiva, se deberá considerar el estado de la técnica en la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida; además, que para determinar si la invención es nueva, estarán

incluidas en el estado de la técnica todas las solicitudes de patente presentadas entre otros países, en el caso concreto Chile y Colombia, con anterioridad a esa fecha, que se encuentren ya tramitadas y otorgadas o concedidas, aunque la publicación de la solicitud de patente se realice con posterioridad a la misma.

En este orden de ideas, tales países determinan que para efectos de lo dispuesto en la ley de la materia, estarán incluídas en el estado de la técnica las solicitudes de patente en trámite y ya otorgadas o concedidas, presentadas ante la autoridad correspondiente con anterioridad en fecha y hora (prioridad reconocida) a aquellas sujetas a examen de fondo, de lo que se concluye que el titular de un derecho de patente que primero presente la solicitud respectiva, tendrá mejor derecho a obtener la patente o el registro de prioridad.

Por otra parte, debe tenerse en cuenta, el informe del examen de fondo realizado por una oficina examinadora extranjera, lo cual debe ser considerado como un documento de apoyo técnico, para el efecto de determinar si la invención de modelo de utilidad, cuya patente se solicita, es nueva, si implica una actividad inventiva y si es susceptible de aplicación anterior, razón por la cual debe considerarse en este caso toda la información que esta promovente aporta al efecto.

Así las cosas, y como quedó indicado la solicitud de patente de modelo de utilidad que nos ocupa, consigna en su resumen, entendido éste como un enunciado breve y conciso de su desarrollo técnico, en donde el resumen comprende una síntesis basada en la descripción, reivindicaciones y dibujos, indicando el sector técnico al que pertenecen la invención, permitiendo una comprensión del problema técnico, de la esencia de la solución del mismo mediante la invención y del uso o usos principales de la misma.

De esta manera, el resumen publicado al efecto es el siguiente:

“El sistema está conformado por paneles y elementos termoplásticos huecos alargados de sección transversal rectilínea con troquelados laterales circulares distribuidos estratégicamente en forma lineal uniforme para permitir una comunicación interna e introducir elementos de refuerzo estructural entre paneles y los elementos, para ensamblar el sistema los paneles y los elementos se

deslizan unos contra otros trabándose entre sí con gran precisión y así formar los muros verticales y la techumbre de la edificación.

Sistema modular constituido por un panel de forma sustancialmente regular comprende una pluralidad de costillas longitudinales y perpendiculares internas y que generan una pluralidad de cavidades internas sustancialmente rectangulares, comprendido dicho panel en un extremo lateral con una extensión de configuración en forma de gancho cuyas puntas se direcciona hacia la parte externa; el extremo lateral opuesto con una extensión de configuración en forma de contra-gancho cuya punta se direcciona hacia la parte interna en que se engarza al contorno extremo de dicho gancho del lado opuesto, las costillas internas presentan troquelados circulares distribuidos en forma estratégica y lineal."

Con base en tales consideraciones previas, mi representada procede a la siguiente:

PRESENTACIÓN DE INFORMACIÓN:

La información que la promovente de este escrito aporta sobre dicha solicitud de patente y los documentos de apoyo técnico, son los siguientes:

1. Inmuebles Ferromartí, S. A. de C. V., en su calidad de solicitante por ser receptor de los derechos cedidos y transferidos por el inventor MANUEL ENRIQUE REQUEJO PRESA, con fecha legal de 1º de julio del 2010 (01.07.10), presentó en Chile ante el Instituto Nacional de la Propiedad Industrial (INAPI), Solicitud de Patente de Sistema Modular para Edificación Progresiva, a la que recayó el número 711-10 ó 711-2010, la cual se encuentra resuelta con el otorgamiento de la Patente de Invención con número de registro 49.630, de fecha 12 de diciembre de 2013.

2. Dentro del trámite de la solicitud de patente de invención presentada por la promovente en Chile a la que se refiere el numeral precedente, se presentó en el Instituto Nacional de la Propiedad Industrial (INAPI) el 13 de septiembre del 2011, por parte del perito examinador, un Primer Informe Pericial, consignando que para su formulación se realizó una búsqueda internacional de patentes previas, con el

resultado de la cita de 06 patentes internacionales, y que las 2 citadas en primer término afectaban algunas de las reivindicaciones de la patente de invención solicitada, por lo cual se consignó lo siguiente:

9 - RESULTADO DE BUSQUEDA DEL ESTADO DE LA TECNICA		
CATEGORIA	CITA DEL DOCUMENTO CON INDICACION DE LAS PARTES RELEVANTES	REIVINDICACIONES AFECTADAS
	Búsqueda Nacional No se encontraron documentos relevantes en la Búsqueda Nacional	
	Búsqueda Internacional (Base europea, americana, japonesa y latina, Google, patenstrom.US, Clasificación, " prefabricated, modules")	
X	US 2005091932 (Roth) 05.05.2005	1, 2
X	EP 0320745 (Carman, Brannan, Dangler, Dillon, Haag, Nehme) 21.06.1989	1, 2
A	US 5608999 (Mcnamara) 11.03.1997	Ninguna
C, A	US 6189269	Ninguna
C, A	US 5311778	Ninguna
C, A	US 5608999	Ninguna

En cuanto al análisis efectuado por parte del perito a las patentes previas, se señaló lo siguiente:

15. - ARGUMENTACION ANALISIS PERICIAL (ARTICULO 83 REGLAMENTO)		SOLICITUD NUMERO:	5
ITEM	CITAS Y EXPLICACIONES	711-10	
	Documento US 2005091932 Un conjunto de construcción compuesto de módulos estructurales termoplásticos de fábrica-fabricados que cuando se interconectan en un sitio del edificio entonces crea la cáscara entera de un edificio que tiene paredes laterales y un tejado. Cada módulo que se forma de un par de paneles paralelos ponteados por tejidos transversos se proporciona en cualquier lado a lo largo de su longitud con un par de pestañas de agarre flexibles que son proyectadas de los paneles. Al congregarse estos módulos para crear la cáscara del edificio, se interconectan módulos adyacentes en relación coplanar por un ensamblador doble-enfrentado en cada cara de la que es un par de ojales. Cuando una cara del ensamblador se aprieta contra un lado de un módulo, las pestañas de agarre se encorvan entonces para doblar en chasquido y detrás del ojal para conectar al ensamblador a este módulo. La otra cara del ensamblador se conecta semejantemente al lado de un módulo adyacente donde los módulos se interconectan entonces en relación coplanar. Cuando llega a ser necesario interconectar cuatro módulos en una formación cruzada, el uso se hace entonces de un cuadrado, ensamblador quad-enfrentado en cada cara de la que es un par de ojales que son enganchables por las pestañas de agarre que proyectan del lado del módulo para ser unido a esta cara. (Memoria) Conclusión: El documento US 2005091932 interfiere la novedad de la presente solicitud. Documento EP 0320745 La invención describe una estructura de edificio modular (10) que pueden construirse con una pluralidad de Documento US 5608999 Un conjunto de componentes estructurales termoplásticos extruido para el uso en la construcción de un edificio, cada componente estructural incluye un miembro de hoja rígido elongado proporcionado con por lo menos dos barras integrales a lo largo del borde. Los componentes estructurales incluyen componentes estructurales de una primera pared llana y segundo se abren paso a componentes estructurales de codo esquina, en donde unos pocos componentes estructurales realizablemente corredizamente enclavan con otros sobre sus barras para formar un panel largo hueco. La célula interior del panel hueco recibe hormigón a ser vertido. Los paneles huecos realizablemente enclavados con paneles huecos adyacentes consecutivamente para formar una estructura de muro continua. Los componentes estructurales en su estado desmontado soltado entre uno y otro son sólidamente apilables en el volumen más pequeño de almacenamiento, donde los costos de envío con que el país fabrica al sitio de construcción local es muy bajo. (Memoria) Conclusión: El documento US 5608999 no interfiere la novedad de la presente solicitud.		

Así pues, es importante señalar que dichas observaciones fueron debidamente contestadas por la promovente y solicitante de la patente de invención en Chile, mediante escrito presentado ante el INAPI el 19 de diciembre del 2011.

Posteriormente, se presentó ante el INAPI, el 26 de marzo del 2012, respuesta del perito correspondiente, determinando con base en las aclaraciones oportunamente formuladas por la promovente y solicitante de la patente de invención en Chile, que ya ninguna de las 06 patentes internacionales citadas en origen como resultado de la búsqueda internacional, afectaba las reivindicaciones de la patente de invención solicitada por la promovente en Chile se requirieron ajustes de forma y **se concluyó que la solicitud tiene nivel inventivo en sus reivindicaciones**, requerimientos de ajustes que fueron debidamente efectuados y desahogados mediante escrito de la promovente presentado ante el INAPI el 12 de junio del 2012, razón por la cual se otorgó a **INMUEBLES FERROMARTÍ, S. A. DE C. V.**, **la Patente de Invención con número de registro 49.630, de fecha 12 de diciembre de 2013.**

3. Mediante escrito presentado ante el INAPI el 10 de agosto del 2012, la ahora solicitante de la patente de modelo de utilidad citada al rubro **INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V.**, indebidamente pretendió actuar como interesada en el trámite de la patente de invención en Chile, de Inmuebles Ferromartí, S. A. de C. V., amparándose al efecto en el artículo 21 de la Ley 19,880, que establece las Bases de los Procedimientos Administrativos que Rigen los Actos de los Órganos de la Administración del Estado, que en su numeral 2 considera interesados en el procedimiento administrativo, a los que sin haber iniciado el procedimiento, tengan derechos que puedan resultar afectados por la decisión que en el mismo se adopte.

En dicho escrito, **INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V.**, manifiesta que se dedica al rubro de la construcción y desde hace 4 años conoce, desarrolla y utiliza la Patente **US 5608999** o su equivalente mexicana (Patente 202025 denominada Panel Prefabricado para Construcción), cuya explotación la tiene licenciada a su favor (**no lo prueba**) y denomina a la misma "Tecnología Intempo", no citando a esa fecha haber presentado en Chile ni en Colombia la referida solicitud de patente de invención o en su caso de patente de modelo de utilidad que ahora nos ocupa.

Así pues, y tal como lo demostraremos en la conclusión del presente escrito, debe considerarse que en lo conducente, **INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V.**, mediante la solicitud de patente de modelo de utilidad de que se trata citada al rubro, ahora pretende patentar en todo caso el invento amparado por la citada Patente **US 5608999**, consistente en:

Documento US 5608999

Un conjunto de componentes estructurales termoplásticos extruido para el uso en la construcción de un edificio, cada componente estructural incluye un miembro de hoja rígido elongado proporcionado con por lo menos dos barras integrales a lo largo del borde. Los componentes estructurales incluyen componentes estructurales de una primera pared llana y segundo se abren paso a componentes estructurales de codo esquina, en donde unos pocos componentes estructurales realizablemente corredizamente enclavan con otros sobre sus barras para formar un panel largo hueco. La célula interior del panel hueco recibe hormigón a ser vertido. Los paneles huecos realizablemente enclavados con paneles huecos adyacentes consecutivamente para formar una estructura de muro continua. Los componentes estructurales en su estado desmontado soltado entre uno y otro son sólidamente apilables en el volumen más pequeño de almacenamiento, donde los costos de envío con que el país fabrica al sitio de construcción local es muy bajo. (Memoria)

Dicho escrito tuvo por parte del INAPI en Chile, resolución de trámite administrativo, de 16 de abril del 2013, en el sentido que “no ha lugar por no ser parte en los presentes autos y que por lo tanto, tal escrito no podrá ser considerado en la tramitación de la resolución.”

En todo caso **INTEMPO** no puede presentar a su favor dicha patente, su solicitud no tiene en todo caso diferencias aparentes con la patente **US 5608999** y no incluye las novedades reconocidas conforme a la patente otorgada a favor de FERROMARTÍ en Colombia, bajo el número de Resolución 38369, de fecha 27 de junio de 2013 y en Chile bajo el número de Registro 49.630, de fecha 12 de diciembre de 2013.

4. Con fecha 30 de octubre de 2013, el Instituto Nacional de Propiedad Industrial de Chile (INAPI), emitió la Resolución de aceptación a registro respecto de la solicitud 0711-2010, con título final “*Sistema y método de construcción modular para construcción progresiva que comprende una pluralidad de piezas prefabricadas, que consisten en un perfil rectangular hueco con una pluralidad de perforaciones y canales deslizables, con al menos un conector, al menos un poste, al menos una tapa, al menos una pieza en u y un material aglutinante*”, por virtud de la cual resuelve conceder a su titular Inmuebles Ferromartí, S. A. de C. V., la patente de invención solicitada por

cumplir con los **requisitos de novedad, nivel inventivo y aplicación industrial** establecidos en la Ley correspondiente.

5. Con fecha de emisión de 12 de diciembre de 2013, y en atención a la Resolución de aceptación de registro ya precisada en el numeral anterior, el Instituto Nacional de Propiedad Industrial de Chile (INAPI), concedió a Inmuebles Ferromartí, S. A. de C. V., el Registro de Patente de Invención número 49.630, respecto de la solicitud 0711-2010, con título final *"Sistema y método de construcción modular para construcción progresiva que comprende una pluralidad de piezas prefabricadas, que consisten en un perfil rectangular hueco con una pluralidad de perforaciones y canales deslizables, con al menos un conector, al menos un poste, al menos una tapa, al menos una pieza en u y un material aglutinante"*, con vigencia de dicho derecho en Chile desde 01 de julio de 2010 hasta el 01 de julio de 2030.

6. Al amparo del derecho de prioridad (01.07.10) respecto de la solicitud de origen presentada en Chile, precisada en el numeral 1 precedente, derecho previsto al efecto por los ordenamientos indicados, en especial el Convenio de París del que México, Chile y Colombia son parte, Inmuebles Ferromartí, S. A. de C. V., con la calidad indicada, con fecha 20 de diciembre del 2010, hora 14:03, presentó ante el Instituto Mexicano de la Propiedad Industrial (IMPI), Solicitud de Patente de Sistema Modular para Edificación Progresiva, a la que correspondió el Expediente MX/a/2010/014277, la cual se encuentra actualmente en trámite.

7. Bajo el mismo derecho de prioridad (01.07.10) respecto de la solicitud de origen presentada en Chile ya precisada, Inmuebles Ferromartí, S. A. de C. V., con la calidad indicada, con fecha 30 de mayo 2011, presentó ante la Superintendencia de Industria y Comercio de la República de Colombia, Delegatura de Propiedad Industrial, División de Nuevas Creaciones, Solicitud de Patente de Invención, de Sistema Modular para Edificación Progresiva, a la que correspondió el Expediente 11-066603, la cual ya fue otorgada mediante la Resolución 38369, de fecha 27 de junio de 2013, con vigencia hasta el 30 de mayo del 2031.

8. Respecto de la citada patente otorgada en Colombia a Inmuebles Ferromartí, S. A. de C. V., mediante la Resolución 38369, de fecha 27 de junio de 2013, precisada en el numeral precedente, tenemos que el resumen de la invención, la descripción detallada de la invención y sus reivindicaciones, son del contenido siguiente:

RESUMEN DE LA INVENCION

La presente invención se refiere a un Sistema Modular que permite la construcción de toda clase de edificaciones de carácter progresivo hacia adentro o hacia fuera , con avances de la técnica conocidos a la fecha, consistentes en la
5 utilización de diversos elementos de construcción con dimensiones logradas a base de la unión de piezas completas de formas poliméricas, que logran el tamaño de los

elementos constructivos requeridos para cada tipo de edificación ahorrando tiempo y ventajas en cuanto a la logística , unión realizada con las piezas previamente prefabricadas, mediante soldadura con ultrasonido, lo que permite fusionar el material a
10 nivel molecular, elementos de construcción que se ensamblan entre sí ya sea bajo el sistema a presión ("snap on") o, por canales deslizables y, dichos elementos de construcción con postes bajo el sistema a presión ("snap on").

Las dimensiones de los elementos de construcción, permiten pre-instalar en su interior y de manera oculta y segura, ductos para instalaciones tales como las
15 eléctricas, las hidráulicas y las sanitarias ,entre otras, logrando con ello una mejora en la productividad y la calidad, por lo que ya no resulta necesario la realización de obras, instalaciones y costos posteriores.

Los elementos de construcción pueden ser también utilizados para (i) modificar o agregar elementos de construcción al interior de las edificaciones para crear nuevos
20 espacios o bien, para (ii) adicionar al exterior de las edificaciones nuevos espacios modulares desde los postes.

Los elementos de construcción se pueden pre-fabricar, de acuerdo al diseño y necesidades, los vanos para puertas y ventanas ,que de ser necesario, incluyan los refuerzos estructurales para la fijación de tales elementos arquitectónicos .

- 25 Además, los elementos de construcción pueden contar con ganchos exteriores u otros elementos de fijación que permiten deslizarlos sobre el mismo, laminados de acabados diversos

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Con base en lo anterior, se utilizan materiales y procesos novedosos en beneficio de la productividad, calidad y costos en la industria de la edificación.

Dicha productividad, permite obtener mayores resultados con los mismos recursos, y su resultado final permite incorporarlos como el acabado definitivo.

- 5 El proceso descrito para las edificaciones, con los elementos de construcción puede utilizarse como sistema de autoconstrucción o construcción asistida disminuyendo costos, tiempos y requerimiento de mano de obra especializada.

En cuanto al aseguramiento de calidad, los elementos de construcción son prefabricados con niveles de precisión industrial, sin requerir posteriores ajustes por
10 mano de obra calificada en el sitio de la edificación.

Por cuanto al costo, derivado de la productividad, se mejora el proceso constructivo debido a los tiempos reducidos de fabricación e instalación.

DESCRIPCION DETALLADA DE LA INVENCION

La invención propuesta considera que la unión de las piezas prefabricadas (1) se efectúa en la fábrica mediante unión por canales deslizables (2) y sistema de soldadura con ultrasonido para formar los elementos con dimensiones logradas (13). Los extremos de los elementos con dimensiones logradas (13) tienen conectores (3) que se instalan mediante unión deslizable. Los postes (4) cuentan con al menos una ranura (8) donde se insertan las lengüeta (6) de los conectores (3) produciéndose una unión permanente (snap on). Los postes (4) cuentan con al menos una tapa (7) que va sobre cada ranura (8) y que se retira cuando se sueltan dichas ranuras (8) para unir un elemento con dimensiones logradas (13). La unión de dichos elementos con dimensiones logradas (13) a los postes (4) se efectúa mediante dicho sistema de enganche (snap-on). Los elementos de dimensiones logradas (13) permiten instalar en su interior ductos (9) para instalaciones eléctricas, de agua, sanitarias gas y transmisión de datos que vienen preinstaladas de fábrica. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden prefabricar de acuerdo al diseño y necesidades de tal manera de incluir los vanos (10) para puertas y ventanas y/o que incluyan refuerzos estructurales para la fijación posterior de dichas ventanas o puertas. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) pueden contar con ganchos exteriores u otros elementos de fijación que permiten fijar sobre ellos laminados o acabados diversos. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) son prefabricados con instrumentos de precisión lo cual facilita el armado en terreno y evita el uso de mano de obra especializada. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con materiales aglutinantes tales como cemento, concreto y espumados, también se pueden llenar con áridos. Las piezas

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prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con
subdivisiones que contengan combinaciones de aglutinante y áridos. Los elementos
con dimensiones logradas tienen perforaciones (11) en su interior que permiten que
20 los materiales aglutinantes y/o los áridos se distribuyan uniformemente por gravedad
en su interior cuando son vaciados. En el caso de que los elementos con
dimensiones logradas (13) vayan rellenos con poliuretano dichos elementos con
dimensiones logradas no llevan perforaciones (11) interiores y el relleno se efectúa
en fábrica. Las planchas (12) que se utilizan para conformar el techo incluyen en su
25 borde un botagua (13). Por otra parte en la fábrica se realiza la extrusión de las
piezas prefabricadas (1); se unen dichas piezas mediante soldadura por ultrasonido,
se hacen los vanos (10) de puertas y ventanas según especificaciones, se instalan
los ductos (9) para instalaciones eléctricas, hidráulicas, sanitarias de agua o
transmisión de datos y se instalan los conectores correspondientes en los extremos
(3) de los elementos con dimensiones logradas (13) todo esto previo al transporte al
lugar de edificación. Luego de esto se traslada al lugar en que se efectuara la
5 edificación. En el lugar de edificación previo al montaje de los elementos descritos
debe construirse un radier con enfierradura (barras o postes metálicos), se insertan
en la enfierradura las piezas U (14) en el lugar donde se instalarán los, sobre las
piezas U (14) y a través de la enfierradura se introducen los elementos con
dimensiones logradas (13) y los postes (4). Se sacan las tapas (7) de los postes en
10 los lugares donde se unirá un elemento con dimensiones logradas (13) con dicho
poste (4), a continuación se unen los elementos con dimensiones logradas (13) con
los postes (4) mediante el sistema de enganche (snap on). Se instalan las ventanas
y puertas en los vanos (10) previamente fabricados para tal efecto, realizado esto se
vacía material aglutinante u otro material por la parte superior de todos los postes (4)
15 y elementos con dimensiones logradas (13) que conforman la instalación. A

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continuación se coloca y fija el techo. Se conectan los ductos (9) de instalaciones eléctricas, hidráulicas, sanitarias y otras que vienen preinstaladas de fábrica, cuando corresponde se aplican o instalan los materiales de revestimiento. Cabe hacer notar que en el caso de ampliación progresiva se debe sacar la tapa (7) del poste e insertar un nuevo elemento con dimensiones logradas (13)

REIVINDICACIONES

5 1.- Sistema de construcción modular que permite la construcción progresiva tanto externa como interna conforme al tamaño requerido para cada edificación, CARACTERIZADO porque comprende

una pluralidad de elementos de construcción (13) constituidos de una pluralidad de piezas prefabricadas (1) que consiste en un perfil rectangular hueco, con una pluralidad de perforaciones (11) dispuestas simétricamente en sus caras frontales y canales deslizables (2) en sus caras laterales, en donde dicha pluralidad de piezas prefabricada (1) están fijadas unas a otras mediante una fusión por ultrasonido de dichos canales deslizables (2) de las caras laterales respectivas a cada pieza prefabricada (1); y dichos elementos de construcción (13) comprenden adicionalmente ductos para instalaciones tales como las eléctricas, las hidráulicas, las sanitarias y de transmisión de datos;

al menos un conector (3) para fijarse en el extremo de un elemento de construcción (13) mediante una unión deslizante de una cara y que comprende una lengüeta (6) en la cara opuesta para una unión permanente a presión o unión deslizante, y una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);

al menos un poste (4) para fijarse con dicho conector (3), constituido por un perfil rectangular y hueco con al menos una ranura (8) en cada costado coincidente con dicha lengüeta (6) para dicha unión permanente a presión o unión deslizante, con una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);

al menos una tapa (7) para fijarse en dicha ranura (8) de un costado no utilizado de dicho poste (4);

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puertas.

5.- Sistema de construcción modular de acuerdo a la reivindicación 1,
20 CARACTERIZADO porque dicha pluralidad de elementos de construcción (13)
comprenden elementos de fijación que permitan fijar sobre ellos laminados o acabados
diversos.

6.- Sistema de construcción modular de acuerdo a la reivindicación 1,
25 CARACTERIZADO porque dicha pluralidad de elementos de construcción (13)
comprenden laminados sobre ellos.

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EL SECRETARIO GENERAL AD-HOC

7.- Sistema de construcción modular de acuerdo a la reivindicación 1,
CARACTERIZADO porque dicha pluralidad de elementos de construcción (13)
comprenden subdivisiones que incluyan una combinación de material aglutinante y
árido.

5

8.- Sistema de construcción modular de acuerdo a la reivindicación 1,
CARACTERIZADO porque dicha pluralidad de elementos de construcción (13)
comprende una enfierradura dispuesta horizontalmente a través de dicha pluralidad de
perforaciones (11).

10

9.- Método de construcción modular que permite la construcción progresiva tanto
externa como interna conforme al tamaño requerido para cada edificación,
CARACTERIZADO porque comprende las siguientes etapas:

a) en una fábrica, extruir una pluralidad de piezas prefabricadas (1) con un
15 perfil rectangular hueco con canales deslizables (2) en sus caras laterales;

- b) en dicha fábrica, efectuar una pluralidad de perforaciones (11) dispuestas simétricamente en las caras frontales de dicha pluralidad de piezas prefabricadas;
- c) en dicha fábrica, unir las piezas prefabricadas mediante soldadura por ultrasonido de dichos canales deslizables (2) para formar pluralidad de elementos de construcción (13);
- d) en dicha fábrica, instalar ductos para instalaciones eléctricas, de agua, sanitarias, gas o transmisión de datos en dicha pluralidad de elementos de construcción (13);
- e) en dicha fábrica, fijar conectores (3) en el extremo de un elemento de construcción (13) mediante una unión deslizable de una de sus caras, en donde dicho conector (3) comprende una lengüeta (6) en la cara opuesta a cada una unión
- f) unir los elementos de construcción (13) con dimensiones logradas con los postes (4) mediante dicha unión permanente a presión o unión deslizable; y
- g) vaciar material aglutinante por la parte superior de todos los postes (4) y los elementos de construcción (13) con dimensiones logradas que conforman la instalación.

10.- Método de construcción modular de acuerdo a la reivindicación 9, CARACTERIZADO porque comprende ante de la etapa f), en fábrica, hacer vanos de puertas y ventanas en los elementos de construcción (13) y luego de la etapa k) instalar las ventanas y puertas en dichos vanos.

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EL SECRETARIO GENERAL AD-HOC

11.- Método de construcción modular de acuerdo a la reivindicación 9, CARACTERIZADO porque comprende colocar y fijar un techo y instalar materiales de revestimiento en elementos de construcción (13).

5 12.- Método de construcción modular de acuerdo a la reivindicación 9, CARACTERIZADO porque después de la etapa a) y antes de la etapa b) dicho método comprende incorporar un laminado sobre dichas piezas prefabricadas.

9. De lo anterior se advierte que la promovente de las presentes observaciones **Inmuebles Ferromartí, S. A. de C. V., cuenta con derechos adquiridos previos, prioritarios y de prelación de novedad de la invención** citada al rubro, conforme a los antecedentes señalados de Chile, México y Colombia, entre otros países, que no pueden ni deben ser transgredidos y desconocidos con la solicitud de patente de modelo de utilidad de INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V., por la exclusividad que además le otorga a mi representada tanto la patente concedida en Colombia como la patente otorgada en Chile, derivada del reclamo de prioridad de la patente origen de Chile, que también cuenta con reclamo de prioridad en México y Colombia, conforme a las novedosas y exclusivas siguientes Reivindicaciones:

- ✓ *El sistema patentado permite el crecimiento progresivo de la construcción una vez realizada, utilizando los medios de ensamble propios de sus partes mediante unión deslizable, de manera horizontal por sistema "snap on".*
- ✓ *El sistema patentado permite que sus elementos sean llenados al armarse en las partes huecas, con cemento o cualquier otro aglutinante.*
- ✓ *El sistema patentado es modular y permite la construcción progresiva tanto externa como interna, conforme al tamaño requerido para cada edificación.*
- ✓ *El sistema patentado comprende una pluralidad de elementos de construcción constituidos de una pluralidad de piezas prefabricadas que consiste en un perfil rectangular hueco, con una pluralidad de perforaciones dispuestas*

simétricamente en sus caras frontales y canales deslizables en su caras laterales, en donde dicha pluralidad de piezas completas de formas poliméricas, prefabricadas están fijadas unas a otras mediante una fusión por ultrasonido de dichos canales deslizables de las caras laterales respectivas a cada pieza prefabricada y tales elementos de construcción comprenden adicionalmente ductos para instalaciones tales como las eléctricas, sanitarias y de transmisión de datos.

- ✓ *El sistema patentado comprende al menos un conector para fijarse en el extremo de un elemento de construcción mediante una unión deslizable de una cara y que comprende una lengüeta en la cara opuesta para una unión permanente a presión o unión deslizable y una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones de dicha pieza prefabricada.*
- ✓ *El sistema patentado comprende al menos un poste para fijarse con dicho conector, constituido por un perfil rectangular y hueco con al menos una ranura en cada costado coincidente con dicha lengüeta para dicha unión permanente a presión o unión deslizable, con una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones de dicha pieza prefabricada.*
- ✓ *El sistema patentado comprende al menos una tapa para fijarse en dicha ranura de un costado no utilizado de dicho poste.*
- ✓ *El sistema patentado comprende al menos una pieza "U" con perforaciones circulares para permitir el paso de material aglutinante y enfierradura.*
- ✓ *El sistema patentado comprende un material aglutinante que se vierte dentro de dicha pluralidad de elementos de construcción y de dichos postes.*
- ✓ *El sistema patentado permite que el material aglutinante sea uno o una combinación de cemento, hormigón, áridos, arcilla y poliuretano expandido.*

- 18
- ✓ *El sistema patentado permite que la pluralidad de elementos de construcción comprendan vanos para puertas y ventanas.*
 - ✓ *El sistema patentado determina que la pluralidad de elementos de construcción comprendan refuerzos estructurales para la fijación posterior de dichas ventanas o puertas.*
 - ✓ *El sistema patentado permite que la pluralidad de elementos de construcción comprendan elementos de fijación que permiten fijar sobre ellos laminados o acabados diversos.*
 - ✓ *El sistema patentado permite que la pluralidad de elementos de construcción comprendan laminados sobre ellos.*
 - ✓ *El sistema patentado permite que la pluralidad de elementos de construcción comprendan subdivisiones que incluyen una combinación de material aglutinante y árido.*
 - ✓ *El sistema patentado permite que la pluralidad de elementos de construcción comprendan una enfierradura dispuesta horizontalmente a través de dicha pluralidad de perforaciones.*
 - ✓ *El sistema patentado comprende las siguientes etapas:*
 - a) *en una fábrica, extruir una pluralidad de piezas prefabricadas con un perfil rectangular hueco con canales deslizables en sus caras laterales;*
 - b) *en dicha fábrica, efectuar una pluralidad de perforaciones dispuestas simétricamente en las caras frontales de dicha pluralidad de piezas prefabricadas;*
 - c) *en dicha fábrica, unir las piezas prefabricadas mediante soldadura por ultrasonido de dichos canales deslizables para formar pluralidad de elementos de construcción;*

- d) *en dicha fábrica, instalar ductos para instalaciones eléctricas, de agua , sanitarias, gas o transmisión de datos en dicha pluralidad de elementos de construcción;*
 - e) *en dicha fábrica, fijar conectores en el extremo de un elemento de construcción mediante una unión deslizable de una de sus caras, en donde dicho conector comprende una lengüeta en la cara opuesta para una unión permanente a presión o unión deslizable, y una pluralidad de perforaciones simétrica con dicha pluralidad de perforaciones de dicha pieza prefabricada;*
 - f) *trasladar de dicha fábrica al lugar en que se efectuara la edificación dicha pluralidad de elementos de construcción;*
 - g) *en el lugar de la edificación construir un radier con enfierradura de barras o postes metálicos;*
 - h) *insertar en la enfierradura piezas U en el lugar en que se instalaran los muros;*
 - i) *introducir sobre las piezas U y a través de la enfierradura los elementos de construcción con dimensiones logradas y postes constituido por un perfil rectangular y hueco con al menos una ranura en cada costado coincidente con dicha lengüeta para una unión permanente a presión o unión deslizable y con una pluralidad de perforaciones simétrica con dicha pluralidad de perforaciones de dicha pieza prefabricada;*
 - j) *unir los elementos de construcción con dimensiones logradas con los postes mediante dicha unión permanente a presión o unión deslizable; y,*
 - k) *vaciado material aglutinante por la parte superior de todos los postes y los elementos de construcción con dimensiones logradas que conforman la instalación.*
- ✓ *El sistema patentado comprende la colocación y fijación de un techo e instalar materiales de revestimiento en elementos de construcción.*

CONCLUSIONES.

PRIMERA.- De conformidad con el Convenio de París para la Protección de la Propiedad Industrial; Tratado de Cooperación en Materia de Patentes; Tratado sobre el Derecho de Patentes de la Organización Mundial de la Propiedad Intelectual; Acuerdo sobre los Aspectos de los Derechos de Propiedad Intelectual relacionados con el Comercio; Decisión 486 del Régimen Común sobre Propiedad Industrial de la Comisión de la Comunidad Andina y la Decisión 344 del Régimen Común sobre Propiedad Industrial del Acuerdo de Cartagena, **sólo serán patentables las invenciones que sean nuevas, resultado de una actividad inventiva y susceptibles de aplicación industrial**, de conformidad con los siguientes numerales:

Acuerdo sobre los Aspectos de los Derechos de Propiedad Intelectual relacionados con el Comercio

“Artículo 27: Materia patentable”

*“Sin perjuicio de lo dispuesto en los párrafos 2 y 3, las patentes podrán obtenerse por todas las invenciones, sean de productos o de procedimientos, en todos los campos de la tecnología, **siempre que sean nuevas, entrañen una actividad inventiva y sean susceptibles de aplicación industrial.**¹ Sin perjuicio de lo dispuesto en el párrafo 4 del artículo 65, en el párrafo 8 del artículo 70 y en el párrafo 3 del presente artículo, las patentes se podrán obtener y los derechos de patente se podrán gozar sin discriminación por el lugar de la invención, el campo de la tecnología o el hecho de que los productos sean importados o producidos en el país.”*

Decisión 486 del Régimen Común sobre Propiedad Industrial de la Comisión de la Comunidad Andina

Artículo 14

¹ A los efectos del presente artículo, todo Miembro podrá considerar que las expresiones "actividad inventiva" y "susceptibles de aplicación industrial" son sinónimos respectivamente de las expresiones "no evidentes" y "útiles".

*“Los Países Miembros otorgarán patentes para las invenciones, sean de producto o de procedimiento, en todos los campos de la tecnología, **siempre que sean nuevas, tengan nivel inventivo y sean susceptibles de aplicación industrial.**”*

Artículo 16

Una invención se considerará nueva cuando no está comprendida en el estado de la técnica.

“El estado de la técnica comprenderá todo lo que haya sido publicado al público por una descripción escrita u oral, utilización, comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida.

Sólo para el efecto de la determinación de la novedad, también se considerará dentro del estado de la técnica, el contenido de una solicitud de patente en trámite ante la oficina nacional competente, cuya fecha de presentación o de prioridad fuese anterior a la fecha de presentación o de prioridad de la solicitud de patente que se estuviese examinando, siempre que dicho contenido esté incluido en la solicitud de fecha anterior cuando ella se publique o hubiese transcurrido el plazo previsto en el artículo 40.”

Artículo 18

*“Se considerará que una invención tiene **nivel inventivo**, si para una persona del oficio normalmente versada en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica.”*

Artículo 19

*“Se considerará que una invención es **susceptible de aplicación industrial**, cuando su objeto pueda ser producido o utilizado en cualquier tipo de industria, entendiéndose por industria la referida a cualquier actividad productiva, incluidos los servicios”.*

Decisión 344 del Régimen Común sobre Propiedad Industrial del Acuerdo de Cartagena

Artículo 1

“Los Países Miembros otorgarán patentes para las invenciones sean de productos o de procedimientos en todos los campos de la tecnología, siempre que sean nuevas, tengan nivel inventivo y sean susceptibles de aplicación industrial.”

Artículo 2

Una invención es nueva cuando no está comprendida en el estado de la técnica.

“El estado de la técnica comprenderá todo lo que haya sido accesible al público, por una descripción escrita u oral, por una utilización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida.

Sólo para el efecto de la determinación de la novedad, también se considerará, dentro del estado de la técnica, el contenido de una solicitud de patente en trámite ante la oficina nacional competente, cuya fecha de en específico presentación o de prioridad fuese anterior a la fecha de prioridad de la solicitud de patente que se estuviese examinando, siempre que dicho contenido se publique.”

Artículo 4

“Se considerará que una invención tiene nivel inventivo, si para una persona del oficio normalmente versada en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica.”

De esta manera, respecto de la novedad y/o nivel inventivo de los **modelos de utilidad** como es el caso de la Solicitud presentada por **INTEMPO SISTEMAS CONSTRUCTIVOS S.A DE C.V.** a la cual mi representada ahora se opone, la Decisión 486 antes citada en sus artículos 81 a 85, regula dicha institución, que por cuanto a su

definición y alcance en concordancia con el artículo 54 de la Decisión 344 de la Comisión del Acuerdo de Cartagena ha sido precisada por el Tribunal de Justicia de la Comunidad Andina con base a lo siguiente:

“Se ha dicho que cuando el objeto del modelo de utilidad se identifica con las invenciones menores estamos frente a una delimitación horizontal, pero si se refiere a formas espacialmente definidas se trata de una delimitación vertical.

En el ordenamiento andino la conceptualización del modelo de utilidad sigue ambas delimitaciones, una delimitación horizontal, como una invención menor, cuando el artículo 54 de la Decisión 344 dice que el modelo de utilidad permite una mejora o un diferente funcionamiento, utilización o fabricación del objeto que lo incorpora o que le proporcione alguna utilidad, ventaja o efecto técnico que antes no tenía. Igualmente, la menor condición inventiva se observa cuando el legislador ha concebido el modelo de utilidad para proteger invenciones relativas a objetos o instrumentos, herramientas o mecanismos que no son merecedoras de la tutela otorgada por el sistema de patentes de invención”.

En vista de lo anterior, se puede determinar que el modelo de utilidad es una figura cercana a las patentes de invención, porque sirve para proteger pequeños inventos, que constituyen aportes técnicos (mejoras sustanciales) que tienen por objeto obtener ventajas útiles sobre lo ya conocido.

En cuanto a la delimitación vertical, el artículo 54 citado, establece que ‘Se concederá patente de modelo de utilidad, a toda nueva forma, configuración o disposición de elementos de algún artefacto, herramienta, instrumento, mecanismo u otro objeto o de alguna parte del mismo (...)’, con lo cual se verifica en relación con formas espacialmente definidas.

En conclusión, el modelo de utilidad constituye una categoría de la propiedad industrial, semejante a la patente de invención, cuya exigencia inventiva, valor científico y avance tecnológico es menor, debido a que más bien se trata de un perfeccionamiento técnico que se traduce en una mejora de tipo práctico o en una ventaja en su empleo o fabricación y/o un efecto beneficioso en cuanto a la aptitud del

objeto para satisfacer una necesidad humana. (Proceso 43-IP-2001. Interpretación Prejudicial de 24 de agosto de 2001). (Proceso 07-IP-2004 la Interpretación Prejudicial de 17 de marzo de 2004 publicada en Gaceta Oficial del Acuerdo de Cartagena N° 1057, de 21 de abril de 2004)."

En este sentido, se tiene incluso que el modelo de utilidad tiene como requisito indispensable para su otorgamiento tratarse de una **invención**, que si bien es respecto de innovaciones técnicas que afectan objetos ya conocidos,² el elemento inventivo continúa siendo el concepto significativo para su otorgamiento y de ahí que le sean aplicables las disposiciones en materia de patente; es decir, que cumpla con los requisitos de novedad, nivel inventivo y susceptibilidad de aplicación industrial.

Así pues, los anteriores elementos han sido debidamente puntualizados en los artículos anteriormente citados y definidos por jurisprudencia que al efecto ha emitido el **Tribunal de Justicia de la Comunidad Andina** y que se destaca enseguida:

1. Novedad de la Invención:

Al respecto el artículo 2 de la Decisión 344 y 16 de la Decisión 486 antes citadas son coincidentes en destacar que **"Una invención es nueva cuando no está comprendida en el estado de la técnica"**

Teniendo en cuenta que en la comprensión doctrinal de tal elemento el propio Tribunal ha recurrido a lo manifestado por *Guillermo Cabanellas*, que indica que las características del concepto de novedad son las siguientes:

- a) **"Objetividad.** La novedad de la tecnología a ser patentada no se determina en relación con personas determinadas ni con el pretendido inventor, sino en relación con el estado objetivo de la técnica en un momento determinado".

² Al efecto se debe considerar lo manifestado sobre el particular Zucherino Daniel R. En su Libro intitulado "PATENTES DE INVENCION" Editorial AD-HOC. S.R.L. 1998. Buenos Aires. Pág. 68: "(...) La patente recae sobre un producto o procedimiento desconocido con anterioridad. El modelo de utilidad protege **innovaciones** técnicas (conformación, dispositivo, mecanismo, estructura nueva) que afectan siempre a objetos ya conocidos (ya empleados para un uso determinado) con la condición de que les confiera una mayor eficacia o comodidad para desempeñar su fin"

b) **“Irreversibilidad de la pérdida de novedad”** “(...) una vez que una tecnología pierde su carácter novedoso, por haber pasado a integrar el estado de la técnica, esa pérdida de novedad se hace irreversible”.

c) **“Carácter Universal de la Novedad”** “(...) la novedad de la invención se determina en relación con los conocimientos existentes en el país o en el extranjero”.

“(...) no puede pretenderse una patente respecto de una tecnología ya conocida en el extranjero, aunque fuera novedosa en el país”.

d) **“Carácter público de la novedad”** “(...) la invención patentada pasará a ser conocida a partir de su publicación implícita en su patentamiento, y posteriormente entrará en el dominio público al expirar la patente”³

2. Nivel Inventivo

Con relación a este requisito, se ha establecido como la característica que debe prevalecer en toda patente y modelo de utilidad, que implique un **avance cualitativo en relación con la técnica ya existente**, ya sea a nivel nacional o en el extranjero. El mismo se establece en el artículo 18 de la Decisión 486 citada que presupone el requisito de nivel inventivo al establecer que la invención goza de dicho nivel al no derivar de manera evidente del estado de la técnica, ni resultar obvia para una persona entendida o versada en la materia.

Así las cosas, este requisito ofrece al examinador la posibilidad de determinar si con los conocimientos técnicos que existían al momento de la invención, se hubiese podido llegar de manera evidente a la misma, o si el resultado hubiese sido obvio para un experto medio en la materia de que se trate, es decir, para una persona del oficio y normalmente versada en la materia técnica correspondiente.

³ **CABANELLAS**, Guillermo. “DERECHO DE LAS PATENTES DE INVENCION”. Tomo 1. Editorial Heliasta. Buenos Aires 2004. Págs. 697 a 714. (Proceso 07-IP-2004, sentencia del 17 de marzo de 2004.)

3. Aplicación Industrial

Para que un invento pueda ser protegido a través de una patente debe ser **susceptible de aplicación industrial**, es decir, que pueda ser producido o utilizado en cualquier actividad productiva o de servicios, como lo manifiesta el artículo 19 de la Decisión 486.

Con respecto a lo anterior, se tiene que el modelo de utilidad que ahora se pretende patentar, **carece de toda novedad e inventiva**, toda vez que de una deconstrucción del resumen de la solicitud presentada por **INTEMPO SISTEMAS CONSTRUCTIVOS S.A. DE C.V.**, se advierte que en el caso concreto no existe una innovación técnica, puesto que lo que pretende patentar se ubica ya en el estado de la técnica, ya que los elementos del mismo no son diferentes respecto de la anterioridad derivada del documento de invención US 568999 citado, toda vez que cualquier técnico con conocimientos medios en la materia podría plantearse el mismo problema, resolverlo en la forma en que ahora se pretende reivindicar y prever el resultado, tomando en consideración la propia invención US 568999, que técnicamente resuelve la cuestión que ahora indebidamente se pretende reivindicar, dadas las casi exactas similitudes y mismo resultado que se obtiene como se muestra en el siguiente cuadro:

REIVINDICACIONES MODELO DE UTILIDAD SISTEMA MODULAR DE PANELES Y ELEMENTOS ESTRUCTURALES TERMOPLÁSTICOS PARA CONSTRUCCIONES PREFABRICADAS	MEMORIA PATENTE US 5608999 O SU EQUIVALENTE MEXICANA (PATENTE 202025 DENOMINADA PANEL PREFABRICADO PARA CONSTRUCCIÓN	
1.-Reivindicación 1: <i>“Un sistema modular de paneles y elementos estructurales termoplásticos para construcciones prefabricadas</i>	1.- a) <i>“Conjunto de componentes estructurales <u>termoplásticos..”</u></i> b) los <u>paneles</u> huecos <i>realizablemente enclavados</i>	En ambos se trata de paneles termoplásticos

..”		
2.- Reivindicación 2: “Que de acuerdo con la reivindicación 1, que siendo del tipo constitutivo en la figuras 2, 3, y 4, por un panel de forma substancialmente rectangular, comprende una pluralidad de cavidades internas substancialmente rectangulares comprendiendo dicho panel en el extremo lateral con una extensión de configuración en forma de gancho cuyas puntas se direcciona hacia la parte externa; el extremo lateral opuesto con una extensión de configuración en forma de contra-gancho cuya punta se direcciona hacia la parte interna que se engarza al contorno externo de dicho gancho del lado opuesto, las costillas internas presentan troquelados circulares distribuidos en forma estratégica lineal ...”	2.- “...en donde unos pocos componentes estructurales realizablemente corredizamente enclavan con otros sobre sus <u>barras para formar un panel largo hueco...</u>”	En ambos se trata de paneles huecos que entre si se componen en una unidad lineal.
3.- Reivindicación 3: “Que de acuerdo con la reivindicación 1, que siendo del tipo constitutivo en la figuras 19, 20, y 21, un panel de forma	3.- “...Los componentes estructurales incluyen componentes estructurales de una primera pared llana y segundo se abren paso a	En ambos los paneles huecos se ensamblan entre sí para formar un muro.

<i>substancialmente rectangular, comprende una pluralidad de costillas longitudinales y perpendiculares internas que generan una pluralidad de cavidades internas substancialmente rectangulares, comprendiendo dicho panel en un extremo lateral con una extensión de configuración en forma de gancho cuya punta se direcciona hacia la parte interna de las costillas perpendiculares; el extremo lateral opuesto con una extensión de configuración en forma de contra-gancho cuya punta se direcciona hacia la parte interna de las costillas perpendiculares que engarza al contorno externo de dicho gancho del lado opuesto, las costillas internas presentan troquelados circulares distribuidos en forma estratégica al lineal..."</i>	<i>componentes estructurales de codo esquina, en donde unos pocos <u>componentes estructurales realizablemente</u> <u>corredizamente enclavan con otros sobre sus barras para formar un panel largo hueco..."</u></i>	
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Consecuentemente y como resultado de la información y apoyo técnico a que la presente promoción se refiere, tenemos que la solicitud de patente de modelo de utilidad de INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V., TÍTULO: *Sistema modular de paneles y elementos estructurales termoplásticos para construcciones prefabricadas*, incumple con los ordenamientos ya citados en esta Primera Conclusión,

por carecer de novedad a la fecha de su presentación y no ser resultado de una actividad inventiva considerando el estado de la técnica en dicha fecha, debiendo incluirse en lo conducente, tanto la Patente US 5608999, Panel Prefabricado para Construcción, que es la que dice admite y confiere INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V., corresponde a su técnica constructiva.

Por tanto, el modelo de utilidad que nos ocupa carece de inventiva, toda vez que como se ha demostrado el estado objetivo de la técnica en este momento, tanto en el país como en el extranjero, en que se pretende reivindicar el descrito modelo de utilidad ya cuenta con elementos técnicos que llegan al mismo resultado, ya que tal resultado como se dijo es consecuencia directa e inmediata del estado de la técnica existente, consecuentemente la pérdida de tal novedad es irreversible.

SEGUNDA.- Por otra parte, se tiene que también carece de nivel inventivo el modelo de utilidad que pretende patentar **INTEMPO CONSTRUCCIONES S.A. DE C.V.**, ya que a la fecha de presentación de su solicitud la materia de sus reivindicaciones ya forman parte del estado de la técnica previo, en razón de los derechos adquiridos previos de novedad de la invención por parte de mi representada Inmuebles Ferromartí, S. A. de C. V., conforme a los antecedentes señalados de Chile, México y Colombia, entre otros países, que no pueden ni deben ser transgredidos y desconocidos con la solicitud de patente de modelo de utilidad de INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V., por la exclusividad que además le otorga a mi representada tanto la patente concedida en Colombia como la patente otorgada en Chile, derivada del reclamo de prioridad de la patente origen de Chile, que también cuenta con reclamo de prioridad en México y Colombia con fecha de prioridad de 1º de julio del 2010.

De esta manera, la prioridad que debe ser reconocida ahora en esta instancia bajo los principios de Trato nacional a los nacionales de los países de la Unión y de Trato de la nación más favorecida reconocidos en el Convenio de París para la Protección de la Propiedad Industrial, conforme a lo siguiente:

Artículo 2

Trato nacional a los nacionales de los países de la Unión

1) Los nacionales de cada uno de los países de la Unión gozarán en todos los demás países de la Unión, en lo que se refiere a la protección de la propiedad industrial, de las ventajas que las leyes respectivas concedan actualmente o en el futuro a sus nacionales, todo ello sin perjuicio de los derechos especialmente previstos por el presente Convenio. En consecuencia, aquéllos tendrán la misma protección que éstos y el mismo recurso legal contra cualquier ataque a sus derechos, siempre y cuando cumplan las condiciones y formalidades impuestas a los nacionales.

2) Ello no obstante, ninguna condición de domicilio o de establecimiento en el país donde la protección se reclame podrá ser exigida a los nacionales de los países de la Unión para gozar de alguno de los derechos de propiedad industrial.

3) Quedan expresamente reservadas las disposiciones de la legislación de cada uno de los países de la Unión relativas al procedimiento judicial y administrativo, y a la competencia, así como a la elección de domicilio o a la constitución de un mandatario, que sean exigidas por las leyes de propiedad industrial.”

En donde dichos principios también están incluidos en la Decisión 486 del Régimen Común sobre Propiedad Industrial de la Comisión de la Comunidad Andina, conforme a los siguientes numerales:

Del Trato Nacional

Artículo 1

“Con respecto a la protección de la propiedad industrial, cada País Miembro concederá a los nacionales de los demás miembros de la Comunidad Andina, de la Organización Mundial del Comercio y del **Convenio de París para la Protección de la Propiedad Industrial, un trato no menos favorable que el que otorgue a sus propios nacionales**, a reserva de lo previsto en los artículos 3 y 5 del Acuerdo sobre los Aspectos de los Derechos de Propiedad

Intelectual relacionados con el Comercio (ADPIC), y en el artículo 2 del Convenio de París para la Protección de la Propiedad Industrial.

Asimismo, podrán conceder dicho trato a los nacionales de un tercer país, bajo las condiciones que prevea la legislación interna del respectivo País Miembro.”

Del Trato de la Nación más Favorecida

Artículo 2

“Con respecto a la protección de la propiedad industrial, toda ventaja, favor, privilegio o inmunidad que conceda un País Miembro a los nacionales de otro País Miembro de la Comunidad Andina, se hará extensiva a los nacionales de cualquier miembro de la Organización Mundial del Comercio o del Convenio de París para la Protección de la Propiedad Industrial.

Lo previsto en el párrafo anterior procederá sin perjuicio de las reservas previstas en los artículos 4 y 5 del Acuerdo sobre los Aspectos de los Derechos de Propiedad Intelectual relacionados con el Comercio (ADPIC).”

Ahora bien, por cuanto al derecho de prioridad y consecuentes derechos de novedad adquiridos de mi representada, conforme a los antecedentes señalados de **Chile, México y Colombia** debe considerarse como **fecha de prioridad la de 1º de julio del 2010,** teniendo en cuenta tal fecha de prioridad por presentación de solicitud de patente, para efectos de considerar en el estado de la técnica la invención reivindicada por mi representada, que es de fecha anterior a la solicitud de patente de modelo de utilidad presentada por INTEMPO SISTEMAS CONSTRUCTIVOS S.A. DE C.V. que ahora nos ocupa, conforme a lo que previenen al efecto el Convenio de París para la Protección de la Propiedad Industrial, y la Ley de la Propiedad Industrial mexicana, que en lo conducente precisan:

Convenio de París para la Protección de la Propiedad Industrial

"Artículo 4 A. a I. Patentes, modelos de utilidad, dibujos y modelos industriales, marcas, certificados de inventor: *derecho de prioridad* G.

Patentes: *división de la solicitud*

A.

1) Quien hubiere depositado regularmente una solicitud de patente de invención, de modelo de utilidad, de dibujo o modelo industrial, de marca de fábrica o de comercio, en alguno de los países de la Unión o su causahabiente, gozará, para efectuar el depósito en los otros países, de un derecho de prioridad, durante los plazos fijados más adelante en el presente.

2) Se reconoce que da origen al derecho de prioridad todo depósito que tenga valor de depósito nacional regular, en virtud de la legislación nacional de cada país de la Unión o de tratados bilaterales o multilaterales concluidos entre países de la Unión.

3) Por depósito nacional regular se entiende todo depósito que sea suficiente para determinar la fecha en la cual la solicitud fue depositada en el país de que se trate, cualquiera que sea la suerte posterior de esta solicitud.

B.

En consecuencia, el depósito efectuado posteriormente en alguno de los demás países de la Unión, antes de la expiración de estos plazos, no podrá ser invalidado por hechos ocurridos en el intervalo, en particular, por otro depósito, por la publicación de la invención o su explotación, por la puesta a la venta de ejemplares del dibujo o del modelo o por el empleo de la marca, y estos hechos no podrán dar lugar a ningún derecho de terceros ni a ninguna posesión personal. Los derechos adquiridos por terceros antes del día de la primera solicitud que sirve de base al derecho de prioridad quedan reservados a lo que disponga la legislación interior de cada país de la Unión.

C.

- 1) Los plazos de prioridad arriba mencionados serán de doce meses para las patentes de invención y los modelos de utilidad y de seis meses para los dibujos o modelos industriales y para las marcas de fábrica o de comercio.
- 2) Estos plazos comienzan a correr a partir de la fecha del depósito de la primera solicitud; el día del depósito no está comprendido en el plazo.
- 3) Si el último día del plazo es un día legalmente feriado o un día en el que la oficina no se abre para recibir el depósito de las solicitudes en el país donde la protección se reclama, el plazo será prorrogado hasta el primer día laborable que siga.
- 4) Deberá ser considerada como primera solicitud, cuya fecha de depósito será el punto de partida del plazo de prioridad, una solicitud posterior que tenga el mismo objeto que una primera solicitud anterior en el sentido del párrafo 2) arriba mencionado, depositada en el mismo país de la Unión, con la condición de que esta solicitud anterior, en la fecha del depósito de la solicitud posterior, haya sido retirada, abandonada o rehusada, sin haber estado sometida a inspección pública y sin dejar derechos subsistentes, y que todavía no haya servido de base para la reivindicación del derecho de prioridad. La solicitud anterior no podrá nunca más servir de base para la reivindicación del derecho de prioridad.

D.

- 1) Quien desee prevalecerse de la prioridad de un depósito anterior estará obligado a indicar en una declaración la fecha y el país de este depósito. Cada país determinará el plazo máximo en que deberá ser efectuada esta declaración.
- 2) Estas indicaciones serán mencionadas en las publicaciones que procedan de la Administración competente, en particular, en las patentes y sus descripciones.

3) Los países de la Unión podrán exigir de quien haga una declaración de prioridad la presentación de una copia de la solicitud (descripción, dibujos, etc.) depositada anteriormente. La copia, certificada su conformidad por la Administración que hubiera recibido dicha solicitud, quedará dispensada de toda legalización y en todo caso podrá ser depositada, exenta de gastos, en cualquier momento dentro del plazo de tres meses contados a partir de la fecha del depósito de la solicitud posterior. Se podrá exigir que vaya acompañada de un certificado de la fecha del depósito expedido por dicha Administración y de una traducción.

4) No se podrán exigir otras formalidades para la declaración de prioridad en el momento del depósito de la solicitud. Cada país de la Unión determinará las consecuencias de la omisión de las formalidades previstas por el presente artículo, sin que estas consecuencias puedan exceder de la pérdida del derecho de prioridad.

5) Posteriormente, podrán ser exigidos otros justificativos. Quien se prevalece de la prioridad de un depósito anterior estará obligado a indicar el número de este depósito; esta indicación será publicada en las condiciones previstas por el párrafo 2) arriba indicado.

E.

1) Cuando un dibujo o modelo industrial haya sido depositado en un país en virtud de un derecho de prioridad basado sobre el depósito de un modelo de utilidad, el plazo de prioridad será el fijado para los dibujos o modelos industriales.

2) Además, está permitido depositar en un país un modelo de utilidad en virtud de un derecho de prioridad basado sobre el depósito de una solicitud de patente y viceversa.

F.

Ningún país de la Unión podrá rehusar una prioridad o una solicitud de patente por el motivo de que el depositante reivindica prioridades múltiples, aun cuando éstas procedan de países diferentes, o por el motivo de que una solicitud que reivindica una o varias prioridades contiene uno o varios elementos que no estaban comprendidos en la solicitud o solicitudes cuya prioridad es reivindicada, con la condición, en los dos casos, de que haya unidad de invención, según la ley del país.

En lo que se refiere a los elementos no comprendidos en la solicitud o solicitudes cuya prioridad es reivindicada, el depósito de la solicitud posterior da origen a un derecho de prioridad en las condiciones normales.

G.

1) Si el examen revela que una solicitud de patente es compleja, el solicitante podrá dividir la solicitud en cierto número de solicitudes divisionales, conservando como fecha de cada una la fecha de la solicitud inicial y, si a ello hubiere lugar, el beneficio del derecho de prioridad.

2) También podrá el solicitante, por su propia iniciativa, dividir la solicitud de patente, conservando, como fecha de cada solicitud divisional, la fecha de solicitud inicial y, si a ello hubiere lugar, el beneficio del derecho de prioridad. Cada país de la Unión tendrá la facultad de determinar las condiciones en las cuales esta división será autorizada.

H.

La prioridad no podrá ser rehusada por el motivo de que ciertos elementos de la invención para los que se reivindica la prioridad no figuren entre las reivindicaciones formuladas en la solicitud presentada en el país de origen, siempre que el conjunto de los documentos de la solicitud revele de manera precisa la existencia de los citados elementos.

I.

1) Las solicitudes de certificados de inventor depositadas en un país en el que los solicitantes tengan derecho a solicitar, a su elección, una patente o un

certificado de inventor, darán origen al derecho de prioridad instituido por el presente artículo en las mismas condiciones y con los mismos efectos que las solicitudes de patentes de invención.

2) En un país donde los depositantes tengan derecho a solicitar, a su elección, una patente o un certificado de inventor, el que solicite un certificado de inventor gozará, conforme a las disposiciones del presente artículo aplicables a las solicitudes de patentes, del derecho de prioridad basado sobre el depósito de una solicitud de patente invención, de modelo de utilidad o de certificado de inventor.”

**Decisión 486 del Régimen Común sobre Propiedad Industrial de la
Comisión de la Comunidad Andina**

De la Reivindicación de Prioridad

Artículo 9.-

“La primera solicitud de patente de invención o de modelo de utilidad, o de registro de diseño industrial o de marca, válidamente presentada en otro País Miembro o ante una autoridad nacional, regional o internacional con la cual el País Miembro estuviese vinculado por algún tratado que establezca un derecho de prioridad análogo al que establece la presente Decisión, conferirá al solicitante o a su causahabiente un derecho de prioridad para solicitar en el País Miembro una patente o un registro respecto de la misma materia. El alcance y los efectos del derecho de prioridad serán los previstos en el Convenio de París para la protección de la Propiedad Industrial.

El derecho de prioridad podrá basarse en una solicitud anterior presentada ante la oficina nacional competente del mismo País Miembro, siempre que en esa solicitud no se hubiese invocado un derecho de prioridad previo. En tal caso, la presentación de la solicitud posterior invocando el derecho de prioridad implicará el abandono de la solicitud anterior con respecto a la materia que fuese común a ambas.

Se reconoce que da origen al derecho de prioridad toda solicitud válidamente admitida a trámite conforme a lo previsto en los Artículos 33, 119 y 140 de la presente Decisión, o en los tratados que resulten aplicables.

Para beneficiarse del derecho de prioridad, la solicitud que la invoca deberá presentarse dentro de los siguientes plazos improrrogables contados desde la fecha de presentación de la solicitud cuya prioridad se invoca:

a) doce meses para las patentes de invención y de modelos de utilidad; y,

b) seis meses para los registros de diseños industriales y de marcas.”

Ley de la Propiedad Industrial (México)

“Artículo 10 BIS.- *El derecho a obtener una patente o un registro pertenecerá al inventor o diseñador, según el caso, sin perjuicio de lo dispuesto en el artículo 14 de esta Ley. Si la invención, modelo de utilidad o diseño industrial hubiese sido realizado por dos o más personas conjuntamente, el derecho a obtener la patente o el registro les pertenecerá a todos en común.*

*Si varias personas hicieran la misma invención o modelo de utilidad independientemente unas de otras, **tendrá mejor derecho a obtener la patente o el registro aquella que primero presente la solicitud respectiva o que reivindique la prioridad de fecha más antigua,** siempre que la solicitud no sea abandonada ni denegada. El derecho a obtener una patente o un registro podrá ser transferido por actos entre vivos o por vía sucesoria.”*

“Artículo 17.- *Para determinar que una invención es nueva y resultado de una actividad inventiva se considerará el estado de la técnica en la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida. Además, para determinar si la invención es nueva, estarán incluidas en el estado de la técnica todas las solicitudes de patente presentadas en México con*

anterioridad a esa fecha, que se encuentren en trámite, aunque la publicación a que se refiere el artículo 52 de esta Ley se realice con posterioridad.⁴

En vista de lo anterior, no debe desconocerse ni pasar desapercibido por esta instancia, en razón de los artículos anteriormente transcritos la prerrogativa que conceden a esta parte los artículos 10 Bis y 17 de la Ley de la Propiedad Industrial mexicana, debiendo considerarse en el estudio de nivel de invención respecto de la solicitud de patente de modelo de utilidad que nos ocupa, que en el estado de la técnica prevalecen todas las solicitudes de patente presentadas por mi representada entre otros países, en el caso concreto Chile, Colombia y México, con anterioridad a la fecha de solicitud del modelo de utilidad que nos ocupa, que se encuentren ya tramitadas y otorgadas o concedidas, aunque la publicación de la solicitud de patente se realice con posterioridad a la misma, puesto que la prioridad al ser un derecho de prelación conforme a lo indicado anteriormente se retrotrae a la fecha de la presentación de la solicitud de patente y de ninguna manera de su publicación.

De esta manera, nos permitimos citar la definición de la palabra **prioridad** conforme al Diccionario de la Real Academia de la Lengua Española:

Prioridad.

(Del lat. prior, -ōris, anterior).

1. f. Anterioridad de algo respecto de otra cosa, en tiempo o en orden.
2. f. Anterioridad o precedencia de algo respecto de otra cosa que depende o procede de ello.

De esta manera, en la doctrina de la materia, se ha reconocido al derecho de prioridad como un derecho de prelación, así como la propia jurisprudencia del Tribunal Andino que en cuanto al tema ha establecido:

“Frente a un eventual conflicto en la presentación de varias solicitudes simultáneas, la doctrina y las normas comunitarias, han desarrollado la

⁴ **Artículo 52.-** La publicación de la solicitud de patente en trámite tendrá lugar lo más pronto posible después del vencimiento del plazo de 18 meses, contado a partir de la fecha de la presentación, en su caso, de prioridad reconocida. A petición del solicitante, la solicitud será publicada antes del vencimiento del plazo señalado. Ley de la Propiedad Industrial (México)

institución de la 'prioridad', que no se traduce sino en conceder prevalencia a la solicitud primeramente presentada, aplicando el principio 'primero en el tiempo, primero en el derecho'".⁵

Así pues, la solicitud de patente como tal, otorga al peticionario el privilegio temporal que acompaña a la misma y de ahí la importancia de la consignación en tal documento de la **hora y fecha de su presentación**.

Lo anterior, ya que de tal fecha y hora de presentación se deriva el derecho adquirido de prioridad que integra al estado de la técnica la materia de su reivindicación, que impide a su vez que se pretenda su patentabilidad posterior por terceros, puesto que conforme al principio "**Primero en el tiempo, primero en el derecho**", se integra al estudio de cualquier solicitud de patente una prelación natural, que impone a la oficina de patentes la obligación de verificar el estado de la técnica conforme a las solicitudes de patente otorgadas y aún en trámite, ventaja, favor, privilegio o inmunidad que le otorga el artículo 17 de la Ley de la Propiedad Industrial mexicana, a mi representada en virtud de su solicitud de patente y correspondientes reclamos de prioridad señalados de Chile, México y Colombia, respecto de lo cual se debe considerar el contenido de sus reivindicaciones patentadas, como integrantes del estado de la técnica desde su fecha de prioridad de **1º de julio del 2010**, que es de fecha anterior a la solicitud de patente de modelo de utilidad presentada por INTEMPO SISTEMAS CONSTRUCTIVOS S.A. DE C.V.

Teniendo en cuenta lo anterior, debe considerarse **al estado de la técnica por todas las solicitudes de patentes presentadas en México por Inmuebles Ferromartí, S. A. de C. V., con anterioridad a esa fecha, que se encuentra concedida y en trámite (Chile 01.07.10-México 20.12.10)** o bien que se trate de una patente de invención 29438 ya otorgada (punto 5 Colombia 30.05.11) todas estas fechas anteriores a la solicitud de patente de modelo de utilidad de INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V., en el entendido de que por lo que toca a las fechas de presentación de las solicitudes de patente de invención por parte de Inmuebles Ferromartí, S. A. de C. V.,

⁵ Sentencia de fecha 31 de octubre de 1997 Proceso 28-IP-96 (Gaceta Oficial No. 318 de enero 26 de 1998).

en México y Colombia, las mismas están sustentadas en Reclamos de Prioridad de la solicitud de patente de origen en Chile, del 1º de julio del 2010 y por lo tanto esa fecha es la que debe ser considerada como fecha legal primigenia de la presentación.

Igualmente, deben ser consideradas por esa autoridad de la propiedad industrial, para efectos del examen de fondo de la solicitud de patente de modelo de utilidad que nos ocupa, en materia de novedad y de conocimiento previo de la técnica, al menos todas y cada una de la patentes internacionales y nacionales que se detallan en el siguiente capítulo de pruebas, más las que esta autoridad considere recabar información al efecto mediante las búsquedas del estado de la técnica nacionales, extranjeras e internacionales correspondientes.

PRUEBAS

Para efectos del debido apoyo técnico de la presente promoción de presentación de información, que sustenta la falta de novedad como resultado de una actividad inventiva respecto de la solicitud de patente de modelo de utilidad de INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V., TÍTULO: *Sistema modular de paneles y elementos estructurales termoplásticos para construcciones prefabricadas*, y relacionadas con todos y cada uno de los puntos esgrimidos en la presente promoción, se ofrecen las siguientes pruebas:

1. Copias certificadas y apostilladas de todo el **Expediente Administrativo 711-10 ó 711-2010 del INAPI en Chile**, respecto de la **Solicitud de Patente del Sistema Modular para Edificación Progresiva, de fecha 1º de julio del 2010**, presentada por Inmuebles Ferromartí, S. A. de C. V., en especial por lo que toca a la fecha de presentación de la Solicitud de Patente de Invención correspondiente, la cual da origen y sustento a los posteriores reclamos de prioridad de dicha patente en México y en Colombia, cuáles fueron los Informes Periciales y las respuestas que se dieron a los mismos; cuál fue el resultado de dichas respuestas y si un presunto tercero interesado concurrió como tal al procedimiento y cuál fue el resultado de ello y cuál es el estado actual de dicha solicitud de patente de invención. Dichas copias deberán ser solicitadas por este Instituto al INAPI en Chile mediante el correspondiente exhorto internacional, Carta Rogatoria o cualquier medio de comunicación y de cooperación

internacional en términos de la Convención Interamericana sobre Exhortos o Cartas Rogatorias.

Dicha información documental puede ser confirmada y ampliada por esa Autoridad a través de la consulta directa de la información pública disponible en el sistema de Internet, en la base de datos de patentes correspondiente del Instituto Nacional de Propiedad Industrial de Chile (INAPI), que para mayor referencia se proporcionan para su consulta los siguiente links:

http://ion.inapi.cl:8080/Patente/View/cons_avanz_rpt.asp?NumSol=201000711

http://ion.inapi.cl:8080/Patente/View/inst_adm.asp?NumSol=201000711&Tipo=0

2. Copias certificadas y apostilladas de todo el Expediente Administrativo 11-066603 de la Superintendencia de Industria y Comercio de la República de Colombia. Delegatura de Propiedad Industrial, División de Nuevas Creaciones, Solicitud de Patente de Invención, de Sistema Modular para Edificación Progresiva, presentada por Inmuebles Ferromartí, S. A. de C. V., el 30 de mayo 2011 en Colombia, en especial por lo que toca a la fecha de presentación de la Solicitud de Patente de Invención correspondiente, con base en reclamo de prioridad a partir de Chile (01.07.10), cuáles fueron los Informes Periciales y las respuestas que se dieron a los mismos; cuál fue el resultado de dichas respuestas y si un presunto tercero interesado concurrió como tal al procedimiento y cuál fue el resultado de ello y cuál es el estado actual de dicha solicitud de patente de invención, en cuanto a la Resolución 38369, de fecha 27 de junio de 2013, que otorga la patente a la promovente, con vigencia hasta el 30 de mayo del 2031, de las cuales se acompaña, para su cotejo, 1 juego en copia simple.

Dicha información documental puede ser confirmada y ampliada por esa Autoridad a través de la consulta directa de la información pública disponible en el sistema de Internet, en la base de datos de patentes correspondiente de la Superintendencia de Industria y Comercio de Colombia, en el Sistema de Nuevas Creaciones, que para mayor referencia se proporcionan para su consulta el siguiente links:

http://serviciospub.sic.gov.co/~oparra/serv_57/externas/DetallePatente.php?consultando=patentescolombianas¶metros=opparametros&vano=11&vtra=2&vnum=66603&vcon=%20%20&vcons=0&vcre=45205&vtem=IM

3. La **consulta específica y análisis por parte de esa autoridad, en los bancos de datos y acervos documentales** de las diversas Instituciones públicas y privadas, nacionales, extranjeras e internacionales, que tiene por objeto la protección de los derechos de la propiedad industrial, así como proporcionar la información y cooperación técnica que le sea requerida por las autoridades competentes, conforme lo dispuesto por la Ley de la Materia, respecto de las siguientes patentes, que ya fueron examinadas conforme al estado previo de la técnica por los peritos correspondientes, tanto en el procedimiento de patente primigenia en Chile que inició mi representada ya citada, con patente otorgada; así como respecto de la patente otorgada por reclamo de prioridad de la primigenia en Chile referida en Colombia ante las autoridades competentes como se relata, también correspondiente a mi representada.

Adicionalmente, es preciso señalar que **la actividad novedosa e inventiva producto de un proceso creativo que desembocó en la materia de las patentes otorgadas en Colombia y en Chile a mi representada y su relación de prioridad**, no se contraponen, ni interfieren en la novedad reconocida a las patentes que se mencionan a continuación.

Ahora bien, lo que pretende presentar ahora la solicitante **INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V.**, **sí se contrapone e interfiere en la novedad** no sólo de dichas patentes que ahora se relacionan sino también en las **dos patentes ya otorgadas a mi representada en Colombia y en Chile**, y su relación de prioridad de la patente primigenia presentada en Chile, dado que como se advierte notoriamente y que deberá ser corroborado por los peritos correspondientes, la ahora solicitante **INTEMPO** de la presunta patente de modelo de utilidad se basa en supuestos resultados que evidentemente se deducen de un conjunto de conocimientos previos hechos públicos por terceras personas distintas a la solicitante y legalmente protegidos, mediante la descripción oral o escrita producto de las mismas.

Dichas Patentes son las siguientes:

- US 2005091932 (Roth) 05.05.2005-Sistema Modular Prefabricado para Edificación Progresiva.
- EP 0320745 (Carman, Brannan, Dangler, Dilon, Haag, Nehme) 21.06.1989-Estructura Modular para Construir y Componentes Prefabricados para ello y Métodos Relacionados.
- US 5608999 (Mcnamara) 11.03.1997-Panel Prefabricado para Construcción.
- MEX 202025 Titular Bernard Mcnamara-Panel Prefabricado para Construcción, que tiene como patente paralela la citada US 5608999 (Mcnamara) 11.03.1997, las cuales manifiesta la solicitante de patente de invención INTEMPO SISTEMAS CONSTRUCTIVOS, S. A. DE C. V., en su escrito de presunto interesado presentado ante el INAPI en Chile y debidamente referido en la presente promoción, tener otorgadas bajo Contrato de Licencia, debiendo aclararse por esta promovente, que tenemos conocimiento extraoficial que la patente que tiene licenciada dicha solicitante, es la mexicana 202025, pero con base en un contrato de 6 de junio del 2005, celebrado con DIGIGRAPH CONSULTANTS INTERNATIONAL INC. d.b.a. D.C. INTERNATIONAL, con domicilio en Quebec, Canadá.
- US 6189269 Vittorio De Zen-Royal Building Systems.
- US 5311778.

En este orden de ideas, nos permitimos citar a continuación la reivindicación 1 modificada de INTEMPO SISTEMAS CONSTRUCTIVOS S.A DE C.V, con el propósito de enfatizar en los elementos de la misma que ya han sido divulgados en el arte previo:

“Un perfil de arrastre inferior en forma de “C” dispuesto horizontalmente, unas varillas de refuerzo dispuestas verticalmente sobre el perfil de arrastre; una pluralidad de paneles de muro de forma sustancialmente rectangular integrado por una pared frontal y una pared posterior con una pluralidad de costillas internas longitudinales perpendiculares a las paredes frontal y posterior quedando entre ellas definiendo una pluralidad de cavidades internas

sustancialmente rectangulares, dichas costillas presentan una pluralidad de troquelados circulares a distintas alturas y dicho panel tiene integrado a todo lo largo de uno de sus extremos laterales un par de extensiones cerca de sus bordes en forma de gancho cuyas puntas se proyectan hacia fuera y el extremo lateral opuesto tiene integrado a lo largo un par de extensiones cerca de sus bordes a todo lo largo en forma de contra gancho cuyas puntas se proyectan hacia adentro; caracterizado porque incluye un canal superior para muro el cual esta formado por un perfil en forma de triangulo rectángulo de cuyos vértices inferiores se extienden dos cejas formando un canal en donde se aloja el extremo superior de los paneles de pared; unos paneles de teco dispuestos sobre el canal superior para muro y sujetado a el por un medio de sujeción quedando inclinado definiendo un techo de dos aguas; un perfil estructural central formado por un perfil rectangular con medios de unión en su parte inferior y un perfil en forma de "V" con cejas superiores que se proyecta hacia afuera para sujetarse a los paneles de techo; un perfil de cumbrera en forma de "V" invertida que queda cubriendo el perfil central y fijado por un medio de unión a los paneles de techo"

Así las cosas, los documentos citados previamente revelan las siguientes características consideradas esenciales por la invención solicitada por Intempo Sistemas Constructivos S.A de C.V:

- I) Sistema modular de paneles y elementos estructurales termoplásticos para construcciones prefabricadas
- II) un perfil de arrastre inferior,
- III) unas varillas de refuerzo,
- IV) una pluralidad de paneles de muro,
- V) una pluralidad de troquelados circulares,
- VI) un canal superior para muro,
- VII) unos paneles de techo,
- VIII) un perfil estructural central, y
- IX) un perfil de cumbrera.

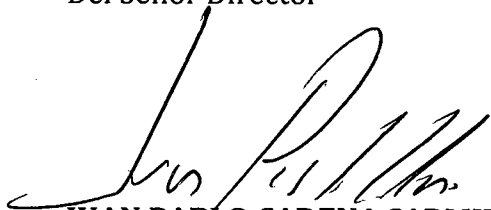
Por lo tanto, es evidente que dichas patentes ya revelaban la totalidad de características esenciales de la patente de modelo de utilidad de INTEMPO, toda vez que comprenden todos y cada uno de los elementos considerados en la misma, por lo cual la patente de modelo de utilidad solicitada, en definitiva **no cumple con los requisitos de novedad y nivel inventivo.**

En vista de lo anterior, solicitamos que sean tenidos los argumentos previamente expuestos, toda vez que tal como quedó demostrado, la solicitud contenida en el expediente No 13 145221 no cumple con los requisitos establecidos en el Título II, Capítulo I de la Decisión 486 de 2000.

NOTIFICACIONES

Recibiré notificaciones en la Secretaría General de la Superintendencia de Industria y Comercio, o en su defecto, en mi oficina de Abogado, situada en la Calle 70ª No. 4-41 de esta ciudad de Bogotá.

Del Señor Director



JUAN PABLO CADENA SARMIENTO

T.P. No. 57.492 del C.SJ.

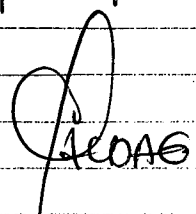
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 Industria y Comercio SUPERINTENDENCIA		PLANILLA DE RADICACIÓN - DIGITALIZACIÓN DIARIA RELACIÓN DE ANEXOS	
Dependencia: 2020		Fecha: 14 / 6 / 20 AAAA MM DD	Recorrido: 4
Tipo de Radicación: Entrada: ☒ Salida: ☐ Traslado: ☐ Convenio: ☐			
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ID	No. Radicación	Consecutivo	Item
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Item	Unidad de Conservación
1	Bolsa
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5	Tomo
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Item	Soporte Documental
7	CD ☒
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11	Foto
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13	Plano
14	Publicación Periódica
15	USB
16	Otro

Observaciones: El cd anexo contiene un total de Archivos: 1 archivo en formato PDF, lo cual fue procesados en el folio 46 correctamente. 
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US 20050091932A1

(19) **United States**(12) **Patent Application Publication** (10) Pub. No.: **US 2005/0091932 A1****Roth**(43) Pub. Date: **May 5, 2005**(54) **BUILDING CONSTRUCTION ASSEMBLY OF STRUCTURAL MODULES**(57) **ABSTRACT**(76) Inventor: **Jonathan Roth, Pardes-Hana (IL)**

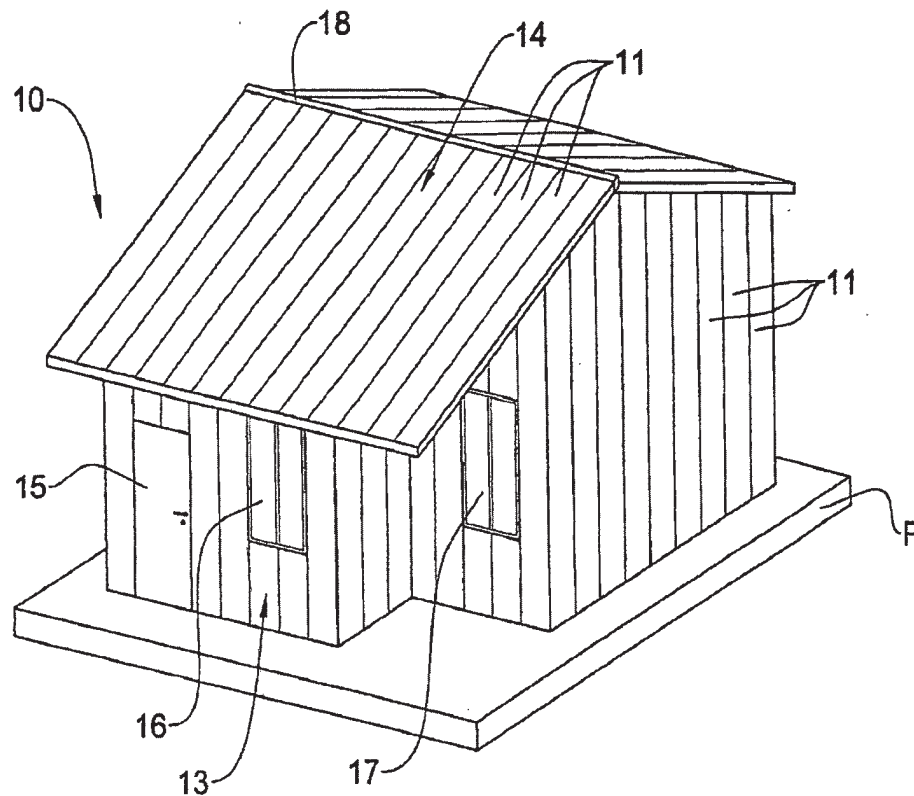
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NATH & ASSOCIATES
1030 15th STREET, NW
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WASHINGTON, DC 20005 (US)

(21) Appl. No.: **10/505,558**(22) PCT Filed: **Feb. 26, 2003**(86) PCT No.: **PCT/IL03/00149**(30) **Foreign Application Priority Data**

Feb. 26, 2002 (IL) 148400

Publication Classification(51) Int. Cl.⁷ **E04H 1/00**(52) U.S. Cl. **52/79.1**

A building construction assembly composed of factory-manufactured thermoplastic structural modules which when interconnected at a building site then create the entire shell of an edifice having side walls and a roof. Each module which is formed of a pair of parallel panels bridged by transverse webs is provided on either side along its length with a pair of flexible catch flanges projecting from the panels. When assembling these modules to create the shell of the edifice, adjacent modules are interconnected in coplanar relation by a double-faced joiner on each face of which is a pair of teeth. When one face of the joiner is pressed against a side of a module, its catch flanges then flex to snap into and behind the teeth to connect the joiner to this module. The other face of the joiner is similarly connected to the side of an adjacent module whereby the modules are then interconnected in coplanar relation. When it becomes necessary to interconnect four modules in a cross formation, use is then made of a square, quad-faced joiner on each face of which are a pair of teeth which are engageable by the catch flanges projecting from the side of the module to be joined to this face.



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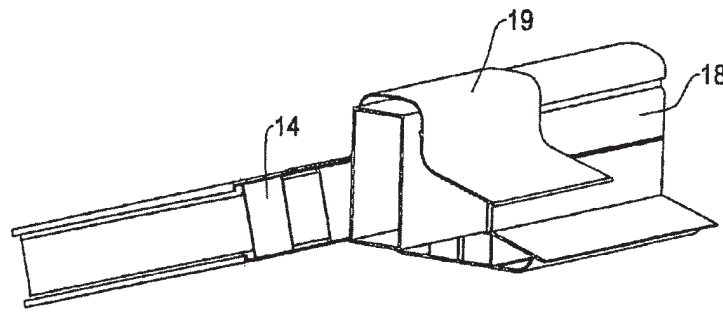
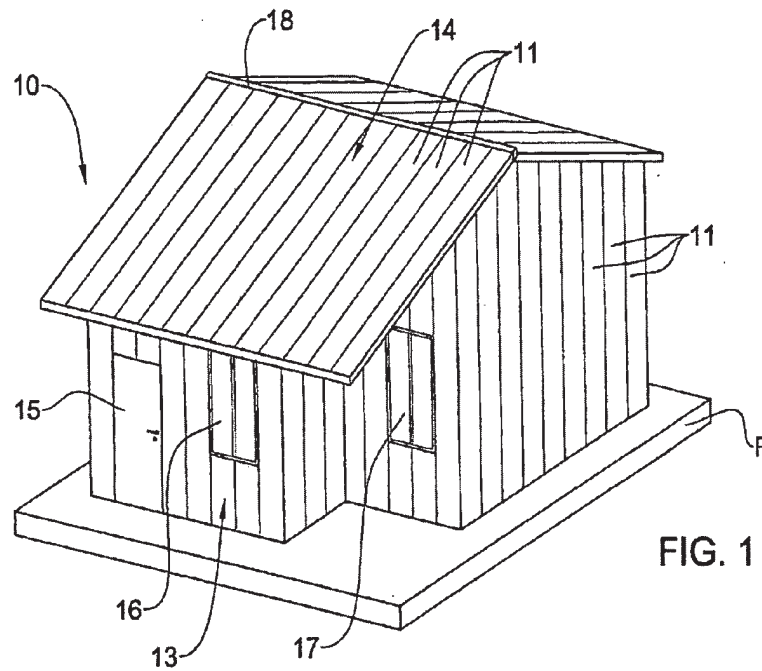


FIG. 2

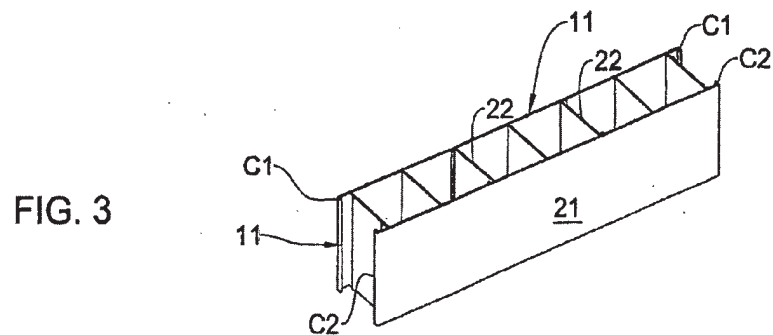


FIG. 3

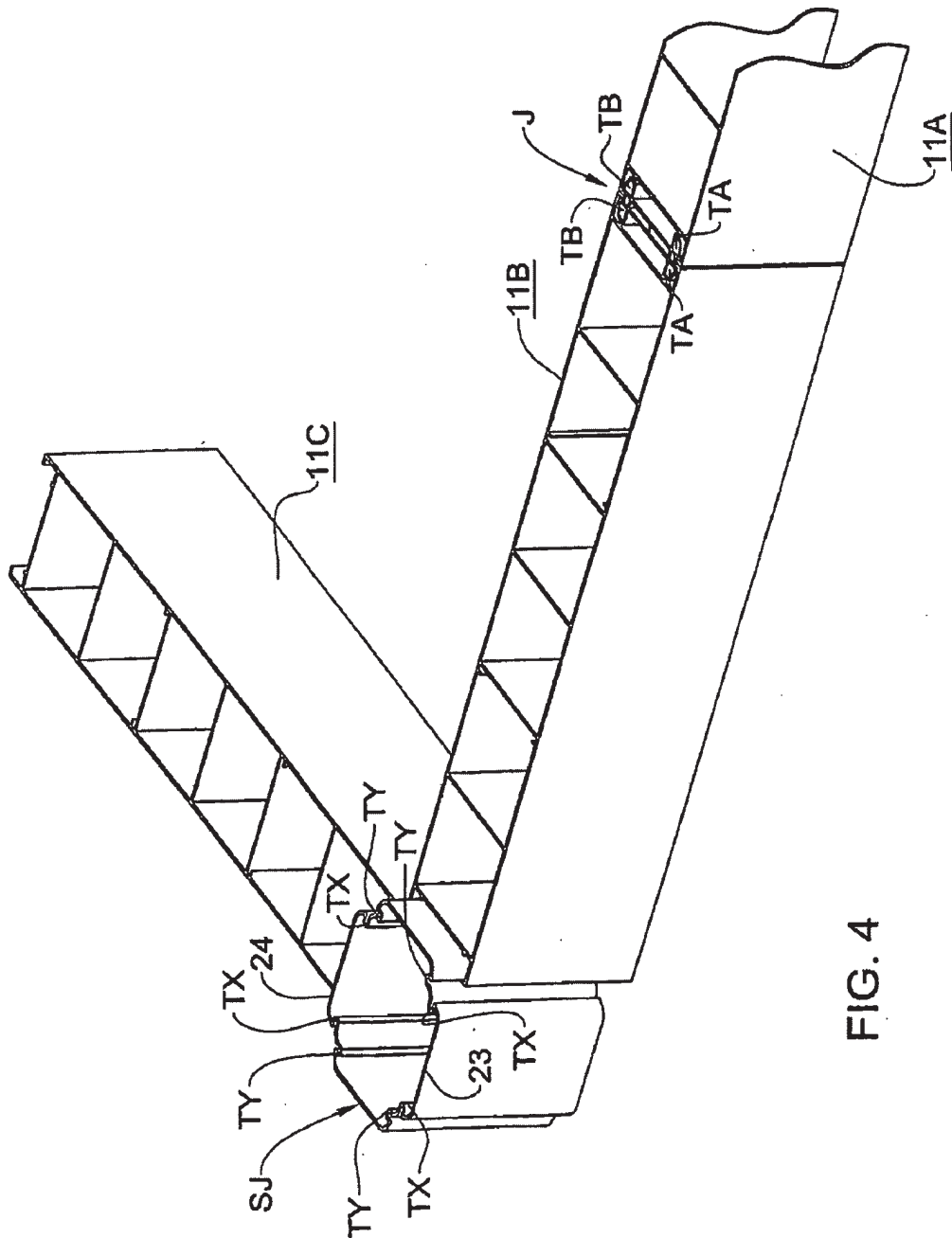


FIG. 4

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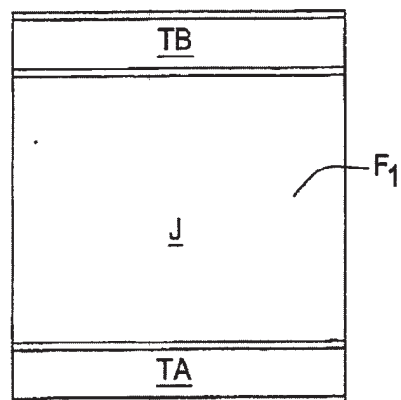


FIG. 5

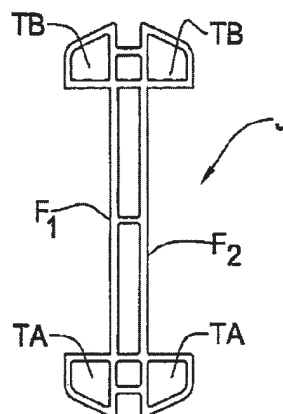


FIG. 6

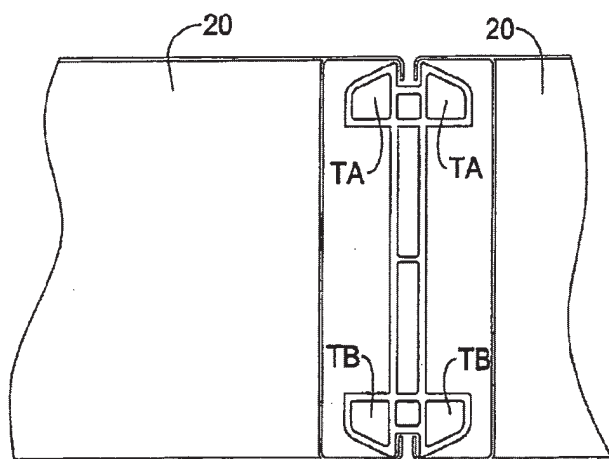


FIG. 7

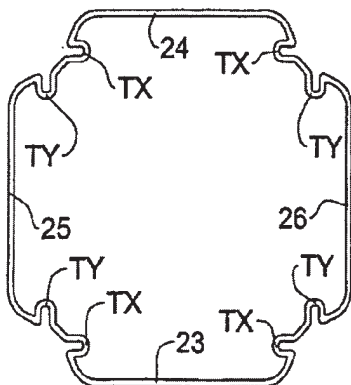


FIG. 8

BUILDING CONSTRUCTION ASSEMBLY OF STRUCTURAL MODULES

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates generally to a building construction assembly composed of plastic structural modules which are interconnectable to create the shell of a residential or other edifice, and in particular to an assembly of this type in which the modules are interconnected by snap-in joiners to create the walls of the shell.

[0003] 2. Status of Prior Art

[0004] The need for low cost housing that is available on short notice becomes most pressing when there is an influx of people into a community who are in search of such housing but cannot afford the cost of standard housing, nor can they wait out the prolonged period it normally takes to construct a standard house.

[0005] Such a situation arose at the conclusion of World War II when thousands of veterans returned to their towns and villages to rejoin or acquire wives and to find a suitable residence for their families. U.S. Pat. No. 1,958,124 is addressed to this situation, for it discloses a building construction assembly composed of factory-manufactured block-like hollow steel modules which when interconnected at a building site create the basic shell of a livable residence.

[0006] But the commercial acceptance of a construction assembly of steel modules was not widespread, for it was discouraged by the need to weld together a multitude of such modules. This requirement added substantially to the cost of erecting the steel shell of the edifice and the time it took to do so.

[0007] Of greater prior art interest is the 1999 U.S. Pat. No. 5,729,944 to De Zen which deals with an assembly of interconnectable thermoplastic structural components, adapted to create the shell of an edifice, as does a construction assembly in accordance with the present invention.

[0008] The structural components disclosed in the De Zen patent are each provided along its length with grooves adapted to mate with interlocking flanges of a box connector serving to interconnect adjacent components. A serious drawback of the De Zen arrangement is that it is necessary to slide the elongated structural components into the box connectors and it is difficult to do so at a building site. Also of prior art interest are De Zen U.S. Pat. Nos. 5,706,620 and 5,974,751 which show construction assemblies similar to those in the De Zen '944 Patent.

[0009] There are known also building structures disclosed in U.S. Pat. 5,247,773. In this patent are described modular structural components extruded from plastic. The structures are used for building a wall, ceiling, roof etc. The structures can be connected by virtue of male and female means provided on the middle of short, transversal walls of the modules. For this purpose the male component of one module has resilient flanges that can be forced into a corresponding female slot of the adjacent module. Relevant to the present invention is the embodiment shown in FIG. 9,10 depicting a dedicated joiner consisting of two male locking protrusions facing in opposite directions and adapted for insertion into corresponding female depressions

made in the modules. The disadvantage of this solution lies in the fact that relatively high forces should be applied to join the modules, since the force is to be applied perpendicularly to the transversal wall of the module and it should be sufficient to deflect both resilient flanges of the male component, the outcome of which is that assembly becomes complicated and inconvenient. This renders the assembling complicate and inconvenient. Furthermore, the disposition of the female depressions on the middle of the transversal wall allows to join the modules merely in side-by-side relationship and not in a cross relationship.

SUMMARY OF THE INVENTION

[0010] In view of the foregoing, the main object of this invention is to provide a building construction assembly composed of factory-manufactured thermoplastic modules capable of being interconnected quickly and without difficulty at a building site to erect the permanent shell or framework of a residential structure or other edifice.

[0011] More particularly, an object of the invention is to provide a building construction assembly of the above type in whose modules are interconnected by snap-in double-faced and quad-faced joiners, the modules being joined together simply by a snap-in action.

[0012] Among the significant advantages of this invention are the following:

[0013] 1st. The snap-in joiners obviate the difficulties encountered in prior art assemblies in which it is necessary to slide the modules with respect to their joiners in order to interconnect them, whereby assembly and erecting of a structure substantially does not require applying force or using tools;

[0014] 2nd. The snap-in joiners interconnect the modules so that no free spaces exist therebetween in walls constructed of these modules, and further, the joiners are concealed between adjoining modules;

[0015] 3rd. The snap-in joiners facilitate the erection of the complete edifice shell at a building site, even a complex edifice, in a matter of hours, rather than days or weeks;

[0016] 4th. The cost of erecting an edifice shell by interconnecting modules by means of snap-in joiners is relatively low, yet the interconnections are strong and durable;

[0017] 5th. A shell created by interconnected modules in accordance with the invention can readily be anchored on a ground pad at a building site, making it possible thereafter to quickly complete the internal structure of the edifice.

[0018] Briefly stated, these objects are attained in a building construction assembly composed of factory-manufactured thermoplastic structural modules which when interconnected at a building site then create the entire shell of an edifice having side walls and a roof. Each module is formed by a pair of parallel panels bridged by transverse webs and provided on either side along its length with a pair of flexible catch flanges projecting from the panels.

[0019] When assembling these modules to create the shell of the edifice, adjacent modules are interconnected in copla-

nar relation by a double-faced joiner; on each face of which is a pair of teeth. When one face of the joiner is pressed against the side of a module, its catch flanges then flex to snap into and behind the teeth to connect the joiner to this module. The other face of the joiner is similarly connected to the side of an adjacent module whereby the modules are then interconnected in coplanar relation.

[0020] When it becomes necessary to interconnect four modules in a cross formation, use is then made of a square quad-faced joiner on each face of which is a pair of teeth to engage the catch flanges of the module joined to this face.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] For a better understanding of the invention as well as other objects and features thereof, reference is made to the annexed drawings wherein:

[0022] FIG. 1 is a perspective view of a one-story residence constructed on a building site, the shell of which is formed from an assembly of interconnected plastic modules in accordance with the invention;

[0023] FIG. 2 illustrates the keel of the gable roof of the building shown in FIG. 1;

[0024] FIG. 3 illustrates one of the modules included in the assembly;

[0025] FIG. 4 is a quad-faced square joiner connecting the second module to a third module at right angles thereto;

[0026] FIG. 5 is an end view of the double-faced joiner;

[0027] FIG. 6 a plan view of a double-faced joiner for interconnecting adjacent modules in coplanar relation;

[0028] FIG. 7 illustrate how the joiner interconnects adjacent modules; and

[0029] FIG. 8 is a plan view of the quad-faced square joiner.

DETAILED DESCRIPTION OF THE INVENTION

[0030] Referring now to FIGS. 1 and 2 of the drawings, shown therein is a one-story house 10 suitable as a family residence, the shell of which defines the walls and roof of the house. The shell is erected at a building site by interconnecting an assembly of structural modules 11 in accordance with the invention.

[0031] These modules are factory-manufactured on a mass production basis to produce an assembly of modules appropriate to the architecture of the edifice. The assembly is then shipped to the building site at which it is only necessary to interconnect the modules 11 to erect the side walls 12 and 13 of the house and its gabled roof 14. The modules forming the walls are structured to provide rectangular openings to accommodate a door 15 and windows 16 and 17.

[0032] The gabled roof 14 is formed by interconnected modules 11 forming angled sides at whose peak is a keel 18. Overlying keel 18 and covering its junctions with the angled sides of the roof is a flashing 19 which serves to waterproof the roof.

[0033] The shell of house 10 is anchored by anchor rods or other means to a rectangular concrete ground pad P. The

architecture of house 10 illustrated in FIGS. 1 and 2 is by way of example only. In practice, the assembly of modules may be tailored to create an edifice of any design having side walls which are vertical, horizontal or angled. When a colony of prefabricated houses is planned, each erected by an assembly of modules in accordance with the invention, it is then desirable that the houses in the colony have different design to avoid regimentation and to provide a more natural community.

[0034] Each module 11, as shown in FIG. 3 is extruded of high-strength thermoplastic material such as PVC, polyethylene or polycarbonate in the manner disclosed in the above-identified De Zen patents. In practice, the plastic material may be fiber-reinforced by glass, carbon or other fibers which act to strengthen the module.

[0035] Module 11 consists of parallel panels 20 and 21 bridged by a row of equispaced transverse webs 22 integral with the panels to form a light-weight structure highly resistant to compressive and bending forces. Because the modules are not heavy, they are easy to handle at the construction site. The space between transverse webs 22 may be filled with foamed thermal isolating material or may include wiring and other installations of the constructions.

[0036] The air space between the panels when the modules are interconnected to form a wall may be used to accommodate electrical wiring or plumbing pipes. The entrapped air space imparts thermal insulation properties to the wall.

[0037] Extending from the opposite ends of module panels 20 and 21 are flexible catch flanges C1 and C2 which run the full length of the module and are provided with bent-in catches. Flanges C1 and C2 project beyond the webs 22 at the opposite ends of the web row, and because the catch flanges are flexible, they can be deflected in the manner to be later explained to catch onto the teeth of a module joiner.

[0038] To join adjacent modules 11A and 11B which are in line with each other so that they are in coplanar relation, there is provided, as shown in FIGS. 4, 5 and 6, a double-faced joiner J having a pair of opposing rectangular faces F1 and F2. Projecting from face F1 is a pair of parallel teeth TA and TB having a trapezoidal cross section, only the outer side of the teeth being sloped to function as a ramp. Projecting from face F2 which is opposite face F1 is a like pair of teeth TA and TB.

[0039] The dimensions of double-faced joiner J complement those of the modules 11A and 11B to be interconnected. Hence when face F1 of joiner J is pressed against the side of module 11A, its projecting teeth TA and TB engage catch flanges C1 and C2 on the side of this module, causing the flanges to flex and snap into and behind the teeth and thereby connect joiner J to module 11A. And when face F2 of joiner J is pressed against the side of the adjacent module 11B to connect the joiner thereto, modules 11A and 11B are then interconnected in a side-by-side, coplanar relation as shown in FIG. 7.

[0040] When the modules are interconnected by double-faced joiner J, the double-faced joiner J is then confined within the space between the end webs 22 of the adjacent modules as shown in FIG. 4. Hence there is no free space between the modules when they are interconnected to form a planar wall of the edifice.

[0041] When it is necessary to join a planar wall to another planar wall at right angles thereto, then as shown in FIGS. 4 and 8, one must use for this purpose a four-faced square joiner SJ each rounded corner of which is defined by a pair of teeth TX and TY at right angles to each other. Thus the opposing parallel faces 23 and 24 of the quad-faced square junction SJ are each provided with a pair of teeth TX, while the opposing parallel faces 25 and 26 which are at right angles to faces 23 and 24 and are each provided with a pair of teeth TY.

[0042] Snapping into the pair of teeth in each face of square joiner SJ are the flexible catch flanges C1 and C2 extending from the side of a module. Thus FIG. 4 shows a third module 11C joined to a face of square junction SJ so that it is at right angles to the second module 11B. A fourth module (not shown) can be joined to the face 25 of the junction so that it too is at right angles to the third module, and a fifth module (not shown) can be joined to face 23 so that it is in line with the second module. Thus when modules are connected to all four faces of the square joiner SJ they are in symmetrical cross formation.

[0043] The double-faced and four-faced make it possible to create the shell of an edifice having planar walls at right angles to each other. If the geometry of the shell is such as to require a joiner for providing an acute angle between one wall and another, the four-faced joiner for this purpose then has an appropriate parallelogram shape.

[0044] While there has been shown an assembly of interconnectable modules for erecting the shell of an edifice, it is to be understood that many changes may be made therein without departing from the scope of the invention as defined by the appended claims. Thus the modules, instead of being extruded of thermoplastic material may be formed of extruded aluminum.

1. A building construction assembly comprising:

a) a group of modules (11), which are interconnectable to create a shell of an edifice (10), each module (11) in the group is defined by a pair of parallel lateral longitudinal panels (20,21) having opposite ends, wherein said lateral panels are bridged by at least one transversal web (22) extending between the panels,

b) a joiner (J,SJ) for interconnecting modules in the group said joiner having at least two faces (F1,F2) detachably connectable to the opposite ends of the module

characterized in that each lateral panel (20,21) terminates at either of the opposite ends thereof with a flexible catch region (C1,C2) having a long portion and a short, bent-in portion and,

either face (J,SJ) of the joiner is provided with a pair of teeth (TA,TB,TX,TY) adapted, when a face of the joiner is pressed against either of the catch regions (C1,C2) of the module to urge the long portion to flex and the bent-in portion to snap into and behind the

teeth (TA,TB,TX,TY) and thus to connect either of opposite ends of the module (11) to the joiner (J,SJ).

2. An assembly as set forth in claim 1, in which the joiner (J) has two opposite faces (F1,F2), either of which is provided with a pair of teeth (TA,TB) adapted to interconnect two modules (11A,11B) in side-by-side, coplanar relationship.

3. An assembly as set forth in claim 1, in which the joiner (SJ) has four faces (23,24,25,26) arranged in a square formation, said faces are adapted to interconnect four modules in a cross relationship.

4. An assembly as set forth in claim 1, in which said modules (11) in the group are made in a factory and are adapted to be joined together at a building site to create said shell.

5. An assembly as set forth in claim 4, in which said modules (11), when interconnected, are adapted to create an edifice shell having walls (12,13) and a roof (14).

6. An assembly as set forth in claim 4, in which each module (11) is formed of a thermoplastic material.

7. An assembly as set forth in claim 6, in which the thermoplastic material is extruded to define a pair of parallel lateral panels (21) and a row of transverse webs (22) bridging the panels.

8. An assembly as set forth in claim 7, in which either of said catch regions (C1,C2) extends from the respective lateral panel (21) and is integral therewith.

9. An assembly as set forth in claim 8, in which the long portion of either of the catch regions (C1,C2) is flush with the respective lateral panel (21).

10. An assembly as set forth in claim 1, in which the shell of the edifice is anchored on a concrete pad (P) at a building site.

11. An assembly as in claim 2, in which said teeth (TA,TB) have a trapezoidal cross section with one sloping side, which, when engaged by either of said catch regions (C1,C2), is adapted to urge the long portion of the catch region to flex and the bent-in portion to snap behind the teeth.

12. A joiner (J,SJ) adapted to interconnect at least two modules (11), each of them having a pair of parallel lateral panels (21) bridged by at least one transversal web (22), wherein either of said lateral panels terminates by a flexible catch region (C1,C2) provided with a long portion and a short, bent-in portion, characterized in that said joiner (J,SJ) has at least two faces (F1,F2,23,24,25,26), each of the faces being provided with a pair of teeth (TA,TB,TX,TY), which are engageable by either of the catch regions (C1,C2) and when a face (F1,F2,23,24,25,26) of the joiner is pressed against the catch region, the teeth (TA,TB,TX,TY) are adapted to urge the long portion of the catch region to flex and the bent-in portion to snap into the teeth.

13. A joiner (J) as set forth in claim 12, having a pair of faces (F1,F2), said faces are opposite to each other.

14. A joiner (SJ) as set forth in claim 12, having four faces (23,24,25,26) arranged in a square formation.

* * * * *

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54 Modular building structure and prefabricated components therefor and related methods.

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57 The invention describes modular building (10) structures that can be constructed with a plurality of prefabricated structural components (30,35,16,18,31,19). The modular building structure can be erected in a relatively short time without the need for craftsmen skilled in the building trades and without the need for specialized tools.

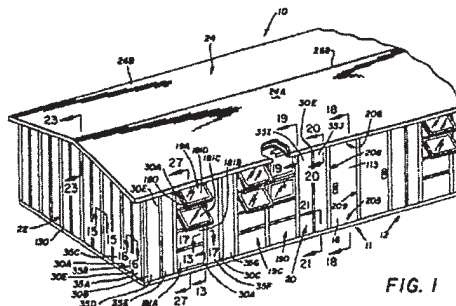


FIG. 1

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MODULAR BUILDING STRUCTURE AND PREFABRICATED COMPONENTS THEREFOR AND RELATED METHODS

TECHNICAL FIELD

The present invention relates generally to modular building structures. More particularly, the present invention relates to modular building structures that can be constructed with a plurality of prefabricated structural components. Specifically, the present invention relates to a modular building structure that can be constructed from preformed structural components and erected by virtue of a novel method in a relatively short time without the need for craftsmen skilled in the building trades.

BACKGROUND OF THE INVENTION

It is well known in the construction industry that significant economic savings can be realized by reducing the amount of work required at the construction site. To achieve this objective, prefabrication has been adopted on a large scale in the construction industry both with respect to general purpose buildings and with respect to personal housing. For example, some sources have estimated that as many as forty percent (40%) of the homes now being built use some form of premanufactured structural components. In general terms, the basic approach has been to produce, at a remote site and in a factory environment, as many of the components of the given building as possible, leaving only site preparation and final assembly to be done at the actual construction site.

There are a number of advantages to be achieved by prefabrication. The most obvious of those advantages is the significant reduction of time and labor required at the job site where labor costs are normally the highest. In addition to the reduced time required for actual erection of the building, there are other time savings possible, particularly inasmuch as the reduced amount of work time at the job site reduces the potential for interruptions resulting from inclement weather.

Furthermore, increased uniformity of the structural components resulting from the enhanced quality control possible in a controlled factory atmosphere and the economic advantages of mass production techniques are also achievable with the prefabrication approach. As is often the situation, the use of standardized, prefabricated structural components not only improves the uniformity of the end product but also greatly simplifies the actual

erection process. This last feature also makes it possible to produce quality buildings with unskilled, or minimally skilled, personnel. Thus, the overall results of prefabrication in the construction industry are greatly improved efficiency and significantly reduced costs.

These advantages are, of course, desirable in any type of construction, but are believed to be exceptionally promising in the production of individual dwellings, particularly in economically distressed areas where cost is one of the most significant obstacles to overcome.

There are a wide variety of practical ways of effectuating the prefabrication concept.

For example, the Crowe U.S. Patent, No. 1,998,448, discloses the factory prefabrication of steel frame panel units of standard dimensions which are filled with cementitious material and assembled so as to leave vertical spaces between adjacent vertical walls for utility connection and with laterally adjacent panels being joined by cover strips or slabs which are interconnected thereto.

The Wagner U.S. Patent, No. 2,850,771, discloses a prefabricated construction system wherein wooden panels are interconnected to vertical posts or columns with the vertical edges of the wooden wall panels and the posts having grooved areas and with spline blocks being used to interconnect the two.

The Paul U.S. Patent, No. 3,229,431, is indicative of another approach wherein a so-called "frameless" modular multistory building is constructed from self-contained prefabricated modules which are simply set on a building foundation and attached thereto by anchor bolts set in the foundation.

The Bolt U.S. Patent, No. 3,284,966, is of general interest in showing a prefabricated building which can be readily assembled or erected at the job site and which is collapsible for transportation purposes.

The Moore U.S. Patent, No. 3,783,563, discloses a prefabricated building constructed of panels formed of molded plastic material, reinforced with glass fibers, and wherein the panels have channels or ribs on their edges adapted to mate with complementary structures of connector members.

Other examples of prefabricated construction components utilizing various plastic materials can be seen in the Kennedy U.S. Patent, No. 2,918,151; the Espeland U.S. Patent, No. 3,662,507; the Sohns U.S. Patent, No. 3,397,496; and, the Farge U.S. Patent, No. 4,183,185.

The foregoing patents are believed to be generally representative of the prior art represented by U.S. patents, and that art does illustrate some diverse approaches to the prefabrication of buildings using various materials. However, none of the aforesaid prior art patents, nor any other prior art with which the inventors are aware, either alone or in combination, achieve the several objects of the present invention.

SUMMARY OF THE INVENTION

It is, therefore, a primary object of the present invention to provide an improved building structure which can be constructed, virtually in its entirety, from a plurality of standardized, mass produced, structural components.

It is another object of the present invention to provide a building structure, as above, which can be erected by relatively unskilled laborers without specialized tools.

It is still another object of the present invention to provide a building structure, as above, which can be erected in a far shorter period of time than a comparable structure constructed from prior known structural components.

It is yet another object of the present invention to provide unique structural components which can be mass produced at relatively modest expense and can then be conveniently shipped to a remote construction site, also at relatively modest cost.

It is a further object of the present invention to provide unique structural components, as above, which are designed to be conveniently extruded from a high performance thermoplastic resin, preferably fiber reinforced, which will equal or exceed the performance characteristics of components made from conventional building materials and which are of relatively light weight for ease of handling.

It is an even further object of the present invention to provide structural components in the nature of coupler members for interconnecting certain other structural components such as, for example, panel members and jamb members.

It is yet a further object of the present invention to provide structural components, as above, which are of sufficiently unique design as to permit quick and facile interconnection by virtue, for example, of means which comprise at least a first pair of connecting flanges presented from each of the coupler members and at least one pair of locking grooves presented from each of the other structural components for effecting a sliding, or telescoping, interconnection therebetween.

It is a still further object of the present inven-

tion to provide structural components in the nature of primary coupler members having a hollow body portion and one or more additional pairs of connecting flanges extending in planes perpendicular to at least the first pair of locking flanges for interconnection with additional structural components that are disposed in planes perpendicular to the plane of the said first pair of connecting flanges.

It is another object of the present invention to provide structural components in the nature of secondary coupler members having a web portion and two pairs of connecting flanges extending outwardly from the web in diametrically opposite directions and adapted for interconnection with locking grooves in certain other structural components.

It is an even further object of the present invention to provide structural components in the nature of window/door jamb members having means on at least one vertical edge surface for effecting interlocking interconnection with adjacent coupler members.

It is an additional object of the present invention to provide structural components in the nature of closure frames having suitably configured, peripheral recesses for engagement with the window/door jamb members.

These and other objects of the invention, as well as the advantages thereof over existing and prior art forms, which will be apparent in view of the following detailed specification, are accomplished by means hereinafter described and claimed.

In general, a modular building structure embodying the concepts of the present invention is erected on a supporting base. The supporting base delineates the locus of points which define the horizontal location of at least the exterior, and preferably also the interior, walls of the modular building structure. A plurality of load bearing coupler members are disposed at intervals along the aforesaid locus of points, and the coupler members are oriented substantially vertically with respect to the supporting base. Means are provided to secure at least selective of the coupler members to the supporting base.

A plurality of panel members are interposed between the successively spaced coupler members, and means are provided structurally to tie the panel members to the coupler members.

In addition to the panel members and the coupler members, a plurality of supplemental structural components are provided to accommodate the selective construction, placement, and operation, of doors and windows as well as to facilitate the support and joinder of juxtaposed components forming the roof of the modular building structure.

One exemplary building structure and at least

one exemplary form of each structural component, together with appropriate modifications thereof when deemed desirable to effect a full disclosure of the subject invention, are shown by way of example in the accompanying drawings and are described in detail without attempting to show all of the various forms and modifications in which the invention might be embodied; the invention being measured by the appended claims and not by the details of the specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a modular building structure embodying the concepts of the present invention, said building structure representing one complete housing unit and a portion of a contiguous housing unit, as may be incorporated within a successive series of such housing units, each of which share a common divider wall with any immediately adjacent unit;

FIG. 2 is a floor plan for one typical housing unit included within the representative building structure depicted in FIG. 1;

FIG. 3 is a perspective representation of a structural component in the nature of an exemplary panel member employed in the walls and roof of a modular building structure such as depicted in FIG. 1;

FIG. 4 is a perspective representation of a structural component in the nature of an exemplary primary coupler member that is particularly adapted to be interposed, and thereby to effect a structural tie, between two, successive, linearly oriented, structural components of the type adapted to be interconnected by said coupler members;

FIG. 5 is a perspective representation of another structural component in the nature of an alternative form of a primary coupler member that is particularly adapted to be interposed, and thereby to effect a structural tie, between two, successive, structural components (of the type adapted to be interconnected by said coupler members) that are perpendicularly disposed, one with respect to the other;

FIG. 6 is a perspective representation of yet another structural component in the nature of a further alternative form of a primary coupler member that is particularly adapted to be interposed at the juncture of three structural components (of the type adapted to be interconnected by said coupler members) and thereby to effect a structural tie between the three said structural components, two of which are linearly oriented, one with respect to the other, and the third of which is perpendicularly oriented with respect to the other two;

FIG. 7 is a perspective representation of still another structural component in the nature of an even further, alternative, primary coupler member that is particularly adapted to be interposed at the juncture of four structural components (of the type adapted to be interconnected by said coupler members) and thereby to effect a structural tie between the four said structural components which are arranged in two pairs, each pair being linearly oriented with respect to each other and perpendicularly oriented with respect to the structural components forming the other pair;

FIG. 8 is a perspective representation of a structural component in the nature of an exemplary secondary coupler member that is particularly adapted to be interposed, and thereby to effect a structural tie, between two, successive, linearly oriented, structural components of the type adapted to be interconnected by said coupler members;

FIG. 9 is a perspective representation of a structural component in the nature of an exemplary jamb member;

FIG. 10 is an exploded perspective representation of a further structural component, this structural component being in the nature of a closure frame member and a separate, juxtaposed, glazing bead member which may be selectively secured to the closure frame;

FIG. 11 is a perspective representation depicting the corner intersection of two form members employed to delineate at least the outer periphery of one type of a supporting base upon which the modular building structure depicted in FIG. 1 may be erected;

FIG. 12 is a perspective representation depicting a portion of an alternative form member employed to delineate at least the outer periphery of another type of supporting base upon which the modular building structure depicted in FIG. 1 may be erected;

FIG. 13 is an enlarged, vertical section taken substantially along line 13-13 of FIG. 1 depicting the structural details of one form of a sill plate that is interposed between the exterior walls and that embodiment of the supporting base the periphery of which was defined by the form member depicted in FIG. 11;

FIG. 14 is a vertical section similar to FIG. 13, but depicting the structural details of an alternative, and further representative, form of a sill plate that is interposed between the exterior walls and that embodiment of the supporting base the periphery of which was defined by the form member depicted in FIG. 12;

FIG. 15 is an enlarged, horizontal section taken substantially along line 15-15 of FIG. 1 depicting the details of a representative arrange-

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ment by which to conjoin one or more panel members (FIG. 3) to a primary coupler member of the type depicted in FIG. 4;

FIG. 16 is an enlarged, horizontal section taken substantially along line 16-16 of FIG. 1 depicting the details of a representative arrangement by which to conjoin two successive panel members (FIG. 3) to a secondary coupler member of the type depicted in FIG. 8;

FIG. 17 is an enlarged, horizontal section taken substantially along line 17-17 of FIG. 1 depicting not only the details of a representative arrangement by which to conjoin a jamb member (FIG. 9) to a primary coupler member of the type depicted in FIG. 4 but also the details of the structural relationship between an operatively conjoined closure frame member, including an appropriate glazing bead (both as depicted in FIG. 10) and the said jamb member;

FIG. 18 is an enlarged, vertical section taken substantially along line 18-18 of FIG. 1 depicting one type of operative interrelationship between a door and the jamb members employed at the top and at the threshold of a door opening;

FIG. 19 is an enlarged, vertical section taken substantially along line 19-19 of FIG. 1 depicting a typically representative arrangement by which to support a roof to an exterior wall in a modular building structure embodying the concepts of the present invention;

FIG. 20 is an enlarged, vertical section taken substantially along line 20-20 of FIG. 1 depicting an alternative arrangement by which to support a roof to an exterior wall;

FIG. 21 is an enlarged, vertical section, similar to FIGS. 13 and 14, but taken substantially along line 21-21 of FIG. 1 to depict the structural details of yet another representative, and perhaps preferred, form of a sill plate that may be interposed between the exterior, and even the interior, walls and virtually any variation of a supporting base;

FIG. 22 is an enlarged, vertical section, similar to FIGS. 19 and 20, but depicting the details of yet another representative, and perhaps preferred, arrangement by which to support, and secure, a roof to an exterior wall in a modular building structure of the type depicted in FIG. 1;

FIG. 23 is an enlarged, vertical section taken substantially along line 23-23 of FIG. 1 depicting the details of one arrangement by which to support, and finish, the ridge of a building embodying the concepts of the present invention;

FIG. 24 is a perspective depicting the structural details of one means by which to support the ridge from a primary coupler member incorporated in the end wall of a building structure of the type depicted in FIG. 1;

FIG. 25 is an exploded perspective depicting a representative arrangement by which to support a purlin interposed at a selected location along the span of the roof;

FIG. 26 is a vertical section taken substantially along line 26-26 of FIG. 25 and appearing on the same sheet of drawings as FIG. 24;

FIG. 27 is an enlarged, vertical section taken substantially along line 27-27 of FIG. 1 to represent the interrelation between a plurality of stacked window units fabricated from structural components according to the concepts of the present invention; and,

FIG. 28 is a representative perspective of a typical panel member with one lateral edge being tied to one form of a primary coupler member and with the other lateral edge being tied to a secondary coupler member, the opposite, longitudinal ends of said structural components having been recessed such that one end of the depicted assemblage will conform with the cross sectional profile of a selected sill plate and such that the other end will afford a race for electrical wiring, or the like and appearing on the same sheet of drawings as FIG. 25.

DESCRIPTION OF AN EXEMPLARY EMBODIMENT

One representative form of a modular building structure embodying the concepts of the present invention is designated generally by the numeral 10 on the accompanying drawings. The representative building structure 10 may, for example, be employed to serve as residential living quarters. The living quarters may be individual, free standing living units, or the living quarters may comprise a successive series of living units, much in the style of the "town house," or "twinplex," concepts having a common wall which separates adjacent living units. With particular reference to FIG. 1, the structure depicted therein includes one complete living unit 11 which may be integrally juxtaposed with a successively adjacent living unit 12 that is only partially depicted.

With additional reference to FIG. 2 it will be seen that the living unit 11 may include two bedrooms 13A and 13B, a bathroom 14 and a combined eating and living room area 15.

Front and rear doors 16 and 18, respectively, allow ingress and egress from the combined eating and living room area 15, and a plurality of windows 19 can be appropriately located to admit light and/or to permit the selective circulation of air.

In the description which follows a "suffix convention" has been employed. That is, a particular

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structural arrangement may be employed at one or more locations. In addition, several variations of a structural component may be presented. When referring generally to a common structural arrangement or variations of a structural component that arrangement, or that component, shall be designated by virtue of a letter suffix employed in combination with the numerical designation employed for general identification of that structural arrangement or that structural component. This same suffix convention shall be employed throughout the specification, and in that regard the suffix convention will be employed, for example, with the windows 19, the load bearing coupler members 30, the positioning shoulders 41 and 42, the connecting flanges 70, the sill plates 140, the jamb surfaces 168, the stop surfaces 169, the window units 181 and the wall cap assemblies 200.

Because the dimensions of a building constructed in accordance with the concepts of the present invention are modular, as will hereinafter become more fully apparent, a veritable host of individual, living unit floor plans can be incorporated within a building structure embodying the concepts of the present invention. Thus it must be appreciated that the floor plan depicted in FIG. 2 is merely representative.

The representative living unit 11 has an exterior wall 20 which constitutes the front facade, an exterior wall 21 which constitutes the rear facade, an exterior wall 22 which constitutes the exposed, end facade, and a common wall 23 which serves to separate the successively adjacent living units 11 and 12. It should be understood that if living unit 11 were to be an individual, free standing structure, the wall 23 would, in that situation, also constitute an exposed, end facade. The entire living unit 11 is covered by a roof 24 (FIG. 1) which may, as depicted, continue longitudinally of the building structure 10 to cover the living unit 12, as well.

As depicted, a window 19A may be provided in the exterior wall 20 to serve bedroom 13A, and a similar window 19B may be provided in the exterior wall 21 to serve bedroom 13B. In addition, a pair of windows 19C and 19D may be provided in the exterior wall 20 to serve the combined eating and living area 15, and an optional window 19E may be provided in the exterior wall 21 to serve the bathroom 14. The front door 16 is provided in the exterior wall 20, and the rear door 18 is provided in the exterior wall 21. The constructional details for the doors and windows will hereinafter be more fully explained.

The various rooms provided interiorly of the living unit 11 are delineated by the interior walls. Specifically, an interior wall 25 extends inwardly from that exterior wall 22 which forms the end facade to divide the bedrooms 13A and 13B, one

from the other. An interior wall 26 extends inwardly from the exterior wall 20 which forms the front facade to divide the bedroom 13A from the combined eating and living area 15, and an interior wall 27 extends inwardly from the exterior wall 21 which forms the rear facade to divide the bedroom 13B from the bathroom 14. An additional interior wall 28 extends inwardly from the exterior wall 21 which forms the rear facade, and a return wall 29 may be provided at the innermost terminus of the interior wall 28. The interior walls 28 and 29 collectively serve to divide the bathroom 14 from the combined eating and living area 15.

An interior door 31A may be employed to provide selective privacy to one bedroom 13A, and a similar, interior door 31B may be employed to provide selective privacy to the other bedroom 13B. A third, interior door 31C may be employed to provide selective privacy to the bathroom 14.

As will be generally apparent from FIG. 2, a plurality of load bearing coupler members, identified generally by the numeral 30, are disposed at spaced intervals along the locus of points which delineate the exterior walls 20-22, the common wall 23, the interior walls 25-28 and the return wall 29. A successive plurality of panel members 35 are interposed between the successively spaced coupler members 30 to form the previously identified interior, as well as the exterior, walls. Certain additional structural components are employed in conjunction not only with fabricating, and hanging, the doors 16, 18 and 31 and the windows 19 but also with effecting the structural ties that must exist between the supporting base and the walls, the walls with each other and the walls with the roof, all during erection of the building structure 10 as will hereinafter be described in detail. In order to facilitate the disclosure of the present invention the plurality of structural components most commonly employed in the construction of the walls and roof of a building structure 10 will first be described in detail.

One of the primary structural components is the panel member 35. As best seen from FIG. 3, the panel member 35 has a body portion 36. The body portion 36 has planar, transversely spaced, substantially parallel, wall skins 38 and 39. A plurality of reinforcing ribs 40 extend transversely between the wall skins 38 and 39. The ribs 40 are, themselves, laterally spaced, one with respect to the others, and they are oriented substantially parallel to the lateral edges of the body portion 36.

The lateral edges of the body portion 36 are delineated by positioning shoulders 41 and 42 presented at the opposite ends of each wall skin. As depicted in FIG. 3, a positioning shoulder 41A defines one lateral edge of skin 38, and a corresponding, and opposed, positioning shoulder 41B

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defines one lateral edge of wall skin 39. The positioning shoulders 41A and 41B are transversely opposed and define not only one lateral edge of the body portion 36 but also the offset juncture between the body portion 36 and the connecting tongue 45 which extends longitudinally along that lateral edge of the body portion defined by the positioning shoulders 41, as will be hereinafter described in greater detail.

Similarly, a positioning shoulder 42A defines the second lateral edge of skin 38, and a corresponding, and opposed, positioning shoulder 42B defines the second lateral edge of wall skin 39. The positioning shoulders 42A and 42B are transversely opposed and define not only the second lateral edge of the body portion 36 but also the offset juncture between the body portion 36 and the connecting tongue 46 which extends longitudinally along that lateral edge of the body portion defined by the positioning shoulders 42.

The tongue 45 has a transversely oriented closure wall 48 that is laterally spaced from the lateral edge of the body portion 36 defined by the positioning shoulders 41A and 41B. The transverse edges of the closure wall 48 are joined to transversely spaced, locking walls 49 and 50. A longitudinally extending locking groove 51 is recessed into the tongue 45 between the locking wall 49 and the body portion 36 such that the locking groove 51 lies parallel with, and adjacent to, the positioning shoulder 41A. A longitudinally extending locking groove 52 is similarly recessed into the tongue 45 between the locking wall 50 and the body portion 36 such that the locking groove 52 lies parallel with, and adjacent to, the positioning shoulder 41B.

The tongue 46 has a transversely oriented closure wall 53 that is laterally spaced from the lateral edge of the body portion 36 defined by the positioning shoulders 42A and 42B. The transverse edges of the closure wall 53 are joined to transversely spaced, locking walls 54 and 55. A longitudinally extending locking groove 56 is recessed into the tongue 46 between the locking wall 54 and the body portion 36 such that the locking groove 56 lies parallel with, and adjacent to, the positioning shoulder 42A. A longitudinally extending locking groove 58 is similarly recessed into the tongue 45 between the locking wall 55 and the body portion 36 such that the locking groove 58 lies parallel with, and adjacent to, the positioning shoulder 42B.

The pair of tongues 45 and 46 presented from the lateral edges 41 and 42, respectively, of the body portion 36 have a transverse thickness that is less than the transverse thickness of the body portion 36.

Specifically, the locking walls 49 and 54 are

transversely offset with respect to the plane of the wall skin 38, and the locking walls 50 and 55 are transversely offset with respect to the plane of the wall skin 39. It is these lateral offsets of the four locking walls 49, 50, 54 and 55 relative to the two skin walls 38 and 39 which results in the transverse thickness of the tongues 45 and 46 being less than the transverse thickness of the body portion 36. The functional purpose for this deliberate disparity between the transverse thickness of the tongues 45 and 46 relative to the transverse thickness of the body portion 36 in each panel member 35 will be hereinafter more fully explained.

There are at least two types, and perhaps three sub-types, of coupler members 30 which may be employed in the construction of a building structure 10 embodying the concepts of the present invention. For example, there are the primary coupler members 30A, 30B, 30C and 30D, as depicted in FIGS. 4 through 7, respectively, and there is a secondary coupler member 30E, as depicted in FIG. 8.

Taking the coupler members in order, the primary coupler member 30A depicted in FIG. 4 is employed to effect a structural tie between two, linearly oriented members. Typically, a primary coupler member 30A might be employed to effect a structural tie between two panel members 35, a panel member 35 and a door 16, 18 or 31, a panel member 35 and a window 19 or any other desired arrangement wherein the structural components secured through a primary coupler member 30A are desired to be linearly oriented.

The primary coupler members 30A through 30D, inclusive, each have a body portion 61 that is preferably of box-shaped cross section. That is, the body portion 61 is hollow and has a generally rectilinear, external periphery which defines a plurality of exterior faces such as the four 62, 63, 64 and 65 depicted. The box-shaped cross section provides excellent bending strength with minimal material as well as excellent columnar strength with a superb L/R ratio.

At least one pair of connecting flanges 70 is presented from said body portion 61. Each connecting flange 70 has an extension arm 71 with proximal and distal edges 72 and 73, respectively. The proximal edge 72 on the extension arm 71 of each connecting flange 70 is integrally secured to the body portion 61 such that the extension arms 71 are each oriented in perpendicular relation with respect to one exterior face and in coplanar relation with respect to one, adjacent, exterior face.

As can be seen with reference to FIG. 4, the extension arm 71A incorporated in the first pair of connecting flanges 70A is oriented not only in perpendicular relation with respect to the exterior face 62 but also in coplanar relation with respect to

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the exterior face 65. Likewise, the extension arm 71B incorporated in the first pair of connecting flanges 70A is oriented not only in perpendicular relation with respect to the exterior face 62 but also in coplanar relation with respect to the exterior face 63. The extension arms 71A and 71B are thus disposed in transversely spaced, parallel relation to form the first pair of the connecting arms 70A.

A locking pawl 75 extends transversely outwardly from the distal edge 73 of each extension arm 71A and 71B forming the first pair of connecting flanges 70A. Specifically, pawl 75A is presented from the distal end 73 of the extension arm 71A, and the pawl 75B is presented from the distal end of the extension arm 71B. As can be seen from FIG. 4, the pawls 75A and 75B so provided extend toward each other in facing opposition.

The primary coupler member 30A depicted in FIG. 4, also employs a second pair of connecting flanges 70B that extend outwardly from said body portion 61 in a diametrically opposite direction relative to the first pair of connecting flanges 70A. As such, the extension arm 71C incorporated in the second pair of connecting flanges 70B is oriented not only in perpendicular relation with respect to the exterior face 64 but also in coplanar relation with respect to the exterior face 65. Likewise, the extension arm 71D incorporated in the second pair of connecting flanges 70B is oriented not only in perpendicular relation with respect to the exterior face 65. Likewise, the extension arm 71D incorporated in the second pair of connecting flanges 70B is oriented not only in perpendicular relation with respect to the exterior face 64 but also in coplanar relation with respect to the exterior face 63. The extension arms 71C and 71D are thus disposed in transversely spaced, parallel relation to form the second pair of the connecting arms 70B.

A locking pawl 75 also extends transversely outwardly from the distal edge 73 of each extension arm 71C and 71D in the second pair of connecting flanges 70B. The locking pawls 75C and 75D presented from the distal ends of the extension arms 71C and 71D, respectively, forming the second pair of connecting flanges 70B also extend toward each other in facing opposition.

The primary coupler member 30B depicted in FIG. 5 is employed to effect a structural tie between two perpendicularly oriented members. Typically, a primary coupler member 30B might be employed to effect a structural tie between two panel members 35, a panel member 35 and a door 16, 18 or 31, a panel member 35 and a window 19 or any other desired arrangement wherein the structural components secured through a primary coupler member 30B are desired to be perpendicularly oriented.

As should be apparent by a comparison of FIG. 5 with FIG. 4, the first pair of connecting flanges 70A incorporated on the primary coupler member 30B depicted in FIG. 5 are identical with the first

pair of connecting flanges 70A incorporated on the primary coupler member 30A depicted in FIG. 4, and the description of the first pair of connecting flanges 70A need not, therefore, be reiterated. Nevertheless, the same numerical designations have been applied to each element in the structural configuration of the first pair of connecting flanges 70A depicted in FIG. 5 as appear in conjunction with the first pair of connecting flanges 70A depicted in FIG. 4 so that one may refer to the description set forth in conjunction with FIG. 4 should any question arise relative to the structural arrangement of the first pair of connecting flanges 70A employed with the primary coupler member 30B depicted in FIG. 5.

The primary coupler member 30B depicted in FIG. 5, also employs a second pair of connecting flanges 70C, but the second pair of connecting flanges 70C extend outwardly from said body portion 61 in a direction that is perpendicular relative to the direction at which the first pair of connecting flanges 70A extend outwardly from the body portion 61.

As such, the extension arm 71E incorporated in the second pair of connecting flanges 70C is oriented not only in perpendicular relation with respect to the exterior face 63 but also in coplanar relation with respect to the exterior face 64. Likewise, the extension arm 71F incorporated in the second pair of connecting flanges 70C is oriented not only in perpendicular relation with respect to the exterior face 63 but also in coplanar relation with respect to the exterior face 62. The extension arms 71E and 71F are thus disposed in transversely spaced, parallel relation to form the second pair of connecting flanges 70C on the primary coupler member 30B.

A locking pawl 75 also extends transversely outwardly from the distal edge 73 of each extension arm 71E and 71F in the second pair of connecting flanges 70C. That is, pawl 75E is presented from the distal end 73 of the extension arm 71E, and pawl 75F is presented from the distal end of the extension arm 71F. The locking pawls 75E and 75F thus presented from the distal ends of the extension arms 71E and 71F forming the second pair of connecting flanges 70C also extend toward each other in facing opposition.

The primary coupler member 30C depicted in FIG. 6 is employed to effect a structural tie between three members, two of which are linearly oriented and the third of which is perpendicularly oriented with respect to the other two. Typically, a primary coupler member 30C might be employed to effect a structural tie between three panel members 35, two panel members 35 and a door 16, 18 or 31, two panel members 35 and a window 19 or any other desired arrangement wherein the struc-

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tural components converge to a common juncture point.

As should be apparent by a comparison of FIG. 6 with FIG. 4, the first and second pair of connecting flanges 70A and 70B incorporated on the primary coupler member 30C depicted in FIG. 6 are identical with the first and second pair of connecting flanges 70A and 70B incorporated on the primary coupler member 30A depicted in FIG. 4. As such, the description of the first and second pair of connecting flanges 70A and 70B need not, therefore, be reiterated. For convenience, however, the same numerical designations have been applied to each element in the structural configuration of the first and second pairs of connecting flanges 70A and 70B depicted in FIG. 6 as appear in conjunction with the first and second pairs of connecting flanges 70A and 70B depicted in FIG. 4 so that one may refer to the description set forth in conjunction with FIG. 4 should any question arise relative to the structural arrangement of the first or second pair of connecting flanges 70A or 70B employed with the primary coupler member 30C depicted in FIG. 6.

The primary coupler member 30C depicted in FIG. 6 also employs a third pair of connecting flanges 70C, but the third pair of connecting flanges 70C extend outwardly from said body portion 61 in a direction that is perpendicular relative to the direction at which the first and second pairs of connecting flanges 70A and 70B extend outwardly from the body portion 61.

As such, the third pair of connecting flanges 70C incorporated on the primary coupler member 30C depicted in FIG. 6 are identical with the second pair of connecting flanges 70C incorporated on the primary coupler member 30B depicted in FIG. 5. For that reason the description of the second pair of connecting flanges 70C described in conjunction with the primary coupler member 30B depicted in FIG. 5 need not, therefore, be reiterated to define the third pair of connecting flanges 70C utilized with the primary coupler member 30C. However, the same numerical designation has been applied to each element in the structural configuration of the third pair of connecting flanges 70C depicted in FIG. 6 as appear in conjunction with the second pair of connecting flanges 70C depicted in FIG. 5 so that one may refer to the description set forth in conjunction with FIG. 5 should any question arise relative to the structural arrangement of the third pair of connecting flanges 70C employed with the primary coupler member 30C depicted in FIG. 6.

The primary coupler member 30D depicted in FIG. 7 is employed to effect a structural tie between four members arranged in two pairs, each pair being linearly oriented with respect to each other and perpendicularly oriented with respect to

the other pair. Typically, a primary coupler member 30D might be employed to effect a structural tie between four panel members 35, three panel members 35 and a door 16, 18 or 31, three panel members 35 and a window 19 or any other desired arrangement wherein four structural components converge to a common juncture point.

As should be apparent by a comparison of FIG. 7 with FIG. 6, the first, second and third pairs of connecting flanges 70A, 70B and 70C incorporated on the primary coupler member 30D depicted in FIG. 7 are identical with the first, second and third pairs of connecting flanges 70A, 70B and 70C incorporated on the primary coupler member 30C depicted in FIG. 6. As such, the description of the first, second and third pairs of connecting flanges 70A, 70B and 70C need not, therefore, be reiterated. Nevertheless, the same numerical designations have been applied to each element in the structural configuration of the first and second pairs of connector flanges 70A and 70B depicted in FIG. 7 as appear in conjunction with the first and second pairs of connecting flanges 70A and 70B depicted in FIG. 6 and described in conjunction with FIG. 4 so that one may refer to the description set forth in conjunction with FIG. 4 should any question arise relative to the structural arrangement of the first and second pairs of connecting flanges 70A and 70B employed with the primary coupler member 30D depicted in FIG. 7.

Similarly, the same numerical designations have been applied to the various elements in the structural configuration of the third pair of connecting flanges 70C depicted in FIG. 6 and described in conjunction with FIG. 5 so that one may refer to the description set forth in conjunction with FIG. 5 should any question arise relative to the structural arrangement of the third pair of connecting flanges 70C employed with the primary coupler member 30D depicted in FIG. 7.

The primary coupler member 30D depicted in FIG. 7 also employs a fourth pair of connecting flanges 70D, and the fourth pair of connecting flanges 70D not only extend outwardly from said body portion 61 in a direction that is perpendicular relative to the direction at which the first and second pair of connecting flanges 70A and 70B extend outwardly from the body portion 61 but also extend outwardly from the body portion 61 in a direction that is diametrically opposite to the direction at which the third pair of connecting flanges 70C extend outwardly from the body portion 61.

As such, the extension arm 71G incorporated in the fourth pair of connecting flanges 70D is oriented not only in perpendicular relation with respect to the exterior face 65 but also in coplanar relation with respect to the exterior face 64. Likewise, the extension arm 71H incorporated in the

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fourth pair of connecting flanges 70D is oriented not only in perpendicular relation with respect to the exterior face 65 but also in coplanar relation with respect to the exterior face 62. The extension arms 71G and 71H are thus disposed in transversely spaced, parallel relation to form a fourth pair of connecting arms 70D.

A locking pawl 75 also extends transversely outwardly from the distal edge 73 of each extension arm 71G and 71H in the fourth pair of connecting flanges 70D. The locking pawls 75G and 75H presented from the distal ends of the extension arms 71G and 71H forming the fourth pair of connecting flanges 70D also extend toward each other in facing opposition.

The secondary coupler member 30E depicted in FIG. 8 is also employed to effect a structural tie between two linearly oriented members. The secondary coupler member 30E is particularly adapted for use at those locations where a greater resistance is required to bending stresses than to columnar stresses or at those locations where the additional columnar strength afforded by the primary coupler members is not required. For example, secondary coupler members 30E may be alternated with the primary coupler members 30A in the construction of walls, assuming that sufficient columnar strength for the particular wall can be achieved by so alternating the coupler members. In addition, it has been found that in the construction of a roof one requires little, if any, resistance to a columnar stresses in comparison to the potentially high bending stresses. The secondary coupler member 30E is, therefore, particularly suited to usage in the construction of roofs, as will hereinafter be more fully described.

Turning, then, to a preferred configuration for the construction of the secondary coupler member 30E, the secondary coupler member employs a web portion 81 with a first and second pair of connecting flanges extending outwardly from said web portion in diametrically opposite directions.

As should be apparent by a comparison of FIG. 8 with FIG. 4, the first and second pair of connecting flanges 70A and 70B incorporated on the secondary coupler member 30E depicted in FIG. 8 are identical with the first and second pair of connecting flanges 70A and 70B incorporated on the primary coupler member 30A depicted in FIG. 4, and the description of the first and second pair of connecting flanges 70A and 70B need not, therefore, be reiterated. In this situation, as in the previous situations where identical elements are incorporated in a separate structural component, the same numerical designations have been applied to the various elements of the first and second pairs of connector flanges 70A and 70B depicted in FIG. 8 as appear in conjunction with the first and second

pairs of connecting flanges 70A and 70B depicted in FIG. 4 so that one may refer to the description set forth in conjunction with FIG. 4 should any question arise relative to the structural arrangement of the first or second pair of connecting flanges 70A or 70B employed with the secondary coupler member 30E depicted in FIG. 8.

The jamb member 90 depicted in FIG. 9 is employed to effect a structural tie between a door 16, 18 or 31 and a coupler member 30, or a window 19 and a coupler member 30. As such, the jamb member 90 can be interconnected to any of the variations of the primary coupler members 30A through 30D, or, for that matter, the secondary member 30E. The jamb member 90 has a body portion 91 which presents transversely spaced, substantially parallel casing surfaces 92 and 93. At one lateral edge of the casing surface 92 a jamb surface 94A extends transversely of the body portion 91 in opposition to a jamb surface 94B which extends transversely of the body portion 91 at the corresponding lateral edge of the casing surface 93.

A stop block 95 extends laterally outwardly from the opposed, and aligned, jamb surfaces 94A and 94B to present oppositely directed stop surfaces 96. The stop surface 96A extends perpendicularly outwardly from the jamb surface 94A, and the stop surface 96B extends perpendicularly outwardly from the jamb surface 94B. The stop surfaces 96A and 96B are substantially parallel to each other and to the casing surfaces 92 and 93, as well. A closure surface 97 extends transversely of the stop block 95 in substantially perpendicular relation to the stop surfaces 96 and in substantially parallel relation to the jamb surfaces 94 to define one lateral edge of the jamb member 90.

The oppositely directed lateral edge of the jamb member 90 is delineated by positioning shoulders 42. A positioning shoulder 42A defines one lateral edge of the casing surface 92, and a corresponding, and opposed, positioning shoulder 42B defines one lateral edge of the casing surface 93. The positioning shoulders 42A and 42B are transversely opposed and define not only the second lateral edge of the jamb member 90 but also the offset juncture between the body portion 91 and the connecting tongue 46 which extends longitudinally along that lateral edge of the body portion defined by the positioning shoulders 42.

As will be apparent by a comparison of FIG. 9 with FIG. 3, the tongue 46 incorporated on the jamb member 90 is identical with the tongue 46 incorporated on the panel member 35, and the description of the tongue 46 need not, therefore, be reiterated. In this situation, as well, the same numerical designations have been applied to the tongue 46 on the jamb member 90 depicted in FIG.

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9 as appear in conjunction with the tongue 46 incorporated on the panel member 35 so that one may refer to the description set forth in conjunction with FIG. 3 should any question arise relative to the structural configuration of the tongue 46 employed with the jamb member 90 depicted in FIG. 9.

Turning now to FIG. 10, the closure frame 100 is a structural member having a generally rectilinear overall outline that is interrupted by a first recess 101 and an oppositely directed second recess 102. One may also mentally view the closure frame 100 as being comprised of two smaller rectilinear configurations 103 and 104 that are contiguously juxtaposed, but offset, one with respect to the other, in order to provide two oppositely directed inside corners 105 and 106 which constitute the apex of the first and second recesses 101 and 102, respectively. No matter how one mentally envisions the closure frame 100, it may preferably be hollow to minimize unnecessary weight. As is also depicted in FIG. 10, a hollow, rectilinear glazing bead 110 will cooperatively interact with the recesses 101 or 102, as will hereinafter be more fully described.

The adjacent ends of selected lengths 111 and 112 of the closure frame 100, for example, may be mitered and joined together in the traditional manner to form a frame for receiving an insert 113. The insert 113 may be a transparent, or translucent, pane of glass, or the like. Conversely, the insert 113 may be an opaque sheet of plastic, or the like, depending upon the desires of the people using the building structure 10. In any event, the insert 113 may be received within the recess 102 which circumscribes the inside opening 114 outlined by the frame formed from selected lengths 111, 112 et cetera of the closure frame 100. So positioned within the recess 102, the insert 113 may be secured in position by appropriate lengths of the glazing bead 110 which may be demountably fastened to the closure frame 100 by virtue of a plurality of screws 115 which extend through the glazing bead 110 and into one wall 116 of the closure frame 100.

As an alternative to mitering the corners on selected lengths of the conjoined closure frame 100, it would also be quite feasible to employ a joiner plug 120 to secure the adjacent ends of two lengths 111 and 112 of the closure frame 100. As depicted in FIG. 10, the joiner plug 120 may have a corner portion 121 which will remain exposed and which may, if desired, have an exterior configuration which identically matches that of the closure frame members 100. In that way one can provide a smooth exterior surface to the entire assemblage which circumscribes the inside opening 114.

Suitably configured legs 122 and 123 may extend outwardly from the corner portion 121 of the

joiner plug 120, preferably at right angles to each other, in order to be insertably received within the hollow interior 124 of those lengths 111 and 112 of the closure frame 100 to be joined. One may effect a permanent joiner by the use of an appropriate adhesive 125 between the legs 122 and 123 and the interior surface 126 of the closure frame 100. On the other hand, the lengths 111 and 112 of the closure frame 100 may be releasably secured to the legs 122 and 123 of the joiner plug 120 by the use of removable fasteners. The screw 115, for example, may serve the dual function of securing a glazing bead 110 to the closure frame 100 as well as securing the lengths 111 and 112 of the closure frame 100 to the joiner plug 120.

The structural components employed in the present invention -- those described above as well as those which will be hereinafter described -- may well comprise an extruded thermoplastic resin. Such resins are preferably reinforced with fibers such as fiberglass and provide a material commonly referred to as a fiber-reinforced plastic (FRP). While a variety of thermoplastic materials and fiber reinforcements are known, one particularly suitable FRP comprises vinyl chloride resins reinforced with glass fibers.

The amount of fiber reinforcement in such a product can range: broadly from about five to 50 percent by weight, based upon the combined weight of glass fibers and vinyl chloride resin; desirably from about 10 to 40 percent by weight; preferably about 15 to 35 percent by weight; and, most preferably about 30 percent by weight. A good disclosure of these products and the process for their preparation can be found in U.S. Pat. No. 4,536,360, the subject matter of which is incorporated herein by reference.

As should be evident to those skilled in the art, practice of the present invention does not require that the structural components comprise vinyl chloride resins reinforced by glass fiber and therefore, the invention is not to be limited thereto or by the disclosure of U.S. Pat. No. 4,536,360. Thus, the structural components may not be fiber reinforced or even thermoplastic so long as they can be manufactured in the configurations described herein.

Turning now to the construction of a modular building structure 10 using the foregoing structural components, one must first prepare a supporting base 130 (FIG. 1) upon which a modular building structure 10 can be erected. At this point it should be emphasized that the supporting base 130, or at least the locus of points which define the walls -- and particularly the exterior walls -- to be erected on the supporting base 130, must be accurately located, and dimensioned. The concepts of the present invention permit the various structural com-

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ponents from which the building structure is to be constructed to be mass produced, off site, and delivered for assembly without special tools and without the special skills of the building trade craftsmen.

That is, the various structural components are simply to be interconnected by unskilled laborers, and after all the various structural components have been put together the result is a completed building structure 10. For those reasons, the dimensions, and layout, of the supporting base 130 are critical to the proper relation of each structural component to the previously, and subsequently, erected structural components as well as to all the structural components which comprise the completed building structure 10.

With that in mind, the supporting base 130 can well comprise a footing, a slab, a deck, a plurality of piers or any other arrangement by which to support the building structure 10. In any event, the supporting base 130 must present the locus of points which define at least the exterior walls of the building structure. One way by which to accomplish the critical objective of accurately delineating the aforesaid locus of points is to provide forms 131 (FIGS. 11 and 12) which will not only permit a supporting base 130 in the nature of a concrete footing, slab or the like to be poured with the necessary dimensional accuracy but also to provide a built-in arrangement for locating the means by which to tie selected primary coupler members 30 to the resulting supporting base 130.

With particular reference to FIG. 11, a pair of forms 131A and 131B, of the type which are customarily fabricated from steel, may be disposed, as shown, to define the outer periphery at one corner of a supporting base 130A upon which a building structure 10 as depicted in FIG. 1 can be erected. A plurality of such forms 131A and 131B may well be employed to delineate the outer periphery of the entire supporting base 130A.

A plurality of tabs 132 are fixedly secured to, and extend horizontally from, the top edge 133 of the forms 131A and 131B to overlie the prepared surface 134 upon which the supporting base 130A will be poured, and each tab 132 presents a recessed guide slot 135 that is of appropriate length and width accurately to determine the locations along the locus of points which define the exterior walls of the building structure 10 at which it is desired, or required, that a reinforcing rod 136 be located to tie selected primary coupler members 30A-30D to the supporting base 130A.

By pre-numbering a complete set of the aforesaid forms 131A and 131B required to define the entire periphery of the supporting base 130A, and/or by providing means well known to the art to assure that the forms 131A and 131B can only be

fitted together in a predetermined manner, even an unskilled laborer will be able accurately to position the plurality of such forms 131A and 131B required to describe the outer periphery of the supporting base 130A. As the supporting base 130A is poured, the laborer will insert suitable reinforcing rods 136 into the freshly poured concrete, using the recessed guide slots 135 accurately to locate each such reinforcing rod 136. A supporting base 130A poured onto the prepared surface 134 circumscribed by a plurality of forms 131A and 131B provides a cross section in conformity with that depicted in FIG. 13.

At least one other style of form 131 will also be subsequently described in detail herein. Irrespective of which style form is employed, however, the objective is to provide a supporting base 130 from which the building can be erected, and to which selective coupler members 30 can be secured. In this regard one must assure not only that preselected coupler members 30 are permanently secured to the supporting base 130 when the building has been completed but also that some means are provided to effect an interim anchoring of the coupler members 30 relative to the supporting base 130 during construction.

In many geographic areas it is mandatory that some permanent anchor means be provided at the base of at least the exterior walls to provide a rigid resistance against lateral wind loading. Wind loads can reach rather monumental proportion when one is designing a structure to resist wind velocities of hurricane magnitude. In addition, it is also highly desirable, and generally required, that some means be provided to preclude the admission of water between the exterior walls and the supporting base. Both of these objectives are achieved by the three arrangements depicted for permanently securing selected coupler members to the supporting base, as will be hereinafter more fully explained.

The means for effecting the anchoring of the coupler members to the supporting base should -- in addition to effecting a permanent anchor by which to resist the wind loading applied against the outside of the exterior walls, which tends to force the walls inwardly of the building -- effect an interim resistance to loadings applied against the interior of the exterior walls, at least prior to the time that the permanent anchoring has been achieved. Two of the arrangements depicted herein to effect permanent anchoring against lateral loads effect the necessary interim resistance, as well, but the third arrangement disclosed herein, and the one which is first described, requires assistance during the construction phase in order to provide the necessary interim protection.

With particular reference to FIG. 13 (which depicts the "third" arrangement mentioned above)

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it can be seen that the reinforcing rod 136, structurally anchored in the supporting base 130A by virtue of the well known provision of a hook 138 buried in the concrete from which the supporting base 130A is formed, extends vertically upwardly out of the supporting base 130A to penetrate the sill plate 140A, through a bore 141, to be received interiorly of a hollow, primary, coupler member, such as member 30A depicted. The interior of the hollow coupler member 30A may be filled with concrete 142 to encase the reinforcing rod 136. In order to achieve the necessary structural tie between the concrete 142 and the reinforcing rod 136, the reinforcing rod 136 should normally extend upwardly on the order of approximately 18 to 24 inches (approximately 45 to 61 cm.). The concrete 142 thereby assures a permanent anchoring of the coupler member 30A to the supporting base 130, through the reinforcing rod 136 to resist substantial lateral loads, but only after the concrete has "cured."

The sill plate 140A employed in the arrangement depicted in FIG. 13 may be in the configuration of a Z-bar. As such, the central web portion 143 thereof has lateral edges from which flange portions 144 and 145 extend perpendicularly outwardly, but in opposite directions. The flange portion 144 overlies, and preferably engages, the peripheral edge 146 of the supporting base 130A. The flange 145, on the other hand, extends upwardly from the supporting base 130A to engage the primary coupler member 30A along that face 65 directed toward the interior of the building structure 10. In that way wind loading applied exteriorly of a wall erected upon a sill plate 140A will be resisted by the substantially vertically extending flange 145, even prior to the time that the concrete 142 has cured. It should also be appreciated that the flange 145 effects a continuous resistance to lateral loads applied exteriorly of the building structure 10 along the full length of each exterior wall, thus supplementing the resistance effected by the reinforcing rods 136 even after the concrete in which they are encased has cured.

The substantially vertical disposition of the flange 145 relative to the horizontally disposed central web portion 143 also serves as an effective means by which to preclude the admission of water into the building 10 from beneath the exterior walls.

As will be readily appreciated, however, until such time as the concrete 142 cures, the structural arrangement depicted in FIG. 13 does not provide an interim anchor which would preclude the movement of either the primary coupler member 30 or the other structural components from which the wall 20 is formed from moving outwardly away from the flange 145. To obviate this problem one may, for example, drive stakes 147 into the ground

surrounding the supporting base 130A and utilize those stakes, or other comparable means, to effect the necessary interim anchoring of the wall 20 against laterally outward movement until such time as the permanent anchor means becomes fully operational. As shown, a shim, or block, 148 may be interposed between the stake 147 and the wall 20 to effect the necessary interim anchor.

If the need to supply interim anchor means by virtue of some temporary structural arrangement not incorporated in the sill plate 140 itself is unacceptable, one may certainly employ an alternative configuration for a sill plate, representative examples of which will hereinafter be described.

As an alternative to the forms 131A and 131B, one may, for example, employ the forms 131C, depicted in FIG. 12, which are also customarily fabricated from steel, to define the outer periphery of one side of a supporting base 130B. A sill plate 140B may, by means well known to the art, be releasably secured to, and extend horizontally outwardly from, the top edge 133 of each form 131C to overlie the prepared surface 134 upon which the supporting base 130B will be poured. As is best seen from FIG. 14, the sill plate 140B may be retained in the concrete which constitutes the supporting base 130B even after the forms 131C are removed.

By pre-numbering a complete set of the aforesaid forms 131C required to define the entire periphery of the supporting base 130B, and/or by providing means well known to the art to assure that the forms 131C can only be fitted together in a predetermined manner, even an unskilled laborer will be able accurately to locate and position the successive plurality of such forms 131C required to delineate the outer periphery of the supporting base 130B. As the supporting base 130B is poured, a laborer will insert suitable reinforcing rods 136 into the freshly poured concrete, using the bores 149 provided at longitudinally spaced intervals along the sill plate 140B accurately to designate the locations at which the reinforcing rods 136 are to be inserted into the concrete as the supporting base 130B, which is at least peripherally defined by the forms 130C, is poured. A supporting base 130B poured onto the prepared surface 134 circumscribed by a plurality of forms 131C provides a cross section in conformity with that perhaps best depicted in FIG. 14.

In the embodiment of the supporting base 130B depicted in FIG. 14, as well, the reinforcing rod 136 extends vertically upwardly out of the supporting base 130B to penetrate the sill plate 140B, through bore 149, and to be received interiorly of the hollow primary coupler member 30A depicted. The interior of each hollow coupler member 30A into which a reinforcing rod 136 extends

is preferably also filled with concrete 142 in order to achieve the necessary structural tie between the coupler 30A and the supporting base 130B, through reinforcing rod 136, as heretofore explained in conjunction with the description of the supporting base 130A.

The sill plate 140B employed in the arrangement depicted in FIGS. 12 and 14 may be in the configuration of a J-bar. The central web portion 150 of the sill plate 140B is disposed substantially horizontally, and a first flange portion 151 extends substantially perpendicularly upwardly from one lateral edge of the central web portion 150. As such, when the sill plate 140B is supported by the form 131C the concrete poured thereunder delineates a shelf 152 in the peripheral edge 153 of the supporting base 130B. That surface of the shelf 152 which is formed by the central web portion 150 becomes a substantially horizontally oriented bearing surface 154, and that surface of the shelf 152 which is formed by the first flange portion 151 becomes a substantially vertically oriented reaction surface 155. The first flange portion 151 remains in contiguous juxtaposition with the reaction surface 155 and is, to that extent, also properly considered to be a portion of the reaction surface which is engaged by that face 65 on the primary coupler member 30A which is directed toward the interior of the building 10. Any wind loading applied exteriorly of the wall -- wall 20, for example, as depicted -- in which the coupler member 30A is employed will be resisted not only by the reinforcing rod 136 but also by the substantially vertically extending first flange portion 151 and the reaction surface 155 presented by the shelf 152 of the supporting base 130B.

The substantially vertical disposition of the first flange portion 151 relative to the horizontally disposed central web portion 150 also serves as an effective means by which to preclude the admission of water into the building 10 from beneath the wall 20.

A second flange extends outwardly from the other lateral edge of the web portion 150. At least a first portion 158 of the second flange extends outwardly of the web portion 150 in the same direction as the first flange 151, and a second portion 159 of the second flange extends outward of the web portion 150 in an opposite direction relative to the first flange portion 151. The first portion 158 of the second flange is thus disposed in parallel, laterally spaced relation relative to the first flange portion 151 and may well serve as the interim anchor means by which to resist any lateral forces applied against the interior of any wall erected upon the sill plate 140B.

The second portion 159 of the second flange overlies, and preferably engages, a portion of the

peripheral edge 153 of the supporting base 130B. The second portion 159 of the second flange, therefore, primarily serves as a decorative means by which to camouflage the visible boundary between the central web portion 150 of the sill plate 140B and the supporting base 130B.

As should now be apparent, if the sill plate 140B is employed along the full perimeter of the building 10, it will serve to achieve the aforesaid, desired objectives therealong.

When one calculates the stresses encountered at the connections between the primary coupler members 30A-30D and the supporting base 130 on which the building structure 10 rests it will generally be determined that only certain of the hollow, primary coupler members 30A-30D will be required to be filled with concrete. At those locations along the locus of points defining the exterior walls where the primary coupler members 30A-30D must be filled with concrete in order to effect a structural tie between the coupler members and the supporting base 130, it will be highly desirable that the primary coupler members 30A-30D fully engage the sill plate 140, or even the supporting base 130 itself. At other locations the structural components forming the exterior walls may either rest upon the sill plate 140 itself or they may rest upon a member interposed between the vertically oriented structural components and the sill plate 140.

For example, as depicted in FIG. 18, a jamb member 90 is capable of being cooperatively received on the web portion 150 and between the flanges 151 and 158 of the sill plate 140B. Should the jamb member 90 be disposed beneath the structural members other than the primary coupler members 30, it is highly desirable that the downwardly directed ends of the other structural members which engage the jamb member 90 be recessed in a configuration which matingly engages the upwardly directed cross sectional profile of the jamb member 90. However, at those locations along the exterior walls where either a door 16 or 18 or a window 19 will be located, the doors and windows will cooperatively engage the jamb member 90, as will hereinafter be more fully explained in conjunction with description of the interaction between the closure frames 100 and the jamb members 90.

The last of the representative sill plates to be described herein is best depicted in FIG. 21 and is generally identified by the alphanumeric designation 140C. Specifically, the sill plate 140C has a horizontally disposed, generally planar, backing 165. A stop block 166 extends vertically upwardly from the medial portion of the backing 165 such that the portions of the backing 165 extending laterally outwardly from the stop block 166 present opposed, and aligned, jamb surfaces 168A and

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168B. The lateral walls of the stop block 166 present oppositely directed stop surfaces 169A and 169B. The stop surface 169A extends perpendicularly upwardly from the jamb surface 168A, and the stop surface 169B extends perpendicularly upwardly from the jamb surface 168B. As such, the stop surfaces 169A and 169B are substantially parallel to each other. A closure surface 170 extends transversely of the stop block 166 in substantially perpendicular relation to the stop surfaces 169 and in substantially parallel relation to the jamb surfaces 168 to define the uppermost surface of the sill plate 140C.

The stop block 166 thus extends upwardly from the backing 165 to engage the structural components along the walls of the building structure 10. Wind, or other lateral, loading applied against any wall erected on a sill plate 140C will be resisted not only by the reinforcing rods received interiorly of those primary coupler members 30A-30D which are filled with concrete, as heretofore discussed, but also by the interaction between the substantially vertically extending stop block 166 and the structural components from which the wall is formed. As such, the configuration of the sill plate 140C can serve as an interim anchor, if some means is provided to secure the sill plate 140C to the supporting base 130A during erection of the building structure 10.

A Ram Set fastener 171, as depicted in FIG. 21, constitutes one means by which to secure a sill plate 140C to a supporting base 130A. Specifically, the fastener 171 attaches that portion of the backing 165 extending laterally of the stop block 166 to the supporting base 130A. This approach permits the sill plate 140C to be positioned, and secured, after the concrete forming the supporting base 130A has cured. It should be noted, however, that it may be preferable to secure only that portion of the backing 165 which presents the jamb surface 168B, as shown, inasmuch as that portion of the backing 165 which presents the jamb surface 168A may be so close to the peripheral edge 146 of the supporting base 130A that insertion of the fastener 173 could spall the peripheral edge 146 of the supporting base 130A.

FIG. 27 discloses an alternative form of sill plate 140C'. Sill plate 140C' is virtually identical with sill plate 140C, except that sill plate 140C' incorporates a built-in, mechanical interconnect 172 which extends downwardly from the backing 165. The built-in interconnect 172 may comprise a leg 173 that is formed integrally with, and which extends downwardly from, the backing 165 to terminate in a bulbous foot portion 174. Such an alternative construction for securing the sill plate 140C' to the supporting base 130A would require that the sill plate 140C' be set into the concrete of the

supporting base 130A before the concrete hardens. Embedding the interconnect 172 into the concrete forming the supporting base 130A would allow the sill plate 140C' to provide the interim anchor desired during erection of the building structure 10.

Referring again to FIG. 21, the ends of the structural components, panel member 35J is depicted, which engage the sill plate 140C (or, for that matter, sill plate 140C') should be recessed, as at 175, to conform with the cross sectional profile of the sill plate 140C or 140C'. For example, the end edges 176A and 176B of the respective wall skins 38 and 39 on the panel member 35 may rest directly on the supporting base 130A, but the transverse elements of the panel member 35, such as the closure walls, not depicted in that figure, and the ribs 40, as depicted, are recessed in a stepped fashion to present end edges 177A and 177B which engage the jamb surfaces 168A and 168B, respectively, on the sill plate 140C or 140C' and an end edge 178 which engages the closure surface 170 on the sill plate 140C or 140C'. The ends of the other coupler members 30 are similarly recessed to engage the sill plate 140C or 140C', and this arrangement works quite well to effect the desired interim anchor between the wall 20 -- or any other exterior, or interior, walls -- and the supporting base 130A until such time as the permanent anchor therebetween becomes fully operational.

By providing a recess 175 at both ends of each structural component two objectives are achieved. First, and most obvious, the laborers would not be required to orient each structural component during the erection process, and second, the recess 175 at the top of each structural component would form a race extending longitudinally of each wall through which the electrical wiring could be routed. An exemplary representation of the use of a recess 175 at both ends of each structural component is further depicted in FIG. 28. As shown, a panel member 35 is operatively engaged by one form of a primary coupler member--i.e., 30A -- as well as a secondary coupler member 30E, and both ends of all three structural components are provided with a recess 175. From that representative depiction it should now be apparent that any, or all, of the structural components employed in a building structure 10 embodying the concepts of the present invention can be similarly recessed.

At those locations along the locus of points defining the exterior walls where the primary coupler members 30A-30D must be filled with concrete in order to effect a structural tie between the coupler members 30A-30D and the supporting base 130A, it will be highly desirable that the primary coupler members 30A-30D fully engage the supporting base 130A itself rather than the sill plate

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140C or 140C' in order not only to assure that the desired tie is effected between the concrete interiorly of the primary coupler members 30A-30D and the reinforcing rod 136 extending upwardly from the supporting base 130A at those locations but also to assure that the columnar load supported by at least those primary coupler members 30A-30D which are filled with concrete 142 is transferred directly to the supporting base 130A without the intervention of any component that might not be designed to support the columnar load to be carried by a concrete filled, primary coupler members 30A-30D.

The substantially vertical disposition of the stop block 166 relative to the horizontally disposed backing 165 also serves as an effective means by which to preclude the passage of water beneath any wall erected thereon. Obviously, therefore, if the sill plate 140C or 140C' is employed along the full perimeter of the building 10, except at those locations where a primary coupler member 30A-30D is to be filled with concrete, the sill plate 140C or 140C' will fully achieve its objectives.

With a basic understanding of the structural components heretofore described as well as the several variations by which one may tie those structural components to the representative supporting bases disclosed, one is ready to consider one or more representative methods by which to erect the walls of a building structure 10.

It will be assumed that the appropriate supporting base 130 has been poured with the reinforcing rods 136 having been secured within the supporting base at accurately located, spaced intervals along at least the locus of points defining the exterior walls. It will be further assumed that the selected sill plates 140 have also been timely positioned. With the description heretofore supplied one skilled in the art would be able to prefabricate the necessary components and complete the supporting base 130 in preparation to the erection of the walls for a building structure 10.

To erect the walls themselves, there are generally two diverse approaches that can be employed. That is, the walls can either be directly assembled in their final, vertical disposition, or the walls can be assembled at ground level and then raised into their final, vertical position. Either approach is acceptable, but there will likely be those who prefer one method over the other.

To erect the walls in situ at least one laborer will require a ladder, stilts or some form of scaffolding. Starting, for example, at a corner such as the corner between the front and end walls 20 and 22 which is best seen in FIG. 1, the laborers may begin to erect wall 22 by positioning two sequential panel members 35A and 35B in linear juxtaposition along the selected sill plate 140 which defines the

locus of points at which the wall 22 is to be erected on the supporting base 130. At this point it should be explained that the following description shall begin with the erection of wall 22 solely by way of example. Those who understand the invention could, as easily, start with virtually any other wall. With that understanding and with the panel members 35A and 35B positioned as previously described, the laborer on the scaffolding, or the like, may take a secondary coupler member 30E and slide it vertically between the linearly juxtaposed panel members 35A and 35B such that, as depicted in FIG. 16, the connecting flanges 70A on the secondary coupler member 30E operatively engage the tongue 45 on panel 35A and the connecting flanges 70B operatively engage the tongue 46 on panel member 35B.

Operative engagement of the connecting flanges 70A on the secondary coupler member 30E with the tongue 45 on the panel member 35A requires that the pawls 75A and 75B on the connecting flanges 70A are slidably received within the locking grooves 51 and 52, respectively, presented from the tongue 45 of panel member 35A. Similarly, operative engagement of the connecting flanges 70B on the secondary coupler member 30E with the tongue 46 on panel member 35B requires that the pawls 75C and 75D on the connecting flanges 70B are slidably received within the locking grooves 56 and 58, respectively, presented from the tongue 46 of panel member 35B. When the flanges 75A-75D are so engaged with the locking grooves 51, 52, 56 and 58, respectively, on the linearly juxtaposed panel members 35A and 35B, the secondary coupler member 30E will relatively easily slide downwardly between the panel members 35A and 35B until the lower end of the secondary coupler member 30E properly engages the sill plate 140. At that time the panel member 35A and 35B are fully tied to the coupler member 30E, and thus to each other.

Reference to FIG. 16 will also reveal the functional purpose of having the tongues 45 and 46 of lesser transverse thickness than the thickness of the body portion 36 of the panel members 35 from which the tongues are presented. By making the transverse offset between the locking wall 49 and the wall skin 38 on panel member 35A equal to the transverse thickness of the extension arm 71A of the connecting flanges 70A, the surface 65 of the secondary coupler member 30E will be located coplanar with the surface of the wall skin 38 on the wall panel 35A. With all the transverse offsets between the wall skins 38 and 39 on the panel members 35 and the corresponding locking walls 49, 50, 54 and 55 on the connecting tongues 45 and/or 46 being so dimensioned, the interior and the exterior surfaces of the end wall 22 defined by

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the wall skins 38 and 39 on successive panel members 35 across the length of the wall will be virtually flush with each other and with the appropriate faces 62-65 on the coupler members 30, used to interconnect the panel members 35.

Continuing with the explanation of one method by which to erect at least the outer walls of a building structure 10, the laborers may position a third, sequential panel member 35C in linear alignment with the now tied panel members 35A and 35B. The third panel member 35C, however, will be modestly spaced, though aligned, with panel member 35B, as best represented in FIG. 15. The aligned, but modestly spaced, disposition of the panel members 35B and 35C permits the laborer on the scaffolding, or the like, to take a primary coupler member 30A and slide it vertically between the panel members 35B and 35C such that the connecting flanges 70A on the primary coupler member 30A engage the tongue 45 on panel member 35B and the connecting flanges 70B on the primary coupler member 30A engage the tongue 46 on the panel member 35C.

In the arrangement depicted in FIG. 15, as well, engagement of the connecting flanges 70A on the primary coupler member 30A with the tongue 45 on the panel member 35B requires that the pawls 75A and 75B on the connecting flanges 70A are slidably received within the locking grooves 51 and 52, respectively, presented from the tongue 45 of panel member 35B. Similarly, engagement of the connecting flanges 70B on the primary coupler member 30A with the tongue 46 on panel member 35C requires that the pawls 75C and 75D on the connecting flanges 70B are slidably received within the locking grooves 56 and 58, respectively, presented from the tongue 46 of panel member 35C. When the flanges 75A-75D are so engaged with the locking grooves 51, 52, 56 and 58, respectively, on the aligned, but moderately spaced, panel members 35B and 35C, the primary coupler member 30A will relatively easily slide downwardly between the panel members 35B and 35C until the lower end of the primary coupler member 30A properly engages the sill plate 140. At that time the panel member 35B and 35C are fully tied to the coupler member 30A, and thus to each other.

The panel members employed to erect the walls 20 and 21 should all be of preferably the same height. However, it should be appreciated that when erecting the end wall 22, as described above, as well as the common wall 23, the successive panel members 35 must be of progressively increasing height, and the upper ends should be inclined to conform to the pitch of each slope 24A and 24B of the roof 24 as the slopes 24A and 24B converge upwardly toward the ridge 269. The progressive increase in the height of the panel mem-

bers 35 forming the end wall 22, for example, should be apparent from viewing FIGS. 25 and 26.

It should be understood that the lower ends of each of the members heretofore assembled should be configured, as necessary, to engage the selected sill plate 140. It should also be understood that the use of a reinforcing rod would not likely be required to tie the structural components heretofore assembled to the supporting base 130. However, it is likely that a reinforcing rod would likely be required at the intersection of walls 20 and 22, and for that reason erection of the panel member 35D in wall 20 will now be described.

For that purpose the laborers would position the panel member 35D perpendicularly with respect to the previously erected panel members 35A-35C and coincident with the selected sill plate 140 which defines that locus of points along which the wall 20 is to be erected on the supporting base 130. With the panel member 35D thus positioned relative to panel member 35A the laborer on the scaffolding, or the like, may take a primary coupler member 30B and slide it vertically between the perpendicularly oriented panel members 35A and 35D such that the connecting flanges 70A on the coupler member 30B engage the tongue 46 on panel 35A and the connecting flanges 70C engage the tongue 45 on panel member 35D. Because the operative engagement of the connecting flanges 70A and 70C with the respective tongues on the panel members 35A and 35D is the same as heretofore explained in conjunction with FIGS. 15 and 16, there is no need to depict, or to describe, the details of that joiner. Suffice it to say that engagement of the primary coupler member 30B with the panel members 35A and 35D effects a tie between each panel member 35A and 35D as well as the primary coupler member 30B, and thus between the panel members 35A and 35D themselves.

It is also quite likely that a primary coupler member employed at a corner of the building structure 10 should be tied, in turn, to the supporting base 130 upon which the building structure 10 is being erected. As such, when the coupler member 30B is operatively insertable between the perpendicularly oriented panel members 35A and 35D it will also slide longitudinally over the vertically disposed reinforcing rod 136 located at that corner of the building structure 10.

Erection of the walls thus continues, component by component. For example, one could continue along wall 20 by positioning a successive panel member 35E aligned with panel member 35D and joining those two panel members by virtue of another, secondary coupler member 30E which would be insertably received therebetween in the manner previously depicted and described in conjunction with the joiner of panel members 35A and

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35B.

To that edge of the panel member 35E not tied to the secondary coupler member 30E one may secure a primary coupler member 30A. This coupler member 30A would serve as a portion of the structural window framing "stud" on the left side of the opening 180 (as viewed in FIG. 1) within which the composite window 19A would be located. Another coupler member 30A could also serve as the structural window framing stud on the opposite, or right, side of the opening 180, and that coupler member 30A could be tied -- in the manner heretofore described in detail relative to the tying of panel member 35C to the primary coupler member 30A -- to panel member 35F.

A jamb member 90 would be supported from the primary coupler members 30A defining each side of the opening 180. The arrangement by which a jamb member 90 is supported from a primary couple member 30 is, perhaps, best represented in FIG. 17. With particular reference to FIG. 17 it will be seen that the connecting flanges 70B on the primary coupler member 30A engage the tongue 46 on the jamb member 90. That is, the respective locking pawls 75C and 75D presented from the extension arms 71C and 71D of the connecting flanges 70B are slidably received within the respective locking grooves 56 and 58 in the tongue 46 of the jamb member 90.

As shown in FIG. 1, the window 19A is a composite window. That is, the window 19A may be comprised of a series of four, vertically stacked window units 181A- 181D. FIG. 17 depicts the lateral relationship of the window unit 181B relative to the jamb member 90, and, as shown, one mounting arm 182 of a hinge 183 may be secured by conventional fastening means such as adhesive, screws or rivets (not shown) to the casing surface 92 on the body portion 91 of the jamb member 90, and the second mounting arm 184 of the hinge 183 may be secured to the stile 185 formed by a length of the closure frame 100. An ear 186 extends outwardly from the mounting arm 182 to lie in adjacent juxtaposition to an ear 188 which extends outwardly from the mounting arm 184. A hinge pin 189 extends between, and operatively connects, the two ears 186 and 188 to permit relative movement of the mounting arms 182 and 184 about the axis defined by the hinge pins 189. A comparable hinge arrangement may be provided on both sides of each window unit 181A- 181D in order to permit each window unit to swing relative to the primary coupler members 30A, and the associated jamb members 90, from which the window units 181 are supported. As will also be seen from FIG. 17, an appropriate sealing strip, such as the weatherstripping 190, can be interposed between the stop surface 96A on the jamb member 90 and the stile

185 of the window unit 181B.

With reference to FIG. 27 one can see how a vertically stacked, successive series of window units 181A- 181D interact with each other to permit each window unit 181A- 181D to be individually opened and closed. To begin at the bottom of the stack, a stop block is presented from the supporting base 130A. One means to present a stop block, such as 95, would be to employ a jamb member 90, as depicted in FIG. 18. Another means for providing a stop block 166 at the desired location would be to employ a sill plate 140C, as shown in FIG. 27. The bottom rail 191 (also formed by a length of the closure frame 100) of the window unit 181A engages the stop surface 169A on the stop block 166, and an appropriate sealing strip 190 may be interposed therebetween.

The uppermost boundary for the inside opening 114 of the window unit 181A constitutes an upper, meeting rail 192 (also formed by a length of the closure frame 100) which is disposed in parallel relation to the bottom rail 191. The lateral ends of the horizontally disposed bottom rail 191 and the upper, meeting rail 192 are joined, as in the manner depicted in FIG. 10, to vertically disposed, left and right stiles 185.

A blind stop 193 is secured to the upper, meeting rail 192 and extends vertically upwardly therefrom. Specifically, the blind stop 193 -- which may comprise a suitable length of a structural body that may be hollow, and of rectilinear cross section, such that it is generally similar to the glazing bead 110, except that it has a greater dimension in at least one direction transversely of its length -- is secured interiorly of the recess 101 presented by the closure frame 100 from which the upper, meeting rail 192 is formed. As shown, the blind stop 193 may be secured, as by a plurality of fasteners such as the screws 197, to the wall 194 presented from the length of closure frame 100 forming the upper, meeting rail 192, and if a sealing strip 190 is to be employed between the blind stop 193 on window unit 181A and the window unit 181B, as hereinafter described, it may be desirable to position a shim 195 between the blind stop 193 and the wall 194 on the upper, meeting rail 192, as shown.

The lowermost member of the next, upwardly successive window unit 181B is a bottom, meeting rail 196 which may also be formed from a length of the closure frame 100. As can best be visualized by reference to FIG. 27, the bottom, meeting rail 196 in window unit 181B is oriented in exactly the same disposition as the bottom rail 191 in window unit 181A, and even though the upper, meeting rail 192 of window unit 181A has an identical cross section to the bottom, meeting rail 196 of window unit 181B, they are disposed in mirrored relation when incorporated on successively upwardly

stacked window units 181A and 181B. As such, the blind stop 193 presented from, and secured to, the upper meeting rail 192 of window unit 181A is engaged by the wall 194 of the recess 101 in the closure frame 100 from which the bottom, meeting rail 196 of window unit 181B is formed. If a sealing strip 190 is to be employed between the window units 181A and 181B, it may well be interposed between the blind stop 193 on window unit 181A and the wall 194 in the bottom, meeting rail 196 of window unit 181B.

In order to be able to open the window unit 181A without interference between the blind stop 193 on the upper, meeting rail 192 of window unit 181A and the bottom, meeting rail 196 of window unit 181B it is necessary that the window unit 181A pivot about an axis, such as the horizontal axis designated by the numeral 198, which allows the uppermost, outer corner 199 on the blind stop 193 to swing inwardly of the structure 10 and away from the bottom, meeting rail 196 on the window unit 181B.

The foregoing arrangement may be repeated successively upwardly until the desired number of window units, such as the four 181A-181D depicted in FIG. 1, are stacked in the window opening 180 between the two, vertically disposed, primary coupler members 30A which delineate the sides of the window opening 180.

As is also depicted in FIG. 27, the uppermost window unit 181D does not utilize a blind stop 193. The upper extremity of the window opening 180 may well be delineated by a jamb member 90 that is supported from a wall cap assembly 200, the details of which will be hereinafter more fully described. As such, the wall 194 on the length of closure frame 100 which forms the upper, meeting rail 201 on the window unit 181D engages the stop surface 96A on the stop block 95 presented from the jamb member 90, and a sealing strip 190 may be interposed therebetween. Because of the aforescribed difference between the window unit 181D and the other window units 181A-181C it will be imperative that the horizontally disposed, pivotal axis 202 about which the window unit 181D swings be located such that the uppermost, interior corner 203 on the recess 101 in the closure frame 100 which forms the upper, meeting rail 210 swing downwardly and outwardly away from the stop block 95 on jamb member 90.

The windows 19B-19E can each be assembled in the fashion of window 19A to include one or more window units 181.

Continuing now with the assembly of wall 20 it will be noted that one or both of the primary coupler members 30A forming the sides of the window opening 180 may be designated to encase a reinforcing rod 136 encapsulated in concrete 142,

as is also depicted in FIG. 17.

The lateral edge of the panel member 35F that is opposite to the lateral edge tied to the primary coupler member 30A which forms the right side of the window opening 180 (as viewed in FIG. 1) may be tied to a primary coupler member 30C in order to effect the requisite structural tie between the interior wall 26 and the exterior wall 20 which is to be intersected by the interior wall 26 at that location.

To prepare for erecting the primary coupler 30C in such a way as to effect a tie between the interior wall 26 and the exterior wall 20 the laborer will position a panel member 35G in linear alignment with the previously erected panel members 35D, 35E and 35F, as well as the window 19A, which cumulatively comprise the exterior wall 20 to that location. The panel member 35G, however, will be modestly spaced, though aligned, with panel member 35F in the same manner as heretofore described in conjunction with the tying of panel member 35B and 35C. In addition, the laborer will position a vertically disposed panel member 35H (FIG. 2) perpendicularly with respect to the plane of wall 20 and convergent upon the modest space between the aligned panel members 35F and 35G. As such, the panel member 35H will be oriented in alignment with the locus of points along which the interior wall 26 is to be erected.

The sill plate 140C is also highly suitable for use in designating the locus of points upon which each interior wall will be erected, and a length of the sill plate 140C may also be disposed to extend perpendicularly inwardly from the exterior wall 20 not only to define the location of the interior wall 26 but also to facilitate the physical positioning of the panel member 35H during erection of the building structure 10.

With the three panel members 35F-35H properly positioned, the laborer on the scaffolding, or the like, may slide the primary coupler member 30C vertically between the three converging panel members 35F-35H such that, simultaneously: the connecting flanges 70A on the primary coupler member 30C will engage the tongue 46 on panel member 35F; the connecting flanges 70B will engage the tongue 45 on panel member 35G; and, the connecting flanges 70C will engage the tongue 45 on panel member 35H.

Because engagement of the connecting flanges 70A-70C with the respective tongues on the panel members 35F-35H is accomplished in the same manner as heretofore explained in considerable detail relative to the tying of the previously erected panel members 35 with the previously erected coupler members 30, there is no need to repeat either a depiction, or a description, of the details by which such a joinder is effected. Suffice it to say

that engagement of the primary coupler member 30C with the panel members 35F-35H effects a tie between each panel member 35F, 35G and 35H to the primary coupler member 30C, and thus between the panel members 35F-35H themselves.

Continuing with the explanation as to the erection of a representative wall 20, the erection of the composite windows 19C and 19D in alignment with the previously erected panel members 35D-35G may be accomplished in the same general manner as the erection of the composite window 19A, and thereafter the continued erection of the aligned panel members 35I and 35J would bring the laborers to door 16.

As depicted, the door 16 may be hung from a coupler member 30D. The use of a coupler member 30D would permit a jamb member 90 to be presented on one side for mounting the door 16 and a second jamb member 90 to be presented on the opposite side of the coupler member 30D for mounting the door 16A in living unit 12. In addition, a coupler member 30D would effect the desired structural tie between the exterior wall 20 and the common wall 23 by engaging the first panel member 35K in the common wall 23. Finally, a coupler member 30D would permit the erection of a panel member 35L that would extend outwardly of the building structure 10 in a direction opposite to the common wall 23 in order to constitute a privacy barrier between the doors 16 and 16A which provide ingress to, and egress from, the adjacent living units 11 and 12.

The tying of the oppositely directed panel members 35K and 35L as well as the oppositely directed jamb members 90, which are disposed perpendicularly with respect to the aligned panel members 35K and 35L, to the primary coupler member 30D is accomplished (by virtue of the engagement between the locking pawls 75 on the connecting flanges 70 presented from the coupler member 30D and the locking grooves 51, 52, 56 and 58 on the tongues 45 and/or 46 of the panel members 35K and 35L as well as the jamb members 90) in the same manner as heretofore described so that when the laborers slides the coupler member 30D downwardly between the opposed, aligned and modestly spaced panel members 35K and 35L (the jamb members 90 may be slid into position after the coupler member 30D is in place) all of the members so joined will be structurally tied together. It is highly likely that the coupler member 30D will also be tied to the supporting base 130, and that, of course, is accomplished by having properly anchored a reinforcing rod 136 within the supporting base 130 as the base was poured so that after the coupler member 30D is positioned the concrete 142 poured into the hollow body portion 61 of the coupler member 30D

will encapsulate the reinforcing rod, as desired.

The doors 16, 16A, 18 and 31 may be fabricated in a manner similar to that employed to fabricate the window units 181. However, as depicted in FIG. 18, it is quite likely that the door 16 will preferably be swung inwardly of the living unit 11 rather than outwardly, as is the fashion generally preferred for window units 181.

To begin at the base of the door 16, a stop block is presented from the supporting base 130. Perhaps the preferable means to provide a stop block, such as 166, would be to employ a sill plate 140C secured to a supporting base 130A such as represented in FIGS. 21 and 27. However, one may employ a stop block 95 by utilizing a jamb member 90 that is, for example, received in the sill plate 140B presented from the supporting base 130B, as depicted in FIG. 18.

The bottom rail 205 (formed by a length of the closure frame 100) of the door 16 engages the stop surface 96B on the stop block 95, and an appropriate sealing strip 190 may be interposed therebetween. The top rail 206 (also formed by a length of the closure frame 100) is disposed in vertically space, parallel relation to the bottom rail 205. The lateral ends of the horizontally disposed bottom and top rails 205 and 206, respectively, are joined, as in the manner depicted in FIG. 10, to the vertically disposed left, lock stile 208 and right, hinge stile 209 (FIG. 1). The central insert 113 for the door 16 is positioned within the continuous recess 102 presented by the lengths of the closure frame 100 from which the rails 205 and 206 as well as the stiles 208 and 209 are formed. The central insert 113 for the door 16 is secured within that recess 102 by appropriate lengths of the glazing bead 110 in the same manner as the glass inserts 113 are secured within the window units 181.

The wall 207 presented from the closure frame 100 forming the top rail 206 engages the stop surface 96B on the stop block 95 presented from the jamb member 90 secured to the wall cap assembly, irrespective of whether one employs the wall cap assembly 200C depicted in FIG. 27 or the relatively uncomplicated wall cap assembly 200A or 200B depicted in FIGS. 19 or 20, respectively. Here, too, a sealing strip 190 may be interposed between the wall 207 on the top rail 206 and the stop surface 96B.

The stiles 208 and 209 would similarly engage the stop surfaces 95B presented from the jamb members 90 tied to the coupler members 30 located at either side of the door 16. The tie between a jamb member 90 and a vertically oriented coupler member 30A is well depicted in FIG. 17, and explained in relation to the use of coupler members 30A at each lateral side of the windows 19. As such, one may refer to FIG. 17, if desired, to

refresh ones recollection as to how that tie is effected, but it would appear superfluous to reiterate the complete explanation at this time. It should also be appreciated that the tie between the jamb member 90 and the coupler member 30D is similarly effected.

At this point it should be eminently clear as to how one would erect all the exterior and interior walls of any building structure embodying the concepts of the present invention. Not only have each of the several unique structural components employed to this point been described in detail, but one or more means by which those structural components can be tied to each other, and to one or more typical supporting base configurations, have also been described in detail. The remainder of the exterior, and/or interior, walls of the exemplary structure 10, or any reasonable variation thereof, should now be able to be erected simply by employing the construction techniques described above.

It will now be recalled that there are generally two diverse approaches by which the walls themselves can be erected. The foregoing description has disclosed the direct assembly of the walls in their final, vertical disposition. It should now also be appreciated that the walls can also be assembled at ground level and then raised into their final, vertical position. With an understanding as to how the various structural components are capable of being tied together, one may readily appreciate that the same general assembly techniques can be effected with the structural components disposed in a horizontal, as well as a vertical, orientation. With reasonable lengths of the walls so assembled at ground level, several laborers can then raise the top of the wall sections so assembled into a vertical position. About the only difficulty that might be encountered would be the raising of a length of wall so that a reinforcing rod 136 extending upwardly out of the supporting base would be received within the hollow, interior of the body portion 6I on any of the primary coupler members 30 designated to receive a reinforcing rod. To obviate that potential difficulty one may simply slide the primary coupler member only partially into position. Then, after the wall has been vertically positioned, and the primary coupler member aligns with the reinforcing rod extending upwardly out of the supporting base, the laborers can continue to slide the primary coupler member downwardly over the reinforcing rod. In that way the walls can be virtually assembled in a horizontal disposition and then raised to their vertical disposition with only a modest effort required to slide selected of the primary coupler members into their final locations.

With the walls thus erected, convenience dictates that one must determine whether or not the

panel members 35 afford sufficient insulation for the environment to be encountered by the building structure 10. The multitudinous, hollow cavities 211 which exist between the wall skins 38 and 39 and the plurality of transverse reinforcing ribs 40 may be sufficient in and of themselves. On the other hand, it is also quite possible that one might prefer to fill the cavities 211 with insulation to reduce thermal and/or acoustical conductivity below that provided by the material from which the structural components are fabricated. In addition, it is possible that one might prefer to provide some interior backing to the wall skins 38 and 39 of the panel members 35, or any other exposed surface, by filling the cavities 211 with some material. In any event, the cavities 211 can be conveniently filled after the walls have been erected and prior to the time that the roof 24 is raised. By way of example, one could fill the cavities with sand, a foamed plastic or even a suitable cementitious material such as an aerated concrete or a concrete utilizing an aggregate having a cellular structure such as a man-made, foamed plastic or a material found in nature, such a pumice.

After the walls have been erected one may place the electrical wiring (not shown) in the recess 175 which may extend along the top of the structural components forming the walls and then secure a suitable wall cap assembly in position atop the various exterior and interior walls. By way of an overview, the wall cap assemblies 200 should accomplish several objectives. First and foremost they should provide at least a support upon which the roof 24 can rest. Second, they should allow for some means by which to effect a structural tie between the roof and the walls (if not to the supporting base itself), as is generally required by the building codes in those jurisdictions subject to heavy winds. Finally, a preferred wall cap assembly should effect some means by which to assure the alignment of the structural components forming the walls -- particularly along those portions of the walls where lateral stability would not be inherent between the adjacent structural components. An excellent example of a situation which exemplifies potentially inherent lateral instability would be in that span of any wall within which a window, or door, exists. The structural components on either side of a window or door are not firmly tied to each other across the door, and whereas special attention can be given in an attempt to assure that those components are tied to the supporting base, it is also highly desirable that those components somehow be tied together across the span of any intervening window or door. A properly designed, and fabricated, wall cap assembly 200 will afford the necessary integrity to the overall structural design.

Three variations of a wall cap assembly 200

are depicted and described herein. With reference to FIG. 19 the cross sectional configuration of a typical wall cap assembly 200A is depicted as it passes across the top of one of those primary coupler members 30A selected to be tied to the supporting base 130. Although it is possible that the reinforcing rod 136 extending upwardly from the supporting base 130 might be of sufficient length to extend the full vertical extent of the coupler member 30A, and beyond, it is much more likely that the head 213 and a considerable length of the shank 214 of a bolt 215 would be buried within the concrete 142 encased by the body portion 61 of the primary coupler member 30A, as depicted.

The wall cap assembly 200A may comprise a metallic channel 216 the web portion 218 of which transversely spans the wall 20. Because the surfaces of all wall skins on all the panel members 35 and the exterior faces 62-65 of all the various coupler members 30 are coplanar when they are incorporated in a wall, either exterior or interior, by making the transverse span of the web portion 218 equal the transverse span between the opposite, exterior faces 63 and 65 on the coupler member 30A depicted in FIG. 19 the containing flanges 219 and 220 extending downwardly from the lateral edges of the web 218 in channel 216 will frictionally engage the wall skins on the panel members 35 as well as the exterior faces 63 and 65 on the coupler members 30. Installing a channel 216 to embrace the top of a wall along its longitudinal extent thus serves to effect the desired, lateral stabilization to the wall.

The wall cap assembly 200A also incorporates a spacer block 221 which rests upon, and extends the longitudinal length of, the web portion 218 in the channel 216. The bolt 215 which extends upwardly from the concrete 142 in the body portion 61 of the coupler portion 30A extends through a bore 222 in the web portion 218 of the channel 216 and a bore 223 in the spacer block 221 which registers with the bore 222. The bore 223 terminates in a counterbore 224 that may be of sufficient depth, and diameter, to receive a washer 225 and a nut 226 by which to secure the wall cap assembly 200A to at least selected coupler members 30. As is also depicted in FIG. 19 the roof 24 may be secured to the spacer block 221, as by a suitable adhesive 228. In this regard it should be noted that there may be a need to retain the roof 24 in proper position until such time as the adhesive "sets." On that basis it may be desirable to employ a temporary fastener, such as a small nail, or screw, 229 through the spacer block 221 and into the wall skin 38 or 39 of the panel members 35 used to form the roof 24, as will be hereinafter more fully explained.

It is also quite feasible to extend the bolt 215 upwardly through the adjacent wall skin 38 and apply the nut 226 interiorly of the panel member 35, as depicted in FIG. 22 and as subsequently explained herein in conjunction with that figure.

The wall cap assembly 200B, which is depicted in FIG. 20, may, like the vast majority of the previously described structural components, comprise an extruded thermoplastic resin which may well be fiber reinforced. The wall cap assembly also includes a channel portion 230 the web portion 231 of which transversely spans the wall 20. As previously explained in conjunction with the description of the wall cap assembly 200A, by making the transverse span of the web portion 231 equal the transverse span between the outer surfaces of the opposite, wall skins 38 and 39 on the panel members 35, the containing flanges 232 and 229 extending downwardly from the lateral edges of the web portion 233 will frictionally engage not only the wall skins 38 and 39 on the panel members 35 but also the exterior faces on the coupler members 30 employed to tie the panel members to each other. Installing a wall cap assembly 200B such that the containing flanges 232 and 233 embrace the top of a wall along its longitudinal extent thus serves to effect the desired, lateral stabilization to the wall.

The wall cap assembly 200B also incorporates a pair of longitudinally extending, laterally displaced, spacer arms 234 and 235 which extend upwardly from the lateral edges of the web portion 231 in diametrically opposite directions than the containing flanges 232 and 233. Each spacer arm 234 and 235 terminates, respectively, in a connector flange 236 and 238. As is also depicted in FIG. 19 the roof 24 may be secured to the connector flanges 236 and 238, as by a suitable adhesive 239. In this regard it should be noted that there may be a need to retain the roof 24 in proper position until such time as the adhesive "sets." On that basis it may be desirable to employ a temporary fastener, such as a small nail, or screw, 240 which extends through the connector flange 238 and into the downwardly directed wall skin 38 or 39 of the panel members 35 used to form the roof 24, as will be hereinafter more fully explained.

Although FIG. 20 represents that span of the wall which lies between the longitudinally spaced coupler members 30 so that the means for effecting a structural tie between the roof 24 and the coupler members 30 is not actually depicted in FIG. 20, it should be appreciated that a bolt 215 such as depicted in conjunction with FIGS. 19 and/or 22 could well be employed at the appropriate locations.

The wall cap assembly 200C, as depicted in FIG. 22, may, like the vast majority of the previously described structural components, also com-

prise an extruded thermoplastic resin which may well be fiber reinforced. The wall cap assembly 200C also includes a channel portion 245 the web portion 246 of which transversely spans the wall 20. As previously explained in conjunction with FIG. 19, by making the transverse span between the containing flanges 248 and 249 equal not only to the transverse span between the opposite, wall skins 38 and 39 on the panel members 35 but also the transverse span between the opposite faces 63 and 65 (or 62 and 64) on the coupler members 30, the containing flanges 248 and 249 will frictionally engage not only the wall skins 38 and 39 on the panel members 35 but also the exterior faces on the coupler members 30 employed to tie the panel members to each other. Installing a wall cap assembly 200C such that the containing flanges 248 and 249 embrace the top of a wall along its longitudinal extent thus serves to effect the desired, lateral stabilization to the wall.

The wall cap assembly 200C also incorporates a pair of longitudinally extending, laterally displaced, spacer blocks 250 and 251 which are connected to the web portion 246 by offset walls 252 and 253 that extend upwardly from the web portion 246 and then in laterally opposite directions to intersect the spacer blocks 250 and 251. The cross section defined by the web portion 246, the offset walls 252 and 253 as well as the containing flanges 248 and 249 outline engaging cavities 255A and 255B, the profile of which exactly duplicates the profile of the connecting flanges 70 presented from each of the various coupler members 30 for a purpose more fully hereinafter explained.

The upper extent of each spacer block 250 and 251 joins corresponding connector flanges 256 and 258, respectively. The connector flanges 256 and 258 are angularly disposed such that the portions which extend angularly upwardly converge, and are preferably joined, at an apex 259. Conversely, the portions of the connector flanges 256 and 258 which extend angularly downwardly past the respective spacer blocks 250 and 251 from which they are presented, diverge such that each joins with one, vertically oriented, leg of an angle brace 260 or 261, respectively. The other leg of each angle brace 260 and 261 extends horizontally and joins with the containing flanges 248 or 249 at their juncture with the respective spacer blocks 250 or 251.

As is also depicted in FIG. 22, the roof 24 may be secured to the connector flanges 256 and 258, as by a suitable adhesive 262. In this regard it should be noted that there may be a need to retain the components from which the roof 24 is assembled in proper position until such time as the adhesive "sets." On that basis it may be desirable to employ a temporary fastener, such as a small nail,

or screw, 263 which extends through the connector flange 256 and into the downwardly directed wall skin 38 of the panel members 35 used to form the roof 24, as will be hereinafter more fully explained. Access to the temporary fastener may be facilitated by punching an access bore 264 through the angle brace 260 at spaced intervals along the length of the wall cap assembly 200C, as is also depicted in FIG. 22.

The wall cap assembly 200C may also be secured to the coupler member 30A, as by a bolt 215, the head 213 and a portion of the shaft 214 of which are embedded in the concrete 142 which fills the coupler member 30A. The shaft 214 extends upwardly out of the concrete 142 to penetrate: a bore 265 in the web portion 246; a bore 266 in the apex 259 of the wall cap assembly 200C; as well as, a bore 267 in the wall skin 38 of the panel member 35 of the roof 24. A beveled washer 268 is received over the shaft 214, and a nut 226 serves to tie the cap assembly 200C as well as the roof 24 to the coupler member 30A, and thus the supporting base 130A, in a manner which should satisfy the most exacting building codes.

With the selected wall cap assembly 200C in place on the exterior walls 20 and 21 which extend generally parallel to the ridge 269 of the roof 24, the laborers may erect the structural supporting arrangement desired at the ridge 269, and any intermediate purlins (hereinafter described) deemed necessary, before assembling the roof 24. As depicted in FIG. 23, the wall cap assembly 200C is particularly suited to serve as the member upon which the roof 24 will rest at the ridge 269 of the roof 24.

The description of the arrangement employed at the ridge 269 may conveniently begin at the intersection of the interior wall 25 with the exterior, end wall 22. For privacy between adjacent bedrooms 13A and 13B it is likely that one would wish to have the wall 25 extend upward to whatever extent is required to close any gap between the top of the wall 25 and whatever roof supporting arrangement is employed. One arrangement which would effect the desired result would be to mount a wall cap assembly 200C upon the upper extremity of the panel members 35 forming the wall 25. So mounted, the containing flanges 248 and 249 on the wall cap assembly 200C would engage the opposed wall skins 38 and 39 of the panel member 35 in the same fashion as the containing flanges 248 and 249 on the wall cap assembly 200C engage the exterior faces 63 and 65 of the coupler member 30A, as depicted in, and as described in conjunction with, FIG. 22.

Along that longitudinal extent of the roof 24 which spans from the coupler member 30C (located at the juncture of the three interior walls

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25, 26 and 27) across the combined eating and living room area 15 to a coupler member 30A within the common wall 23, however, some structural reinforcement will be required to afford the necessary beam strength along that span of the ridge 269. As best represented in FIG. 24, a joist hanger 270 may be secured from the top of the coupler member 30C. The anchor flange 271 on the joist hanger 270 extends horizontally across the top of the coupler member 30C, and the shaft 214 of bolt 215 extends upwardly through the bore 272 in the anchor flange 271 to receive a nut 226 (not shown in FIG. 24, but depicted in FIG. 22). A stirrup 273 extends downwardly from the anchor flange 271 for a distance substantially equal to at least the lateral dimension of a panel member 35 less the lateral dimension of the tongue 45. This configuration would allow the tongue 45 to extend upwardly above the level of the anchor flange 271 on the joist hanger 270. As shown, the upper surface of the anchor flange 271 should preferably lie in the same plane as the positioning shoulders 41A and 41B. With the panel member 35 so disposed, the tongue 46 rests upon the horizontal supporting foot 274 of the joist hanger 270.

One may, of course, allow the tongue 46 to constitute the exposed underside of the beam formed by the panel member 35 which spans across the combined eating and living room area 15. It is, however, also possible that one would prefer to provide a geometrically cleaner appearance to the underside of the beam spanning the combined eating and living room area 15, and in that situation one could support a terminating coupler member 275 from the tongue 46.

The terminating member 275 can be fabricated in the same manner as the primary coupler member 30A, except that the connecting flanges 70B would be eliminated from the terminating member 275. As such, the connector flanges 70A on the terminating member 275 would operatively engage the tongue 46 on the panel member 35 supported in the stirrup 273. That is, the locking pawls 75A and 75B on the connecting flanges 70A would be received within the locking grooves 56 and 58, respectively, of the tongue 46. The hollow body portion 61 of terminating member 275 would serve as an excellent race within which to receive the electrical wiring, and the unobstructed, rectilinear, exterior faces 63, 64 and 65 on the body portion 61 would provide a clean finish to the lower edge portion of the composite beam formed from the panel member 35.

Even though one might choose to employ a terminating coupler member 275 on the underside of the panel member 35 when the latter is serving as a beam, one still has the choice of resting the tongue 46 on the supporting foot 274 of stirrup 273

or resting the terminating coupler member 275 on the supporting foot 274. Should one elect to rest the tongue 46 of the panel member 35 on the supporting foot 274, even when a terminating coupler member 275 is supported therefrom, the depth of the joist hanger 275 would not be changed. One would, however, elect to remove that length of the connecting flanges 70A which would preclude the body portion 61 of the terminating coupler member 275 from engaging the exterior face 65 on the coupler member 30C from which the joist hanger 270 is supported. This arrangement is depicted in FIG. 24, and it will be observed that the connecting flanges 70A terminate the juncture with the side plates 276 of the joist hanger.

It is also possible that one might prefer to have the terminating coupler member 275 rest directly upon the supporting foot 274 of the stirrup 273 in the joist hanger 270. That choice would require only that the depth of the stirrup 273 be extended to include the depth of the body portion 61 of the terminating coupler member 275.

In either situation, the panel member 35 spans across the combined eating and living room area 15 to be received, in the manner desired, in the stirrup 273 of a second joist hanger 270 supported from the coupler member 30 in the common wall 23.

The configuration of the panel member 35 is such that it affords not only excellent bending strength but also rather good columnar strength along its longitudinal axis. However, it must be understood that the configuration of the panel member 35 affords rather poor strength against relatively high compressive loading (on the order of what one might expect to encounter from any substantial roof loading) in a direction laterally of the panel member 35 itself. As a result, it is considered highly desirable, if not absolutely necessary, that at least the end openings of the cavities 211, which extend longitudinally within the panel member 35, be plugged to impart the additional strength required to prevent the longitudinal ends of the panel member 35 -- which rests upon the coupler members 30 serving as the beam supports -- from buckling when employed as a simple beam.

Specifically, the panel member 35 must be reinforced to accept the stresses imparted to the ends thereof as a result of the distribution of forces required to effect a transfer of the load carried by the panel member 35 acting as a beam (across the span of the combined eating and living room area 15) into the columnar support provided by the coupler members 30 from which the joist hangers 270 are carried. The necessary plugging can be effected by the simple wooden plugs 278 inserted within the ends of the cavities 211, as depicted in FIG.

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24. Should the terminating coupler member 275 rest directly upon the supporting foot 274 of the joist hanger 270, it is recommended that consideration be given as to whether the hollow body portion 61 of the terminating coupler member 275 should also be plugged. Such calculations are well within the skill of the engineers who will be determining the details for a given environment and need not be discussed to any greater extent herein.

With the panel member 35 thus supported as a simple beam which extends between the joist hangers 270, the connecting flanges 70A on a secondary coupler member 30E can, as best seen from FIG. 23, operatively engage the tongue 45 at the uppermost edge of the panel member 35. As has been previously described in considerable detail, operative engagement of the connecting flanges 70A with the tongue 45 requires that the locking pawls 75A and 75B on the connecting flanges 70A are received within the locking grooves 51 and 52, respectively, of the tongue 45 on the panel member 35.

The connecting flanges 70B on the secondary coupler member 30E are operatively received within the engaging cavities 255 in the wall cap assembly 200C to effect a structural tie therebetween. As is also depicted in FIG. 23, the cross sectional profile of the extension arm 71C, including the locking pawl 75C presented therefrom, is sufficiently congruent with the cross sectional profile of the engaging cavity 255A, and the cross sectional profile of the extension arm 71D, including the cross sectional profile of the locking pawl 75D presented therefrom, is sufficiently congruent with the cross sectional profile of the engaging cavity 255B, that the wall cap assembly 200C can easily slide relative to the secondary coupler member 30E, as necessary to effect an operative engagement therebetween.

In some environments the roof 24 can be sufficiently supported between the ridge 269 and the parallel exterior walls 20 and 21. In those situations the roof may be assembled as soon as the roof supporting arrangement is assembled at the ridge 269. With continued reference to FIGS. 1, 22 and 23, a pair of panel members 35 are rested upon the connector flange 256 presented upon the wall cap assembly 200C secured to the top of the exterior wall 20. The pair of panel members 35 are then manipulated until they are disposed, as desired, to span between that wall cap assembly 200C on an exterior wall and a second wall cap assembly 200C located at the ridge 269 of the roof 24.

Were the wall cap assembly 200A secured to the wall 20, the panel members 35 would be rested upon the spacer block 221 (as depicted in FIG.

19), and were the wall cap assembly 200B secured to the wall 20, the panel members 35 would be rested upon the connector flanges 236 and 238 (as depicted in FIG. 20).

In any event, when two wall panel members 35 are thus supported between a wall cap assembly 200 on an exterior wall and the supporting arrangement employed at the ridge 269 of the roof 24, the laborers may slide a coupler member 30 therebetween operatively to engage the two panel members so positioned. Typically, one would tie the successive panel members 35 forming the roof 24 with secondary coupler members 30E, as depicted in, and as described in conjunction with, FIG. 16. The roof 24 is thus assembled by sequentially positioning successive panel members 35 along the longitudinal extent of the two sloping sides 24A and 24B of the roof 24 and by tying the successive panel members to each other with the appropriate coupler members 30 as well as by tying the panel members 35 to the wall cap assemblies 200 in the manner heretofore described in conjunction with the description of the several variations for the wall cap assemblies 200 disclosed.

With the panel members 35 forming the two slopes 24A and 24B of the roof 24 tied in place as depicted in FIG. 23 the ridge cap member 280 may be installed. The ridge cap member 280 has a pair of mounting tabs 281A and 281B which engage the wall skins 39 of the panel members 35 forming the opposed slopes 24A and 24B, respectively of the roof 24, and they may be secured thereto by fastener means such as screws, rivets or adhesive 282.

The cross sectional profile of the ridge cap member 280 may be virtually any shape desired, but the miniature parroting of the roof line depicted is quite functional. That is, the peaked upper walls 283A and 283B shed water, and the horizontally disposed laterally extending walls 284A and 284B may be pierced, as desired, with a plurality of apertures 285 which accommodate any desired ventilation.

It was previously mentioned that one may employ purlins to provide any intermediate support to the span of each slope 24A or 24B forming the roof 24. A typical arrangement by which to support a metallic purlin 290 is best represented in FIGS. 25 and 26.

To assure a suitable columnar bearing for the ends of the purlin 290 the coupler members 30 selected to support at least the opposite ends of the purlin 290 should preferably be tied to the supporting base 130 in a manner hereinbefore described. The hollow interior of the body portion 61 for that coupler member 30 should be filled with concrete 142 up to a level such that the support flange 291 on purlin 290 can rest upon the con-

crete 142 within the coupler member 30. Additional bearing support can also be provided by employing a coupler member 30C in lieu of the coupler member 30A which might normally be employed at the location where a purlin 290 would be placed. By employing a coupler member 30C a jamb member 90 may, as depicted in FIGS. 25 and 26, extend upwardly beneath the purlin 290 and terminate at preferably the same level as the concrete 142 within the coupler member 30C. In addition to providing an additional support area upon which the purlin 290 can rest, the presence of the jamb member 90 increases the L/R ratio of the combination in order to provide the most effective columnar arrangement for supporting the ends of the purlin 290.

Assuming that one would elect to support the purlin 290 from a coupler member 30C, the exterior face 63 would be notched, as at 292, to receive the end of the purlin 290. The support flange 291 will include not only the horizontal portion 293 which rests upon the supporting surface but also a vertically oriented, return portion 294 which contributes to the strength of the support flange 291 to resist bending moments. The purlin 290 also includes a web portion 295 which affords the primary measure of the beam depth. Finally, the purlin 290 preferably also presents a connector flange 296 which is angularly disposed to conform to the pitch of the roof sides 24A or 24B, as best depicted in FIG. 26, to engage the wall skins 38 of the panel members 35 used to assemble the roof 24. Here, too, the wall skins 38 may be preferably secured to the connector flange 296, as by any suitable means such as adhesive 262, and even an interim fastener, such as the screw 298, may be employed to allow the adhesive 262 the required span of time within which to "set."

The choice as to whether or not to employ purlins will be dependent upon the roof loading expected to be encountered in the environment where the building structure 10 is to be erected and also upon the span between the exterior walls and the ridge 269. It should, however, also be now apparent that one could, as well employ purlins 290 on either side of the ridge 269 to serve as the principal support for the ridge 269. Such choices can well be made by those who design the building structure for a particular use and/or environment and are not considered to be limitations on the concepts of the present invention.

The foregoing disclosure has included several alternative configurations for various structural components, and as such, there are a wide variety of choices for the specific combinations of structural components that can be incorporated in any given building structure 10. It should be understood that the decision as to which configuration for each

structural component to be used will be made by the designers, architects and/or engineers, off-site and prior to the time that the structural components are shipped to the construction site. However, once the selection is made, for whatever considerations, as to which specific configuration is desired for each structural component that will be employed in a particular building project, the structural components so selected can be supplied to the building site in kit form for erection by virtually unskilled laborers under the supervision of a minimal number of knowledgeable foremen.

As should now be apparent, the present invention not only teaches that a building can be constructed virtually in its entirety from a plurality of standardized, mass produced, structural components by relatively unskilled laborers without specialized tools in a far shorter period of time than a comparable structure can be constructed from prior known components but also that the other objects of the invention can likewise be accomplished.

Claims

1. Structural components for a modular building to be erected upon a supporting base, said structural components comprising:
a plurality of load bearing coupler members to be disposed in spaced intervals along the locus of points defining walls of a modular building, said coupler members to be oriented substantially vertically with respect to the supporting base;
means selectively to secure said coupler members to the supporting base;
a plurality of panel members; and,
means structurally to tie said panel members to said coupler members.

2. Structural components for a modular building, as set forth in claim 1, wherein said means structurally to tie said panel members to said coupler members further comprises:
at least one pair of transversely spaced, parallel connecting flanges presented from said coupler members;
oppositely directed, lateral edges on side panel members;
tongue means presented from at least one of said lateral edges on said panel member; and,
said connecting flanges operatively engaging said tongue means selectively to tie said panel members to said coupler members.

3. Structural components for a modular building, as set forth in claim 2, wherein said means structurally to tie said panel members to said coupler members further comprises:
at least one pair of transversely spaced, parallel connecting flanges presented from each said cou-

plier member; and,
at least one pair of locking grooves recessed into
said tongue means;
means presented from said connecting flanges co-
operatively to engage said locking grooves selec-
tively to tie said panel members to said coupler
members.

4. A structural member for engaging and sup-
porting a roof in a modular building structure, said
structural member comprising:
a pair of laterally spaced, generally vertically ori-
ented, spacer blocks having upper and lower por-
tions;
web means extending generally horizontally be-
tween the lower portions of said spacer blocks;
containing flanges extending downwardly from the
lower portions of said spacer blocks; and,
connector flanges attached to, and oriented sub-
stantially transversely of, the upper portions of said
spacer blocks to support the roof.

5. A modular building structure comprising:
a supporting base extending along the locus of
points which define at least the exterior walls of the
building structure;
a plurality of load bearing coupler members dis-
posed at spaced intervals along said supporting
base, said coupler members being oriented sub-
stantially vertically with respect to said supporting
base;
means selectively to secure at last selected cou-
pler members to said supporting base;
a plurality of vertically oriented panel members
interposed between said spaced coupler members
to form the walls; and,
means structurally to tie said panel members to
said coupler members.

6. A modular building structure, as set forth in
claim 5, wherein:
one or more anchor means are secured to said
supporting base and extend upwardly therefrom;
and,
means are provided operatively to engage said
anchor means and thereby secure at least selected
load bearing coupler members to said supporting
base.

7. A modular building structure, as set forth in
claim 5; further comprising:
a sill plate;
said sill plate interposed between said supporting
base and said panel members as well as at least
selected of said load bearing coupler members;
means to secure said sill plate to said supporting
base.

8. A method for the construction of a building
from a plurality of prefabricated components com-
prising the steps of:
providing a supporting base;
positioning a panel member adjacent another panel

member;
sliding a coupler member between the positioned
panel members and into interlocking engagement
therewith;

5 sequentially adding panel members and coupler
members by repeating said steps of positioning
and sliding to form interior and exterior walls of the
desired building structure.

9. A method of the construction of a building
from a plurality of prefabricated components, as set
forth in claim 8, comprising the further step of:
joining the top edges of the panel members and
coupler members along the interior and exterior
walls with wall cap assemblies.

10. A method for the construction of a building
from a plurality of prefabricated components, as set
forth in claim 9, comprising the further step of:
affixing a roof to the wall cap assemblies.

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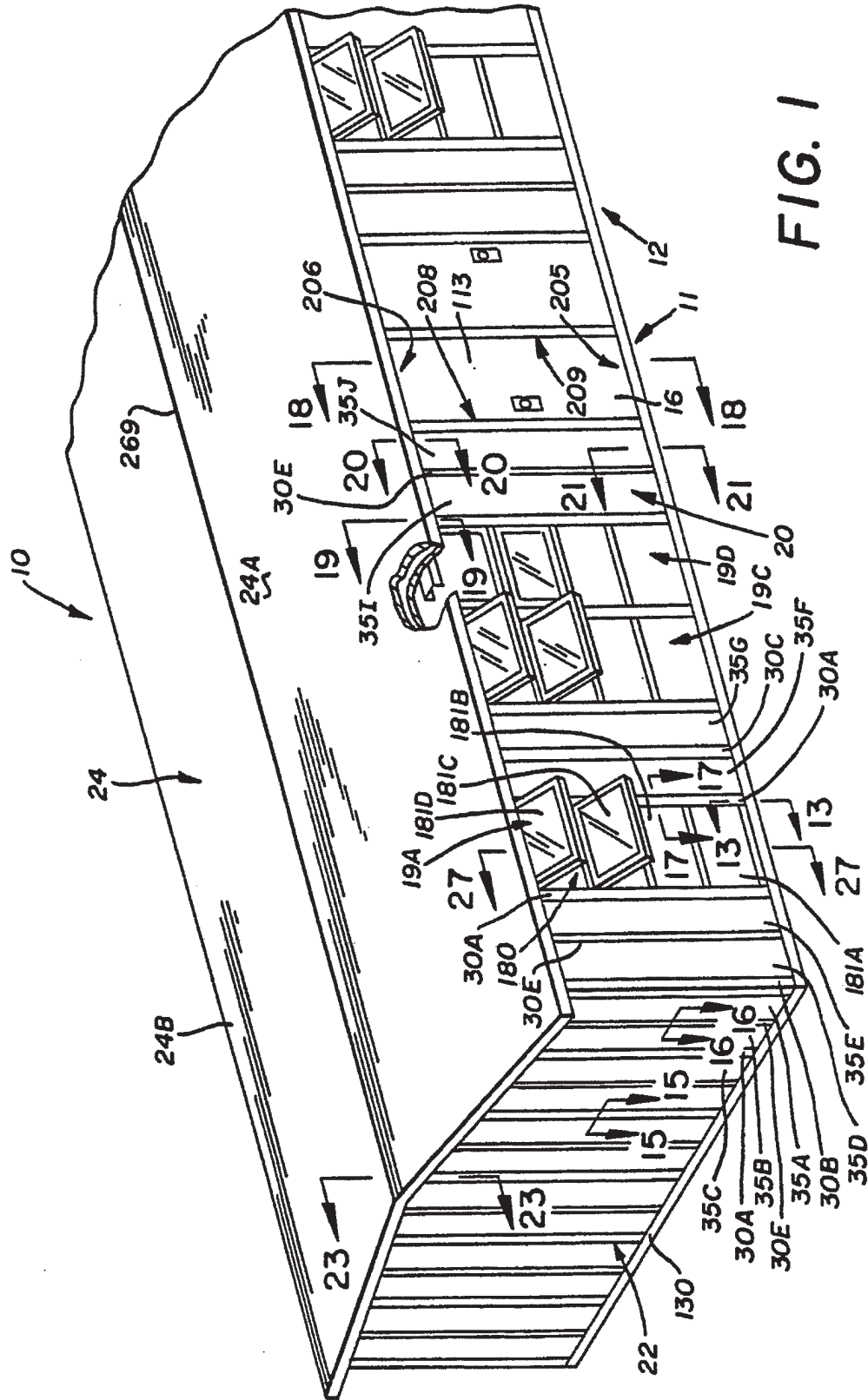
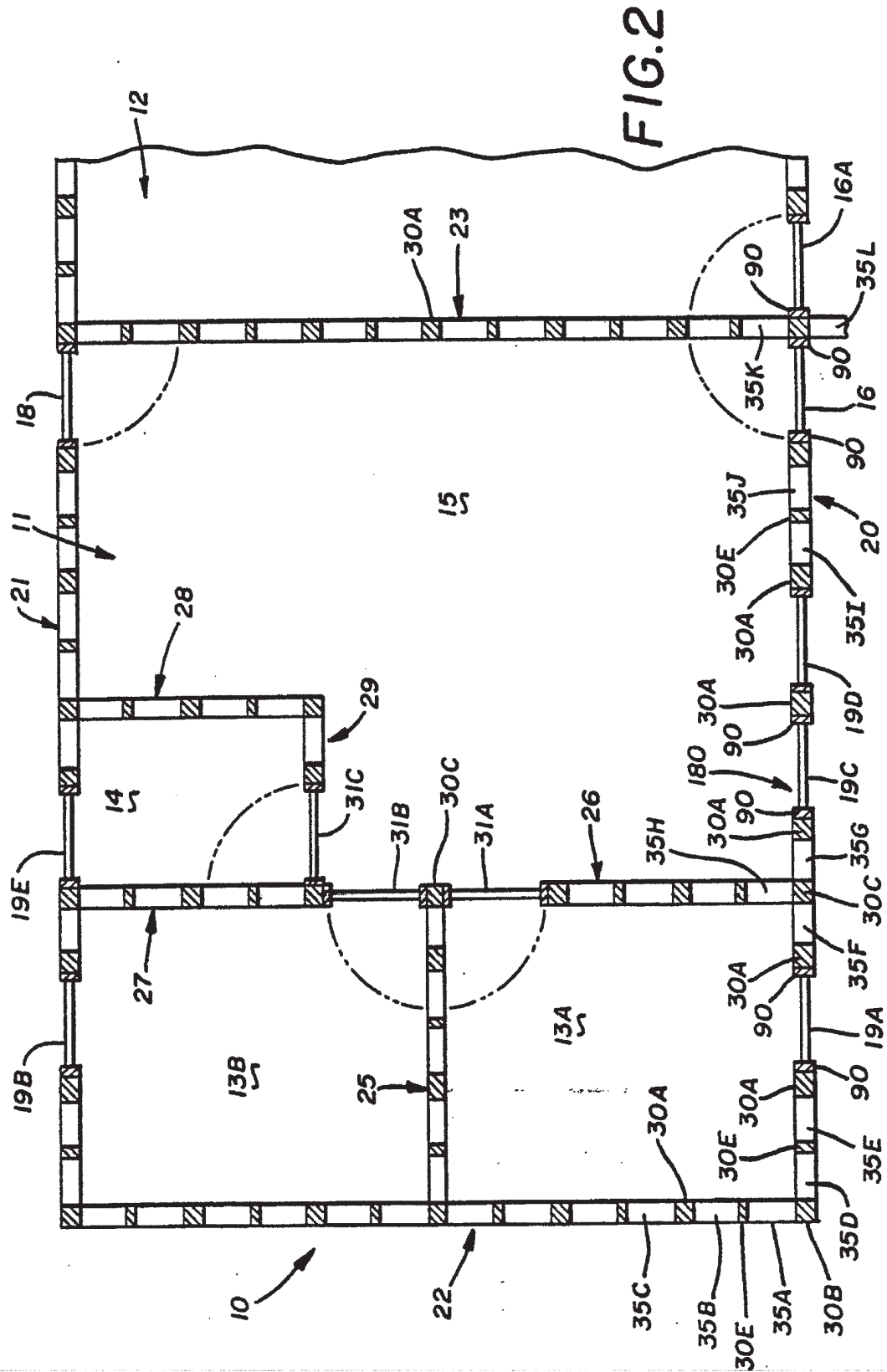


FIG. 1



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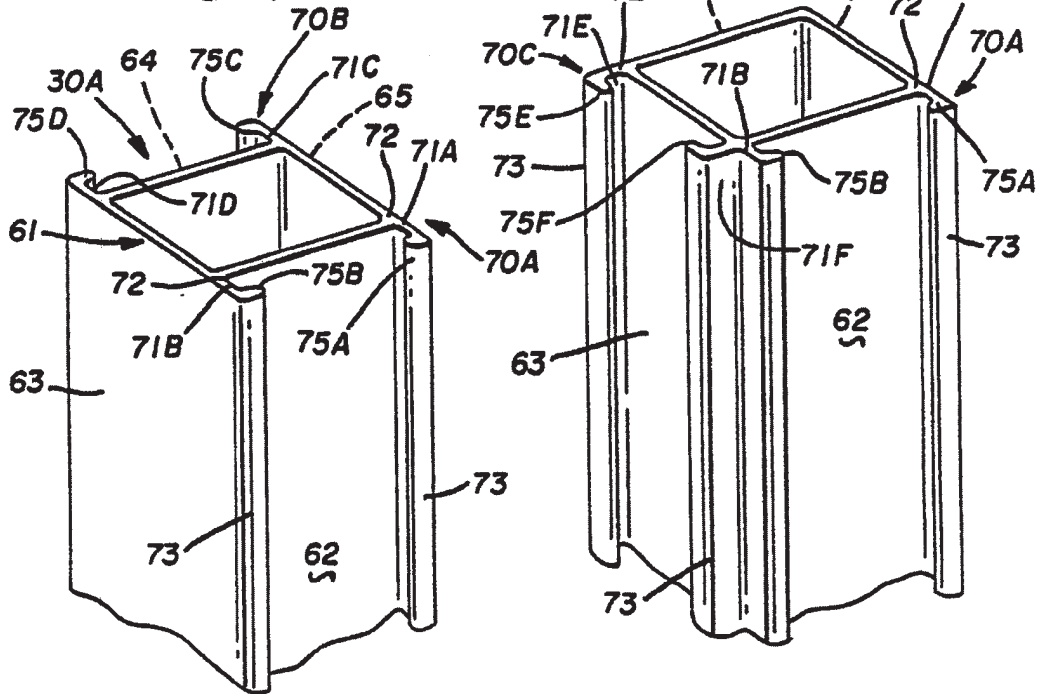
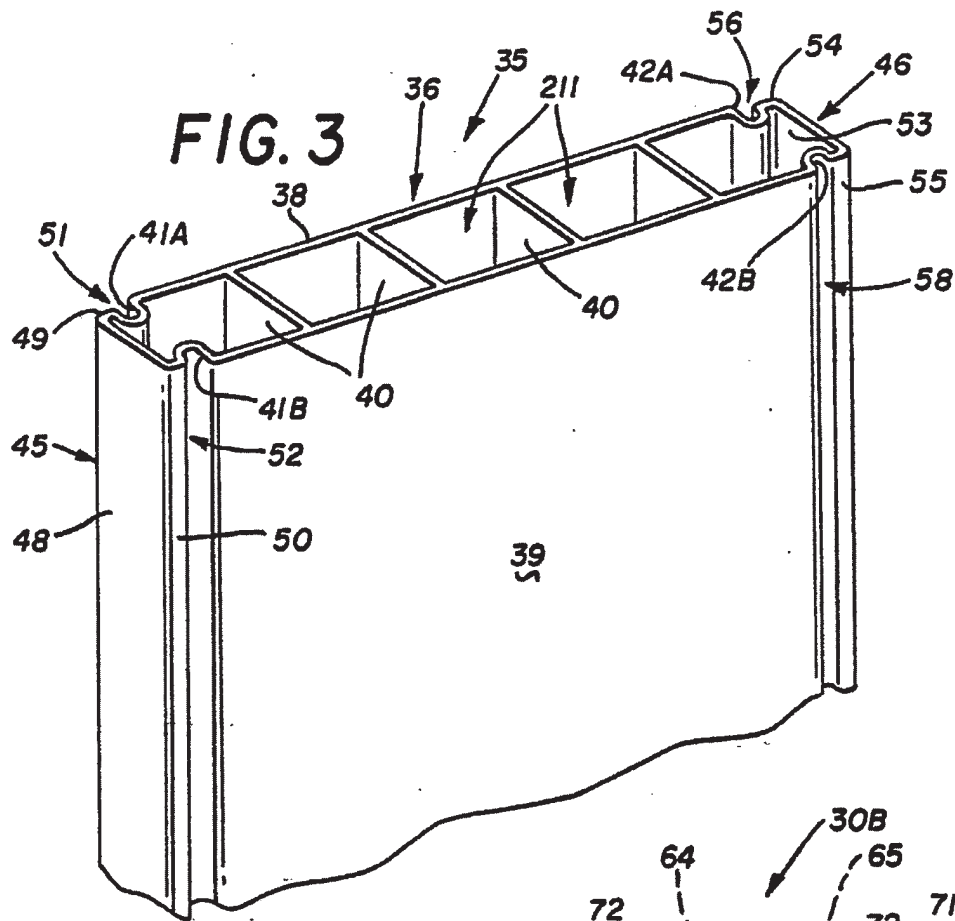


FIG. 4

FIG. 5

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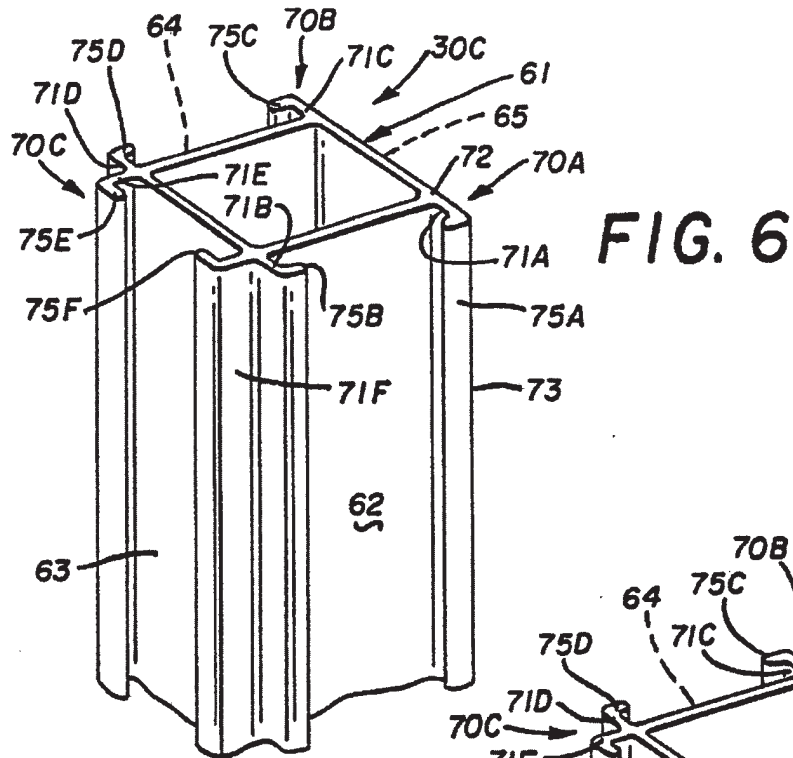


FIG. 6

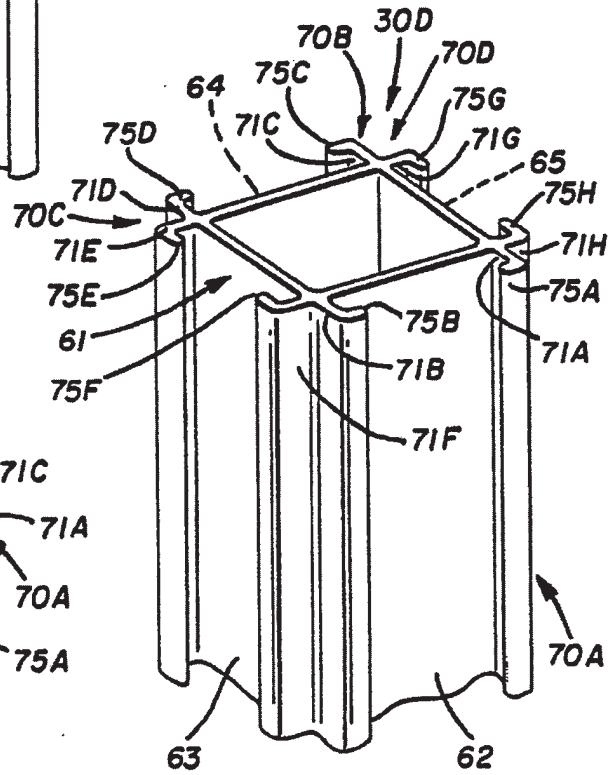


FIG. 7

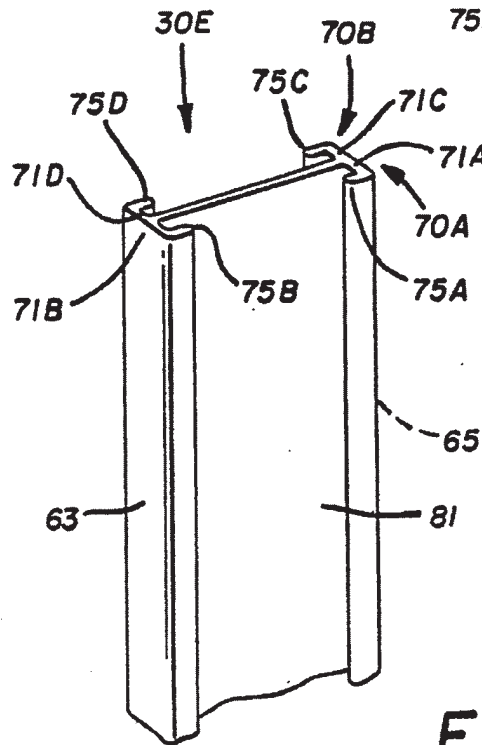
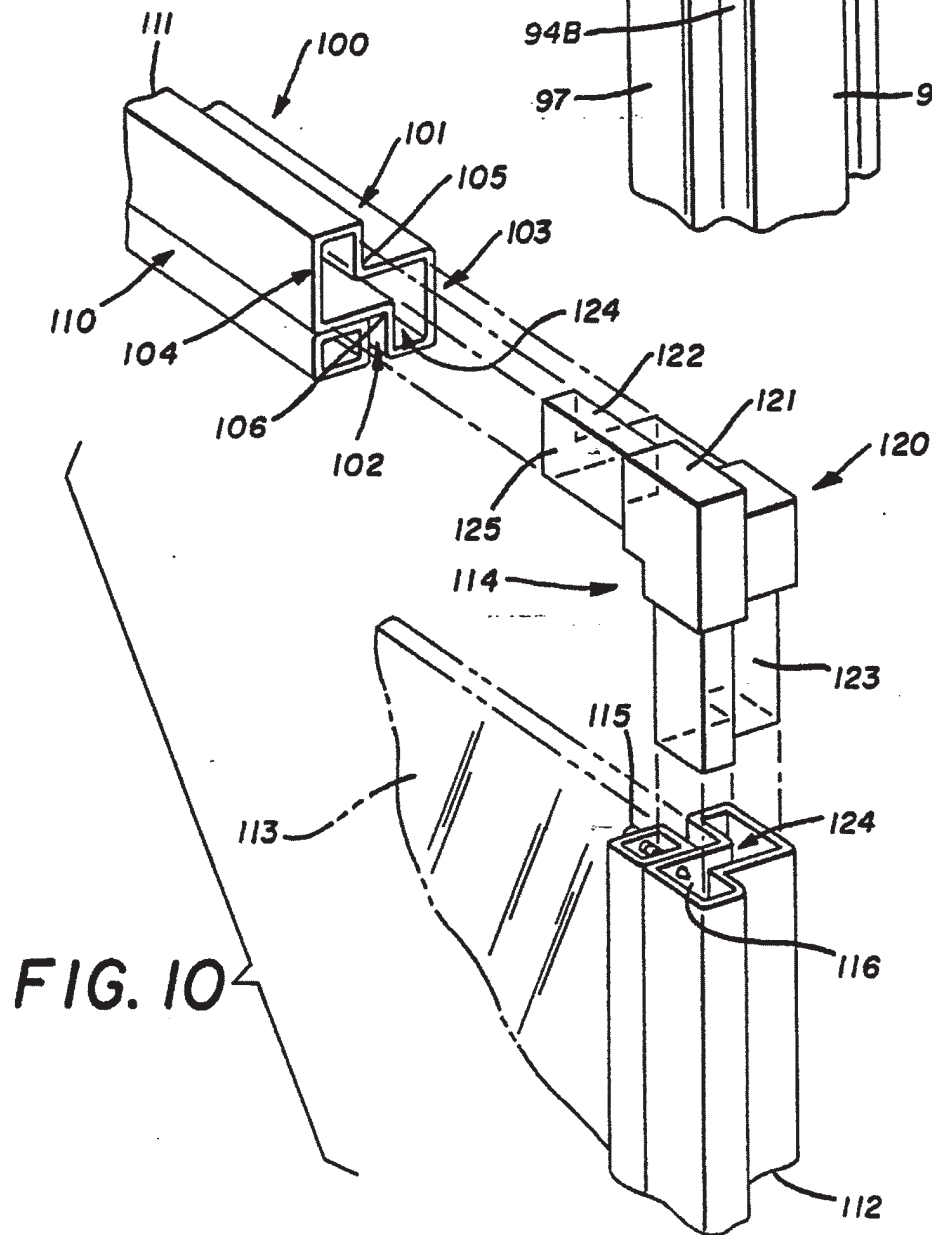
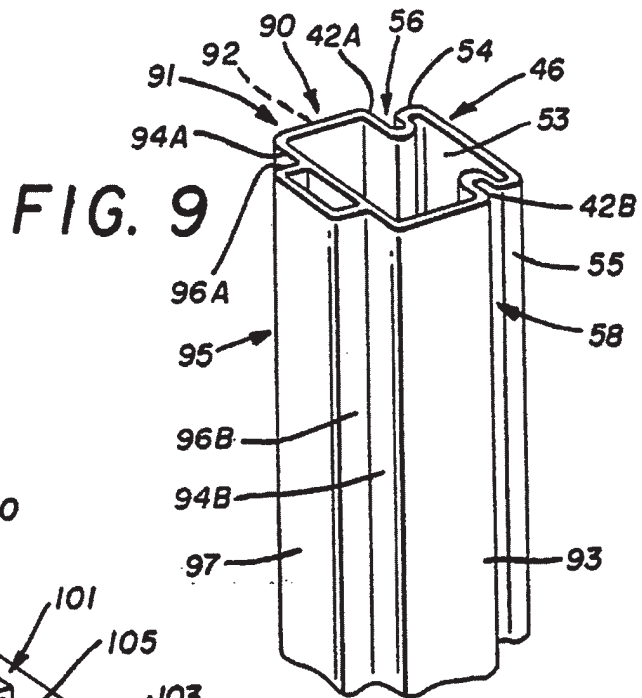
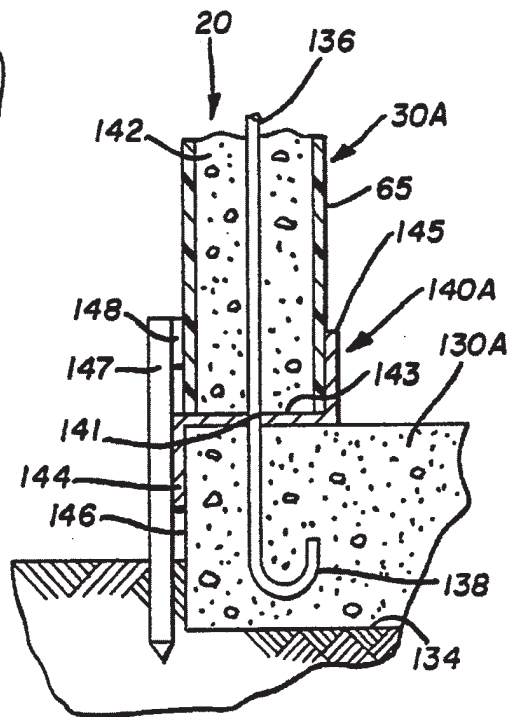
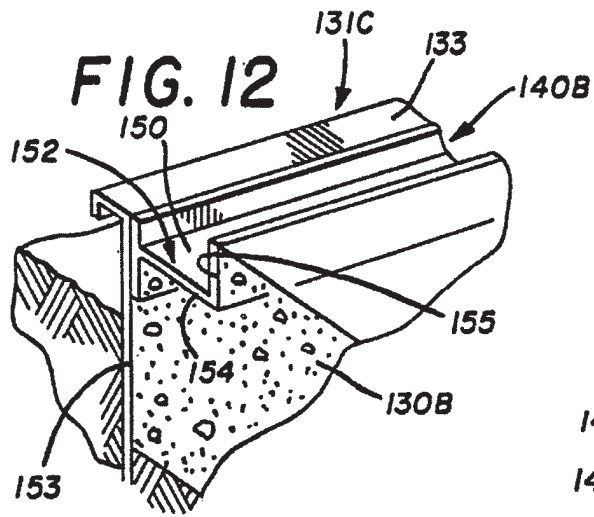
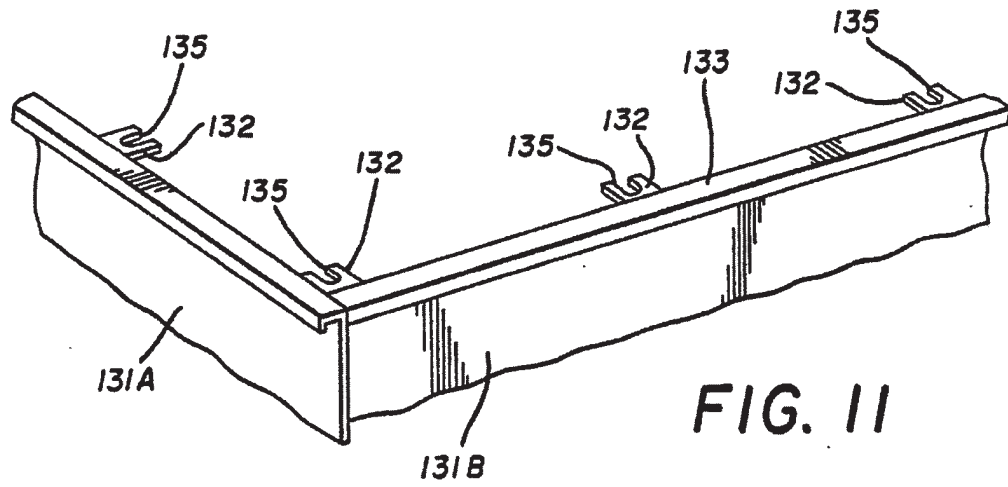


FIG. 8

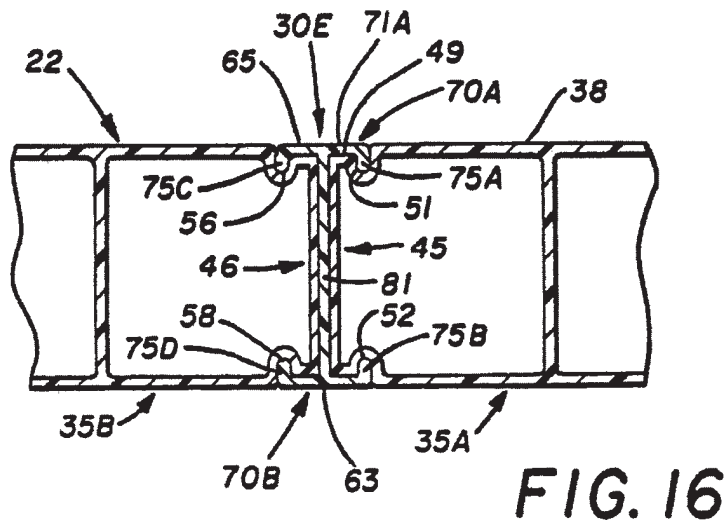
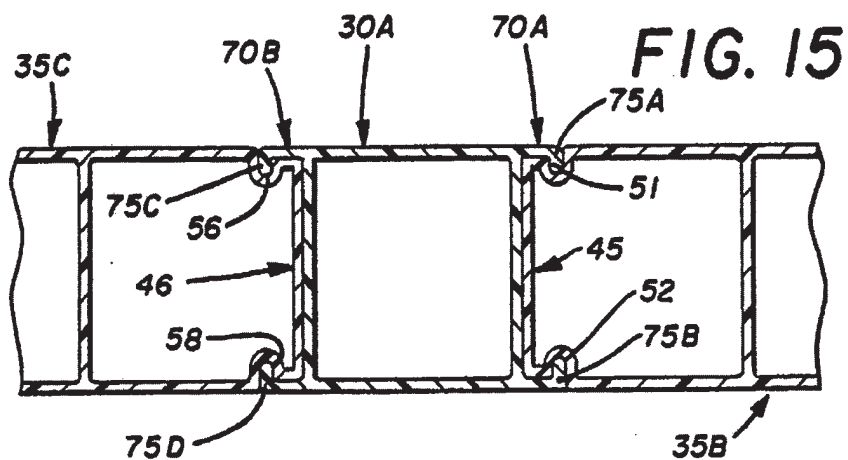
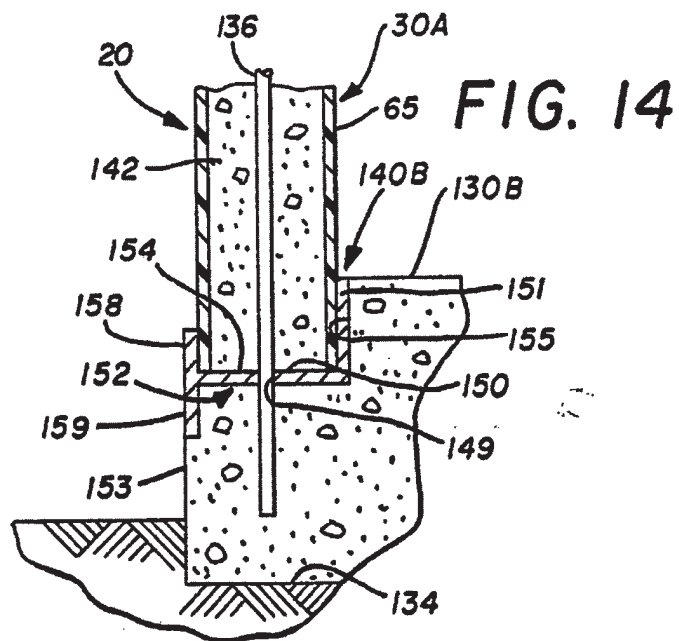
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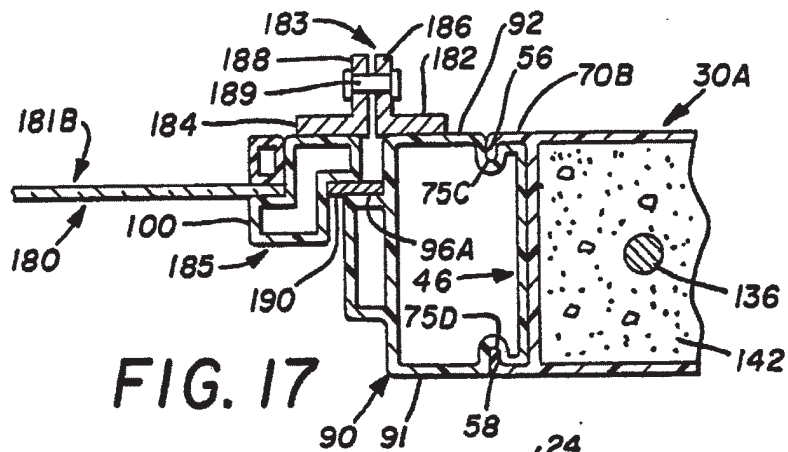


FIG. 17

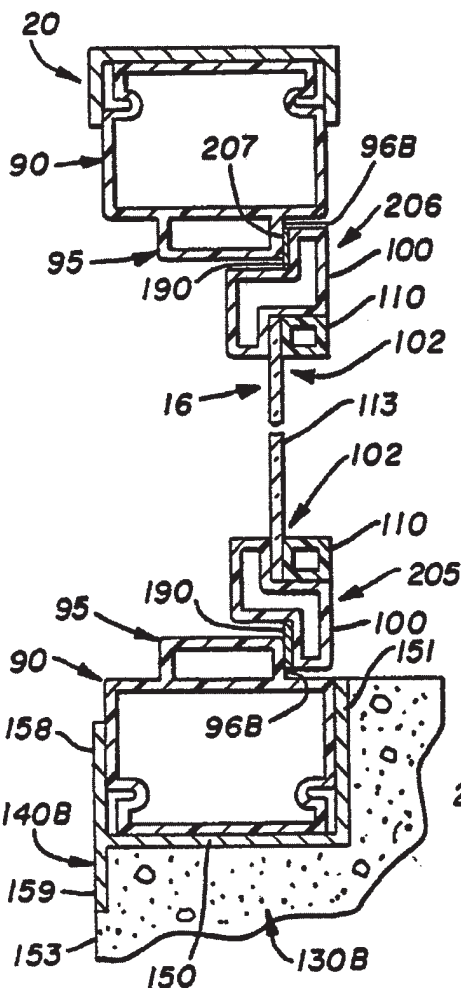


FIG. 18

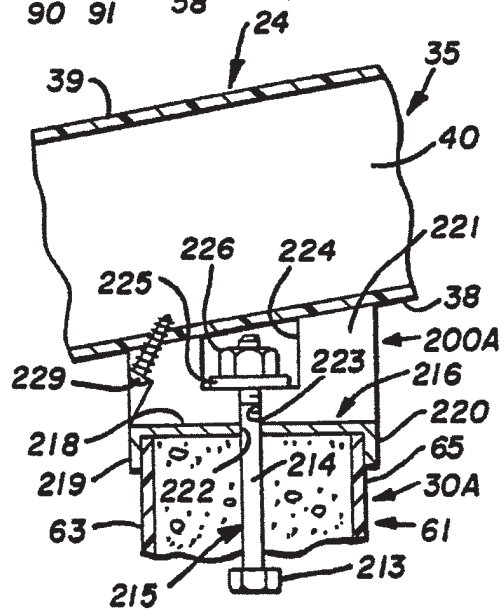


FIG. 19

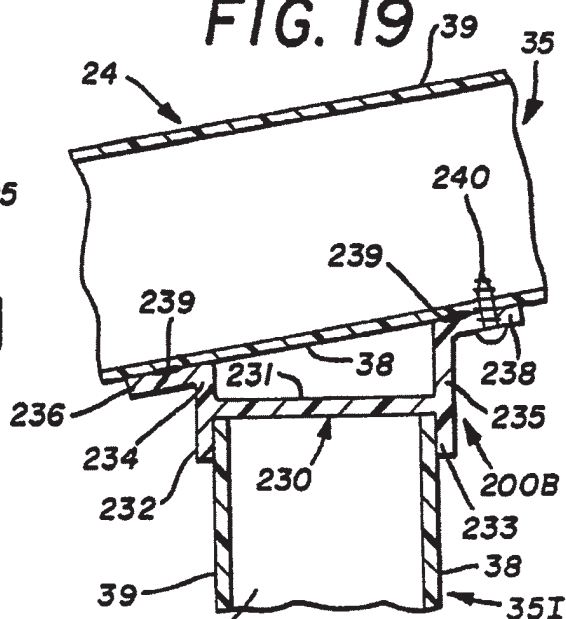


FIG. 20

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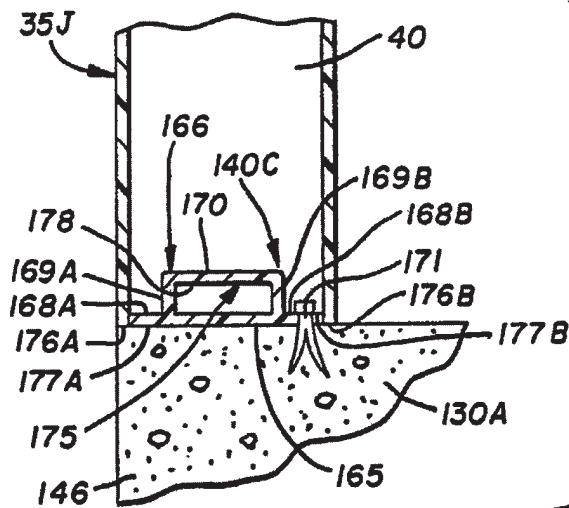


FIG. 21

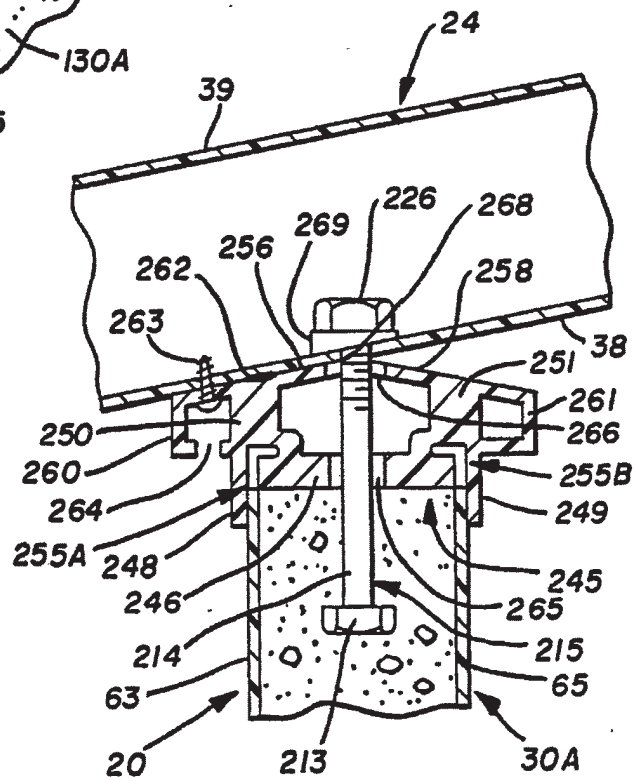


FIG. 22

09

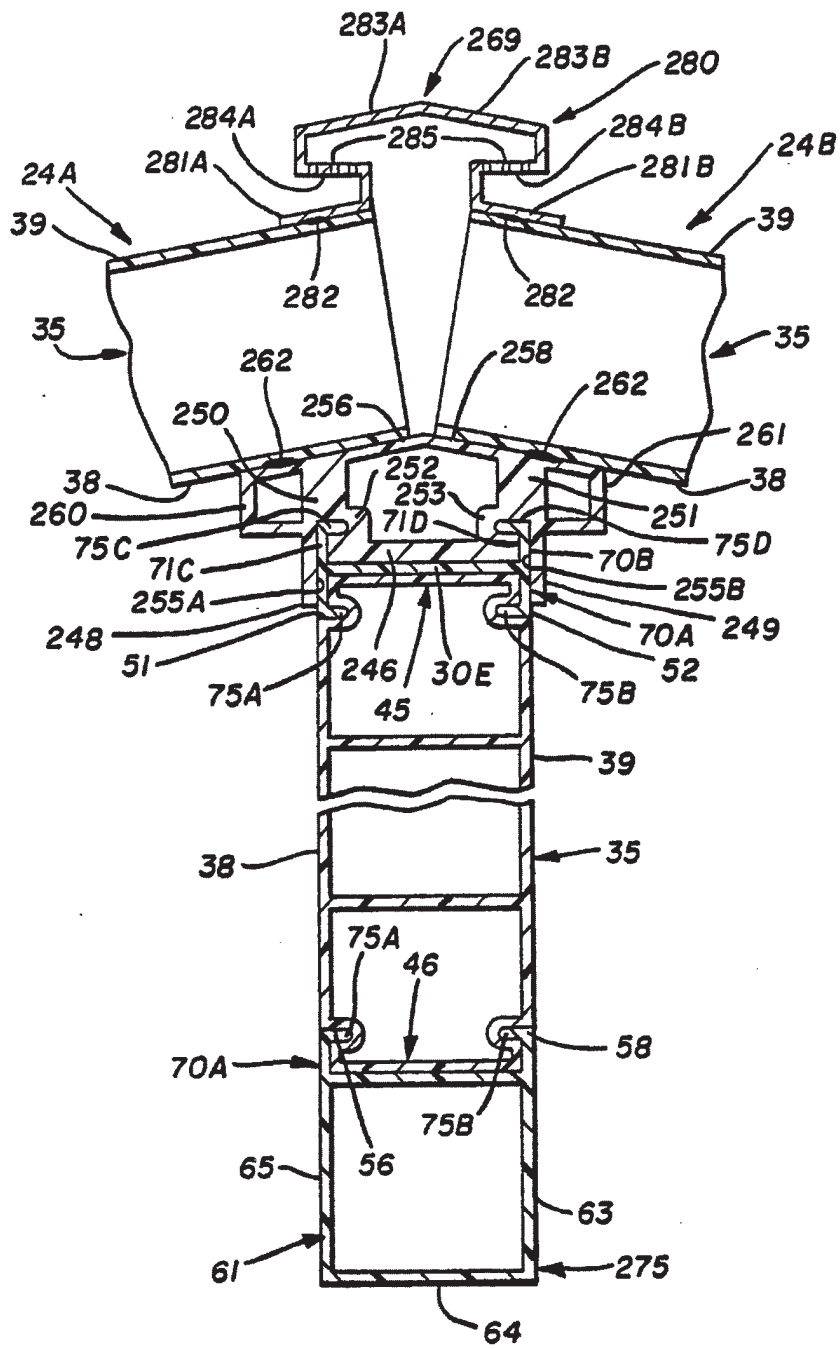


FIG. 23

80
91

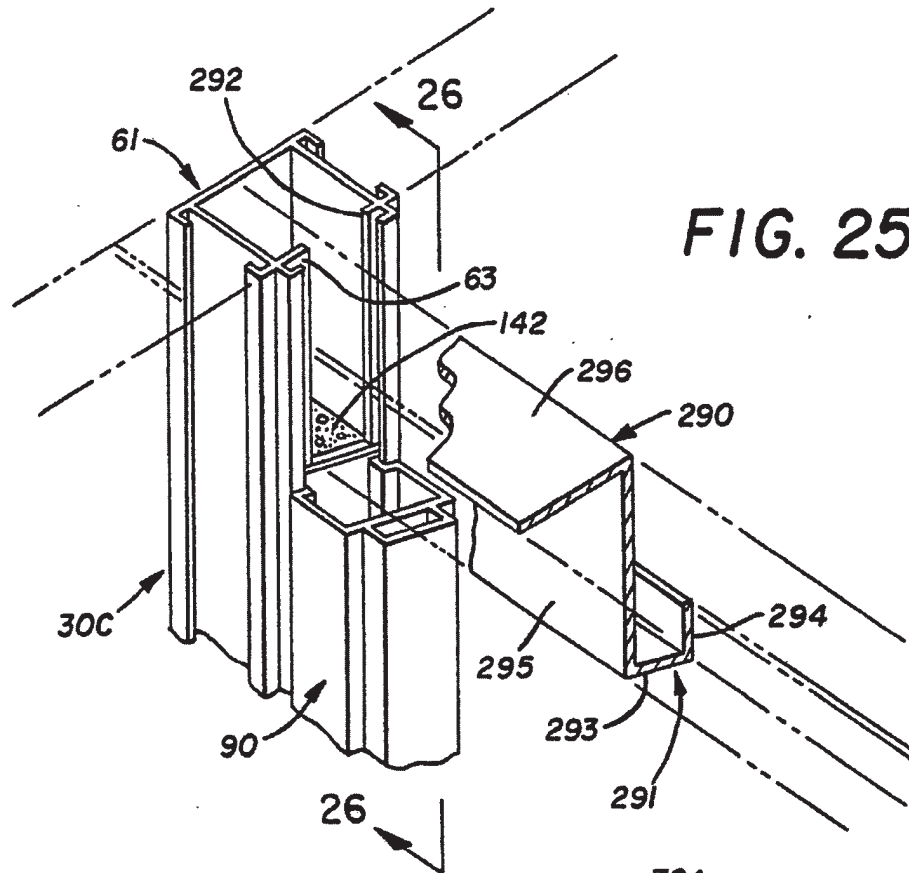


FIG. 25

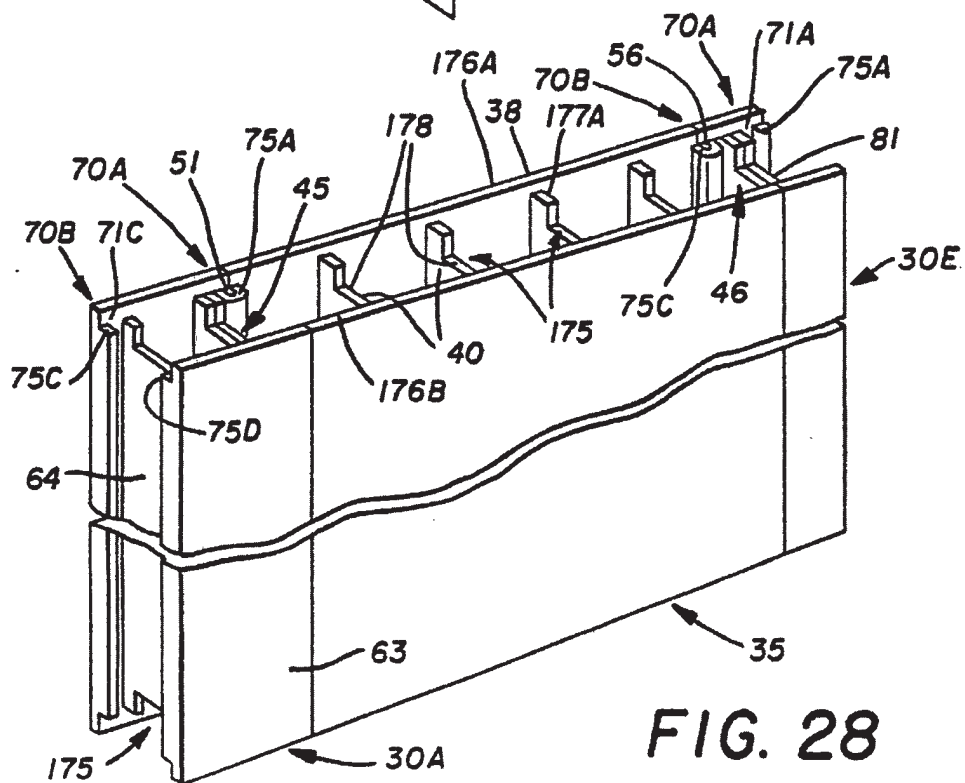


FIG. 28

90
92

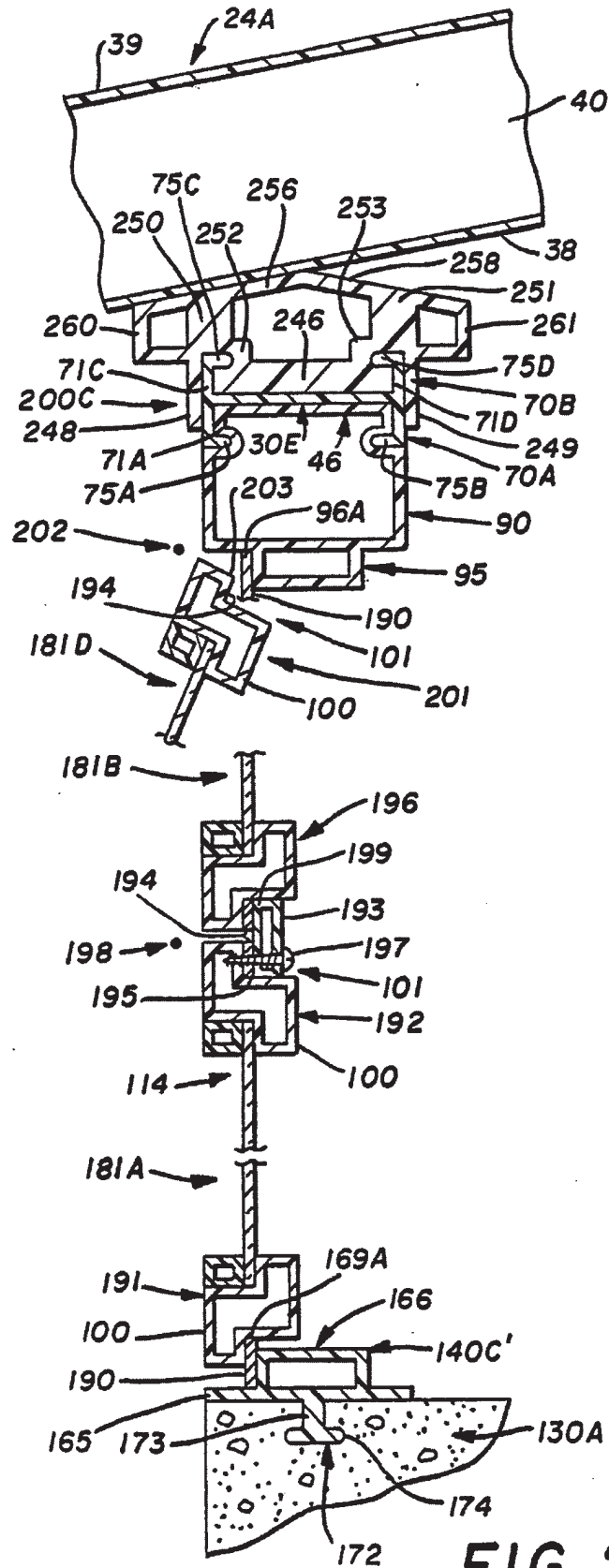


FIG. 27



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 12 0314

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
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			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			E 04 B E 04 H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20-03-1989	Examiner SCHOLS W.L.H.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	



US005608999A

United States Patent [19]

McNamara

[11] Patent Number: 5,608,999**[45] Date of Patent: Mar. 11, 1997****[54] PREFABRICATED BUILDING PANEL**

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J4H 2T2

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[21] Appl. No.: **507,881**

[22] Filed: **Jul. 27, 1995**

[51] Int. Cl.⁶ **E04B 2/28; E04B 2/72**

[52] U.S. Cl. **52/275; 52/426; 52/429;**
52/220.1; 52/783.1; 52/563; 52/588.1; 52/731.3

[58] Field of Search **52/275, 279, 282.1,**
52/588.1, 589.1, 591.1, 592.1, 783.1, 731.2,
731.3, 732.1, 732.2, 563, 571, 426, 427,
429, 442, 220.1; 249/33, 36, 38, 40, 219.1,
216, 194

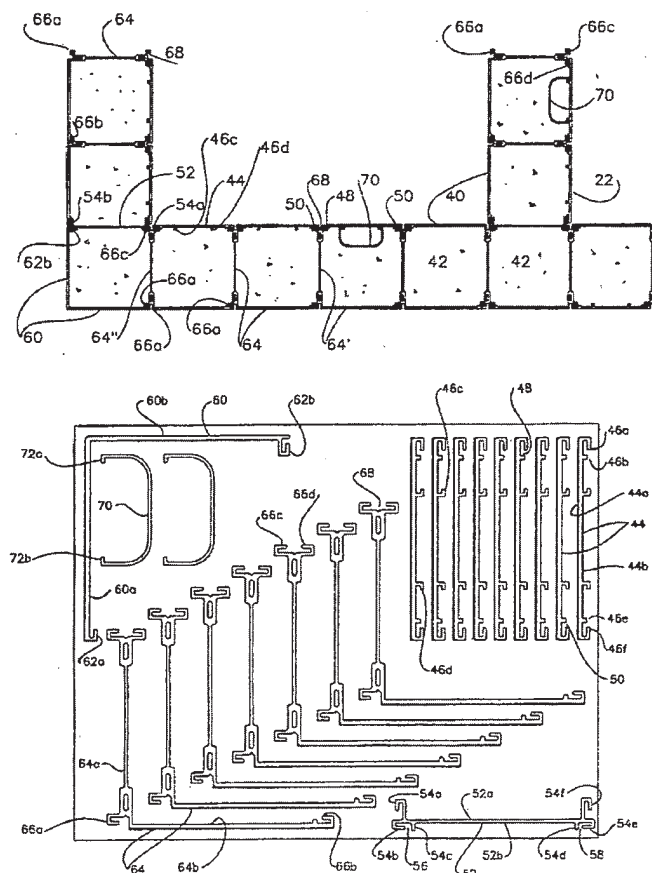
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Primary Examiner—Robert Canfield
Attorney, Agent, or Firm—F. Martineau

[57] ABSTRACT

An assembly of extruded thermoplastic structural components for use in the construction of a building, each structural component including an elongated rigid sheet member provided with at least two integral lengthwise edgewise rails. The structural components include first flat wall structural components and second elbowed corner structural components, wherein a few of the structural components releasably slidingly interlock with one another about their rails to form a hollow elongated panel. The inside cell of the hollow panel receives concrete to be poured. The hollow panel releasably interlocks with adjacent hollow panels successively to form a continuous wall structure. The structural components in their disassembled state released from one another are compactly stackable in the smallest volume of storage, whereby shipping costs from the home country manufacture to the local building site are very low.

4 Claims, 10 Drawing Sheets

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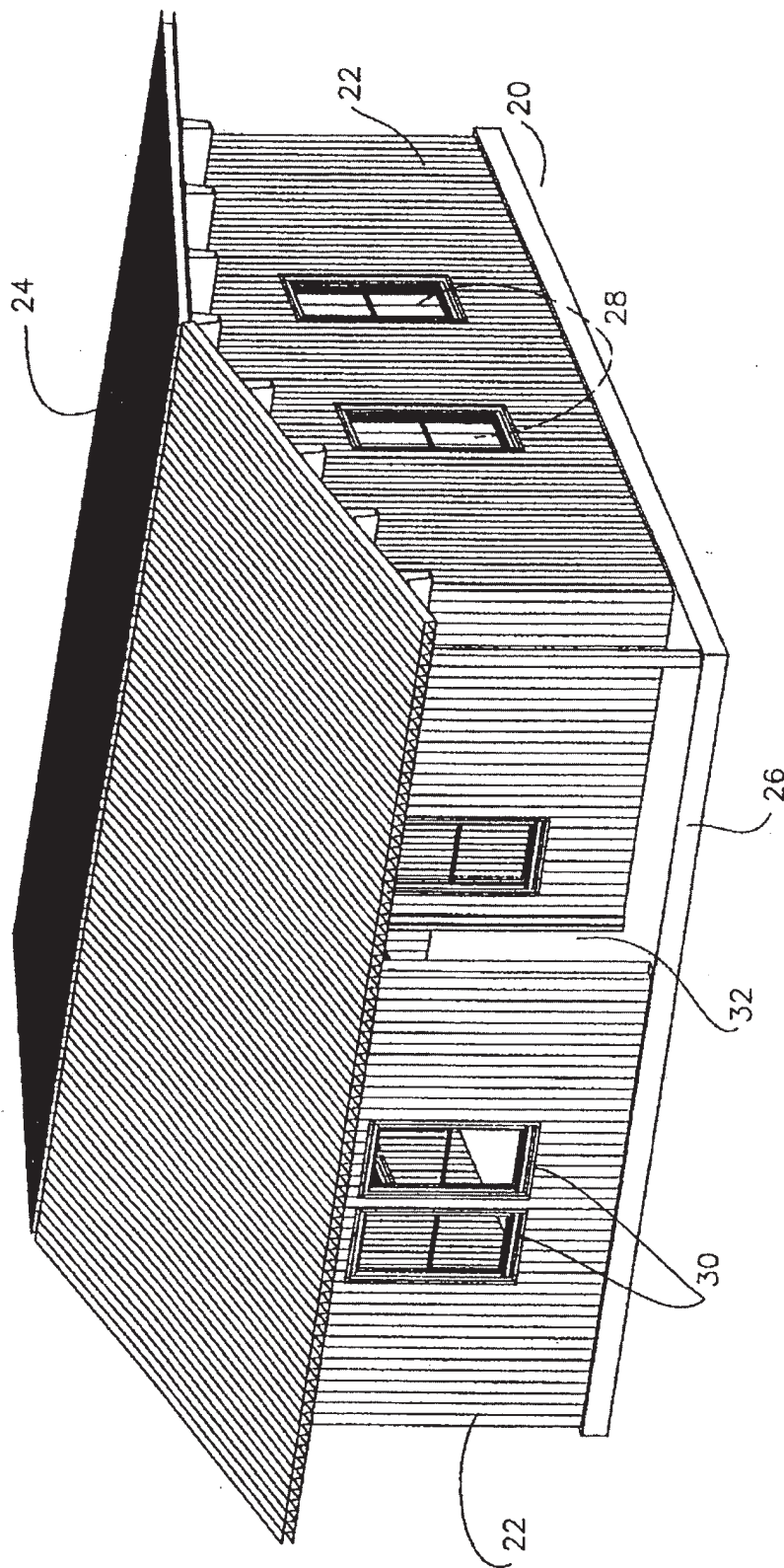


Fig. 1

96
96

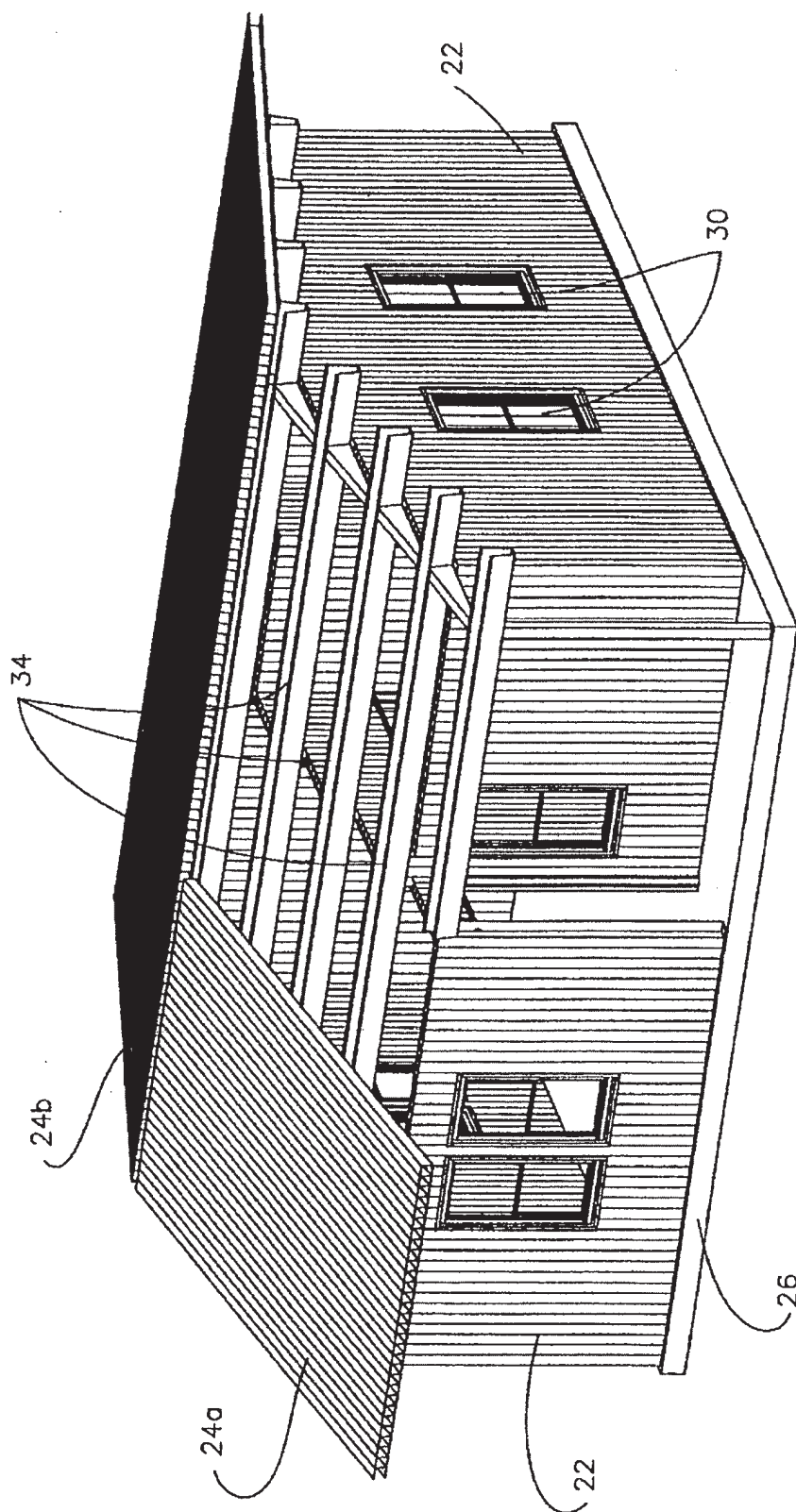


Fig. 2

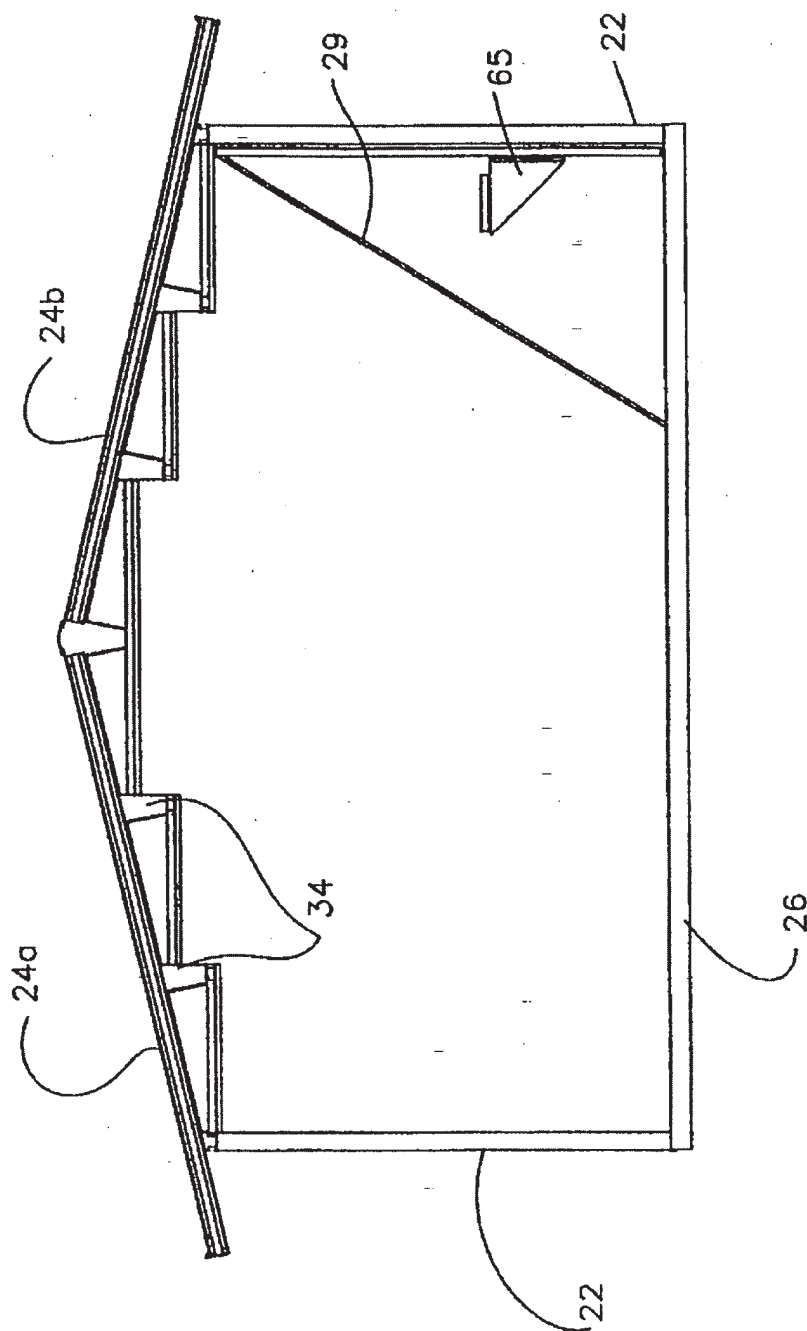
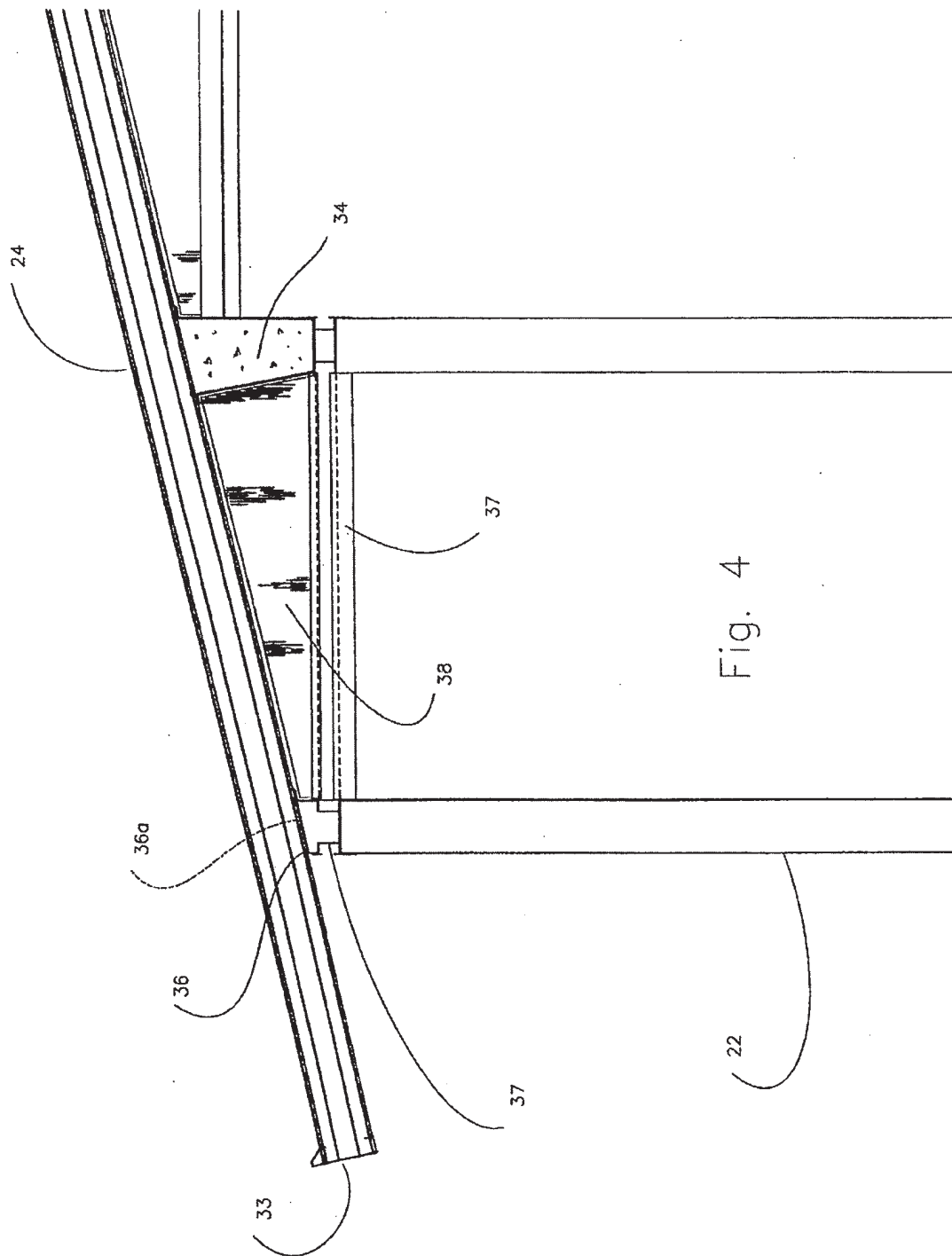


Fig. 3



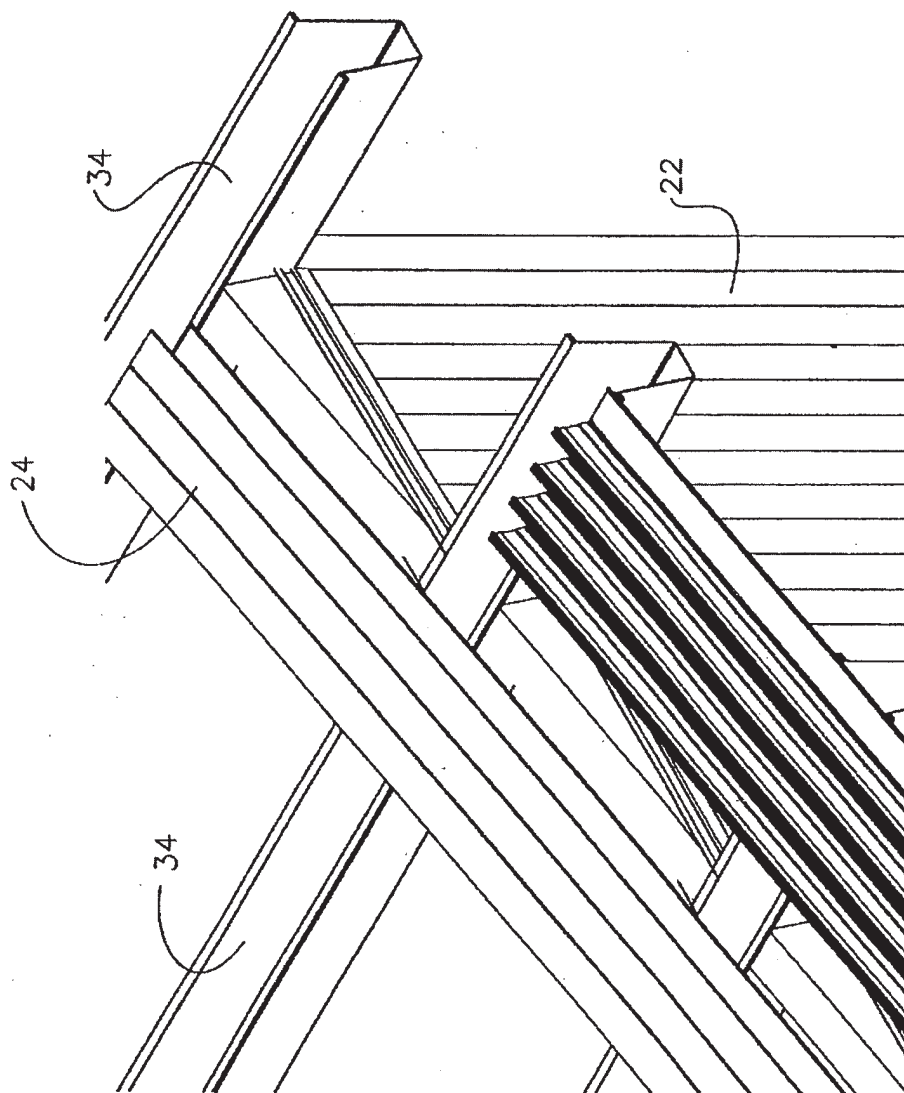


Fig. 5

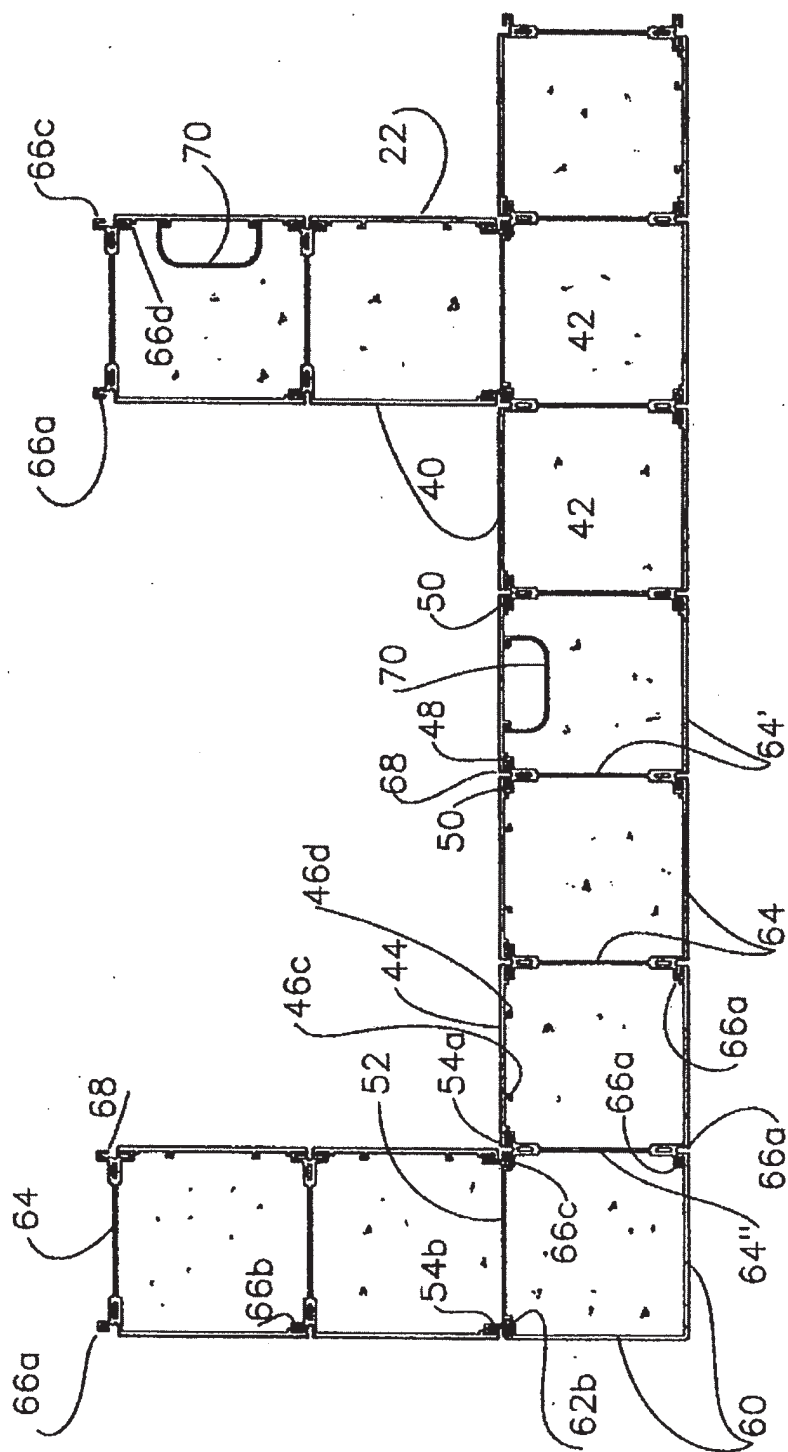


Fig. 6

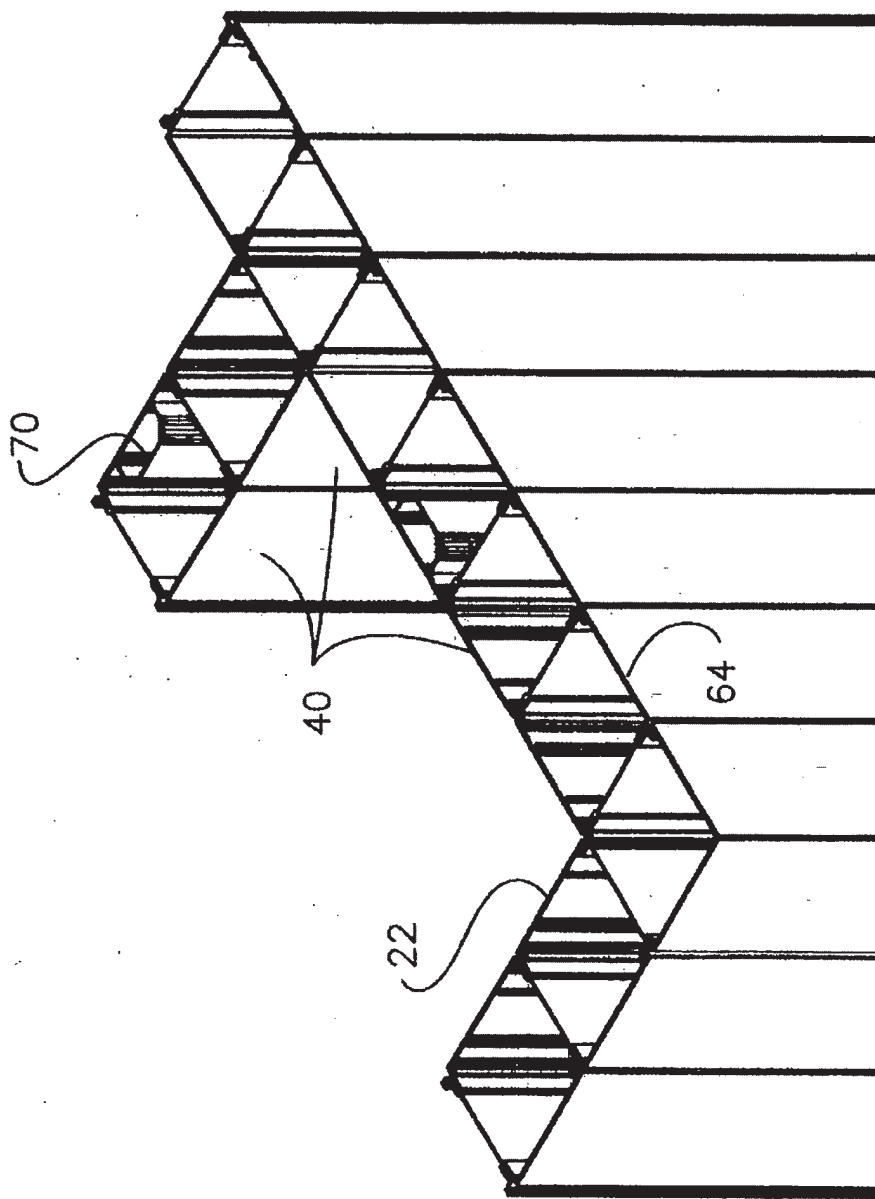


Fig. 7

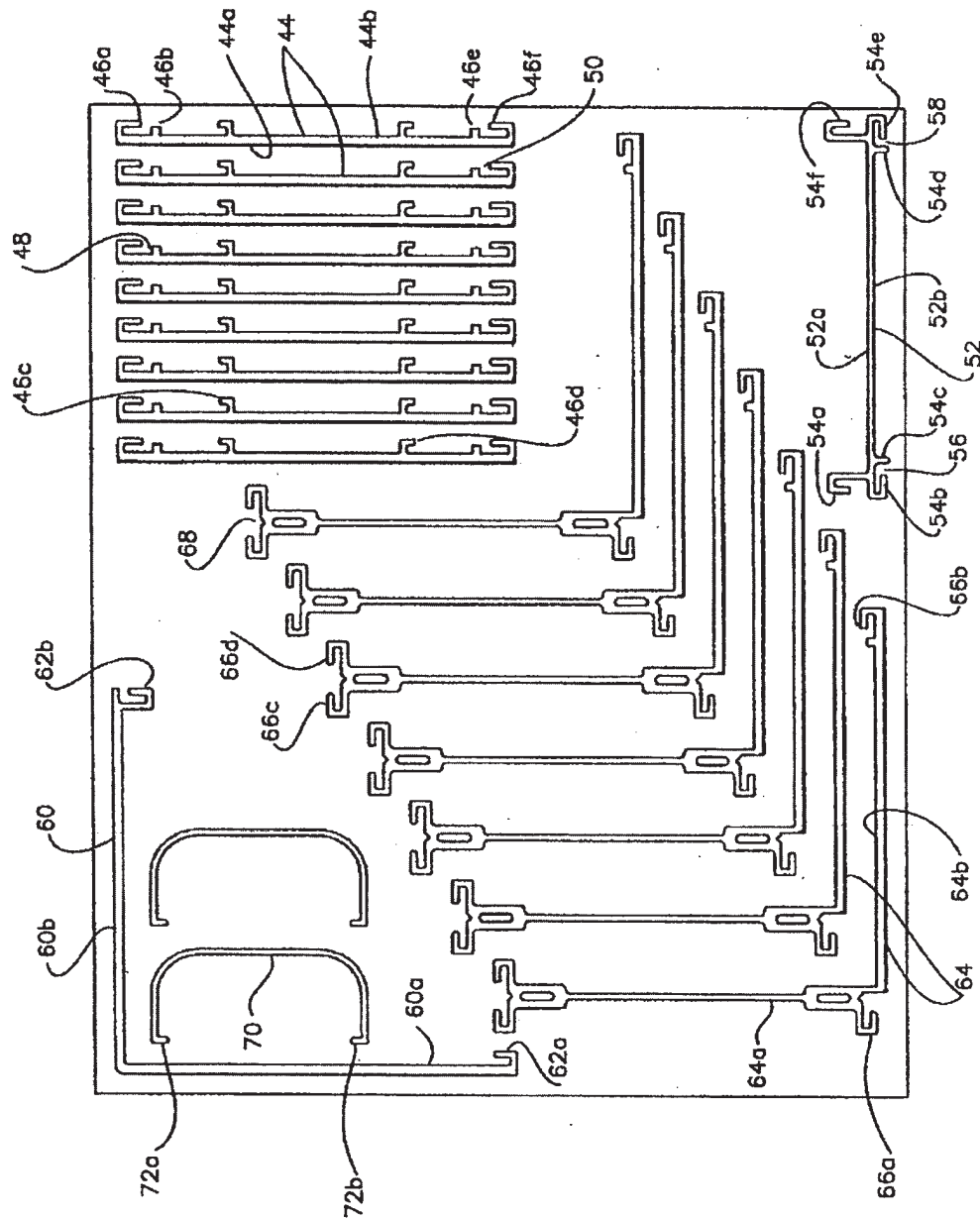


Fig. 8

10.3

~~10~~

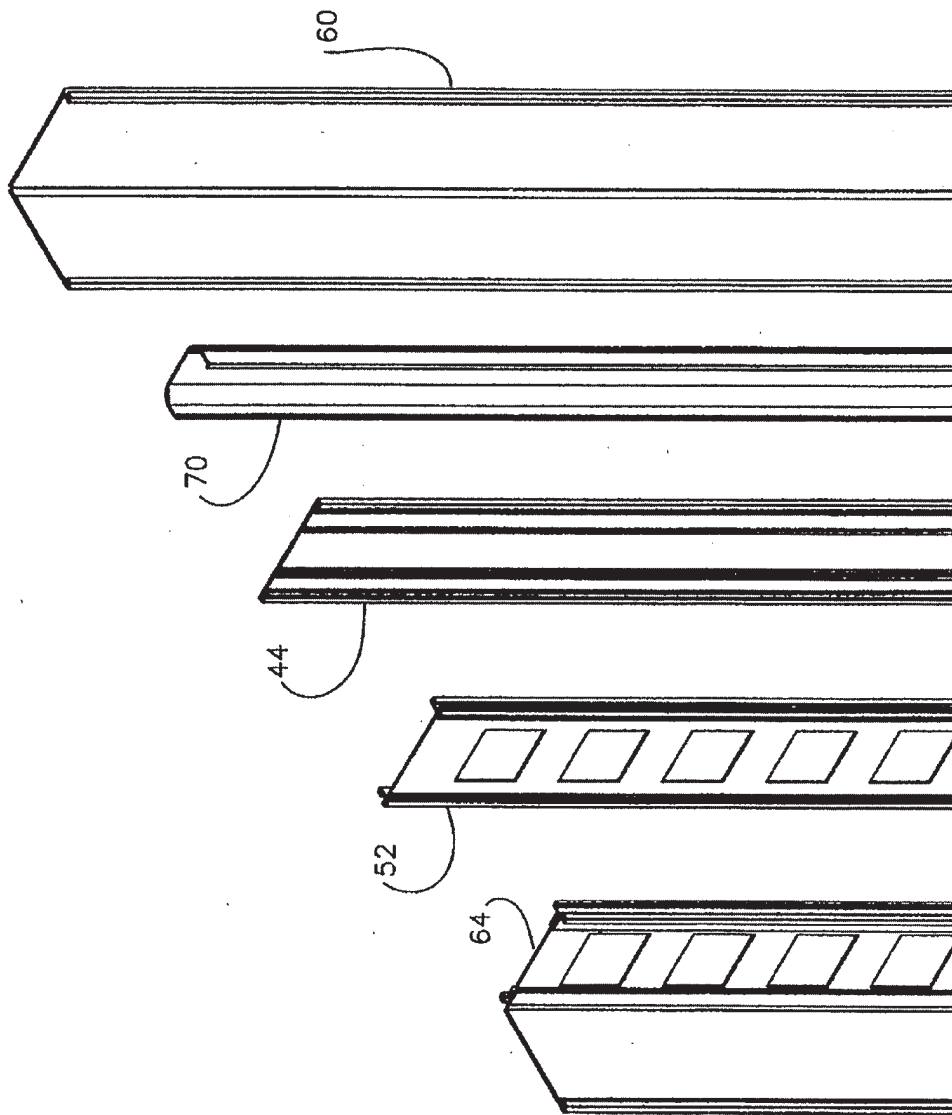


Fig. 9 Fig. 10 Fig. 11 Fig. 12 Fig. 13

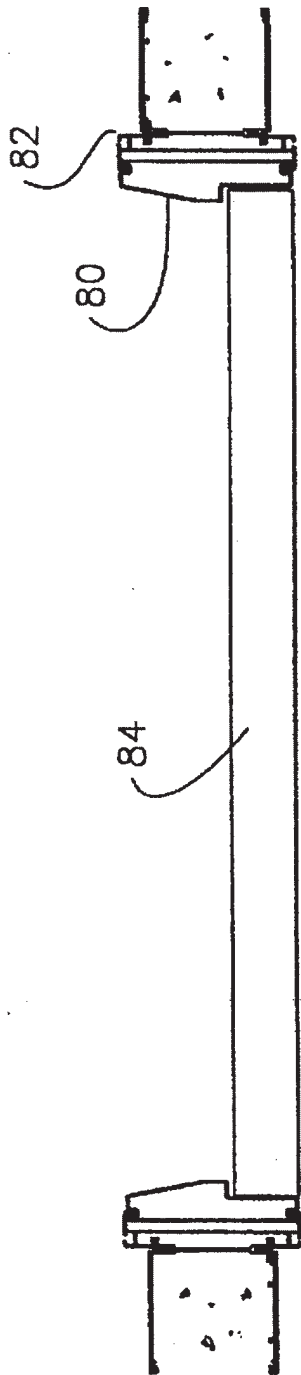


Fig. 14

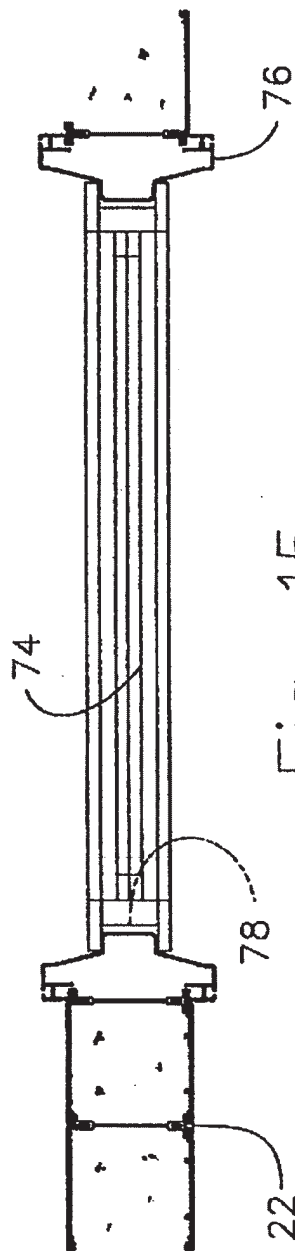


Fig. 15

PREFABRICATED BUILDING PANEL

FIELD OF THE INVENTION

This invention relates to interlocking factory-made structural components, particularly extruded plastic components, for assembly by unskilled labour into a building.

BACKGROUND OF THE INVENTION

Currently, there are two main methods used for the construction of concrete buildings:

1. assembling individual casings on each building site, and then pouring the liquid concrete in these casings before it is allowed to set. The delays for constructions in this case are quite lengthy.

2. Providing precast factory-made components, which substantially decrease the time required for in situ assembly of the house. Unfortunately, a significant disadvantage is that heavy machinery is required for this method. Moreover, transportation costs of the factory-made components, and the associated distance between the building site and the extrusion manufacturing facility, become major cost elements.

Major trends in the construction business include a progressive shift from conventional structural components, namely wood, steel and aluminum, toward extruded plastic material-based panel products having enhanced value added factory-made features, increased durability, decreased maintenance requirements and major domestic energy consumption savings features. PolyVinyl Chloride (PVC) is particularly appreciated, since it is cost effective: having 56% of chloride in weight (supplied from halite) and only 44% of hydrocarbons, PVC will be less cost-sensitive than other plastic materials to the cyclical variations in the market prices of petroleum products and of ethylene in particular.

Such plastic based wall panels are desirable, because of their resistance to weather, to impacting and to abrasive forces, because they have a good loading resistance relative to its weight, a very high resistance to the destructive action of chemical agents and a good resistance to combustion, rust, salt, insect damages, and rot. These plastic panels apply not only to domestic buildings or houses, but also to industrial, commercial and institutional buildings, and not excluding gazebos, partitions, sound barriers along highways, farm buildings and barns, and sheds.

Canadian patent application No 2,070,079 published Nov. 30, 1993 in the name of Vittorio DE ZEN, discloses a building constructed of extruded, thermoplastic, structural components. The building is based on a system of factory-made components developed in such a way as to include all the components required for the assembly on the building site of a house with unskilled labour. The extruded modular components are edgewise interlocked to one another to form continuous, flat wall panels for forming the upright walls and roof parts of the building. More particularly, the side walls and roof panels are said to be configured to be connected into the housing structure by interlocking mating engagement with adjoining members so that they can be assembled without the use of tools. Each wall panel is hollow, is made from PVC plastic material, and consists of spaced exterior and interior walls connected by transverse webs forming internal cells.

Such a wall panel system is lightweight and very easy to assemble by unskilled labour. It appears basically as a casing into which concrete is poured to form smooth, aesthetically

appealing interior and exterior plastic wall faces which require minimal maintenance compared to houses built according to different standards.

On the building sites, after assembly of the hollow wall panels, the internal cells can then be filled with uncured (liquid) concrete and/or a flowable thermal insulation material. Hence, a self-supporting structure can be erected and anchored to a base and converted into a permanent and sturdy structure.

The De Zen structural components as disclosed include extruded hollow panels, extruded hollow pane box connectors, extruded hollow beams and adapters, and extruded panel connectors. All these structural components are factory made, so that they can be assembled on the building sites by unskilled workers in a short period of time. Interior and exterior doors, windows, electrical and plumbing lines, cupboards, and other building elements can be accommodated by this system.

An important disadvantage of such hollow extruded panels pertains to their transportation to the building site: since they are hollow, they take a relatively important volume in the truck van storage area, i.e. a lot of empty space trapped by the hollow panels is wasted during shipping thereof.

In particular, within the new commercial environment created by the North American Free Trade Agreement (NAFTA), trade barriers such as tariffs between Canada, the United States and Mexico have disappeared or are in the process of disappearing. Accordingly, the importance of transportation costs of building components have increased as a percentage of the total costs of building constructions.

U.S. Pat. No. 3,992,839 issued Nov. 23, 1976 to the Ethyl Corporation, also discloses hollow extruded wall members, which are interconnected by transversely extending integral male and female connectors. More particularly, each wall member includes two main parallel wall panels spaced from one another by the transverse connectors. The male connector forms an arrow shape stud, while the female connector forms a complementary socket. The male and female connector elements interlock horizontally with one another in snap-on or clipping, generally unadjustable fashion, along interconnecting axes being orthogonal to that of the parallel (interior and exterior) side wall panels. Additional open tubular corner connector beams are provided, to interlock two adjacent wall members at a 90° degree relative to one another.

One disadvantage of such an extruded wall system as in the Ethyl patent, is that substantial volume is once again wasted during shipping of the corner connector beams, since again, these corner connectors circumscribe a hollow. Moreover, because the axes of interconnection of the wall panels are orthogonal to the planes of the wall panels, a separate corner connector element is required to interlock the two adjacent corner wall panels, thus increasing the total number of wall components required for assembling the building. Thirdly, such transverse connector studs are more likely to be accidentally damaged during handling thereof in the shipping process, because they protrude from the main panel walls, and because they are of the snap-on type. Also, relative adjustment of the panels is difficult, because once the male and female connectors are clipped together, they are not designed to be thereafter relatively movable.

OBJECTS OF THE INVENTION

The gist of the invention is to provide a system of lightweight plastic building wall and roof modular compo-

nents for building construction, which may be stacked in a very efficient fashion in their disassembled state so as to take the smallest loading volume during shipping.

An important object of the invention is that said modular components be of easy assembly by unskilled labour.

A general object of the invention is to provide a building system combining home country state of the art technology with local labour and locally available building materials (usually concrete), wherein the total project cost for a building unit be very low.

Another object of the invention is that the building system consist of several plastic components which will be used as casings for receiving and supporting therein the concrete.

An object of the invention is to improve upon published Canadian patent application No 2,070,079, supra.

SUMMARY OF THE INVENTION

Accordingly with the objects of the invention, there is disclosed an assembly of extruded thermoplastic structural components for use in the construction of a building, each structural component including an elongated rigid sheet member provided with at least two integral lengthwise edgewise rail members, said structural components including first flat wall structural components and second elbowed corner structural components, wherein a few of said structural components releasably slidably interlock with one another about their said rail members to form a hollow elongated panel; wherein each said hollow panel defines a body, including a flat exterior face and a flat interior face, and circumscribing a generally closed inner enclosure cell, said inner cell for receiving concrete to be poured and said hollow panel body adapted to withstand the load of a column of concrete poured therein; said sliding interlock engagement between said few structural components forming said hollow panel defining continuous lengthwise adjustment means for one said structural component relative to the other of said few structural components, said hollow panel releasably interlocking with adjacent hollow panels successively to form a continuous wall structure; and wherein said structural components in their disassembled state released from one another are compactly stackable in the smallest volume of storage whereby shipping costs from the home country manufacture to the local building site are very low.

Preferably, the thermoplastic material used in said structural components is polyvinyl chloride, admixed with at least one of the following reinforcing and stabilizing material: mineral fibres and filling materials.

Each said first structural component could further include additional lengthwise rail members, located intermediately of the first mentioned rail members; and further including at least one third structural component, being of cross-sectionally U-shape and having a pair of lengthwise edgewise flanges, said flange slidably adjustably engaging said additional intermediate rail members of a given said first structural component wherein said first and third structural components become interlocked; and wherein a generally closed channel is defined by said third structural component within said inner cell of a said hollow panel member, for free lengthwise passage of electrical lines.

Such a prefabricated building construction system uses thermo-setting plastic extrusions. This system has been conceived for the construction of low-cost buildings and enable production of all the structural components on a large scale.

These plastic based extrusions will be factory-made, being pre-cut and prelabelled to be assembled on the building sites by unskilled labour in countries where demand for this type of building is high. The wall extrusions are thereafter filled with concrete, while the extrusions forming the roof may be filled by regular concrete or by concrete mixed with polystyrene pellets which will permit the increase of the thermal ratio of the roof while decreasing also the roofing weight. The extrusions can be stacked in a compact fashion, so as to reduce the shipping costs. These buildings will therefore be quite economical and may be sold in all developing countries. This building system will use state of the art techniques for the structural plastic components in the home country factory, while an unskilled labour force and local concrete will be used on the building sites.

This building system is in fact a system of wasted casing, which may also be used for manufacture of a wide variety of structures such as fences, docks or privadas. The buildings manufactured with this system are for all practical purposes built from monolithic ferro-concrete. They will therefore be resistant to earthquakes, termites, corrosion, rot, hurricanes, and generally speaking to damaging weathering action.

The wall and roofing extrusions have been developed so as to resist to concrete expansion during setting thereof. The extrusions are assembled together so as to constitute a hollow wall by sliding same vertically from the top down, adjustably one into the other. Bores are made in the extrusions forming the web of the wall, so as to allow concrete to seep from one cell to another so as to make a monolithic wall. Moreover, reinforcing steel rods may be mounted to the base and to the top of the wall, to improve resistance of the concrete.

Several auxiliary extrusions are envisioned, so as to constitute the outer corners of the L-walls, the T intersections of the walls, the top and bottom sills, the roof soffits, and the extrusions which are used as adaptors for the doors and windows.

The system is a complete system including false frames to receive windows and doors, a roof frame system moulded in place thanks to a fibreglass casing (or with wooden beams), together with all the adaptors required for constituting the complete envelope of a building.

The extrusions have been developed so as to support therein the load of concrete. The main extrusions may be made from recycled PVC. A thin layer of co-extrusion will then be made in coextrusion over the exposed surface of these extrusions. The extrusions may be deep-dyed or may be painted thereafter.

The whole system is conceived and controlled by computer. This enables to make the components on a large scale, but also to personalize each of the buildings according to the particular needs of the clients. CAO-FAO computer conception and manufacture enables excellent inventory management and follow-up of working and shipping schedules.

The building components are characterized in that they are made from a plastic material, preferably extruded PVC; that they are finished on both sides, so that no outer or inner coating is to be installed thereafter; that the PVC extrusions interlock into one another so as to make a hollow wall ready to receive concrete; that some of these components carry therein channels to receive electrical lines which will be concealed in the walls and roofs; that a low number of different components will be required to make a building; that these building components may have varying textures and colours; and that the components are of modular dimen-

104
106

sions, the dimensions of the doors and windows having therefore to conform to these component dimensions.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a house constructed with the modular plastic components of the present invention, into which concrete has been poured;

FIG. 2 is a view similar to FIG. 1 but with a fraction of the roof panels being removed to show the roof frame rafters, and suggesting that the roofing is made from a precast fibreglass casing into which is poured reinforced concrete;

FIG. 3 is a vertical sectional view of the house of FIG. 1, showing in cross-section the wall panels and roof panels according to the invention, together with top and bottom sills;

FIG. 4 is a view at an enlarged scale of the area at the upper left side of FIG. 3;

FIG. 5 is an isometric view of the building elements of FIG. 4, showing the connection between the various wall and roof components;

FIG. 6 is a horizontal sectional view of the interlocked wall panels from a corner and T-intersection of the building of FIGS. 1-2;

FIG. 7 is an isometric view of the elements from FIG. 6;

FIG. 8 is a top plan view of a plurality of the modular panel components in disassembled state, suggesting how they can be stored for shipping on a flat surface within minimal storage area;

FIGS. 9 to 13 are isometric views of five different modular panel components according to the invention, with the V-shape component shown in FIG. 9 forming most of the elements of the system; and

FIGS. 14 and 15 are vertical sectional views of an intermediate section of upright wall panel from the building of FIGS. 1-2, suggesting how a door and a window can respectively be mounted into corresponding door and window frames mounted into wall apertures therein.

DETAILED DESCRIPTION OF THE EMBODIMENTS OF THE INVENTION

House 20 illustrated in FIGS. 1-3 is constructed according to the teachings of the invention, and includes upright side walls 22, a sloping roof 24, and a ground basement concrete flooring 26 cast on the building site. To the peripheral edge of the concrete flooring 26, there is mounted a lower sill, which can receive the wall extrusions (as detailed later). To accommodate windows 74 in the side wall 22, window apertures 28 should be made in the side wall 22, into each of which is mounted a window frame assembly 30. The window apertures 28 may be made by selectively sectioning at the home base factory the extrusion panels at different lengths. A large door opening 32 should also be made through side wall 22, for hingedly mounting therein an access door 84 (FIG. 14). Elongated rafters 34 support the two diverging roof sections 24a, 24b, over the top ends of the house side walls 22, while the concrete ground basement flooring 26 supports the bottom ends of the upright side walls 22.

FIGS. 4-5 suggest how the roof 24 is supported by the side walls 22 of the house 20. On all side walls 22, there is a top sill 38. However, the front walls are covered by a top sill 38 in which is mounted a shim 36, to accommodate the fact that the roof does not make a right angle with the building

side wall. The roofing elements 52 and 64 are laid over the shim. The beams from FIG. 9 can be seen, as well as the filling components (FIG. 11). The conventional flashing 33 is located at the bottom edge of the roof slope.

In FIG. 4, to the top of all side walls 22 is mounted a top sill 37, which interlocks to the top end of the side walls 22 and may be secured thereto by screws into the screw groove made on the extrusion 64 of FIG. 9. This sill 37 discloses on each side a ridge enabling the setting of electrical lines which may be connected to the hollow channels 70 (FIG. 6, detailed below), and installed horizontally. Moreover, this sill 37 is used as an anchor for a stay 29, shown in FIG. 3, during concrete pouring to reinforce the upright side wall 22. This stay consists of an upright steel extrusion, abutting against the interior side of the building upright wall 22 and anchored at its top end to the wall 22 in the upper sill 37.

An inclined adjustment stem 29 (FIG. 3) is anchored to the flooring at a distance of approximately 1 to 2 meters from the base of the wall 22, and a square is provided to support the wooden beams (and thus make a scaffolding so that the workers may pour the concrete into the walls). These stays must be installed at approximately two meters intervals, and are recovered after completion of the building construction for other projects.

The roofing 24 is inclined, with the lateral walls 22 having different lengths so as to support this sloped roof. Considering that the system does not provide for any sectioning of pre-cut extrusions on the building sites and that it is almost impossible to manufacture pre-cut extrusions having different lengths relative to one another with respect to the roof slope, the lateral walls 22 of the building are therefore made as a ladder, i.e. in steps. In other words, taking into account that the beams are mounted at one meter intervals, the top of the wall supporting these beams will be straight and will increase in height by 20 centimeters increments at each meter. No sectioning will therefore be required on the building site, and the extrusions of the lateral walls 22 will be of a different length but these types of lengths will be limited. The top of these lateral walls 22 being made in steps, they will receive the upper sill 37 onto which a triangular panel 38 will be mounted to fill the gap between the building side wall 22 and the sloped roof 24. This triangular panel 38 may be made from full or empty wood, of a frame with an integral mosquito net to afford good air circulation, of a frame with permanent glass, or with ventilation louvres, according to the tastes of the customer.

In FIG. 5, we can see the concrete beams or rafters, 34, supporting the roof 24, which are made integral to the PVC casing 64 (FIG. 9) as well as the filling components 44 (FIG. 11) between the rafters. The rafters or beams 34 will be made from concrete cast on the building sites into fibreglass casings, which will be mounted beneath the lateral walls 22 and which will bear under the interior walls. As already explained, during the concrete pouring, temporary stays will be added at about two meters intervals, to support the concrete during pouring. Reinforcing steel rods will be mounted interiorly of this casing, so as to make reinforced concrete beams.

Although this system works very well, it is possible to replace these ferro-concrete beams, depending on the tastes of the customers, by wooden beams of the painted or varnished type. The ferro-concrete beams will be connected to the wall by reinforced steel rods included into the ferro-concrete of the walls and of the rafters 34. In the same fashion, the roof 24 will be connected to the rafters 34 by reinforcing steel rods cast into the rafter 34 and filled at the

same time in the concrete cells 42 of the roof 24. If wooden beams are alternately used instead of the concrete beams, the latter are bolted with threaded stems cast on the concrete walls and extending through the beams. The PVC extrusion constituting the roof will be anchored to the wooden beams by screws or by galvanized nails.

FIGS. 6 and 7 show in horizontal cross-section and in isometric view some of the side walls 22 of the house 20. As shown in these figures, the side wall 22 is hollow, consisting of a plurality of hollow panel assemblies 40, . . . being interlocked to one another in successive pairs in a fashion detailed below. Each panel assembly 40 is rectangular, and preferably square, in cross-section, defining four side walls circumscribing a closed inner cell 42. The top end of the panel assemblies 40 forms an open mouth, adapted to receive flow-through concrete to be poured inside the panel assembly inner cell 42. The side walls of the panel assemblies 40 should be made from a waterproof, rigid material, being relatively thin while being capable of withstanding the loading of concrete inside the inner cell 42. Preferably this panel assembly side wall material will be an extruded thermoplastic sheet material.

FIGS. 8-13 show the various extruded thermoplastic sheet components making the various panel members forming the cross-sectionally quadrangular panel assemblies 40 of the house. FIG. 8 is particular suggests how the extrusion in their disassembled condition can be stacked to take the minimum volume, so as to reduce shipping costs. All the components have been thought off to enable the most efficient stacking features. The extrusions will be shipped in boxes into which may be loaded the various required structural components to make a given wall or roof area.

In the present invention, there are basically four main types of panel members, which are used for both the upright side walls 22 of the building as well as for the roof paneling 24:

1. a first panel member 44, FIG. 11, having a main flat face 44a and an opposite face 44b carrying six transverse fingers 46a, 46b, 46c, 46d, 46e, and 46f. Opposite ends fingers 46a, 46f, are each L-shape and intumed. Straight fingers 46b, 46c, project spacedly proximate the respective L-fingers 46a and 46f, to form a pair of opposite open end pockets 48, 50, respectively. Intermediate fingers 46c, 46d, are L-shape and outturned, i.e. with their outer legs directed away from one another.

2. A second panel member 52, FIG. 10, defining a main body being flat on both faces thereof 52a and 52b, and carrying a triplet of fingers 54a, 54b, 54c, and 54d, 54e, and 54f, at each of the two opposite edges thereof. J-shape fingers 54a, 54f, project from face 52a and are outturned. L-shape fingers 54b, 54e, project from face 52b and are intumed. Straight fingers 54c, 54d, project from face 52b spacedly proximate L-fingers 54b, 54e, to form a pair of opposite open end pockets 56, 58, respectively. This extruded component of FIG. 10 is also perforated, to allow therethrough uncured concrete flow as well as free passage of the reinforcing steel rods.

3. A third, cross-sectionally L-shape panel member 60, FIG. 13, defining a main body having a pair of opposite flat surfaces 60a, 60b, and carrying two ears 62a, 62b, at the opposite edges thereof. Ear 62a projects from face 60a, is L-shape and intumed; while ear 62b is J-shape, is outturned and also projects from face 60a.

4. A fourth, cross-sectionally L-shape panel member 64, FIG. 9, is provided, defining a main body having a pair of opposite, generally flat surfaces 64a, 64b, and carrying four

ears 66a, 66b, 66c, and 66d. J-shape ear 66a projects outwardly from face 64a at the elbowed portion thereof. J-shape ear 66b projects transversely from face 64b at an end edge thereof; while J-shape ears 66c and 66d face one another and project transversely from faces 64a and 64b respectively at the end edge opposite J-shape ear 66b, so as to define a large open end pocket 68 therebetween. This component 64 is cross-sectionally V-shape, and has two sides of similar length. One of the sides may be made from a layer of recycled plastic material together with a coextruded finishing layer, forming the exposed part of the wall, while the opposite side is in fact the wall central core. The central core is perforated so as to allow free passage of uncured concrete from one cell to another, and also to enable free passage of reinforcing steel rods (not shown) to reinforce the wall. This extrusion consists of sliding anchors which permit to interconnect several of the components 64, with one another or with the extrusion of FIG. 11. Moreover, at the slider joint 68, the central sheet body core has been thickened, so as to enable the mounting of frame anchoring screws for cupboards 65 (FIG. 3), or other components requiring to be attached to the wall. The gap between the various extrusions enable to screw through this central core thickening 68 without compromising the finishing of the exposed surface.

The extrusion components 64 shown in FIG. 9 will be applied flatly against the rafters forming the roof frame 24. Once these extrusions 64 are anchored to the roof frame, additional extrusions will be mounted by sliding same from the top down of the building. The periphery of the roof will be closed by the flashing strips 33. These extrusions will keep the concrete in place during pouring thereof, and will ensure the presence of a peripheral flashing 33, around the roofing 24, and of a water outlet. Once all the roofing extrusions have been mounted and anchored, they are filled, one side at a time, at the front or at the rear, with regular concrete or with concrete containing polystyrene pellets. These polystyrene pellets will decrease the overall weight of the concrete, and thus the load supported by the extrusions, and will increase the thermal insulation ratio of the roof 24. Once the front part is filled with concrete, and after setting thereof, the rear part may be filled with concrete to thus complete the building.

Once the concrete has been completely poured, the building 20 will then become completely monolithic, and all the components will become anchored to one another as if they would have been cast all at the same time. The reinforcing steel anchoring will also be provided between the concrete flooring 26 and the walls 22.

Preferably, a cross-sectionally C-shape panel member 70, FIG. 12, may also be provided, having a pair of intumed flanges 72a, 72b, at opposite end edges thereof, for through passage by electrical lines (not shown). For accessing the electrical lines inside channel 70, there is only required to bore a hollow channel in the wall 44, to allow the electrical lines to extend to the top of the wall 22, and to jump from one room to another through the gap provided in the upper sill 37.

The V-shape component 64 in FIG. 9 constitutes the main portion of the present construction system. The component 52 in FIG. 10 is a connector element which enables to obtain the T intersections with the walls 22. In FIG. 11, the component 44 is used with component 64 of FIG. 9 to constitute one of the exterior faces of the walls 22. In FIG. 12, the component 70 is an extrusion with interlocks with the ears 46c, 46d, of component 44 of FIG. 10 inside the wall 22, so as to provide vertical channels for the eventual

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passage of electrical conduits. In FIG. 13, the component 60 is an extrusion which is used to make the corners of the building 20.

From FIG. 6, it will now be understood how the four main components of the invention can be interlocked to one another to form a building structure. Along a straight wall, each cross-sectionally quadrangular panel assembly 40 includes two L-shape panel components 64, 64', which make three of the four walls of the panel assembly 40 (one of the four legs thereof extending to a second adjacent panel assembly), and a flat panel component 44 interconnecting the two L-panel components 64, 64'. More particularly, the end ears 46a, 46f, of flat panel component 44 hookingly engage transversely into the free end channel pockets 68, 68', of the two L-panel components 64, 64' thus spacedly interlocking in parallel relationship the two corresponding legs of these panel components 64, 64'; while the ear 66a of one L-panel component 64 hookingly engages with the ear 66b of the adjacent L-panel component 64'; hence forming a stable cross-sectionally quadrangular hollow panel assembly 40.

An important advantage of such interconnection system for the panel components of a given pair of panel assemblies 40, 40', is the sliding adjustability of the ears 46a, 46f, lengthwisely of the channels formed by the L-panel pockets 68, 68'. This relative sliding ability of the two L-panels 64, 64', enable unskilled workers to successively install these L-panels side by side, progressively, with minimal danger of accidental structural damage while providing continuous axial sliding adjustment capability therebetween. Such a construction system will therefore provide real cost savings with respect to the in situ labour force, thanks to foolproof panel assembly design. In fact, it is this foolproof assembly design, together with the compactness when disassembled for shipping purposes, that afford the unexpectedly high performance achieved with this panel assembly, compared with prior art systems, such as with the snap-on technique disclosed in U.S. Pat. No. 3,992,839, supra.

At corner portions of the side wall 22, the L-shape corner panel component 60 is used, for two of the four sides of the panel assembly 40. A flat panel component 52 is attached by its axial ear 54b to the ear 62b of L-panel 60. The last side of the quadrangular panel assembly 40 is formed by one leg of the L-shape component 64", with ear 66c thereof hooking with axial ear 54e of flat panel 52, and with ear 62a of L-panel 60 hooking with elbowed part ear 66a of L-panel component 64".

Whenever wiring or plumbing lines need to be carried by the wall panel 22 of the building 20, it is preferable that they be made to extend through the hollow 42 of the panel assemblies 40. To prevent the concrete to be poured into the hollow 42 of panel assemblies 40 from engaging these electrical lines, there is slidably mounted to the flanges 46c, 46d, of flat structural panel 44, the cross-sectionally C-shape thermoplastic structural component 70. Hence, an inner chamber of channel is formed inside C-component 70, being separated in fluid-tight fashion relative to the main inner cell 42 of a hollow wall panel 40, for free passage of the electrical lines safe from the concrete inside cell 42.

FIGS. 14 and 15 show door and window assemblies made with plastic extrusions. The windows 74 are mounted into the side wall 22 about a false frame 76 consisting of an extrusion. This extrusion 76 is used to support the windows 74 but also discloses a peripheral groove which may be used to hook shielding weather-boards to the false frame 76. The window frame 76 is installed at the same time as the wall

extrusions 22. However, the window sill is installed only after concrete has set. The door 84 is hingedly mounted to a door frame 80, which is made from PVC and is connected to the wall extrusions 22 by a specific connector component 82 made also from plastic. The door frame installation is done in a similar fashion as that of the window frame installation, except that in FIG. 14, the connector extrusion 82 is used for anchoring the door frame 80 to the PVC frame.

Once the concrete has set, the window sill must be installed, and the window 74 itself must thereafter be mounted into the false frame 76. The door frame 80 may be mounted at the same time as the extrusions and be in position during concrete pouring.

The completed building thus consists of concrete walls covered with plastic, which may be left white or dyed (either deep-dyed or painted with a special paint). The edges of the windows and the soffits can however be of a different colour. The inside of the building thus consists of a white plastic surface for the walls and for the roofs, with the exposed rafters of varnished wood or cast concrete rafters in position inside a coloured fibreglass casing.

The plastic used can be from PVC or other thermosetting plastic material. The plastics used are freely available on the market and are currently manufactured by known corporations. The coextrusion system which will be used is a well known system in the industry, and by adding mineral fibres or filling materials thereto, resistance of plastic should be improved.

All the building system has been developed so that, during the preparation of the plans of the building, all the components forming the building be defined by computed-assisted design, to be thereafter manufactured and precut in the home factory. No component sectioning is required on the building site, and the system assembly is performed by unskilled labour. This system thus enables the conception and production at a large scale of the building, while considerably decreasing the timeframe for manufacture and execution thereof.

I claim:

1. An assembly of extruded thermoplastic structural components for use in the construction of the upright side walls and roofing of a building, each structural component including an elongated rigid sheet member provided with at least two integral lengthwise edgewise rail members, said structural components including first and third flat wall structural components and second and fourth elbowed corner structural components, wherein the second elbowed corner structural components are provided with at least three integral lengthwise rail members, and wherein a few of said structural components are releasably slidably interlocked with one another about their said rail members, without tools being required, to form hollow elongated panels wherein each said hollow panel defines a main body, including a flat exterior face and a flat interior face, and circumscribing a generally closed inner enclosure cell, said inner cell for receiving concrete to be poured and said hollow panel body adapted to withstand the load of a column of concrete poured therein; said sliding interlock engagement between said few structural components forming said hollow panels defining continuous lengthwise adjustment means for one said structural component relative to the other of said few structural components, said hollow panels releasably interlocking with adjoining hollow panels successively to form a continuous wall structure; and wherein said structural components in their disassembled state released from one another are compactly stackable in the smallest volume of storage whereby shipping costs from the home country manufacture to the local building site are very low.

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2. An assembly of extruded thermoplastic structural components as defined in claim 1, wherein the thermoplastic material used in said structural components is polyvinyl chloride, admixed with at least one of the following reinforcing and stabilizing material: mineral fibres and filling materials.

3. An assembly of extruded thermoplastic structural components as defined in claim 1, wherein each said first structural component further includes additional lengthwise rail members, located intermediately of the first mentioned rail members; and further including at least one additional structural component, being of cross-sectionally U-shape and having a pair of lengthwise edgewise flanges, said flanges slidably adjustably releasably engaging said additional intermediate rail members of a given said first struc-

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tural component wherein said first and additional structural components become interlocked; and wherein a generally closed channel is defined by said third structural component within said inner cell of a said hollow panel member, for free lengthwise passage of electrical lines.

4. An assembly of extruded thermoplastic structural components as defined in claim 1, wherein said second elbowed corner structural component defines a central body core, proximate a corresponding said rail member, said central body core being thickened so as to enable the mounting of frame anchoring screws for cupboards and the like articles requiring to be suspended over ground and to be attached to the inside face of said upright side walls of the building.

* * * * *



US006189269B1

(12) **United States Patent**
De Zen

(10) **Patent No.:** **US 6,189,269 B1**
(45) **Date of Patent:** **Feb. 20, 2001**

- (54) **THERMOPLASTIC WALL FORMING MEMBER WITH WIRING CHANNEL**
- (75) Inventor: **Vittorio De Zen, Woodbridge (CA)**
- (73) Assignee: **Royal Building Systems (CDN) Limited, Woodbridge**
- (*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.
- (21) Appl. No.: **08/933,509**
- (22) Filed: **Sep. 18, 1997**

Related U.S. Application Data

- (62) Division of application No. 08/338,605, filed as application No. PCT/CA93/00226 on May 27, 1993, now Pat. No. 5,706,620.

(30) Foreign Application Priority Data

May 29, 1992 (CA) 2070029

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- (52) U.S. Cl. **52/220.5; 52/220.1; 52/421; 52/718.04; 52/508.1**

- (58) Field of Search 52/220.7, 220.1, 52/220.5, 220.3, 220.2, 275, 421, 431, 438, 287.1, 718.04, 588.1, 563, 427, 429

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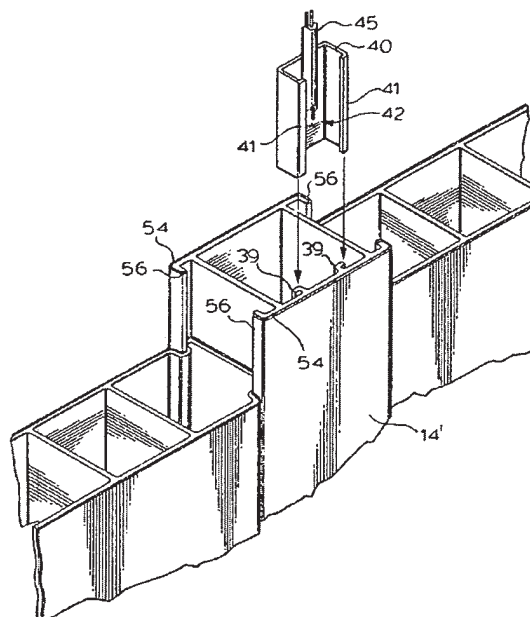
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Primary Examiner—Beth A. Stephan
Assistant Examiner—Brian E. Glessner

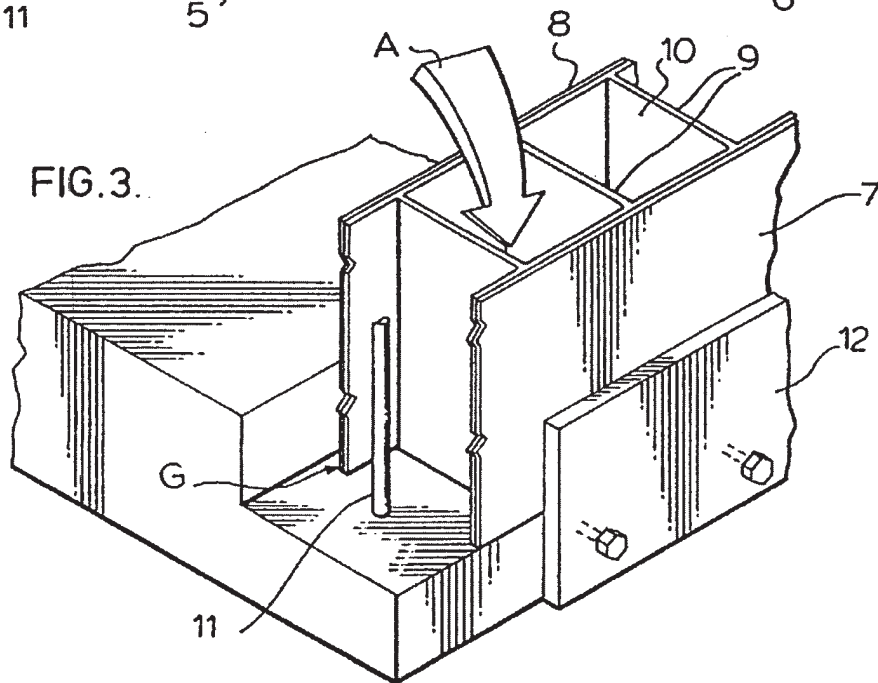
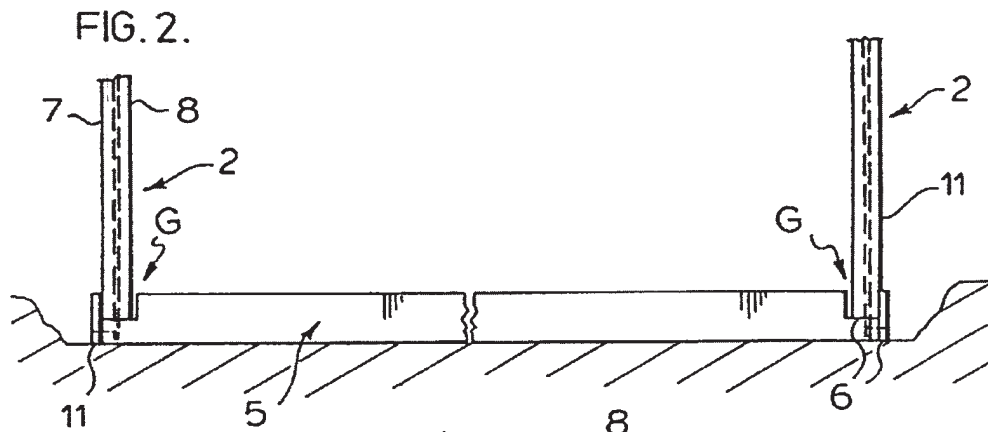
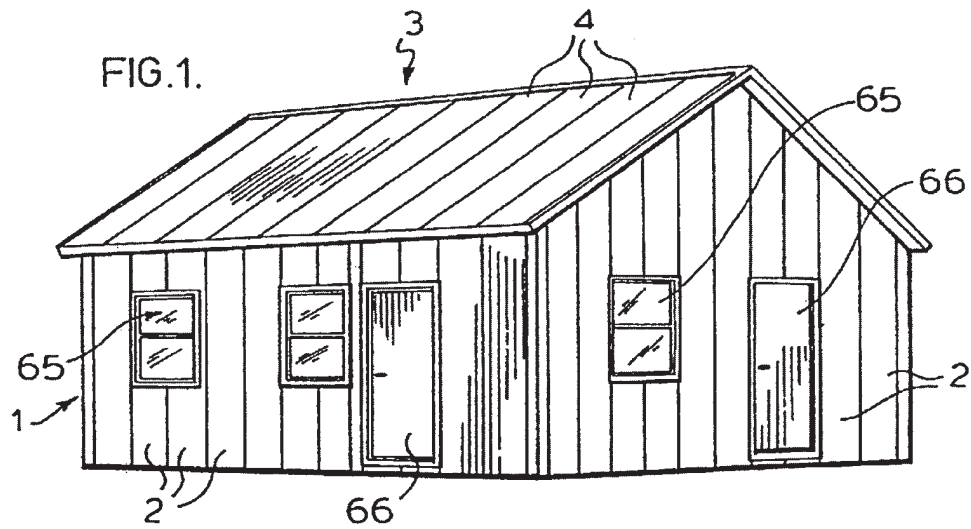
(57) ABSTRACT

A thermoplastic wall forming member is provided with rails for securing a wiring channel interiorly of a hollow structure to be formed by the wall forming member and other wall forming members.

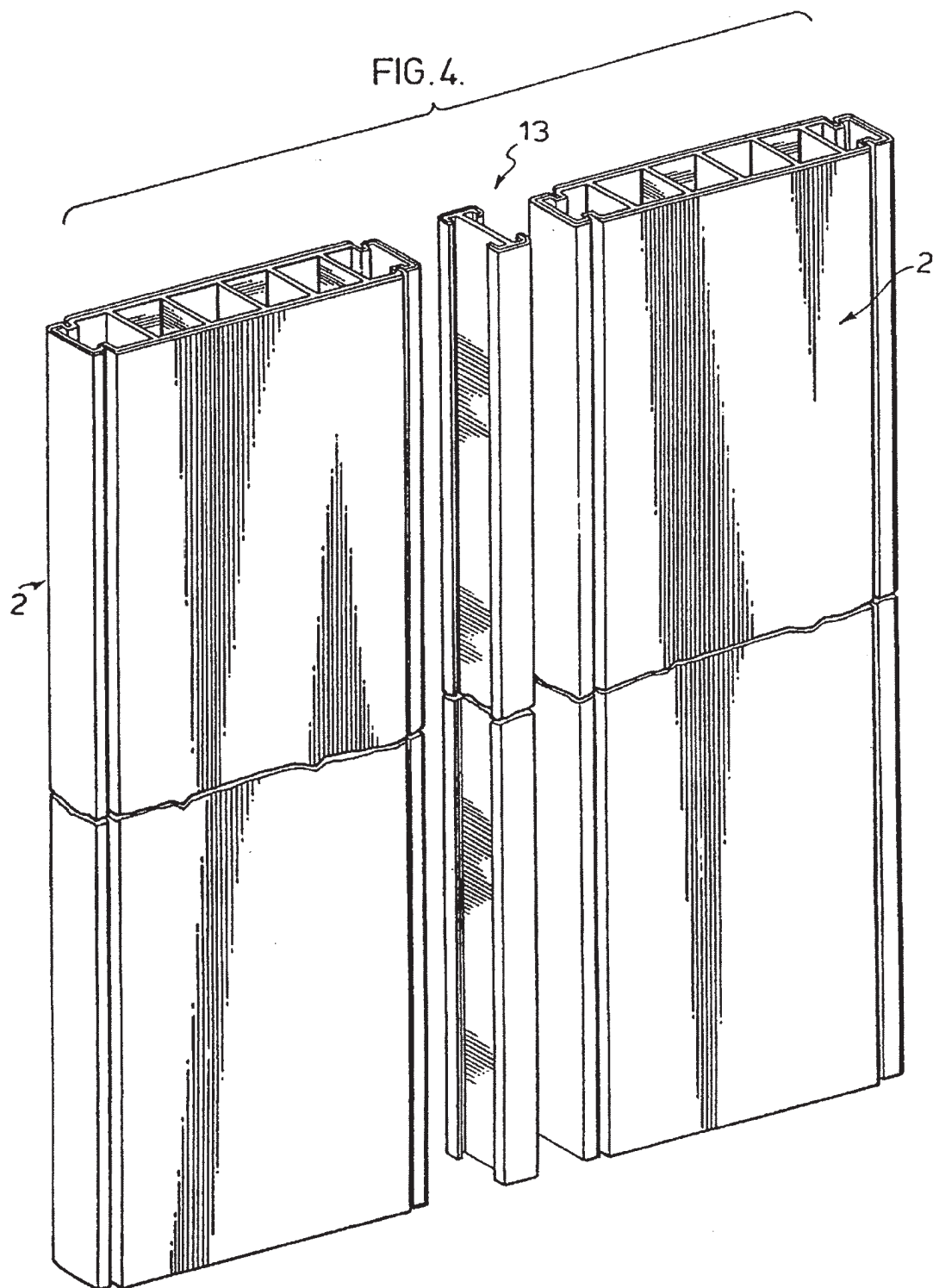
7 Claims, 12 Drawing Sheets



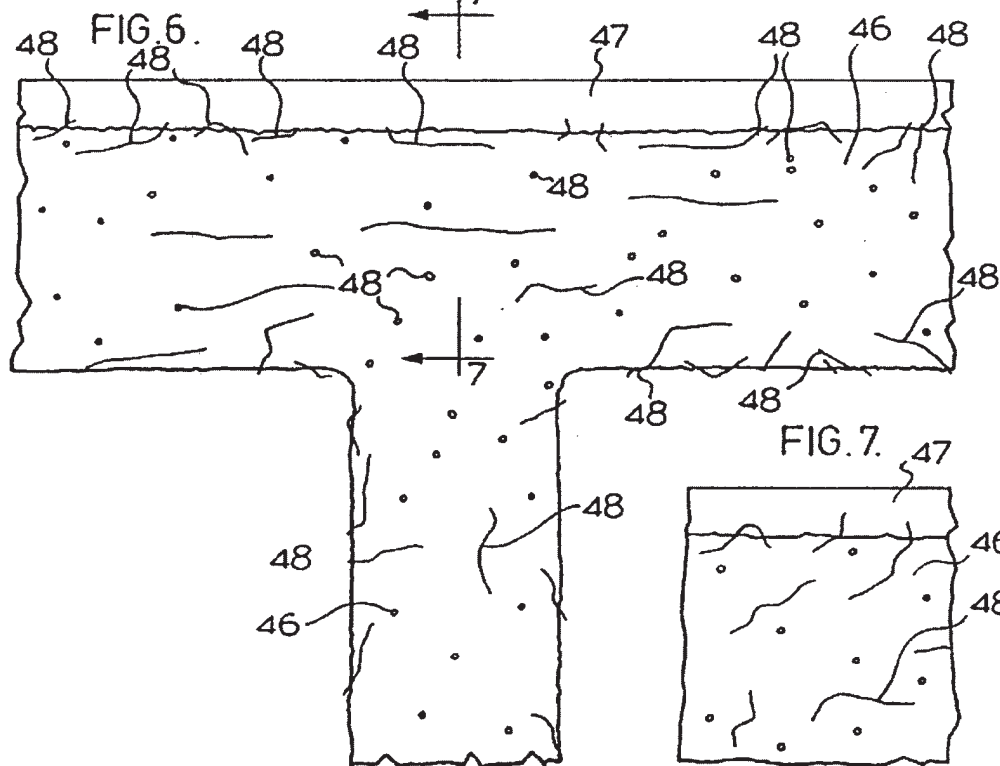
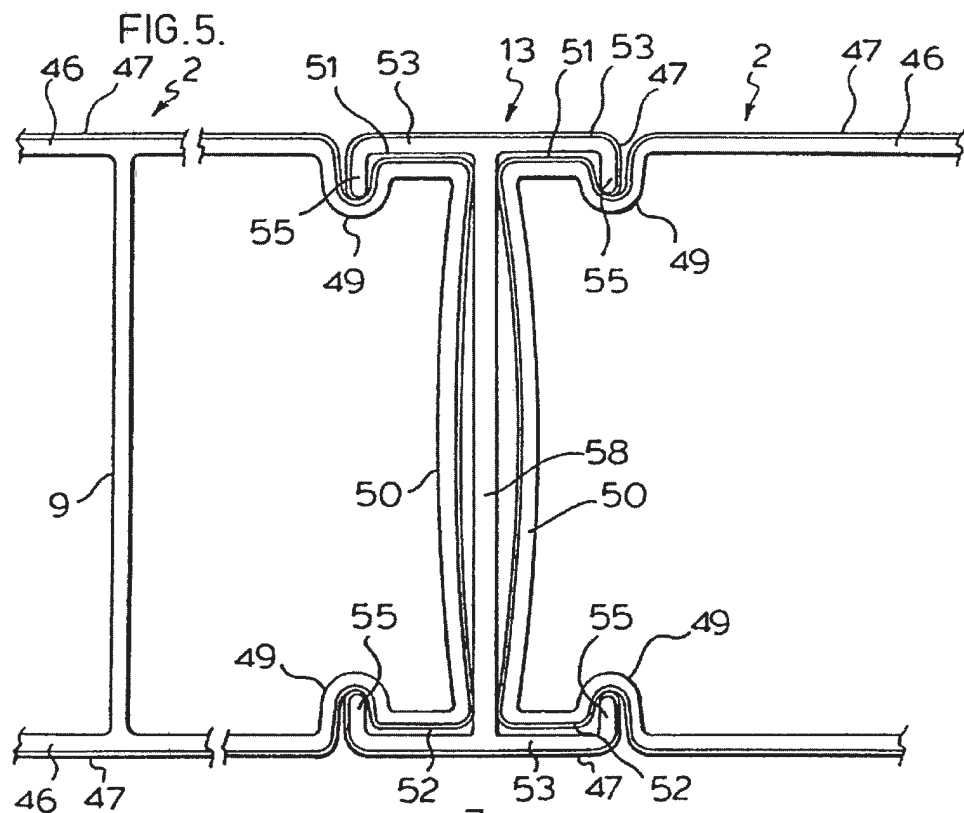
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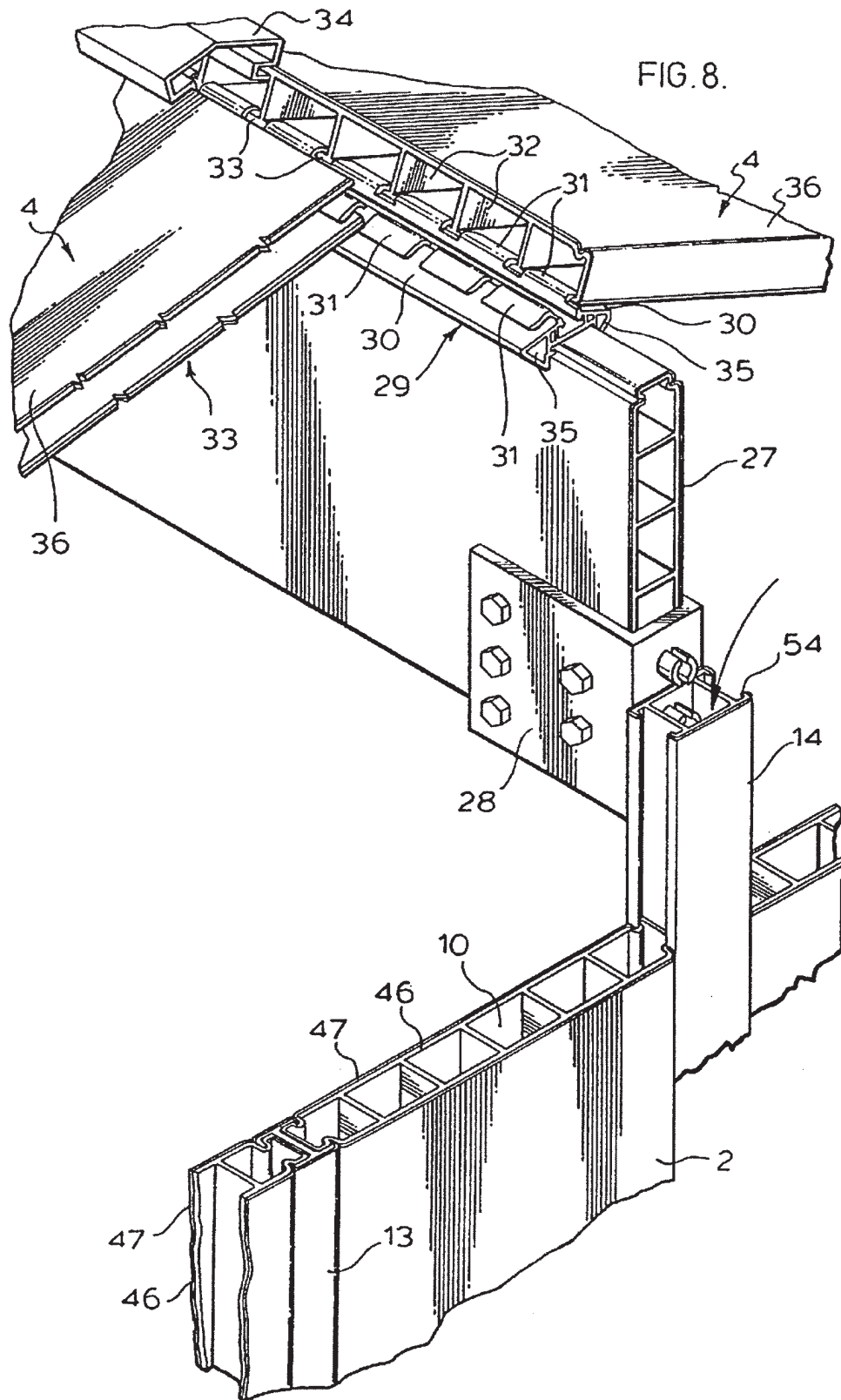
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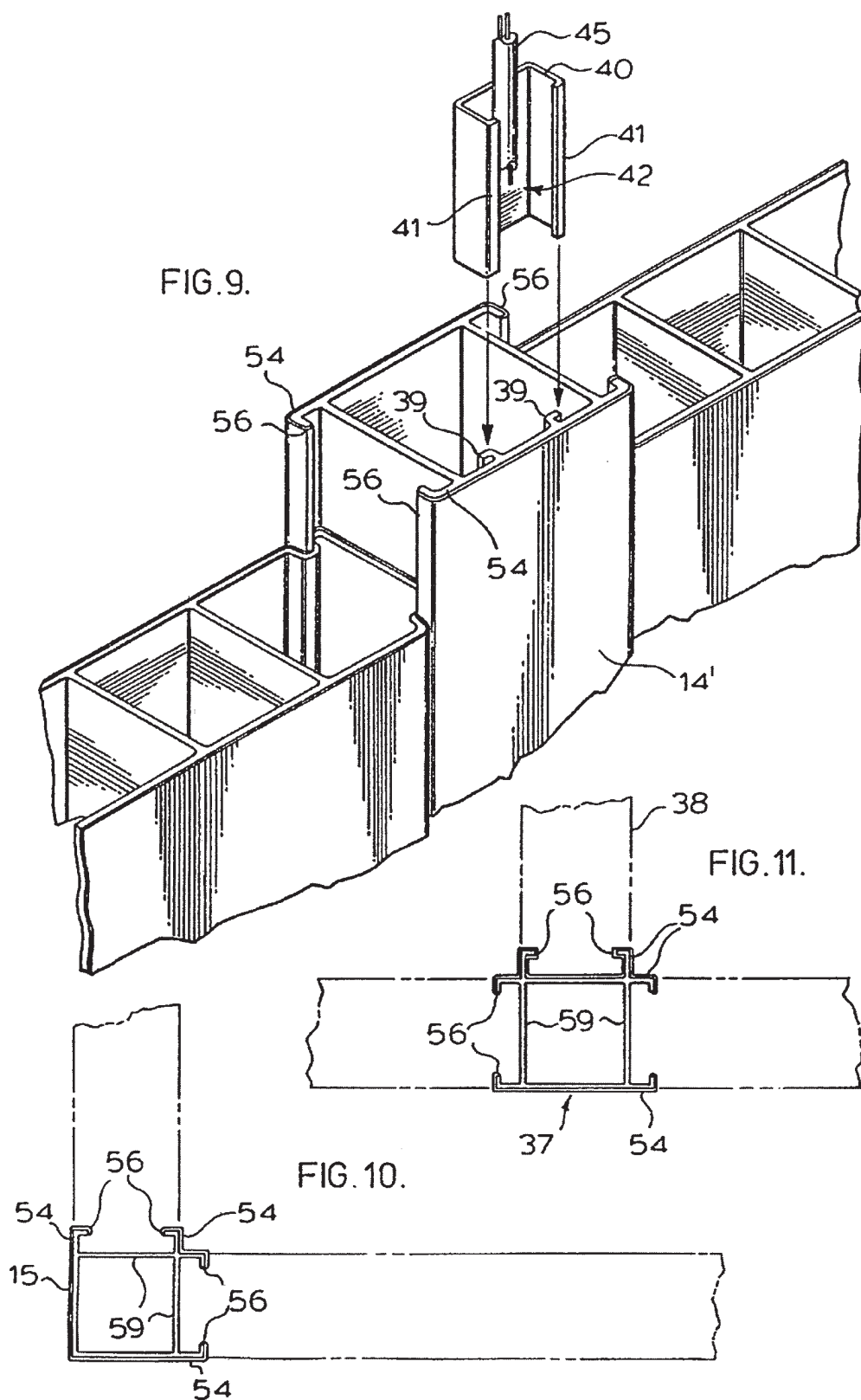
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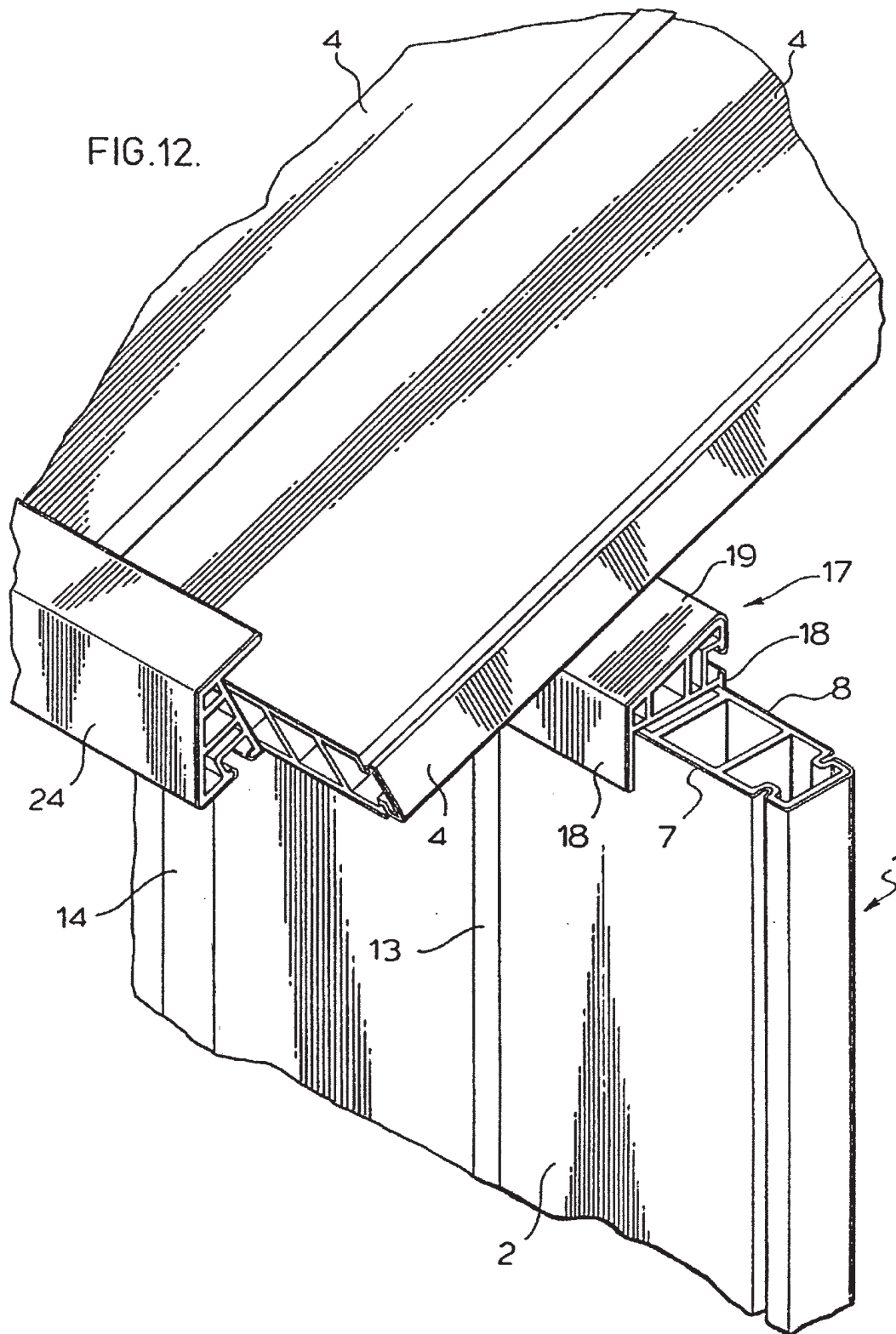


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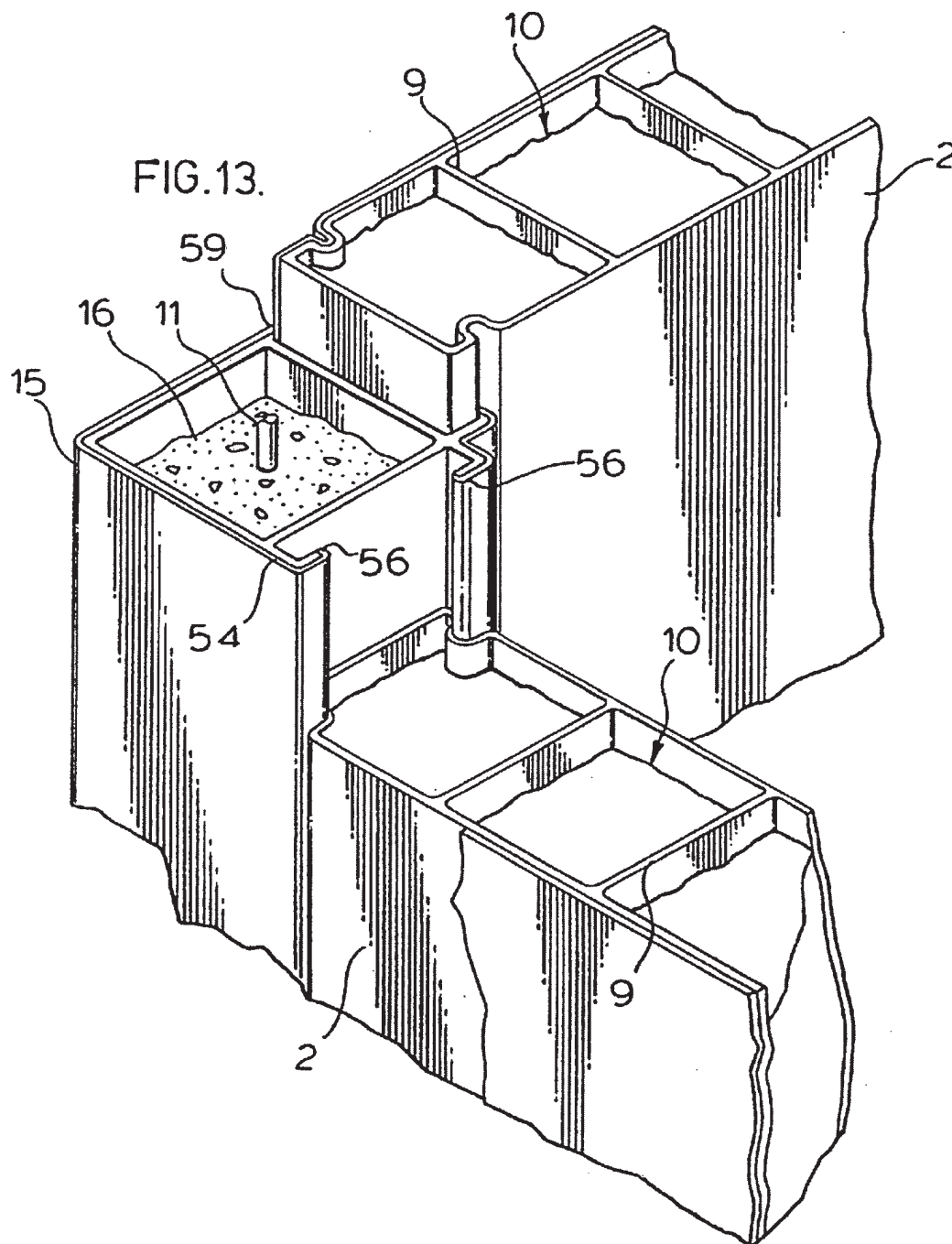
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FIG.12.



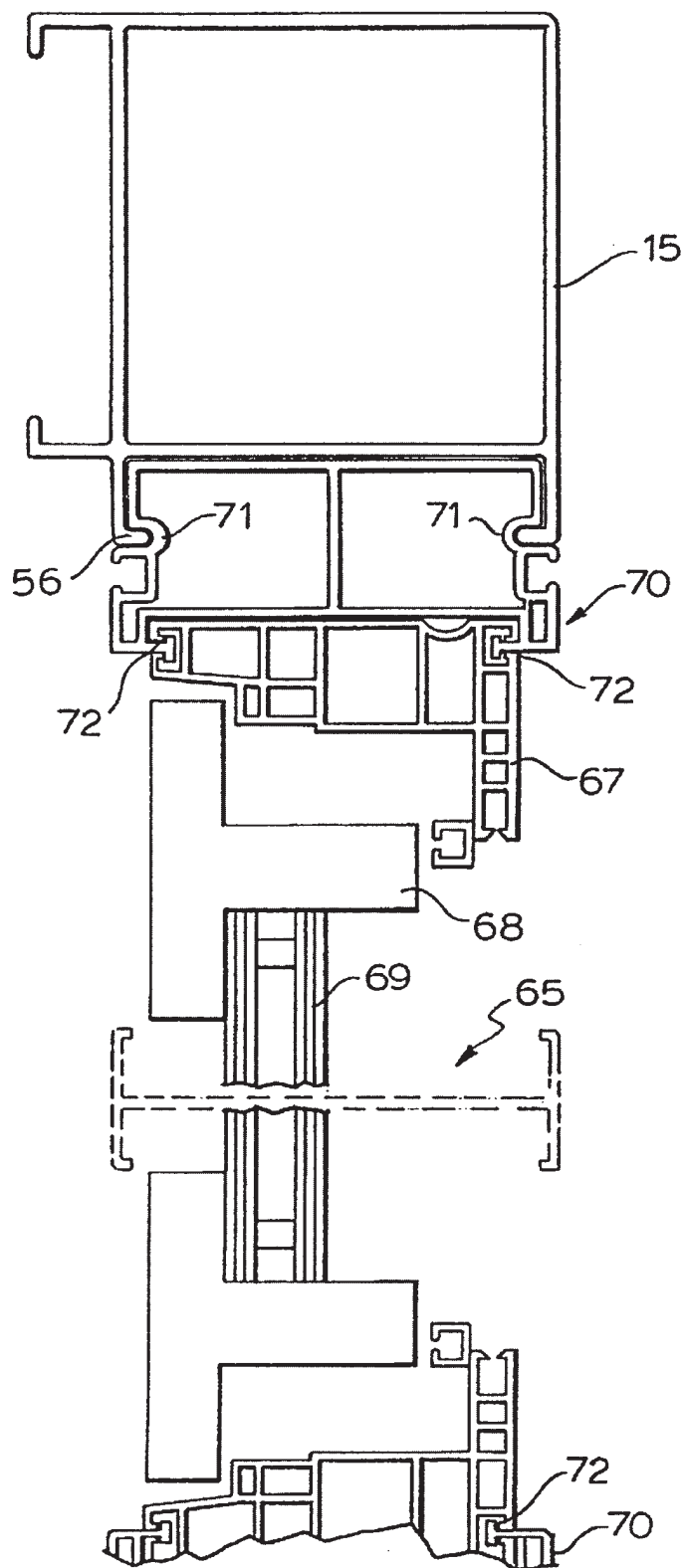
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FIG.13.

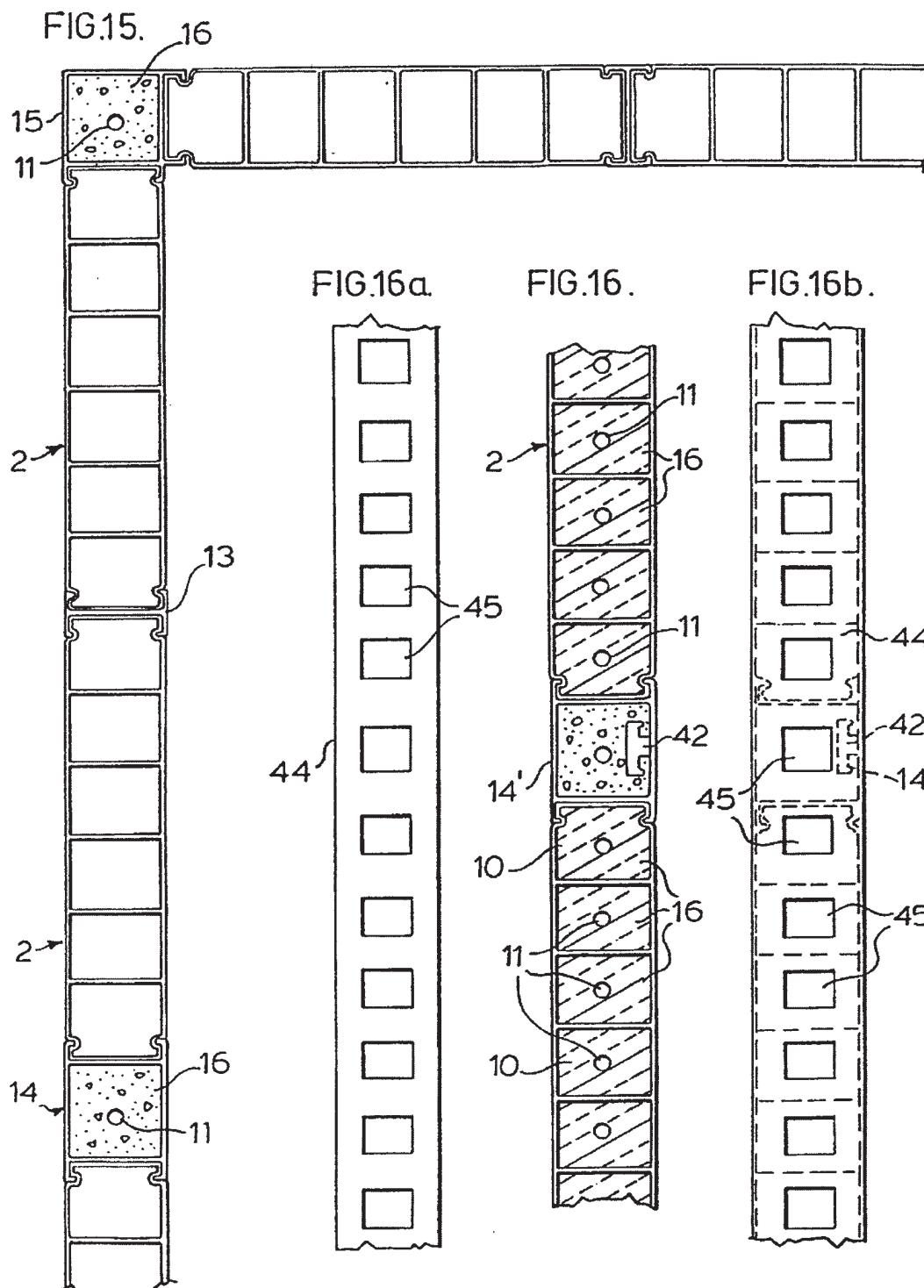


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FIG.14.



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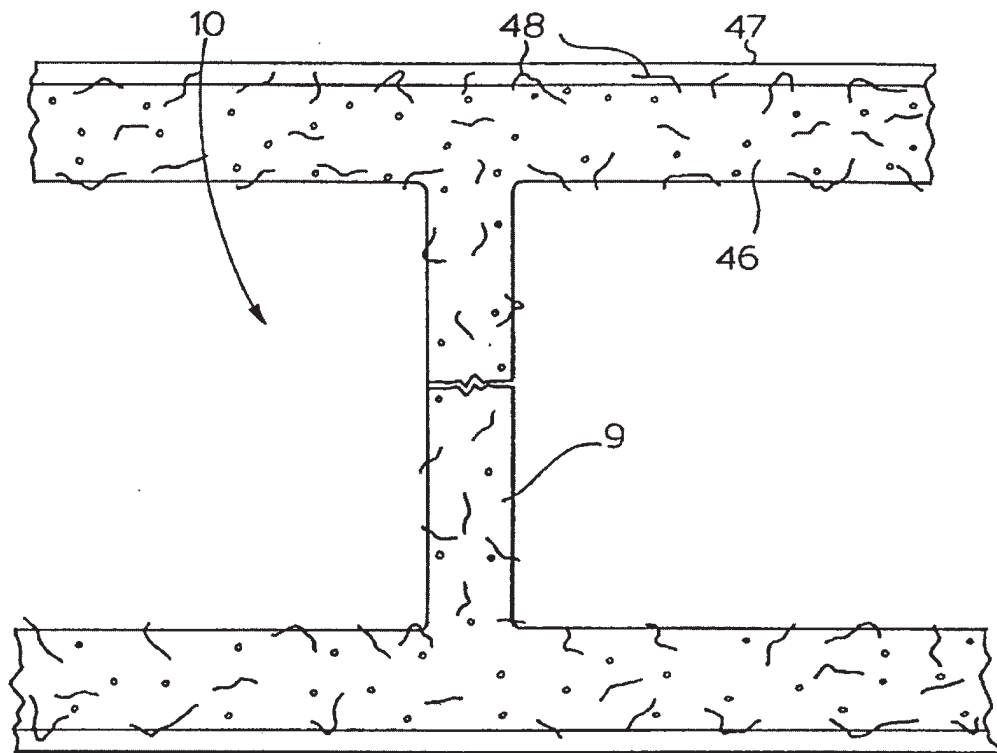


FIG. 18.

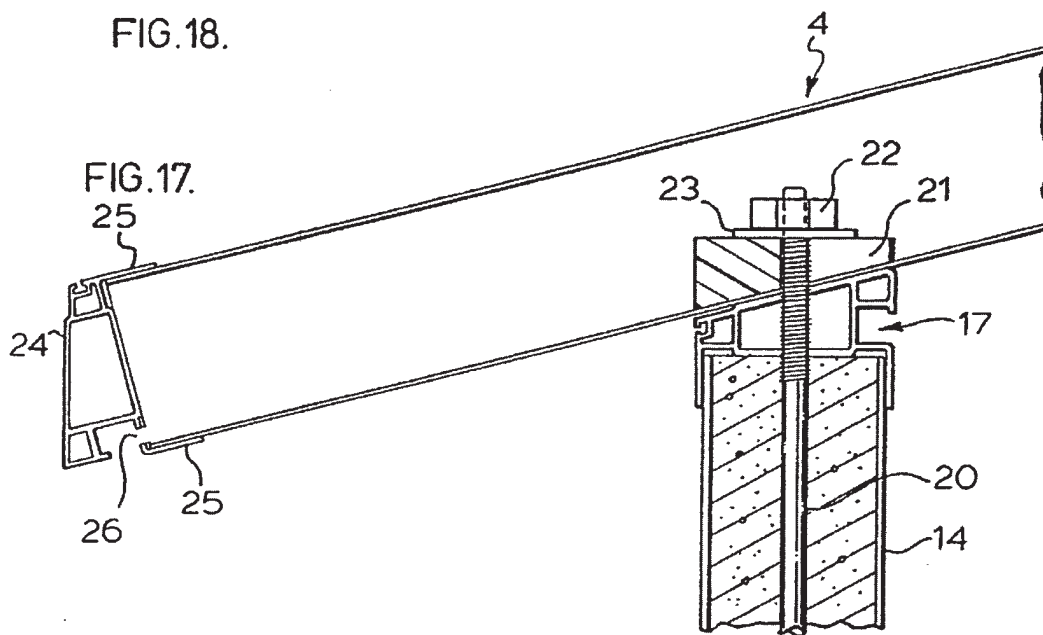


FIG. 17.

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FIG. 20.

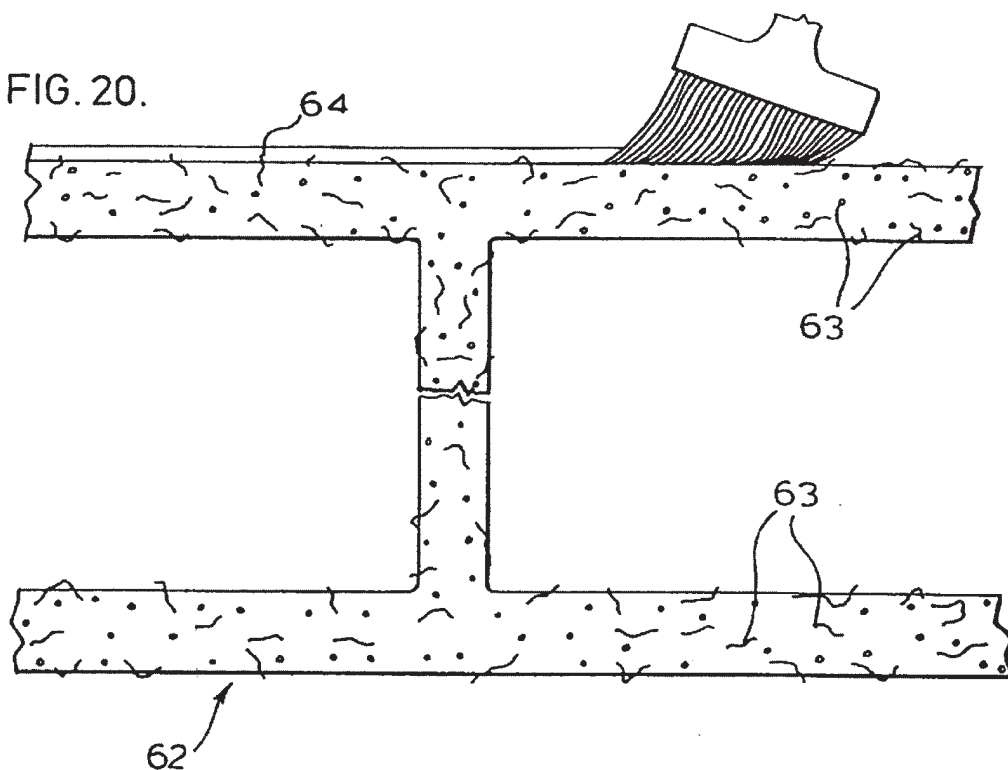
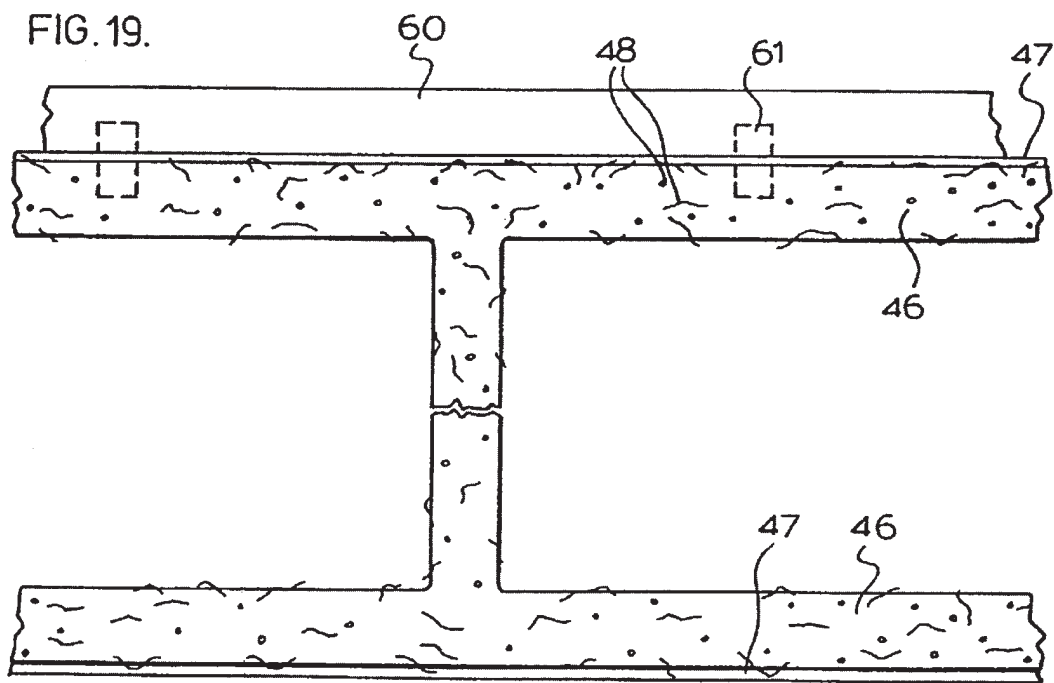


FIG. 19.



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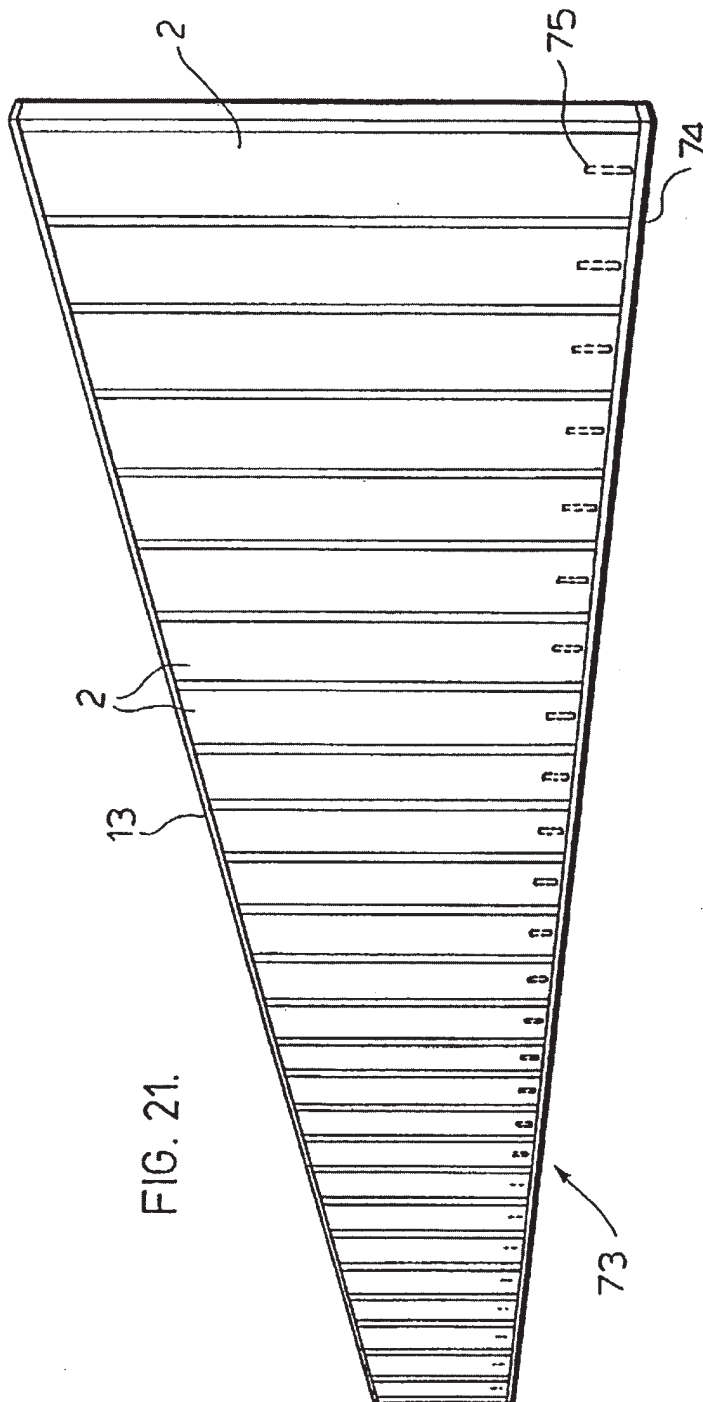


FIG. 21.

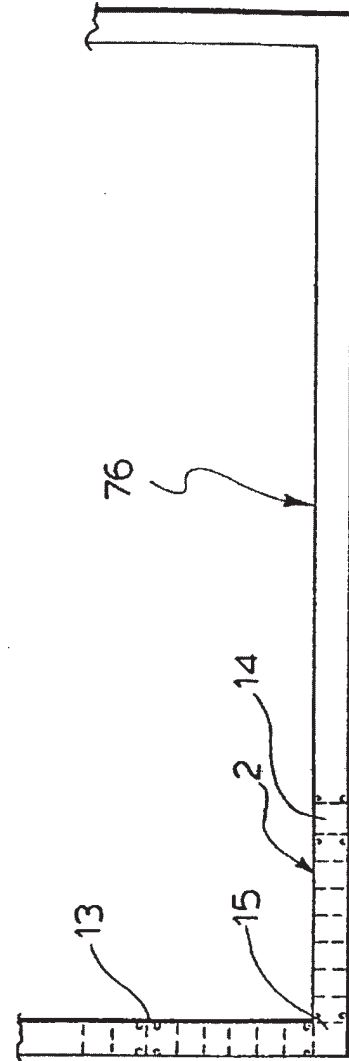


FIG. 22.

THERMOPLASTIC WALL FORMING MEMBER WITH WIRING CHANNEL

This is a Divisional Application of U.S. patent application Ser. No. 08/338,605, filed Nov. 22, 1995, U.S. Pat. No. 5,706,620 which is a 371 of PCT/CA93/00226 filed May 27, 1993.

FIELD OF INVENTION

The present invention relates to the provision of novel structural system and structural components therefor, their method of manufacture, and structures formed therefrom. More particularly, the invention relates to the provision of novel interlocking thermoplastic structural components which can be mass produced at low cost and which can be quickly and easily interlocked together to erect a wide range of structures which will require minimal maintenance and will be safe from termites, corrosion, rust or rot and will be highly resistant to the effects of weathering.

Further, the invention relates to the provision of such novel structural components which include hollow components adapted to accept concrete or other material therein to enable a structure erected therefrom to be anchored to a base and converted into a permanent and essentially indestructible structure which will withstand earthquakes, tornadoes and other natural phenomena. The invention also relates to the method of producing such components.

While the structural components of the invention can be used in the erection of a wide range of structures, it is of particular note that their existence now enables low cost durable or permanent housing to be provided for the masses throughout the world regardless of the climatic conditions.

DESCRIPTION OF THE PRIOR ART

While the use of plastic to form wall panels or the like for use in building construction has been proposed, such panels have not had the necessary load bearing or other structural requirements to form practical structures which could be mass produced at low cost and quickly easily assembled to erect durable low cost structures and, in particular, low cost housing.

U.S. Pat. No. 3,992,839, for instance, discloses a plastic panel fabricated from separate panel members, preferably formed of polyvinyl chloride which snap together to form a thin wall panel. The panels in turn are formed to snap together to provide a wall structure. Such fabricated panels are inherently weak and lack the strength and load bearing capacity to form adequate structural components for use for instance in the forming of the walls and roof of a practical durable building.

U.S. Pat. No. 3,662,507 discloses the use of tongue and grooved individually prefabricated panels said to be preferably of plastic which are bonded or glued together and used particularly for the forming of basement walls. Such panels do not permit of high speed production and are not capable of being quickly and easily interlocked together in the erection of a house or other structure.

U.S. Pat. No. 4,557,091 discloses a hollow panel member having a width of about one and one-half inches (1½") and a complicated interior formed by pultrusion, a process involving drawing long glass strands and a plastic binding material forcefully through a die under heat to form the glass strands into a compacted glass mat bound together by the plastic material. Such a process is prohibitively slow and expensive and the panels themselves do not provide accept-

able or practical structures for forming the walls and roofing of a housing system such as contemplated by the present invention.

SUMMARY OF THE INVENTION

The present invention resides in one of its aspects in the providing of novel thermoplastic structural components which can be quickly and easily interconnected to erect a wide range of structures from simple walls, fences, and enclosures, to complete houses or buildings, said thermoplastic structural components incorporating a reinforcing constituent imparting structural strength and expansion control thereto and flowable with the thermoplastic material through an extrusion die, said components being extruded into an integral essentially rigid structural shape having the reinforcing constituent distributed throughout the thermoplastic material, said structural components being configured to present means for interconnection with adjoining structural components so that they can be easily and quickly locked together in the erection of the structure desired.

The structural components according to the invention include extruded hollow panels, extruded hollow panel box connectors or columns, extruded hollow beams and adapters, and extruded panel connectors, all of which are provided with integrally formed means to enable interlocking connection with adjoining structural components for quick and easy assembly into the structure being erected.

Also according to the invention, the hollow wall panels and columns have a structural strength to accept the pouring of concrete or the like therein without deformation to provide permanent essentially indestructible wall structures.

In the case of the erection of a house or building, it will be understood that with the walls of the house or building erected on a concrete pad with the wall panels and/or wall panel connecting columns of the invention anchored with concrete to the pad a permanent roof supporting wall structure resistant to tornadoes, earthquakes and other natural phenomena is provided.

In its preferred form, the invention resides in forming the structural thermoplastic components aforesaid by extruding such components to have a thermoplastic core or substrate having reinforcing glass fibers anchored in and distributed therethroughout imparting tensile strength and expansion control thereto while co-extruding a smooth thermoplastic skin on the exposed exterior surfaces of said core, the said skin embedding and interlocking with glass fiber portions that are exposed at the interface between said reinforced core and said skin.

In accordance with the preferred form of the invention, the thermoplastic skin provides an attractive maintenance free smooth surface adding to the appearance and ease of handling and interlocking the structural components as well as providing an impact resistant surface protecting the glass fiber reinforced core and the embedded glass fibers against external shock. Moreover, the thermoplastic skin can be colored as desired and provided with appropriate ultra violet protective agents as will be understood to protect such color and prevent weathering.

The structural system of the invention has particular value in the housing field whereby a house or building may be constructed on a concrete pad and formed of interconnected extruded structural components including hollow wall and roof panels and connecting columns having thermoplastic substrates reinforced with glass fibers anchored thereto and dispersed there throughout, the substrates being covered with a smooth thermoplastic impact resistant skin. The wall

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panels are anchored to the concrete pad by concrete introduced internally into said hollow wall panels and/or connecting columns as desired. It will also be understood that if desired the house structure, including the walls and roof, can be clad with any decorative exterior as desired.

The invention further resides in the method of forming the structural components by coextruding the smooth thermoplastic and the reinforced thermoplastic substrate to facilitate extrusion and to effect the bonding therebetween.

These and other features of the invention will be understood from the following detailed description taken in conjunction with the accompanying drawings.

According to an aspect of the invention, a thermoplastic wall forming member is provided with a pair of spaced apart rails for securing a wiring channel interiorly of a hollow wall structure which is formed by the wall forming member and other wall forming members. When the wiring channel is secured to the wall forming member, it provides an isolated compartment within the formed wall structure. The wall structure can then be filled with material such as concrete or the like outwardly around and without entering the wiring channel leaving an unobstructed wiring raceway within the wall structure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a house constructed of extruded thermoplastic structural components in accordance with the invention.

FIG. 2 is a broken away view showing how the wall panels of the house sit on a concrete pad.

FIG. 3 is an enlarged perspective broken away view illustrating the seating of a wall panel on the concrete pad with the arrow indicating where anchoring and reinforcing concrete or the like can be introduced.

FIG. 4 is an enlarged broken away perspective view illustrating a pair of panel members and a joiner therefor ready to be assembled.

FIG. 5 is an enlarged end view illustrating the manner in which the joiner connects to adjacent panel components.

FIG. 6 is a broken away cross-sectional view illustrating the structure of a typical extruded structural component having a thermal plastic core or substrate incorporating reinforcing glass fibers with the exposed exterior surface covered with a smooth thermoplastic skin sealing the substrate surface and embedding the glass fibers to be anchored thereby to the substrate.

FIG. 7 is a cross-sectional view on line 7—7 of FIG. 6.

FIG. 8 is a broken away perspective view illustrating the assemblage of the exterior wall panels and interior wall panel and the roof panels at the ridge of the house.

FIG. 9 is a broken away perspective view illustrating a wall joining box connector or column provided with interlocking means to receive a channel forming insert to carry electrical wiring internally of the wall.

FIGS. 10 and 11 illustrate other forms of panel box connectors or columns.

FIG. 12 is a broken away perspective view illustrating the mounting of the lower end of a roof panel on the wall structure and the capping for such lower end roof panel.

FIG. 13 is a broken away perspective view of a wall corner illustrating how the hollow wall panels and corner box connector or column constitute concrete forms to receive concrete or the like to anchor the wall structure to the concrete pad and to create an impregnable rigid wall struc-

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ture of discrete concrete filled cells capable of withstanding earthquakes, tornadoes and other natural phenomena while at the same time providing effective insulation against heat and cold transfer.

FIG. 14 is a cross-sectional view illustrating a window installation using an adapter configured to interlock with the wall columns and supporting a standard window.

FIG. 15 is a top plan view of a wall which may be the wall of any structure as well as that of a house embodying the invention and illustrating the use of concrete only in the box connectors or columns.

FIG. 16 is a broken away top plan view illustrating a wall structure in which the individual cells of the panels themselves as well as the box connector or column joiner are filled with concrete for maximum wall strength.

FIG. 16a is a top view of a concrete pouring guide.

FIG. 16b is a top view of the concrete guide of FIG. 16a fitted atop a wall panel used to provide the concrete filled wall structure of FIG. 16.

FIG. 17 is broken away cross-sectional view illustrating one manner of connecting the roof panels to the house walls.

FIG. 18 is an enlarged broken away end view of a portion of a practical example of panel component or member embodying the invention and illustrating the relative thicknesses of the outer walls of the reinforced core and the internal connecting webs or walls and the bonded skin layer sealing the exposed external walls of the panel.

FIG. 19 is a broken away view illustrating an extruded reinforced wall panel embodying the invention having a decorative cladding applied to the exterior surface.

FIG. 20 is a view of a non load bearing interior wall panel in which the skin has been replaced by a coating such as paint.

FIG. 21 is an elevational view of a fence, wall, sound barrier or other similar structure embodying the invention and erected with structural panels and connectors of the invention.

FIG. 22 is a diagram illustrating an enclosure erected according to the invention with structural panels and connectors of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The structural components of the invention have great utility in the erection of a wide range of structures but have special importance in the field of housing since there is a desperate need for low cost durable or permanent housing throughout the-world which efforts to date have not been able to resolve. The requirements of such housing are that they must be constructed from components that can be massed produced at low cost and quickly and easily assembled to form a durable or permanent structure by unskilled workman. Further the resulting structure must be such as to withstand wide variations in climatic conditions and be capable of withstanding the shock of earthquakes, tornadoes, wind, hail, rain and snowstorms, high humidity, wide temperature ranges, without corroding, rotting or rupturing. Such housing must also be impervious to termites and other insects. Additionally, to be truly and widely accepted, such housing must have a satisfactory aesthetic appeal.

The present invention in addition to its utility for erecting all kinds of other structures for the first time enables the provision of housing meeting all of the above criteria as will hereinafter appear.

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With reference to FIG. 1, a typical house which the invention provides has walls 1 assembled from wall panels 2 and a roof 3 assembled from roof panels 4 as shown in FIG. 8.

The wall and roof panels are configured to be connected to the housing structure by interlocking mating engagement with adjoining members so that they can be assembled without the use of tools as hereinafter more fully discussed.

As shown in FIG. 2, all that needs to be done to prepare the site of the house is to construct a concrete pad 5, having a reduced thickness border flange 6 forming a ledge to receive the wall panels 2, as shown particularly in FIG. 3.

The wall panels 2 have spaced exterior and interior walls 7 and 8 connected by transverse webs 9 forming internal cells 10 into which concrete can be poured as illustrated by the arrow A as desired to provided an extremely strong permanent wall structure. Additionally, the concrete pad can be provided with anchor rods 11 as desired projecting up into the cells 10 to anchor the concrete poured into the cells and hence the wall panels to the pad. A runner 12 is provided to contain concrete from seeping out underneath the wall panel.

As can be seen if FIG. 2 of the drawings, the walls of the house and the size of the concrete pad are dimensioned such that there is a very slight gap G to the inside of the walls at the thickened portion of the pad. This provides a tolerance to ensure that the walls will fit down around the thick part of the pad and rest on the thinner border flange 6 as again seen in FIG. 2 and as also shown in FIG. 3 of the drawings.

When the concrete is poured into the walls, it does, as found in conventional concrete pouring methods, contain a certain amount of water. As can again be seen in FIG. 3 of the drawings, the wall forming panels are left open at their lower ends where they seat atop the concrete pad flange 6. This allows the water in the concrete to effectively drain out the bottom of the wall panels and, although runner 12 does provide an effective guard against concrete seepage from beneath the wall panels, it is not a water guard and therefore allows any water from the concrete in the wall panels to drain off of the pad. The runner 12 further provides a guide assisting in alignment of the wall panels along the outer edge of the concrete pad.

As illustrated in FIGS. 4 and 5, adjoining panels are adapted to be connected by a joiner 13 and then, as shown in FIG. 15, the free end of the panels are interlocked with a vertical column 14. Column 14 is a typical column for interlocking with adjoining interlocked panel pairs intermediate the length of the wall while column 15 is a corner column for interlocking adjoining walls which meet at a corner. As shown in FIG. 15, the columns 14 and 15 are filled with concrete 16 and are anchored to the concrete pad by the anchor rods 11. FIG. 15 illustrates the situation where only the connecting columns 14 and 15 receive concrete, whereas FIG. 16 illustrates concrete in both the column 14 and the internal cells 10 of the wall panels 2.

If the house structure is intended to be subsequently moved, sand can be employed in place of concrete in the columns and/or internal wall panel cells as desired to give the structural strength and anchorage desired. Also, of course, the internal wall cells 10 and/or the locking wall columns 14 and 15 can be filled with material other than concrete including insulation material. Alternatively, the columns could be filled with concrete and the panels filled with insulation material or such other arrangements as desired.

To have the house of modular form, for convenience, the wall panels 2, joiner 13, and columns 14 and 15 have been

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dimensioned to provide a lateral distance from center line of column to center line of column of one meter. The thickness of the wall panels 2 from exterior wall 7 to interior wall 8 has been conveniently selected as four inches as a balance between cost and structural strength. Such walls, of course, may have a greater thickness but this adds to the cost while substantially thinner walls reduce wall strength and the amount of concrete that such walls can accept.

As illustrated in FIG. 12, the upper ends of the walls 1 are capped by a hollow wall cap beam 17 having flanges 18 embracing the exterior and interior walls of the wall panel to firmly seat thereon. This wall cap or beam is of a hollow configuration and has a sloping upper surface 19 to support the lower ends of the roof panels 4.

As shown in FIG. 17, the means of securing the roof panels 4 to the sloping wall cap surface 19 may comprise a threaded rod 20 embedded in concrete in one of a wall column 14 or internal wall panel cells 10 and projecting up through wall cap 17 and a wedge clamp 21 secured by nut 22 and washer 23 threaded onto the upper end of rod 20. Hollow end cap beam 24 with flanges 25 embracing the upper and lower surfaces of the roof panels closes off the lower ends of these panels but provide suitable drainable openings 26 which also allow air circulation through the hollow roof panels 4.

As shown in FIG. 8, centrally of the depth of the house is a hollow ridge panel or beam 27 of similar construction to the wall panels 2 supported by a yolk 28 carried by a column 14. Interlocked on the top of the ridge beam 27 is a roof panel ridge connector beam 29 having sloping roof panel supporting surfaces 30 which terminate in upwardly and rearwardly extending flanges or fingers 31 which project into the cells 32 of the roof panels 4 to overlie and hold the lower surfaces 33 of such cells, thereby anchoring the upper ends of the roof panels to the ridge beam 27. A ridge vent 34 is provided to cover the spacing between the upper ends of the roof panels 4 and interlock therewith while allowing air to circulate through the ridge vent, the roof cells 27 and out the vent openings 26 in the end cap 24. The roof panel ridge beam 27 is provided with closed hollow sections 35 underlying the support surfaces 30 to impart strength and rigidity thereto.

The roof panels 4 may have dimensions similar to those of the wall panels 2 but, where increased roof spans are required or heavy roof loads are anticipated, the depth of thickness of the roof panels that is the separation between the lower roof surfaces 33 and the upper roof surfaces 36 may be increased, for example to six inches and as well the glass fiber content may also be increased. Similarly, the depth or thickness and glass content of the ridge panel beam can be increased where heavy loading is to be expected.

In addition to the columns 14, for joining straight wall sections and the corner columns 15, as illustrated in FIG. 11, columns 37 are provided for connecting an internal wall panel 38 to the panels forming one of the external walls 1.

It is highly desirable to conceal the electrical wiring to be used in the house internally within the walls. To this end, there is shown in FIG. 9 a column corresponding to column 14 and designated as 14' which includes a pair of spaced fingers 39 which project interiorly of the column and are turned outwardly in opposite directions to provide slide guides for receiving a channel 40 having intumed flanges 41 which slidably interlock behind the fingers 39 to provide a separate compartment 42 for receiving wiring 43 or other services.

This separate compartment 42 provided on assembly of the channel 40 within the column 14' can be closed off upon

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concrete being poured into column 14' to leave the channel open for the reception of the wiring 43.

FIGS. 16a and 16b show features which enable loading of the concrete into the wall without exposing compartment 42 to the concrete. In particular, FIG. 16a shows a concrete guide or jig generally indicated at 44 having a series of openings 45 provided therein. As shown in FIG. 16b, the jig 44 is placed atop the wall structure and the openings in the jig align generally centrally with each of the cells or compartments 10 in the wall structure. Of particular interest, the opening through the jig over column 14' does not line up with the compartment 42 formed by the channel 40 engaged with the guides 39 which are protected by the body of the jig. Channel 40 and guides 29 are in abutting contact with the bottom of the jig and, therefore, when the concrete is poured through the jig, the compartment 42 is effectively sealed off from the concrete flow. The jig has the added benefit that it provides a top level to which the concrete is filled and, because of the smaller size of the openings in the jig relative to the compartment sizes, helps to prevent any overflow of concrete material from the wall structure.

It will be appreciated that to produce a stable, solid and permanent structure such as, for example, a house structure as described above requires the various components panels such as the wall panels, wall connecting columns and joiners, the roof panels, the wall beams such as the wall caps and the ridge beams to have the structural strength and load bearing capacity to perform their functions. At the same time, to be practical these components have to be capable of being produced in large quantities at low costs.

While ordinary thermoplastics such as vinyl chloride, eg. polyvinyl chloride (PVC), can be readily extruded to a desired shaped, the resulting product does not have sufficient strength to constitute a load bearing structural member adequate for the building of a substantial load withstanding or permanent structure. Further such a member has unacceptable dimensional changes with temperature. On the other hand, strengthening the plastic material in a manner which renders it uneconomical to produce product therefrom is equally unacceptable.

The structural components of the present invention are achieved by the use of a thermoplastic material reinforced in such a manner that the reinforced thermoplastic provides the requisite strength and expansion control yet is still flowable through an extrusion die. In this way the component can be continuously extruded with the reinforcing constituents distributed throughout the thermoplastic material and with the walls of the component being continuous and integral at their juncture.

While there are known thermoplastic reinforcing agents such as mineral or other fibers and known expansion controlling agents such as calcium carbonate, a reinforcing agent or constituent particularly useful for the present invention, comprises small glass fibers. These glass fibers when anchored in a thermoplastic material such as vinyl chloride, eg. a polyvinyl chloride (PVC), provide the requisite reinforcing and expansion controlling characteristics suitable in the various structural components of the invention.

A suitable material incorporating small glass fibers which can be used in the production of the structural components of the invention is available under the trade-mark FIBER-LOC from the B.F. Goodrich Company of Akron, Ohio, such material being described in detail in B. F. Goodrich's U.S. Pat. No. 4,536,360 wherein very fine short glass fibers are bound within a composition of vinyl chloride resin.

The presence of glass fibers in the PVC or other thermoplastic material while providing tensile strength and expansion control to the material creates an extrusion problem and, if they are too large and too concentrated, it is not practical to extrude the material. Preferably such fibers should be of the order of a few microns in diameter and a few millimeters in length and in concentrations not greater than, and preferably substantially less than, about thirty-five percent by weight based upon the combined weight of glass fibers and vinyl chloride resins.

Also, the presence of the glass fibers creates a brittleness which makes a structure produced solely from a glass fiber reinforced plastic subject to potential fracture from impact. This potential increases with increased concentration of glass fibers.

According to the preferred form of the invention, the problems encountered with the use of the glass fibers as the reinforcing constituent while utilizing their beneficial reinforcing qualities have been resolved by co-extruding with the glass reinforced thermoplastic a smooth thermoplastic skin covering the external exposed surfaces of the various structural components.

The smooth plastic skin may be PVC, rigid PVC, semi-rigid PVC, ABS, polycarbonate. Suitable thermoplastics are available from G.E. under the trade-mark GELOY and NORYL.

Thus, according to the preferred form of the invention, the structural components having the characteristics desired, as shown particularly in the enlarged views FIGS. 6. and 7, comprises a core or substrate 46 comprising a glass fiber reinforced thermoplastic such as PVC and a co-extruded smooth outer skin 47 covering the exposed exterior surfaces of the structural component.

The skin 47 serves a number of useful purposes. Because of the presence of the glass fibers 48 in the core or substrate 46, the substrate is somewhat brittle and its surfaces are rough and abrasive with portions of the glass fibers projecting through the surface of the substrate rendering the substrate somewhat porous and susceptible to the ingress of moisture which can adversely effect the bond between the glass fibers and the thermoplastic material.

The co-extrusion of the thermoplastic skin covers and seals the outer exposed surfaces of the structural component against the ingress of moisture thereby maintaining the integrity of the binding of the glass fibers to substrate plastic. Further, the outer skin 47 not only covers exposed glass fibers 48 but these exposed glass fibers become embedded in the thermoplastic material so the exterior surface of the component is totally smooth. The glass fibers in turn in becoming embedded in the outer skin lock the skin to the substrate so that the expansion and contraction of the outer skin is fixed to the expansion and contraction of the substrate which is controlled or limited by the presence of the incorporated glass fibers which have a much smaller coefficient of expansion than the plastic.

Another important function of the outer skin 47 is that the thermoplastic material selected for the skin can be formulated, as will be appreciated by those skilled in the art, to include agents providing impact resistance. Thus the skin can provide an impact resistant or absorbing covering encasing the exposed surfaces of the structural component, thereby rendering the structural component impact resistant.

The outer skin 47 can also incorporate any desired coloring and can be made resistant to ultraviolet radiation so that it will not fade by the inclusion of a weathering agent as will be understood by those skilled in the art.

The combination of the coextruded substrate 46 and smooth skin 47 thus enables the provision of structural components which are essentially maintenance free, and impact resistant, and which will not corrode, rot or rust and which will be impervious to moisture, termites, and other insects.

As particularly illustrated in FIG. 5, the walls of the panels, whether wall panels 2 or roof panels 4, make provision for interconnection into the house structure by being extruded to provide opposing slide channels or grooves 49 inwardly of the panel edge or side walls 50.

The spacing between the exterior and interior surface of the panels at 51 and 52 extending from the grooves 49 to the panel edge or side walls 50 is reduced to accommodate the thickness of the ends or flanges 53 of the joiner 13 illustrated in FIG. 5 or the projecting walls 54 of the various columns 14, 15 and 31 illustrated in FIGS. 9, 10 and 11. With this arrangement, the exposed surfaces of the panels are flush with the exposed surfaces of the joiners or columns to present smooth continuous exposed surfaces.

The joiners 13 have inturned flanges 55 adapted to slidably engage and seat in the grooves 49 in the wall and roof panels to form an interlock therewith. Similarly, the box connectors or columns 14, 15 and 37 have inturned flanges 56 adapted to slidably engage and seat in such grooves 49 to effect quick and simple sliding interlocking assembly of the components without the use of tools.

To facilitate this sliding interlock the end or side walls 50 of the panels are slightly concaved as illustrated in FIG. 5. This maintains the panel end 50 out of contact with the web 58 of the joiner which on assembly becomes interior of the wall. This web 58 of the joiner is not covered with the skin 47 and would therefore resist sliding against the panel end. Also this arrangement avoids any interference with the sliding interlock if the tolerances of the panel walls 50 and the joiner web 58 are exceeded. The joiners smooth skin 47 extends around the ends of the inturned flanges 55 so that they easily slide within the grooves 49 at the panel ends.

As noted with the panel and joiner components assembled the unskinned joiner webs 58 are contained internally within and protected by the wall or roof structure. In the same vein, the transverse walls 59 of the columns or box connectors 14, 15, and 39 are unskinned end, when assembled, are contained internally within and protected by the wall structure.

While the outer smooth plastic skin 47 presents a very attractive appearance which may be colored as desired, as shown in FIG. 19 a decorative facing illustrated at 60 may be applied to the panels such as wall panel 2. This decorative facing can take any desired form such as simulated brick, stone, clapboard and the like. It will also be appreciated that the roofing panels may also have a facing to simulate roof tiling, shingles, and the like, the facing being attached by any suitable means diagrammatically illustrated at 61 in FIG. 20.

Where the wall panels are not required to have the same load bearing capacity as the wall panels previously described in the preferred embodiment for the outside walls of the house, that is for instance where the walls are to form interior walls, the thermoplastic material of these panels, such as the panel 62 in FIG. 17, may contain reinforcing agents other than glass fibers. Such other reinforcing agents indicated at 63 may comprise other fibers such as mineral fibers or non fibrous material such as calcium carbonate which would be readily flowable through an extrusion die. Further, the plastic outer skin may be omitted.

In such cases, the exposed surfaces of the panels can be decorated and covered or sealed by a layer of paint 64 as illustrated in FIG. 20 or by wallpaper or decorative panelling and the like.

The method of forming the structural load bearing components comprising the panels 2 and 4, the columns 14, 15 and 31, the joiners 13 and the wall caps or beams and the roof panel end caps, according to the invention involves coextruding the smooth thermoplastic material skin layer 47 simultaneously with the glass fiber reinforced substrate material 46 and utilizing such skin layer as a lubricant to facilitate the flow of the substrate material through the forming dies. By so coextruding the skin layer protects the surfaces of the forming dies contacted thereby, isolating same from the abrasion of the exposed fiber glass ends or portions of the substrate material.

In the structural components such as the panels 2 and 4 which have internal transverse webs such as webs 9 bridging between the wall forming portions, extrusion is facilitated by having the width or thickness of these webs somewhat less than the thickness of the wall portions 7 and 8. As a practical example, with the thickness of the webs 9 chosen at 0.065 inches, the wall portions may have a thickness of 0.080 inches while the thickness of the skin 47 may be of the order of 0.015 inches, thus making the panel walls 7 and 8 0.030 inches thicker than the internal webs.

Structurally, the walls 8 and 9 of the panels can be looked at as the flanges of an I beam and the transverse webs 9 as the webs of the beam in considering loading capacity. Similarly, the ends of the joiners 13 can be looked at as the flanges of an I beam while the transverse web or wall 58 is the web of the beam. The columns 14, 15 and 37 can be considered as box beams for structural purposes.

It will be appreciated that the example given is purely an example and the specific dimensions and proportions can readily be altered as appreciated by those skilled in the art.

The individual structural components of the invention are extruded in long continuous lengths and are cut off at the desired lengths required. In this connection, it will be appreciated that these components are capable of being sawn and notched without rupture to provided for door and window openings and the like to receive the windows 65 and doors 66 illustrated in FIG. 1.

As shown in FIG. 14 for example, the window 65 may be a conventional window having a standard plastic window frame 67 mounting the window sash 68 carrying the glass 69. To mount the window, extruded hollow thermoplastic adapters 70 are provided which are formed with channels or grooves 71 which interlock, for example, with the inturned flanges 56 of one of the box columns, depending upon the position of the window, corner box column 15 being shown. The adapters are proportioned so that with a window they span between two columns to maintain the chosen one meter modular format of the house. Thus, the window unit with adapters 70 illustrated in FIG. 14 it will extend between interlock with the corner column 15 and an intermediate column 15.

The adapter 70 is provided with legs 72 which interengage with and carry the window frame 67. It will be understood that the window unit including the adapters 70 can be simply slid into position or assembled in the same manner as the panels and connectors are assembled without requiring tools or other fastening means.

Similar arrangements can be provided for accommodating the doors 66 which also are readily available in plastic as will be readily appreciated.

While the use of the structural components of the invention to form a house or building is describe in detail FIG. 21 shows the use of structural components according to the invention for producing a simple wall 73 such as a highway

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sound barrier, a fence or a divider. In this connection panels corresponding to panels 2 are provided and interlocked with joiners 13 or if desired box connectors and anchored by concrete poured therein to a concrete base 74 with anchor rods 75. Such a wall will have exceptional permanency, strength, and weatherability with low cost materials and can be erected quickly and easily by simply sliding the components into interlocking engagement. FIG. 22 shows in diagrammatic form the use of panels 2, formed into a simple enclosure 76 using corner box connectors or column 15.

It will be understood from the foregoing that the invention provides structural components and a structural system for erecting structures from simple structures to complete buildings in which the structural components having the requisite load bearing and structural requirements can be mass produced at low cost and can be erected and locked together by simply sliding them into place so that erection can be effected rapidly and easily just by a pair of workmen.

In addition to their other advantages discussed above, the structural components have low heat retention, that is they form poor thermal sinks and do not readily transfer heat and cold. Thus, in using the structure for building enclosures the wall structures of the enclosure, particularly when filled with concrete, provide excellent insulation against the transfer of heat and cold.

Again, for the building of housing or other buildings, the fact that the roof panels are hollow and provide air circulation as well as having low thermal conductivity enables these panels to form excellent insulation against the transfer of heat and cold through to the interior of the building.

It should also be noted that the interlocking connections between the various structural components provides a tortuous path effectively blocking the ingress of moisture at these points of connection while, of course, the components themselves are impervious to moisture penetration.

Although various preferred embodiments of the present invention have been described herein in detail, it will be appreciated by those skilled in the art, that variations may be made thereto without departing from the spirit of the invention or the scope of the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A thermoplastic wall forming member having connectors which are adapted to join with further wall forming members to build a hollow wall for receiving filler material internally of the wall, said wall forming member having securing means thereon positioned away from the connectors thereof adapted to secure thereto a blocking member which does not extend across the width of the wall to block off a hollow area within the receiving region which area would otherwise be filled in by the filler material, said securing means comprising a pair of spaced apart projecting fingers adapted to interlock with the blocking member, and wherein each of said fingers has a securing flange, the flanges on the fingers being directed outwardly away from one another.

2. A thermoplastic wall forming system including a wall forming member having connecting ends which join with

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further wall forming members to build a wall which has a hollow receiving region for filler material internally of the wall which extends between said connecting ends, a blocking member which does not extend across the width of the wall releasably interlocked with spaced apart projecting fingers provided on the wall forming member away from the connecting ends thereof, said blocking member blocking off a hollow area within the wall receiving region which area would otherwise be filled in by the filler material.

3. A thermoplastic wall forming system as claimed in claim 2, wherein said spaced apart fingers have flanges thereon and wherein said blocking member comprises a channel member having flanges which releasably interlock with the flanges on said fingers.

4. A thermoplastic wall forming system as claimed in claim 3, wherein the flanges on said fingers are directed outwardly away from one another and wherein the flanges on said channel member are directed inwardly towards one another and interlock outwardly over the flanges on said fingers.

5. A thermoplastic wall forming member having a wall portion with ends which are adapted to interlock with ends of wall portions of other wall forming members to make a hollow wall structure, said wall portion being provided with securing means for securing a wiring channel interiorly of the hollow wall structure to be formed by said wall member and the other wall forming members, said securing means comprises a pair of spaced apart undercut rails on said wall portion away from said ends thereof.

6. A construction made from a plurality of interlocked thermoplastic wall forming members, at least one of said wall forming members being provided with a pair of wiring channel securing rails located internally of said wall construction, a wiring channel slideably engaged by and connected internally of said wall construction solely to said rails and wherein said wall construction is loaded with concrete outwardly around said wiring channel, said wiring channel providing an isolated hollow compartment surrounded by the concrete within said wall construction.

7. A thermoplastic wall forming system including a wall forming member having connecting ends which join with further wall forming members to build a wall which has a hollow receiving region for filler material internally of the wall, a blocking member releasably interlocked with spaced apart projecting fingers provided on the wall forming member away from the connecting ends thereof, said blocking member blocking off a hollow area within the receiving region which area would otherwise be filled in by the filler material wherein said spaced apart fingers have flanges thereon and wherein said blocking member comprises a channel member having flanges which releasably interlock with the flanges on said fingers, said flanges on said fingers being directed outwardly away from one another and said flanges on said channel member being directed inwardly towards one another and interlock outwardly over the flanges on said fingers.

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[11] Patent Number: 5,311,778

[45] **Date of Patent:** May 17, 1994

[54] PROCESS AND APPARATUS TO IDENTIFY THE PRESENCE OF STRUCTURAL CAVITIES IN SLEEVES FOR THE MANUFACTURE OF DRIVING BELTS

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[21] Appl. No.: 793,733

[57] **ABSTRACT**

[22] Filed: Nov. 21, 1991

A process and apparatus for identifying defects within the structure of a tubular sleeve used to make toothed belts, the sleeve, having a toothed inner surface 2a, is operatively mounted on rollers 5, 6 operable in rotation to move the sleeve transversely to the extension of the teeth 3. An ultrasonic emitting and receiving member 15 movable parallel to the rollers 5, 6 detects the presence of structural cavities 3a in the sleeve. An electronic processing unit 20 carries out the identification and memorization of the position of the structural cavities 3a on the longitudinal extension of the sleeve 2.

[30] Foreign Application Priority Data

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[51] Int. Cl.⁵ G01N 29/26

[52] U.S. Cl. 73/622; 73/634

[58] Field of Search 73/634, 620, 627, 629,
73/622

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18 Claims, 3 Drawing Sheets

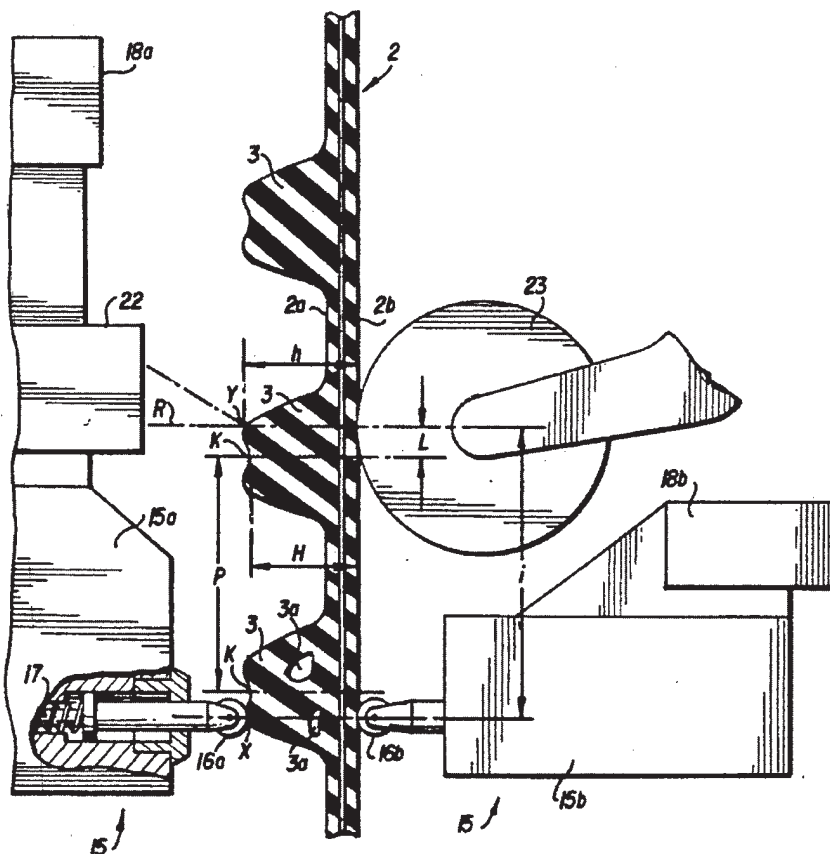
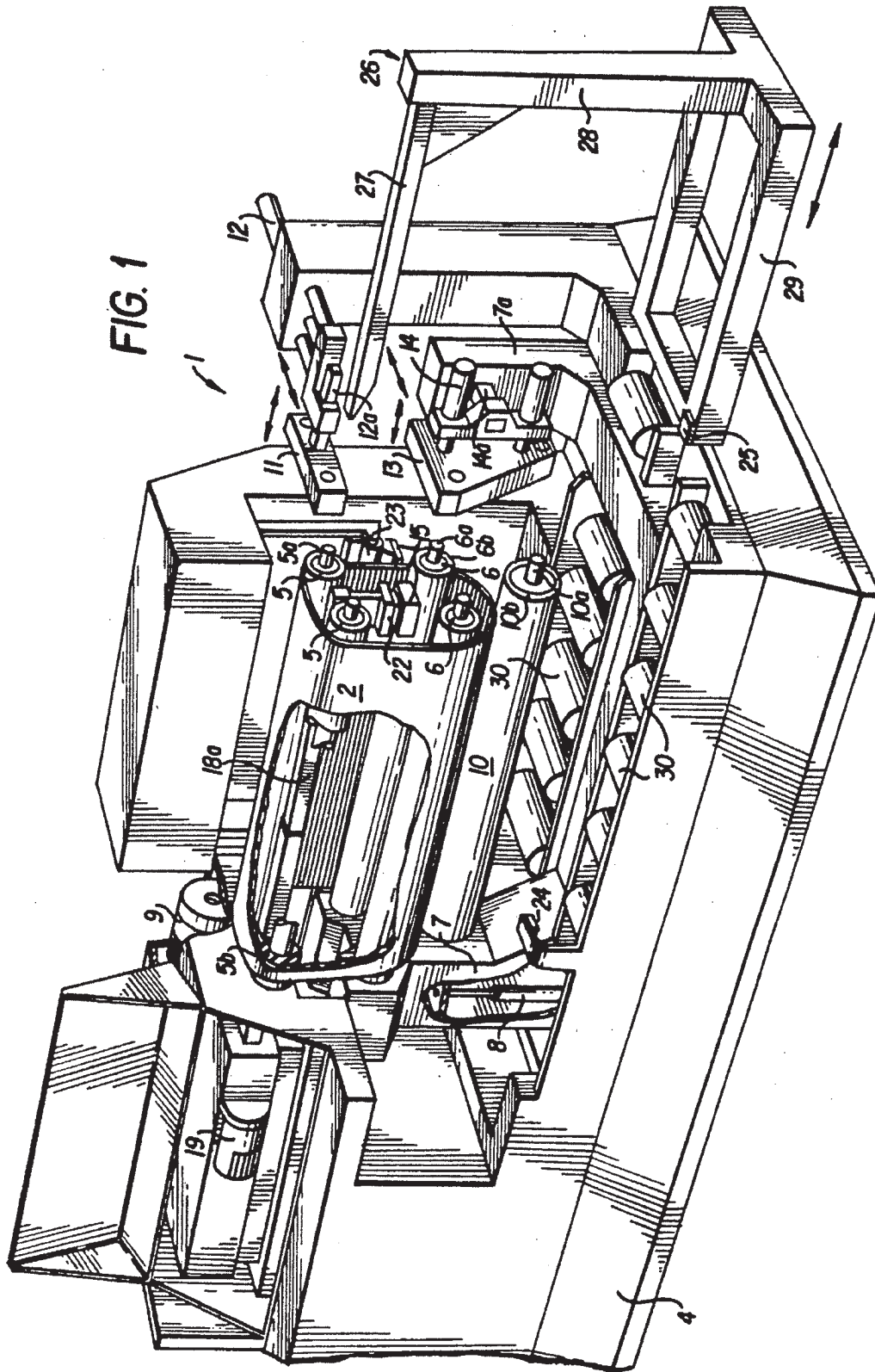
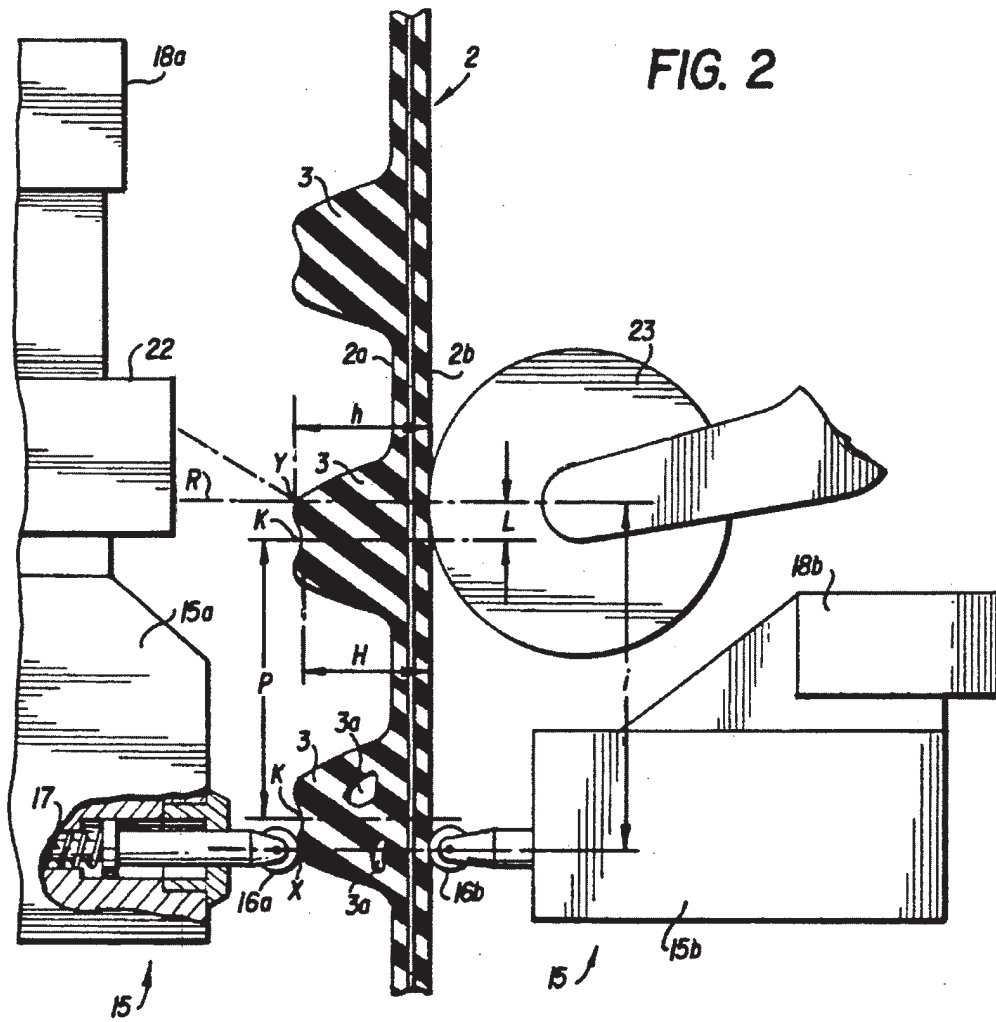


FIG. 1



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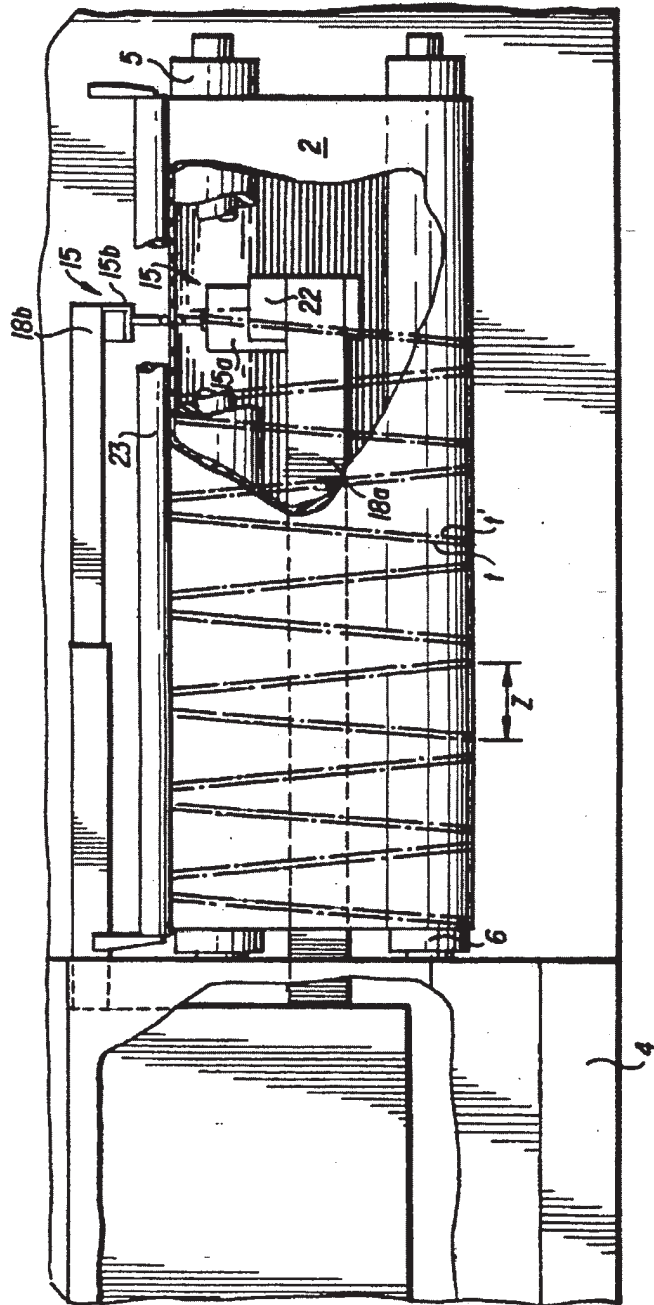


FIG. 3

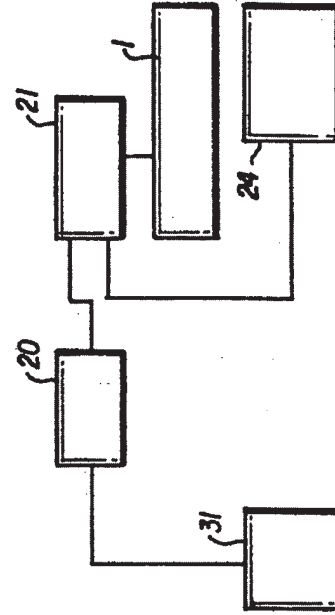


FIG. 4

PROCESS AND APPARATUS TO IDENTIFY THE PRESENCE OF STRUCTURAL CAVITIES IN SLEEVES FOR THE MANUFACTURE OF DRIVING BELTS

CROSS REFERENCE TO RELATED APPLICATIONS

Copending U.S. application Ser. No. 07/792,876, filed on even date herewith (now U.S. Pat. No. 5,198,068), for PROCESS AND APPARATUS TO APPLY IDENTIFICATION INSCRIPTIONS ON SLEEVES MADE OF ELASTOMERIC MATERIAL IN THE MANUFACTURE OF DRIVING BELTS.

Copending U.S. application Ser. No. 07/793,731, filed on even date herewith, for PROCESS AND APPARATUS FOR HANDLING DRIVING BELTS IN AN AUTOMATED MANNER.

Copending U.S. application Ser. No. 07/793,840, filed on even date herewith (now U.S. Pat. No. 5,217,562), for MACHINE AND PROCESS FOR COILING AND WINDING TUBULAR SLEEVES OF ELASTOMERIC MATERIAL INCORPORATING REINFORCING FIBERS.

Copending U.S. application Ser. No. 07/793,732, filed on even date herewith, for PROCESS AND APPARATUS FOR THE INSPECTING JUNCTIONS IN SLEEVE LINING FABRICS FOR THE MANUFACTURE OF TOOTHED BELTS.

Copending U.S. application Ser. No. 07/792,880, filed on even date herewith (now U.S. Pat. No. 5,243,532), for PROCESS AND AUTOMATIC INSTALLATION FOR THE CONTROL OF THE QUALITY AND OF THE PRODUCTION OF TRANSMISSION BELTS.

Copending U.S. application Ser. No. 07/793,729, filed on even date herewith (now U.S. Pat. No. 5,247,463), for A PROCESS AND APPARATUS FOR INSPECTING THE GEOMETRICAL CONFIGURATION OF TOOTHED DRIVING ELEMENTS.

The disclosures of each of the above identified U.S. applications and patents are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

The present invention relates to a process and an apparatus to identify the presence of structural cavities in sleeves for the manufacture of driving belts.

The invention is adapted to carry out quality control tests on sleeves for the production of driving belts of different kinds, such as toothed belts, flat grooved belts, toothed V-belts and so on.

In the course of the present description reference will be particularly made, by way of example only, to the test carried out on a sleeve for the manufacture of toothed belts.

It is known that toothed belts are obtained by a cutting operation carried out at several axially spaced circumferential lines on an axially elongated cylindrical tubular sleeve having a toothed inner surface.

This sleeve is made by wrapping at least a reinforcement layer incorporating a plurality of inextensible cords around a cylindrical grooved die which has negatively reproduced toothing on its outer surface and

upon which one or more layers of elastomeric material are then superposed.

The semifinished product thus obtained is then submitted to a vulcanization process in an autoclave.

During the above operation the semifinished product, previously enclosed in a rubber coating sheath, undergoes a suitable heating by means of steam under pressure which is sent into the die and to the outside of the sheath surrounding the semifinished product.

Due to the steam pressure, the layers of elastomeric material are submitted to homogeneously-distributed centripetal compressive forces urging the elastomeric material to forcedly pass through the inextensible cord layer. Thus the elastomeric material will fill the grooves provided in the die, thereby creating the inner toothing on the finished sleeve.

It may however happen that, during the vulcanization step, the proper formation of teeth is impaired due to undesired infiltrations of steam and/or condensate between the elastomer layers of the semi-finished product.

These infiltrations give rise to cavities in the sleeve structure and in particular within the teeth and the presence of said cavities causes an alteration to the operating features and strength of the toothed belts that will be subsequently obtained from the above cutting operation.

The formation of cavities can also take place for other reasons, for example due to the development of gas resulting from an incorrect composition of the materials forming the elastomeric layers.

It is clear that when a belt having defects of the above described type is used, it could easily break thereby involving the risk of serious damages to the apparatus on which the belt itself is mounted.

In order to avoid these risks as much as possible, it is necessary that the sleeves produced and/or the belts subsequently obtained be submitted to suitable quality control tests or inspections.

At the present state of the art these inspections are merely based on the visual examination of the toothing by an operator.

As can be easily understood, these empirical inspecting methods offer insufficient reliability. In fact, the identification of possible cavities in the sleeve toothing depends to a great extent on the skill of the operator entrusted with the inspection and the care he or she puts in carrying out the operation.

It is also necessary to take into account the fact that the cavities can be of very small sizes, having a diameter smaller than half a millimeter.

In addition and above all, the mere visual evaluation of the toothed surface enables only cavities appearing on the surface itself to be identified, without offering the possibility of detecting those cavities that are incorporated internally in the elastomeric material.

It is also to be pointed out that the presently used inspection methodologies do not permit timely interventions in the cases in which the structural cavities are due to incorrect operation of the apparatuses used during the sleeve vulcanization step or to errors in the composition of the materials used.

The main object of the present invention is substantially to solve the problems of the known art, by a process and an apparatus enabling an accurate and reliable inspection of the toothing.

A further object of the invention is to provide a process and an apparatus capable of identifying and signal-

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ling the presence of structural cavities in the toothing in a very timely manner, when they are due to incorrect operation of the apparatuses adopted in the vulcanization processes or to wrong compositions of the materials used for the manufacture of the sleeves, in order to allow immediate interventions for the elimination of these anomalies.

SUMMARY OF THE INVENTION

The foregoing and further objects that will become more apparent in the course of the following description are substantially attained by a process for identifying the presence of structural cavities in sleeves for the manufacture of driving belts, characterized in that it comprises the following steps:

- a) operatively mounting a sleeve on supporting and handling means;
- b) moving the sleeve in a direction transverse to its longitudinal axis;
- c) positioning an ultrasonic emitting and receiving member in an operating condition on one wall of the sleeve;
- d) moving the ultrasonic emitting and receiving member in to a direction parallel to the sleeve axis, so that said emitting and receiving member may send ultrasonic signals through the sleeve to a first read point moving in a helical manner relative to the sleeve axis;
- e) detecting and processing signals emitted from the ultrasonic emitting and receiving member in order to identify the presence of structural cavities in the sleeve;
- f) detecting and storing the position of the ultrasonic emitting and receiving member on the longitudinal extension of the sleeve when the presence of structural cavities has been ascertained.

In accordance with the invention, the above process is put into practice by an apparatus for identifying the presence of structural cavities in sleeves for the manufacture of driving belts, characterized in that it comprises:

- supporting means designed to operatively engage a sleeve;
- first motion-imparting means cooperating with said supporting means so as to impart a continuous movement to the sleeve in a transverse direction to the longitudinal extension thereof;
- at least one ultrasonic emitting and receiving member arranged to operate through the sleeve at a first read point, in order to detect the presence of structural cavities in the sleeve itself;
- second motion-imparting means acting on the emitting and receiving member to impart a translatory movement to the same in a direction parallel to the sleeve axis, so that the first read point will move in a helical manner relative to the sleeve axis;
- an electronic processing unit operatively connected to the ultrasonic emitting and receiving member as well as to the second motion-imparting means in order to identify the position on the longitudinal extension of the sleeve of the structural cavities detected by said emitting and receiving member.

BRIEF DESCRIPTION OF THE DRAWINGS

Further features and advantages will become more apparent from the detailed description of a preferred embodiment of a process and an apparatus for identifying the presence of structural cavities in sleeves for the manufacture of driving belts in accordance with the invention, given hereinafter by way of non-limiting

example with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of an apparatus used for putting into practice the process of the invention on toothed sleeves for the manufacture of toothed belts;

FIG. 2 is a diagrammatic side view of a detail of the apparatus, to an enlarged scale, showing the ultrasonic emitting and receiving member and the reading member in an operating condition;

FIG. 3 is fragmentary diagrammatic top view showing the structure of the ultrasonic emitting and receiving member and the reading member, as well as the path of the relative motion between said members and the sleeve;

FIG. 4 is a block diagram showing the operating principle on which the apparatus of the invention is based.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to the drawings and in particular to FIG. 1 an apparatus for identifying the presence of structural cavities in sleeves for the manufacture of driving belts in accordance with the invention has been generally denoted by reference numeral 1.

In the embodiment described apparatus 1 lends itself to act on sleeves 2 of the type used for the manufacture of toothed belts.

Each sleeve 2 is provided with a toothed inner surface 2a having a plurality of shaped teeth 3 disposed parallel to one another in side by side relation according to a predetermined spacing "P", (see FIG. 2).

The configuration of the teeth 3 can be various depending upon the purpose of the belt.

In the embodiment shown in FIG. 2 the shape of teeth 3 is as described in the U.S. Pat. No. 4,850,943, the disclosure of which is hereby incorporated by reference.

For various reasons well known to those skilled in the art and discussed above, unacceptable cavities denoted by 3a in FIG. 2 can be present in the sleeve 2 and in particular in the teeth 3.

The presence of these cavities 3a requires discarding of any individual belts that, after the execution of the conventional circumferential-cutting operations on the sleeve 2, exhibit said cavities.

In accordance with the present invention, apparatus 1 lends itself to perform the identification of the structural cavities 3a by a process that, in a preferential solution, essentially comprises the following steps;

- a) operatively mounting the sleeve 2 on supporting and handling means;
- b) moving the sleeve 2 in a direction transverse to its longitudinal axis;
- c) positioning an ultrasonic emitting and receiving member and a reading member in an operating condition on one wall of the sleeve 2;
- d) moving the ultrasonic emitting and receiving member and the reading member in a direction parallel to the sleeve axis, so that said emitting and receiving member and reading member act on the sleeve respectively at a first read point and a second read point moving in a helical manner relative to the sleeve axis;
- e) repeatedly reading the height of the toothed surface passing under the second read point in order to identify the outline of the transverse extension of the individual teeth 3;

- f) timing the interval of time intervening between the different detections of height values carried out during the repeated reading step;
- g) identifying the passage under the second read point of at least two characteristic points each belonging to the transverse outline of one of said teeth 3, said characteristic points being spaced apart from each other by a known predetermined amount;
- h) measuring the time interval between the passage of said characteristic points under the second read point, to which interval a displacement of the toothed surface 2a equal to said known amount is correlated;
- i) assigning a corresponding distance value from one of said characteristic points to each height value detected during step e), based on the time elapsing between the detection of the height value and the detection of the passage of said characteristic point, as well as on the value of the space/time ratio resulting from step h);
- j) detecting and processing signals emitted from the ultrasonic emitting and receiving member in order to identify the presence of structural cavities 3a in the sleeve 2;
- k) stopping the step e) when the first read point is located in a region of the toothed surface 2a included between two contiguous teeth 3;
- l) detecting and storing the position of the ultrasonic emitting and receiving member on the longitudinal extension of the sleeve 2 when the presence of structural cavities 3a has been ascertained.

For the above purpose, apparatus 1 substantially comprises a bed 4 on which supporting means 5, 6, 10 is mounted which is arranged to operatively support the toothed element 2.

In the embodiment shown the supporting means is comprised of at least an upper roller 5 rotatably engaged to the bed 4 and at least a lower roller 6 parallel to the upper roller 5 and operatively engaged to a supporting column 7 movable, upon command of fluid-operated actuators 8 or similar means, to enable the lower roller 6 to move close to and away from the upper roller 5.

In greater detail, in the embodiment shown two upper rollers 5 and two lower rollers 6 are provided and they are disposed in side by side relation along substantially horizontal planes.

Preferably connected to the supporting column 7 is at least one auxiliary lower roller 10, disposed in parallel to and under the lower rollers 6. The auxiliary roller 10 is adapted to be used in place of the lower rollers 6 when the sleeves 2 being worked have a large circumferential extension.

Associated with the supporting means 5, 6, 10 is the motion-imparting means consisting of at least a first motor 9 acting on at least one of the upper rollers 5 to impart a continuous movement to the sleeve 2 in a direction substantially perpendicular to the longitudinal extension of the teeth 3 provided thereon.

As shown in FIG. 1, each of the supporting rollers 5, 6, 10 is provided with a coating layer made of elastomeric material 5b, 6b, 10b in order to ensure a firm grip on the toothed surface 2a and an easy adaptability to the different types of sleeves 2 being worked.

At least one of the ends 5a of each upper roller 5 can be operatively engaged by a first removable support 11 slidably guided relative to the bed 4 and laterally movable apart from the upper rollers, with two degrees of freedom upon command, for example, by fluid-operated

cylinders 12 and 12A or the like, to enable the support unit 11 to be moved out of the way of an incoming sleeve 2 to be engaged about the rollers, as diagrammatically shown in FIG. 1.

In the same manner, at least one of the ends 6a, 10a of each of the lower rollers 6 and auxiliary roller 10 can be operatively engaged by a second removable support 13 connected with two degrees of freedom to a side extension 7a of the supporting column 7 and movable laterally apart from the lower rollers upon command, for example by respective actuators 14 and 14A to enable support 13 to be similarly moved.

Apparatus 1 is provided with at least an ultrasonic emitting and receiving member, generally denoted by 15, designed to operate through the sleeve 2 at a first read point "X", (see FIG. 2) in order to detect the presence of structural cavities 3a.

In greater detail, and with reference to FIG. 2, the ultrasonic emitting and receiving member 15, known per se and therefore not described in detail, comprises an ultrasonic emitting part 15a and an ultrasonic receiving part 15b facing each other in mutual alignment and acting by means of respective rollers 16a, 16b in sliding contact relationship on the inner surface 2a and the outer surface 2b respectively, or in any case two opposite surfaces, of the sleeve 2.

Preferably at least the emitting part 15a is submitted to an elastic thrust action upon command of a preloading spring 17 ensuring contact thereof with the outline of the teeth 3.

The emitting part 15a and the receiving part 15b are fastened to respective telescopic bars 18a, 18b (see FIGS. 1 and 2) simultaneously extensible upon command of second motion imparting means consisting for example of at least a threaded bar, not shown and known and conventional, set in rotation by a second motor 19.

The cooperation between the second motor 19 and said threaded bar imparts a continuous translatory movement to the emitting and receiving member, 15 in a direction parallel to the sleeve axis and, therefore, also parallel to the longitudinal extension of the teeth 3.

The ultrasonic emitting and receiving member 15 is capable of sending, by means of the emitting part 15a, ultrasonic signals of an appropriate frequency through the sleeve 2 towards the receiving part 15b.

It is preferably provided that the frequency of the ultrasonic waves should have a value in the range of 0.3 MHz to 0.5 MHz.

The receiving part 15b in turn is capable of sensing the signals sent from the emitting part 15a and consequently emit electric signals correlated with the ultrasonic reception signal.

In the absence of structural discontinuities in the sleeve 2, the ultrasonic waves easily pass through the elastomeric material interposed between the emitting part 15a and the receiving part 15b and can be therefore clearly sensed by the receiving part.

If on the contrary one or more structural cavities 3a are incorporated in the elastomeric material in the regions passed through by the ultrasonic waves, that is at the first read point "X", the travel of the ultrasonic waves is greatly hindered and, as a result, said waves will not be sensed by the receiving part 15a or will be sensed to a very reduced degree.

The emitting and receiving member 15 are connected to an electronic processing unit 20.

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An electronic control box 21 (FIG. 4) of the type commonly named PLC, controls the sequential operation of the various members associated with apparatus 1 (motors 9, 19, actuator cylinders 8, 12, 14, and so on).

The processing unit 20, preferably consisting of a conventional personal computer, in accordance with modalities to be clarified in the following, processes signals received by the ultrasonic emitting and receiving member 15 in order to identify the position of the structural cavities 3a on the longitudinal extension of the sleeve 2.

In a preferred embodiment, combined with the ultrasonic emitting and receiving member 15 is at least a reading member 22, preferably of the laser beam type, fastened to one end of the telescopic bar 18a engaging the emitting part 15a.

The reading member 22, not described in detail and known per se, sends a light beam "R" onto the toothed surface 2a of the sleeve 2 and, by picking up the reflected light from the struck surface at a second read point "Y" adjacent the first reading point "X", is capable of emitting electric signals correlated to the distance between the reading member and the second read point "Y" struck by the light beam "R".

A freely rotating locating roller 23, disposed parallel to the movement direction of the reading member 22, acts on the outer surface 2b of the sleeve 2 in order to keep said surface to a predetermined distance relative to the reading member.

Preferably, within the general operation of apparatus 1, the reading member 22 which is connected to the electronic processing unit 20 as well upon interposition of the electronic control box 21, is used to inspect the geometrical configuration of the toothed surface 2a, in accordance with a process, which is described in a co-pending patent U.S. application Ser. No. 07/792,880 as already above identified under the heading "Cross Reference to Related Applications" and specifically incorporated herein by reference. For the purpose, the processing unit 20 processes signals received from the reading member 22 in order to draw data relating to the geometrical configuration of the toothed surface 2a therefrom, which data are then compared with theoretical geometric parameters previously stored in the processing unit.

As regards, on the contrary, the cooperation with the ultrasonic emitting and receiving member 15, the reading member 22 is used to enable the electronic processing unit 20 to know the position of the first read point "X", instant by instant, on the outline of the toothed surface 2a.

As will be more clearly understood in the following, this expedient is intended to permit the processing unit 20 to disenable alternatively either the emission or the reception of signals by the ultrasonic emitting and receiving member 15 each time the first read point "X" is located in a region of the toothed surface 2a included between two contiguous teeth 3. The disenable area in the longitudinal section of the belt in FIG. 2 can be identified by the distance between the points of two teeth in the belt determined by the meeting between the connecting radius at the tooth root and the beginning of the flank.

Theoretical geometric parameters corresponding to the toothed surfaces 2a of different types of sleeves 2 produced in the factory in which apparatus 1 is installed are input to the memory of the processing unit 20. An individual code is then assigned to the theoretical geo-

metric parameters of each type of toothed surface 2a which code will enable the immediate selective recalling of said parameters for carrying out the operating steps of apparatus 1.

The individual code corresponding to the sleeve 2 being tested is detected by the electronic control box 21 when the sleeve is fitted on the rollers 5, 6.

For the purpose, an automatic read and record head 24 is conventionally interlocked to the electronic control box 21, which head is designed to detect the information recorded on a corresponding proper card 25 associated with a handling support 26 conventionally used to transport the sleeves 2 and the belts subsequently produced between the various work stations inside the factory.

Preferably the head 24 and the card 25 are magnetic.

The above handling support 26 holds the sleeve 2 by means of a bar 27 fastened in cantilevered fashion to a post 28 standing up from a base framework 29.

The handling support 26 lends itself to be operatively engaged along a roller-bed 30 mounted to the lower part of the apparatus bed 4, in order to fit the sleeve 3 on the rollers 5, 6 located close to each other, while the magnetic card 25 is simultaneously brought under the read head 24.

In this situation, the electronic control box 21 can transmit the individual code recorded on the magnetic card 25 carried by the handling support 26, to the processing unit 20.

The sleeve 2 is laid on the upper rollers 5, for example by lowering the roller-bed 30, then the handling support 26 is unthreaded from the sleeve, as shown in FIG. 1, to operatively engage with the ends 5a, 6a, 10a of the upper and lower rollers 5 and 6, 10.

Meanwhile, the processing unit 20 has found in its memory the theoretical geometric parameters corresponding to the individual code signalled to it. Therefore the processing unit 20 causes, through the activation of the electronic control box 21, the lowering of the lower rollers 6, 10 to an extent sufficient to produce a given tensioning of the sleeve 2.

At the end of the lowering an inspection step can be provided, through measuring means associated with the supporting column 7, in order to verify whether the carried out positioning of the lower rollers 6, 10 corresponds to the expected tensioning of the sleeve 2.

At this point, apparatus 1 begins the process for identifying the structural cavities 3a in the sleeve 2, which process, in accordance with the present invention, takes place following the modalities set forth hereinafter.

The processing unit 20 enables the electronic control box 21 to actuate the first motor 9 which, through the upper rollers 5, sets in motion the sleeve 2 in a direction transverse to the extension of the teeth 3 in the example of FIG. 1 that would be a rotary motion of the sleeve 2 about its own axis.

Simultaneously the second motor 19 is actuated as well, and it causes the translation of the ultrasonic emitting and receiving member 15 and the reading member 22 in a direction substantially parallel to the longitudinal extension of the teeth 3, according to a predetermined speed.

Preferably the starting motion point of the emitting and receiving member 15 and the reading member 22 is located laterally apart from the sleeve 2, so that the movement speeds of the sleeve and of said members 15, 22 may be stabilized before the process for the identification of cavities 3a really begins.

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When the ultrasonic emitting and receiving member 15 and reading member 22 move within the sleeve 2, the first read point "X" and the second read point "Y" are moved relative to the toothed surface according to respective substantially helical parallel paths "t", "t" (FIG. 3) the pitch "z" of which is correlated with the ratio existing between the movement speeds of the members 15, 22 and the sleeve itself.

By adjusting these speeds it is possible to obtain helical paths "t", "t" having the desired pitch "z". The more the pitch "z" of paths "t", "t" is reduced, the more closely the inspection test is carried out. A satisfactorily close inspection is achieved when the pitch "z" of the helical paths "t", "t" is lower than or equal to the width of the belts to be produced. In this way, one can in fact be sure that all teeth 3 belonging to each of the belts to be obtained will pass before the read point "X", "Y", in order to be submitted to the inspection test.

As previously stated, in order that the processing unit 20 may be capable of periodically disabling the ultrasonic emitting and receiving member 15 for the above clarified purposes, it is necessary for the processing unit to know the exact position of the first read point "X" relative to the individual teeth 3.

To this end the processing unit 20, based on signals coming from the reading member 22, identifies the transverse outline of the toothed surface 2a by means of repeated detections of the height "h" exhibited, instant by instant, by the toothed surface at the second read point "Y".

Simultaneously, the processing unit 20 calculates the interval of time intervening between the different detections of the height values "h".

The processing unit 20 also carries out the identification of the passage, under the second read point "Y", of two identical characteristic points "K" each belonging to the transverse outline of one of the teeth 3. These characteristic points "K" that in the described embodiment are constituted by a recess 3b formed on top of each tooth 3 and having a predetermined height "H", are unmistakably spaced apart from each other by a known amount previously stored in the processing unit 20, which amount is preferably the same as the spacing "P" of teeth 3. By measuring the interval of time between the passage of the two characteristic points "K", the processing unit 20 is capable of establishing the displacement of the toothed surface 2a relative to the read points "X" and "Y" expressed as the space/time ratio resulting when the value of spacing "P" is divided by the value of the interval of time.

Depending upon the value of the emerged space/time ratio, the processing unit 20 assigns to each height value "h" detected during the repeated reading step, a corresponding distance value "L" from one of the characteristic points "K", based on the interval of time intervening between the detection of the height value and the detection of the passage of said characteristic point "K".

By mathematically interpolating the center distance "i" existing between the first and second read points "X" and "Y", the processing unit 20 is capable of knowing the exact frequency of passage of the teeth 3 before the first read point "X" and can consequently stop the cavity detection step carried out by the ultrasonic emitting and receiving member 15 each time the first read point "X" falls on the area of the toothed surface 2a included between two contiguous teeth 3.

For safety purposes, the identification of the interval of time intervening between the passage of the characteristic points "K" is preferably repeated two or three times consecutively, each referring to two different teeth 3, as far as the processing unit 20 finds a constant time value for a predetermined number of times between one measuring and the next one.

At the beginning of the test, the execution of these operating steps entails a temporary disabling of the ultrasonic emitting and receiving member 15, so that, as a result, cavities 3a that might be present in the first teeth 3 passing under the first read point "X" cannot be identified.

This lack of identification however does not represent a problem in that the unchecked teeth certainly belong to one of the end belts of the sleeve 2 that, as is known, are discarded "a priori".

It is also provided that the operating steps for detecting the space/time ratio be carried out several times at predetermined intervals during the inspection test on the sleeve 2.

In this way, one can be sure that the test result is not impaired by possible variations in the relative speed between the toothed surface 2a and the read points "X" and "Y", caused for example either by uncontrolled variations in the running speed of the first and/or second motor 9, 19, or slight elastic deformations of the sleeve 2 and/or the elastomeric coating layers disposed on the rollers 5, 6, 10, or by an imperfect parallelism between the individual teeth 3 and the direction of movement of the emitting and receiving member 15 and the reading member 22.

When the presence of one or more structural cavities 3a is detected, the processing unit 20 identifies which of the belts to be produced in the following cutting operation on the sleeve 2 will have a defective tooth 3.

For the purpose, the processing unit 20 should preferably know the width of the single belts to be produced and be able to carry out the above operation based on the movement speed of the reading member 22 and the interval of time elapsed from the moment that the identification step by the ultrasonic emitting and receiving member has started to the moment at which the presence of cavities 3a is detected.

During the test all the identified cavities 3a and the positions of the belts corresponding thereto are stored in the processing unit 20.

When, at the end of the test, the handling support 26 is engaged again on the roller-bed 30 in order to pick up the sleeve 2, the processing unit 20 will send signals relating to the position of the cavities 3a to the magnetic card 25, through the electronic control box 21 and the read and record head 24.

Signals input to the magnetic card 25 will enable other automatic machines provided in the belt production cycle to identify and discard the belts that after the subsequent cutting operation of the sleeve, will have defective teeth.

Advantageously, the process in accordance with the invention also enables timely interventions in order to eliminate the causes that have led to the formation of the structural cavities 3a.

For the purpose, the processing unit 20 is provided to be able to transmit all data detected during the test to a processor 31. The processor 31 supervising the operation of the main apparatuses used in the belt production cycle will signal the operating anomaly of the apparatus

or apparatuses in which the formation of cavities 3a is supposed to have had origin.

The present invention attains the intended purposes.

In fact, by virtue of the process and apparatus in question the possible presence of cavities 3a' can be identified in a very reliable and accurate manner.

In this connection it is to be noted that the inventive apparatus also enables cavities of very reduced sizes and completely incorporated in the elastomeric material to be detected.

In addition the process and apparatus in reference permit suitable and timely interventions on the machines and production processes in which the causes of the defects found in the sleeve structure reside.

Obviously, modifications and variations can be made to the invention as conceived, also depending upon the type of sleeve being worked, all of them falling within the scope of the inventive idea.

For example the emitting member can be replaced by equivalent elements adapted to send signals, waves and the like the intensity of which could be sensed by the receiving member to a different extent depending upon the presence or absence of cavities in the elastomeric material of the belt.

The cited equivalent elements can be, among other things, sources emitting other sorts of waves.

The described method can also apply to the identification of cavities located other than in the teeth, for example on elastomeric portions between the tooth base line and the belt back.

We claim:

1. A process for identifying the presence of structural cavities in elongated sleeves for the manufacture of driving belts, each sleeve having a longitudinal axis and at least one toothed surface with a plurality of generally axially extending shaped teeth which are disposed parallel to one another in side by side relation according to a predetermined spacing P, said process comprising the following steps:

- a) operatively mounting the sleeve on supporting and handling means;
- b) moving the sleeve in a direction transverse to its longitudinal axis;
- c) positioning an ultrasonic emitting and receiving member and a reading member in an operating position on one wall of the sleeve;
- d) moving the ultrasonic emitting and receiving member and the reading member in a helical manner and in a direction parallel to the longitudinal axis of the sleeve, so that said emitting and receiving member and said reading member act on the sleeve at a first read point "X" and a second read point "Y" respectively;
- e) repeatedly reading a height "h" of the toothed surface passing under the second read point "Y" in order to identify an outline of individual teeth;
- f) measuring the interval of time between different detections of height value "h" carried out during the repeated reading step;
- g) identifying passage under the second read point "Y" of at least two characteristic points "K" of each outline of one of said teeth, said characteristic points "K" being spaced apart from each other by a known predetermined amount;
- h) measuring the interval of time between the passage of said characteristic points "K" under the second read point "Y", to which interval a displacement of

the toothed surface equal to said known amount is correlated;

- i) assigning a corresponding distance value "L" from one of said characteristic points "K", to each height value "h" detected during step e), based on a time elapsing between a detection of a height value and the detection of the passage of said characteristic point K, as well as on a value of a space/-time ratio resulting from step h);
- j) detecting and processing signals emitted from the ultrasonic emitting and receiving member in order to identify the presence of structural cavities in the sleeve;
- k) stopping step e) when the first read point X is located in a region of the toothed surface included between two contiguous teeth;
- l) detecting and storing the position of the ultrasonic emitting and receiving member on the longitudinal axis of the sleeve when the presence of structural cavities has been ascertained.

2. A process according to claim 1 including performing step l) by measuring the interval of time between the beginning of step j) and the instant at which one of said structural cavities is detected, said ultrasonic emitting and receiving member being moved at a predetermined speed.

3. A process according to claim 1, in which said known amount corresponds to the distribution spacing P of the teeth.

4. A process according to claim 1, in which said steps for identifying the passage of two characteristic points K and measuring the interval of time elapsing between the passage of said points K are carried out several consecutive times when the detected interval of time is the same for a predetermined number of consecutive timings.

5. An apparatus for identifying the presence of structural cavities in elongated sleeves for the manufacture of driving belts, each sleeve having a longitudinal axis and at least one toothed surface having a plurality of generally axially extending shaped teeth which are disposed parallel to one another in side by side relation according to a predetermined spacing P, said apparatus comprising:

supporting means for operatively engaging a sleeve; first motion-imparting means cooperating with said supporting means so as to impart a continuous movement to the sleeve in a direction transverse to the longitudinal axis thereof;

at least one ultrasonic emitting and receiving member positioned to operate through the sleeve at a first read point X, for detecting the presence of structural cavities within the sleeve;

at least one reading member positioned to operate adjacent the toothed surface in order to identify an outline of the side extension of the individual teeth through repeated readings of a height h of the toothed surface, which is moving before a second read point Y;

second motion-imparting means acting on the emitting and receiving member and the reading member to impart a translatory movement to said member in a helical manner and in a direction parallel to the longitudinal axis of the sleeve, so that the first read point X and second read point Y move helically relative to said longitudinal axis;

an electronic processing unit operatively connected to the ultrasonic emitting and receiving member as

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well as to the second motion-imparting means in order to identify the position, on a longitudinal surface of the sleeve, of structural cavities detected by said emitting and receiving member, said processing unit being also operatively connected to the reading member so as to disenable the ultrasonic emitting and receiving member when the first read point X is located in an area of the toothed surface included between two contiguous teeth.

6. An apparatus according to claim 5 in which said supporting means comprises at least one upper supporting roller and at least one lower supporting roller parallel thereto and adapted to be selectively positioned so as to be moved closer to and farther away from each other, in order to operatively engage the sleeve so as to give said sleeve a predetermined tensioning.

7. An apparatus according to claim 6, in which at least some of said supporting rollers are provided with a coating layer of elastomeric material.

8. An apparatus according to claim 6 further comprising a pair of upper rollers and a pair of lower rollers disposed parallel to one another in side by side relation and lying in respective horizontal planes.

9. An apparatus according to claim 6 further comprising at least one auxiliary lower roller disposed under said lower supporting roller.

10. An apparatus according to claim 6 in which said lower supporting roller is operatively engaged to a supporting column movable upon command of actuator means to enable the lower roller to move closer to and farther away from the upper roller.

11. An apparatus according to claim 6 in which each of said upper and lower rollers has at least one end operatively supported by a removable support adapted to be laterally moved apart from the corresponding roller to permit the engagement of a tubular sleeve on said upper and lower rollers.

12. An apparatus according to claim 5 in which said ultrasonic emitting and receiving member comprises an

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ultrasonic emitting part and an ultrasonic receiving part facing each other in mutual alignment and acting by contact on respectively opposite surfaces of the sleeve.

13. An apparatus according to claim 12, in which at least one of said emitting part and said receiving part has means to cause said part to be in an elastic thrust relation.

14. An apparatus according to claim 5, further comprising at least a freely rotating locating roller disposed parallel to the movement direction of the reading member and acting on an outer surface of the sleeve to keep said surface spaced apart by a predetermined distance from the reading member.

15. An apparatus according to claim 5 further comprising a read and record head operatively connected to said processing unit to transmit an individual code to the processing unit, said code being recorded on a card associated with a handling support transporting the sleeve being worked; supporting rollers for said handling support; theoretical geometric parameters of several different toothed elements being stored in said processing unit.

16. An apparatus according to claim 5 in which said electronic processing unit is operatively connected to a processor in order to inform the processor of the presence of structural cavities identified in the sleeve, said processor being arranged to consequently signal any operating anomalies and to identify such anomalies in relation to apparatuses previously used for the production of the sleeve.

17. An apparatus according to claim 15 in which said processing unit is arranged to record on the card, through the read and record head, the position, on a surface of the sleeve, of the structural cavities present therein.

18. An apparatus according to claim 15 in which said head and card are magnetic.

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Patente de invención

Solicitud: 0711-2010

Registro: 49.630

En conformidad a la ley 19.039, sobre Propiedad Industrial, concedese a:

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País: **MEXICO**

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Inventores:

MANUEL ENRIQUE REQUEJO PRESA.

Título:

SISTEMA Y METODO DE CONSTRUCCION MODULAR PARA CONSTRUCCION PROGRESIVA QUE COMPRENDE UNA PLURALIDAD DE PIEZAS PREFABRICADAS, QUE CONSISTEN EN UN PERFIL RECTANGULAR HUECO CON UNA PLURALIDAD DE PERFORACIONES Y CANALES DESLIZABLES, CON AL MENOS UN CONECTOR, AL MENOS UN POSTE, AL MENOS UNA TAPA, AL MENOS UNA PIEZA EN U Y UN MATERIAL AGLUTINANTE.


MAXIMILIANO SANTA CRUZ S.
Director Nacional



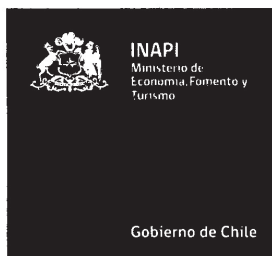

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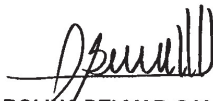
Título : **SISTEMA Y METODO DE CONSTRUCCION MODULAR PARA CONSTRUCCION PROGRESIVA QUE COMPRENDE UNA PLURALIDAD DE PIEZAS PREFABRICADAS, QUE CONSISTEN EN UN PERFIL RECTANGULAR HUECO CON UNA PLURALIDAD DE PERFORACIONES Y CANALES DESLIZABLES, CON AL MENOS UN CONECTOR, AL MENOS UN POSTE, AL MENOS UNA TAPA, AL MENOS UNA PIEZA EN U Y UN MATERIAL AGLUTINANTE.**

CIP : **(E)04C2/00, E04C2/20, E04C2/30**

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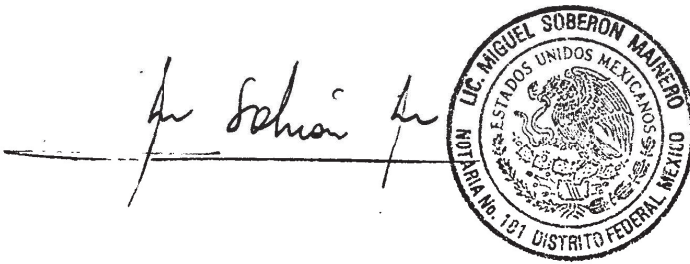



CAROLINA BELMAR GAMBOA
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INVENCION



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(54) Título de la Invención (Máximo 330 caracteres)

Sistema y método de construcción modular para construcción progresiva que comprende una pluralidad de piezas prefabricadas que consisten en un perfil rectangular hueco con una pluralidad de perforaciones y canales deslizables, con al menos un conector, al menos un poste, al menos una tapa, al menos una pieza en U y un material aglutinante.

(57) Resumen (Máximo 1600 caracteres)

Sistema y un método de construcción modular para la construcción progresiva tanto externa como interna conforme al tamaño requerido para cada edificación, que comprende una pluralidad de elementos de construcción constituidos de una pluralidad de piezas prefabricadas que consisten en un perfil rectangular hueco, con una pluralidad de perforaciones dispuestas simétricamente en sus caras frontales y canales deslizables en sus caras laterales, en donde dicha pluralidad de piezas prefabricadas están fijadas unas a otras mediante una soldadura por ultrasonido de dichos canales deslizables de las caras laterales respectivas a cada pieza prefabricada; y dichos elementos de construcción comprenden además ductos para instalaciones; al menos un conector para fijarse en el extremo de un elemento de construcción mediante una unión deslizable de una cara y que comprende una lengüeta en la cara opuesta, y una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones de dicha pieza prefabricada; al menos un poste para fijarse con dicho conector, constituido por un perfil rectangular y hueco con al menos una ranura en cada costado coincidente con dicha lengüeta, con una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones de dicha pieza prefabricada; al menos una tapa para fijarse en dicha ranura de un costado no utilizado de dicho poste; al menos una pieza U con perforaciones circulares, y un material aglutinante que se vierte dentro de dicha pluralidad de elementos de construcción y de dichos postes.

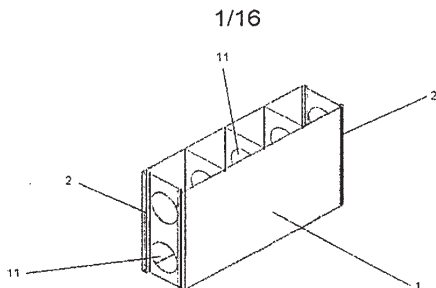


Figura 1



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MEMORIA DESCRIPTIVA

CAMPO DE APLICACIÓN DE LA INVENCION

La presente invención se refiere a un sistema modular para edificación progresiva que se desarrolla en el área de la construcción, específicamente en el área de la construcción por módulos.

DESCRIPCION DEL ARTE PREVIO

En el estado de la técnica existen antecedentes previos que indican que la construcción con paneles termoplásticos existe en el estado de la técnica, es así por ejemplo como se puede mencionar la patente US 6.189.269 que divulga un sistema que permite la unión de sistemas prefabricados mediante el uso de uniones deslizables, dicho sistema no permite el crecimiento progresivo de la construcción una vez hecha utilizando los medios de ensamblaje propios de sus partes. Ni utiliza el ensamblaje de las piezas de manera horizontal por medio de sistema snap-on. También se tiene por ejemplo la patente US 5.608.999 que se compone de elementos en forma de placas planas, rectangulares y semicirculares que se ensamblan mediante rieles que también permiten la unión deslizable. Los elementos al armarse conforman módulos huecos que se llenan solo con cemento. Este sistema no permite tampoco la unión horizontal ni utiliza sistema de unión por sistema snap-on. Este sistema tampoco permite el crecimiento progresivo utilizando los medios de unión una vez realizada la construcción. Otra patente relacionada con el tema es la US 5.311.778 que divulga un sistema modular de multi-componentes para fabricar estructuras de pared, el sistema consta de formas prefabricadas, cada



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extremo de cada panel tiene flanges tipo "L" y el otro extremo tiene ranuras tipo "L" de tal manera que dichas ranuras entran una dentro de la otra. Este sistema también permite la unión solamente mediante unión deslizable.

RESUMEN DE LA INVENCION

La presente invención se refiere a un Sistema Modular que permite la construcción de toda clase de edificaciones de carácter progresivo hacia adentro o hacia fuera, con avances de la técnica conocidos a la fecha, consistentes en la utilización de diversos elementos de construcción con dimensiones logradas a base de la unión de piezas completas de formas poliméricas, que logran el tamaño de los elementos constructivos requeridos para cada tipo de edificación ahorrando tiempo y ventajas en cuanto a la logística, unión realizada con las piezas previamente prefabricadas, mediante soldadura con ultrasonido, lo que permite fusionar el material a nivel molecular, elementos de construcción que se ensamblan entre sí ya sea bajo el sistema a presión ("snap on") o, por canales deslizables y, dichos elementos de construcción con postes bajo el sistema a presión ("snap on").

Las dimensiones de los elementos de construcción, permiten pre-instalar en su interior y de manera oculta y segura, ductos para instalaciones tales como las eléctricas, las hidráulicas y las sanitarias, entre otras, logrando con ello una mejora en la productividad y la calidad, por lo que ya no resulta necesario la realización de obras, instalaciones y costos posteriores.

Los elementos de construcción pueden ser también utilizados para (i) modificar o agregar elementos de construcción al interior de las edificaciones para



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crear nuevos espacios o bien, para (ii) adicionar al exterior de las edificaciones nuevos espacios modulares desde los postes.

Los elementos de construcción se pueden pre-fabricar, de acuerdo al diseño y necesidades, los vanos para puertas y ventanas, que de ser necesario, incluyan los refuerzos estructurales para la fijación de tales elementos arquitectónicos.

Además, los elementos de construcción pueden contar con ganchos exteriores u otros elementos de fijación que permiten deslizar sobre el mismo, laminados de acabados diversos.

Con base en lo anterior, se utilizan materiales y procesos novedosos en beneficio de la productividad, calidad y costos en la industria de la edificación.

Dicha productividad, permite obtener mayores resultados con los mismos recursos, y su resultado final permite incorporarlos como el acabado definitivo.

El proceso descrito para las edificaciones, con los elementos de construcción puede utilizarse como sistema de autoconstrucción o construcción asistida disminuyendo costos, tiempos y requerimiento de mano de obra especializada.

En cuanto al aseguramiento de calidad, los elementos de construcción son prefabricados con niveles de precisión industrial, sin requerir posteriores ajustes por mano de obra calificada en el sitio de la edificación.

Por cuanto al costo, derivado de la productividad, se mejora el proceso constructivo debido a los tiempos reducidos de fabricación e instalación.

BREVE DESCRIPCION DE LAS FIGURAS

La figura 1 muestra una pieza prefabricada.

La figura 2 muestra un poste sin tapas.



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La figura 3 muestra una tapa con su unión permanente (snap-on).

La figura 4 muestra un conector con su union deslizable y su unión permanente (snap-on).

La figura 5 muestra una pieza tipo U con sus correspondientes perforaciones para pasar la enfierradura o postes.

La figura 6 muestra una plancha de techo con su botagua.

La figura 7 muestra el ensamble en fábrica dos piezas prefabricadas para formar un elemento con dimensiones logradas.

La figura 8 muestra un detalle de un poste con sus tapas.

La figura 9 muestra la unión con soldadura de ultrasonido de las piezas prefabricadas que conformaran un elemento con dimensiones logradas antes y después de aplicar la soldadura con ultrasonido.

La figura 10 muestra un modulo con sus ductos para instalaciones eléctricas, de agua, sanitarias gas y transmisión de datos preinstalados.

La figura 11 muestra la unión de dos elementos con dimensiones logradas en una esquina mediante los conectores correspondientes.

La figura 12 muestra el retiro de una tapa desde un poste cuando se desea instalar un nuevo elemento con dimensiones logradas.

La figura 13 muestra la inserción de un conector en el extremo de un elemento con dimensiones logradas.

La figura 14 muestra la inserción de un nuevo modulo en forma horizontal hacia la unión permanente (snap-on).

La figura 15 muestra un modulo ya conectado utilizando la unión permanente (snap-on).

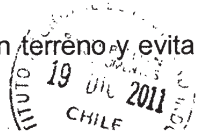


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La figura 16 muestra un vano de puerta en una pieza prefabricada.

DESCRIPCION DETALLADA DE LA INVENCION

La invención propuesta considera que la unión de las piezas prefabricadas (1) se efectúa en la fábrica mediante unión por canales deslizables (2) y sistema de soldadura con ultrasonido para formar los elementos con dimensiones logradas (13). Los extremos de los elementos con dimensiones logradas (13) tienen conectores (3) que se instalan mediante unión deslizable. Los postes (4) cuentan con al menos una ranura (8) donde se insertan las lengüeta (6) de los conectores (3) produciéndose una unión permanente (snap on). Los postes (4) cuentan con al menos una tapa (7) que va sobre cada ranura (8) y que se retira cuando se utilizan dichas ranuras (8) para unir un elemento con dimensiones logradas (13). La unión de dichos elementos con dimensiones logradas (13) a los postes (4) se efectúa mediante dicho sistema de enganche (snap-on). Los elementos de dimensiones logradas (13) permiten instalar en su interior ductos (9) para instalaciones eléctricas, de agua, sanitarias gas y transmisión de datos que vienen preinstaladas de fábrica. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden prefabricar de acuerdo al diseño y necesidades de tal manera de incluir los vanos (10) para puertas y ventanas y/o que incluyan refuerzos estructurales para la fijación posterior de dichas ventanas o puertas. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) pueden contar con ganchos exteriores u otros elementos de fijación que permiten fijar sobre ellos laminados o acabados diversos. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) son prefabricados con instrumentos de precisión lo cual facilita el armado en terreno y evita el uso de



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mano de obra especializada. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con materiales aglutinantes tales como cemento, concreto y espumados, también se pueden llenar con áridos. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con subdivisiones que contengan combinaciones de aglutinante y áridos. Los elementos con dimensiones logradas tienen perforaciones (11) en su interior que permiten que los materiales aglutinantes y/o los áridos se distribuyan uniformemente por gravedad en su interior cuando son vaciados. En el caso de que los elementos con dimensiones logradas (13) vayan rellenos con poliuretano dichos elementos con dimensiones logradas no llevan perforaciones (11) interiores y el relleno se efectúa en fábrica. Las planchas (12) que se utilizan para conformar el techo incluyen en su borde un botagua (13). Por otra parte en la fábrica se realiza la extrusión de las piezas prefabricadas (1); se unen dichas piezas mediante soldadura con ultrasonido, se hacen los vanos (10) de puertas y ventanas según especificaciones, se instalan los ductos (9) para instalaciones eléctricas, hidráulicas, sanitarias de agua o transmisión de datos y se instalan los conectores correspondientes en los extremos (3) de los elementos con dimensiones logradas (13) todo esto previo al transporte al lugar de edificación. Luego de esto se traslada al lugar en que se efectuara la edificación. En el lugar de edificación previo al montaje de los elementos descritos debe construirse un radier con enfierradura (barras o postes metálicos), se insertan en la enfierradura las piezas U (14) en el lugar donde se instalarán los elementos con dimensiones logradas (13), sobre las piezas U (14) y a través de la enfierradura se introducen los elementos con dimensiones logradas (13) y los postes (4). Se sacan las tapas (7) de los postes en los lugares donde se unirá un elemento

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con dimensiones logradas (13) con dicho poste (4), a continuación se unen los elementos con dimensiones logradas (13) con los postes (4) mediante el sistema de enganche (snap on). Se instalan las ventanas y puertas en los vanos (10) previamente fabricados para tal efecto, realizado esto se vacía material aglutinante u otro material por la parte superior de todos los postes (4) y elementos con dimensiones logradas (13) que conforman la instalación. A continuación se coloca y fija el techo. Se conectan los ductos (9) de instalaciones eléctricas, hidráulicas, sanitarias y otras que vienen preinstaladas de fábrica, cuando corresponde se aplican o instalan los materiales de revestimiento. Cabe hacer notar que en el caso de ampliación progresiva se debe sacar la tapa (7) del poste e insertar un nuevo elemento con dimensiones logradas (13).



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REIVINDICACIONES

1.- Sistema de construcción modular para la construcción progresiva tanto externa como interna conforme al tamaño requerido para cada edificación, que comprende una pluralidad de elementos de construcción (13) constituidos de una pluralidad de piezas prefabricadas (1), CARACTERIZADO porque comprende

dichas piezas prefabricadas (1) consisten en un perfil rectangular hueco, con una pluralidad de perforaciones (11) dispuestas simétricamente en sus caras frontales y canales deslizables (2) en sus caras laterales, en donde dicha pluralidad de piezas prefabricada (1) están fijadas unas a otras mediante una soldadura por ultrasonido de dichos canales deslizables (2) de las caras laterales respectivas a cada pieza prefabricada (1); y dichos elementos de construcción (13) comprenden adicionalmente ductos para instalaciones tales como las eléctricas, las hidráulicas, las sanitarias y de transmisión de datos;

al menos un conector (3) para fijarse en el extremo de un elemento de construcción (13) mediante una unión deslizable de una cara y que comprende una lengüeta (6) en la cara opuesta para una unión permanente a presión o unión deslizable, y una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);

al menos un poste (4) para fijarse con dicho conector (3), constituido por un perfil rectangular y hueco con al menos una ranura (8) en cada costado coincidente con dicha lengüeta (6) para dicha unión permanente a presión o unión deslizable, con una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);



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al menos una tapa (7) para fijarse en dicha ranura (8) de un costado no utilizado de dicho poste (4);

al menos una pieza U (14) con perforaciones circulares para permitir el paso de material aglutinante y enfierradura, y

un material aglutinante que se vierte dentro de dicha pluralidad de elementos de construcción (13) y de dichos postes (4).

2.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicho material aglutinante es uno o una combinación de los siguientes materiales: cemento, hormigón, áridos, arcilla y poliuretano expandido.

3.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden vanos para puertas y ventanas.

4.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden refuerzos estructurales para la fijación posterior de dichas ventanas o puertas.

5.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden elementos de fijación que permitan fijar sobre ellos laminados o acabados diversos.



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6.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden laminados sobre ellos.

7.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden subdivisiones que incluyen una combinación de material aglutinante y árido.

8.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprende una enfierradura dispuesta horizontalmente a través de dicha pluralidad de perforaciones (11).

9.- Método de construcción modular para la construcción progresiva tanto externa como interna conforme al tamaño requerido para cada edificación, CARACTERIZADO porque comprende las siguientes etapas:

a) en una fábrica, extruir una pluralidad de piezas prefabricadas (1) con un perfil rectangular hueco con canales deslizables (2) en sus caras laterales;

b) en dicha fábrica, efectuar una pluralidad de perforaciones (11) dispuestas simétricamente en las caras frontales de dicha pluralidad de piezas prefabricadas;



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c) en dicha fábrica, unir las piezas prefabricadas mediante soldadura por ultrasonido de dichos canales deslizables (2) para formar pluralidad de elementos de construcción (13);

d) en dicha fábrica, instalar ductos para instalaciones eléctricas, de agua , sanitarias, gas o transmisión de datos en dicha pluralidad de elementos de construcción (13);

e) en dicha fábrica, fijar conectores (3) en el extremo de un elemento de construcción (13) mediante una unión deslizable de una de sus caras, en donde dicho conector (3) comprende una lengüeta (6) en la cara opuesta para una unión permanente a presión o unión deslizable, y una pluralidad de perforaciones simétrica con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);

f) trasladar de dicha fábrica al lugar en que se efectuara la edificación dicha pluralidad de elementos de construcción (13);

g) en el lugar de la edificación construir un radier con enfierradura de barras o postes metálicos;

h) insertar en la enfierradura piezas U (14) en el lugar en que se instalaran los muros;

i) introducir sobre las piezas U (14) y a través de la enfierradura los elementos de construcción (13) con dimensiones logradas y postes (4) constituido por un perfil rectangular y hueco con al menos una ranura (8) en cada costado coincidente con dicha lengüeta (6) para una unión permanente a presión o unión deslizable y con una pluralidad de perforaciones simétrica con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);



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j) unir los elementos de construcción (13) con dimensiones logradas con los postes (4) mediante dicha unión permanente a presión o unión deslizante; y

k) vaciar material aglutinante por la parte superior de todos los postes (4) y los elementos de construcción (13) con dimensiones logradas que conforman la instalación.

10.- Método de construcción modular de acuerdo a la reivindicación 9, CARACTERIZADO porque comprende ante de la etapa f) de trasladar de dicha fábrica al lugar en que se efectuara la edificación dicha pluralidad de elementos de construcción (13), en fábrica, hacer vanos de puertas y ventanas en los elementos de construcción (13) y luego de la etapa k) de vaciar material aglutinante por la parte superior de todos los postes (4) y los elementos de construcción (13) con dimensiones logradas que conforman la instalación, instalar las ventanas y puertas en dichos vanos.

11.- Método de construcción modular de acuerdo a la reivindicación 9, CARACTERIZADO porque comprende colocar y fijar un techo y instalar materiales de revestimiento en elementos de construcción (13).

12.- Método de construcción modular de acuerdo a la reivindicación 9, CARACTERIZADO porque después de la etapa a) de en una fábrica, extruir una pluralidad de piezas prefabricadas (1) con un perfil rectangular hueco con canales deslizables (2) en sus caras laterales y antes de la etapa b) de en dicha fábrica, efectuar una pluralidad de perforaciones (11) dispuestas simétricamente en las caras



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frontales de dicha pluralidad de piezas prefabricadas, dicho método comprende incorporar un laminado sobre dichas piezas prefabricadas.



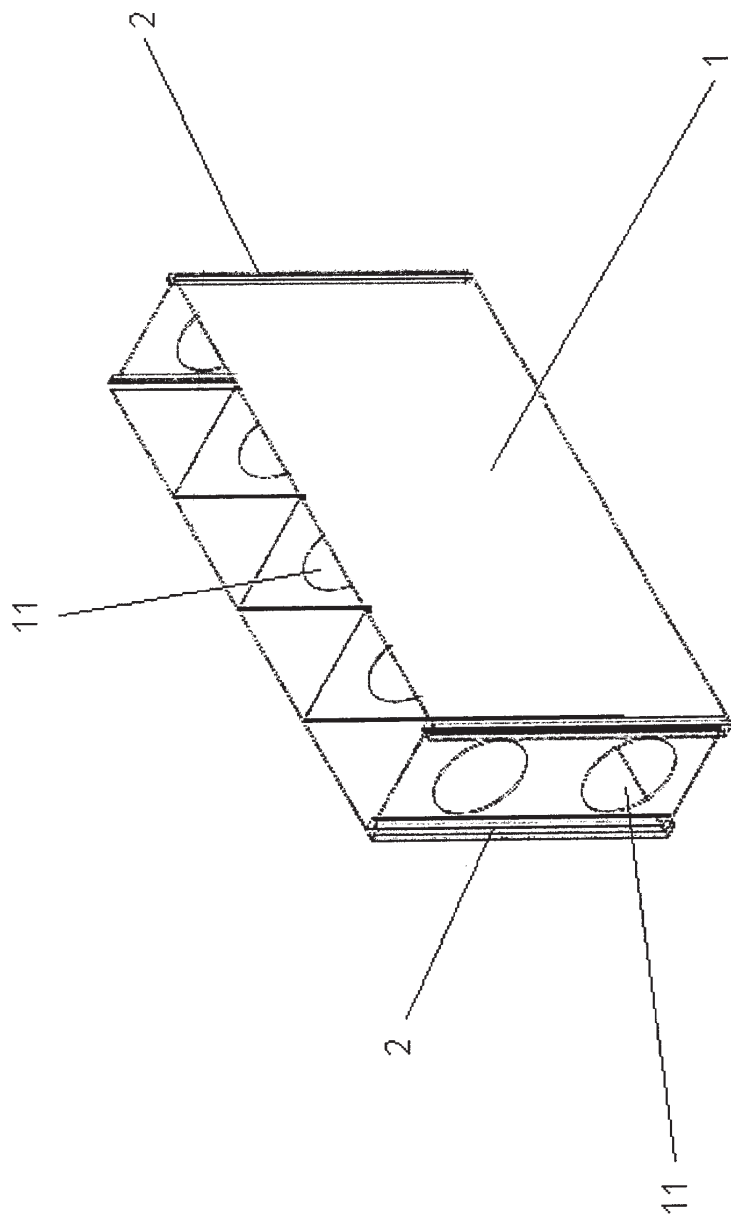


Figura 1



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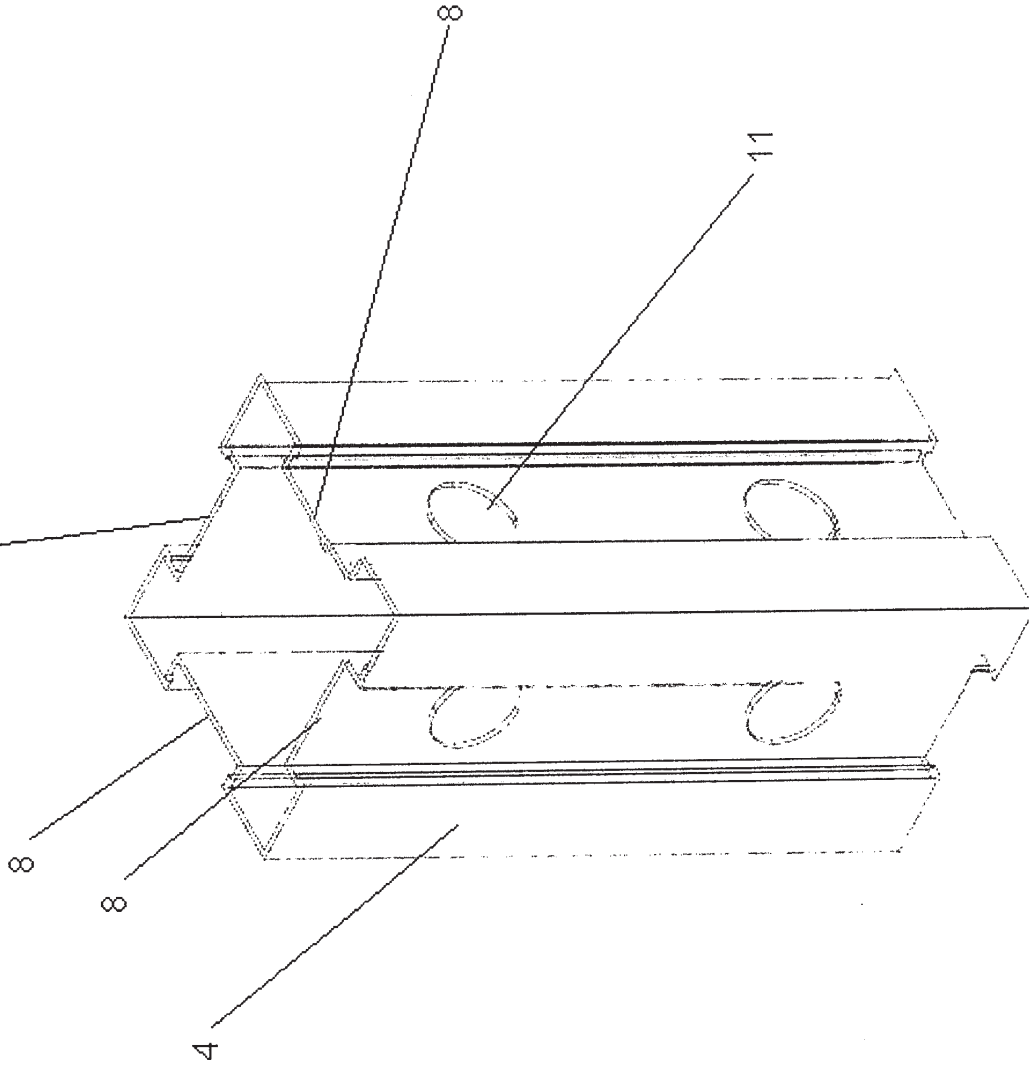


Figura 2



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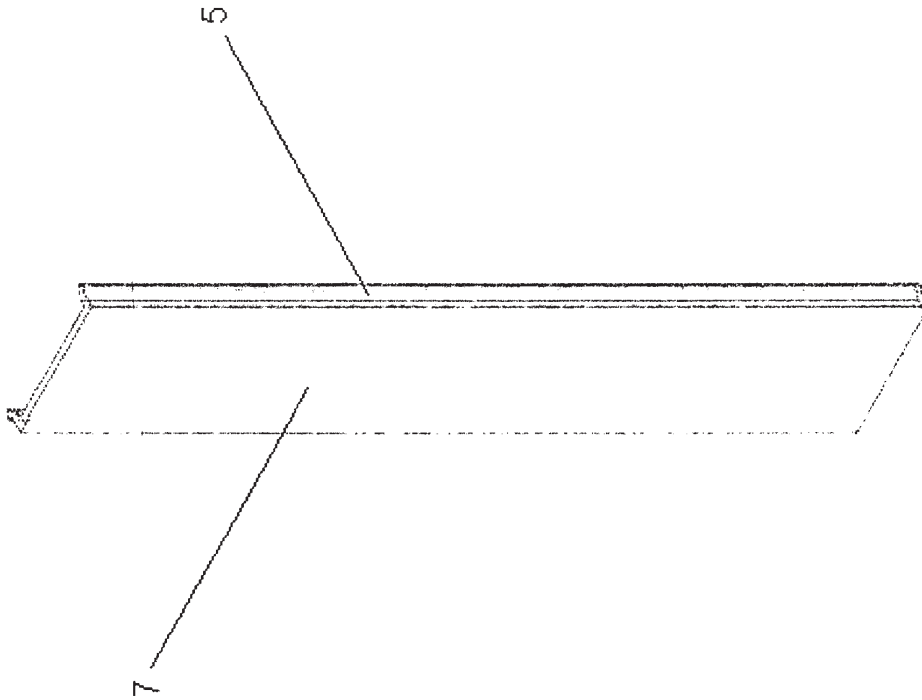


Figura 3



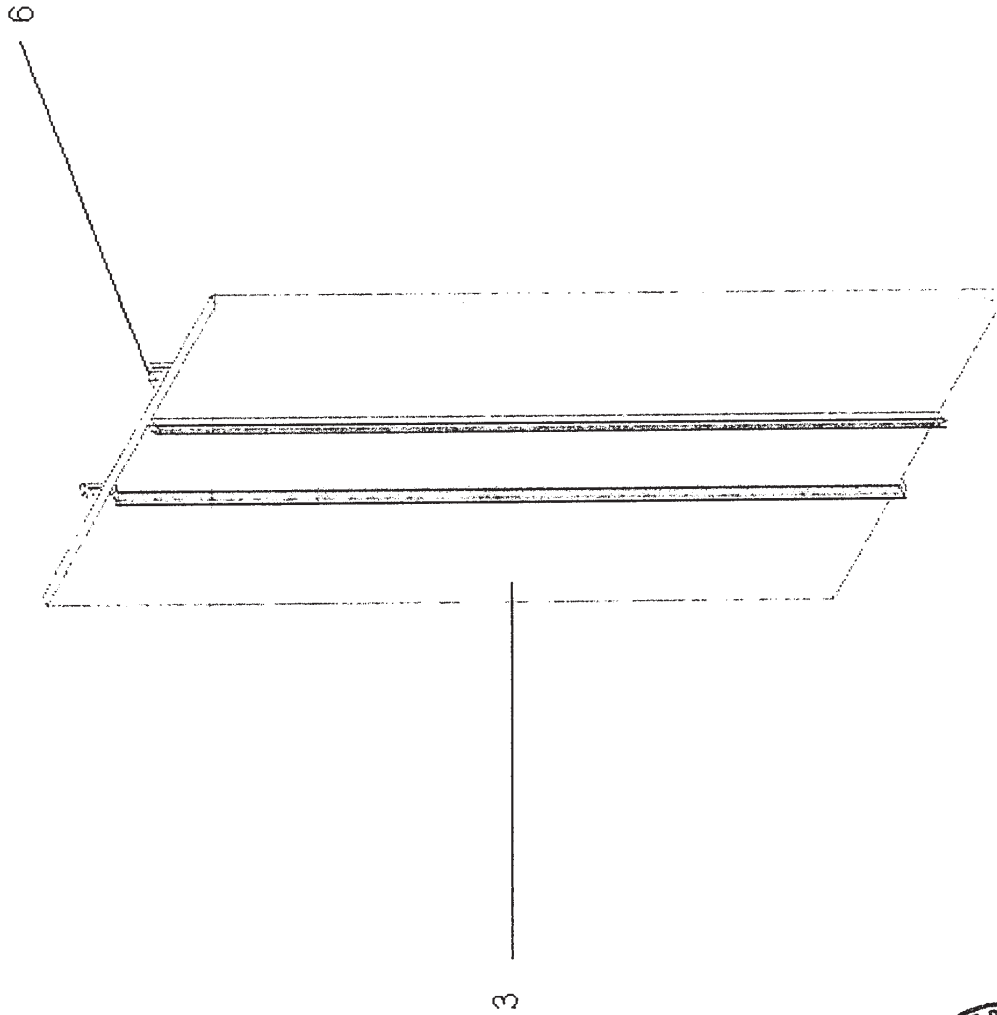


Figura 4



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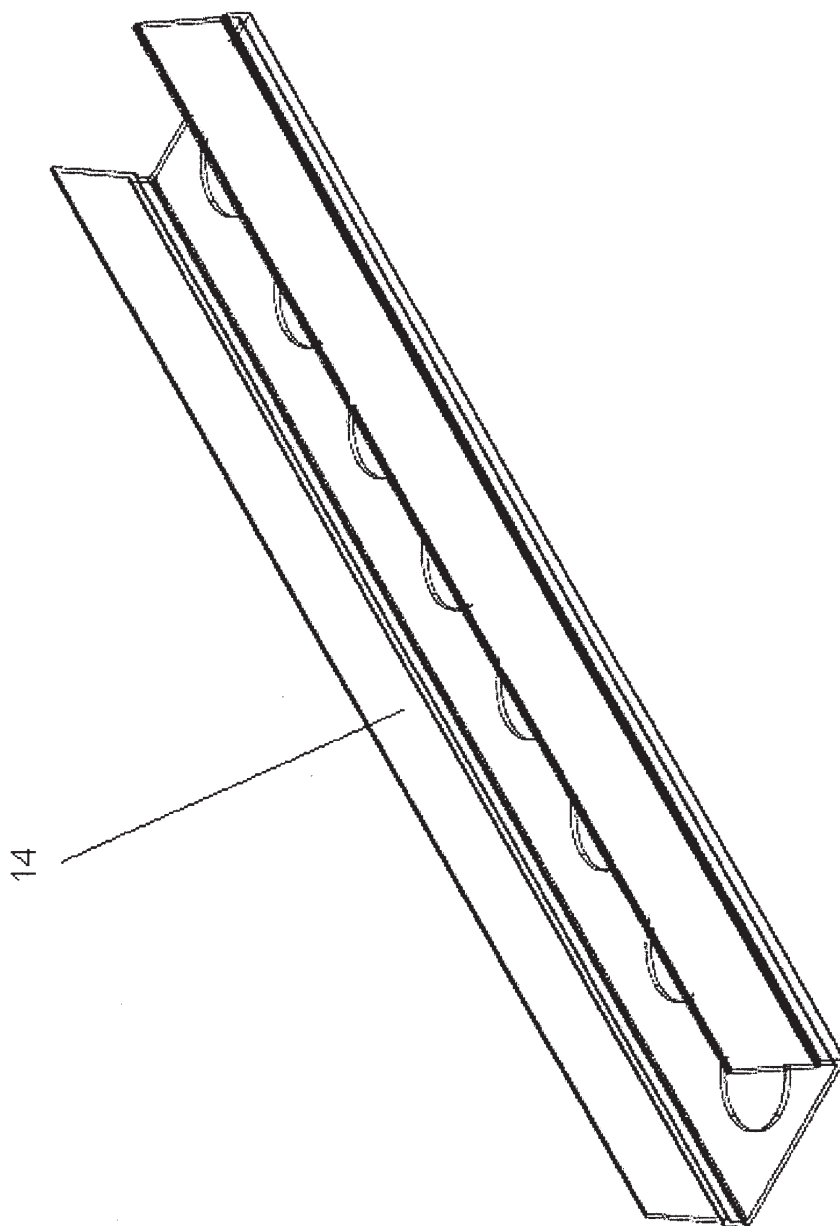


Figura 5



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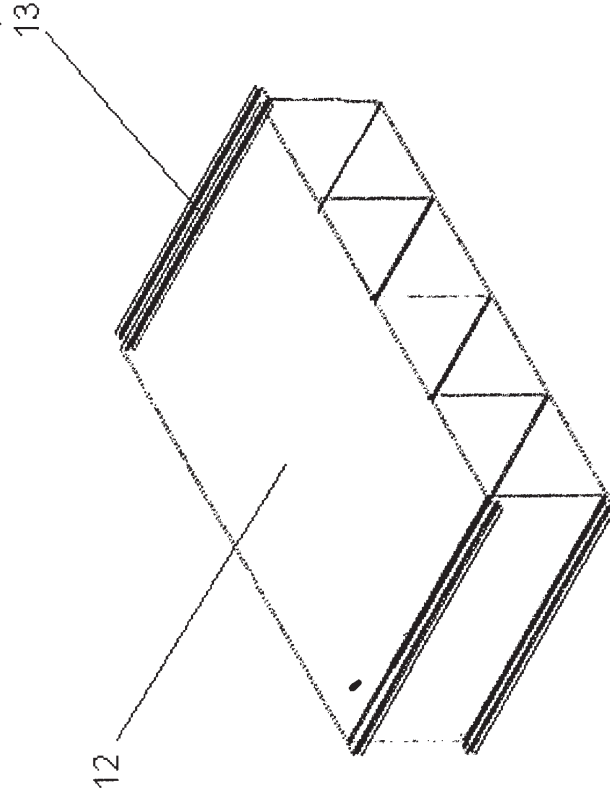


Figura 6



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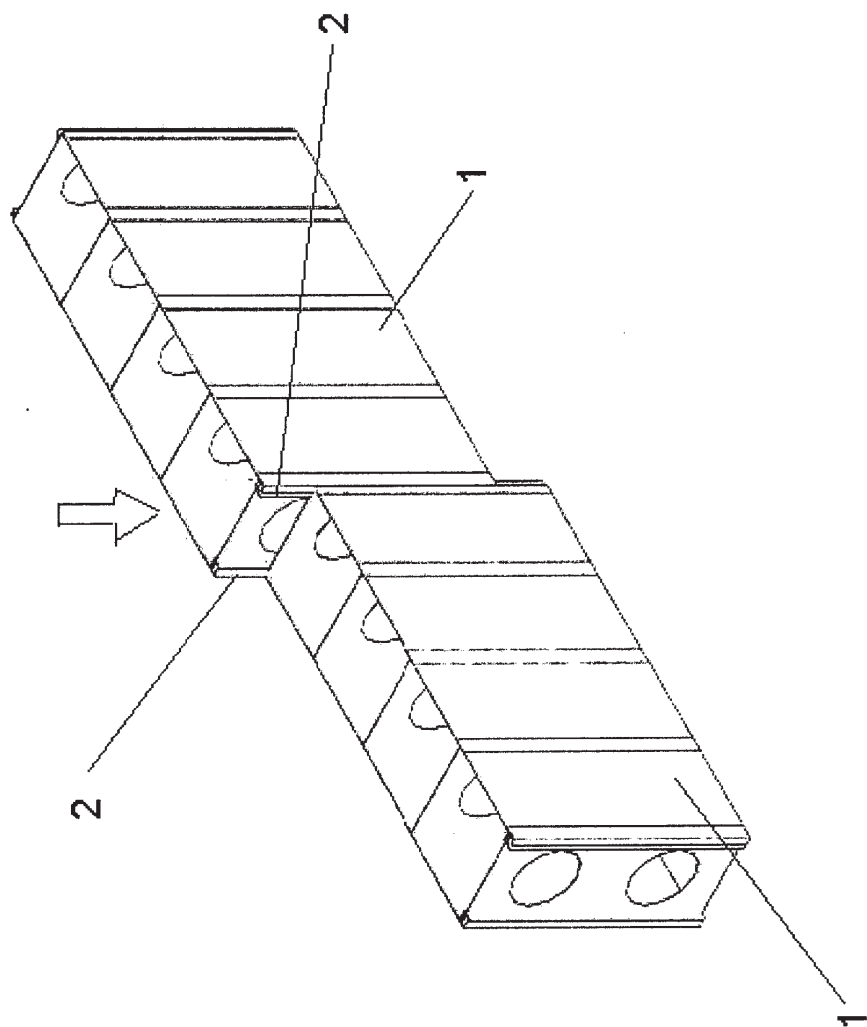


Figura 7



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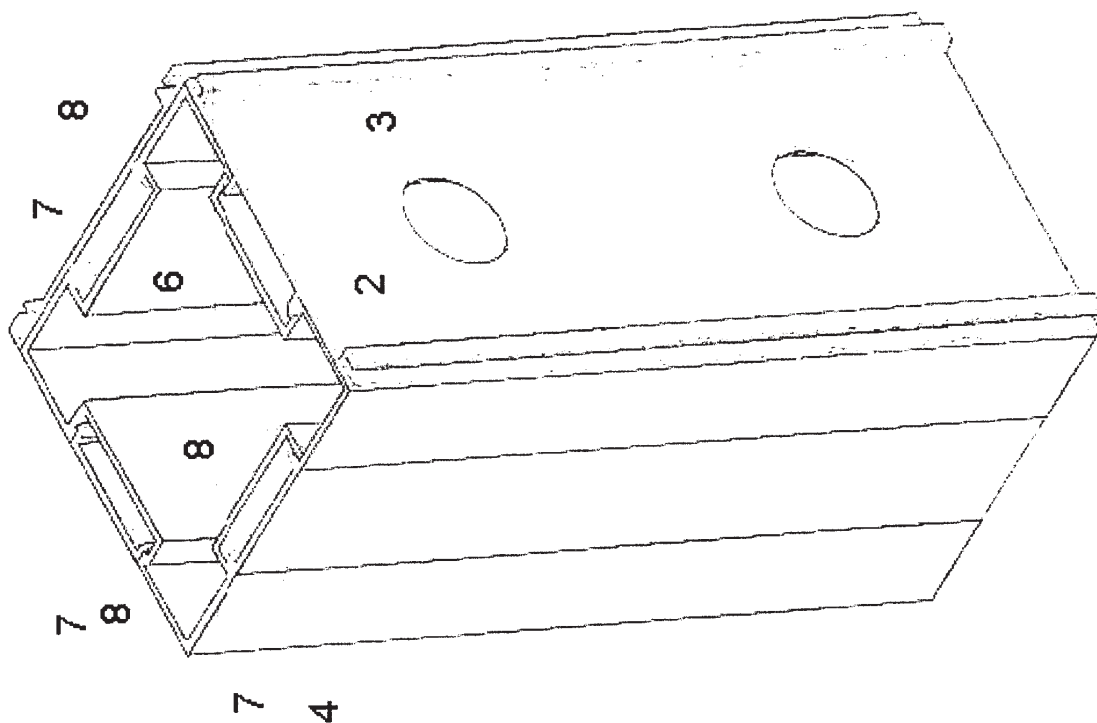


Figura 8



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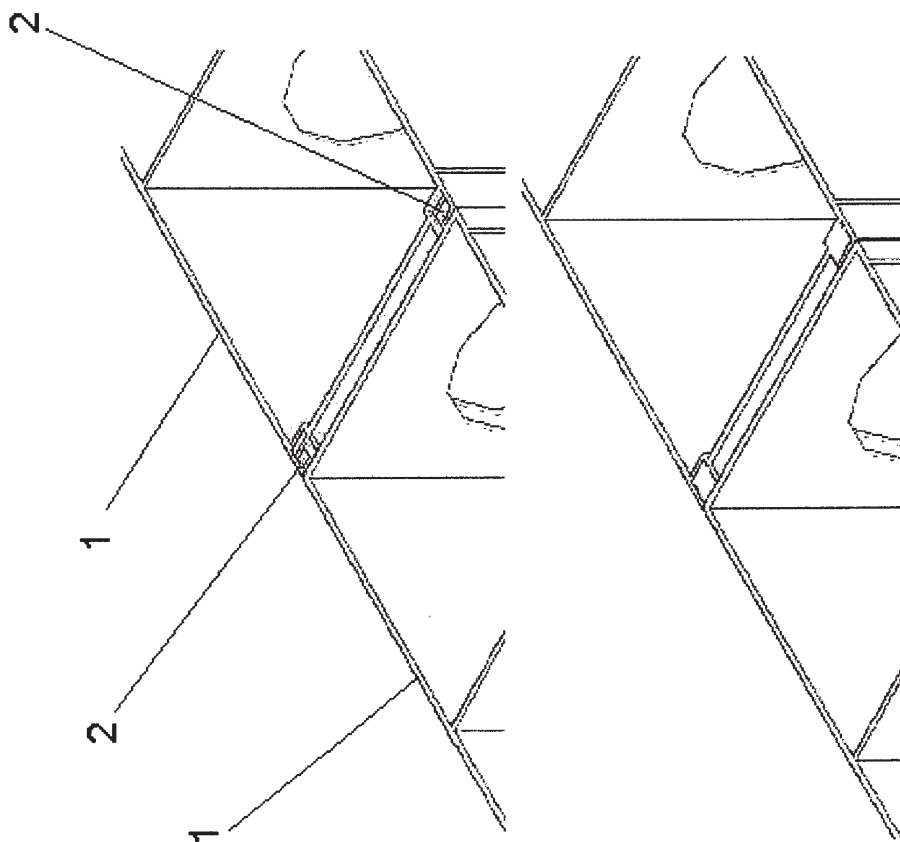


Figura 9



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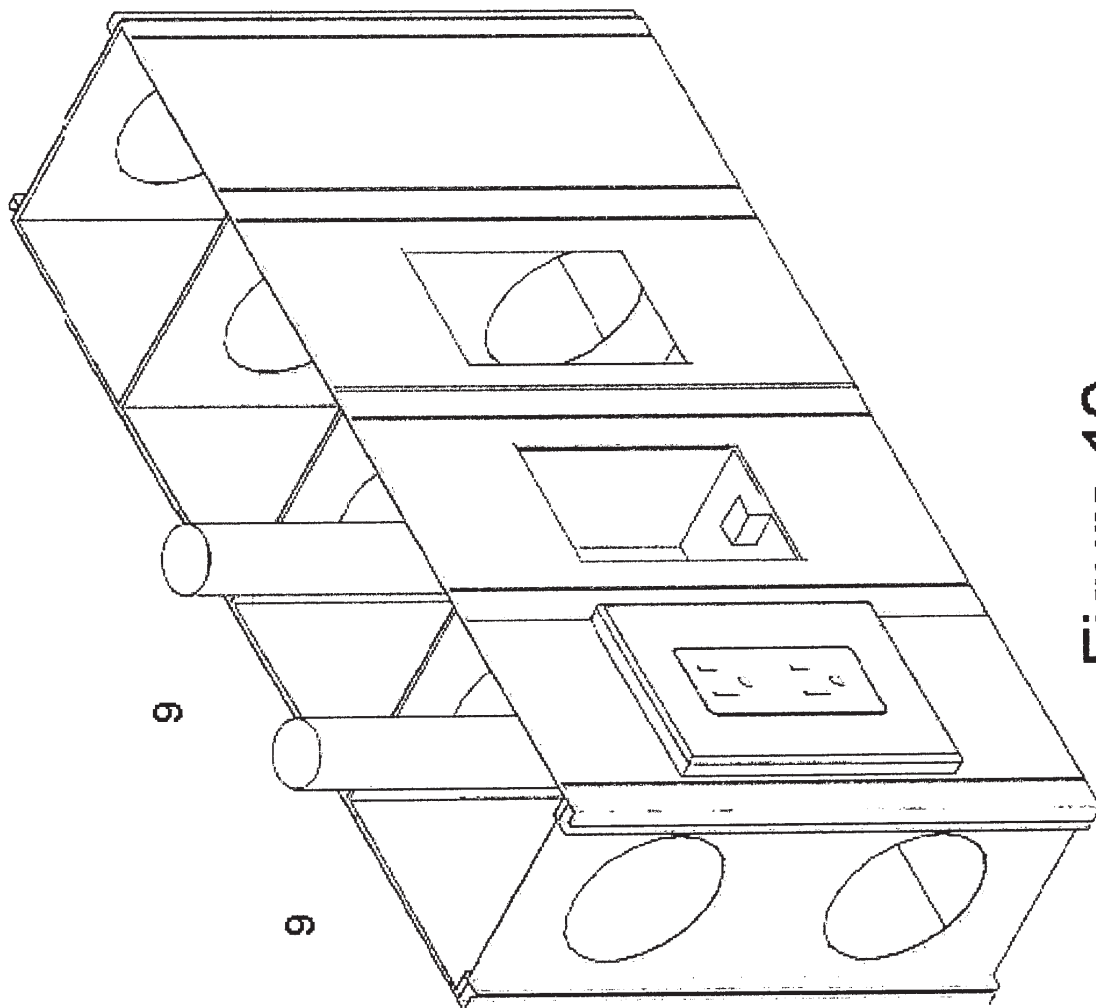


Figura 10



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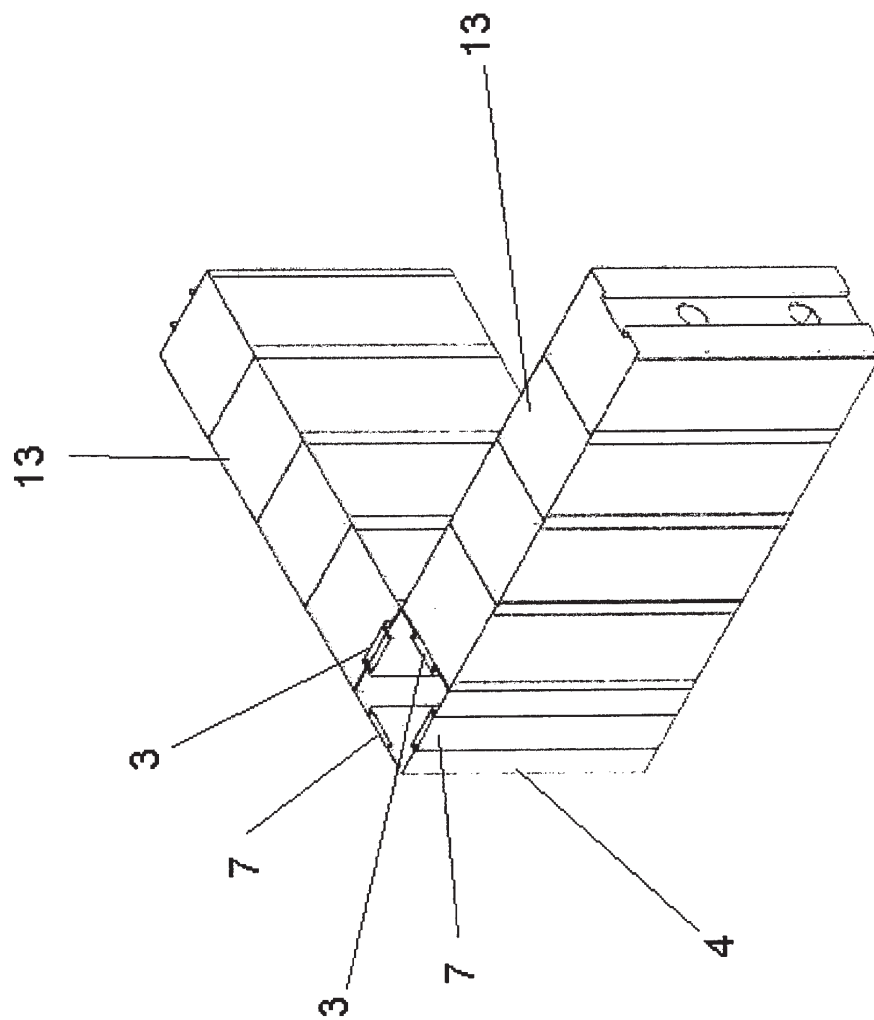


Figura 11



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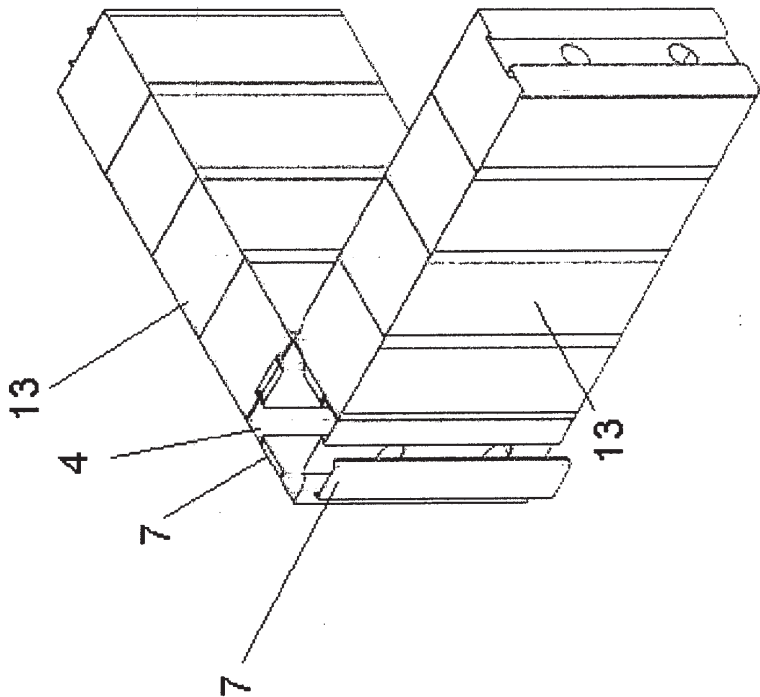


Figura 12



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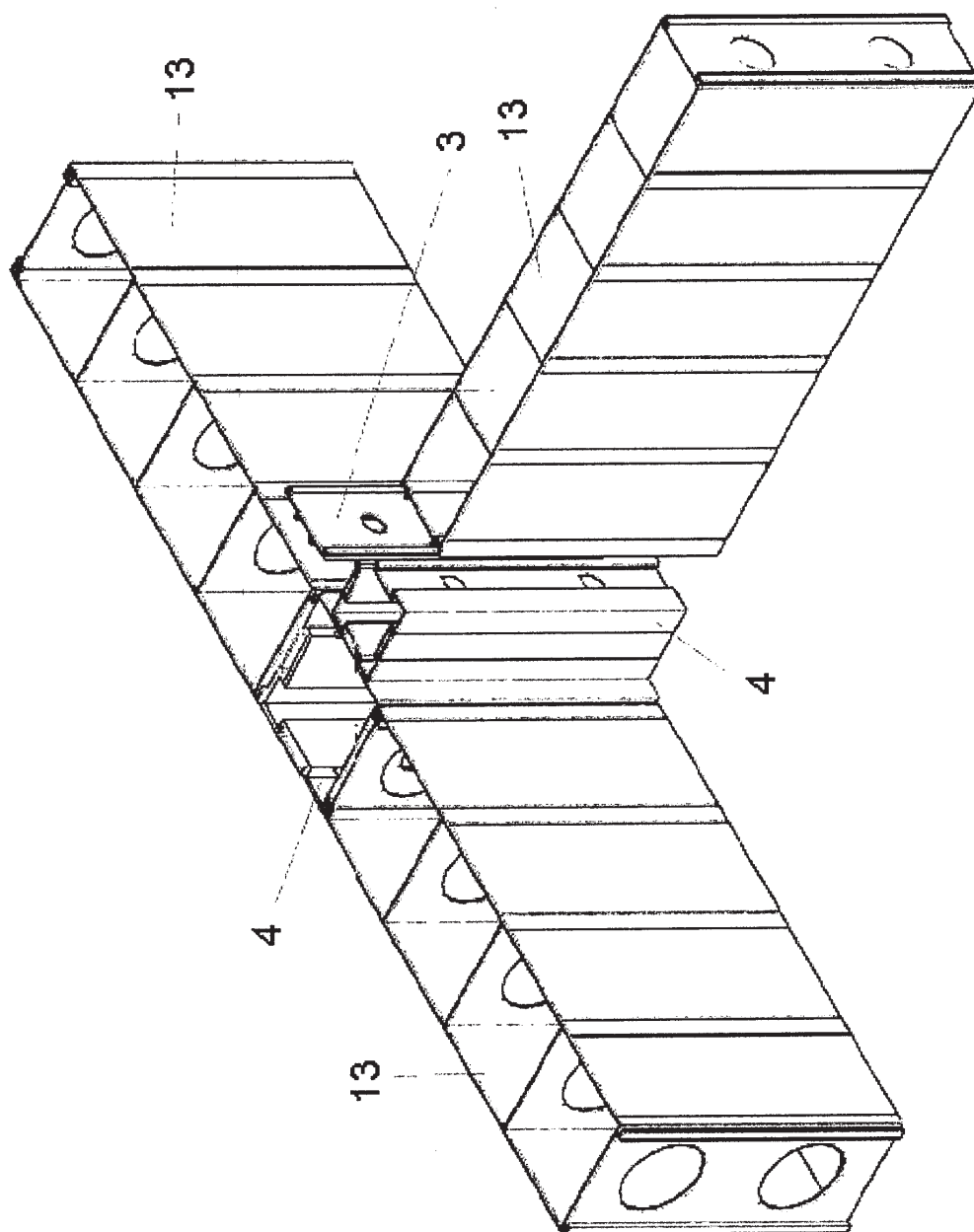


Figura 13



14/16

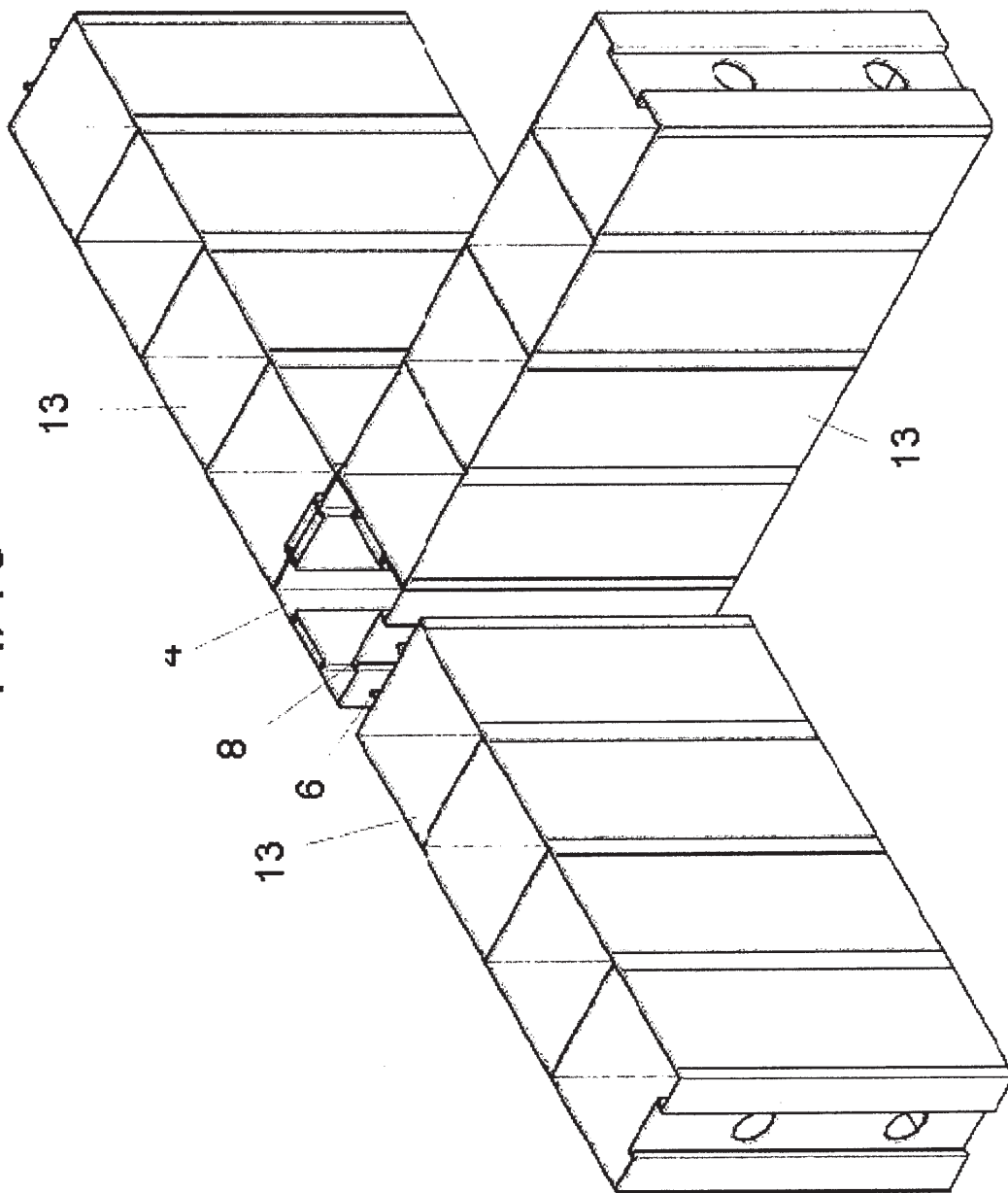


Figura 14



15/16

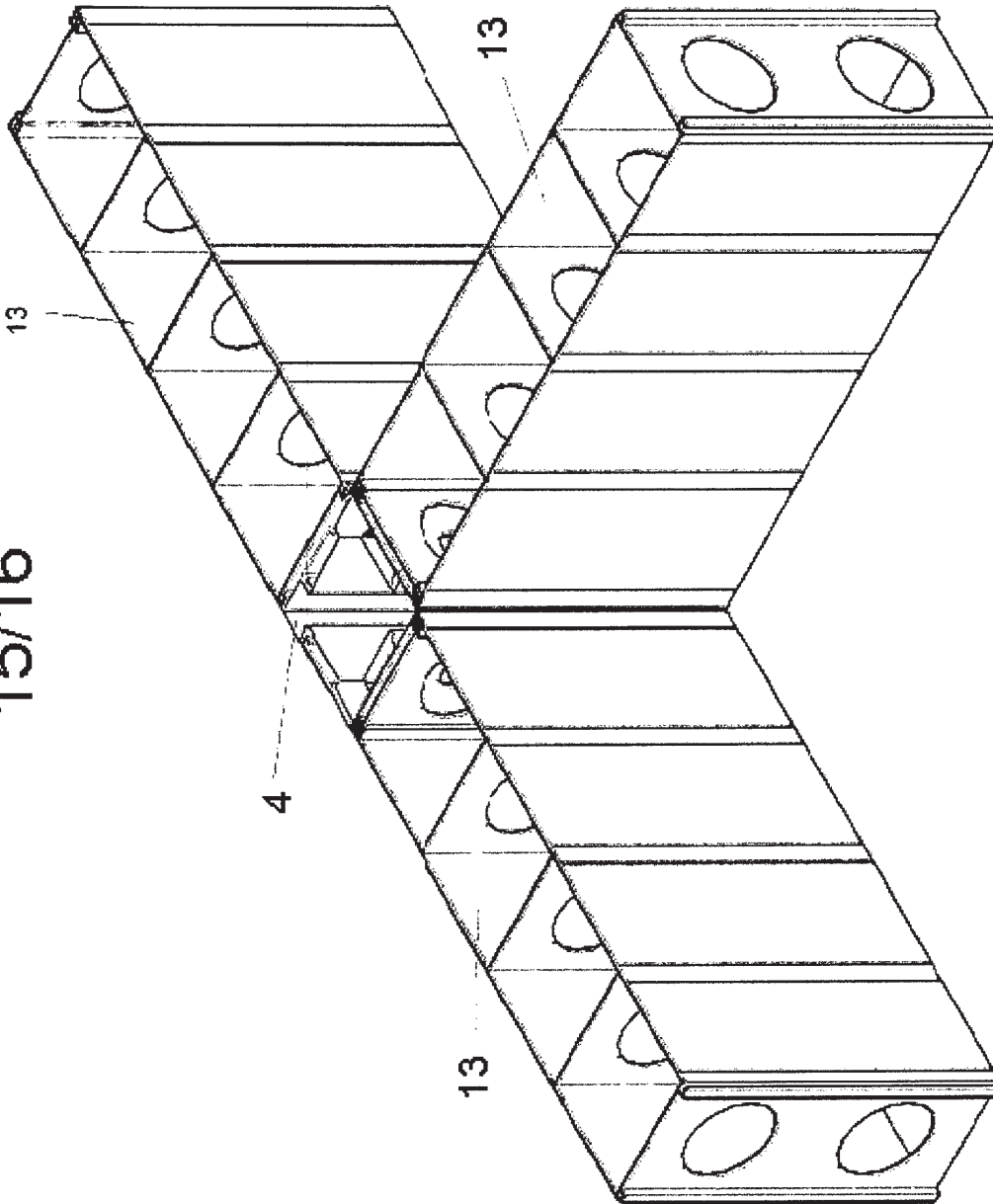


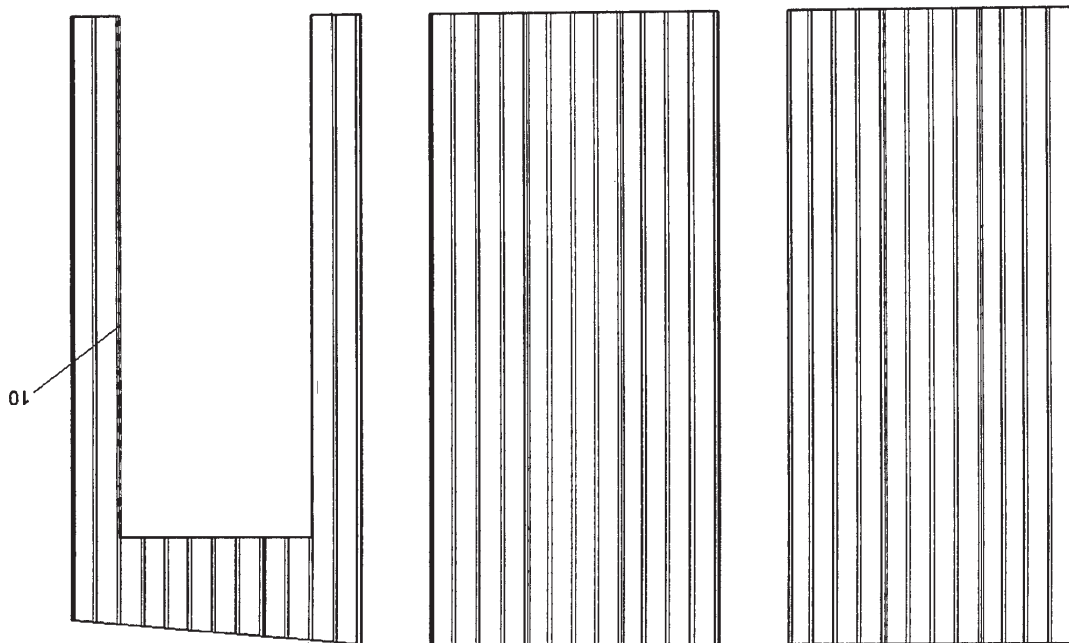
Figura 15



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Figura 16

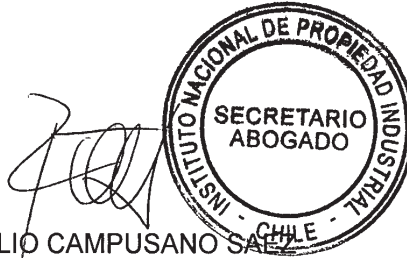


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ROGELIO CAMPUSANO SAE

Secretario – Abogado

Patentes de Invención, Modelos de Utilidad, Dibujos y
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(At: - À:)

BOGOTA D.C

El:

(On: - Le:)

10/3/2013 11:22:37 a.m.

Por:

(By: The Ministry of Foreign Affairs of Colombia - Par: Ministère des Affaires Étrangères de la Colombie)

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Act. 411 PRESENTACION Folios: 81



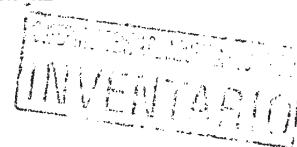
Industria y Comercio

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P.I.

DELEGATURA DE PROPIEDAD INDUSTRIAL

División de Nuevas Creaciones



SOLICITUD PATENTE DE INVENCION

21. EXPEDIENTE No.

11-66603

54. TÍTULO "SISTEMA MODULAR PARA
EDIFICACION PROGRESIVA"

51. CLASIFICACIÓN INTERNACIONAL

71. SOLICITANTE Inmuebles Ferromarti SA de C

DOMICILIO

Atizapan de Zaragoza, Estado
de Mexico

74. APODERADO

Humberto Rubio Sanchez
cod. 4134

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PE.

FORMULARIO ÚNICO DE SOLICITUD DE PATENTE
2000-3

SOLICITUD DE:

X Patente de Invención

Patente de Modelo de Utilidad

SOLICITANTE (71) Nombre y Dirección: **Inmuebles Ferromarti S.A. de C.V.**
C. Tabasco 3, Colonia Lázaro Cárdenas 52979,
Atizapán de Zaragoza, Estado de México, México

Lugar de
constitución: **Estado de México, México**

REPRESENTANTE O APODERADO (74)	Nombre:	HUMBERTO RUBIO CAMACHO	IDENTIFICACIÓN
	Dirección:	Carrera 7 No. 74 – 64, Of. 506	C.C. No. 17'192.062
	Teléfono:	3132408 Fax: 3131647	T.P. 50.007 CSJ
	E-mail:		

Nombre y **Manuel Enrique REQUEJO PRESA**
INVENTOR(ES): Dirección: **C. Tabasco 3, Colonia Lázaro Cárdenas 52979**
(72) **Atizapán de Zaragoza, Estado de México, México**

TITULO (54) "SISTEMA MODULAR PARA EDIFICACION PROGRESIVA"

Clasificación Internacional (51) F01N 3/00

Prioridad	(33) País de origen	(32) Fecha	(31) Número de solicitud
SI <u>X</u> NO ___	CHILE	1 DE JULIO DE 2010	711-2010

Para publicar a partir de la fecha de la presente solicitud a los:

6 meses _____ 12 meses X 18 meses _____ Otro _____

Comprobante de pago No. **11-0051554** Fecha: **30 DE MAYO DE 2011**
11-0051555 **30 DE MAYO DE 2011**

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**EXTRACTO PARA PUBLICACIÓN
SOLICITUD DE PATENTE DE INVENCION
DELEGATURA PROPIEDAD INDUSTRIAL**

(21) No. SOLICITUD: (51) INT. CL.:
(22) FECHA DE PRESENTACIÓN: (71) SOLICITANTE: **Inmuebles Ferromarti S.A. de C.V.**
(30) PRIORIDAD: **CHILENA**
(31) No. DE SOLICITUD: **711-2010** (72) INVENTORES: **Manuel Enrique REQUEJO PRESA**
(32) FECHA DE PRESENTACIÓN: **1 DE JULIO DE 2010**
(33) PAÍS: **CHILE** (74) APODERADO: **Humberto RUBIO CAMACHO**

Solicitud Internacional No. Fecha
Publicación Internacional No. Fecha

FECHA ENTRADA EN FASE NACIONAL:

(54) TITULO: "SISTEMA MODULAR PARA EDIFICACION PROGRESIVA"

RESUMEN:

La presente invención se refiere a un Sistema Modular que permite la construcción de toda clase de edificaciones de carácter progresivo hacia adentro o hacia fuera, con avances de la técnica conocidos a la fecha, consistentes en la utilización de diversos elementos de construcción con dimensiones logradas a base de la unión de piezas completas de formas poliméricas, que logran el tamaño de los elementos constructivos requeridos para cada tipo de edificación ahorrando tiempo y ventajas en cuanto a la logística, unión realizada con las piezas previamente prefabricadas, mediante soldadura con ultrasonido, lo que permite fusionar el material a nivel molecular, elementos de construcción que se ensamblan entre sí ya sea bajo el sistema a presión ("snap on") o, por canales deslizables y, dichos elementos de construcción con postes bajo el sistema a presión ("snap on").

Las dimensiones de los elementos de construcción, permiten pre-instalar en su interior y de manera oculta y segura, ductos para instalaciones tales como las eléctricas, las hidráulicas y las sanitarias, entre otras, logrando con ello una mejora en la productividad y la calidad, por lo que ya no resulta necesario la realización de obras, instalaciones y costos posteriores.

Los elementos de construcción pueden ser también utilizados para (i) modificar o agregar elementos de construcción al interior de las edificaciones para crear nuevos espacios o bien, para (ii) adicionar al exterior de las edificaciones nuevos espacios modulares desde los postes.

Los elementos de construcción se pueden pre-fabricar, de acuerdo al diseño y necesidades, los vanos para puertas y ventanas, que de ser necesario, incluyan los refuerzos estructurales para la fijación de tales elementos arquitectónicos.

Además, los elementos de construcción pueden contar con ganchos exteriores u otros elementos de fijación que permiten deslizar sobre el mismo, laminados de acabados diversos

Con base en lo anterior, se utilizan materiales y procesos novedosos en beneficio de la productividad, calidad y costos en la industria de la edificación.

Dicha productividad, permite obtener mayores resultados con los mismos recursos, y su resultado final permite incorporarlos como el acabado definitivo.

El proceso descrito para las edificaciones, con los elementos de construcción puede utilizarse como sistema de autoconstrucción o construcción asistida disminuyendo costos, tiempos y requerimiento de mano de obra especializada.

En cuanto al aseguramiento de calidad, los elementos de construcción son prefabricados con niveles de precisión industrial, sin requerir posteriores ajustes por mano de obra calificada en el sitio de la edificación.

Por cuanto al costo, derivado de la productividad, se mejora el proceso constructivo debido a los tiempos reducidos de fabricación e instalación.

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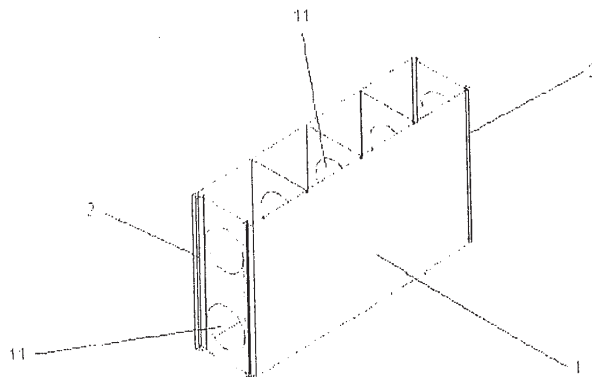
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ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud.
- ☐ Comprobante de pago de la tasa por concepto de excedente de palabras en la publicación.
- ☒ Comprobante de pago por reivindicación de prioridad.
- ☐ Certificado de existencia y representación legal cuando el solicitante sea persona jurídica
- ☐ Poderes, si fuere el caso.
- ☒ Copia certificada de la primera solicitud, si se reivindica prioridad.
- ☐ Traducción simple de la primera solicitud, si se reivindica prioridad.
- ☐ Documento de cesión del inventor al solicitante o a su causante.
- ☒ Descripción de la invención.
- ☒ Una o más reivindicaciones.
- ☒ Dibujos y/o planos necesarios.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser del caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☒ Arte final 12 x 12

(11) Figura característica:



(12)

HUMBERTO RUBIO CAMACHO

FIRMA

C.C. 17'192.062 de Bogotá

T.P. 50.007 Consejo Superior de

La Judicatura

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NIT : 800.176.089-2

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Industria y Comercio

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NI 830.000.228

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TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	VR. PAGO
CONSIGNACION	BANCO DE BOGOTA	062754387	431627416	30/05/2011	3.584.000.00

*** Conceptos Pagados ***

CANT.	RENTISTICO	CONCEPTO	Vr. UNDITARIO	Vr. CONCEPTO
150005-01-01	SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE INVENCIÓN	571.000.00	571.000.00
				\$571.000.00

SON: **QUINIENTOS SETENTA Y UN MIL PESOS MONEDA CORRIENTE***

Responsable: _____

Recibo de Caja Aplicado al Expediente No. _____

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-066603- -00000-0000

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Industria y Comercio

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CONSIGNACION	BANCO DE BOGOTA	062754387	431627416	30/05/2011	3.584.000.00

*** Conceptos Pagados ***

CANT.	RENTISTICO	CONCEPTO	Vr. UNDITARIO	Vr. CONCEPTO
1.500	05-01-01 SOLICITUDES	82 INVOCACION DE UNA PRIORIDAD EN NUEVAS CREACIONES	162.000.00	162.000.00
				\$162.000.00

SON: **CIENTO SESENTA Y DOS MIL PESOS MONEDA CORRIENTE***

Responsable: _____

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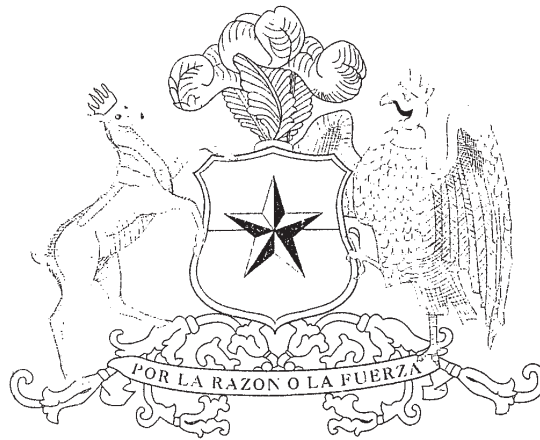
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REPUBLICA DE CHILE

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corresponden a una solicitud de Patente de Invención.

N° 711-2010

Presentada en Chile con fecha:

01 DE JULIO DE 2010



Esteban Figueroa Nagel
Conservador de Patentes



Maximiliano Santa Cruz Scantlebury
Director Nacional



21 N° Solicitud	11 N° Registro
00711	01.07.2010
43 Fecha de Publicación	
22 Fecha de Solicitud	45 Fecha de Registro

SOLICITUD DE PATENTE

1258

12 TIPO DE SOLICITUD	PRIORIDAD	DOCUMENTOS ACOMPAÑADOS
☒ INVENCIÓN ☐ MODELO DE UTILIDAD ☐ DISEÑO INDUSTRIAL ☐ DIBUJO INDUSTRIAL ☐ ESQUEMAS DE TRAZADO O TOPOGRAFÍA DE CIRCUITOS INTEGRADOS	31 N° _____ 32 FECHA _____ 33 PAIS _____ 31 N° _____ 32 FECHA _____ 33 PAIS _____ 31 N° _____ 32 FECHA _____ 33 PAIS _____	☒ RESUMEN ☒ MEMORIA DESCRIPTIVA ☒ PLIEGO DE REIVINDICACIONES ☒ DIBUJOS ☒ PODER ☒ CESIÓN ☐ COPIA PRIORIDAD ☐ PROTOTIPO

54 TITULO O MATERIA DE LA SOLICITUD

"SISTEMA MODULAR PARA EDIFICACIÓN PROGRESIVA."

71 SOLICITANTE (Razón Social y/o Apellido Paterno, Apellido Materno, Nombres, Rut - Calle, Comuna, Ciudad, País - Teléfono, Correo Electrónico)

Inmuebles Ferromarti S.A. de C.V.
C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

74 REPRESENTANTE (Apellido Paterno, Apellido Materno, Nombres, Rut - Calle, Comuna, Ciudad, País - Teléfono, Correo Electrónico)

ESTUDIO SILVA & CIA.
Juan Pablo Silva Dorado y/o Patricio Silva Del Campo y/o Jaime Silva Barros y/o Francisco J. Silva Dorado y/o Gonzalo Sánchez Serrano y/o Augusto Perez Gallardo y/o Arturo Covarrubias Vargas y/o Rodrigo León Urrutia y/o Daniela Castro González.

Hendaya 60, piso 4
Las Condes, Santiago, CHILE.
(56 2) 438 70 00
(56 2) 372 04 44
mail@silva.cl
www.silva.cl

72 INVENTOR O CREADOR (Apellido Paterno, Apellido Materno, Nombres, Rut - Calle, Comuna, Ciudad, País - Teléfono, Correo Electrónico)

1.-Manuel Enrique Requejo Presa
Domicilio: C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

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Jaime Silva Barros
7.033.085-7

Nombre y Firma Representante

Nombre y Firma Solicitante

VISITENOS EN : www.inapi.cl

LLENAR POR COMPUTADOR O MAQUINA DE ESCRIBIR

128
182

(19) **HOJA TÉCNICA (RESUMEN)**

(12) TIPO DE SOLICITUD

(11) N° REGISTRO



INVENCION



MODELO DE UTILIDAD

(43) Fecha de Publicación

(51) Int. Cl. - - - - -

(21) Número de Solicitud

(22) Fecha de Solicitud

(30) Número de Prioridad (País. N° y Fecha)

(72) Nombre Inventor(es) (Incluir Dirección)

1.-Manuel Enrique Requejo Presa

Domicilio: C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

(71) Nombre Solicitante (Incluir Dirección y Teléfono)

Inmuebles Ferromarti S.A. de C.V.
C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

(74) Representante (Incluir Dirección y Teléfono)

SILVA & CIA Juan Pablo Silva Dorado y/o Patricio Silva Del Campo y/o Jaime Silva Barros y/o Francisco Silva Dorado y/o Gonzalo Sánchez Serrano y/o Arturo Covarrubias Vargas y/o Rodrigo León Urrutia y/o Daniela Castro González y/o Augusto Pérez Gallardo. Hendaya 60 piso 4, Las Condes, Santiago, CHILE. ☎ (56 2) 438 70 00.

(54) Título de la Invención (Máximo 330 caracteres)

"SISTEMA MODULAR PARA EDIFICACIÓN PROGRESIVA."

(57) Resumen (Máximo 1600 caracteres)

Sistema Modular de construcción para toda clase de edificaciones de carácter progresivo, utilizando elementos de construcción con dimensiones logradas por la unión de piezas con formas poliméricas, logrando el tamaño requerido.

Elaborado con piezas prefabricadas mediante soldadura con ultrasonido, permitiendo fusionar a nivel molecular el material, para el ensamble de los elementos de construcción con postes, bajo el sistema a presión o por canales deslizables.

Permite preinstalar de manera oculta y segura, ductos para instalaciones eléctricas, hidráulicas y sanitarias, evitando la realización de obras y costos posteriores, mejorando la productividad y calidad.

Puede ser utilizado para modificar o agregar elementos de construcción, creando nuevos espacios en el interior de las edificaciones; o adicionando al exterior de éstas, nuevos espacios modulares.

Los elementos de construcción son prefabricados con precisión industrial, sin requerir posteriores ajustes de mano calificada, conforme a diseño y necesidades, incluyendo vanos para puertas y ventanas, con refuerzos estructurales para su fijación; y, ganchos exteriores para deslizar laminados de diversos acabados.

En su productividad se utilizan materiales y procesos novedosos, cuya calidad y reducción de costos beneficia a la industria de la edificación, ya que los elementos constructivos pueden utilizarse como sistema de autoconstrucción o construcción asistida.

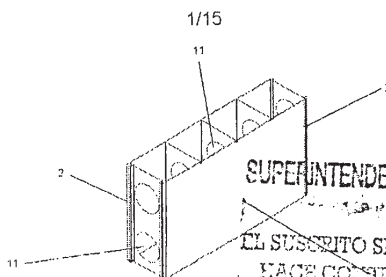


Figura 1

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Nombre y Firma Solicitante o Representante

181
183

MEMORIA DESCRIPTIVA

CAMPO DE APLICACIÓN DE LA INVENCION

La presente invención se refiere a un sistema modular para edificación progresiva que se desarrolla en el área de la construcción, específicamente en el área de la construcción por módulos

DESCRIPCION DEL ARTE PREVIO

En el estado de la técnica existen antecedentes previos que indican que la construcción con paneles termoplásticos existe en el estado de la técnica, es así por ejemplo como se puede mencionar la patente **US 6,189,269** que divulga un sistema que permite la unión de sistemas prefabricados mediante el uso de uniones deslizables, dicho sistema no permite el crecimiento progresivo de la construcción una vez hecha utilizando los medios de ensamblaje propios de sus partes. Ni utiliza el ensamblaje de las piezas de manera horizontal por medio de sistema snap-on. También se tiene por ejemplo la patente **US 5,608,999** que se compone de elementos en forma de placas planas, rectangulares y semicirculares que se ensamblan mediante rieles que también permiten la unión deslizable. Los elementos al armarse conforman módulos huecos que se llenan solo con con cemento. Este sistema no permite tampoco la unión horizontal ni utiliza sistema de unión por sistema snap-on. Este sistema tampoco permite el crecimiento progresivo utilizando los medios de unión una vez realizada la construcción. Otra patente relacionada con el tema es la **US 5,311, 778** que divulga un sistema modular de mult-componentes para fabricar estructuras de pared, el sistema consta de formas prefabricadas, cada

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extremo de cada panel tiene flanges tipo "L" y el otro extremo tiene ranuras tipo "L" de tal manera que dichas ranuras entran una dentro de la otra. Este sistema también permite la unión solamente mediante unión deslizable

RESUMEN DE LA INVENCION

La presente invención se refiere a un Sistema Modular que permite la construcción de toda clase de edificaciones de carácter progresivo hacia adentro o hacia fuera , con avances de la técnica conocidos a la fecha, consistentes en la utilización de diversos elementos de construcción con dimensiones logradas a base de la unión de piezas completas de formas poliméricas, que logran el tamaño de los elementos constructivos requeridos para cada tipo de edificación ahorrando tiempo y ventajas en cuanto a la logística , unión realizada con las piezas previamente prefabricadas, mediante soldadura con ultrasonido, lo que permite fusionar el material a nivel molecular, elementos de construcción que se ensamblan entre sí ya sea bajo el sistema a presión ("snap on") o, por canales deslizables y, dichos elementos de construcción con postes bajo el sistema a presión ("snap on").

Las dimensiones de los elementos de construcción, permiten pre-instalar en su interior y de manera oculta y segura, ductos para instalaciones tales como las eléctricas, las hidráulicas y las sanitarias ,entre otras, logrando con ello una mejora en la productividad y la calidad, por lo que ya no resulta necesario la realización de obras, instalaciones y costos posteriores.

Los elementos de construcción pueden ser también utilizados para (i) modificar o agregar elementos de construcción al interior de las edificaciones para

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crear nuevos espacios o bien, para (ii) adicionar al exterior de las edificaciones nuevos espacios modulares desde los postes.

Los elementos de construcción se pueden pre-fabricar, de acuerdo al diseño y necesidades, los vanos para puertas y ventanas ,que de ser necesario, incluyan los refuerzos estructurales para la fijación de tales elementos arquitectónicos .

Además, los elementos de construcción pueden contar con ganchos exteriores u otros elementos de fijación que permiten deslizar sobre el mismo, laminados de acabados diversos

Con base en lo anterior, se utilizan materiales y procesos novedosos en beneficio de la productividad, calidad y costos en la industria de la edificación.

Dicha productividad, permite obtener mayores resultados con los mismos recursos, y su resultado final permite incorporarlos como el acabado definitivo.

El proceso descrito para las edificaciones, con los elementos de construcción puede utilizarse como sistema de autoconstrucción o construcción asistida disminuyendo costos, tiempos y requerimiento de mano de obra especializada.

En cuanto al aseguramiento de calidad, los elementos de construcción son prefabricados con niveles de precisión industrial, sin requerir posteriores ajustes por mano de obra calificada en el sitio de la edificación.

Por cuanto al costo, derivado de la productividad, se mejora el proceso constructivo debido a los tiempos reducidos de fabricación e instalación.

BREVE DESCRIPCION DE LAS FIGURAS

La figura 1 muestra una pieza prefabricada

La figura 2 muestra un poste sin tapas

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La figura 3 muestra una tapa con su unión permanente (snap-on)

La figura 4 muestra un conector con su union deslizable y su unión permanente (snap-on)

La figura 5 muestra una pieza tipo U con sus correspondientes perforaciones para pasar la enfierradura o postes

La figura 6 muestra una plancha de techo con su botagua

La figura 7 muestra el ensamble en fábrica dos piezas prefabricadas para formar un elemento con dimensiones logradas

La figura 8 muestra un detalle de un poste con sus tapas

La figura 9 muestra la unión con soldadura de ultrasonido de las piezas prefabricadas que conformaran un elemento con dimensiones logradas antes y después de aplicar la soldadura con ultrasonido

La figura 10 muestra un modulo con sus ductos para instalaciones eléctricas, de agua, sanitarias gas y transmisión de datos preinstalados

La figura 11 muestra la unión de dos elemento con dimensiones logradas en una esquina mediante los conectores correspondientes.

La figura 12 muestra el retiro de una tapa desde un poste cuando se desea instalar un nuevo elemento con dimensiones logradas

La figura 13 muestra la inserción de un conector en el extremo de un elemento con dimensiones logradas

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La figura 14 muestra la inserción de un nuevo modulo en forma horizontal hacia la unión permanente (snap-on)

La figura 15 muestra un modulo ya conectado utilizando la unión permanente (snap-on)

DESCRIPCION DETALLADA DE LA INVENCION

La invención propuesta considera que la unión de las piezas prefabricadas (1) se efectúa en la fábrica mediante unión por canales deslizables (2) y sistema de soldadura con ultrasonido para formar los elementos con dimensiones logradas (13). Los extremos de los elementos con dimensiones logradas (13) tienen conectores (3) que se instalan mediante unión deslizable. Los postes (4) cuentan con al menos una ranura (8) donde se insertan las lengüeta (6) de los conectores (3) produciéndose una unión permanente (snap on). Los postes (4) cuentan con al menos una tapa (7) que va sobre cada ranura (8) y que se retira cuando se utilizan dichas ranuras (8) para unir un elemento con dimensiones logradas (13). La unión de dichos elementos con dimensiones logradas (13) a los postes (4) se efectúa mediante dicho sistema de enganche (snap-on). Los elementos de dimensiones logradas (13) permiten instalar en su interior ductos (9) para instalaciones eléctricas, de agua, sanitarias gas y transmisión de datos que vienen preinstaladas de fábrica. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden prefabricar de acuerdo al diseño y necesidades de tal manera de incluir los vanos (10) para puertas y ventanas y/o que incluyan refuerzos estructurales para la fijación posterior de dichas ventanas o puertas. Las piezas prefabricadas (1) y los elementos con dimensiones logradas

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(13) pueden contar con ganchos exteriores u otros elementos de fijación que permiten fijar sobre ellos laminados o acabados diversos. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) son prefabricados con instrumentos de precisión lo cual facilita el armado en terreno y evita el uso de mano de obra especializada. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con materiales aglutinantes tales como cemento, concreto y espumados, también se pueden llenar con áridos. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con subdivisiones que contengan combinaciones de aglutinante y áridos. Los elementos con dimensiones logradas tienen perforaciones (11) en su interior que permiten que los materiales aglutinantes y/o los áridos se distribuyan uniformemente por gravedad en su interior cuando son vaciados. En el caso de que los elementos con dimensiones logradas (13) vayan rellenos con poliuretano dichos elementos con dimensiones logradas no llevan perforaciones (11) interiores y el relleno se efectúa en fábrica. Las planchas (12) que se utilizan para conformar el techo incluyen en su borde un botagua (13). Por otra parte en la fábrica se realiza la extrusión de las piezas prefabricadas (1); se unen dichas piezas mediante soldadura con ultrasonido, se hacen los vanos (10) de puertas y ventanas según especificaciones, se instalan los ductos (9) para instalaciones eléctricas, hidráulicas, sanitarias de agua o transmisión de datos y se instalan los conectores correspondientes en los extremos (3) de los elementos con dimensiones logradas (13) todo esto previo al transporte al lugar de edificación. Luego de esto se traslada al lugar en que se efectuara la edificación. En el lugar de edificación previo al montaje de los elementos descritos debe construirse un radier.

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con enfierradura (barras o postes metálicos) , se insertan en la enfierradura las piezas U (14) en el lugar donde se instalarán los, sobre las piezas U (14) y a través de la enfierradura se introducen los elementos con dimensiones logradas (13) y los postes (4) . Se sacan las tapas (7) de los postes en los lugares donde se unirá un elemento con dimensiones logradas (13) con dicho poste (4) , a continuación se unen los elementos con dimensiones logradas (13) con los postes (4) mediante el sistema de enganche (snap on) . Se instalan las ventanas y puertas en los vanos (10) previamente fabricados para tal efecto, realizado esto se vacía material aglutinante u otro material por la parte superior de todos los postes (4) y elementos con dimensiones logradas (13) que conforman la instalación. A continuación se coloca y fija el techo. Se conectan los ductos (9) de instalaciones eléctricas, hidráulicas, sanitarias y otras que vienen preinstaladas de fábrica, cuando corresponde se aplican o instalan los materiales de revestimiento. Cabe hacer notar que en el caso de ampliación progresiva se debe sacar la tapa (7) del poste e insertar un nuevo elementos con dimensiones logradas (13)

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REIVINDICACIONES

1. Sistema de construcción a base de elementos huecos con dimensiones logradas a partir de la unión de piezas prefabricadas y postes que incluyen cuatro puntos de unión que permiten la conexión del resto de los elementos y que permiten la construcción progresiva tanto al exterior como al interior a partir de ellos conforme al tamaño requerido para cada edificación
CARACTERIZADO porque:
 - a) La unión de dichas piezas prefabricadas se efectúa en la fábrica mediante unión por canales deslizables y sistema de soldadura con ultrasonido para formar los elementos con dimensiones logradas.
 - b) Los extremos de los elementos con dimensiones logradas tienen conectores que se instalan mediante unión deslizable y/o sistema de presión (snap-on).
 - c) Los postes cuentan con al menos una ranura donde se insertan las lenguetas de los conectores
 - d) Los postes cuentan con al menos una tapa que va sobre cada ranura y que se retira cuando se utilizan las ranuras para unir elementos con dimensiones logradas.
 - e) La unión de dichos elementos con dimensiones logradas a los postes se efectúa mediante un sistema de presión (snap-on)
 - f) Los elementos de dimensiones logradas permiten instalar en su interior ductos para instalaciones eléctricas, de agua, sanitarias, gas y transmisión de datos que vienen preinstaladas de fábrica.

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- g) Las piezas prefabricadas y los elementos con dimensiones logradas se pueden prefabricar de acuerdo al diseño y necesidades de tal manera de incluir los vanos para puertas y ventanas y/o que incluyan refuerzos estructurales para la fijación posterior de dichas ventanas o puertas.
- h) Las piezas prefabricadas y los elementos con dimensiones logradas pueden contar con ganchos exteriores u otros elementos de fijación que permitan fijar sobre ellos laminados o acabados diversos.
- i) Las piezas prefabricadas y los elementos con dimensiones logradas son prefabricados con instrumentos de precisión.
- j) Las piezas prefabricadas y los elementos con dimensiones logradas se pueden llenar con materiales aglutinantes tales como cemento, concreto y espumados, también se pueden llenar con áridos.
- k) Las piezas prefabricadas y los elementos con dimensiones logradas se pueden llenar con subdivisiones que contengan combinaciones de aglutinante y áridos.
- l) Los elementos con dimensiones logradas tienen perforaciones en su interior que permiten que los materiales aglutinantes y/o los áridos se distribuyan uniformemente por gravedad en su interior cuando son vaciados.
- m) En el caso de que los elementos con dimensiones logradas vayan rellenos con poliuretano dichos elementos con dimensiones logradas no llevan perforaciones interiores y el relleno se efectúa en fábrica.
- n) Las planchas que se utilizan para conformar el techo incluyen en su borde un botagua.

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2. Metodo para utilizar un sistema de construcción a base de elementos huecos con dimensiones logradas a partir de la unión de piezas prefabricadas y postes conforme al tamaño requerido para cada edificación
CARACTERIZADO porque que consiste en:

- a) En fabrica extruir las piezas prefabricadas
- b) En fabrica efectuar las perforaciones interiores en dichas piezas que permitirán que el material aglutinante y áridos se deposite uniformemente por gravedad en su interior
- c) En fabrica unir las piezas prefabricadas entre si mediante soldadura por ultrasonido
- d) En fabrica fabricar hacer los vanos de puertas y ventanas según especificaciones
- e) En fabrica instalar los ductos para instalaciones eléctricas, de agua , sanitarias, gas o transmisión de datos.
- f) En fabrica instalar los conectores correspondientes en los extremos de los elementos con dimensiones logradas
- g) Trasladar de la fábrica al lugar en que se efectuara la edificación
- h) En el lugar de la edificación construir un radier con enfierradura (barras o postes metálicos)
- i) insertar en la enfierradura las piezas U en el lugar en que se instalaran los muros.
- j) introducir sobre las piezas U y a traves de la enfierradura los elementos: con dimensiones logradas y los postes sobre las piezas U

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- k) sacar las tapas de los postes en los lugares donde se unirá un elemento con dimensiones logradas con dicho poste
- l) unir los elementos con dimensiones logradas con los postes mediante el sistema de presión (snap on).
- m) vaciar material aglutinante u otro material por la parte superior de todas las postes y elementos con dimensiones logradas que conforman la instalación
- n) instalar las ventanas y puertas en los vanos previamente fabricados para tal efecto
- o) colocar y fijar el techo
- p) conectar los ductos de instalaciones eléctricas, de agua , sanitarias , gas y transmisión de datos que vienen preinstaladas de fábrica.
- q) Aplicar o instalar si se requiere los materiales de revestimiento
- r) En el caso de ampliación progresiva sacar la tapa del poste e insertar un nuevo elementos con dimensiones logradas para una construcción progresiva exterior o interior

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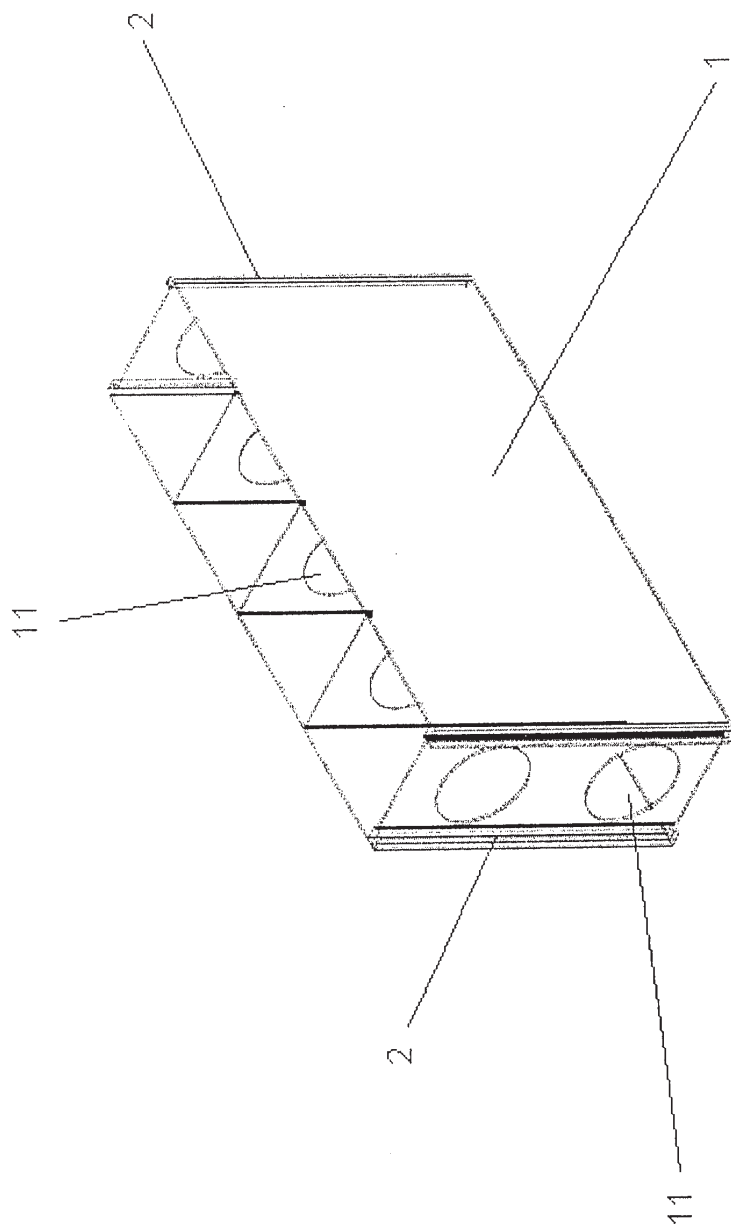


Figura 1

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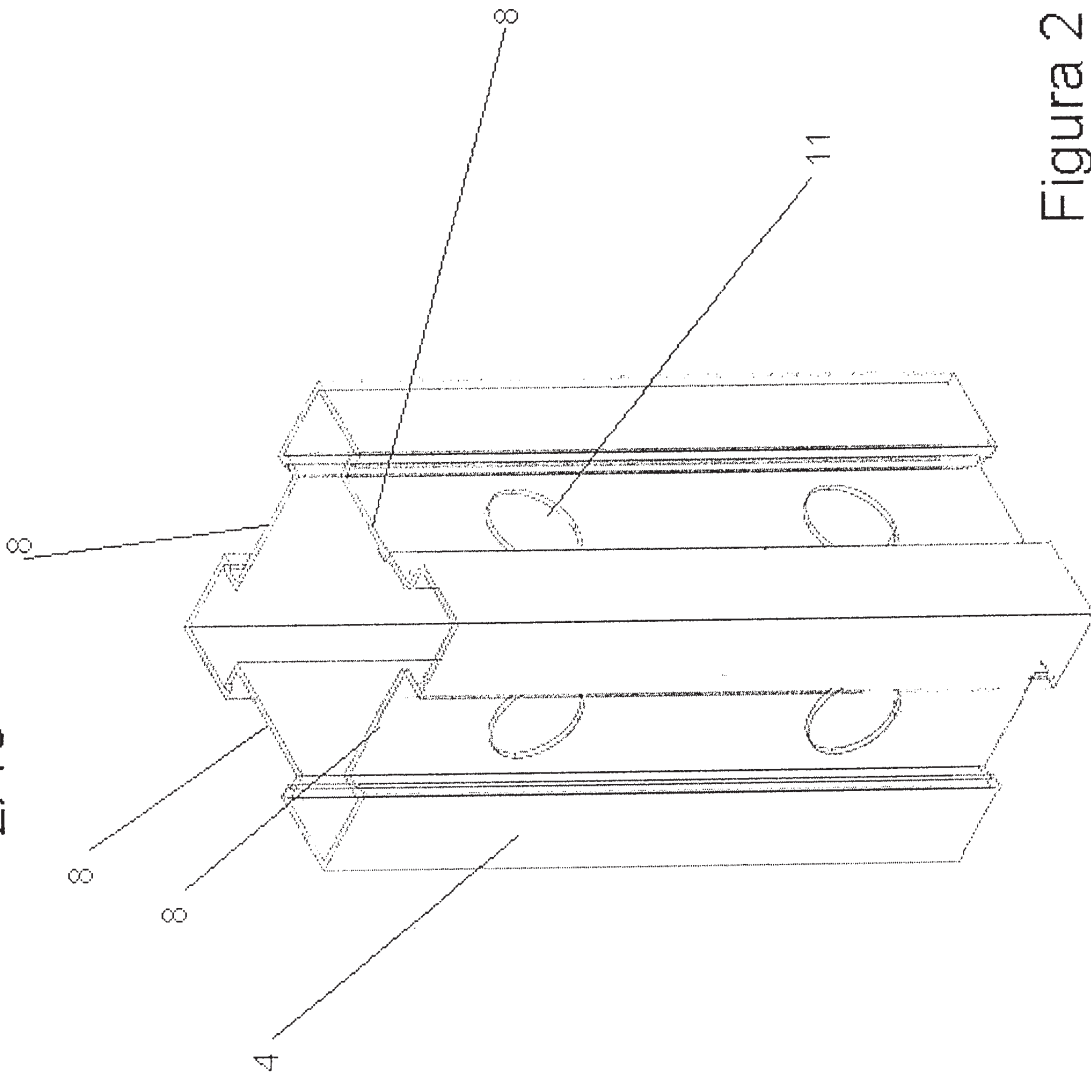


Figura 2

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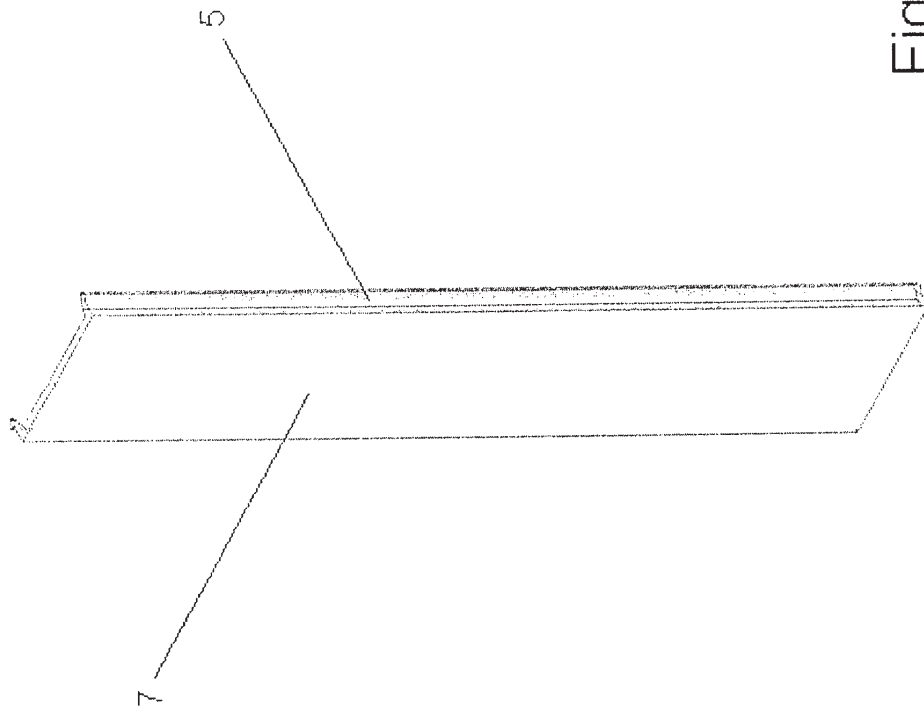


Figura 3

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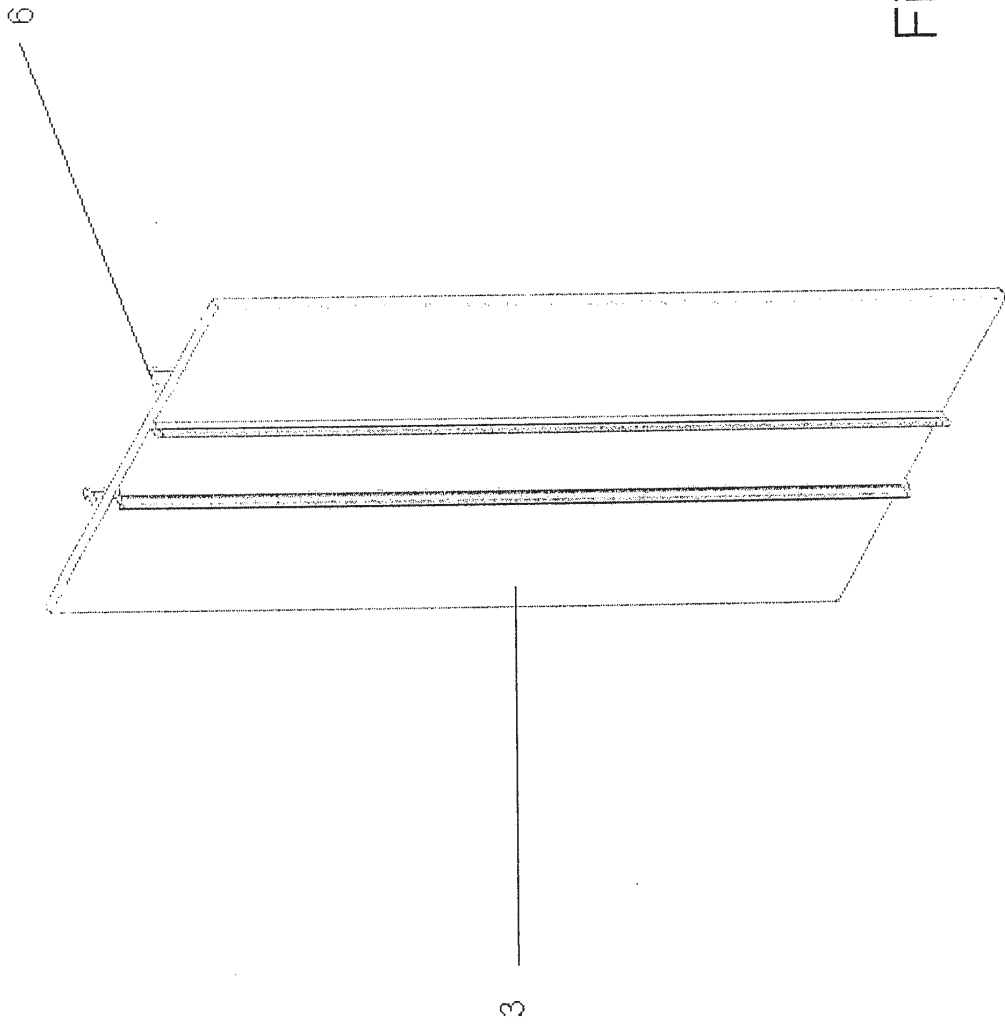


Figura 4

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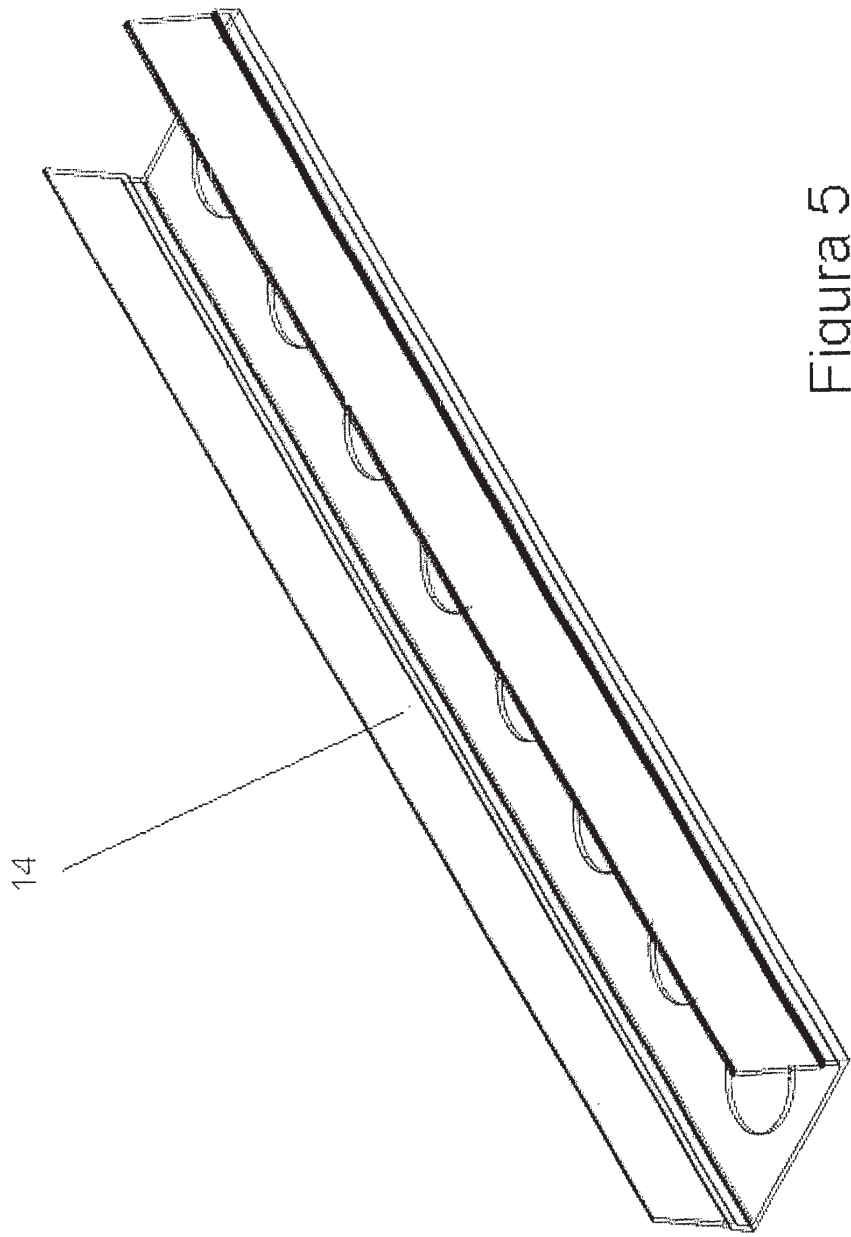


Figura 5



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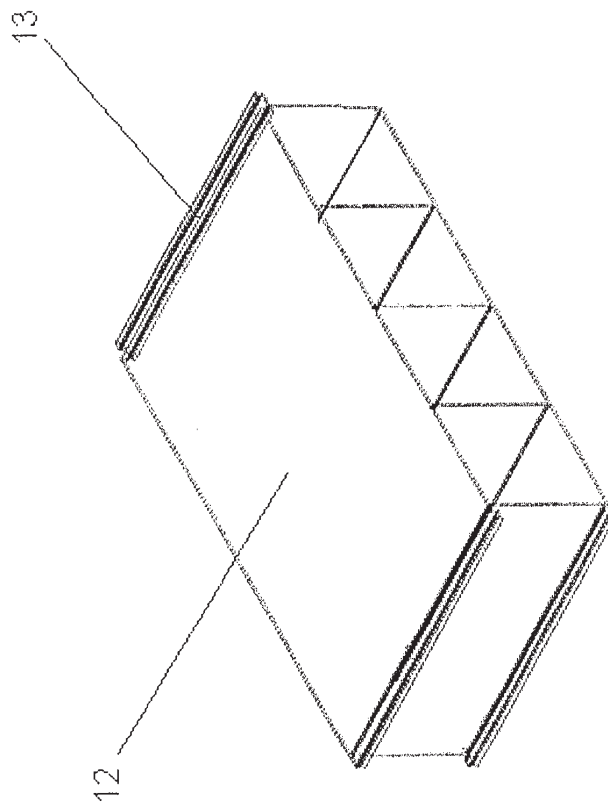


Figura 6

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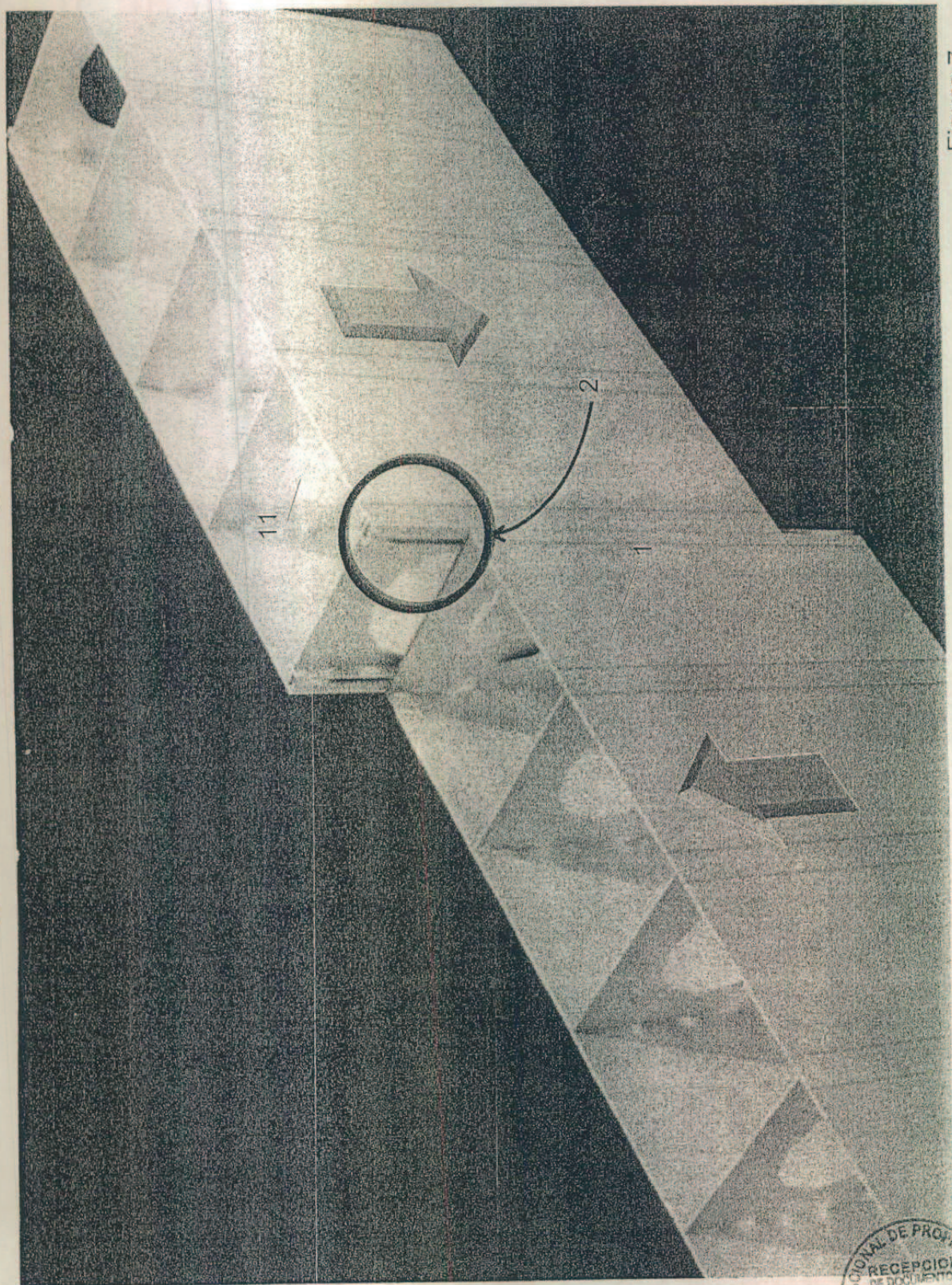


Figura 7



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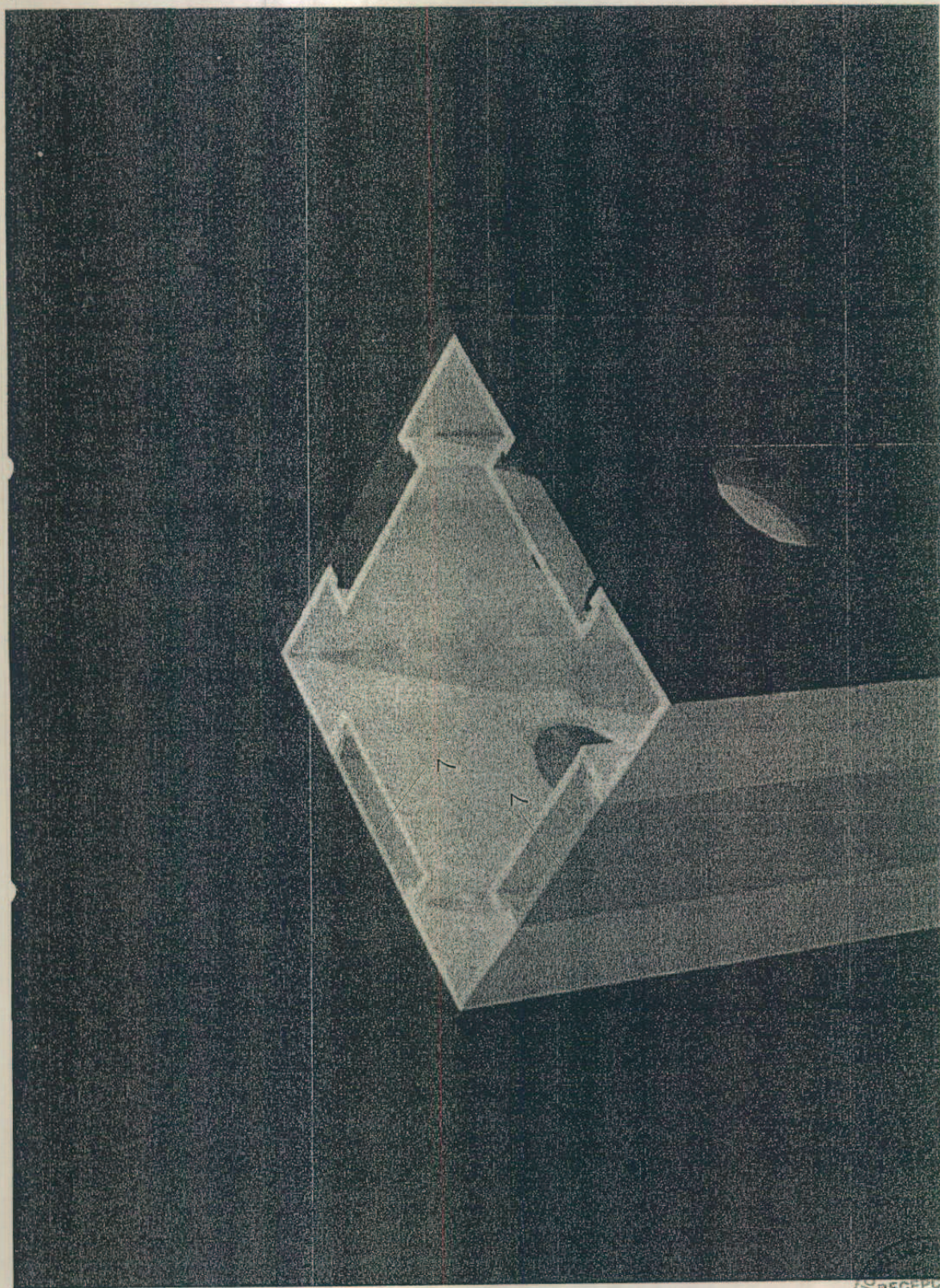


Figura 8

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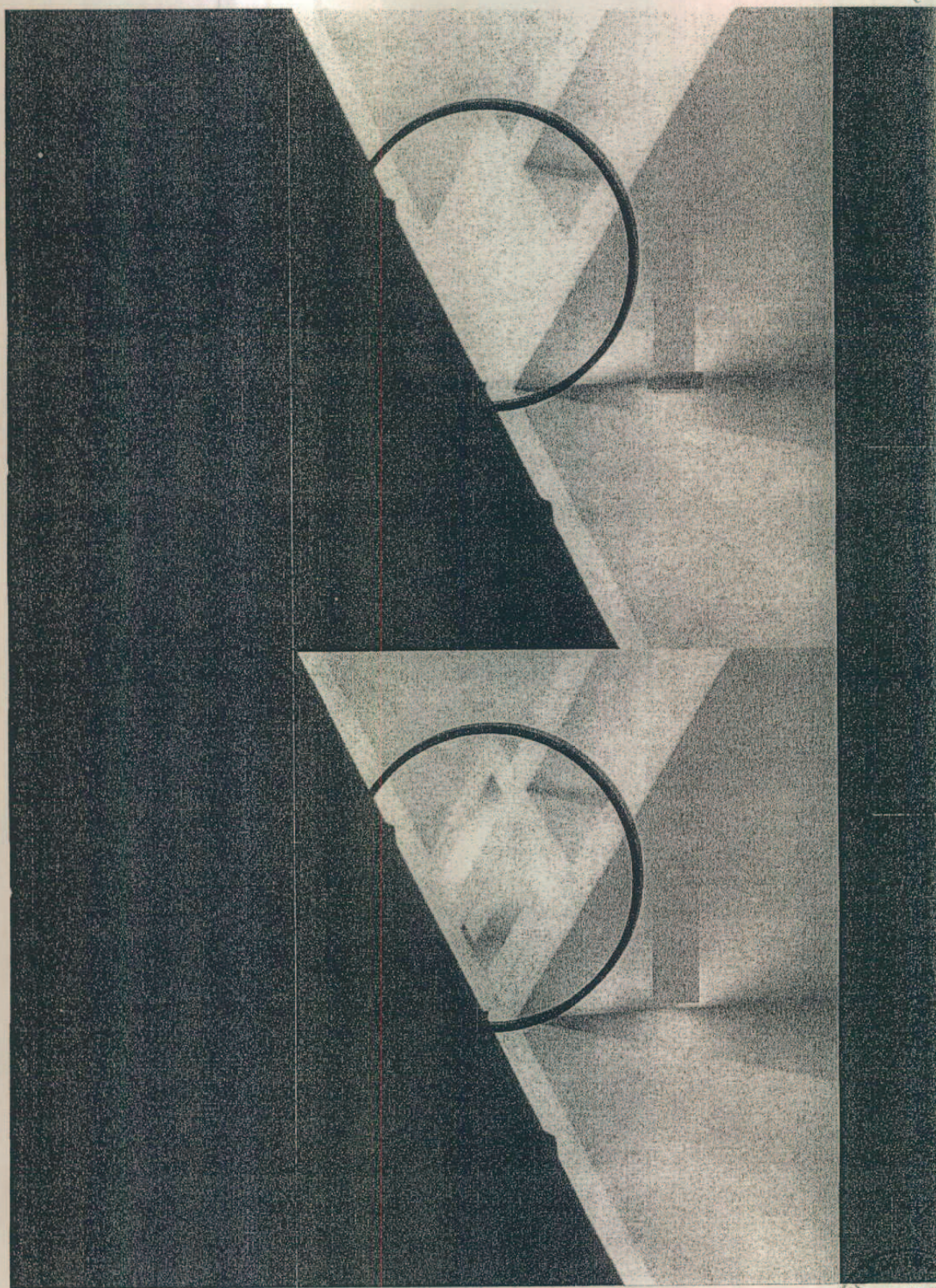


Figura 9

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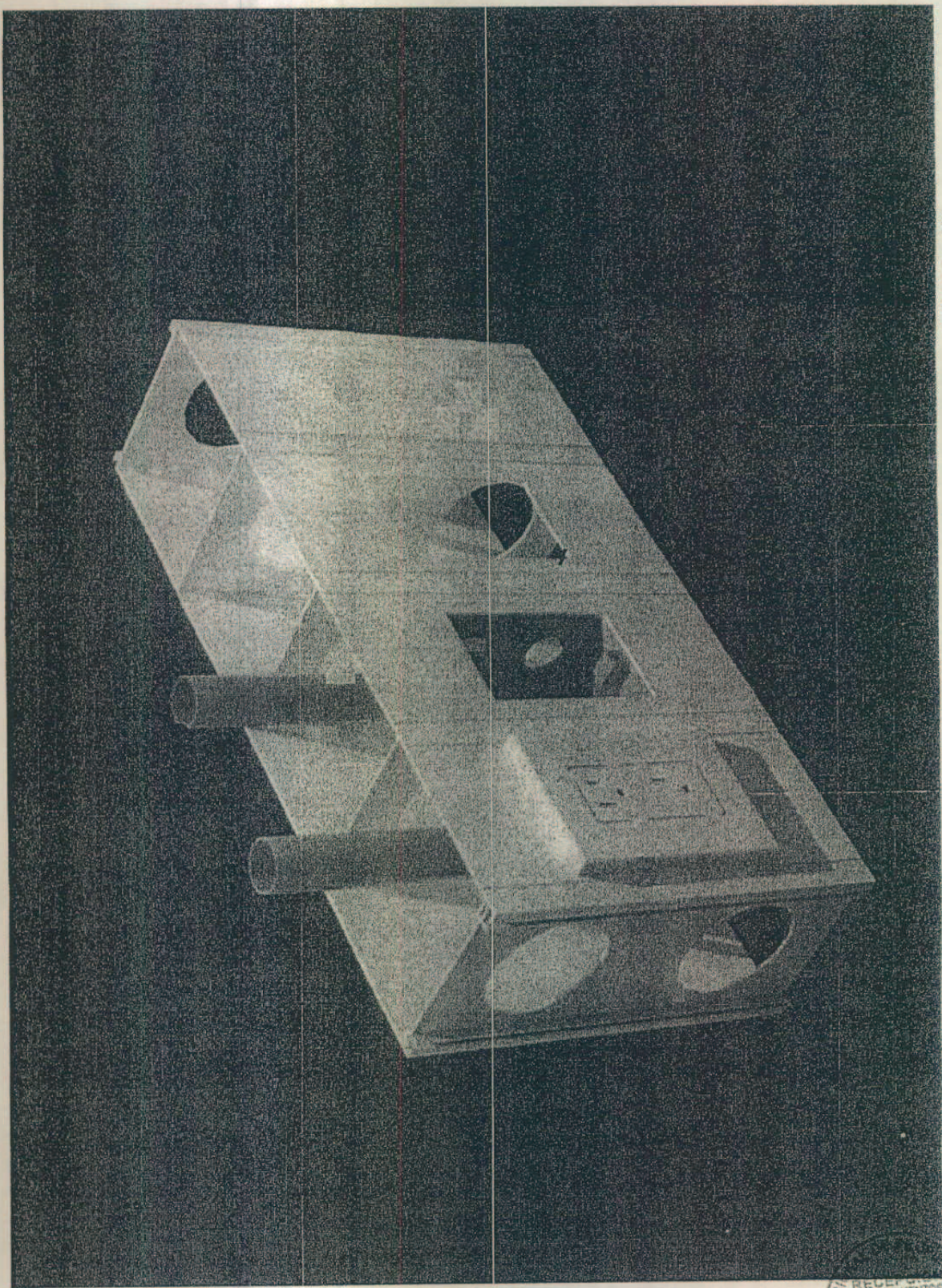


Figura 10

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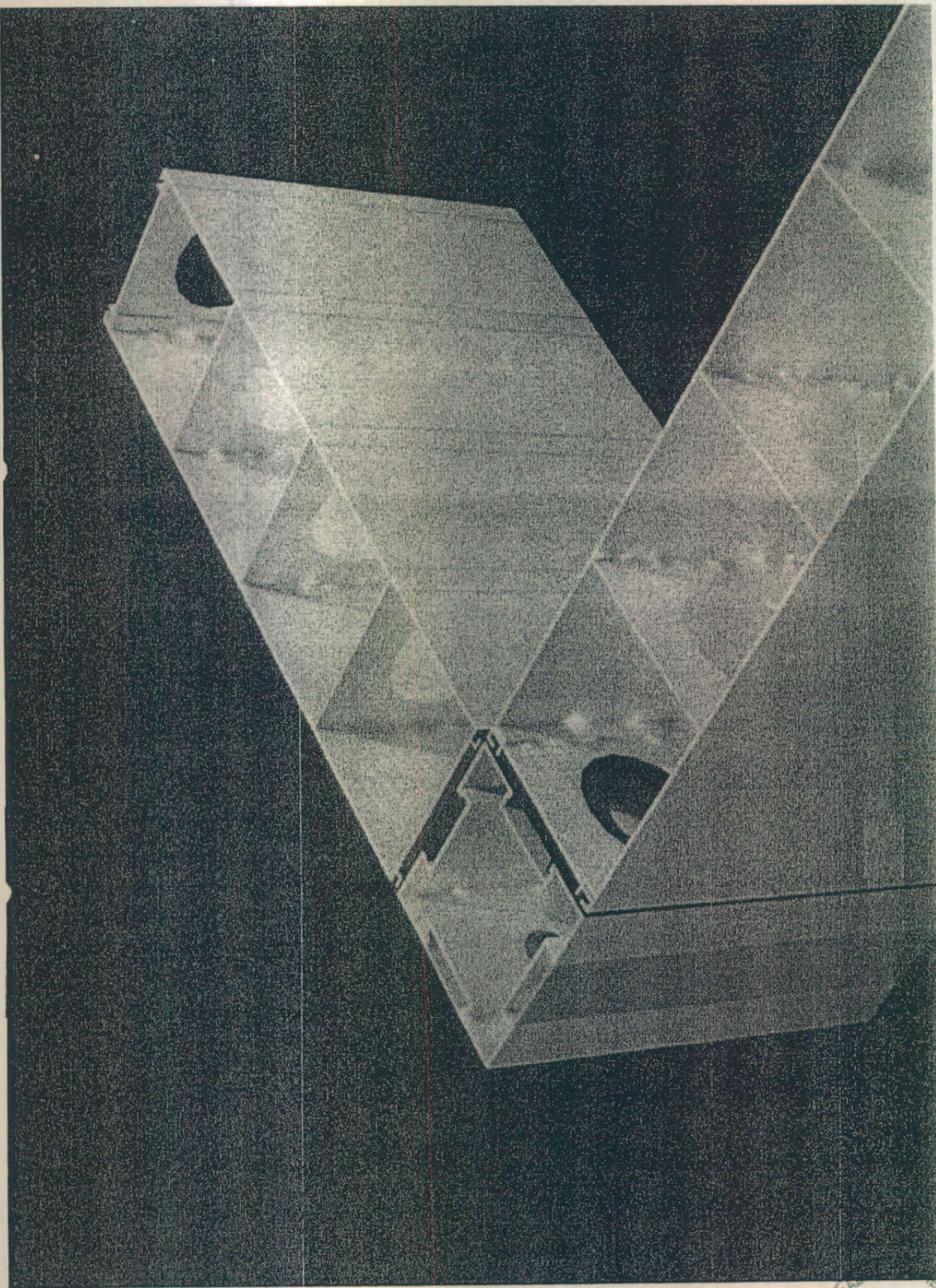


Figura 11

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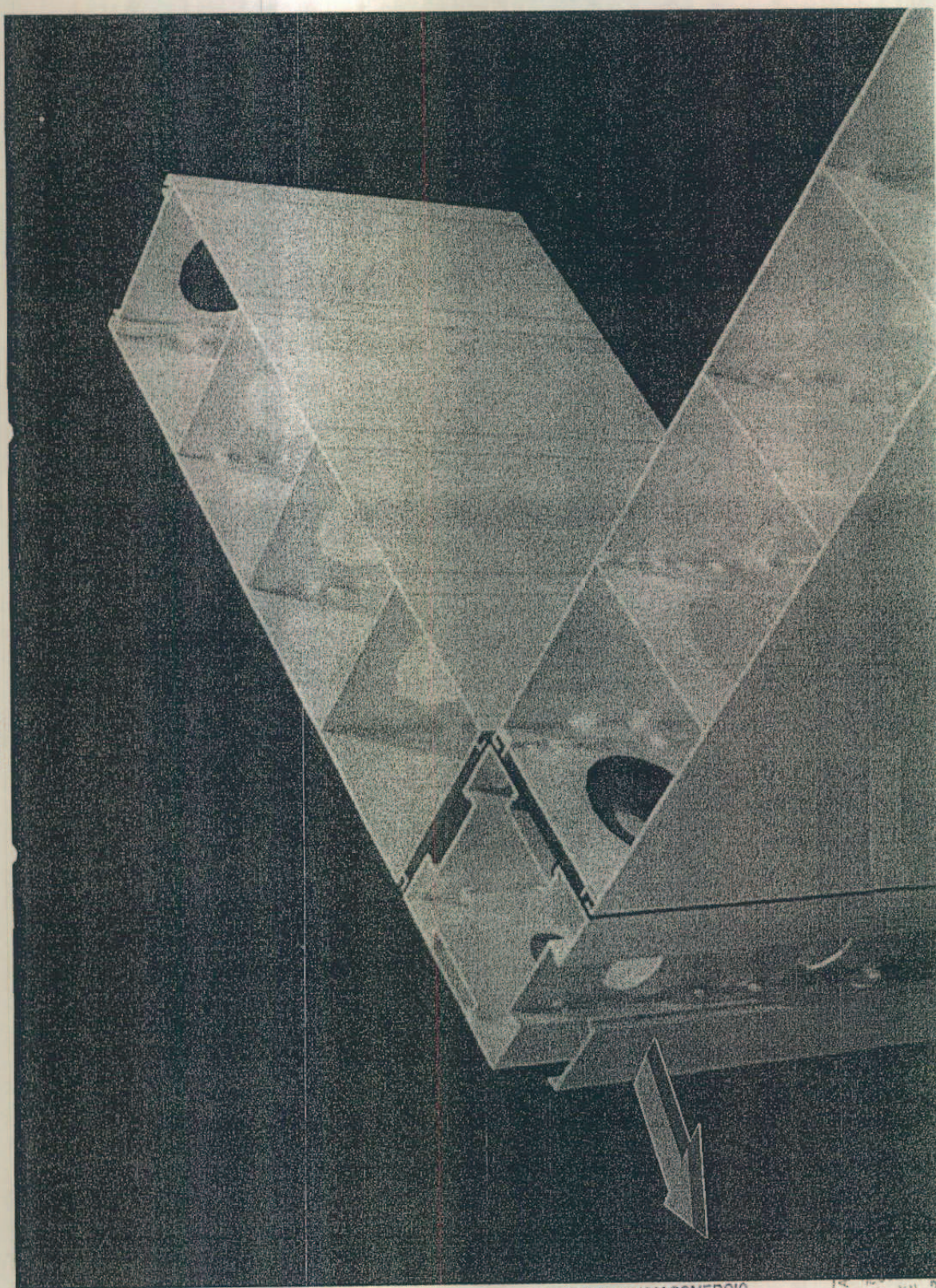


Figura 12

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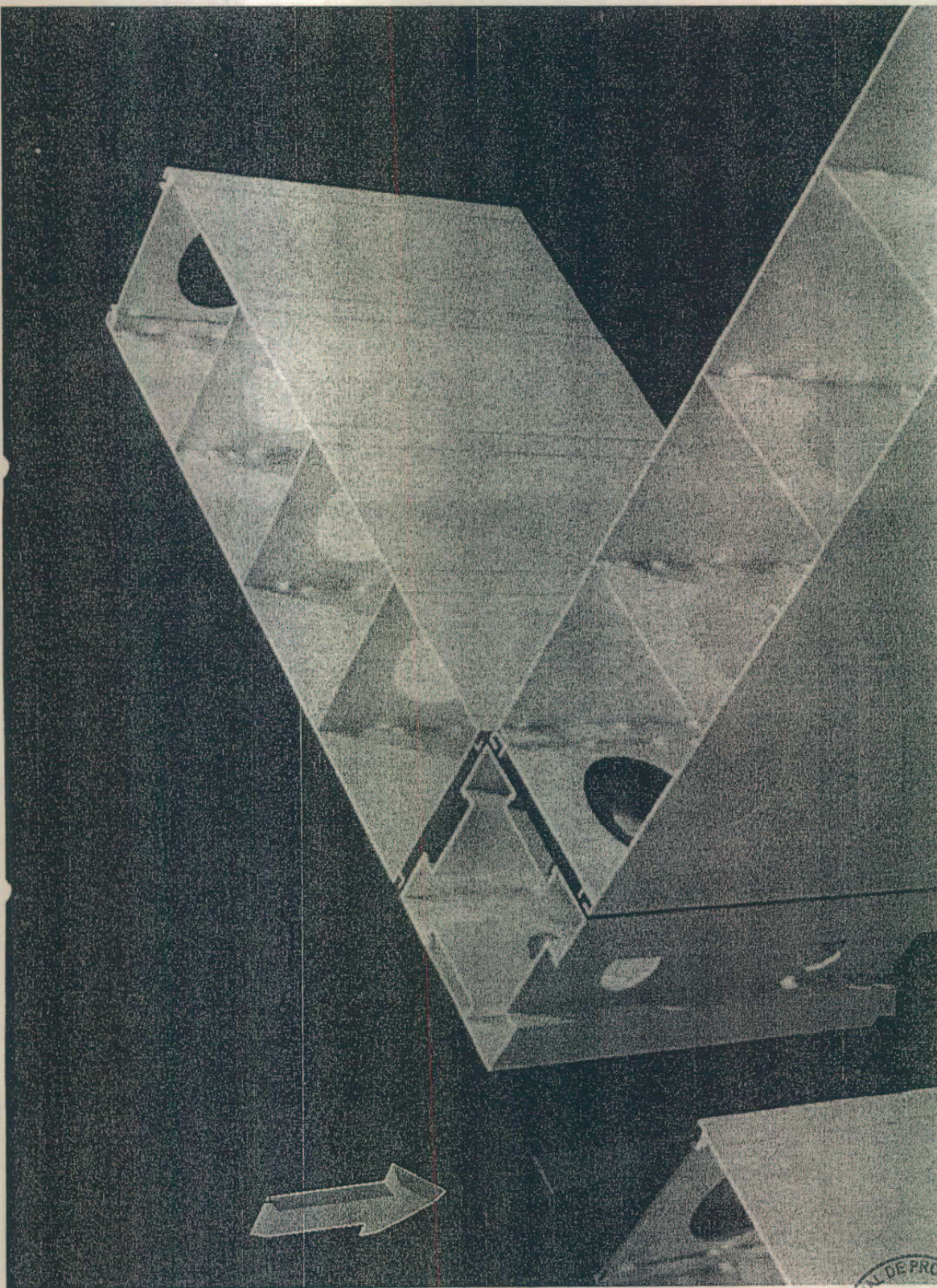


Figura 13

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

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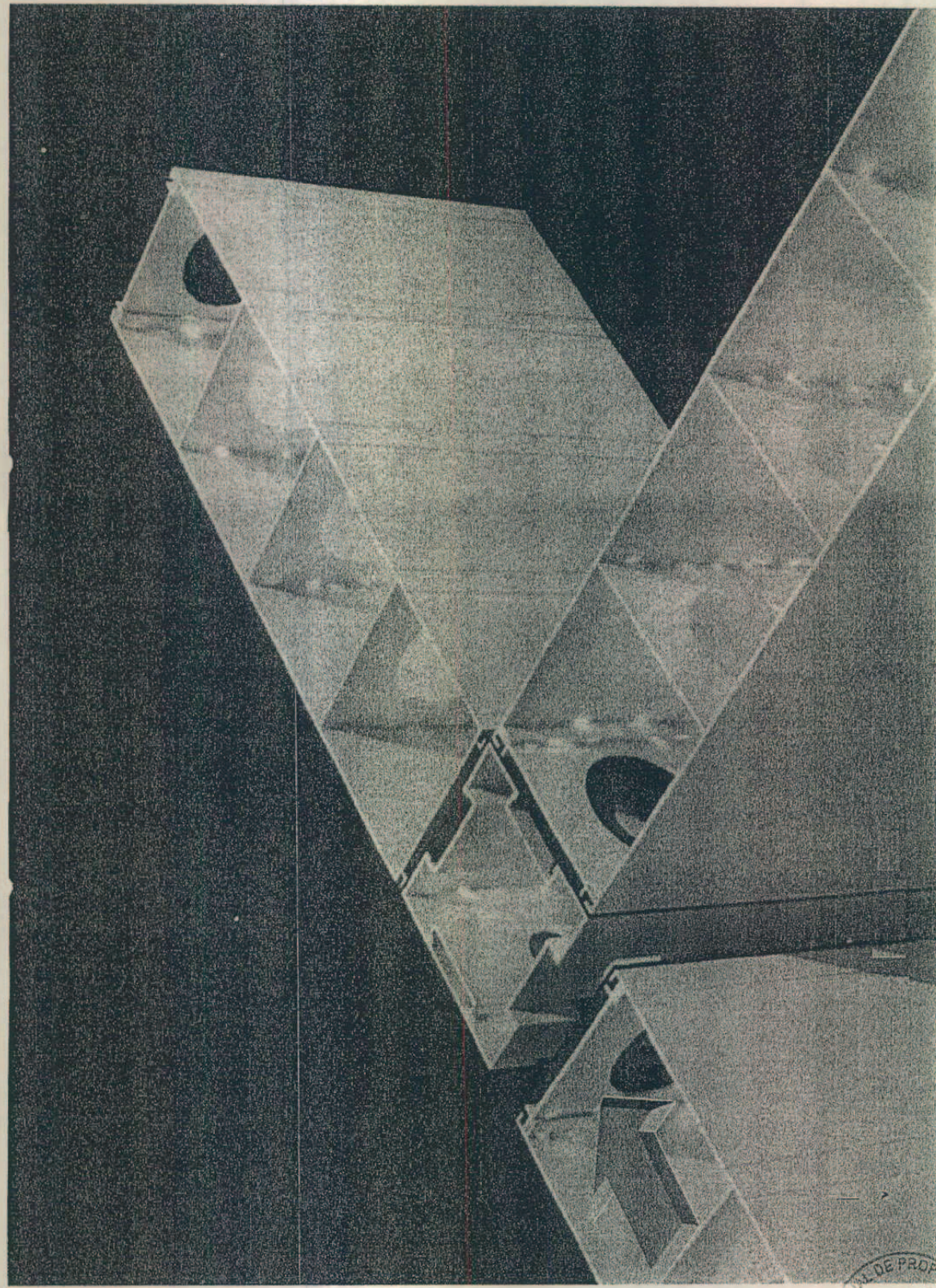


Figura 14

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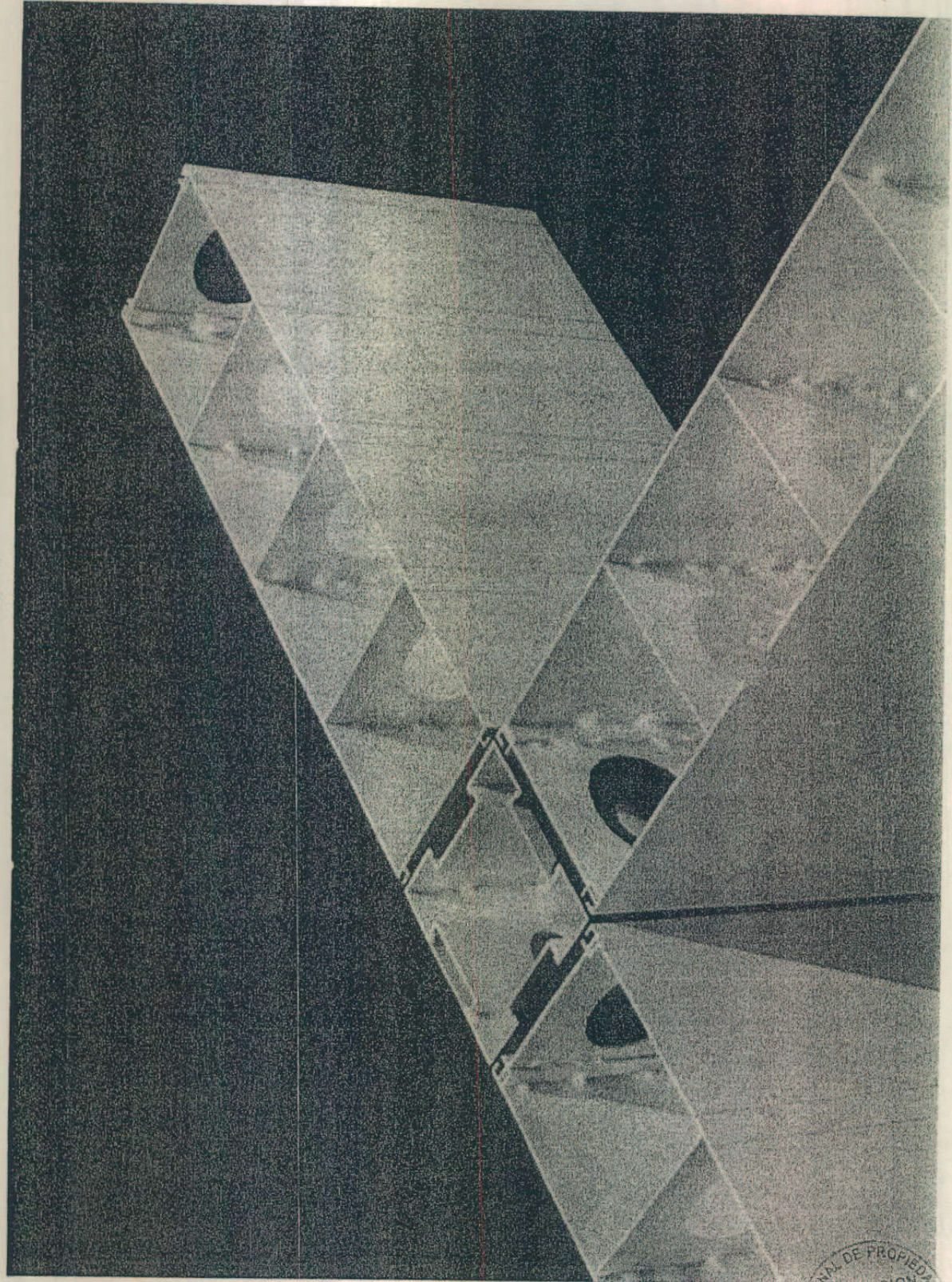


Figura 15

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SISTEMA MODULAR PARA EDIFICACIÓN PROGRESIVA

MEMORIA DESCRIPTIVA

5 CAMPO DE APLICACIÓN DE LA INVENCION

La presente invención se refiere a un sistema modular para edificación progresiva que se desarrolla en el área de la construcción, específicamente en el área de la construcción por módulos

10 DESCRIPCION DEL ARTE PREVIO

En el estado de la técnica existen antecedentes previos que indican que la construcción con paneles termoplásticos existe en el estado de la técnica, es así por ejemplo como se puede mencionar la patente **US 6,189,269** que divulga un sistema que permite la unión de sistemas prefabricados mediante el uso de uniones deslizables, dicho sistema no permite el crecimiento progresivo de la construcción una vez hecha utilizando los medios de ensamblaje propios de sus partes. Ni utiliza el ensamblaje de las piezas de manera horizontal por medio de sistema snap-on. También se tiene por ejemplo la patente **US 5,608,999** que se compone de elementos en forma de placas planas, rectangulares y semicirculares que se ensamblan mediante rieles que también permiten la unión deslizable. Los elementos al armarse conforman módulos huecos que se llenan solo con cemento. Este sistema no permite tampoco la unión horizontal ni utiliza sistema de unión por sistema snap-on. Este sistema tampoco permite el crecimiento progresivo utilizando los medios de unión una vez realizada la construcción. Otra patente relacionada con el tema es la **US 5,311, 778** que divulga un sistema modular de mult-componentes para fabricar estructuras de pared, el sistema consta de formas prefabricadas, cada extremo de cada panel tiene flanges tipo "L" y el otro extremo tiene ranuras tipo "L" de tal manera que dichas ranuras entran una dentro de la otra. Este sistema también permite la unión solamente mediante unión deslizable

RESUMEN DE LA INVENCION

La presente invención se refiere a un Sistema Modular que permite la construcción de toda clase de edificaciones de carácter progresivo hacia adentro o hacia fuera, con avances de la técnica conocidos a la fecha, consistentes en la utilización de diversos elementos de construcción con dimensiones adaptadas a

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base de la unión de piezas completas de formas poliméricas, que logran el tamaño de los elementos constructivos requeridos para cada tipo de edificación ahorrando tiempo y ventajas en cuanto a la logística, unión realizada con las piezas previamente prefabricadas, mediante soldadura con ultrasonido, lo que permite fusionar el material a nivel molecular, elementos de construcción que se ensamblan entre sí ya sea bajo el sistema a presión ("snap on") o, por canales deslizables y, dichos elementos de construcción con postes bajo el sistema a presión ("snap on").

Las dimensiones de los elementos de construcción, permiten pre-instalar en su interior y de manera oculta y segura, ductos para instalaciones tales como las eléctricas, las hidráulicas y las sanitarias, entre otras, logrando con ello una mejora en la productividad y la calidad, por lo que ya no resulta necesario la realización de obras, instalaciones y costos posteriores.

Los elementos de construcción pueden ser también utilizados para (i) modificar o agregar elementos de construcción al interior de las edificaciones para crear nuevos espacios o bien, para (ii) adicionar al exterior de las edificaciones nuevos espacios modulares desde los postes.

Los elementos de construcción se pueden pre-fabricar, de acuerdo al diseño y necesidades, los vanos para puertas y ventanas, que de ser necesario, incluyan los refuerzos estructurales para la fijación de tales elementos arquitectónicos.

Además, los elementos de construcción pueden contar con ganchos exteriores u otros elementos de fijación que permiten deslizar sobre el mismo, laminados de acabados diversos

Con base en lo anterior, se utilizan materiales y procesos novedosos en beneficio de la productividad, calidad y costos en la industria de la edificación. Dicha productividad, permite obtener mayores resultados con los mismos recursos, y su resultado final permite incorporarlos como el acabado definitivo. El proceso descrito para las edificaciones, con los elementos de construcción puede utilizarse como sistema de autoconstrucción o construcción asistida disminuyendo costos, tiempos y requerimiento de mano de obra especializada. En cuanto al aseguramiento de calidad, los elementos de construcción son prefabricados con niveles de precisión industrial, sin requerir posteriores ajustes por mano de obra calificada en el sitio de la edificación.

Por cuanto al costo, derivado de la productividad, se mejora el proceso constructivo debido a los tiempos reducidos de fabricación e instalación.

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BREVE DESCRIPCION DE LAS FIGURAS

- La figura 1 muestra una pieza prefabricada
- 5 La figura 2 muestra un poste sin tapas
- La figura 3 muestra una tapa con su unión permanente (snap-on)
- La figura 4 muestra un conector con su union deslizable y su unión permanente
- 10 (snap-on)
- La figura 5 muestra una pieza tipo U con sus correspondientes perforaciones para pasar la enfierradura o postes
- 15 La figura 6 muestra una plancha de techo con su botagua
- La figura 7 muestra el ensamble en fábrica dos piezas prefabricadas para formar un elemento con dimensiones logradas
- La figura 8 muestra un detalle de un poste con sus tapas
- 20 La figura 9 muestra la unión con soldadura de ultrasonido de las piezas prefabricadas que conformaran un elemento con dimensiones logradas antes y después de aplicar la soldadura con ultrasonido
- La figura 10 muestra un modulo con sus ductos para instalaciones eléctricas, de
- 25 agua, sanitarias gas y transmisión de datos preinstalados
- La figura 11 muestra la unión de dos elemento con dimensiones logradas en una esquina mediante los conectores correspondientes.
- La figura 12 muestra el retiro de una tapa desde un poste cuando se desea
- 30 instalar un nuevo elemento con dimensiones logradas
- La figura 13 muestra la inserción de un conector en el extremo de un elemento con dimensiones logradas
- 35 La figura 14 muestra la inserción de un nuevo modulo en forma horizontal hacia la unión permanente (snap-on)

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La figura 15 muestra un modulo ya conectado utilizando la unión permanente (snap-on)

La figura 16 muestra un vano de puerta en una pieza prefabricada

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DESCRIPCION DETALLADA DE LA INVENCION

La invención propuesta considera que la unión de las piezas prefabricadas (1) se efectúa en la fábrica mediante unión por canales deslizables (2) y sistema de soldadura con ultrasonido para formar los elementos con dimensiones logradas (13). Los extremos de los elementos con dimensiones logradas (13) tienen conectores (3) que se instalan mediante unión deslizable. Los postes (4) cuentan con al menos una ranura (8) donde se insertan las lengüeta (6) de los conectores (3) produciéndose una unión permanente (snap on). Los postes (4) cuentan con al menos una tapa (7) que va sobre cada ranura (8) y que se retira cuando se utilizan dichas ranuras (8) para unir un elemento con dimensiones logradas (13). La unión de dichos elementos con dimensiones logradas (13) a los postes (4) se efectúa mediante dicho sistema de enganche (snap-on). Los elementos de dimensiones logradas (13) permiten instalar en su interior ductos (9) para instalaciones eléctricas, de agua, sanitarias gas y transmisión de datos que vienen preinstaladas de fábrica. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden prefabricar de acuerdo al diseño y necesidades de tal manera de incluir los vanos (10) para puertas y ventanas y/o que incluyan refuerzos estructurales para la fijación posterior de dichas ventanas o puertas. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) pueden contar con ganchos exteriores u otros elementos de fijación que permiten fijar sobre ellos laminados o acabados diversos. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) son prefabricados con instrumentos de precisión lo cual facilita el armado en terreno y evita el uso de mano de obra especializada. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con materiales aglutinantes tales como cemento, concreto y espumados, también se pueden llenar con áridos. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con subdivisiones que contengan combinaciones de aglutinante y áridos. Los elementos con dimensiones logradas tienen perforaciones (11) en su interior que permiten que los materiales aglutinantes y/o los áridos se distribuyan uniformemente por

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gravedad en su interior cuando son vaciados. En el caso de que los elementos con dimensiones logradas (13) vayan rellenos con poliuretano dichos elementos con dimensiones logradas no llevan perforaciones (11) interiores y el relleno se efectúa en fábrica. Las planchas (12) que se utilizan para conformar el techo incluyen en su borde un botagua (13). Por otra parte en la fábrica se realiza la extrusión de las piezas prefabricadas (1); se unen dichas piezas mediante soldadura con ultrasonido, se hacen los vanos (10) de puertas y ventanas según especificaciones, se instalan los ductos (9) para instalaciones eléctricas, hidráulicas, sanitarias de agua o transmisión de datos y se instalan los conectores correspondientes en los extremos (3) de los elementos con dimensiones logradas (13) todo esto previo al transporte al lugar de edificación. Luego de esto se traslada al lugar en que se efectuara la edificación. En el lugar de edificación previo al montaje de los elementos descritos debe construirse un radier con enfierradura (barras o postes metálicos), se insertan en la enfierradura las piezas U (14) en el lugar donde se instalarán los, sobre las piezas U (14) y a través de la enfierradura se introducen los elementos con dimensiones logradas (13) y los postes (4). Se sacan las tapas (7) de los postes en los lugares donde se unirá un elemento con dimensiones logradas (13) con dicho poste (4), a continuación se unen los elementos con dimensiones logradas (13) con los postes (4) mediante el sistema de enganche (snap on). Se instalan las ventanas y puertas en los vanos (10) previamente fabricados para tal efecto, realizado esto se vacía material aglutinante u otro material por la parte superior de todos los postes (4) y elementos con dimensiones logradas (13) que conforman la instalación. A continuación se coloca y fija el techo. Se conectan los ductos (9) de instalaciones eléctricas, hidráulicas, sanitarias y otras que vienen preinstaladas de fábrica, cuando corresponde se aplican o instalan los materiales de revestimiento. Cabe hacer notar que en el caso de ampliación progresiva se debe sacar la tapa (7) del poste e insertar un nuevo elemento con dimensiones logradas (13)

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REIVINDICACIONES

- 5 1. Sistema de construcción a base de elementos huecos con dimensiones
logradas a partir de la unión de piezas prefabricadas y postes que incluyen
cuatro puntos de unión que permiten la conexión del resto de los elementos
y que permiten la construcción progresiva tanto al exterior como al interior a
partir de ellos conforme al tamaño requerido para cada edificación
- 10 CARACTERIZADO porque:
- a) La unión de dichas piezas prefabricadas se efectúa en la fábrica mediante
unión por canales deslizables y sistema de soldadura con ultrasonido para
formar los elementos con dimensiones logradas.
- b) Los extremos de los elementos con dimensiones logradas tienen
conectores que se instalan mediante unión deslizable y/o sistema de
presión (snap-on).
- 15 c) Los postes cuentan con al menos una ranura donde se insertan las
lenguetas de los conectores
- d) Los postes cuentan con al menos una tapa que va sobre cada ranura y que
se retira cuando se utilizan las ranuras para unir elementos con
dimensiones logradas.
- 20 e) La unión de dichos elementos con dimensiones logradas a los postes se
efectúa mediante un sistema de presión (snap-on)
- f) Los elementos de dimensiones logradas permiten instalar en su interior
ductos para instalaciones eléctricas, de agua, sanitarias, gas y transmisión
de datos que vienen preinstaladas de fábrica.
- 25 g) Las piezas prefabricadas y los elementos con dimensiones logradas se
pueden prefabricar de acuerdo al diseño y necesidades de tal manera de
incluir los vanos para puertas y ventanas y/o que incluyan refuerzos
estructurales para la fijación posterior de dichas ventanas o puertas.
- 30 h) Las piezas prefabricadas y los elementos con dimensiones logradas
pueden contar con ganchos exteriores u otros elementos de fijación que
permitan fijar sobre ellos laminados o acabados diversos.
- i) Las piezas prefabricadas y los elementos con dimensiones logradas son
prefabricados con instrumentos de precisión
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- j) Las piezas prefabricadas y los elementos con dimensiones logradas se pueden llenar con materiales aglutinantes tales como cemento, concreto y espumados, también se pueden llenar con áridos.
- k) Las piezas prefabricadas y los elementos con dimensiones logradas se pueden llenar con subdivisiones que contengan combinaciones de aglutinante y áridos.
- l) Los elementos con dimensiones logradas tienen perforaciones en su interior que permiten que los materiales aglutinantes y/o los áridos se distribuyan uniformemente por gravedad en su interior cuando son vaciados.
- m) En el caso de que los elementos con dimensiones logradas vayan rellenos con poliuretano dichos elementos con dimensiones logradas no llevan perforaciones interiores y el relleno se efectúa en fábrica.
- n) Las planchas que se utilizan para conformar el techo incluyen en su borde un botagua.
2. Metodo para utilizar un sistema de construcción a base de elementos huecos con dimensiones logradas a partir de la unión de piezas prefabricadas y postes conforme al tamaño requerido para cada edificación
- CHARACTERIZADO porque que consiste en:
- a) En fabrica extruir las piezas prefabricadas
- b) En fabrica efectuar las perforaciones interiores en dichas piezas que permitirán que el material aglutinante y áridos se deposite uniformemente por gravedad en su interior
- c) En fabrica unir las piezas prefabricadas entre si mediante soldadura por ultrasonido
- d) En fabrica fabricar hacer los vanos de puertas y ventanas según especificaciones
- e) En fabrica instalar los ductos para instalaciones eléctricas, de agua , sanitarias, gas o transmisión de datos.
- f) En fabrica instalar los conectores correspondientes en los extremos de los elementos con dimensiones logradas
- g) Trasladar de la fábrica al lugar en que se efectuara la edificación
- h) En el lugar de la edificación construir un radier con enfierradura (barras o postes metálicos)
- i) insertar en la enfierradura las piezas en el lugar en que se instalaran los muros.

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- j) introducir sobre las piezas U y a través de la enfierradura los elementos con dimensiones logradas y los postes sobre las piezas U
- k) sacar las tapas de los postes en los lugares donde se unirá un elemento con dimensiones logradas con dicho poste
- 5 l) unir los elementos con dimensiones logradas con los postes mediante el sistema de presión (snap on).
- m) vaciar material aglutinante u otro material por la parte superior de todas las postes y elementos con dimensiones logradas que conforman la instalación
- n) instalar las ventanas y puertas en los vanos previamente fabricados para tal efecto
- 10 o) colocar y fijar el techo
- p) conectar los ductos de instalaciones eléctricas, de agua, sanitarias, gas y transmisión de datos que vienen preinstaladas de fábrica.
- q) Aplicar o instalar si se requiere los materiales de revestimiento
- 15 r) En el caso de ampliación progresiva sacar la tapa del poste e insertar un nuevo elemento con dimensiones logradas para una construcción progresiva exterior o interior

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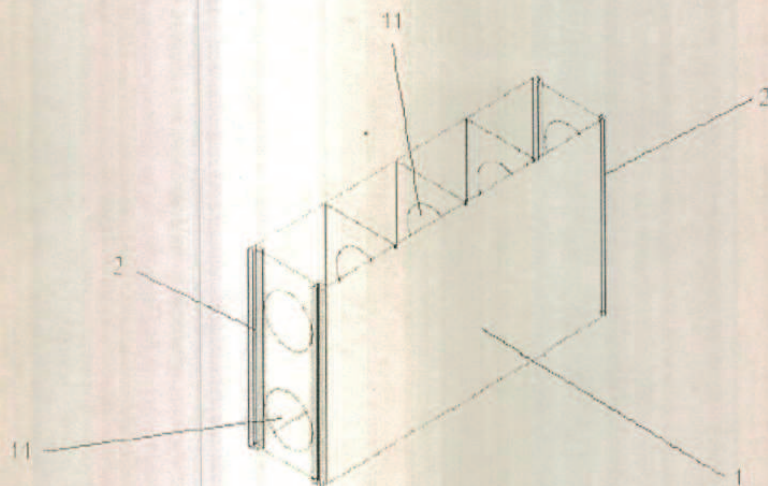


Figura 1

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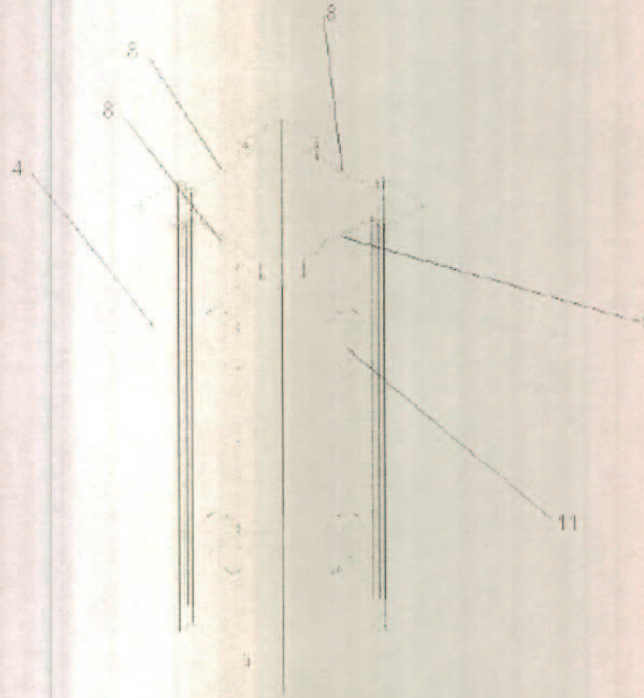


Figura 2

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Figura 3

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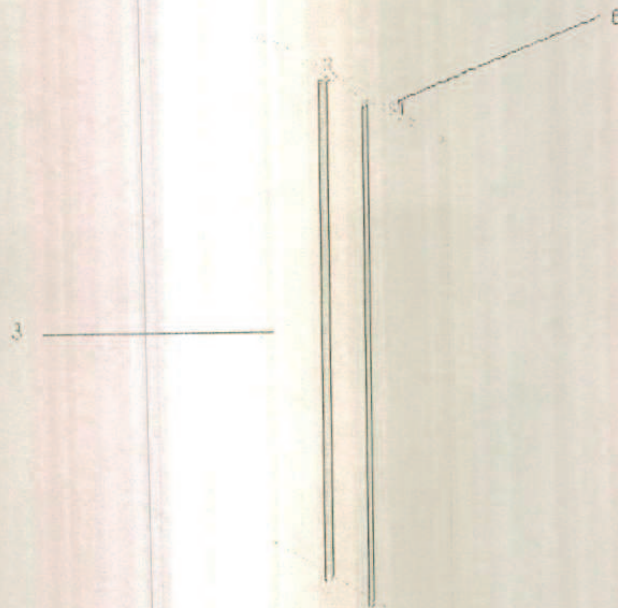


Figura 4

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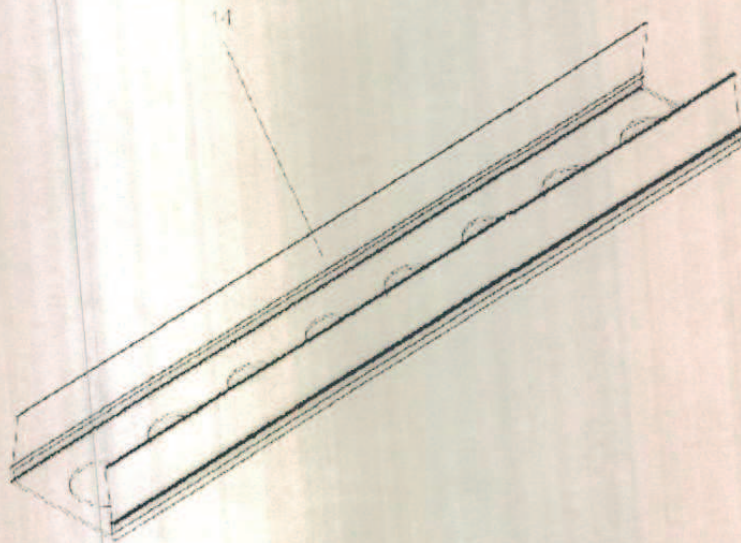


Figura 5

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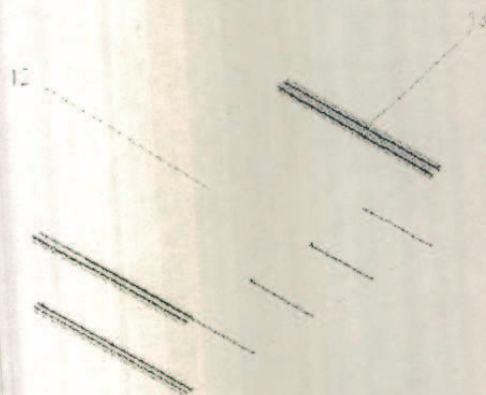


Figura 6

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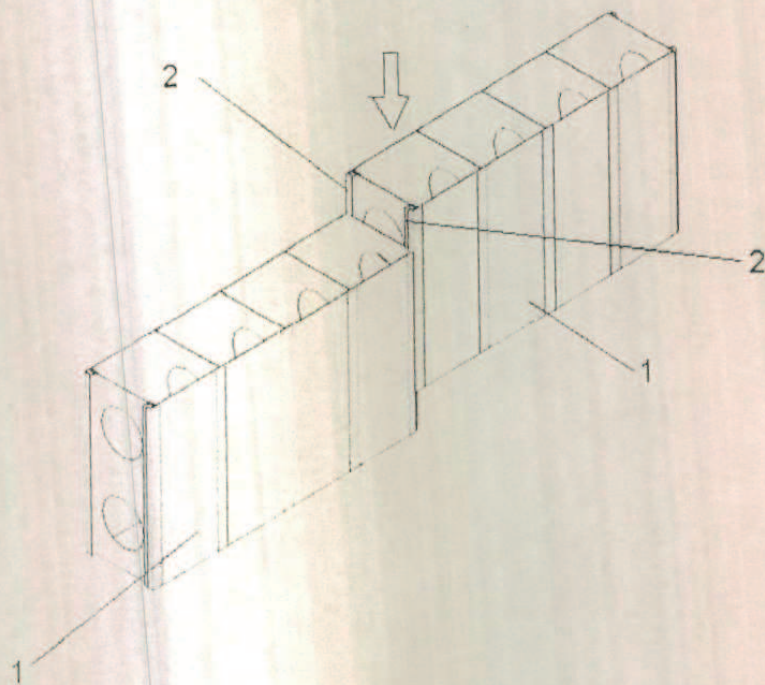


Figura 7

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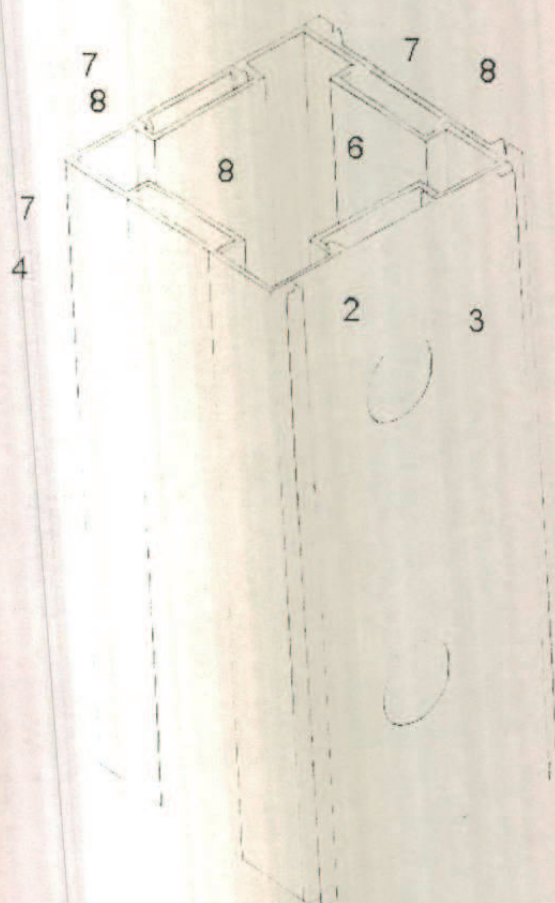
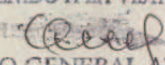


Figura 8

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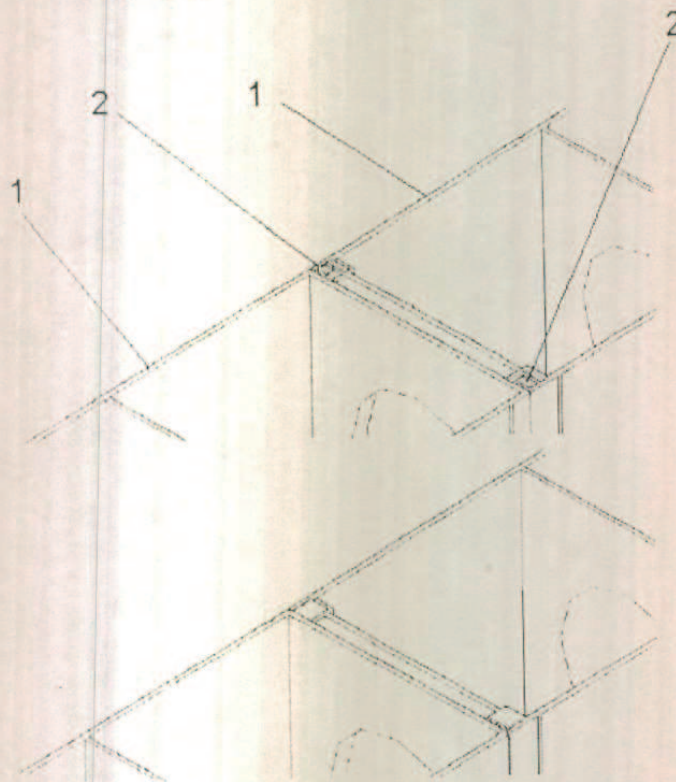
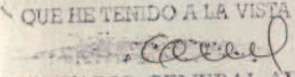


Figura 9

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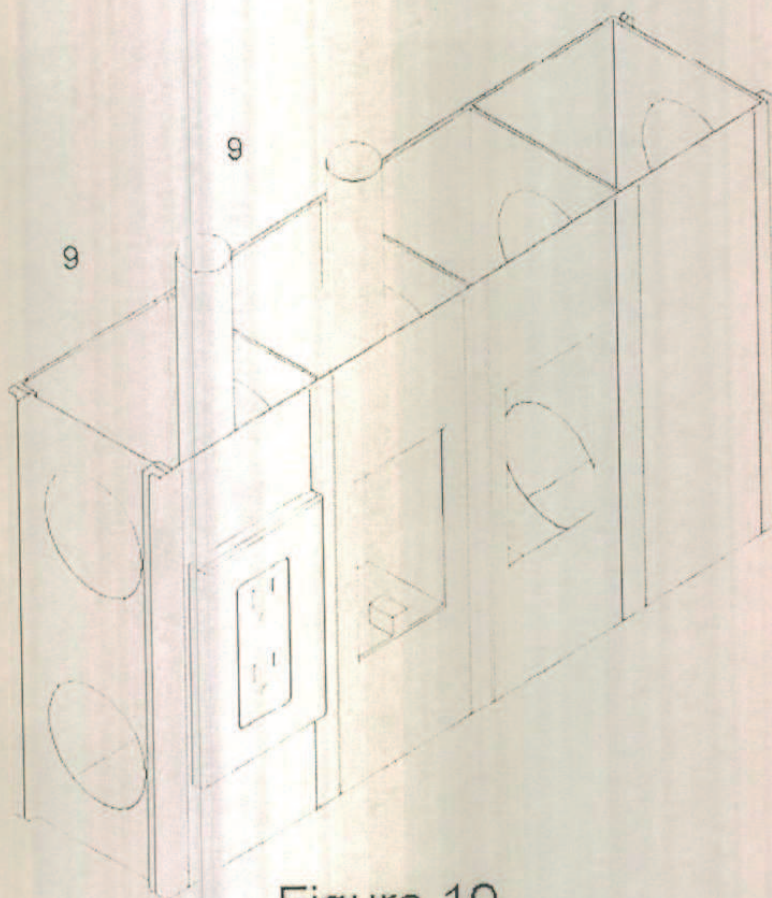
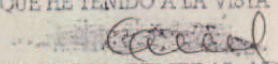


Figura 10

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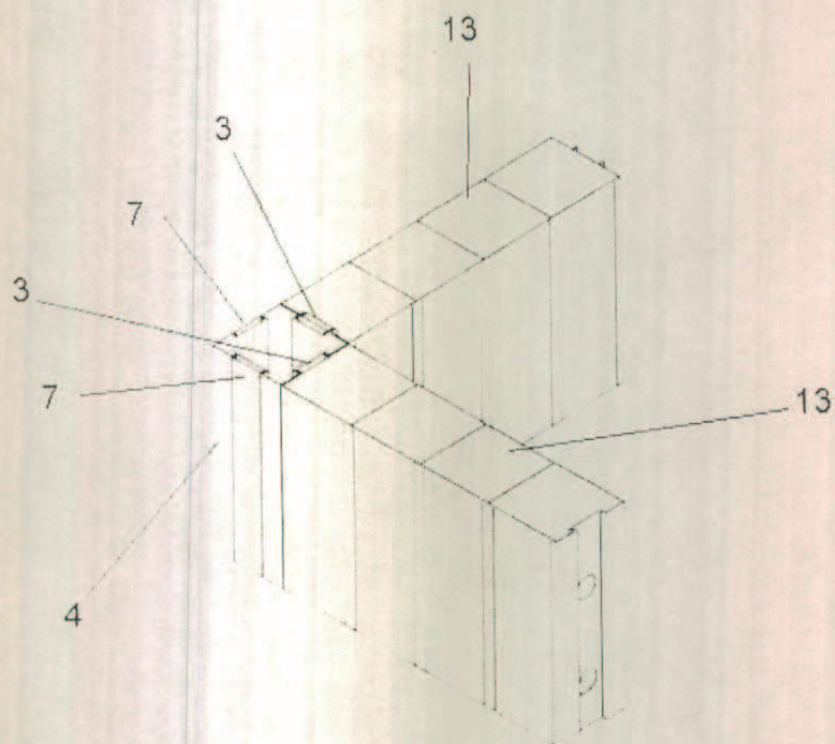


Figura 11

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
EL SUSCRITO SECRETARIO GENERAL AD-5
HACE CONSTAR QUE LA PRESENTE COPIA
FOTOSTATICA COINCIDE CON EL ORIGINAL
QUE HE TENIDO A LA VISTA
EL SECRETARIO GENERAL AD-5

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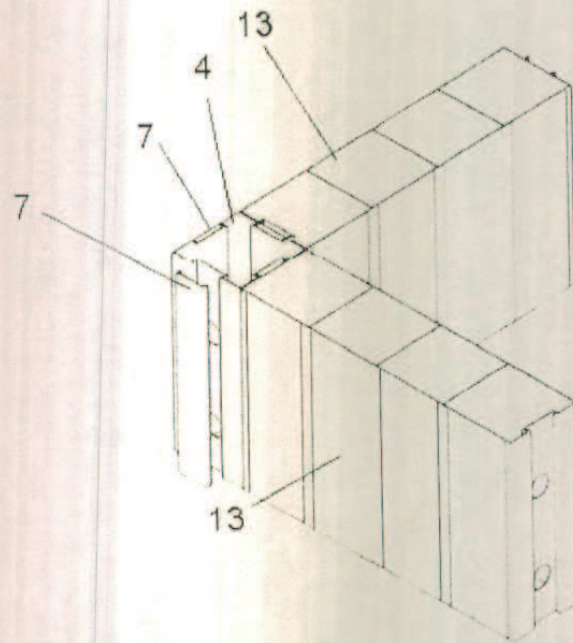


Figura 12

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

EL SUSCRITO SECRETARIO GENERAL, AD-HOC
HACE CONSTAR QUE LA PRESENTE COPIA
FOTOSTÁTICA COINCIDE CON EL ORIGINAL
QUE HE TENIDO A LA VISTA

[Signature]
EL SECRETARIO GENERAL AD-HOC

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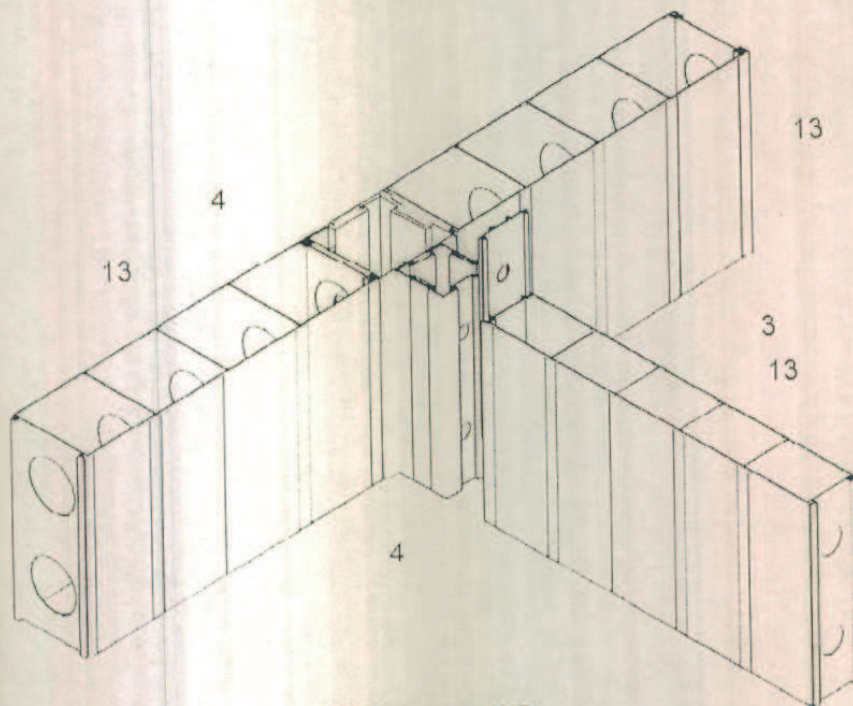


Figura 13

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

EL SUSCRITO SECRETARIO GENERAL, AD-HOC
HACE CONSTAR QUE LA PRESENTE COPIA
FOTOSTÁTICA COINCIDE CON EL ORIGINAL
QUE HE TENIDO A LA VISTA

[Signature]
EL SECRETARIO GENERAL AD-HOC

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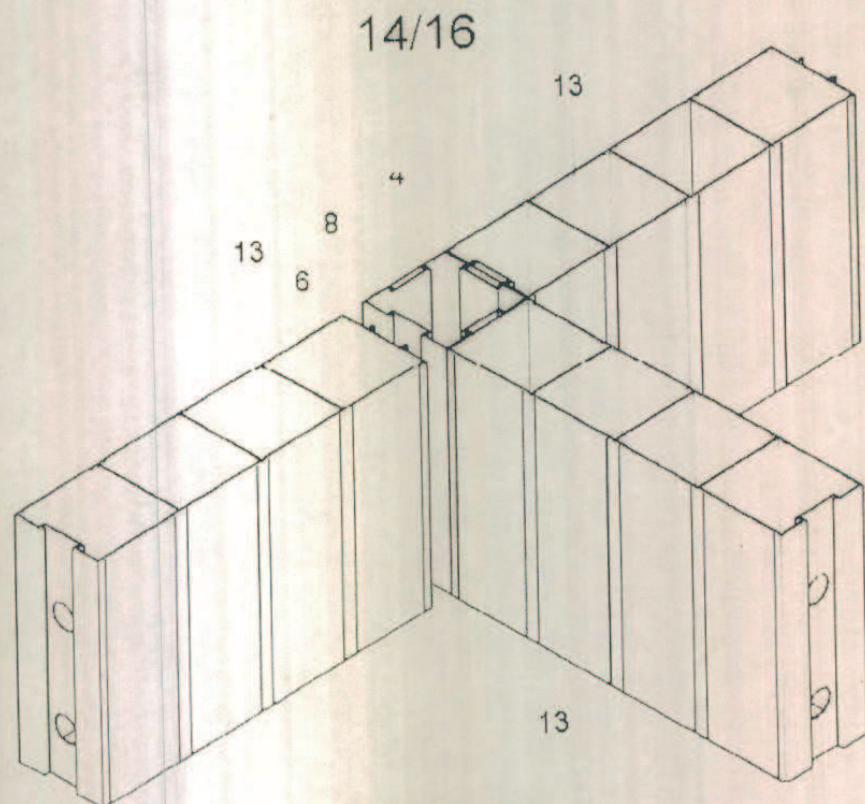


Figura 14

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
EL SUSCRITO SECRETARIO GENERAL, AD-HOC
HACE CONSTAR QUE LA PRESENTE COPIA
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El Secretario General AD-HOC

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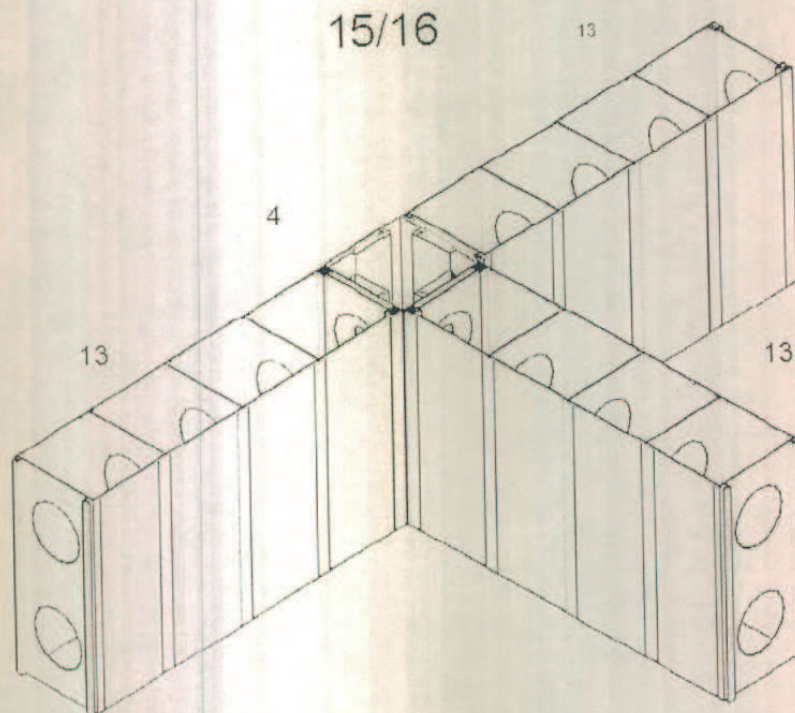


Figura 15

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

EL SUSCRITO SECRETARIO GENERAL, AD-HOC
HACE CONSTAR QUE LA PRESENTE COPIA
FOTOSTATICA COINCIDE CON EL ORIGINAL
QUE HE TENIDO A LA VISTA

EL SECRETARIO GENERAL AD-HOC

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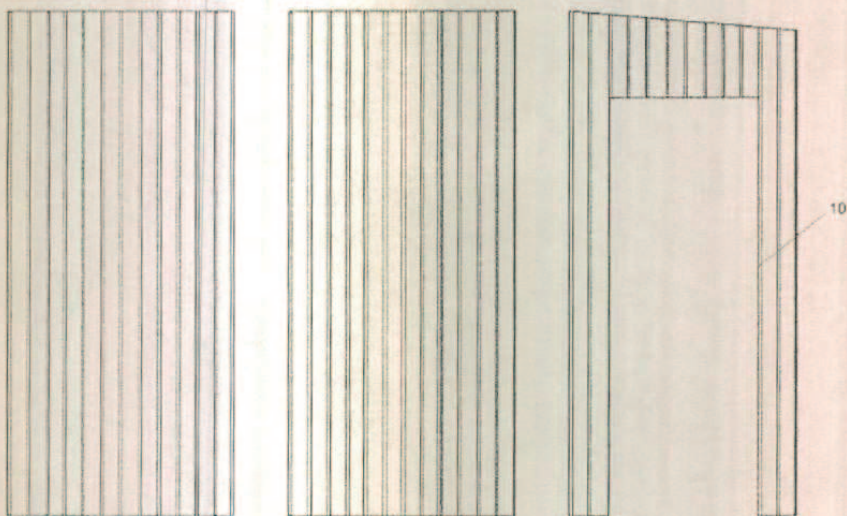
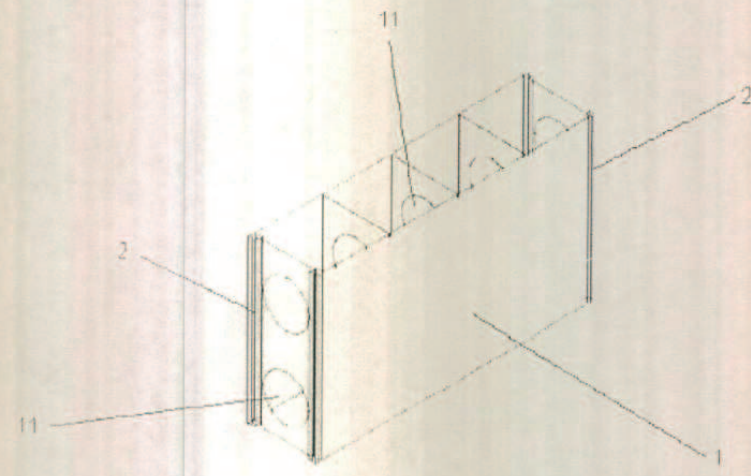
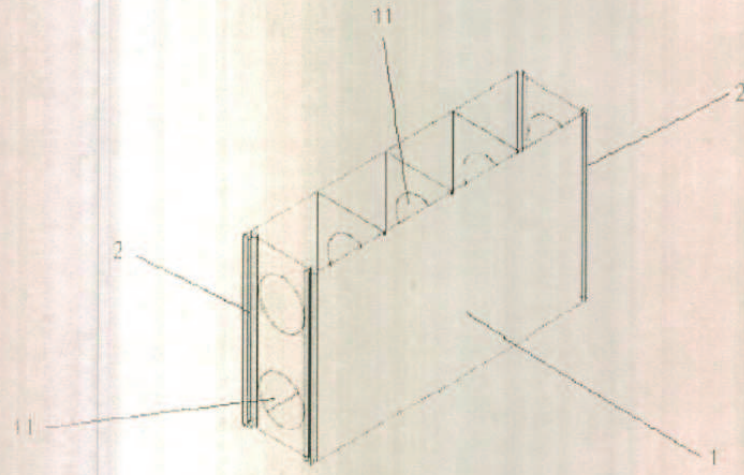


Figura 16

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
EL SUSCRITO SECRETARIO GENERAL AD-HOC
HACE CONSTAR QUE LA PRESENTE COPIA
FOTOSTÁTICA COINCIDE CON EL ORIGINAL
QUE HE TENIDO A LA VISTA
EL SECRETARIO GENERAL AD-HOC



SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

EL SUSCRITO SECRETARIO GENERAL, AD-HOC
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QUE HE TENIDO A LA VISTA

[Signature]
EL SECRETARIO GENERAL AD-HOC

Industria y Comercio
SUPERINTENDENCIA

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO DIVISION DE NUEVAS CREACIONES TARJETA ARCHIVO PROPIETARIOS			
PATENTE DE INVENCION		PCT	X
		MODELO DE UTILIDAD	DISEÑO INDUSTRIAL
(21) N° de solicitud:	(22) Fecha de solicitud:		
(51) Clasificación Internacional:			
(71) Solicitante(s)	Inmuebles Ferromartí S.A. de C.V.		
(72) Inventor(es)	Manuel Enrique REQUEJO PRESA		
(74) Agente:	HUMBERTO RUBIO CAMACHO		
(30) Prioridad	(31) No. Prioridad	(32) Fecha	(33) País
CHILENA	711-2010	01/07/2010	CHILE
(85) Fecha inicio fase nacional:		(87) Publicación internacional	
*5) Datos relativos a la presentación de la solicitud PCT		Fecha:	
Fecha de presentación de la solicitud:		N° publicación:	
No. de solicitud:			
(54) Título: SISTEMA MODULAR PARA EDIFICACION PROGRESIVA			

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
EL SUSCRITO SECRETARIO GENERAL, AD-HOC
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EL SUSCRITO SECRETARIO GENERAL AD-HOC
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QUE HE TENIDO A LA VISTA
EL SECRETARIO GENERAL AD-HOC

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO DIVISION DE NUEVAS CREACIONES TARJETA ARCHIVO TEMATICO			
PATENTE DE INVENCIÓN		X	PCT
MODELO DE UTILIDAD		DISEÑO INDUSTRIAL	
N° de solicitud: (22) Fecha de solicitud:			
(31) Clasificación Internacional:			
(71) Solicitante(s) Inmuebles Ferromarti S.A. de C.V.			
(72) Inventor(es) Manuel Enrique REQUEJO PRESA			
(74) Agente: HUMBERTO RUBIO CAMACHO			
(30) Prioridad	(31)	No. Prioridad	(32) Fecha
CHILENA		711-2010	01/07/2010
		(33) Pais	CHILE
(85) Fecha inicio fase nacional:		(87) Publicación internacional:	
(86) Datos relativos a la presentación de la solíc. PCT		Fecha:	
Fecha de presentación de la solicitud:		No. Publicación:	
No. de solicitud:			
(54) Título: "SISTEMA MODULAR PARA EDIFICACION PROGRESIVA"			
(57) Resumen: La presente invención se refiere a un Sistema Modular que permite la construcción de toda clase de edificaciones de carácter progresivo hacia adentro o hacia fuera, con avances de la técnica conocidos a la fecha, consistentes en la utilización de diversos elementos de construcción con dimensiones logradas a base de la unión de piezas completas de formas poliméricas, que logran el tamaño de los elementos constructivos requeridos para cada tipo de edificación ahorrando tiempo y ventajas en cuanto a la logística, unión realizada con las piezas previamente prefabricadas, mediante soldadura con ultrasonido, lo que permite fusionar el material a nivel molecular, elementos de construcción que se ensamblan entre sí ya sea bajo el sistema a presión ("snap on") o, por canales deslizables y, dichos elementos de construcción con postes bajo el sistema a presión ("snap on"). -- dimensiones de los elementos de construcción, permiten pre-instalar en su interior y de manera oculta y segura, ductos para instalaciones tales como las eléctricas, las hidráulicas y las sanitarias, entre otras, logrando con ello una mejora en la productividad y la calidad, por lo que ya no resulta necesario la realización de obras, instalaciones y costos posteriores. Los elementos de construcción pueden ser también utilizados para (i) modificar o agregar elementos de construcción al interior de las edificaciones para crear nuevos espacios o bien, para (ii) adicionar al exterior de las edificaciones nuevos espacios modulares desde los postes. Los elementos de construcción se pueden pre-fabricar, de acuerdo al diseño y necesidades, los vanos para puertas y ventanas, que de ser necesario, incluyan los refuerzos estructurales para la fijación de tales elementos arquitectónicos. Además, los elementos de construcción pueden contar con ganchos exteriores u otros elementos de fijación que permiten deslizar sobre el mismo, laminados de acabados diversos. Con base en lo anterior, se utilizan materiales y procesos novedosos en beneficio de la productividad, calidad y costos en la industria de la edificación. Dicha productividad, permite obtener mayores resultados con los mismos recursos, y su resultado final permite incorporarlos como el acabado definitivo. El proceso descrito para las edificaciones, con los elementos de construcción puede utilizarse como sistema de autoconstrucción o construcción asistida disminuyendo costos, tiempos y requerimiento de mano de obra especializada. En cuanto al aseguramiento de calidad, los elementos de construcción son prefabricados con niveles de precisión industrial, sin requerir posteriores ajustes por mano de obra calificada en el sitio de la edificación. Por cuanto al costo, derivado de la productividad, se mejora el proceso constructivo debido a los tiempos reducidos de fabricación e instalación.			



SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-066603-00000-0000

Fecha: 2011-05-30 14:54:00 Dep. 2020 DIR NUEVASCR
Tra. 2 PATENTES Evt. 1 REGDEPOSITO
Act. 411 PRESENTACION Folios: 61

62
134
136

PATENTE DE INVENCION ☒

MODELO DE UTILIDAD ☐

Art. 33 Decisión 486/00

☒	Indicación que se solicita una patente.
☒	Datos de identificación del solicitante o de la persona que presenta la solicitud
☒	Descripción de la invención
☒	Dibujos de ser estos pertinentes
☒	Comprobante de pago de las tasas establecidas (De ser el caso formato de descuento)
Completa ☒	Incompleta ☐

PATENTE DE INVENCION PCT ☐

MODELO DE UTILIDAD PCT ☐

Art. 33 Decisión 486/00, Circular Única

☐	Indicación que se solicita una PCT
☐	Copia de la solicitud en español, tal como fue presentada inicialmente (capítulo descriptivo, reivindicatorio, resumen)
☐	Dibujos de ser estos pertinentes
☐	Comprobante de pago de las tasas establecidas (de ser el caso formato de descuento)
Completa ☐	Incompleta ☐

DISEÑO INDUSTRIAL ☐

(Art. 119 Decisión 486/00)

☐	Indicación que se solicita Diseño industrial
☐	Datos de identificación del solicitante o de la persona que presenta la solicitud
☐	Representación gráfica y fotográfica del Diseño industrial o muestra del material que incorpora el diseño
☐	Comprobante de pago de las tasas establecidas
Completa ☐	Incompleta ☐

ESQUEMA DE TRAZADO ☐

(Art. 92 Decisión 486/00)

☐	Indicación que se solicita un esquema de trazado
☐	Datos de identificación del solicitante o de la persona que presenta la solicitud
☐	Representación gráfica de un esquema de trazado
☐	Comprobante de pago de las tasas establecidas
Completa ☐	Incompleta ☐

PI02-F08 (2009-11-18)

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
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Doctor(a)
RUBIO CAMACHO HUMBERTO
Apoderado(a) y/o Representante de
INMUEBLES FERROMARTI S.A. DE C.V.

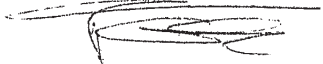
REFERENCIA	Radicación No.	11 066603
	Trámite	2
	Evento	1
	Actuación	430
	Oficio No.	21233

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica que:

1. Debe allegar el poder otorgado al abogado que aparece en la solicitud como apoderado, con el lleno de los requisitos exigidos en el Código de Procedimiento Civil. Adicionalmente, deberá presentar el documento que acredita la existencia y representación legal de la sociedad solicitante.
2. Debe allegar copia del documento en que consta la cesión del derecho a la patente otorgado por el(los) inventor(s) al(los) solicitante(s) o a su(s) causante(s) (art. 26-k, Dec 486/2000).
3. Debe enviar un resumen, el cual consiste en una síntesis de la divulgación técnica contenida en la solicitud de patente. Dicho resumen servirá solo para fines de información técnica y no tendrá efecto alguno para interpretar el alcance de la protección conferida por la patente.

En cumplimiento del artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos (2) meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Unica No.10 de 2001.


JOSE LUIS SALAZAR LOPEZ
Director de Nuevas Creaciones (e)

El anterior requerimiento fue notificado por fijación en lista de fecha 21 de ACP 2020
adpa11

Al contestar favor indique el número de
radicación que se encuentra a continuación

Sede Centro: Carrera 13 No. 27-00 Pisos 2, 5, 7 y 10 PBX: 5870000
Sede CAN: Av. Cra 50 No. 26-55 int. 2 Tel: 5880070
Call Center 5920400. Línea 01800-910165
Web: www.sic.gov.co e-mail: info@sic.gov.co
Bogotá D.C. - Colombia

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EL SECRETARIO GENERAL AD-HOC

HUMBERTO RUBIO & CIA.

ABOGADOS

Cra. 7 # 74 - 64 Oficina 506
Tel: (571) 3132408 - 3132423 - 3132410 - 3131759
Fax: (571) 3131647 - 3132367
E-mail: mail@rubiolawyers.com
Apartado Aéreo 218
Bogotá, D.C. - Colombia

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-066603- -00001-0000

Fecha: 2011-07-12 14:25:05 Dep. 2020 DIR.NUEVASCR
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 329 CTOINFORMACION Folios: 5

Señor

SUPERINTENDENTE DE INDUSTRIA Y COMERCIO DIVISIÓN DE NUEVAS CREACIONES

E. _____ S. _____ D. _____

Expediente No.: **11-066.603**
Patente de Invención: **"SISTEMA MODULAR PARA
EDIFICACION PROGRESIVA"**
Titular: **INMUEBLES FERROMARTI S.A.
DE C.V.**

PRESENTACION DOCUMENTOS

HUMBERTO RUBIO CAMACHO, mayor de edad, domiciliado en Bogotá, D.C., identificado con la cédula de ciudadanía número 17.192.062 de Bogotá, abogado en ejercicio, portador de la Tarjeta Profesional No. 50.007 expedida por el Consejo Superior de la Judicatura, actuando en carácter de **APODERADO** de la sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, domiciliada en C. Tabasco 3, Colonia Lázaro Cárdenas 52979, Atizapán de Zaragoza, Estado de México, México, me permito anexar:

- 1.- Fotocopia auténtica del documento de poder otorgado a mi favor por la Sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, junto con el Certificado Notarial que acredita la existencia y representación legal de mí representada, el cual se encuentra debidamente legalizado por el sistema de Apostille.
- 2.- Original del Documento de Cesión otorgado por el Inventor, debidamente legalizado por el sistema de Apostille; por medio del cual se cede todos los derechos poseídos sobre la presente invención a favor de mi representada la Sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**

Teniendo en cuenta lo anterior solicito se continúe con el trámite correspondiente.

Atentamente,

HUMBERTO RUBIO CAMACHO

C.C. 17.192.062 de Bogotá

T.P. 50.007 Consejo Superior

de la Judicatura.

COD. 4134

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

EL SUSCRITO SECRETARIO GENERAL, AD-HOC

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EL SECRETARIO GENERAL AD-HOC

3082/ P000943

HUMBERTO RUBIO & CIA LTDA.

ABOGADOS

PODER

POWER OF ATTORNEY

El abajo firmado, en nombre y representación de
INMUEBLES FERROMARTI, S.A. DE C.V.

Domiciliado en:
C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

The undersigned, in the name and on behalf of
INMUEBLES FERROMARTI, S.A. DE C.V.

with domicile at:
C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

por el presente conferimos poder amplio y suficiente a HUMBERTO RUBIO CAMACHO y/o TINEKE STOL TERZANI y/o ALVARO DIAZ LOZANO domiciliados en Bogotá, Colombia, para solicitar de las oficinas y autoridades correspondientes la obtención de registros, renovaciones, trasposos y en general todo lo relacionado con el mantenimiento, obtención y protección de sus marcas de fábrica, marcas colectivas, marcas de certificación, denominaciones comerciales, marcas de comercio, patentes, diseños industriales, modelos de utilidad, nombres de dominio, licencias sanitarias, derechos de autor, inscripción de licencias para explotación de derechos patrimoniales en obras de propiedad intelectual, inscripción de licencias de uso, limitaciones de los productos y o servicios y cancelaciones en los registros a cuyo efecto le faculta para dar ante dichas autoridades todos los pasos necesarios en cumplimiento del objeto indicado; elevar solicitudes, descripciones, protestas, declaraciones, apelaciones y reclamos; abonar todos los impuestos y cuotas de cualquier otros pagos determinados por la Ley; recibir todos los documentos presentados, solicitar testimonios, desistir, modificar y enmendar solicitudes, cobrar y percibir para oponerse y protestar contra cualquier solicitud, que a juicio del apoderado, pudieran prestarse a confusión o infringir o de cualquier modo perjudicar las marcas, denominaciones o patentes del Mandante; renuncia parcial o total los derechos otorgados mediante el registro de marcas, patentes y demas modalidades de la Propiedad Industrial. A los mandatarios se les otorga autorización amplia y bastante para contestar todos los reclamos y las demandas presentadas ante autoridades administrativas y judiciales, desistir de procedimientos, transar conflictos, pudiendo así mismo sustituir este Poder en todo o en parte y revocar dichas sustituciones.

Dado y firmado hoy 4 de mayo, 2011

En México, D.F.

Firma(s)/ Signature(s)

Nombre de cada firmante/ MANUEL ENRIQUE REQUEJO PRESA

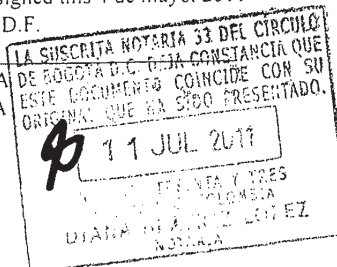
Name of each signor MANUEL ENRIQUE REQUEJO PRESA

Cargo de cada firmante/ Representante Legal

Position of each signor Legal Representative

Given and signed this 4 de mayo, 2011

In México, D.F.



SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

El Suscrito Secretario General, AD-HOC
hace constar que la presente copia
fotostática coincide con la copia que
reposa en los Archivos de esta Entidad.

Secretario General, AD-HOC

**HUMBERTO RUBIO & CIA LTDA.
ABOGADOS**

CERTIFICADO NOTARIAL (Individuo)

A los días del mes de ante mi,
Notario Público de compareció personalmente

a quien(es) doy fe de conocer y me consta que
es(son) la(s) persona(s) firmante(s) del documento
que precede, y quien(es) tiene(n) capacidad legal para
otorgarlo.

CERTIFICADO NOTARIAL (SOCIEDAD)

Hoy 4 de Mayo de 2011
compareció(eron) personalmente
MANUEL ENRIQUE REQUEJO PRESA

a quien(es) conozco como la(s) persona(s) que
firma(n) este documento en representación de la
sociedad/compañía denominada
INMUEBLES FERROMARTI, S.A. DE C.V.

Certifico:

a) Que

INMUEBLES FERROMARTI, S.A. DE C.V.

es una sociedad/compañía legalmente constituida y
existente de acuerdo con las Leyes de **México**

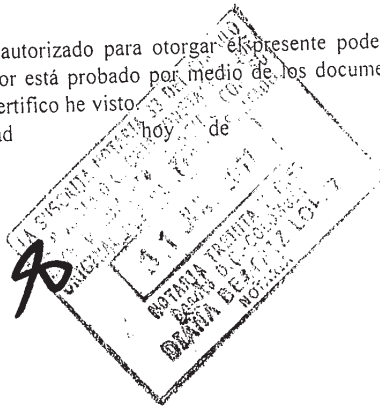
b) Que el domicilio de dicha sociedad/compañía es
**C. Tabasco 3, Colonia Lázaro Cárdenas 52979,
Atizapán de Zaragoza, Estado de México, México**

c) Que el objeto u objetos para los cuales se otorga el
presente poder están comprendidos dentro del objeto
social de la mencionada sociedad/compañía.

d) Que

está autorizado para otorgar el presente poder. Lo
anterior está probado por medio de los documentos,
que certifico he visto.

Ciudad hoy de
de



NOTARIAL CERTIFICATE (Individual)

On this day of before me, a Notary
Public of personally appeared to

me known, and known to me to be the person(s) who
executed that foregoing document, and who has
(have) legal capacity to execute it.

NOTARIAL CERTIFICATE (Corporation)

On this day of
personally appeared

whom I know to be the person(s) who signed this
document as representative(s) of the
corporation/company named

I Certify:

a) That

is a corporation/company legally constituted and in
existence accordance with the law of

b) That the domicile of said corporation/company is

c) That the purpose or purposes for which the present
Power of Attorney is granted are compromised
within the object set forth in the charter of the
mentioned corporation/company.

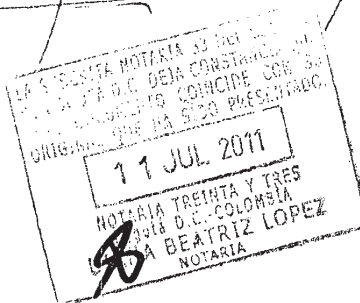
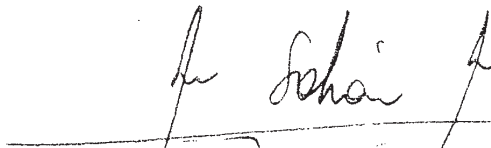
d) That Mr(s).

is authorized to grant the present Power of Attorney.
The aforementioned was duly proven through the
documents and I duly verify having seen them.

State

This day of

~~238~~
240



GOBIERNO DEL DISTRITO DE COCA
CONSEJERIA JURIDICA Y
DE SERVICIO SOCIAL
SUPERINTENDENCIA

IA JURIDICA
SUPERINTENDENCIA DE INDUSTRIA Y
COMERCIO

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hace constar que la presente copia
fotostatica coincide con la copia que
reposa en los Archivos de esta Entidad.

Secretario General, AD-HOC

239/67
241



México

D. F.

Apostille
(Convention de la Haye du 5 octobre 1961)

67.00

Derechos \$

No. Orden 00 18630

En México el presente documento público ha sido firmado

por MIGUEL SOBERON MAINERO

quien actúa en calidad de NOTARIO 181 DEL DISTRITO FEDERAL

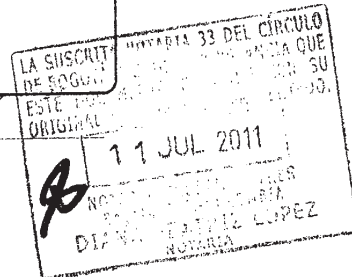
y está revestido del sello correspondiente a NOTARIA No. 181 DISTRITO FEDERAL
MEXICO

Certificado en MEXICO, D.F. por LETICIA DELGADO VALENCIA
SECRETARÍA DE JUSTICIA Y DE SERVICIOS LEGALES
JEFES DE UNIDAD DEPENDIENTES DE LA D.G.J.E.L. DE LA CONSEJERÍA
JURÍDICA Y DE SERVICIOS LEGALES

MEXICO, D.F. el 03 de JUNIO de 2011

Firma

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Secretario General, AD-HOC

ASSIGNMENT

The undersigned

MANUEL ENRIQUE REQUEJO PRESA

Domiciled in

C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

State(s) under oath to be sole and true
inventor(s) of

La solicitud de Patente presentada en Chile bajo el
No. 711-10

State as well, that assign, without
reservations or limitations, in favor of

Inmuebles Ferromartí, S.A. de C.V.

Domiciled in

C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

All rights inherent to said invention
and that the above mentioned
company hereby is enabled to apply, in
its name, for the corresponding patent
in the Republic of

COLOMBIA

MANUEL ENRIQUE REQUEJO PRESA

NOTARIZATION OR LEGALIZATION BY APOSTILLE
OR COLOMBIAN CONSULATE IS REQUIRED

CESION

El abajo firmado(s)

MANUEL ENRIQUE REQUEJO PRESA

Domiciliado(s) en

C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

Declaro bajo juramento ser
único(s) y verdadero(s) inventor(es) de
La solicitud de Patente presentada en Chile bajo el
No. 711-10

Declaro así mismo que cede y
transfiere, sin limitación, a favor de la
sociedad

Inmuebles Ferromartí, S.A. de C.V.

Domiciliada en

C. Tabasco 3, Colonia Lázaro Cárdenas 52979
Atizapán de Zaragoza
Estado de México

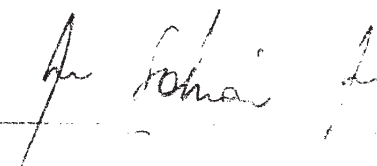
Todos los derechos inherentes a dicha
invención y que la citada sociedad
queda facultada para solicitar en su
nombre la patente correspondiente en
la República de

COLOMBIA

MANUEL ENRIQUE REQUEJO PRESA

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
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MIGUEL SOBERON MAINERO, Notario Ciento Ochenta y Uno del Distrito Federal, **C E R T I F I C O** que el señor **MANUEL ENRIQUE REQUEJO PRESA**, RATIFICO en mi presencia el contenido y reconoció como suya, por ser de su puño y letra, la firma que calza el presente documento, que consta de una foja escrita por el anverso. Con este motivo he levantado en el protocolo a mi cargo el acta número **CUARENTA Y CINCO MIL OCHOCIENTOS ONCE**, de esta misma fecha, en la que consta que me aseguré de la identidad y capacidad legal del compareciente.- Doy Fe.- México, Distrito Federal, a once de mayo de dos mil once, -----



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115200 1141



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ESTADO DE MEXICO
SECRETARIA DE ECONOMIA
D.F.

Apostille
(Convention de la Haye du 5 octobre 1961)

67.00

Derechos \$

No. Orden 17407

En México el presente documento público ha sido firmado

por MIGUEL SOBERON MAINERO

quien actúa en calidad de NOTARIO 181 DEL DISTRITO FEDERAL

y está revestido del sello correspondiente a NOTARIA No. 181 DISTRITO FEDERAL,
MEXICO

Certificado en MEXICO, D.F. por LETICIA DELGADO VALENCIA
JEFE DE UNIDAD DEPARTAMENTAL CONSULTIVA DE LA D.G.J.E.I. DE LA CONSEJERIA
JURIDICA Y DE SERVICIOS LEGALES

MEXICO, D.F. el 25 de MAYO de 2011

Firma

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HUMBERTO RUBIO & CIA.

ABOGADOS

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Tel: (571) 3132408 - 3132423 - 3132410 - 3131759
Fax: (571) 3131647 - 3132367
E-mail: mail@rubiolawyers.com
Apartado Aéreo 21848
Bogota, D.C. - Colombia

24201
244

Doctor

JOSE LUIS SALAZAR LOPEZ

**Jefe de la División de Nuevas Creaciones
Superintendencia de Industria y Comercio**

E. S. D.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-066603-00003-0000

Fecha: 2011-09-15 14:28:57 Dep. 2020 DIR.NUEVASCR
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 444 RESPUESTAREQUE Folios: 3

Expediente No.

11-066.603

Patente de Invención:

**"SISTEMA MODULAR PARA
EDIFICACION PROGRESIVA"**

Titular:

**INMUEBLES FERROMARTI S.A. DE
C.V.**

RESPUESTA A REQUERIMIENTO ARTÍCULO 39

OFICIO No 12338 NOTIFICADO POR FIJACION EN LISTA DE 11 DE AGOSTO DE 2011

HUMBERTO RUBIO CAMACHO, mayor de edad, domiciliado en Bogotá, D.C., identificado con la cédula de ciudadanía número 17.192.062 de Bogotá, abogado en ejercicio, portador de la Tarjeta Profesional No. 50.007 expedida por el Consejo Superior de la Judicatura, actuando en carácter de **APODERADO** de la sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, domiciliada en C. Tabasco 3, Colonia Lázaro Cárdenas, Atizapán de Zaragoza, México 52979, México; encontrándome dentro del término legal para dar contestación al auto proferido por su Despacho mediante Oficio No. 12338 notificado por fijación en lista el 11 de Agosto de 2011, me permito manifestar y anexar:

MANIFIESTO

- 1.- Fotocopia auténtica del documento de poder otorgado a mi favor por la Sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, junto con el Certificado Notarial que acredita la existencia y representación legal de mí representada, el cual se encuentra debidamente legalizado por el sistema de Apostille, **fue aportada mediante memorial de 5 folios, presentado ante su despacho el 12 de Julio de 2011, el cual reposa en el presente expediente.**
- 2.- Original del documento de cesión otorgado por el inventor, debidamente legalizado por el sistema de Apostille; por medio del cual se ceden todos los derechos poseídos sobre la presente invención a favor de mi representada la Sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, **fue aportado mediante memorial de 5 folios, presentado ante su despacho el 12 de Julio de 2011, el cual reposa en el presente expediente.**

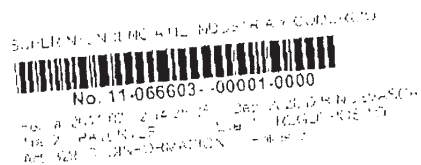
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Señor
SUPERINTENDENTE DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES
E. _____ S. _____ D. _____



Expediente No.: **11-066.603**
Patente de Invención: **"SISTEMA MODULAR PARA EDIFICACION PROGRESIVA"**
Titular: **INMUEBLES FERROMARTI S.A. DE C.V.**

PRESENTACION DOCUMENTOS

HUMBERTO RUBIO CAMACHO, mayor de edad, domiciliado en Bogotá, D.C., identificado con la cédula de ciudadanía número 17.192.062 de Bogotá, abogado en ejercicio, portador de la Tarjeta Profesional No. 50.007 expedida por el Consejo Superior de la Judicatura, actuando en carácter de **APODERADO** de la sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, domiciliada en Cl. Lázaro Cárdenas 52979, Atizapán de Zaragoza, Estado de México, México, me permito anevar:

- 1.- Fotocopia auténtica del documento de poder otorgado a mi favor por la Sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, junto con el Certificado Notarial que acredita la existencia y representación legal de mi representada, el cual se encuentra debidamente legalizado por el sistema de Apostille.
- 2.- Original del Documento de Cesión otorgado por el Inventor, debidamente legalizado por el sistema de Apostille; por medio del cual se cede todos los derechos posidos sobre la presente invención a favor de mi representada la Sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**

ANEXO

- 1.- Acogiendo la observación del examinador, estamos anexando nuevo extracto para publicación que contiene resumen modificado de la presente invención, de conformidad con lo dispuesto el artículo 31 D. 486.

Teniendo en cuenta que los documentos solicitados, fueron aportados dentro del término legal y se encuentran anexos al expediente, en forma respetuosa solicito continuar con el trámite correspondiente.

Atentamente,


HUMBERTO RUBIO CAMACHO
C.C. 17.192.062 de Bogotá
T.P. 50.007 Consejo Superior de la Judicatura.
COD. 4134

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
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244 246

**EXTRACTO PARA PUBLICACIÓN
SOLICITUD DE PATENTE DE INVENCION
DELEGATURA PROPIEDAD INDUSTRIAL**

(21) No. SOLICITUD: (51) INT. CL.:
(22) FECHA DE PRESENTACIÓN: (71) SOLICITANTE: **Inmuebles Ferromarti S.A. de C.V.**
(30) PRIORIDAD: **CHILENA**
(31) No. DE SOLICITUD: **711-2010** (72) INVENTORES: **Manuel Enrique REQUEJO PRESA**
(32) FECHA DE PRESENTACIÓN: **1 DE JULIO DE 2010**
(33) PAÍS: **CHILE** (74) APODERADO: **Humberto RUBIO CAMACHO**

Solicitud Internacional No. Fecha
Publicación Internacional No. Fecha

FECHA ENTRADA EN FASE NACIONAL:

(54) TITULO: "SISTEMA MODULAR PARA EDIFICACION PROGRESIVA"

RESUMEN:

Sistema de construcción a base de elementos huecos con dimensiones logradas a partir de la unión de piezas prefabricadas y postes que incluyen cuatro puntos de unión que permiten la conexión del resto de los elementos y que permiten la construcción progresiva tanto al exterior como al interior a partir de ellos conforme al tamaño requerido para cada edificación.

La unión de dichas piezas prefabricadas se efectúa en la fábrica mediante unión por canales deslizables y sistema de soldadura con ultrasonido para formar los elementos con dimensiones logradas. Este Sistema Modular que permite la construcción de toda clase de edificaciones de carácter progresivo hacia adentro o hacia fuera, consistentes en la utilización de diversos elementos de construcción con dimensiones logradas a base de la unión de piezas completas de formas poliméricas, que logran el tamaño de los elementos constructivos requeridos para cada tipo de edificación ahorrando tiempo y ventajas en cuanto a la logística. Elementos de construcción que se ensamblan entre sí ya sea bajo el sistema a presión ("snap on") o, por canales deslizables y, dichos elementos de construcción con postes bajo el sistema a presión ("snap on").

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2020
Bogotá D.C.,

Doctor(a)
RUBIO CAMACHO HUMBERTO
Apoderado(a) y/o Representante de
INMUEBLES FERROMARTI S.A. DE C.V.

REFERENCIA	Radicación No. 11 66603
	Trámite 2
	Evento 1
	Actuación 416
	Oficio No. 14863
	Folios 1

Teniendo en cuenta que la solicitud de privilegio de patente que se tramita bajo el expediente indicado en la referencia, reúne los requisitos de forma establecidos en los artículos 26 y 27 de la Decisión 486 de la Comisión de la Comunidad Andina, y en las demás disposiciones vigentes sobre la materia, se envía el extracto de la solicitud a la Oficina de Comunicaciones para efecto de su publicación en la Gaceta de Propiedad Industrial.

De acuerdo con lo previsto por el artículo 40 de la Decisión 486/00, la publicación en este caso se hará a partir del día 30 del mes de Mayo de 2012.

Cúmplase
Dado en Bogotá DC, 12 DIC. 2011

JOSE LUIS SALAZAR LOPEZ
Director de Nuevas Creaciones (c)

jesanch1

Al contestar favor indique el número
de radicación consignado en el rótulo

Sede Centro: Carrera 13 No. 27-00 pisos 2, 5, 7 y 10 PBX: 5870000
Sede CAN: Av. Carrera 50 No. 26 - 55 int.2. Tel 5880070
Call Center 5920400. Línea 01800-910165
Web: www.sic.gov.co e-mail: info@sic.gov.co
Bogotá D.C. Colombia

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HUMBERTO RUBIO & CIA.

ABOGADOS

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Tel: (571) 3132408 – 3132423 - 3132410 - 3131759
Fax: (571) 3131647 - 3132367
E-mail: mail@hrcia.com

Apartado
Bogota, D

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-066603- -00004-0000

Fecha: 2012-11-07 13:45:32 Dep. 2020 DIR.NUEVASCR
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 538 PETICION Folios: 2

Señores

SUPERINTENDENCIA DE INDUSTRIA Y

División de Nuevas Creaciones

E. S. D.

REF: Expediente No.
Patente de Invención:

Titular:

11-066603
SISTEMA MODULAR PARA
EDIFICACION
PROGRESIVA
INMUEBLES FERROMARTI
S.A. DE C.V.

Publicada en la Gaceta de la Propiedad Industrial No. 645 de 31 de Mayo de 2012

SOLICITUD DE EXAMEN DE PATENTABILIDAD

HUMBERTO RUBIO CAMACHO, mayor de edad, domiciliado en Bogotá, D.C., identificado con la cédula de ciudadanía número 17.192.062 de Bogotá, abogado en ejercicio, portador de la Tarjeta Profesional No. 50.007, expedida por el Consejo Superior de la Judicatura, actuando en carácter de **APODERADO** de la sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, respetuosamente solicito a esa Dependencia:

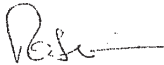
1.- De conformidad con lo establecido en el Artículo 44 de la Decisión 486 de la Comisión de la Comunidad Andina y estando dentro del término legal de seis (6) meses contados desde la fecha de publicación en la Gaceta No. 645 de 31 de Mayo de 2012, de la solicitud de la patente de la referencia, solicito se sirvan proceder a efectuar el examen de patentabilidad de la Invención.

2.- Para que la presente petición sea viable, estoy anexando el siguiente documento:

2.1. Recibo de pago No. 12-115169 de 6 de Noviembre de 2012; de acuerdo con la Resolución No. 75858 de 26 de Diciembre de 2011.

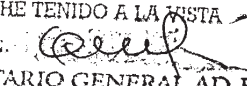
3.- Por lo anterior solicito se continúe con el trámite correspondiente.

Atentamente,


HUMBERTO RUBIO CAMACHO
C.C. 17.192.062 de Bogotá
T.P. 50.007 Consejo Superior
de la Judicatura.
COD. 4134

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

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27/249

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
NIT : 800.176.089-2
- / -

Industria y Comercio SUPERINTENDENCIA	RECIBO DE CAJA	No. 12 - 115169
		Bogotá D.C., Noviembre 06 de 2012 - 13:58:15

RECIBIDO DE : HUMBERTO RUBIO & CIA ABOGADOS LTDA NI 830.000.228

*** Soporte del Pago ***

TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	VR PAGO
CONSIGNACION	BANCO DE BOGOTA	062754387	452434614	06/11/2012	1.240.000.00

*** Conceptos Pagados ***

ANT. RENTISTICO	CONCEPTO	VR. UNDITARIO	VR. CONCEPTO
CONCEPTO DE SOLICITUDES	114 PTC CAP-II EXAMEN DE PATENTIBILIDAD DE INVENSIÓN	490.000.00	490.000.00
			\$490.000.00

MON: **CUATROCIENTOS NOVENTA MIL PESOS MONEDA CORRIENTE**

Responsable: _____

Recibo de Caja Aplicado al Expediente No. _____

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-066603- -00004-0000

Fecha: 2012-11-07 13:45:32 Dep. 2020 DIR.NUEVASCR
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 538 PETICION Folios: 2

EXAMINACION:

PATENTE: SISTEMA MODULAR PARA EDIFICACION PROGRESIVA

Sede Centro: Carrera 13 No. 27 - 00 Pisos 3,4,5 y 10 Bogotá, D.C.- Colombia

Web: www.sic.gov.co e-mail: info@sic.gov.co Consultador: (571) 5870000 Fax: (571) 5870284 Línea: 018000-910165 Call Center: (571) 6513240

Documento No. 012 - 13 58 16

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 11-066603- -00006-0000

Fecha: 2013-04-22 13:13:08 Dep. 2020 DIR.NUEVASOR
Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 523 RESPUESTA Folios: 16

Doctor

José Luis SALAZAR LOPEZ

Jefe de la División de Nuevas Creaciones

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

E. _____ S. _____ D. _____

REF. Expediente No.: 11-066603
Patente de Invención: "SISTEMA MODULAR PARA EDIFICACION PROGRESIVA"
Clasificación Int.: E 04 C 2/00, 2/30
Solicitante: INMUEBLES FERROMARTI S.A. DE C.V.

RESPUESTA A REQUERIMIENTO

OFICIO No. 1172 NOTIFICADO POR FIJACION EN LISTA DE 29 DE ENERO DE 2013.

Humberto RUBIO CAMACHO, mayor de edad, domiciliado en Bogotá, identificado con la Cédula de Ciudadanía No. 17'192.062 de Bogotá, Abogado en Ejercicio, portador de la Tarjeta Profesional No. 50.007 expedida por el Consejo Superior de la Judicatura, actuando en carácter de apoderado de la Sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, domiciliada EN C. Tabasco 3, Colonia Lázaro Cárdenas 52979, Atizapán de Zaragoza, México; conforme al poder que para todos los efectos relacionadas con la Propiedad Industrial me fue conferido por la citada compañía, debidamente reconocido por su Despacho; encontrándome dentro del término legal para dar contestación al auto proferido por su Despacho mediante Oficio No. 1172, notificado por Estado de 29 de enero de 2013, me permito:

Manifestar:

I- En el informe oficial emitido sobre la presente solicitud, se han emitido las objeciones que a continuación se resumen:

a. Reivindicaciones relativas a un uso (Art 14 D 486)

Según el art. 14 D486 son patentables procedimientos y productos, la reivindicación presentada a continuación, no cumple con este requisito, por lo tanto, no es patentable, porque reclamar la utilización de la invención no es materia susceptible de protección.

Reivindicación 2: "Método para utilizar un sistema de construcción a base de

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elementos huecos con dimensiones logradas a partir de la unión de pieza prefabricadas y postes (...)"

b. De la solicitud de Patente**De las Reivindicaciones (Art 30 D 486)**

La invención está siendo caracterizada mediante resultados a alcanzar, por ejemplo, expresiones como *"los elementos de dimensiones....."* la reivindicación 1 no definen el sistema para el que se busca protección, sino resultados esperados del funcionamiento del mismo, de acuerdo con esto la materia reclamada incluiría no solo la solución propuesta por el solicitante, sino todas las alternativas presentes o futuras que lleguen a ese resultado. Por lo tanto, se sugiere definir la invención por las características esenciales, estructurales que contribuyen a la obtención de estos efectos.

Las siguientes expresiones no son características técnicas que permitan la comparación con el estado de la técnica: *"la unión de dicha piezas..."* por lo que se sugiere suprimirlas.

Se sugiere suprimir la expresión "se utilizan" empleada en el literal n de la reivindicación 1.

Los términos "al menos" y "pueden contar" precediendo características esenciales no limitan la invención, ya que las hacen opcionales, por lo cual se sugiere modificarlo por un término concreto.

El capítulo reivindicatorio presenta problemas de claridad, redacción y concisión, debido a esto no es posible establecer cuál es la materia para la que se busca protección.

c. Determinación del Estado de la Técnica

El estado de la Técnica se determinó en base en la fecha de presentación de la solicitud de prioridad: julio 01 de 201 y se encontraron los siguientes documentos que anticipan el objeto de esta solicitud:

Item	Documento	Título	Fecha de Publicación
E-1	ES 2279096	"Conjunto de módulos estructurales para la construcción de un edificio"	01-12-2004

d. Examen de Patentabilidad (Art 14 D486)

Se aclara que los efectos técnicos enseñados en el capítulo reivindicatorio no son materia que pueda compararse con el estado de la técnica y no serán tenidos en cuenta en el examen de patentabilidad.

Novedad (Art 16 D486)

La reivindicación 1 consiste en un *"Sistema de construcción a base de elementos..."*

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Las características técnicas de la reivindicación 1 con la anterioridad D1, se concluye que el sistema de construcción para el que se busca protección ya era conocido en el estado de la técnica como se evidencia con la anterioridad encontrada.

La reivindicación independiente 2 se encuentra objetada en el presente concepto técnico.

e. **Conclusión:**

Los requisitos de Patentabilidad de la presente solicitud están afectados así:

Item	Documento	Reivindicaciones afectadas	Requisito que afecta
01	ES 2279096	1	Novedad/Inventiva

II- **En contestación a las observaciones anteriores, manifestamos lo siguiente:**

2.1. **Reivindicaciones relativas a uso**

Teniendo en cuenta las observaciones del examinador, se ha modificado el capítulo reivindicatorio no haciendo referencia al uso sino al método de construcción.

2.2. **Reivindicaciones**

Acompañamos a esta respuesta un nuevo juego de reivindicaciones (1-12), todas las cuales están sustentadas en el contenido de la solicitud prioritaria originalmente presentada, y por lo tanto es permitida según el artículo 34 de la mencionada Decisión 486. Las observaciones en las reivindicaciones con respecto a la falta de características esenciales en la reivindicación 1 y los términos que generan falta de claridad en el pliego son superados por el nuevo pliego de reivindicaciones presentado.

Así mismo se anexa un nuevo pliego descriptivo.

2.3. **Determinación del Estado de la Técnica**

Examen de Patentabilidad

Novedad

2.3.1. El examinador considera que la presente solicitud se ve afectada por el documento del estado de la técnica D1 (ES 2279096), al respecto nos permitimos indicar que estamos en desacuerdo por los siguientes argumentos:

Las enmiendas a la cláusula 1 superan esta objeción. Como se indica a continuación.

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D1 divulga un conjunto de construcciones de un edificio que comprende un grupo de módulos que pueden interconectarse para crear el armazón del edificio, estando definido cada módulo del grupo por un par de paneles longitudinales laterales paralelos que tienen extremos opuestos, donde dichos paneles laterales están puenteados por al menos una banda transversal que se extiende entre los paneles, un elemento de unión para conectar los módulos, donde cada panel lateral termina en una pestaña de enganche que se unen a presión con el elemento de unión. De acuerdo al nuevo pliego de reivindicaciones presentado, el documento D1 no describe la pluralidad de perforaciones presentes en las piezas prefabricadas en al menos un conector y en al menos un poste para fijarse con dichos conectores, tampoco describe al menos una tapa para fijarse a la ranura y al menos una pieza U con perforaciones circulares, por lo tanto, el nuevo pliego de reivindicaciones cumple con el requisito de Novedad.

El Efecto técnico que presenta la presencia de dichas perforaciones es reforzar la unión entre las piezas que son interconectadas. Junto con eso, las perforaciones circulares de la pieza en U permiten el paso de material aglutinante y enfierradura. El problema técnico que resuelve es cómo aumentar el refuerzo en el armado de un sistema de construcción modular constituido por una pluralidad de elementos que encajan uno con otro. En vista de esto, la solicitud no se encuentra anticipada por D1, pues si bien este documento describe un sistema modular constituido por el encaje de diversos elementos, no presenta dichas características que permiten aumentar el refuerzo del sistema de construcción modular. Por lo tanto, la solicitud cumple con el requisito de nivel inventivo.

Es por tanto que el Solicitante respetuosamente sostiene que las características de la invención de la nueva Reivindicación 1, ni se muestran ni se sugieren en las técnicas descritas en D1. Por lo que el Solicitante respetuosamente solicita que se retire la objeción puesto que la reivindicación modificada 1 no era conocida en el estado de la técnica del documento D1. Adicionalmente la nueva reivindicación 2 y demás dependientes de la nueva reivindicación 1, cumplen con todos los requisitos establecidos por la Decisión 486 debe considerarse patentable la solicitud en estudio por las razones arriba indicadas.

Por todo lo anteriormente argumentado, entendemos que la solicitud es patentable a la luz de los documentos del estado de la técnica citada en el examen de patentabilidad, y por lo tanto, las objeciones sobre la falta de novedad, nivel inventivo y estado de la técnica de la misma deben reconsiderarse.

Teniendo en cuenta que las nuevas reivindicaciones definen la materia que se desea proteger siendo claras, concisas y debidamente sustentadas en la descripción,

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consideramos que se han subsanado todos y cada uno de las objeciones expuestas por el examinador, por tanto el nuevo capítulo reivindicatorio contiene materia nueva susceptible de considerarse como novedosa conforme lo establece el artículo 16 de la Decisión 486. Solicito que, sobre la base de las nuevas reivindicaciones que aquí se adjuntan, se proceda a la concesión de la patente colombiana correspondiente.

Anexo:

- i. Capítulo descriptivo modificado.
- ii. Capítulo reivindicatorio modificado.

Petición:

Conforme a lo anterior, una vez atendidos los requerimientos y exigencias del examinador y al tener en cuenta los nuevos capítulos descriptivo y reivindicatorio presentados, solicito muy amablemente a su Despacho, llevar a cabo un nuevo estudio de patentabilidad teniendo en cuenta los argumentos aquí expuestos y sea concedido el privilegio de invención solicitado, y en caso contrario se hagan las correspondientes observaciones con el ánimo de hacer lo pertinente dentro del presente trámite.

Atentamente,

**HUMBERTO RUBIO CAMACHO****C.C. 17'192.062 de Bogotá****T.P. 50.007 de Consejo Superior
de la Judicatura.****COD. 4134****SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO****EL SUSCRITO SECRETARIO GENERAL AD-HOC
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MEMORIA DESCRIPTIVA

CAMPO DE APLICACIÓN DE LA INVENCION

5 La presente invención se refiere a un sistema modular para edificación progresiva que se desarrolla en el área de la construcción, específicamente en el área de la construcción por módulos.

DESCRIPCION DEL ARTE PREVIO

10 En el estado de la técnica existen antecedentes previos que indican que la construcción con paneles termoplásticos existe en el estado de la técnica, es así por ejemplo como se puede mencionar la patente **US 6,189,269** que divulga un sistema que permite la unión de sistemas prefabricados mediante el uso de uniones deslizables, dicho sistema no permite el crecimiento progresivo de la construcción una vez hecha
15 utilizando los medios de ensamblaje propios de sus partes. Ni utiliza el ensamblaje de las piezas de manera horizontal por medio de sistema snap -on . También se tiene por ejemplo la patente **US 5,608,999** que se compone de elementos en forma de placas planas, rectangulares y semicirculares que se ensamblan mediante rieles que también permiten la unión deslizable. Los elementos al armarse conforman módulos huecos que
20 se llenan solo con con cemento. Este sistema no permite tampoco la unión horizontal ni utiliza sistema de unión por sistema snap-on. Este sistema tampoco permite el crecimiento progresivo utilizando los medios de unión una vez realizada la construcción. Otra patente relacionada con el tema es la **US 5,311, 778** que divulga un sistema modular de mult-componentes para fabricar estructuras de pared, el sistema consta de
25 formas prefabricadas, cada extremo de cada panel tiene flanges tipo "L" y el otro extremo tiene ranuras tipo "L" de tal manera que dichas ranuras entran una dentro de la otra. Este sistema también permite la unión solamente mediante unión deslizable

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RESUMEN DE LA INVENCION

La presente invención se refiere a un Sistema Modular que permite la construcción de toda clase de edificaciones de carácter progresivo hacia adentro o hacia fuera , con avances de la técnica conocidos a la fecha, consistentes en la
5 utilización de diversos elementos de construcción con dimensiones logradas a base de la unión de piezas completas de formas poliméricas, que logran el tamaño de los elementos constructivos requeridos para cada tipo de edificación ahorrando tiempo y ventajas en cuanto a la logística , unión realizada con las piezas previamente prefabricadas, mediante soldadura con ultrasonido, lo que permite fusionar el material a
10 nivel molecular, elementos de construcción que se ensamblan entre sí ya sea bajo el sistema a presión ("snap on") o, por canales deslizables y, dichos elementos de construcción con postes bajo el sistema a presión ("snap on").

Las dimensiones de los elementos de construcción, permiten pre-instalar en su interior y de manera oculta y segura, ductos para instalaciones tales como las
15 eléctricas, las hidráulicas y las sanitarias ,entre otras, logrando con ello una mejora en la productividad y la calidad, por lo que ya no resulta necesario la realización de obras, instalaciones y costos posteriores.

Los elementos de construcción pueden ser también utilizados para (i) modificar o agregar elementos de construcción al interior de las edificaciones para crear nuevos
20 espacios o bien, para (ii) adicionar al exterior de las edificaciones nuevos espacios modulares desde los postes.

Los elementos de construcción se pueden pre-fabricar, de acuerdo al diseño y necesidades, los vanos para puertas y ventanas ,que de ser necesario, incluyan los refuerzos estructurales para la fijación de tales elementos arquitectónicos .

25 Además, los elementos de construcción pueden contar con ganchos exteriores u otros elementos de fijación que permiten deslizar sobre el mismo, laminados de acabados diversos

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Con base en lo anterior, se utilizan materiales y procesos novedosos en beneficio de la productividad, calidad y costos en la industria de la edificación.

Dicha productividad, permite obtener mayores resultados con los mismos recursos, y su resultado final permite incorporarlos como el acabado definitivo.

- 5 El proceso descrito para las edificaciones, con los elementos de construcción puede utilizarse como sistema de autoconstrucción o construcción asistida disminuyendo costos, tiempos y requerimiento de mano de obra especializada.

En cuanto al aseguramiento de calidad, los elementos de construcción son prefabricados con niveles de precisión industrial, sin requerir posteriores ajustes por

- 10 mano de obra calificada en el sitio de la edificación.

Por cuanto al costo, derivado de la productividad, se mejora el proceso constructivo debido a los tiempos reducidos de fabricación e instalación.

BREVE DESCRIPCION DE LAS FIGURAS

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La figura 1 muestra una pieza prefabricada

La figura 2 muestra un poste sin tapas

- 20 La figura 3 muestra una tapa con su unión permanente (snap-on)

La figura 4 muestra un conector con su union deslizable y su unión permanente (snap-on)

- 25 La figura 5 muestra una pieza tipo U con sus correspondientes perforaciones para pasar la enfierradura o postes

La figura 6 muestra una plancha de techo con su botagua

- 30 La figura 7 muestra el ensamble en fábrica dos piezas prefabricadas para formar un elemento con dimensiones logradas

La figura 8 muestra un detalle de un poste con sus tapas

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La figura 9 muestra la unión con soldadura de ultrasonido de las piezas prefabricadas que conformaran un elemento con dimensiones logradas antes y después de aplicar la soldadura con ultrasonido

- 5 La figura 10 muestra un modulo con sus ductos para instalaciones eléctricas, de agua, sanitarias gas y transmisión de datos preinstalados

La figura 11 muestra la unión de dos elemento con dimensiones logradas en una esquina mediante los conectores correspondientes.

- 10 La figura 12 muestra el retiro de una tapa desde un poste cuando se desea instalar un nuevo elemento con dimensiones logradas

La figura 13 muestra la inserción de un conector en el extremo de un elemento con dimensiones logradas

- 15 La figura 14 muestra la inserción de un nuevo modulo en forma horizontal hacia la unión permanente (snap-on)

La figura 15 muestra un modulo ya conectado utilizando la unión permanente (snap-on)

La figura 16 muestra un vano de puerta en una pieza prefabricada

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DESCRIPCION DETALLADA DE LA INVENCION

- La invención propuesta considera que la unión de las piezas prefabricadas (1) se efectúa en la fábrica mediante unión por canales deslizables (2) y sistema de soldadura con ultrasonido para formar los elementos con dimensiones logradas (13). Los extremos de los elementos con dimensiones logradas (13) tienen conectores (3) que se instalan mediante unión deslizable. Los postes (4) cuentan con al menos una ranura (8) donde se insertan las lengüeta (6) de los conectores (3) produciendose una unión permanente (snap on). Los postes (4) cuentan con al menos una tapa (7) que va sobre cada ranura (8) y que se retira cuando se utilizan dichas ranuras (8)

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para unir un elemento con dimensiones logradas (13) . La unión de dichos elementos con dimensiones logradas (13) a los postes (4) se efectúa mediante dicho sistema de enganche (snap-on). Los elementos de dimensiones logradas (13) permiten instalar en su interior ductos (9) para instalaciones eléctricas, de agua , sanitarias gas y transmisión de datos que vienen preinstaladas de fábrica. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden prefabricar de acuerdo al diseño y necesidades de tal manera de incluir los vanos (10) para puertas y ventanas y/o que incluyan refuerzos estructurales para la fijación posterior de dichas ventanas o puertas. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) pueden contar con ganchos exteriores u otros elementos de fijación que permiten fijar sobre ellos laminados o acabados diversos. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) son prefabricados con instrumentos de precisión lo cual facilita el armado en terreno y evita el uso de mano de obra especializada . Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con materiales aglutinantes tales como cemento, concreto y espumados, también se pueden llenar con áridos. Las piezas prefabricadas (1) y los elementos con dimensiones logradas (13) se pueden llenar con subdivisiones que contengan combinaciones de aglutinante y áridos. Los elementos con dimensiones logradas tienen perforaciones (11) en su interior que permiten que los materiales aglutinantes y/o los áridos se distribuyan uniformemente por gravedad en su interior cuando son vaciados. En el caso de que los elementos con dimensiones logradas (13) vayan rellenos con poliuretano dichos elementos con dimensiones logradas no llevan perforaciones (11) interiores y el relleno se efectúa en fábrica. Las planchas (12) que se utilizan para conformar el techo incluyen en su borde un botagua (13). Por otra parte en la fábrica se realiza la extrusión de las piezas prefabricadas (1); se unen dichas piezas prefabricadas (1) con un sistema de ultrasonido , se hacen los vanos (10) de puertas y ventanas según especificaciones y se instalan

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los ductos (9) para instalaciones eléctricas, hidráulicas, sanitarias de agua o transmisión de datos y se instalan los conectores correspondientes en los extremos (3) de los elementos con dimensiones logradas (13) todo esto previo al transporte al lugar de edificación. Luego de esto se traslada al lugar en que se efectuara la edificación. En el lugar de edificación previo al montaje de los elementos descritos debe construirse un radier con enfierradura (barras o postes metálicos) , se insertan en la enfierradura las piezas U (14) en el lugar donde se instalarán los, sobre las piezas U (14) y a través de la enfierradura se introducen los elementos con dimensiones logradas (13) y los postes (4) . Se sacan las tapas (7) de los postes en los lugares donde se unirá un elemento con dimensiones logradas (13) con dicho poste (4) , a continuación se unen los elementos con dimensiones logradas (13) con los postes (4) mediante el sistema de enganche (snap on) . Se instalan las ventanas y puertas en los vanos (10) previamente fabricados para tal efecto, realizado esto se vacía material aglutinante u otro material por la parte superior de todos los postes (4) y elementos con dimensiones logradas (13) que conforman la instalación. A continuación se coloca y fija el techo. Se conectan los ductos (9) de instalaciones eléctricas, hidráulicas, sanitarias y otras que vienen preinstaladas de fábrica, cuando corresponde se aplican o instalan los materiales de revestimiento. Cabe hacer notar que en el caso de ampliación progresiva se debe sacar la tapa (7) del poste e insertar un nuevo elemento con dimensiones logradas (13)

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REIVINDICACIONES

5 1.- Sistema de construcción modular que permite la construcción progresiva tanto externa como interna conforme al tamaño requerido para cada edificación, CARACTERIZADO porque comprende

una pluralidad de elementos de construcción (13) constituidos de una pluralidad de piezas prefabricadas (1) que consiste en un perfil rectangular hueco, con una pluralidad de perforaciones (11) dispuestas simétricamente en sus caras frontales y canales deslizables (2) en sus caras laterales, en donde dicha pluralidad de piezas prefabricada (1) están fijadas unas a otras mediante una fusión por ultrasonido de dichos canales deslizables (2) de las caras laterales respectivas a cada pieza prefabricada (1); y dichos elementos de construcción (13) comprenden adicionalmente ductos para instalaciones tales como las eléctricas, las hidráulicas, las sanitarias y de transmisión de datos;

al menos un conector (3) para fijarse en el extremo de un elemento de construcción (13) mediante una unión deslizable de una cara y que comprende una lengüeta (6) en la cara opuesta para una unión permanente a presión o unión deslizable, y una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);

al menos un poste (4) para fijarse con dicho conector (3), constituido por un perfil rectangular y hueco con al menos una ranura (8) en cada costado coincidente con dicha lengüeta (6) para dicha unión permanente a presión o unión deslizable, con una pluralidad de perforaciones coincidente con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);

al menos una tapa (7) para fijarse en dicha ranura (8) de un costado no utilizado de dicho poste (4);

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al menos una pieza U (14) con perforaciones circulares para permitir el paso de material aglutinante y enfierradura, y

un material aglutinante que se vierte dentro de dicha pluralidad de elementos de construcción (13) y de dichos postes (4).

5

2.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicho material aglutinante es uno o una combinación de los siguientes materiales: cemento, hormigón, áridos, arcilla y poliuretano expandido.

10 3.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden vanos para puertas y ventanas.

15 4.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden refuerzos estructurales para la fijación posterior de dichas ventanas o puertas.

20 5.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden elementos de fijación que permitan fijar sobre ellos laminados o acabados diversos.

25 6.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden laminados sobre ellos.

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7.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprenden subdivisiones que incluyen una combinación de material aglutinante y árido.

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8.- Sistema de construcción modular de acuerdo a la reivindicación 1, CARACTERIZADO porque dicha pluralidad de elementos de construcción (13) comprende una enfierradura dispuesta horizontalmente a través de dicha pluralidad de perforaciones (11).

10

9.- Método de construcción modular que permite la construcción progresiva tanto externa como interna conforme al tamaño requerido para cada edificación, CARACTERIZADO porque comprende las siguientes etapas:

a) en una fábrica, extruir una pluralidad de piezas prefabricadas (1) con un perfil rectangular hueco con canales deslizables (2) en sus caras laterales;

15

b) en dicha fábrica, efectuar una pluralidad de perforaciones (11) dispuestas simétricamente en las caras frontales de dicha pluralidad de piezas prefabricadas;

c) en dicha fábrica, unir las piezas prefabricadas mediante soldadura por ultrasonido de dichos canales deslizables (2) para formar pluralidad de elementos de construcción (13);

20

d) en dicha fábrica, instalar ductos para instalaciones eléctricas, de agua, sanitarias, gas o transmisión de datos en dicha pluralidad de elementos de construcción (13);

e) en dicha fábrica, fijar conectores (3) en el extremo de un elemento de construcción (13) mediante una unión deslizable de una de sus caras, en donde dicho conector (3) comprende una lengüeta (6), en la cara opuesta para una unión

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permanente a presión o unión deslizable, y una pluralidad de perforaciones simétrica con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);

f) trasladar de dicha fábrica al lugar en que se efectuara la edificación dicha pluralidad de elementos de construcción (13);

5 g) en el lugar de la edificación construir un radier con enfierradura de barras o postes metálicos;

h) insertar en la enfierradura piezas U (14) en el lugar en que se instalaran los muros;

10 i) introducir sobre las piezas U (14) y a través de la enfierradura los elementos de construcción (13) con dimensiones logradas y postes (4) constituido por un perfil rectangular y hueco con al menos una ranura (8) en cada costado coincidente con dicha lengüeta (6) para una unión permanente a presión o unión deslizable y con una pluralidad de perforaciones simétrica con dicha pluralidad de perforaciones (11) de dicha pieza prefabricada (1);

15 j) unir los elementos de construcción (13) con dimensiones logradas con los postes (4) mediante dicha unión permanente a presión o unión deslizable; y

k) vaciar material aglutinante por la parte superior de todos los postes (4) y los elementos de construcción (13) con dimensiones logradas que conforman la instalación.

20

10.- Método de construcción modular de acuerdo a la reivindicación 9, CARACTERIZADO porque comprende ante de la etapa f), en fábrica, hacer vanos de puertas y ventanas en los elementos de construcción (13) y luego de la etapa k) instalar las ventanas y puertas en dichos vanos.

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11.- Método de construcción modular de acuerdo a la reivindicación 9, CARACTERIZADO porque comprende colocar y fijar un techo y instalar materiales de revestimiento en elementos de construcción (13).

5 12.- Método de construcción modular de acuerdo a la reivindicación 9, CARACTERIZADO porque después de la etapa a) y antes de la etapa b) dicho método comprende incorporar un laminado sobre dichas piezas prefabricadas.

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Tra. 2 PATENTES Eve: 1 REGDEPOSITO
Act. 329 CTOINFORMACION Folios: 2

Doctor

José Luis SALAZAR LOPEZ

Jefe de la División de Nuevas Creaciones

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E. S. D.

REF. Expediente No.: 11-066603
Patente de Invención: "SISTEMA MODULAR PARA EDIFICACION PROGRESIVA"
Solicitante: INMUEBLES FERROMARTI S.A. DE C.V.

COMPLEMENTO A LA RESPUESTA A REQUERIMIENTO

OFICIO No. 1172 NOTIFICADO POR FIJACION EN LISTA DE 29 DE ENERO DE 2013.

Humberto RUBIO CAMACHO, mayor de edad, domiciliado en Bogotá, identificado con la Cédula de Ciudadanía No.17'192.062 de Bogotá, Abogado en Ejercicio, portador de la Tarjeta Profesional No. 50.007 expedida por el Consejo Superior de la Judicatura, actuando en carácter de apoderado de la Sociedad **INMUEBLES FERROMARTI S.A. DE C.V.**, domiciliada EN C. Tabasco 3, Colonia Lázaro Cárdenas 52979, Atizapán de Zaragoza, México; conforme al poder que para todos los efectos relacionadas con la Propiedad Industrial me fue conferido por la citada compañía, debidamente reconocido por su Despacho; encontrándome dentro de la debida oportunidad procesal, por medio del presente escrito me permito *complementar* la Respuesta a Requerimiento presentada el 22 de abril de 2013, para lo cual manifiesto y anexo:

1. El Capitulo reivindicatorio presentado el 22 de abril de 2013, contiene un total de doce (12) reivindicaciones.
2. Teniendo en cuenta que la tasa pagada al momento de comenzar el examen de patentabilidad de la presente invención cubre (10) reivindicaciones, estamos anexando Recibo de pago No.13-0037932 de 23 de abril de 2013, por el excedente de dos (2) reivindicaciones.

Conforme a lo anterior, solicito muy amablemente a su Despacho, llevar a cabo el estudio de todas las reivindicaciones presentadas junto con la respuesta a requerimiento radicada el 22 de abril de 2013.

Atentamente,

HUMBERTO RUBIO CAMACHO
C.C. 17'192.062 de Bogotá
T.P. 50.007 de Consejo Superior
de la Judicatura.
COD. 4134

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Industria y Comercio SUPERINTENDENCIA		RECIBO DE CAJA		No. 13 - 0037932	
				Bogotá D.C., Abril 23 de 2013 - 14:29:16	
RECIBIDO DE : HUMBERTO RUBIO & CIA ABOGADOS LTDA				NI 830.000.228	
*** Soporte del Pago ***					
TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	VR. PAGO
CONSIGNACION	BANCO DE BOGOTA	062754387	523134975	23/04/2013	2.640.000.00
*** Conceptos Pagados ***					
CANT.	RENTISTICO	CONCEPTO	Vr. UNDITARIO	Vr. CONCEPTO	
2	50005-01-01 SOLICITUDES	1607 REIVINDICACION PATENTE UNITARIA ADICIONAL A LAS 10 INIC	30.000.00	60.000.00	
				=====	
				\$60.000.00	
				=====	
SON: **SESENTA MIL PESOS MONEDA CORRIENTE***					
Responsable: _____					
Recibo de Caja Aplicado al Expediente No. _____					
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO					
					
No. 11-066603- -00007-0000					
Fecha: 2013-04-24 13:24:44 Dep. 2020 DIR.NUEVASCR					
Tra. 2 PATENTES Eve: 1 REGDEPOSITO					
Act. 329 CTOINFORMACION Folios: 2					
EXCEDENTE DE REIVINDICACION EN LA PATENTE:					
PATENTE: SISTEMA MODULAR PARA EDIFICACION PROGRESIVA					
Sede Centro: Carrera 13 No. 27 - 00 Pisos 3,4,5 y 10 Bogotá, D.C.- Colombia					
Web: www.sic.gov.co e-mail: info@sic.gov.co Conmutador: (571) 5870000 Fax: (571) 5870284 Línea: 018000-910165 Call Center: (571) 6513240					
Abril 23 de 2013 - 14:29:16					

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REPÚBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

RESOLUCIÓN No: 38369

Por la cual se otorga una patente de invención

CERTIFICADO

Rad. N° 11-066603

EL SUPERINTENDENTE DE INDUSTRIA Y COMERCIO

en ejercicio de sus facultades legales, en especial de las conferidas en el numeral 26 del artículo 3° del Decreto 4886 de 2011, y

CONSIDERANDO:

PRIMERO: Que mediante escrito radicado en esta Superintendencia el día 30 de mayo de 2011 con el N° 11-066603-00000-0000, la(s) sociedad(es) Inmuebles Ferromarti S.A de C.V., presentó la solicitud de patente de invención titulada "SISTEMA MODULAR PARA EDIFICACIÓN PROGRESIVA".

SEGUNDO: Que el extracto de esta solicitud fue publicado en la Gaceta de la Propiedad Industrial N° 645 del 31 de mayo de 2012, sin que se hubieran presentado oposiciones por parte de terceros.

TERCERO: Que realizado el examen de fondo mediante Oficio N° 1172, notificado por fijación en lista el 29 de enero de 2013, se requirió a la solicitante en los términos del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina para que presentara respuesta a las observaciones de carácter técnico, relacionadas con la patentabilidad o cumplimiento de los requisitos establecidos por esta Decisión para la concesión de la patente.

CUARTO: Que la solicitante mediante escrito radicado bajo el N° 11-066603-00006-0000 del 22 de abril de 2013 respondió oportunamente el requerimiento formulado y presentó nueva(s) reivindicación(es) 1 a 12 que reemplaza(n) las originalmente presentadas, atendiendo de esta manera las observaciones efectuadas en el examen de fondo. Se aceptó el nuevo capítulo reivindicatorio presentado, comoquiera que se ajusta a las prescripciones contenidas en el artículo 34 de la Decisión 486.

QUINTO: Que en virtud de lo dispuesto en el artículo 14 de la Decisión 486 expedida por la Comisión de la Comunidad Andina "Los países miembros otorgarán patentes para las invenciones, sean de producto o de procedimiento, en todos los campos de la tecnología, siempre que sean nuevas, tengan nivel inventivo y sean susceptibles de aplicación industrial."

SEXTO: Que en el presente caso la(s) reivindicación(es) 1 a 12 cumple(n) los requisitos indicados en el considerando anterior y, en consecuencia, este Despacho encuentra procedente conceder para la(s) misma(s) la patente solicitada.

Página 1 de 3

Al contestar favor indique el número de radicación que se indica a continuación:
Cod Verificación: 981709395

S Sede Centro: Carrera 13 No. 27-90 piso 22 S.C.I.D. PER 5870000
Call Center 59204000 Línea gratuita Nacional 01800-910165
Web: www.sic.gov.co e-mail: contactenos@sic.gov.co
Bogotá D.C. Colombia

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REPÚBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

RESOLUCIÓN No: 38369
Por la cual se otorga una patente de invención

CERTIFICADO

Rad. N° 11-066603

RESUELVE:

ARTÍCULO PRIMERO: Otorgar patente de invención para la creación titulada:

"SISTEMA MODULAR PARA EDIFICACIÓN PROGRESIVA"

Clasificación IPC: E 04 C 2/00, 2/30.

Reivindicación(es): 1 a 12 incluidas en el radicado bajo el N° 11-066603-00006-0000.

Titular(es): INMUEBLES FERROMARTI S.A DE C.V.

Domicilio(s): Atizapán de Zaragoza, Estado de México, México

Inventor(es): Manuel Enrique Requejo Presa.

Prioridad(es) N°: 711-2010 Fecha: 01 de julio de 2010 País: CL.

Vigente desde: 30 de mayo de 2011 Hasta: 30 de mayo de 2031.

ARTÍCULO SEGUNDO: La titular tendrá los derechos y las obligaciones establecidos en la Decisión 486 de la Comisión de la Comunidad Andina y en las demás disposiciones legales vigentes sobre propiedad industrial, precisando que para mantener vigente la patente se deberá cancelar la tasa anual de mantenimiento, conforme lo dispone el artículo 80 de la referida norma comunitaria.

ARTÍCULO TERCERO: Entregar a la titular copia auténtica de esta resolución y el certificado de patente, previas las anotaciones en los libros de registro.

ARTÍCULO CUARTO: Notificar el contenido de la presente resolución a la(s) sociedad(es) Inmuebles Ferromarti S.A de C.V., entregándole(s) copia de la misma y advirtiéndole(s) que contra ella(s) procede el recurso de amparo ante el

Página 2 de 3

Al contestar favor indique el número
de radicación que se indica a continuación:
Cod Verificación: 981709395

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REPÚBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

RESOLUCIÓN No: 38369
Por la cual se otorga una patente de invención

CERTIFICADO

Rad. N° 11-066603

Superintendente de Industria y Comercio, el cual podrá ser interpuesto en el momento de la notificación o dentro de los cinco (5) días hábiles siguientes a ella.

NOTIFÍQUESE Y CÚMPLASE
Dada en Bogotá D.C., el 27 Jun 2013

EL SUPERINTENDENTE DE INDUSTRIA Y COMERCIO,



PABLO FELIPE ROBLEDO DEL CASTILLO

Doctor(a)
HUMBERTO RUBIO CAMACHO
mail@rubiolawyers.com

Elaboró: Diego Alberto Cardenas Gonzalez ✓
Revisó: Leonardo Rojas Vega ✓
Revisó: Jose Luis Salazar Lopez ✓
Aprobó: Jose Luis Londoño Fernandez ✓

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

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