

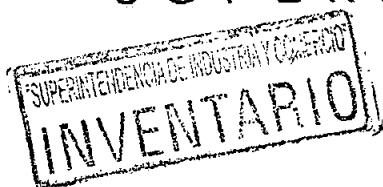
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Digitalización CSA Ltda



PCT

Industria y Comercio

SUPERINTENDENCIA



SOLICITUD

PATENTE DE INVENCION

10-74958

21. EXPEDIENTE Nº _____

54. TÍTULO ENSAMBLES ELEVADORES QUE INCLUYE UN FUERTE
SISTEMA DE VIGA POSTERIOR TRAPEZOIDAL.

51. CLASIFICACIÓN INTERNACIONAL B66C 5/00

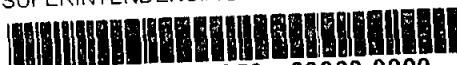
71. SOLICITANTE Global Track Technologies Pty Ltd.

DOMICILIO Victoria, Australia

74. APODERADO DILIA MARIA RODRIGUEZ D'ALEMAN

22. BOGOTÁ, D.C. _____

22-06-2010



No. 10-074958-00000-0000

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Tra. 11 PATENTEIYII Eve: 379 FASENACIONALII
Act. 411 PRESENTACION Folios: 218

FORMULARIO ÚNICO DE SOLICITUD DE PATENTE
PCT
ENTRADA EN FASE NACIONAL

1

SOLICITUD DE:



Patente de Invención



Patente de Modelo de Utilidad



Capítulo I.



Capítulo II.

2

SOLICITANTE
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IDENTIFICACIÓN

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Otro ☐

Número

3

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TP 20824 CSJ

4

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5

PCT (86)

Solicitud Internacional No. PCT/AU2008/001731

Fecha 24 de noviembre de 2008

Publicación Internacional No. WO 2009/065183 A1

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6 TÍTULO (54) ENSAMBLES ELEVADORES QUE INCLUYE UN FUERTE SISTEMA DE VIGA POSTERIOR TRAPEZOIDAL.

7 Clasificación Internacional (51)

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8 Prioridad

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08 de julio de 2008

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9 C mpr bante de pago No. 10-45,116 // 10-45,117 // 10-36,675 // 10-45,317

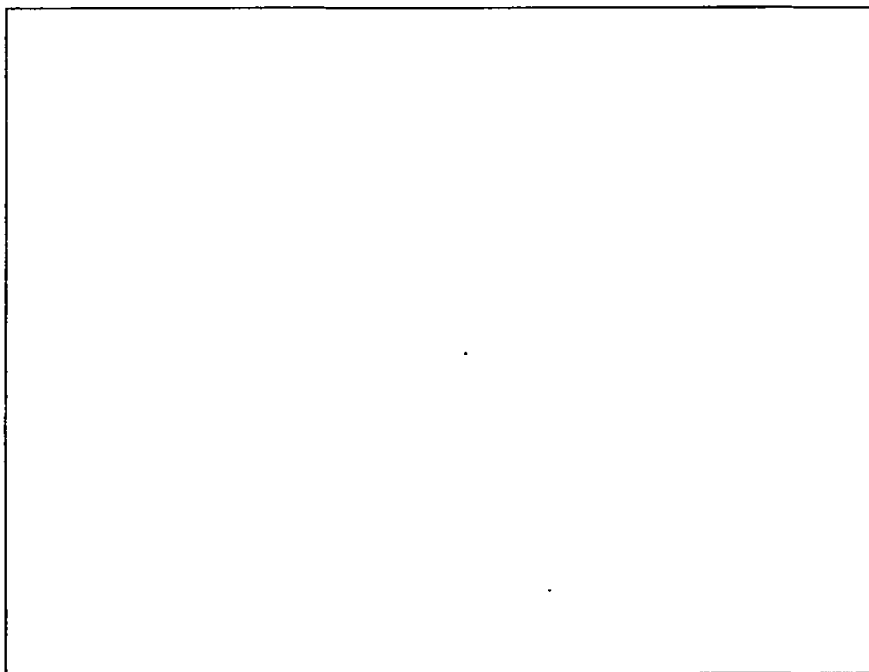
Fecha 02/06/10 // 02/06/10 // 06/05/10 // 02/06/10

10

ANEXOS

- ☐ Comprobante de pago de la tasa de presentación de la solicitud
- ☐ Documento que acredita la existencia y representación legal cuando el solicitante sea persona jurídica
- ☐ Poderes si fuere el caso
- ☐ Documento de cesión del inventor al solicitante o a su causante
- ☐ Declaraciones
- ☐ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☐ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
- ☐ Copia del examen preliminar internacional efectuado por la Autoridad Internacional de Examen Preliminar (IPEA).
- ☐ Traducción del examen preliminar internacional efectuado por la IPEA
- ☐ De ser el caso copia de contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas
- ☐ De ser el caso, certificado de deposito del material biológico
- ☐ Arte final 12 X 12 .
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☐ De ser el caso, modificaciones efectuadas a la solicitud internacional
- ☐ Otros Opinión escrita.

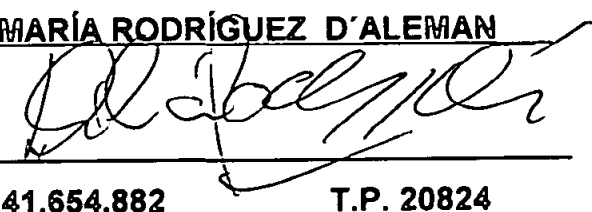
11 FIGURA CARACTERÍSTICA



12 Solicito la concesión de la patente

NOMBRE : DILIA MARÍA RODRÍGUEZ D'ALEMAN

FIRMA:


C.C. 41.654.882 T.P. 20824

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 10 - 45,116
FECHA : JUNIO 2 DE 2010

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-074958- -00000-0000

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Tra 11 PATENTEIYII Eve: 379 FASENACIONALII
Act. 411 PRESENTACION Folios: 218

**** CONSIGNACION ****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	Nº. PAGO	FECHA PAGO	Vr. PAGO
CLARKE MODET	CONSIGNACION	BANCO DE BOGOTA	062754387	134881294	02/06/2010	98,035,000.00

**** CONCEPTO ****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01	SOLICITUDES	
		1 TRAMITES DE SOL. DE PATENTE DE IN	554,000.00
		TOTAL :	\$ 554,000.00

SON: QUINIENTOS CINCUENTA Y CUATRO MIL PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL EXPEDIENTE N°.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 10 - 45,117
FECHA : JUNIO 2 DE 2010

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-074958- -00000-0000

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Act. 411 PRESENTACION Folios: 218

**** CONSIGNACION ****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
CLARKE MODET	CONSIGNACION	BANCO DE BOGOTA	062754387	134881294	02/06/2010	98,035,000.00

**** CONCEPTO ****

CANT. CONTABILITADO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE IN	554,000.00
	TOTAL :	\$ 554,000.00

SON: QUINIENTOS CINCUENTA Y CUATRO MIL PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

NIT : 800176089-2

CERTIFICACION DE EXCEDENTE : 10 - 36,675
FECHA : MAYO 6 DE 2010

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-074958-00000-0000

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Tra. 11 PATENTEIYII Eve: 379 FASENACIONALI
Act. 411 PRESENTACION Fotos: 218

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***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CLARKE MODET Y CO. COLOMB	CONSIGNACION	BANCO DE BOGOTA	062754387	353151680	05/05/2010	91,310,000.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-09	PRORROGAS Y RENOVACIONES	
99		PRORROGAS Y RENOVACIONES	50,000.00
		TOTAL :	\$ 50,000.00

SON: CINCUENTA MIL PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL ASUNTO No.

ESTA CERTIFICACION DE EXCEDENTE DE PAGO SOLO PODRA SER UTILIZADA
COMO PARTE DE LA CANCELACION DE UNA TARIFA VIGENTE Y NO PODRA SER
SUSTITUIDA POR NINGUN RECIBO.

4

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

CERTIFICACION DE EXCEDENTE : 10 - 45,317
FECHA : JUNIO 2 DE 2010

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-074958- -00000-0000

Fecha: 2010-06-22 14:59:31 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Eve: 379 FASENACIONALII
Act. 411 PRESENTACION Folios: 218

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
CLARKE MODET	CONSIGNACION	BANCO DE BOGOTA	062754387	134681294	02/06/2010	98,035,000.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-09	DTROS SERVICIOS DE PROPIEDAD I	
		99 DTROS SERVICIOS ADMINISTRATIVOS	20,000.00
		TOTAL :	\$ 20,000.00

SON: VEINTE MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

ESTA CERTIFICACION DE EXCEDENTE DE PAGO SOLO PODRA SER UTILIZADA
COMO PARTE DE LA CANCELACION DE UNA TARIFA VIGENTE Y NO PODRA SER
SUSTITUIDA POR NINGUN RECIBO.

RESUMEN DE LA INVENCION

Se describen ensambles de grúas para puentes, sistemas fuertes de viga posterior trapezoidal y carros para
5 ensambles de grúas de puente. De acuerdo con algunas modalidades, un ensamble de grúa de puente comprende una viga trapezoidal y un puente que puede fijarse el lado inferior de la viga trapezoidal. El puente comprende medios de unión para fijar un dispositivo elevador para el ensamble de grúa.
10 Cuando menos una pista guía se une a una estructura de soporte y cuando menos un carro puede moverse longitudinalmente a lo largo de cuando menos una pista de guía. Cada carro comprende un par de placas de montaje separadas y una pluralidad rodillos montados rotatoriamente a
15 las placas de montaje en una orientación sustancialmente vertical. Un eje se extiende entre las placas de montaje y está fijado pivotantemente a ellas. Un brazo de desplazamiento tiene un primer extremo acoplado pivotalmente al eje y cuando menos un segundo extremo para la conexión
20 pivotal al puente.

ENSAMBLES ELEVADORES QUE INCLUYE UN FUERTE SISTEMA DE VIGA

POSTERIOR TRAPEZOIDAL

CAMPO DE LA INVENCION

5 La presente invención se refiere a ensambles elevadores, y particularmente, pero sin limitarse a, los sistemas fuertes de viga posterior trapezoidal, para usarse con respecto a las grúas de puente manuales. La presente invención también se refiere a los carros para las grúas de puente. El sistema
10 fuerte de viga posterior trapezoidal tiene utilidad particular con respecto a los ensambles de grúa de puente y a los dispositivos de elevación suspendidos operados manualmente. Sin embargo, será apreciado que la presente invención tiene una aplicación más amplia y no está limitada
15 a ese uso particular.

ANTECEDENTES DE LA INVENCION

Los sistemas fuertes de viga posterior trapezoidal son deseables para los diseños de grúas de puente porque permiten
20 que el peso del puente sea reducido en comparación con el uso de vigas estructurales de la sección rectangular hueca (RHS).

El uso de vigas trapezoidales se conoce en la técnica anterior. Por ejemplo: patente norteamericana número 6,868,646; patente norteamericana número 6,574,818; patente

norteamericana número 2,336,622; patente norteamericana
número 5,426,906; patente norteamericana número 6,189,854;
patente norteamericana número 1,552,474; patente
norteamericana número 4,610,117; patente norteamericana
5 número 2,367,291; y patente norteamericana número 3,708,937.

Los ensambles de grúa suspendidos existentes
incluyen generalmente una grúa, que se suspende de una
carretilla que a su vez está suspendida por lo menos de un
puente. La carretilla es capaz de moverse longitudinal a lo
10 largo de por lo menos un puente. El por lo menos un puente
movible se apoya en el extremo de un par de pistas o guías
paralelas. Las pistas o guías se montan generalmente a una
estructura del techo o azotea del edificio. Alternativamente,
las pistas o guías (designadas de aquí en adelante
15 simplemente como "guías") podrían ser sostenidas en una
superestructura de acero. Esta es una opción particularmente
atractiva en las situaciones donde la estructura del techo o
de azotea del edificio en cuestión no se diseña para soportar
cargas.

20 Un problema con los ensambles de grúa y las vigas
de puente suspendidos existentes es que no permiten el diseño
de puentes con peso reducido y con fuerza comparable a las
vigas RHS o a otras vigas estructurales estándar. La
reducción del peso de los puentes permitiría una instalación

y una operación más fáciles y reduciría el costo total de fabricación. Además, el peso reducido de los puentes reduciría la tensión y la carga en la estructura a la cual se une el sistema fuerte de viga posterior trapezoidal.

5 Mientras que los dispositivos descritos antes satisfacen sus respectivos objetivos y requisitos, particulares las patentes ya mencionadas no describen un sistema fuerte de viga posterior trapezoidal que permita el peso reducido de los ensambles de grúa de puente suspendidos
10 operados manualmente.

Por lo tanto, existe una necesidad de un sistema fuerte de viga posterior trapezoidal nuevo y mejorado que se pueda utilizar para los ensambles de grúa de puente suspendidos operados manualmente.

15 Otro problema con los ensambles manuales existentes de la grúa de puente, y no solo aquellos con vigas trapezoidales, ocurre cuando un operador intenta iniciar el movimiento del puente en cualquier dirección en relación a las guías. El esfuerzo requerido para iniciar tal movimiento
20 es frecuentemente considerable, por lo menos en parte debido al hecho de que se inicia el movimiento del otro extremo del puente. Esto puede hacer que el puente se tuerza con respecto a las guías inmóviles, y de tal modo se unescan y previenen el movimiento adicional. Además, con los ensambles

existentes, las guías deben estar alineadas paralelas o casi paralelas durante la instalación, si no el puente tiende a atascarse en las guías previendo el movimiento adicional.

Los problemas de atasco ya mencionados se han
5 abordado a un grado apreciable con el ensamble de grúa del inventor de acuerdo lo descrito en la publicación internacional de solicitud de patente No. WO 03/101878. Sin embargo, este ensamble de grúa es solamente aplicable a diseños específicos de la grúa de puente e incluye algunas
10 limitaciones. Por ejemplo, el puente suspendido del ensamble de grúa limita el espacio superior disponible en el ambiente en el cual el ensamble de grúa está instalado.

SUMARIO DE LA INVENCION

15 Es un objeto preferido de la presente invención el proporcionar un ensamble de grúa nuevo y mejorado que evite, o por lo menos mejore, una o más de las desventajas ya mencionadas de la técnica anterior.

El inventor ha identificado varias modificaciones y
20 mejoras a su ensamble de grúa tales que las modalidades de la presente invención residen en un ensamble mejorado de la grúa de puente, un carro mejorado para los ensambles de la grúa de puente y un ensamble mejorado de la grúa de puente que comprende una fuerte viga trasera trapezoidal.

De acuerdo con un aspecto, las modalidades de la presente invención residen en un carro para un ensamble de grúa de puente, el carro comprende:

un par de placas de montaje separadas;

5 una pluralidad de rodillos montados rotatoriamente con una orientación substancialmente vertical a las placas de montaje para el movimiento longitudinal del carro a lo largo de una respectiva pista de guía del ensamble de grúa de puente;

10 un miembro alargado que se extiende entre las placas de montaje; y

un brazo de desplazamiento acoplado de forma pivotante en un primer extremo al miembro alargado, el brazo de desplazamiento tiene por lo menos un segundo extremo para
15 la conexión pivotante a un puente, el puente presenta los medios de unión para sostener un dispositivo elevador del ensamble de grúa de puente.

El brazo de desplazamiento se puede acoplar pivotantemente a un poste de pivote vía un cojinete del poste
20 de pivote, el poste de pivote se extiende desde el miembro alargado.

El miembro alargado puede ser un eje asegurado de manera pivotante a las placas de montaje. Convenientemente, el brazo de desplazamiento está conectado de forma pivotante

con una manga del puente para recibir un extremo del puente.

Convenientemente, el brazo de desplazamiento comprende un par de apéndices, cada apéndice está conectado de forma pivotante con la manga del puente mediante un
5 sujetador.

Preferentemente, por lo menos una de las placas de montaje comprende una abertura a través de la cual el puente sobresale.

La respectiva pista de guía puede estar bajo la
10 forma de un perfil de doble T y el carro se mueve encima de una malla del perfil de doble T.

Preferentemente, algunos de la pluralidad de rodillos se colocan por encima de una malla del perfil de doble T y algunos de la pluralidad de rodillos se colocan por
15 debajo de la malla.

El carro puede comprender además uno o más rodillos extremos, cada rodillo extremo empotrado y capaz de rodar a lo largo de un borde respectivo de la malla del perfil de doble T.

20 Preferentemente, un par de rodillos extremos se montan rotatoriamente en una orientación substancialmente horizontal a cada placa de montaje.

El carro puede comprender además:

un segundo miembro alargado separado del miembro

alargado, el segundo miembro alargado se extiende entre las placas de montaje; y

un segundo brazo de desplazamiento acoplado de forma pivotante en un primer extremo al segundo miembro
5 alargado, el brazo de desplazamiento tiene por lo menos un segundo extremo para la conexión pivotante al puente.

El segundo miembro alargado puede ser un eje asegurado de manera pivotante a las placas de montaje.

El carro puede comprender además un hombro a
10 cualquier lado del puente en el extremo del puente, cada hombro conectado de forma pivotante con un brazo respectivo de desplazamiento.

El lado inferior de cada hombro puede comprender un soporte para recibir un par de sujetadores para la conexión
15 pivotante a un brazo respectivo de desplazamiento.

El carro puede comprender además las proyecciones que se extienden dentro de las placas de montaje adyacentes a los rodillos para prevenir el descarrilamiento de los rodillos de la pista de guía.

20 Las placas de montaje y los primeros y segundos miembros alargados pueden formar parte de una caja de moldeo.

El carro puede comprender además a un primer miembro base para montarse por lo menos a un miembro de anti-descarrilamiento. El primer miembro base puede comprender una

pluralidad de aberturas alargadas para el montaje variable de por lo menos un miembro de anti-descarrilamiento.

El carro puede comprender además por lo menos un miembro base extremo para montar uno o más rodillos extremos, cada rodillo extremo está empotrado y es capaz de rodar a lo largo de un borde respectivo de una malla de un perfil de doble T de la respectiva pista de guía.

Por lo menos un miembro base extremo puede comprender una pluralidad de aberturas alargadas para el montaje variable de los uno o más rodillos extremos.

De acuerdo con otro aspecto, las modalidades de la presente invención residen en un ensamble de grúa de puente que comprende:

una viga trapezoidal;
un puente conectable a una superficie inferior de la viga trapezoidal, el puente comprende medios de unión para sostener un dispositivo elevador;

por lo menos una pista de guía conectable a una estructura de soporte;

por lo menos un carro movable longitudinalmente a lo largo de por lo menos una pista de guía, el carro comprende:

un par de placas de montaje separadas;

una pluralidad de rodillos montados de forma

rotatoria en una orientación substancialmente vertical a las placas de montaje;

un eje que se extiende en medio y asegurado de manera pivotante a las placas de montaje; y

5 un brazo de desplazamiento acoplado de forma pivotante en un primer extremo al eje, el brazo de desplazamiento tiene por lo menos un segundo extremo para la conexión pivotante al puente.

Convenientemente, la viga trapezoidal tiene una
10 sección superior, un primer lado asegurado rígidamente a la sección superior y un segundo lado asegurado rígidamente a la sección superior opuesta al primer lado, los primeros y segundos lados se afilan hacia adentro entre sí desde la sección superior a la pista de guía.

15 Alternativamente, la sección superior tiene una primera sección superior asegurada rígidamente al primer lado, y una segunda sección superior asegurada rígidamente al segundo lado, en donde la primera sección superior se asegura rígidamente a la segunda sección superior de una manera
20 generalmente traslapada.

Convenientemente, por lo menos la parte del primer lado y/o por lo menos parte del segundo lado comprenden una estructura de red.

El por lo menos un carro puede moverse por encima o

estar suspendido con respecto a la guía.

Convenientemente, la viga de puente se puede construir con solamente la viga trapezoidal, en donde la viga trapezoidal ofrece un primer reborde que se extiende de una primera viga opuesta a la sección superior y un segundo reborde que se extiende de una segunda viga opuesta a la sección superior, los primeros y segundos rebordes están orientados entre sí. La configuración de los primeros y segundos rebordes y los primeros y segundos lados permiten que un componente de la grúa de puente sea recibido allí.

Las modalidades de la invención pueden también incluir una pluralidad de refuerzos de diafragma dentro de los primeros y segundos lados.

De acuerdo otro aspecto, las modalidades de la presente invención residen en un ensamble de grúa de puente que comprende:

una viga trapezoidal;

por lo menos una pista de guía que puede fijarse a una superficie inferior de la viga trapezoidal;

por lo menos un carro móvil longitudinalmente dentro por lo menos la pista de guía;

un puente que comprende los medios de unión para sostener un dispositivo elevador;

por lo menos un brazo de desplazamiento que tiene

un primer extremo conectado de forma pivotante con el por lo menos un carro y por lo menos un segundo extremo conectado de forma pivotante con un puente, el puente comprende medios de unión para sostener un dispositivo elevador; y

5 un empalme universal provisto entre el por lo menos un brazo de desplazamiento y el por lo menos un carro para absorber los movimientos rotatorios y laterales del puente cuando se aplica una fuerza a los medios de unión.

De acuerdo con todo otro aspecto, modalidades de la
10 presente invención residen en el ensamble de grúa de puente que comprende:

un puente que tiene medios de unión para sostener un dispositivo elevador;

por lo menos una pista de guía conectable a una
15 estructura de soporte; y

por lo menos un carro como se describe en la reivindicación 1 movable longitudinalmente a lo largo de por lo menos de la pista de guía.

Debe apreciarse que el ensamble no incluye el
20 dispositivo elevador, o partes del mismo. La inclusión del dispositivo elevador en la discusión de la presente invención se proporciona simplemente para definir el contexto de la invención.

Otros aspectos de la presente invención llegarán a

ser evidentes de la descripción detallada siguiente. Las características y las ventajas numerosas de la presente invención serán fácilmente evidentes para las personas de habilidad ordinaria en la técnica después de la lectura de la descripción detallada siguiente, de las modalidades actualmente preferidas, pero no obstante ilustrativas, de la presente invención cuando se toman en conjunto con los dibujos anexos. A este respecto, antes de explicar la presente modalidad de la invención detalladamente, debe ser entendido que la invención no está limitada en su uso a los detalles de construcción y a la disposición de los componentes descrita en la descripción siguiente o ilustrada en los dibujos. La invención es capaz de otras modalidades y de ser implementada y realizada de varias maneras.

15

BREVE DESCRIPCIÓN DE LAS FIGURAS

A modo de ejemplo solamente, las modalidades preferidas de la invención serán descritas más completamente adelante con referencia a los dibujos anexos, en los cuales:

20 La figura 1 es una vista en perspectiva de un sistema fuerte de viga posterior trapezoidal de acuerdo con modalidades de la presente invención.

La figura 2 es una vista lateral del sistema fuerte de viga posterior trapezoidal de la figura 1.

La figura 3 es una vista en sección transversal del sistema fuerte de viga posterior trapezoidal tomado a lo largo de la línea 3 en la figura 2.

La figura 4 es una vista en sección transversal del sistema fuerte de viga posterior trapezoidal tomado a lo largo de la línea 4 en la figura 3.

La figura 5 es una vista en perspectiva de una modalidad alternativa del sistema fuerte de viga posterior trapezoidal de acuerdo con modalidades de la presente invención.

La figura 6 muestra vistas delanteras de modalidades alternativas del sistema fuerte de viga posterior trapezoidal de acuerdo con modalidades de la presente invención.

La figura 7 es una vista en perspectiva de una modalidad alternativa del sistema fuerte de viga posterior trapezoidal de acuerdo con modalidades de la presente invención.

La figura 8 es una vista en sección transversal parcial de la modalidad alternativa del sistema fuerte de viga posterior trapezoidal ilustrado en la figura 7.

La figura 9 es una vista en sección transversal parcial de la modalidad alternativa del sistema fuerte de viga posterior trapezoidal tomado a lo largo de la línea 9

en la figura 8.

La figura 10 es una vista en sección transversal parcial de la modalidad alternativa del sistema fuerte de viga posterior trapezoidal ilustrado en la figura 9.

5 La figura 11 es una vista en sección transversal parcial de la modalidad alternativa del sistema fuerte de viga posterior trapezoidal tomado a lo largo de la línea 11 en la figura 9.

La figura 12 es una vista en sección transversal
10 parcial de una modalidad alternativa del sistema fuerte de viga posterior trapezoidal ilustrado en la figura 11.

La figura 13 es una vista en perspectiva de una modalidad alternativa del sistema fuerte de viga posterior trapezoidal de acuerdo con modalidades de la presente
15 invención.

La figura 14 es una vista en sección transversal parcial de la modalidad alternativa del sistema fuerte de viga posterior trapezoidal tomado a lo largo de la línea 14 en la figura 11.

20 La figura 15 es una vista en sección transversal parcial de la modalidad alternativa del sistema fuerte de viga posterior trapezoidal tomado a lo largo de la línea 15 en la figura 14.

La figura 16 es una vista en perspectiva de otra

modalidad alternativa del sistema fuerte de viga posterior trapezoidal de acuerdo con modalidades de la presente invención.

La figura 17 es una vista agrandada de la parte del
5 sistema fuerte de viga posterior trapezoidal mostrado en la figura 16.

La figura 18 es una vista lateral de otra modalidad alternativa del sistema fuerte de viga posterior trapezoidal de acuerdo con modalidades de la presente invención.

10 La figura 19 es una vista en perspectiva de otra modalidad alternativa de un ensamble de grúa de acuerdo con modalidades de la presente invención.

La figura 20 es una vista de planta del ensamble de grúa mostrado en la figura 19.

15 La figura 21 es una vista lateral del ensamble de grúa mostrado en la figura 19.

La figura 22 es una vista agrandada del ensamble de grúa mostrado en la figura 19.

20 La figura 23 es una vista del extremo del ensamble de grúa mostrado en la figura 19.

La figura 24 es una vista en perspectiva de otra modalidad alternativa de un carro para un ensamble de grúa de acuerdo con modalidades de la presente invención.

La figura 25 es una vista en perspectiva girada de

una caja del carro mostrado en la figura 24.

La figura 26 es una vista de plan de la caja mostrada en la figura 25.

La figura 27 es una vista en perspectiva de un
5 ensamble de grúa de puente que comprende otras modalidades
alternativas de un carro donde los carros son energizados.

La figura 28 es una vista de planta del ensamble de grúa de puente de la figura 27.

La figura 29 es una vista lateral del ensamble de
10 grúa de puente de la figura 27.

La figura 30 es vista seccional de un carro del ensamble de grúa de puente de la figura 27.

La figura 31 es vista de plan seccional parcial de los componentes del carro del montaje de la figura 27.

15 La figura 32 es una vista seccional parcial del final de los componentes del carro del montaje de la figura 27.

Los mismos números de referencia se refieren a las mismas partes en todas las figuras.

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DESCRIPCIÓN DETALLADA DE LA INVENCION

Refiriéndonos ahora a los dibujos se muestra un sistema fuerte de viga posterior trapezoidal de acuerdo modalidades de la presente invención y es señalado

generalmente con el número de referencia 10.

En la figura 1, un sistema fuerte de viga posterior trapezoidal 10 nuevo y mejorado de la presente invención para reducir el peso de grúas de puente se ilustra y será descrita. Más particularmente, el sistema fuerte de viga posterior trapezoidal 10 tiene una viga trapezoidal 12, una pista de guía 30, y una tapa extrema 26. La viga trapezoidal 12 incluye un primer lado 14, un segundo lado 20 y una sección superior 16 adyacente a los lados primera y segunda 14, 20 las cuales se aseguran rígidamente entre sí a travpes de medios tales como, pero sin limitarse a, soldadura a lo largo de sus bordes o costuras, remaches, sujetadores, pegamento, o abrazaderas. La pista de guía 30 se une a los extremos de los lados primero y segundo 14, 20 opuestas a las secciones superiores traslapadas. La tapa extrema 26 se une a los lados primero y segundo 14, 20 sobre la pista de guía 30, para cubrir los lados primero y segundo 14, 20 y sus secciones superiores traslapadas.

La pista de guía 30 tiene una abertura 34 y está bajo la forma de viga de canal abierto, preferentemente una viga con corte central. La pista de guía 30 y la abertura 34 se adaptan para recibir un componente de la grúa de puente. La pista de guía 30 se hace de un metal, pero cualquier otro material que tenga una fuerza similar se puede utilizar, por

ejemplo materiales compuestos, o aleaciones.

Como se ilustra en la figura 2, la viga trapezoidal 12 tiene una pluralidad de refuerzos de diafragma 40 que se unen al interior de la viga trapezoidal 12 y están separados de forma incremental a lo largo de su longitud longitudinal. La viga trapezoidal 12 puede unirse, preferentemente asegurarse rígidamente, a una estructura de soporte 13, que puede ser un techo del edificio, la azotea, una superestructura separada, o un marco de soporte. La viga trapezoidal 12 se hace de un metal, pero cualquier otro material que tenga una fuerza similar se puede utilizar, por ejemplo materiales compuestos, o aleaciones.

La pista de guía 30 puede extenderse más allá de la viga trapezoidal 12 para poder conectar con las pistas de guía 30 adicionales a través de un acoplador 38 de pista de guía.

Refiriéndonos ahora a la figura 3, la viga trapezoidal 12 incluye además un primer reborde 18 opuesto a la sección superior 16 de el primer lado 14, y un segundo reborde 24 opuesta a la sección superior 16 de la segunda cara 20. La sección superior 16 se asegura rígidamente a los lados primero y segundo 14, 20 a lo largo de sus longitudes enteras. Los lados primero y segundo 14, 20 se adelgazan hacia adentro desde la sección superior 16 a sus rebordes

respectivos 18, 24. El ángulo al cual los lados primero y segundo 14, 20 se adelgazan se relaciona con la altura de la viga trapezoidal 12 y la anchura de la pista de guía 30.

Alternativamente, como se muestra en la figura 3, la viga trapezoidal 12 puede incluir una primera sección superior 22 adyacente a el primer lado 14, una segunda sección superior 22' adyacente la segunda cara 20, un primer reborde 18 opuesto a la primera sección superior 22 de el primer lado 14 y un segundo reborde 24 opuesta a la segunda sección superior 22' de la segunda cara 20. Las primeras y segundas secciones superiores 22, 22' están orientadas en paralelo y adyacente entre sí para producir un contacto al ras a lo largo de su longitud entera. Los lados primero y segundo 14, 20 se adelgazan hacia adentro desde sus secciones superiores respectivas 22, 22' a sus rebordes respectivos 18, 24. El ángulo al cual los lados primero y segundo 14, 20 se adelgazan se relacionan con la altura de la viga trapezoidal 12 y la anchura de la pista de guía 30. La primera sección superior 22 se coloca sobre la segunda sección superior 22' para dejar un espacio libre entre los bordes de las primeras y segundas secciones superiores 22, 22' y los lados primero y segundo 14, 20, de tal modo permitiendo que las primeras y segundas secciones superiores 22, 22' se fijen rígidamente entre sí, tal como, pero limitado a, soldadura a lo largo de

los bordes de las primeras y segundas secciones superiores 22, 22'. La pista de guía 30 tiene lados 32 y una porción superior 36 adyacente a los lados 32, produciendo así una viga de canal abierto. Los primeros y segundos rebordes 18, 24 se extienden hacia abajo desde los lados primero y segundo 14, 20 para recibir los lados 32 de la pista de guía 30. Los primeros y segundos rebordes 18, 24 se fijan rígidamente a los lados 32, tales como por ejemplo, pero sin limitarse a, soldadura a lo largo de los bordes de los rebordes primeros y segundos 18, 24.

Los refuerzos de diafragma 40 se configuran para corresponder a la forma interior de la viga trapezoidal 12, permitiendo de tal modo que los refuerzos de diafragma 40 sean insertados con seguridad. Los refuerzos de diafragma 40 tienen cada uno esquinas superiores biseladas 42, y una abertura central 44. Las esquinas superiores biseladas 42 se configuran para recibir el borde de las primeras o segundas secciones superiores 22, 22', dependiendo de la orientación de las secciones superiores. La sección inferior de los refuerzos de diafragma 40 se configura para empotrar contra la porción superior 36 de la pista de guía 30. Los refuerzos de diafragma 40 se fijan rígidamente al interior de la viga trapezoidal 12 y a la porción superior 36 de la pista de guía 30. Debe apreciarse que los refuerzos de diafragma 40

aumentan la fuerza y la rigidez del sistema fuerte de viga posterior trapezoidal 10.

Como se ilustra mejor en la figura 4, el acoplador de la pista de guía 38 tiene una forma que corresponde a la de la pista de guía 30 y que es más grande para permitir que el acoplador de la pista de guía 38 se deslice sobre la pista de guía 30, de tal modo permitiendo que una pista adicional de guía 30 sea insertada en el extremo libre del acoplador de la pista de guía 38, como se ilustra mejor en las figuras 2 y 4. El acoplador de la pista de guía 38 se fija rígidamente a ambos extremos de las pistas de guía 30 insertadas allí.

Además, el acoplador de la pista de guía 38 se puede configurar a la forma de la pista de guía 30, pero es más pequeño en tamaño para permitir que el acoplador de la pista de guía 38 sea insertado en dos pistas de guía 30 colindantes (no ilustradas).

Se aprecia que la pista de guía 30, como se describe anteriormente, se puede adaptar para recibir en la abertura 34, un carro, una carretilla, una grúa en movimiento, o cualquier otro componente de la grúa en movimiento o de la grúa de puente.

Un sistema fuerte de viga posterior trapezoidal 50 de la modalidad alternativa se ilustra en la figura 5. El sistema fuerte de viga posterior trapezoidal 50 de la

modalidad alternativa tiene un primer lado 54, un segundo lado 60, y una sección superior 56 que se asegura rígidamente a los lados primero y segundo 54, 60 a través de medios tales como, pero no limitados a, soldadura a lo largo de sus costuras del reborde, remaches, sujetadores, pegamento, o abrazaderas.

Alternativamente, haciendo referencia adicional a la figura 6, el sistema fuerte de viga posterior trapezoidal 50 puede incluir una primera sección superior 62 adyacente a el primer lado 54, una segunda sección superior 62' adyacente a la segunda cara 60, un primer reborde 58 opuesto a la primera sección superior 62 de el primer lado 54, un segundo reborde 64 opuesto a la segunda sección superior 62' de la segunda cara 60 y una abertura 66 entre los primeros y segundos rebordes 58, 64. Las primeras y segundas secciones superiores 62, 62' están orientadas paralelas y adyacentes entre sí para producir un contacto al ras a lo largo de su longitud entera. La primera sección superior 62 se coloca sobre la segunda sección superior 62' para dejar un espacio libre entre los bordes de las primeras y segundas secciones superiores 62, 62' y los lados primero y segundo 54, 60, de tal modo permitiendo que las primeras y segundas secciones superiores 62, 62' se fijen rígidamente entre sí, mediante por ejemplo, pero sin limitarse a, soldadura a lo largo de

los bordes de los lados primero y segundo 54, 60.

Además, los refuerzos del diafragma (no ilustrados) se pueden insertar en el sistema fuerte trapezoidal 50 de una manera que dejan un espacio entre la parte inferior del refuerzo y los primeros y segundos rebordes 58, 64 de la viga trasera.

Los primeros y segundos rebordes 58, 64 forman un ángulo interno entre sí. Preferentemente, el ángulo orienta los primeros y segundos rebordes 58, 64 paralelos a la sección superior 56, como se ilustra mejor en la figura 6. Este primer reborde 58, el segundo reborde 64 y la configuración de la abertura 66 produce substancialmente un sistema de guía o de pista adaptado para recibir un carro, una carretilla, o un componente de la grúa en movimiento o de la grúa de puente. Los lados primero y segundo 54, 60 se adelgazan hacia adentro desde la sección superior 56 hasta sus rebordes respectivos 58, 64. El ángulo al cual los lados primero y segundo 54, 60 se adelgazan se relaciona con la anchura deseada de la abertura 66.

Se aprecia en la modalidad alternativa que el sistema fuerte de viga posterior trapezoidal 50, como se describe anteriormente, produce una combinación de viga trapezoidal y de pista de guía que puede adaptarse para recibir a través de la abertura 66, un carro, una carretilla,

una grúa en movimiento, o de cualquier otro componente de la grúa en movimiento o de la grúa de puente.

La figura 7 ilustra otro sistema fuerte de viga posterior trapezoidal 70 de la modalidad alternativa, que incluye un ensamble elevador. Un dispositivo elevador bajo la forma de una grúa manual (no ilustrada) se puede suspender del ensamble elevador mediante los medios de unión 76. Los medios de unión 76 podrían ser un gancho, una cadena u otro dispositivo conveniente. Debe apreciarse que el dispositivo elevador podría adoptar cualquier forma conveniente. Por ejemplo, el dispositivo elevador podía ser una grúa accionada manualmente o eléctricamente.

Los medios de unión 76 están conectados con una carretilla 78, que se ilustra en detalle adicional, por ejemplo, en la figura 8. La carretilla 78 movable se suspende de un puente 72, que puede tener una configuración similar a la pista de guía 30. Además, el puente 72 podía estar bajo la forma de sección de canal abierto, perfil de doble T, o cualquier otra forma conveniente. La carretilla 78 incluye los rodillos de la carretilla que son ruedas, rodamientos de bolas u otros medios de propulsión convenientes. Los rodillos son capaces de rodar longitudinalmente a lo largo del puente 72. Los rodillos de la carretilla podían adoptar cualquier forma conveniente. A este respecto, los rodillos de la

carretilla podían incluir superficies recubiertas de plástico para un funcionamiento silencioso. Alternativamente, los rodillos, incluyendo las superficies del rodillo, se podrían construir de acero. Alternativamente, otros mecanismos se
5 podrían utilizar en lugar de los rodillos, tales que la carretilla 78 pueda moverse a lo largo de la longitud del puente 72.

Los medios de unión 76 se extienden con una abertura 74 provista en la superficie inferior del puente 72.
10 De esta manera los medios de unión 76 y la grúa son movibles a lo largo de la longitud del puente 72. Cuando el puente 72 no tiene una ranura, los medios de unión 76 están conectados con la carretilla 78 o el puente 72. Debe apreciarse que los medios de unión 76 se podrían conectar de forma móvil con dos
15 o más puentes 72.

Como se muestra en la figura 7, se proporcionan dos sistemas fuertes de viga posterior trapezoidal 10 substancialmente paralelos. El puente 72 es movable longitudinalmente en relación a las pistas de guía paralelas
20 30 de los sistemas fuertes de viga posterior trapezoidal 10. En la modalidad ilustrada, el puente 72 es manualmente movable en relación a las pistas de guía 30 paralelas. Sin embargo, debe apreciarse que el puente 72 podría moverse eléctricamente en relación a las pistas de guía paralelas 30.

Las pistas de guía paralelas 30 de los sistemas fuertes de viga posterior trapezoidal 10 como se muestra se forman de una sección central de canal abierto que se proporcionan respectivamente las aberturas 34.

5 Como se ilustra mejor en la figura 9, las pistas de guía paralelas 30 están cada una aseguradas rígidamente a los primeros y segundos rebordes 18, 24 de las vigas trapezoidales 12, formando de tal modo el sistema fuerte de viga posterior trapezoidal 10 al cual se unen al ensamble
10 elevador, produciendo de tal modo el sistema fuerte de viga posterior trapezoidal 70 de la modalidad alternativa. La sección superior 16 de las vigas trapezoidales 12 entonces se asegura rígidamente a un techo del edificio, a un techo o a una superestructura separada. Sin embargo, debe apreciarse
15 que las pistas de guía paralelas 30 se podrían proporcionar un cierto movimiento en relación a sus montajes, si se deseado. Las tapas extremas 26 se aseguran rígidamente a los extremos de las vigas trapezoidales 12 para cubrir los lados primero y segundo 14, 20 y la sección superior 16.

20 Puede apreciarse que los acopladores de la pista guía 38 se pueden unir a los extremos de las pistas de guía 30 para permitir la unión de las pistas de guía adicionales 30 al sistema fuerte de viga posterior trapezoidal 70 de la modalidad alterna.

El puente 72 incluye los carros 80, que se proporcionan para viajar a lo largo de las pistas de guía paralelas 30. La relación y la configuración de los carros 80 y de las pistas de guía 30 son substancialmente idénticas.

5 Por lo tanto, la descripción siguiente, referente a las figuras 8 y 9, en parte, se refiere solamente a un carro 80 y a la pista de guía 30. Además, los carros 80 se pueden motorizar o proporcionar un sistema del motor y de impulsión.

Las pistas de guía paralelas 30 del sistema fuerte

10 de viga posterior trapezoidal 10 se ilustran en las figuras 7, 8 y 9 como siendo canales abiertos en perfil y por lo tanto incluye un sistema de pista interno. Las vigas trapezoidales 12 cada una incluyen una pluralidad de los refuerzos de diafragma 40 asegurados rígidamente allí. Debe

15 apreciarse, sin embargo, que las pistas de guía 30 podrían adoptar otros perfiles convenientes, incluyendo los perfiles de doble T (o pista externa) (no ilustrados).

El carro 80, o un dispositivo similar, puede moverse a lo largo de las pistas de guía paralelas 30 del

20 sistema fuerte de viga posterior trapezoidal 10 e incluye por lo menos una placa de montaje 82. La placa de montaje 82 se configura para viajar longitudinalmente a lo largo de la pista paralela de guía 30 mediante rodillos 84, 86, 88, 90 que se montan de forma rotatoria a la placa de montaje 82.

Los carros 80 portan el peso del puente 72 y de la grúa (no ilustrada), que a su vez, son portadas por las pistas de guía paralelas 30. Una placa de montaje adicional 82 puede ser usada en el exterior del perfil (perfil de doble T).

5 Preferentemente, los rodillos 84, 86, 88, 90 incluyen las superficies afiladas de tal modo que permiten a los rodillos 84, 86, 88, 90 rodar eficientemente a lo largo de las pistas de guía 30. Los rodillos 84, 86, 88, 90 incluyen superficies de rodamiento recubiertas de plástico (o
10 caucho). Las superficies recubiertas de plástico se proporcionan para reducir el ruido del rodamiento de los rodillos 84, 86, 88, 90. Debe apreciarse, sin embargo, que los rodillos 84, 86, 88, 90 no necesitan incluir superficies de rodamiento recubiertas de plástico. Los rodillos 84, 86,
15 88, 90 podrían incluir, por ejemplo, superficies de rodamiento de acero. Además, debe apreciarse que los rodillos 84, 86, 88, 90 se podrían substituir por otro arreglo conveniente tal como, por ejemplo, un arreglo de cojinetes.

Los ensambles existentes de la grúa tienden a
20 atascarse cuando un operador inicia el movimiento del puente a lo largo de las guías del ensamble. Esto es, en parte, un resultado de la conexión rígida en los ensambles existentes de la grúa del puente al carro.

Para abordar este problema, la presente invención

incluye un brazo de desplazamiento 92. El brazo de desplazamiento 92 se construye de acero suave, o de acero de mayor calidad, generalmente de placa de acero o de bandas de acero. Alternativamente, el brazo de desplazamiento 92 se
5 podía construir de cualquier otro material conveniente. El brazo de desplazamiento 92 está conectado de forma pivotante con una manga 94. La manga 94 se sujeta rígidamente (por cualquier medio conveniente) a la placa de montaje 82. La placa de montaje 82 se suelda preferentemente a la manga 94,
10 pero otros medios de unión rígidos tales como pernos podrían ser utilizados. La conexión pivotante entre el brazo de desplazamiento 92 y la manga 94 es mediante un rodamiento de bolas 96. El rodamiento de bolas 96 es conservado en el lugar por un asiento de rodamiento de bolas 98 provisto en el brazo
15 de desplazamiento 92 y la manga 94. El rodamiento de bolas 96 puede ser manufacturado de cualquier grado conveniente de acero, o de cualquier otro material conveniente. El asiento del cojinete se forma de un plástico, tal como nylon, para minimizar la fricción, pero se podría formar de otros
20 materiales convenientes. El brazo de desplazamiento 92 está conectado de forma pivotante con una manga del puente 100, como ilustrado en las figuras 8 y 9, que a su vez, está conectada con seguridad con un extremo del puente 72. La manga del puente 100 se construye del acero. Cualquier acero

conveniente del grado, o cualquier otro material, se podía utilizar en la construcción de la manga del puente 100. El brazo de desplazamiento 92 está conectado de forma pivotante con la manga del puente 100 mediante dos sujetadores 102, 104
5 vía los apéndices del brazo de desplazamiento 106,108. Los sujetadores 102, 104 proporcionan una conexión pivotante entre el brazo de desplazamiento 92 y la manga del puente 100.

La disposición anterior forma un empalme universal
10 que proporciona el pivoteo relativo necesario y el movimiento lateral entre el carro 80 y el puente 72 por lo menos para reducir la incidencia de atasques del sistema fuerte de viga posterior trapezoidal 70 de la modalidad alternativa, después de la iniciación del movimiento del puente 72 en relación a
15 las pistas de guía paralelas 30 de los sistemas fuertes de viga posterior trapezoidal 10. Debe apreciarse que la conexión pivotante de los carros 80 al puente 72 podría adoptar las configuraciones diferentes a ésta descrita específicamente arriba. La conexión pivotante podría, por
20 ejemplo, incluir el extremo de barra, o la otra disposición de acoplamiento pivotante o rotatoria.

La placa de montaje 82 incluye un mecanismo de seguridad bajo la forma de medios de anti-descarrilamiento 82A, 82B. Los medios de anti-descarrilamiento 82A, 82B son

los rodamientos de bolas o similares, que aseguran que los carros 80 siguen enganchados con las pistas de guía 30 del sistema fuerte de viga posterior trapezoidal 10. Los medios de anti-descarrilamiento 82A, 82B se proveen para prevenir
5 que el puente 72 y la grúa caigan a la tierra en caso de falta de los rodillos 84, 86, 88, 90 u otras partes del carro 80.

El puente 72 y las pistas de guía paralelas 30 se forman del acero en frío en tubo o barra. Puede también
10 apreciarse que el puente 72 puede estar bajo la forma de sistema de viga trapezoidal 10, 50, formando de tal modo un puente de viga trapezoidal 72', como se ilustra mejor en las figuras 9 y 10. El puente 72 puede consistir de la viga trapezoidal 12, y la pista de guía 30, en donde la porción de
15 pista de guía 30 que se extiende a la última viga trapezoidal 12 se recibe en la manga del puente 100.

Se hace ahora referencia a la figura 10, que ilustra otro sistema fuerte de viga trasera trapezoidal 120 de la modalidad alternativa. El sistema fuerte de viga
20 trasera trapezoidal 120 de la modalidad alternativa es similar al sistema fuerte de viga posterior trapezoidal 70 de la modalidad alternativa de la figura 7 salvo que las pistas de guía paralelas 30 y las vigas trapezoidales 12 del sistema fuerte de viga posterior trapezoidal 70 de la modalidad

alternativa se substituyen por las vigas trapezoidales paralela 50 de la modalidad alternativa de las figuras 5 y 6.

La viga trapezoidal 50 tiene un primer lado 54, una sección superior 56, un primer reborde 58, un segundo
5 lado 60, y un segundo reborde 64. La sección superior 56 se asegura rígidamente a los lados primero y segundo 54, 60 a través de medios tales como, pero sin limitarse a, soldadura a lo largo de sus costuras del reborde, remaches, sujetadores, pegamento, o abrazadera. La sección superior 56
10 es adyacente a el primer lado 54 y la segunda cara 60. El primer reborde 58 está opuesto a la sección superior 56 de el primer lado 54, y el segundo reborde 64 está opuesto a la sección superior 56 de la segunda cara 60. Una abertura 66 se define entre los primeros y segundos rebordes 58, 64.

15 Los primeros y segundos rebordes 58, 64 forman un ángulo interno entre sí. Preferentemente, el ángulo se orienta los primeros y segundos rebordes 58, 64 paralelos a la sección superior 56, como se ilustra mejor en la figura 10.

20 Los lados primero y segundo 54, 60 se adelgazan hacia adentro desde las secciones superiores 56 a sus rebordes respectivos 58, 64. El ángulo al cual los lados primero y segundo 54, 60 se adelgazan se relaciona con la anchura deseada de la abertura 66.

El puente 72 incluye carros 80. Los carros 80 se proporcionan para viajar a lo largo de los primeros y segundos rebordes 58, 64 del sistema fuerte de viga posterior trapezoidal 50 de la modalidad alterna respectivamente. La
5 relación y la configuración de los carros 80 y de los primeros y segundos rebordes 58, 64 son substancialmente idénticas. Por lo tanto, la descripción siguiente, referente a la figura 10, en parte, se refiere solamente a un carro 80 y a los primeros y segundos rebordes 58, 64 de un sistema
10 fuerte de viga posterior trapezoidal 50 de la única modalidad alternativa. Además, los carros 80 se pueden motorizar o proveer con un sistema del motor y de impulsión.

Los primeros y segundos rebordes 58, 64 del sistema fuerte de viga trasera trapezoidal 50 de la modalidad
15 alternativa forma un sistema de pista interno. El sistema fuerte de viga posterior trapezoidal 50 de la modalidad alternativa puede cada uno incluir una pluralidad de refuerzos de diafragma 40 asegurados rígidamente en el mismo (no ilustrado). Debe apreciarse, sin embargo, que los
20 primeros y segundos rebordes 58, 64 podrían adoptar otros perfiles convenientes, incluyendo el perfil de doble T, o los perfiles externos de la pista (no ilustrados).

El carro 80, o un dispositivo similar, es movibles a lo largo de los primeros y segundos rebordes 58, 64 del

sistema fuerte de viga posterior trapezoidal 50 e incluye por lo menos una placa de montaje 82. La placa de montaje 82 se configura para viajar longitudinalmente a lo largo de los primeros y segundos rebordes 58, 64 mediante los rodillos 84, 86, 88, 90, que se montan de forma rotatoria a la placa de montaje 82. Los carros 80 portan el peso del puente 72 y de la grúa (no ilustrada), que es, a su vez, portado por los primeros y segundos rebordes 58, 64 del sistema fuerte de viga posterior trapezoidal 50. Una placa de montaje adicional 82 puede ser usado en el exterior del perfil (perfil de doble T).

Preferentemente, los rodillos 84, 86, 88, 90 incluyen las superficies afiladas de tal modo que permiten a los rodillos 84, 86, 88, 90 rodar eficientemente a lo largo de los primeros y segundos rebordes 58, 64. Los rodillos 84, 86, 88, 90 incluyen superficies del rodamiento recubiertas plástico (o caucho). Las superficies de rodamiento recubiertas de plástico se proporcionan para reducir el ruido del rodamiento de los rodillos 84, 86, 88, 90. Debe apreciarse, sin embargo, que los rodillos 84, 86, 88, 90 no necesitan incluir superficies de rodamiento recubiertas de plástico. Los rodillos 84, 86, 88, 90 podrían en vez de esto incluir, por ejemplo, superficies de rodamiento de acero.

Además, debe apreciarse que los rodillos 84, 86,

88, 90 se podrían substituir por otro arreglo conveniente tal como, por ejemplo, un arreglo de cojinete.

Los ensambles existentes de la grúa tienden a atascarse cuando un operador inicia el movimiento del puente
5 a lo largo de las guías del ensamble. Esto es, en parte, un resultado de la conexión rígida en los ensambles existentes de la grúa del puente al carro.

Para abordar este problema, esta modalidad alternativa de la presente invención incluye un brazo de
10 desplazamiento 82. El brazo de desplazamiento 92 se construye del acero suave, o de acero de alto-grado, generalmente de la de placas de acero o de bandas de acero. Alternativamente, el brazo de desplazamiento 92 se podría construir de cualquier otro material conveniente. El brazo de desplazamiento 92 está
15 conectado de forma pivotante con una manga 94. La manga 94 se sujeta rígidamente (por cualquier medio conveniente) a la placa de montaje 82. La placa de montaje 82 se suelda preferentemente a la manga 94, pero otros medios de unión rígidos tales como pernos podrían ser utilizados. La conexión
20 pivotante entre el brazo de desplazamiento 92 y la manga 94 se realiza mediante un rodamiento de bolas 96. El rodamiento de bolas 96 es conservado en el lugar por un asiento de rodamiento de bolas 98 provisto en el brazo de desplazamiento 92 y la manga 94. El rodamiento de bolas 96 podía ser

manufacturado de cualquier grado conveniente de acero, o de cualquier otro material conveniente. El asiento del cojinete se forma de un plástico, tal como nylon, para reducir al mínimo la fricción, pero se podría formar de otros materiales
5 convenientes.

El brazo de desplazamiento 92 está conectado de forma pivotante con una manga del puente 100, como es ilustrado en la figura 10, que a su vez, está conectado con seguridad con un extremo del puente 72. La manga del puente
10 100 se construye de acero. Cualquier grado conveniente del acero, o cualquier otro material, se podía utilizar en la construcción de la manga del puente 100. El brazo de desplazamiento 92 está conectado de forma pivotante con la manga del puente 100 mediante dos sujetadores 102, 104 vía
15 los apéndices del brazo de desplazamiento 106, 108. Los sujetadores 102, 104 proporcionan una conexión pivotante entre el brazo de desplazamiento 92 y la manga del puente 100.

La disposición anterior forma un empalme universal
20 que proporciona el pivoteo relativo necesario y el movimiento lateral entre el carro 80 y el puente 72 por lo menos para reducir la incidencia de atascos del ensamble elevador 120 de la modalidad alternativa, después de la iniciación del movimiento del puente 72 en relación a los primeros y

segundos rebordes 58, 64 del sistema fuerte de viga posterior trapezoidal 50 de la modalidad alterna.

Debe apreciarse que la conexión pivotante de los carros 80 al puente 72 podría adoptar una configuración
5 diferente a la descrita específicamente arriba. La conexión pivotante podría alternativamente, por ejemplo, incluir el extremo de barra, u otro arreglo de acoplamiento pivotante o rotatoria.

La placa de montaje 82 incluye un mecanismo de
10 seguridad bajo la forma de medios de anti-descarrilamiento 82A, 82B. Los medios de anti-descarrilamiento 82A, 82B son rodamientos de bolas o similares, que aseguran que los carros 80 sigan enganchados con los primeros y segundos rebordes 58, 64 del sistema fuerte de viga posterior trapezoidal 50 de la
15 modalidad alternativa. Los medios de anti-descarrilamiento 82A, 82B se proveen para prevenir que el puente 72 y la grúa caigan a tierra en caso de falla de los rodillos 84, 86, 88, 90 u otras partes del carro 80.

Puede también apreciarse que el puente 72 puede
20 estar bajo la forma de sistema de viga trapezoidal 10, 50, de tal modo formando un puente de viga trapezoidal 72'. El puente 72 puede consistir en la viga trapezoidal 12, y la pista de guía 30, en donde la porción de pista de guía 30 que se extiende más allá de la viga trapezoidal 12 se recibe en

la manga del puente 100.

Refiriéndonos ahora a la figura 11 que ilustra la modalidad alternativa del sistema fuerte de viga posterior trapezoidal 70 que tiene el puente 72 consiste de la viga trapezoidal 12 y de la pista de guía 30, formando de tal modo un puente de viga trapezoidal 72'. Todos los elementos y sus funciones del sistema fuerte de viga trasera trapezoidal 70 descrito antes se incorporan aquí a la modalidad alternativa ilustrada en la figura 11.

El puente de viga trapezoidal 72' consiste en la viga trapezoidal 12 y la pista de guía 30, incluyendo todos sus elementos estructurales que se describe anteriormente.

El brazo de desplazamiento 92 se puede modificar para acomodar allí el puente de viga trapezoidal 72'. El brazo de desplazamiento 92 está conectado de forma pivotante con una manga del puente 100, como es ilustrado en la figura 11, que a su vez, está conectado con seguridad con la pista de guía 30 del puente de viga trapezoidal 72'. La manga del puente 100 se construye de acero. Cualquier acero de grado conveniente, o cualquier otro material, se podría utilizar en la construcción de la manga del puente 100. El brazo de desplazamiento 92 está conectado de forma pivotante con la manga del puente 100 mediante dos sujetadores 102, 104 vía los apéndices del brazo de desplazamiento 106, 108. Los

sujetadores 102, 104 proporcionan una conexión pivotante entre el brazo de desplazamiento 92 y la manga del puente 100. El brazo de desplazamiento 92, la manga 94 y el carro 80 son idénticos a los descritos antes las figuras 8-10.

5 Refiriéndonos ahora a la figura 12 que ilustra otro puente trapezoidal 70' de la viga de la modalidad alternativa que consiste en el puente de viga trapezoidal 72' y el carro 80'. El puente de viga trapezoidal 72' incluye los carros 80', de los cuales sólo uno se ilustra. El carro 80' se
10 proporciona para viajar a lo largo de las pistas de guía paralelas 30 respectivamente, como se describe anteriormente con respecto a las figuras 7 y 8. La relación y la configuración del carro 80' y de las pistas de guía 30 son substancialmente idénticas. Por lo tanto, la descripción
15 siguiente, referente a la figura 12, en parte, se refiere solamente a un carro 80'. Además, los carros 80' se pueden motorizar o proveer con un sistema del motor y de impulsión.

El carro 80', o un dispositivo similar, es movibles a lo largo de las pistas de guía paralelas 30 del sistema
20 fuerte de viga posterior trapezoidal 70 e incluye por lo menos una placa de montaje 82. La placa de montaje 82 se configura para moverse longitudinalmente a lo largo de la pista paralela de guía 30 por los rodillos 84, 86, 88, 90, que se montan de forma rotatoria a la placa de montaje 82.

Los carros 80' portan el peso del puente de viga trapezoidal 72' y de la grúa (no ilustrada), que a su vez es portado por las pistas de guía paralelas 30. Una placa de montaje adicional 82 puede ser usada en el exterior del perfil
5 (perfil de doble T).

Preferentemente, los rodillos 84, 86, 88, 90 incluyen las superficies adelgazadas de tal modo que permiten a los rodillos 84, 86, 88, 90 rodar eficientemente a lo largo de las pistas de guía 30. Los rodillos 84, 86, 88, 90
10 incluyen superficies de rodamiento recubiertas de plástico (o caucho). Las superficies de rodamiento recubiertas de plástico se provén para reducir el ruido del rodamiento de los rodillos 84, 86, 88, 90. Debe apreciarse, sin embargo, que los rodillos 84, 86, 88, 90 no necesitan incluir
15 superficies de rodamiento recubiertas de plástico. Los rodillos 84, 86, 88, 90 podrían incluir, por ejemplo, superficies de rodamiento de acero.

La placa de montaje 82 incluye un mecanismo de seguridad bajo la forma de medios de anti-descarrilamiento
20 82A, 82B. Los medios de anti-descarrilamiento 82A, 82B son ruedas montadas horizontalmente o similares, que aseguran que los carros 80' sigan enganchados con las pistas de guía 30 del sistema fuerte de viga posterior trapezoidal 70. Los medios de anti-descarrilamiento 82A, 82B se proporcionan para

prevenir que el puente de viga trapezoidal 72' y la grúa caigan a la tierra en caso de fallas de los rodillos 84, 86, 88, 90 u otras partes del carro 80'.

El brazo de desplazamiento 92 se puede modificar
5 para acomodar allí el puente de viga trapezoidal 72'. El
brazo de desplazamiento 92 está conectado de forma pivotante
con una manga del puente 100, como es ilustrado en la figura
12, que a su vez, está conectado con seguridad con la pista
de guía 30 del puente de viga trapezoidal 72'. La manga del
10 puente 100 se construye de acero. Cualquier acero de grado
conveniente, o cualquier otro material, se podría utilizar en
la construcción de la manga del puente 100. El brazo de
desplazamiento 92 está conectado de forma pivotante con la
manga del puente 100 mediante dos sujetadores 102, 104 vía
15 los apéndices del brazo de desplazamiento 106, 108. Los
sujetadores 102, 104 proporcionan una conexión pivotante
entre el brazo de desplazamiento 92 y la manga del puente
100. Una pluralidad de los tornillos de presión 110 se
utiliza para asegurar la pista de guía 30 del puente de viga
20 trapezoidal 72' a la manga del puente 100.

El puente de viga trapezoidal 72' se adapta para
recibir allí la carretilla 78, la carretilla 78 es sostenida
por la pista de guía 30 del puente de viga trapezoidal 72'.
Los medios de unión 76 de la carretilla 78 de tal modo se

reciben dentro de la abertura 74 de la pista de guía 30 del puente de viga trapezoidal 72'.

Una barra suspendida 112 conecta pivotantemente el brazo de desplazamiento 92 con la placa de montaje 82, mientras que un par de los cables 114 conecta los apéndices del brazo de desplazamiento 106,108 con la placa de montaje 82. La barra suspendida 112 pasa a través de la parte superior del brazo de desplazamiento 92, un soporte del poste de pivote 116, y una tuerca del pivote 118. Un perno de rodamiento 120 apoya el brazo de desplazamiento 92 a la barra suspendida 112.

Refiriéndonos ahora a las figuras 13-15, que ilustran otro sistema fuerte de viga trasera trapezoidal 130 de la modalidad alternativa que consiste en el puente de viga trapezoidal 72' y el carro 134 que se adapta al recorrido a lo largo de los perfiles de doble T paralelos 132 respectivamente, de los cuales sólo uno se ilustra. La relación y la configuración del carro 134 y de los perfiles de doble T 132 son substancialmente idénticas. Por lo tanto, la descripción siguiente, referente a las figuras 13-15, en parte, se refiere solamente a un carro 134. Los perfiles de doble T 132 se pueden unir a una estructura o a una superficie de soporte (133).

El carro 134, o un dispositivo similar, es movable

a lo largo de los perfiles de doble T 132 del sistema fuerte de viga trasera trapezoidal 130 e incluye por lo menos una placa de montaje 136. La figura 14 muestra una modalidad que comprende dos placas de montaje 136. La placa de montaje 136 se configura para viajar longitudinalmente a lo largo del perfil de doble T paralelo 132 mediante los rodillos 138, 140, 142, 144 que se montan de forma rotatoria a la placa de montaje 136. Los rodillos 138, 142 se colocan en una malla del perfil de doble T 132, mientras que los rodillos 140, 144 se colocan en la otra malla del perfil de doble T 132, como se ilustra mejor en la figura 14. Los carros 134 portan el peso del puente de viga trapezoidal 72' y de la grúa (no ilustrada), que a su vez es portado por los perfiles de doble T 132. Además, los carros 134 se pueden motorizar o proporcionar un sistema de motor y de impulsión.

Preferentemente, los rodillos 138, 140, 142, 144 incluyen los rodamientos de bolas de surco profundo 148 de tal modo que permiten a los rodillos 138, 140, 142, 144 rodar eficientemente a lo largo de los perfiles de doble T 132. Los rodillos 138, 140, 142, 144 incluyen superficies de rodamiento recubiertas de plástico (o caucho). Las superficies de rodamiento recubiertas de plástico se proporcionan para reducir el ruido del rodamiento de los rodillos 138, 140, 142, 144. Debe apreciarse, sin embargo,

que los rodillos 138, 140, 142, 144 no necesitan incluir superficies de rodamiento recubiertas de plástico. Los rodillos 138, 140, 142, 144 podrían incluir, por ejemplo, superficies del laminado de acero.

5 La placa de montaje 136 incluye un mecanismo de seguridad bajo la forma de pernos de anti-descarrilamiento 150. Los pernos de anti-descarrilamiento 150 aseguran que los carros 134 sigan enganchados con el perfil de doble T 132 del sistema fuerte de viga trasera trapezoidal 130 de la
10 modalidad alterna. Los pernos de anti-descarrilamiento 150 se proporcionan para prevenir que el puente de viga trapezoidal 72' y la grúa caigan a tierra en caso de falla de los rodillos 138, 140, 142, 144 u otras partes del carro 134.

 El brazo de desplazamiento 152, que tiene la
15 configuración de un colgador en forma de U, se puede modificar para acomodar allí el puente de viga trapezoidal 72'. El brazo de desplazamiento 152 está conectado de forma pivotante con una manga del puente o una placa del colgador de recorrido cruzado 156, como se ilustra mejor en las
20 figuras 14 y 15, que a su vez, está conectado con seguridad con una manga del puente o una placa del colgador de recorrido cruzado 158. La manga del puente o la placa del colgador de recorrido cruzado 158 está conectada con seguridad con la pista de guía 30 del puente de viga



trapezoidal 72'. La manga del puente o la placa del colgador de recorrido cruzado 158 se construye de acero. Cualquier acero de grado conveniente, o cualquier otro material, se podría utilizar en la construcción de la manga del puente o la placa del colgador de recorrido cruzado 158. El brazo de desplazamiento 152 está conectado de forma pivotante con la manga del puente o la placa del colgador de recorrido cruzado 158 mediante dos sujetadores 160 vía la manga del puente o una placa del colgador de recorrido cruzado 156. Los sujetadores 106 proporcionan una conexión pivotante entre el brazo de desplazamiento 152 y la manga del puente o una placa del colgador de recorrido cruzado 158. Una pluralidad de tornillos de presión 162 se utiliza para asegurar la pista de guía 30 del puente de viga trapezoidal 72' a la manga del puente o una placa del colgador de recorrido cruzado 158.

El puente de viga trapezoidal 72' se adapta para recibir allí la carretilla 78, con la carretilla 78 que es sostenida por la pista de guía 30 del puente de viga trapezoidal 72'. Los medios de unión 76 de la carretilla 78 de tal modo recibida dentro de la abertura 74 de la pista de guía 30 del puente de viga trapezoidal 72'.

El brazo de desplazamiento 152 está conectado de forma pivotante con las placas de montaje 136 por un eje principal 168. El eje principal 168 pasa a través de las

placas de montaje 136 y es asegurado de manera pivotante a las placas de montaje 136 mediante arandelas 170 y tuercas de fijación 172. Los espaciadores del eje principal 174 se colocan entre las placas de montaje 136 y un poste de pivote 5 178. El brazo de desplazamiento 152 está conectado de forma pivotante con el poste de pivote 178 vía un cojinete para el poste de pivote 180. Además, los cables 182 conectan las placas del colgador de recorrido 156 con el eje principal 168.

10 Refiriéndonos ahora a la figura 16, otra modalidad de la presente invención comprende un sistema fuerte de viga trasera trapezoidal 200 que comprende una viga trapezoidal 12 que tiene una sección superior 16, un primer lado de ahusamiento interno 14 y un segundo lado de ahusamiento 15 interno 20 como se describe anteriormente en referencia a otras modalidades. Una sección inferior 202 opuesta a la sección superior 16 se extiende entre los lados primero y segundo 14, 20. Una porción superior 36 del puente 72", que puede tener una configuración similar a la pista de guía 30 20 como se describe anteriormente, es asegurada a la sección inferior 202 de la viga trapezoidal 12 por cualquier medio conveniente conocido en la técnica, por ejemplo, pero no limitado a, soldadura a lo largo de sus costuras del reborde, remaches, sujetadores, pegamento, o abrazaderas. Como se

describe anteriormente con respecto a las modalidades anteriores, el puente 72" comprende una abertura 74 a través de la cual se extienden los medios de unión 76 para un dispositivo elevador. Los medios de unión están conectados
5 con una carretilla móvil a lo largo del interior del puente 72" como se describe anteriormente.

La modalidad mostrada en la figura 16 comprende un par de pistas paralelas separadas de guía 204 que tienen perfiles de doble T, que proporcionan las pistas externas
10 para un sistema fuerte de viga posterior trapezoidal que se extiende en la parte superior. De acuerdo con lo ilustrado en la figura 16, la viga trapezoidal 12 se extiende substancialmente perpendicular en medio de, y se sostiene en las pistas paralelas separadas de guía 204 vía los carros
15 respectivos 206, o dispositivos similares. Los carros 206 portan el peso de la viga trapezoidal 12 y de la grúa (no ilustrada), que a su vez es portado por las pistas de guía paralelas 204, así formando una grúa de puente.

Con referencia a la vista agrandada en la figura
20 17, cada carro 206 comprende por lo menos una placa de montaje 136. En esta modalidad, cada carro 206 comprende un par de placas de montaje separadas substancialmente en forma de U 136. Por lo menos una placa de montaje 136, y en esta modalidad ambas placas de montaje 136, comprenden una



abertura 137 a través de la cual sobresale el puente 72", como se describe más detalladamente adelante. Cada carro 206 es movable longitudinalmente a lo largo de su pista de guía respectiva 204 en virtud de los rodillos 208, 210, 212, 214, 5 216, 218, 220, 222 montados de forma rotatoria en una orientación substancialmente vertical a las placas de montaje 136. Aunque los rodillos 218, 220, 222 no sean visibles en la figura 17, la disposición de los rodillos es igual en cada placa de montaje 136. Los rodillos 208, 212, 216, 220 se 10 colocan en una malla del perfil de doble T de la pista de guía 204 y los rodillos 210, 214, 218, 222 se colocan por debajo de la malla. Por lo tanto, cada carro 206 comprende cuatro pares de rodillos, cada par que tiene un rodillo sobre y debajo de la malla.

15 Cada carro 206 comprende además uno o más rodillos 224 del extremo que se empotran y ruedan a lo largo del borde de la malla del perfil de doble T. En la modalidad ilustrada, un par de rodillos extremos 224 se monta de forma rotatoria en una orientación substancialmente horizontal a cada placa 20 de montaje 136.

Los rodillos 208, 210, 212, 214, 216, 218, 220, 222, 224 pueden incluir uno de los siguientes como se describe anteriormente con respecto a las modalidades anteriores: rodamiento de bolas de surco profundo,

superficies de rodamiento recubiertas de plástico o de caucho, superficies de rodamiento de acero.

El puente 72" se une a cada carro 206 vía un brazo de desplazamiento 226 y un miembro alargado bajo la forma de
5 eje principal 168 que se extiende en medio de y está asegurado de manera pivotante a las placas de montaje 136. El brazo de desplazamiento 226 se construye de acero suave, o de acero del alto-grado, generalmente de placas de acero o de barras de acero, pero cualquier otro material conveniente
10 puede ser utilizado. El brazo de desplazamiento 226 está conectado de forma pivotante con una manga de puente 230, que recibe y está conectada con seguridad con un extremo del puente 72". La manga de puente 230 se construye de cualquier acero conveniente del grado, o de cualquier otro material
15 conveniente. El brazo de desplazamiento 226 está conectado de forma pivotante con la manga de puente 230 mediante sujetadores 102 en cualquier lado del brazo de desplazamiento 226 vía los apéndices del brazo de desplazamiento 232. Los sujetadores 102 proporcionan una conexión pivotante entre el
20 brazo de desplazamiento 92 y la manga de puente 230.

El eje principal 168 se asegura pivotantemente a cada placa de montaje 136 con las arandelas 170 en cualquier lado de la placa de montaje 136 y de las tuercas de fijación 172 en el exterior de las placas de montaje 136. Los

espaciadores del eje principal 174 se colocan entre las placas de montaje 136 y un poste de pivote 178 que se extiende desde el eje principal 168. El brazo de desplazamiento 226 está conectado de forma pivotante en el
5 primer extremo con el poste de pivote 178 vía un cojinete para el poste de pivote 180, que puede estar bajo la forma de buje plástico lubricado.

Los apéndices 232 dan al brazo de desplazamiento 226 una configuración generalmente de U invertida de tal
10 forma que el primer extremo está conectado de forma pivotante con los extremos del poste 178 y los segundos extremos de cada 232 conectan de forma pivotante con la manga de puente 230 por los sujetadores 102.

La disposición anterior forma un empalme universal
15 que proporcione el pivoteo relativo necesario y el movimiento lateral entre los carros 206 y el puente 72". El movimiento fluido de la disposición evita los atascamientos, particularmente después del inicio del movimiento del puente 72" que forma el puente de la grúa en relación a las pistas
20 de guía paralelas 204 del sistema fuerte de viga trasera trapezoidal 200.

Debe apreciarse que la conexión pivotante de los carros 206 al puente 72" podría adoptar configuraciones diferentes a las descritas específicamente antes. La conexión

pivotante podía por ejemplo, incluir el extremo de barra, u otra disposición pivotante o rotatoria del acoplamiento. En algunas modalidades alternativas de la presente invención, los carros 206 se pueden substituir por los carros descritos en la publicación internacional No. WO 03/101878 del solicitante, cuyo contenido de la solicitud de patente se incorpora aquí como referencia.

Con referencia a la figura 18, de acuerdo con algunas otras modalidades alternativas de la presente invención, por lo menos la parte de los lados primero y segundo 14, 20 de la viga trapezoidal 12 comprende una estructura de red o recortada 300 y no los lados sólidos de acuerdo lo descrito con respecto a las modalidades anteriores. De acuerdo con algunas modalidades, la mayoría de los lados primero y segundo 14, 20, aparte de los extremos sólidos 302, comprende la estructura de red 300, que permite la reducción adicional en el peso del puente mientras que conserva suficiente fuerza. Como se describe anteriormente con respecto a modalidades anteriores, esta modalidad comprende las tapas extremas 26 unidas a los lados primero y segundo 14, 20 sobre el puente 72" y refuerzos de diafragma 40 dentro de la viga trapezoidal 12, que puede también ser elementos verticales adyacentes provistos de la estructura de red 300.

Como otra alternativa adicional a la modalidad mostrada en la figura 18, se omite el puente 72" y las placas de acero planas 304 se sueldan a y se extienden de la sección inferior 202 de la viga trapezoidal 12 para proporcionar una pista. La carretilla 78 que comprende el brazo de desplazamiento 152 que depende de allí como se describe anteriormente se extienden en las placas de acero planas 304 que forman la pista en vez del puente 72".

Refiriéndonos ahora a las figuras 19-21, otra modalidad de la presente invención comprende un ensamblaje elevador 300 que comprende un puente 72'', que puede tener una configuración similar a la pista de guía 30. Como se describe anteriormente con respecto a modalidades anteriores, el puente 72'' comprende una abertura 74 en una superficie inferior a través de la cual se extienden los medios de unión 76 para un dispositivo elevador. Los medios de unión están conectados con la carretilla 78 (mostrada en la figura 7) movable a lo largo del interior del puente 72'' como se describe anteriormente.

La modalidad mostrada en las figuras 19-21 comprende un par de pistas de guía paralelas separadas 204 que tienen perfiles de doble T, que proporcionan las pistas externas para una grúa de puente que se extiende en la parte superior. Según lo ilustrado en las figuras 19-21, el puente

72"' se extiende substancialmente perpendicular en medio de, y sostenido por, las pistas de guía paralelas separadas 204 vía los carros respectivos 306, o dispositivos similares. Los carros 306 portan el peso del puente 72"' y de la grúa (no
5 ilustrada), que a su vez es portado por las pistas de guía paralelas 204, formando así una grúa de puente.

Con referencia adicional a las vistas agrandadas en las figuras 22 y 23, cada carro 306 comprende por lo menos una placa de montaje 136. En esta modalidad, cada carro 306
10 comprende un par de las placas de montaje substancialmente rectangulares 136 separadas, cada una con una abertura 307 que las atraviesa. Cada carro 306 puede moverse longitudinalmente a lo largo de su respectiva pista de guía 204 en virtud de los rodillos 308, 310, 312, 314, montados de
15 forma rotatoria en una orientación substancialmente vertical a las placas de montaje 136 mediante los ejes respectivos 316, 318. Este arreglo se muestra lo más claramente posible en la figura 20. Los ejes 316, 318 pueden estar bajo la forma de pernos roscados que pasan a través de las aberturas en las
20 placas de montaje 136 y asegurado en el lugar con los pernos 320. Los pernos y/o los espaciadores se pueden utilizar para mantener la posición de los rodillos 308, 310, 312, 314 a lo largo de los ejes respectivos 316, 318. Los rodillos 308, 310, 312, 314 se colocan en una malla del perfil de doble T

67.

de la pista de guía 204. Cada carro 306 comprende proyecciones 322 que se extienden dentro de las placas de montaje 136 adyacentes a los rodillos 308, 310, 312, 314. Las proyecciones 322 se extienden hacia adentro sobre una malla
5 del perfil de doble T de la pista de guía 204 y actúan como placas anti-descarrilamiento para prevenir el descarrilamiento de los rodillos 308, 310, 312, 314 y por lo tanto los carros 306 de la pista de guía 204.

Cada carro 306 comprende además uno o más rodillos
10 de guía 224 que se empotran y ruedan a lo largo del borde de la malla del perfil de doble T. En la modalidad ilustrada, un par de los rodillos de guía 224 se monta de forma rotatoria en una orientación substancialmente horizontal a cada placa de montaje 136 con un rodillo de guía 224 en cada extremo de
15 la placa de montaje 136.

Los rodillos 308, 310, 312, 314 y rodillos de guía 224 pueden incluir uno de los siguientes como se describe anteriormente con respecto a modalidades anteriores: rodamiento de bolas de surco profundo, superficies de
20 rodamiento recubiertas de plástico o de caucho, superficies de rodamiento de acero.

El puente 72'' se une a cada carro 306 mediante un par de brazos de desplazamiento 226 asegurado de manera pivotante a un miembro alargado respectivo bajo la forma de



eje principal 168 que se extiende entre las placas de montaje 136. Los brazos de desplazamiento 226 se construyen de acero suave, o de acero de alto grado, generalmente de placas de acero o de bandas de acero, pero cualquier otro material
5 conveniente puede ser utilizado. Cada brazo de desplazamiento 226 está conectado de forma pivotante con el puente 72'' vía un hombro 324 conectado con seguridad con un extremo del puente 72''. Un par de hombros 324, por ejemplo, se suelda en un arreglo paralelo a cada lado del puente 72'' en su
10 extremo de acuerdo con las indicaciones de las figuras 19-23. Como se muestra en la figura 23, cada hombro 324 comprende un soporte bajo la forma de placa de anti-caída 326 soldada a un superficie inferior de cada hombro 324. Cada soporte 326 comprende una abertura en cada extremo para recibir un
15 sujetador 102 bajo la forma de barra. Cada brazo de desplazamiento 226 está conectado de forma pivotante con un hombro respectivo 324 mediante sujetadores 102 que pasan por cualquier lado del brazo de desplazamiento 226 y en las aberturas en cada extremo de soporte 326. Los sujetadores 102
20 proporcionan una conexión pivotante entre el brazo de desplazamiento 226 y los hombros 324 del puente 72''. De acuerdo con algunas modalidades, las aberturas se extienden a través de la longitud de soporte 326 y un par de barras se utiliza tal que una sola barra pasa a través de cada brazo de

desplazamiento 226 y de soporte respectivo 326.

Los ejes principales 168 pueden estar bajo la forma de pernos roscados y se aseguran a cada placa de montaje 136 con arandelas 170 a cualquier lado de la placa de montaje 136 y de las tuercas de fijación 172 en el interior y el exterior de las placas de montaje 136, como se describe anteriormente con respecto a modalidades anteriores. Solamente las tuercas de fijación 172 en el exterior de las placas de montaje 136 se muestran en las figuras 19-23. Aunque no estén mostrados en las figuras 19-23, de acuerdo lo descrito previamente aquí, (en referencia, por ejemplo, a la figura 14), de acuerdo algunas modalidades, los espaciadores del eje principal 174 se puedan colocar entre las placas de montaje 136 y un poste respectivo de pivote 178. Los brazos de desplazamiento 226 están conectados de manera pivotante con los postes respectivos de pivote 178 a través de un cojinete para el poste de pivote 180, que puede estar bajo la forma de un buje plástico lubricado.

La disposición anterior forma un empalme universal que proporciona el necesario pivoteo relativo y el movimiento lateral entre los carros 306 y el puente 72". El movimiento fluido de la disposición evita el atascamiento, particularmente después de la iniciación del movimiento del puente 72" que forma el puente de la grúa en relación a las

pistas de guía paralelas 204 del ensamble elevador 300. La
abertura 307 a través de cada placa de montaje 136 permite el
suficiente movimiento de la pista de guía 30 y los hombros
324. Los hombros 324 provén la unión a los pares de los
5 brazos de desplazamiento 226 y el espacio entre los hombros
324 permite el acoplamiento de la carretilla 78 al puente
72''.

Debe apreciarse que la conexión pivotante de los
carros 306 al puente 72'' podría adoptar las configuraciones
10 diferentes a la descrita específicamente antes. La conexión
pivotante podría, por ejemplo, incluir el extremo de barra, u
otro arreglo de acoplamiento pivotante o rotatorio.

Aunque las modalidades mostradas en las figuras 19-
23 muestran un puente plano 72'', el sistema fuerte de viga
15 trasera trapezoidal ya mencionado se puedan utilizar con las
modalidades mostradas en las figuras 19-23. Otra variación a
las modalidades mostradas en las figuras 19-23 se muestra en
las figuras 24-26. En esta modalidad, el ensamble elevador
400 comprende un puente 72'' que tiene un par de hombros 324
20 provistos en cada extremo para el acoplador giratorio a los
brazos de desplazamiento 226 respectivos de un carro
respectivo 406 como se describe anteriormente. Sin embargo,
en esta modalidad, las placas de montaje 136 forman dos
paredes de una caja de moldeo 402, que se puede vaciar de

cualquier metal conveniente, tal como acero grado 4140 de alta resistencia a la tracción. En esta modalidad, una de las placas de montaje 136 en un lado más cercano al puente 72'' comprende una abertura 307 a través de la cual el puente 72'' sobresale para permitir la conexión pivotante de los hombros 324 a los brazos de desplazamiento 226. La placa de montaje 136 en el exterior es una pared plana y no comprende una abertura.

Los miembros 168, comprenden postes de pivote 178, tienen una sección transversal cuadrada y se vacían con la caja 402. Los miembros alargados 168 pueden sin embargo tener otras formas de sección transversal. Por lo tanto, se fijan a los miembros alargados 168 no en la forma de ejes de pivote principales como se describe anteriormente con respecto a las modalidades mostradas en las figuras 16, 17 y 19-23.

Cada carro 406 es movable longitudinalmente a lo largo de su respectiva pista de guía 204 en virtud de los rodillos 308, 310, 312, 314, montados de forma rotatoria en una orientación substancialmente vertical a las placas de montaje 136 vía los ejes respectivos 316, 318 como se describe anteriormente. Las placas de montaje 136 de cualquier lado de la caja de moldeo 402 comprenden aberturas 403 y collares 405 para los ejes de montaje 316, 318.

Cada carro 406 comprende por lo menos un miembro de

anti-descarrilamiento 408 y en esta modalidad a los pares de los miembros de anti-descarrilamiento 408 se montan a una superficie inferior de la caja de moldeo 402 debajo de las placas de montaje 136 de cualquier lado de la caja de moldeo 402. La caja 402 se moldea con un miembro 409 de la primera base en una posición substancialmente central que comprende una pluralidad de aberturas alargadas 410. En esta modalidad, se proporcionan cuatro aberturas alargadas 410 y se fijan los miembros de anti-descarrilamiento 408 al miembro 409 de la primera base con sujetadores, tales como tuercas y los pernos. Los miembros de anti-descarrilamiento 408 comprenden un bloque 412 que se empotra o se extiende muy cerca a la malla del perfil de doble T de la pista de guía 204 y de una placa 414 unida al bloque 412 por los sujetadores que se coloca debajo de la malla del perfil de doble T para prevenir el descarrilamiento de los rodillos 308, 310, 312, 314 y por lo tanto del carro 406 de la pista de guía 204. Las aberturas alargadas 410 permiten la colocación exacta y el montaje variable de los miembros de anti-descarrilamiento 408 con respecto a la pista de guía 204 y permiten al carro 406 ser utilizado en una amplia gama de pistas de la guía de diversos tamaños y formas.

Cada carro 406 comprende además uno o más rodillos de guía 224 que se empotran y ruedan a lo largo del borde de

la malla del perfil de doble T. En la modalidad ilustrada, un par de rodillos de guía 224 se monta de forma rotatoria en una orientación substancialmente horizontal a un extremo respectivo del miembro base 416 de la caja de moldeo 402 con
5 sujetadores, tales como tuercas y pernos. Cada miembro base 416 comprende un par de aberturas alargadas 418 para permitir la colocación exacta y el montaje variable de los rodillos de guía 224.

La modalidad mostrada en las figuras 24-26 tiene
10 fuerza superior que algunas de las modalidades anteriores y es más barata de producir porque se moldea como una sola unidad y no se forma de componentes trabajados a máquina y cortados por separado.

Debe apreciarse que las partes de los arreglos
15 descritos antes se podrían incorporar en los ensambles existentes. A este respecto, el solicitante considera que los arreglos ilustrados en las figuras 7-26 en su totalidad o en parte, se podrían incorporar en los ensambles existentes. El solicitante considera que por lo menos los arreglos que
20 comprenden los carros que se desplazan en la parte superior descritos aquí se pueden motorizar y no ser movidos a mano.

Las modalidades de la presente invención que comprenden los carros motorizados que se mueven en la parte superior ahora serán descritas en referencia a las figuras

27-32.

Las figuras 27-29 muestran un ensamble 500 de la grúa de puente que comprende un par de pistas guía separadas 204 conectables a una estructura de soporte (no mostrada) y a un par de carros 506 movibles longitudinalmente a lo largo de las pistas de guía 204 respectivas. Como con algunas de las modalidades anteriormente descritas, el puente 72'' comprende un par de hombros 324 en cada extremo del puente. Un hombro 324 se une a cualquier lado del puente 72'' por cualquier medio conveniente, tal como soldadura, y cada hombro 324 sobresale más allá del extremo del puente 72''.

Con la referencia adicional a la figura 30, cada hombro 324 del puente 72'' está conectado de forma pivotante con un brazo respectivo de desplazamiento 226. En esta modalidad, cada brazo de desplazamiento 226 está bajo la forma de estribo 502. Cada estribo 502 se puede considerar que comprende un par de los apéndices separados del brazo de desplazamiento 232 que se ensamblan en un primer extremo que forma un reborde 504 y se ensamblan en un segundo extremo que forma una base 506 del estribo 502. Cada hombro 324 está conectado de forma pivotante con un estribo respectivo 502 en el segundo extremo vía un poste de pivote 178 y un cojinete para el poste de pivote 180 montados a la base 506.

El reborde 504 de cada estribo 502 comprende una

abertura 508 para contener un cojinete esférico 510. La
abertura 508 y el cojinete esférico 510 reciben desplazable y
de forma rotatoria a un miembro alargado bajo la forma de eje
principal 168. El eje principal 168 está sostenido por un
5 cuerpo 512 del carro 506, que cubre los componentes del carro
506. El cuerpo 512 se puede considerar que comprende un par
de las placas de montaje transversales 515 paredes de extremo
de formación del cuerpo 512 y de las placas de montaje 136
paredes laterales de formación del cuerpo 512. Como se
10 muestra en la figura 27, una placa de montaje interna 136
comprende una abertura 307 a través de la cual el puente 72''
y/o los hombros 324 del puente sobresalen para el
acoplamiento pivotante a los estribos 502. Las placas 507 se
unen a las placas de montaje internas 136 sobre el puente
15 72'' para prevenir el recorrido ascendente del puente en
relación al carro 506, evitando así que los hombros 324
salten de los postes de pivote 178 y de los cojinetes del
poste del pivote 180.

El cuerpo 512 también comprende un techo 514 unida
20 a las placas de montaje transversales 515 y a las placas de
montaje 136. En las figuras 27-29, el cuerpo 512 se ha
omitido del carro 506 en el lado derecho para mostrar los
componentes internos. Parte del techo 514 y/o de las placas
de montaje transversales 515 se puede curvar, como se muestra

lo más claramente posible en las figuras 27 y 30. Como se muestra en la figura 30, el eje principal 168 es sostenido en cada extremo por las porciones reforzadas 516, que pueden ser parte de las placas de montaje transversales 515 o parte del techo 514. El eje principal 168 también es sostenido en una región substancialmente central por la porción reforzada 518 colgado hacia abajo del techo 514. Sin embargo, será apreciado que en modalidades alternativas, el eje principal 168 se puede sostener en cada extremo por las placas de montaje transversales 515 del cuerpo 512.

Como se muestra lo más claramente posible en las figuras 30 y 31, el carro 506 también comprende por lo menos un medio de empuje 520 montado de forma desplazable en el eje principal 168 adyacente al reborde 504 en el primer extremo del estribo 502. En la modalidad mostrada, los medios de empuje 520 bajo la forma de resortes helicoidales se proporcionan en cualquier lado del reborde 504 de cada estribo 502 para mantener los estribos 502 alineados con los hombros respectivos 324 del puente y para prevenir ensuciar los estribos 502 del eje principal 168 y/o de los hombros 324 que sostienen el puente 72". Por lo menos un espaciador 522 se monta desplazable en el eje principal 168 entre los medios de empuje 520 y el cuerpo 512. En la modalidad mostrada, un espaciador 522 está montado desplazado fuera de cada uno de

los medios de empuje externos 520 para cada estribo 502. Los medios de empuje internos 520 también se empotran con la porción reforzada central 518 del cuerpo 512.

El ensamble 500 de la grúa de puente también
5 comprende los medios de impulsión 524 unidos a cada carro 506
vía una caja de engranajes 526 para conducir cada carro a lo
largo de su respectiva pista de guía 204. Los medios de la
impulsión pueden tomar cualquier forma conveniente, tal como
un motor eléctrico, y los medios de la impulsión para cada
10 carro se sincronizan vía una conexión alámbrica o inalámbrica
tal que ambos carros 506 son conducidos en la misma dirección
simultáneamente para mover el puente 72'' a lo largo de las
pistas de guía 204. La caja de engranajes 526 se puede montar
al cuerpo 512 por cualquier medio conveniente y unir a uno de
15 los ejes 316 o 318 en los cuales están montados
respectivamente los rodillos 308 y 310 o los rodillos 312 y
314 para conducir el carro a lo largo de la pista de guía
204.

Con referencia a la figura 29, el puente 72''
20 comprende los medios de unión 76 para sostener un dispositivo
elevador del ensamble de la grúa de puente 500. La figura 29
muestra un par de medios de unión 76, cada uno de los cuales
se une a una carretilla 78, que puede estar bajo la forma de
montaje doble de la carretilla, que se extiende dentro de la

77

estructura hueca del puente 72'' como se describe anteriormente. Una caja del motor de elevación 528 se une a los medios de unión 76 para la operación motorizada del dispositivo elevador.

5 Con referencia a la figura 32, los miembros de anti-descarrilamiento 408 se unen a una superficie inferior del cuerpo 512, por ejemplo, como se describe anteriormente. En esta modalidad, los miembros de anti-descarrilamiento 408 son estructuras unitarias y no están formados de un bloque
10 separado 412 y de la placa 414 como se describe anteriormente con respecto a la figura 24. El rodillo 310 se asegura en el lugar en el eje 316 vía el anillo de cierre 530 y la arandela 532. La figura 32 también muestra una placa circular 530, que es una placa de cubierta unida al cuerpo 512.

15 Mientras que las modalidades descritas referente a las figuras 27-32 comprenden un par de brazos de desplazamiento 226 bajo la forma de estribos 502, debe apreciarse que las modalidades de la presente invención pueden incluir un solo brazo de desplazamiento 226 bajo la
20 forma de estribo 502 conectado de forma pivotante con el puente 72'' vía el poste de pivote 178 y el cojinete para el poste de pivote 180, opcionalmente vía una manga del puente, así omitiendo los hombros 324.

Por lo tanto, de acuerdo con otro aspecto, la

presente invención reside en un carro 506 para un ensamble 500, el carro de la grúa de puente que comprende un cuerpo 512 que tiene un par de placas de montaje transversales separadas 515, un par de las placas de montaje 136 y un techo 514. El carro 506 comprende una pluralidad de los rodillos 308, 310, 312, 314 montados de forma rotatoria en una orientación substancialmente vertical al cuerpo 512 para el movimiento longitudinal del carro 506 a lo largo de una respectiva pista de guía 204 del ensamble 500 de la grúa de puente. El carro 506 también comprende un miembro alargado sostenido por el cuerpo y por lo menos un brazo de desplazamiento 226 bajo la forma de estribo 502 unido desplazable y de forma rotatoria en un primer extremo al miembro alargado, por ejemplo vía un cojinete esférico. El estribo 502 tiene por lo menos un segundo extremo para la conexión pivotante al puente 72'', por ejemplo vía el poste del pivote y un cojinete del poste del pivote.

Las modalidades alternativas de los carros 506 que comprenden el ensamble 500 de la grúa de puente proporcionan el recorrido mejorado de los carros 506 a lo largo de las pistas de guía 204 y de la probabilidad reducida de atasco comparada con los ensambles existentes. Esto es un resultado de la conexión pivotante del puente 72'' a los segundos extremos de los estribos 502. Esto es también un resultado

del acoplador de los estribos 502 en el primer extremo vía los cojinetes esféricos 510. El mantenimiento substancial de la posición de los estribos 502 vía los medios de empuje 520 también contribuyen a la probabilidad reducida de atasco y
5 facilitan el recorrido de los carros 506. Por lo tanto será apreciado que el acoplador ya mencionado del puente 72'' a los carros 506 se puede también utilizar para las grúas de puente manuales tales que los medios de impulsión 524 y la caja de engranajes 526 están omitidos.

10 Los sistemas fuertes de viga trasera trapezoidal 10, 50, 70, 70', 130, 200 de la modalidad alternativa permiten que el peso del puente sea reducido por el aproximadamente 35% comparado con usar vigas RHS como viga trasera fuerte.

15 Además, sin el uso de los haces traseros fuertes trapezoidales 10, 50, 70, 70 ', 130, 200, un diseño de un puente corriente de 1 tonelada de 12 metros pesa 513 kg. Usando las vigas traseras fuertes trapezoidales 10, 50, 70, 70', 130, 200 de acuerdo con las modalidades de la invención,
20 un diseño de un puente corriente de 2 tonelada de 12 metros pesa 440 kg. Las modalidades de la presente invención también permiten longitudes del puente de hasta por lo menos 15 metros para las grúas de puente manuales y longitudes considerablemente más largas del puente para las grúas de

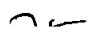
puentes motorizadas. Así puede apreciarse el beneficio de usar la viga trasera fuerte trapezoidal 10, 50, 70, 70', 130, 200 de acuerdo las modalidades de la invención en las grúas de puente.

5 Los sistemas fuertes de la viga trasera trapezoidales 10, 50, 70, 70', 130, 200 de la modalidad alternativa, y los ensambles de elevación 300, 400, 500 de la presente invención se han encontrado que por lo menos reduce la incidencia de atascos experimentada por los ensambles
10 existentes. Esto se aplica a las versiones manuales y motorizadas. Además, los sistemas fuertes de la viga trasera trapezoidales 10, 50, 70, 70', 130, 200 de la modalidad alternativa, y los ensambles de elevación 300, 400, 500 de la presente invención también se han encontrado que requieren
15 menos esfuerzo del operador para iniciar el movimiento del puente 72, 72', 72", 72"' a lo largo de las vigas paralelas 10, 50, 132, 204 cuando se comparan a los ensambles existentes. Las ensamblajes 200, 300, 400, 500 particularmente también proporcionan más sitio principal en comparación con
20 algunos de los ensambles existentes.

 Por otra parte, la presente invención es particularmente útil, porque puede ser incorporada relativamente fácilmente en los ensambles existentes.

 Mientras que las modalidades preferidas del sistema

fuerte de viga posterior trapezoidal se han descrito detalladamente, debe ser evidente que son posibles modificaciones y variaciones, que entrarán dentro del alcance de la invención. Con respecto a la descripción anterior, debe
5 ser observado que las relaciones dimensionales óptimas para las partes de la invención, incluyen variaciones de tamaño, materiales, forma, forma, función y manera de la operación, del ensamble y del uso, se consideran fácilmente evidentes y obvias para la persona experta en la técnica y a todas las
10 relaciones equivalentes a los ilustrados en los dibujos y descritos en la descripción se pretende estén comprendidos en la presente invención. Por lo tanto, el precedente se considera como ilustrativo solamente de los principios de la invención. Además, puesto que numerosas modificaciones y
15 numerosos cambios numerosos fácilmente se les ocurrirán a los expertos en la materia, no se desea limitar la invención a la construcción y a la operación exactas mostradas y descritas y por consiguiente, todas las modificaciones y equivalentes convenientes los cuales puedan usarse, caen dentro del
20 alcance de la invención.



NOVEDAD DE LA INVENCION

Habiéndose descrito la invención como antecede, se reclama como propiedad lo contenido en las siguientes:

5

REIVINDICACIONES

1. Un carro para un ensamble de grúa de puente, caracterizado porque comprende:

un par de placas de montaje separadas, por lo menos una de las placas de montaje presentan una abertura;

10

una pluralidad de rodillos montados de forma rotatoria en una orientación substancialmente vertical a las placas de montaje para el movimiento longitudinal del carro a lo largo de una respectiva pista de guía del ensamble de grúa de puente;

15

un miembro alargado que se extiende entre las placas de montaje; y

20

un brazo de desplazamiento acoplado de forma pivotante en un primer extremo al miembro alargado, el brazo de desplazamiento que tiene por lo menos un segundo extremo para la conexión pivotante a un puente, el puente sobresale a través de la abertura en por lo menos una de las placas de montaje y comprende medios de unión para sostener un dispositivo elevador del ensamble de grúa de puente.

2. El carro de conformidad con la reivindicación 1,

caracterizado porque el brazo de desplazamiento se acopla pivotantemente a un poste del pivote vía un cojinete del poste del pivote, el poste de pivote se extiende desde el miembro alargado.

5 3. El carro de conformidad con la reivindicación 1, caracterizado porque el miembro alargado es un eje asegurado de manera pivotante a las placas de montaje.

 4. El carro de conformidad con la reivindicación 1, caracterizado porque el brazo de desplazamiento está
10 conectado de forma pivotante con una manga del puente para recibir un extremo del puente.

 5. El carro de conformidad con la reivindicación 4, caracterizado porque el brazo de desplazamiento comprende un par de apéndices, cada apéndice conectado de forma pivotante
15 con la manga del puente por un sujetador.

 6. El carro de conformidad con la reivindicación 1, caracterizado porque ambas placas de montaje comprenden una abertura.

 7. El carro de conformidad con la reivindicación 1,
20 caracterizado porque el carro se mueve encima de la respectiva pista de guía.

 8. El carro de conformidad con la reivindicación 1, caracterizado porque la respectiva pista de guía está bajo la forma de perfil de doble T y el carro se mueve por encima de

una malla del perfil de doble T.

9. El carro de conformidad con la reivindicación 8, caracterizado porque algunos de la pluralidad de rodillos se coloca encima de una malla del perfil de doble T y algunos de
5 la pluralidad de rodillos se coloca por debajo de la malla.

10. El carro de conformidad con la reivindicación 8, caracterizado porque además comprende uno o más rodillos extremos, cada rodillo extremo está empotrado y es capaz de rodar a lo largo de un borde respectivo de la malla del
10 perfil de doble T.

11. El carro de conformidad con la reivindicación 10, caracterizado porque un par de rodillos extremos se monta de forma rotatoria con una orientación substancialmente horizontal a cada placa de montaje.

15 12. El carro de conformidad con la reivindicación 1, caracterizado porque además comprende:

un segundo miembro alargado separado del miembro alargado, el segundo miembro alargado que se extiende entre las placas de montaje; y

20 un segundo brazo de desplazamiento acoplado de forma pivotante en un primer extremo al segundo miembro alargado, el brazo de desplazamiento que tiene por lo menos un segundo extremo para la conexión pivotante al puente.

13. El carro de conformidad con la reivindicación

12, caracterizado porque el segundo miembro alargado es un eje asegurado de manera pivotante a las placas de montaje.

14. El carro de conformidad con la reivindicación 12, caracterizado porque además comprende un hombro a
5 cualquier lado del puente en el extremo del puente, cada hombro está conectado de forma pivotante con un brazo respectivo de desplazamiento.

15. El carro de conformidad con la reivindicación 14, caracterizado porque además comprende un soporte en la
10 superficie inferior de cada hombro para recibir un par de sujetadores para la conexión pivotante a un brazo respectivo de desplazamiento.

16. El carro de conformidad con la reivindicación 12, caracterizado porque además comprende las proyecciones
15 que se extienden en el interior de las placas de montaje adyacentes a los rodillos para prevenir el descarrilamiento de los rodillos de la pista de guía.

17. El carro de conformidad con la reivindicación 12, caracterizado porque las placas de montaje y los primeros
20 y segundos miembros alargados forman parte de una caja de moldeo.

18. El carro de conformidad con la reivindicación 17, caracterizado porque además comprende un primer miembro base para montar por lo menos un miembro de anti-.

descarrilamiento.

19. El carro de conformidad con la reivindicación 18, caracterizado porque el primer miembro base comprende una pluralidad de las aberturas alargadas para el montaje variable por lo menos de un miembro del anti-
5 descarrilamiento.

20. El carro de conformidad con la reivindicación 17, caracterizado porque además comprende por lo menos un miembro base extremo para montar uno o más rodillos extremos,
10 cada rodillo extremo está empotrado y es capaz de rodar a lo largo de un borde respectivo de una malla de un perfil de doble T de la respectiva pista de guía.

21. El carro de conformidad con la reivindicación 20, caracterizado porque por lo menos un miembro base extremo
15 comprende una pluralidad de las aberturas alargadas para el montaje variable de uno o más rodillos extremos.

22. Un ensamble de grúa de puente caracterizado porque comprende:

una viga trapezoidal;

20 un puente unido a una superficie inferior de la viga trapezoidal, el puente comprende medios de unión para sostener un dispositivo elevador;

por lo menos una pista de guía conectable a una estructura de soporte;

por lo menos un carro movable longitudinalmente a lo largo de por lo menos una pista de guía, el carro comprende:

un par de placas de montaje separadas;

5 una pluralidad de rodillos montada de forma rotatoria en una orientación substancialmente vertical a las placas de montaje;

un miembro alargado que se extiende entre las placas de montaje; y

10 un brazo de desplazamiento acoplado de forma pivotante en un primer extremo al miembro alargado, el brazo de desplazamiento que tiene por lo menos un segundo extremo para la conexión pivotante al puente.

23. El ensamble de grúa de puente de conformidad
15 con la reivindicación 22, caracterizado porque la viga trapezoidal tiene una sección superior, un primer lado asegurado rígidamente a la sección superior y un segundo lado asegurado rígidamente a la sección superior opuesta al primer lado, caracterizado porque los primeros y segundos lados se
20 adelgazan hacia adentro entre sí de la sección superior al puente.

24. El ensamble de grúa de puente de conformidad con la reivindicación 23, caracterizado porque la sección superior tiene una primera sección superior asegurada

rígidamente al primer lado y una segunda sección superior asegurada rígidamente al segundo lado, y porque la primera sección superior se asegura rígidamente a la segunda sección superior de una manera generalmente traslapada.

5 25. El ensamble de grúa de puente de conformidad con la reivindicación 24, caracterizado porque por lo menos una parte del primer lado y/o por lo menos una parte del segundo lado presentan una estructura de red.

10 26. El ensamble de grúa de puente de conformidad con la reivindicación 22, caracterizado porque el por lo menos un carro se desplaza por encima o es colgado debajo con respecto a la pista de guía.

15 27. El ensamble de grúa de puente de conformidad con la reivindicación 22, caracterizado porque la viga trapezoidal ofrece un primer reborde que se extiende de una primera viga opuesta a la sección superior y un segundo reborde que se extiende de una segunda viga opuesta a la sección superior, los primeros y segundos rebordes están orientaron uno frente al otro.

20 28. El ensamble de grúa de puente de conformidad con la reivindicación 27, caracterizado porque la configuración de los primeros y segundos rebordes y los primeros y segundos lados permiten que un componente de la grúa de puente sea recibido allí.

29. El ensamble de grúa de puente de conformidad con la reivindicación 27, caracterizado porque además comprende una pluralidad de refuerzos de diafragma dentro de los primeros y segundos lados.

5 30. Un ensamble de grúa de puente caracterizado porque comprende:

 una viga trapezoidal;

 por lo menos una pista de guía conectable a una superficie inferior de la viga trapezoidal;

10 por lo menos un carro movable longitudinalmente dentro de por lo menos una pista de guía;

 un puente que comprende medios de unión para sostener un dispositivo elevador;

 por lo menos un brazo de desplazamiento que tiene
15 un primer extremo conectado de forma pivotante con por lo menos un carro y por lo menos un segundo extremo conectado de forma pivotante con un puente, el puente que comprende medios de unión para sostener un dispositivo elevador; y

 un empalme universal provisto entre el por lo menos
20 un brazo de desplazamiento y el por lo menos un carro para absorber los movimientos rotatorios y laterales del puente cuando se aplica una fuerza a los medios de unión.

31. El ensamble de grúa de puente de conformidad con la reivindicación 30, caracterizado porque el por lo

menos un carro se desplaza por encima o es colgado debajo con respecto a la pista de guía.

32. El ensamble de grúa de puente de conformidad con la reivindicación 30, caracterizado porque además
5 comprende una viga trapezoidal unida a la parte superior del puente.

33. El ensamble de grúa de puente de conformidad con la reivindicación 32, caracterizado porque un primer lado y/o un segundo lado de la viga trapezoidal unidos a la parte
10 superior del puente comprende una estructura de red.

34. Un ensamble de grúa de puente caracterizado porque comprende:

un puente que tiene medios de unión para sostener un dispositivo elevador;

15 por lo menos una pista de guía conectable a una estructura de soporte;

y por lo menos un carro de conformidad con la reivindicación 1 movable longitudinalmente a lo largo de por lo menos una pista de guía.

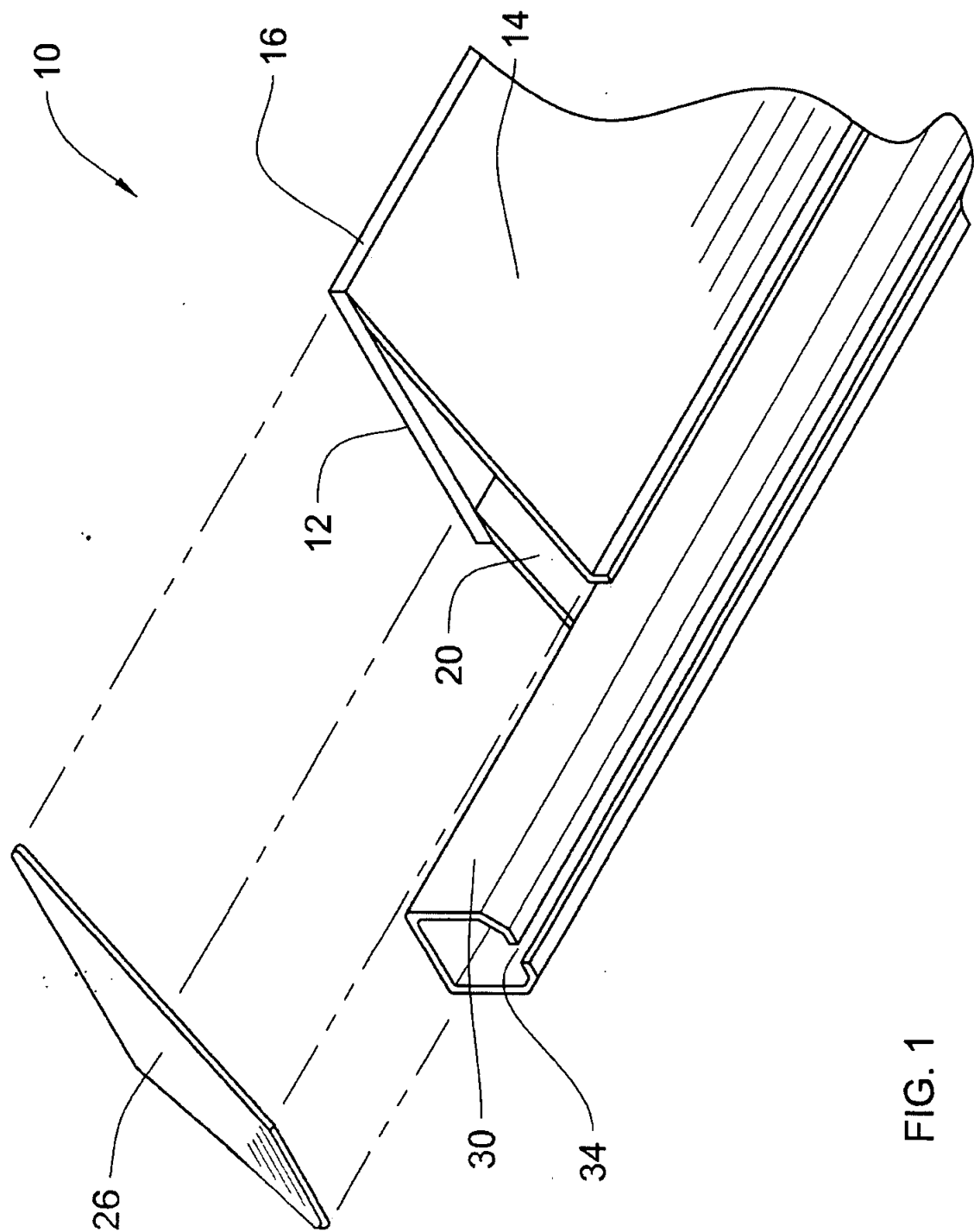
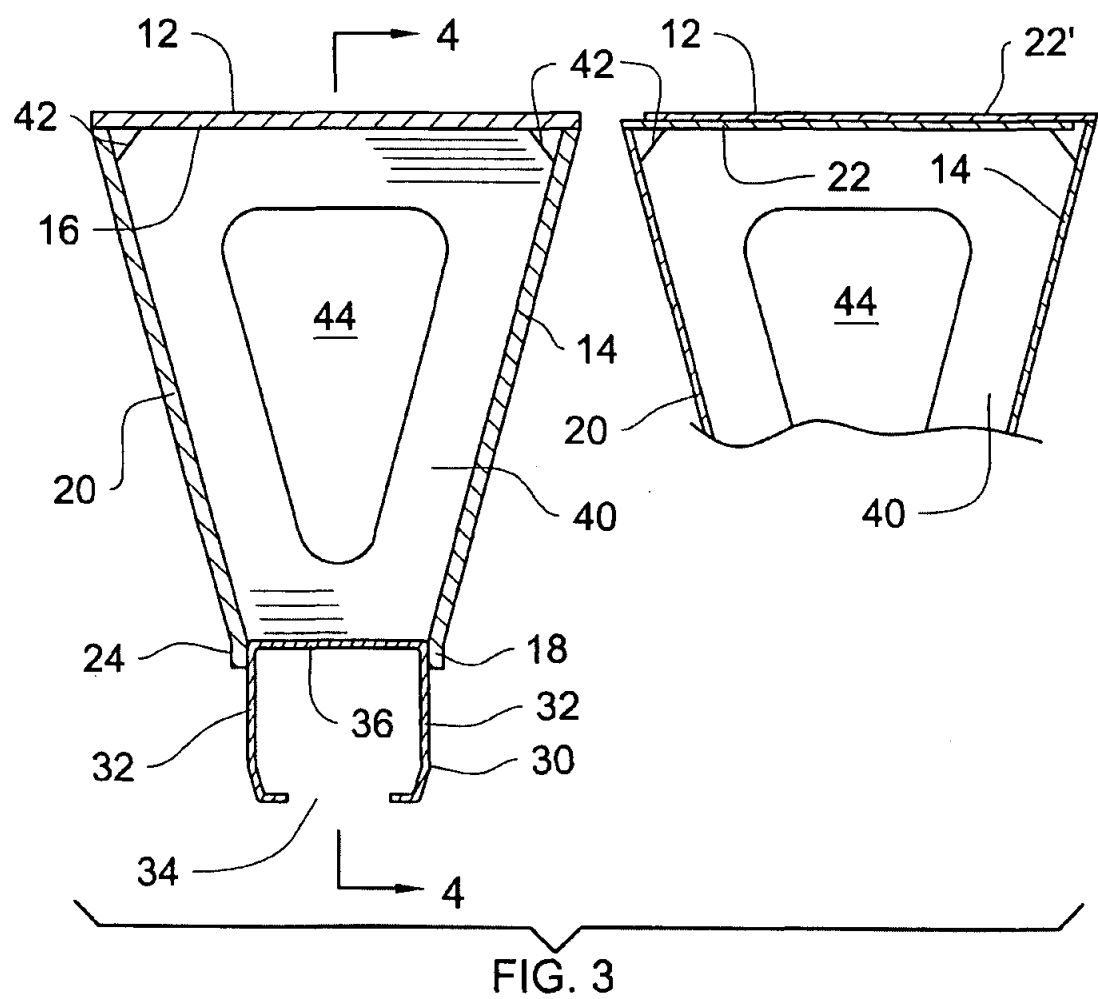
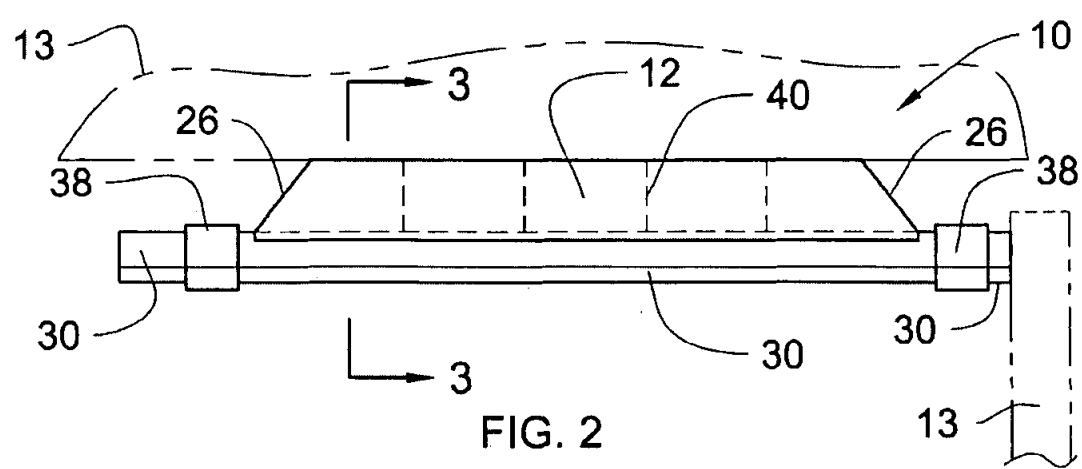


FIG. 1



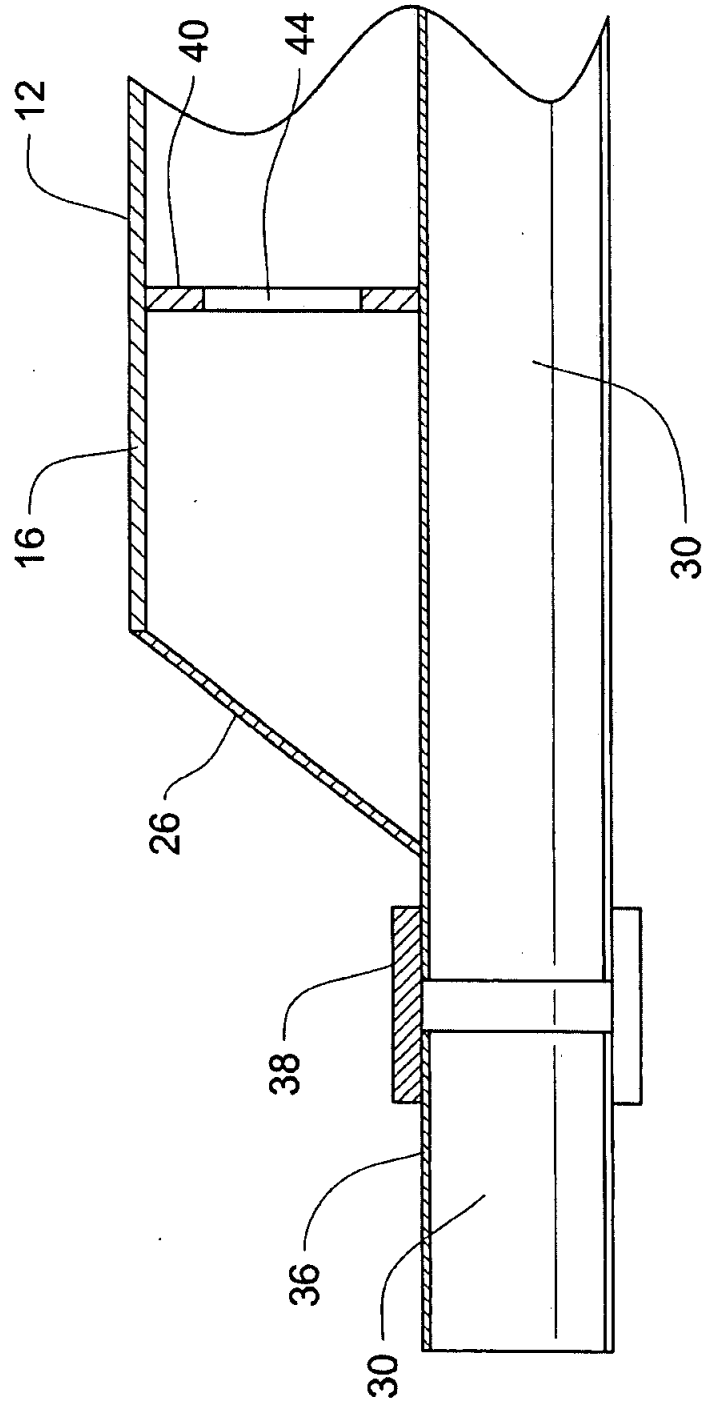


FIG. 4

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FIG. 5

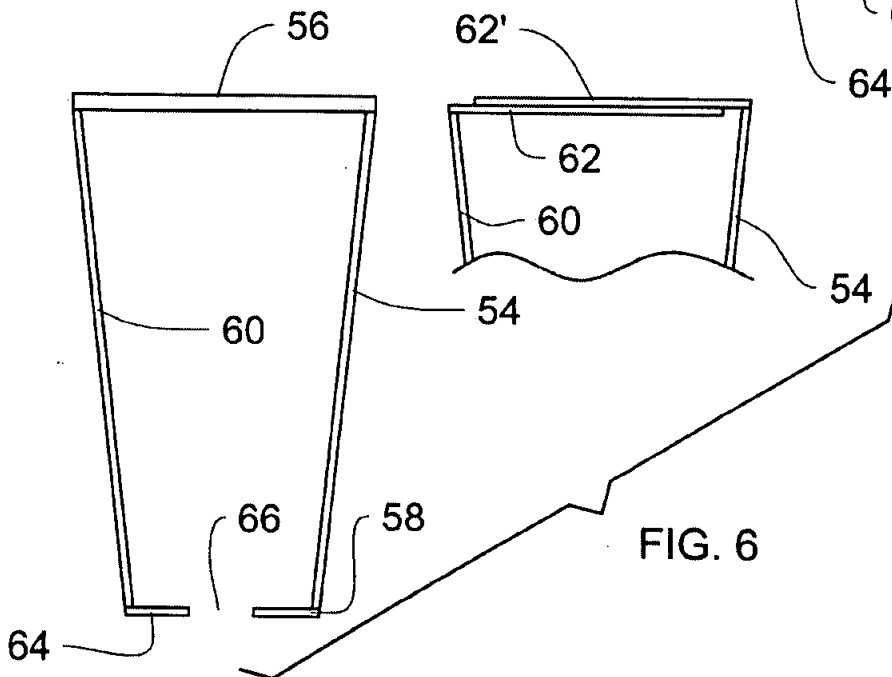
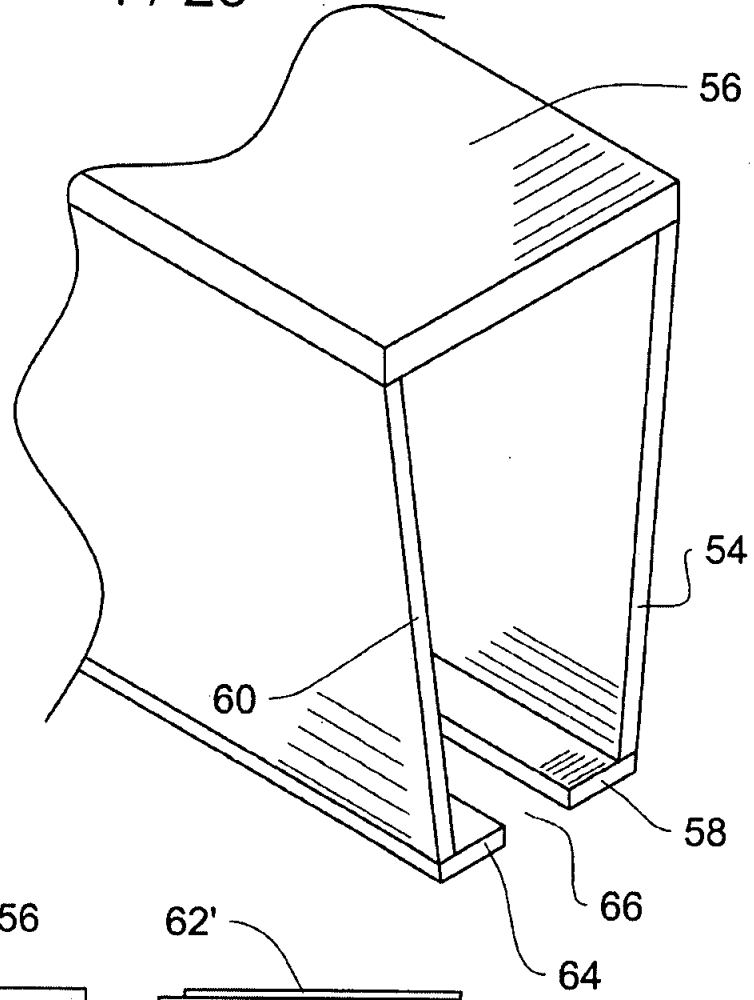


FIG. 6

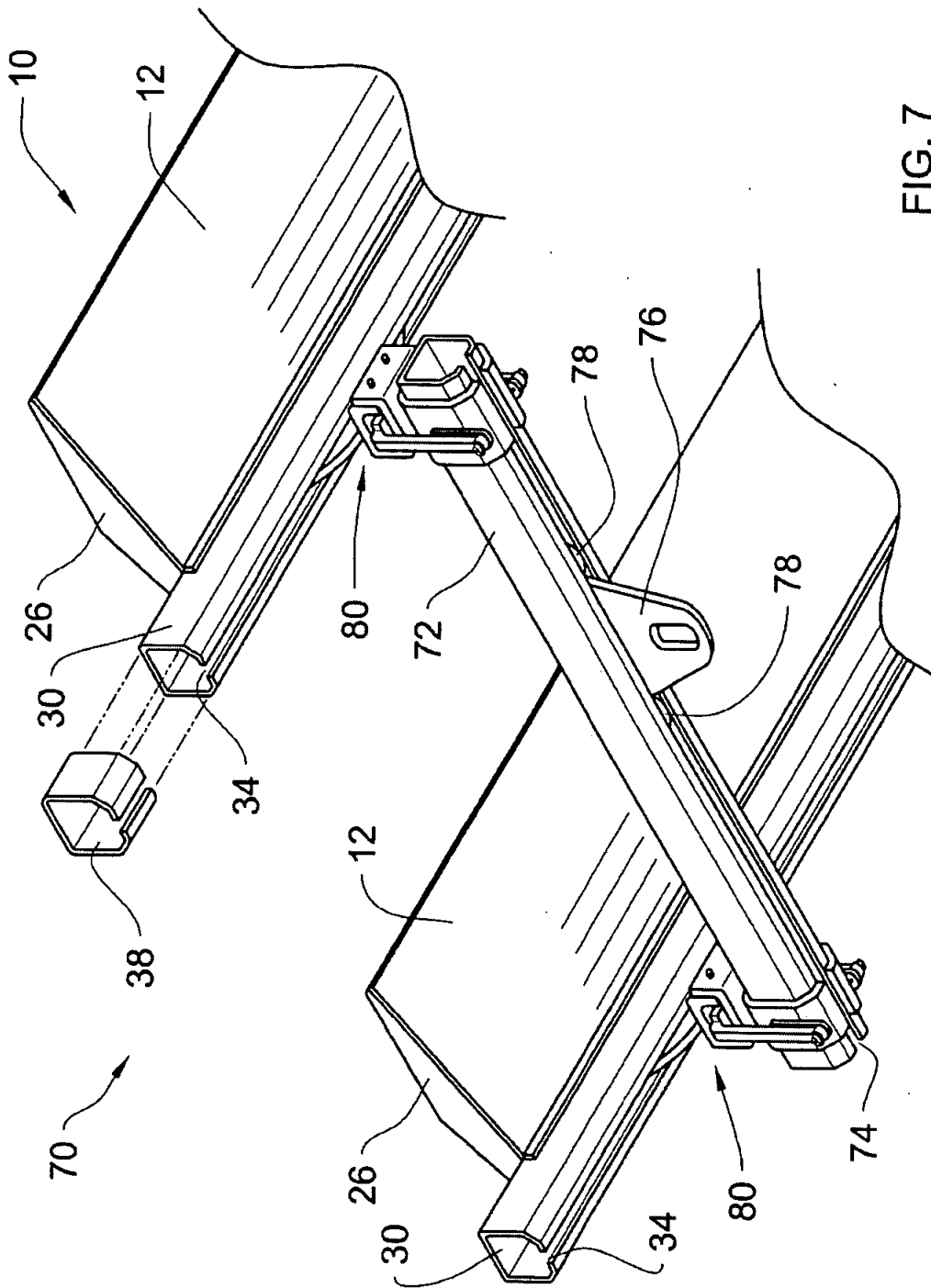


FIG. 7

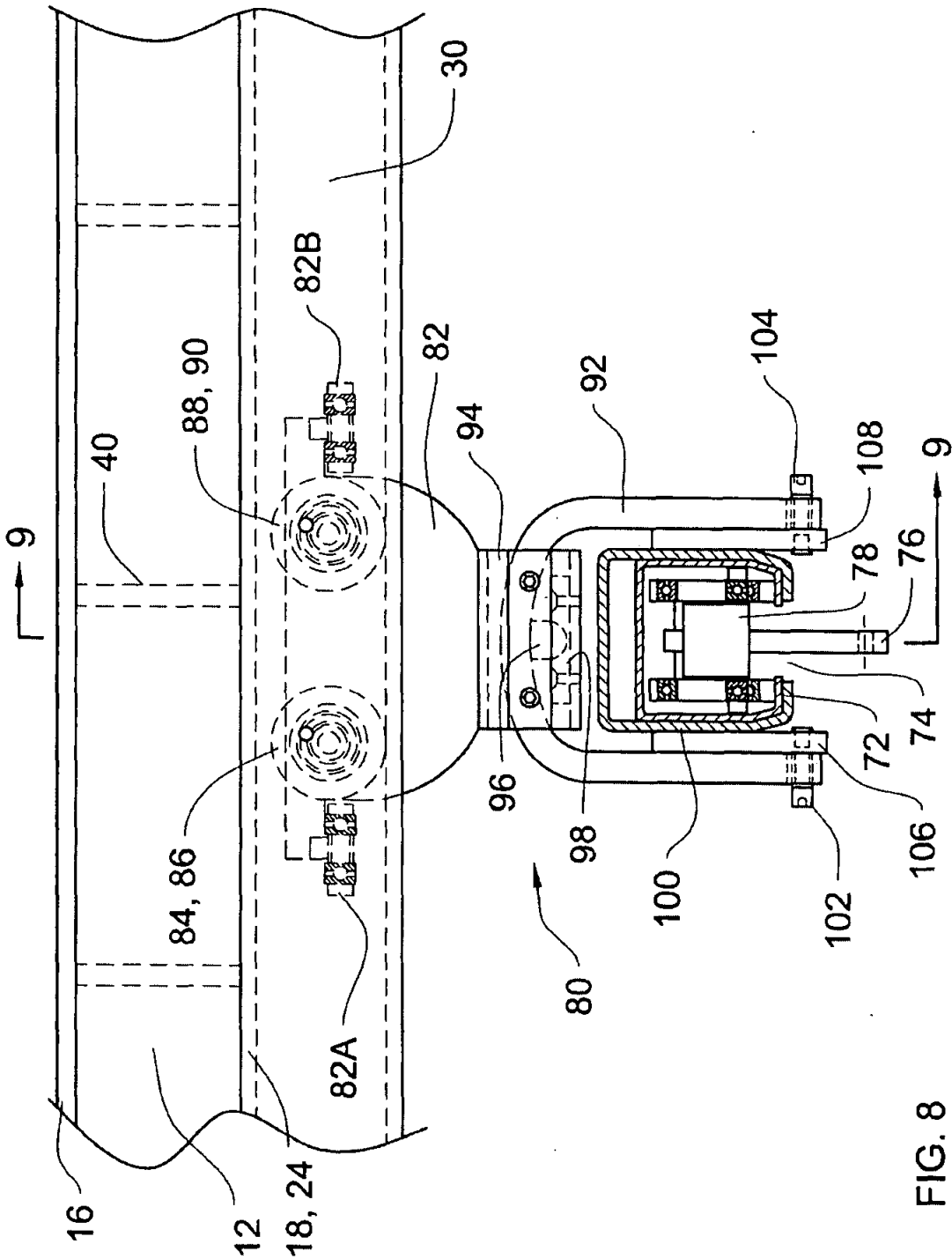
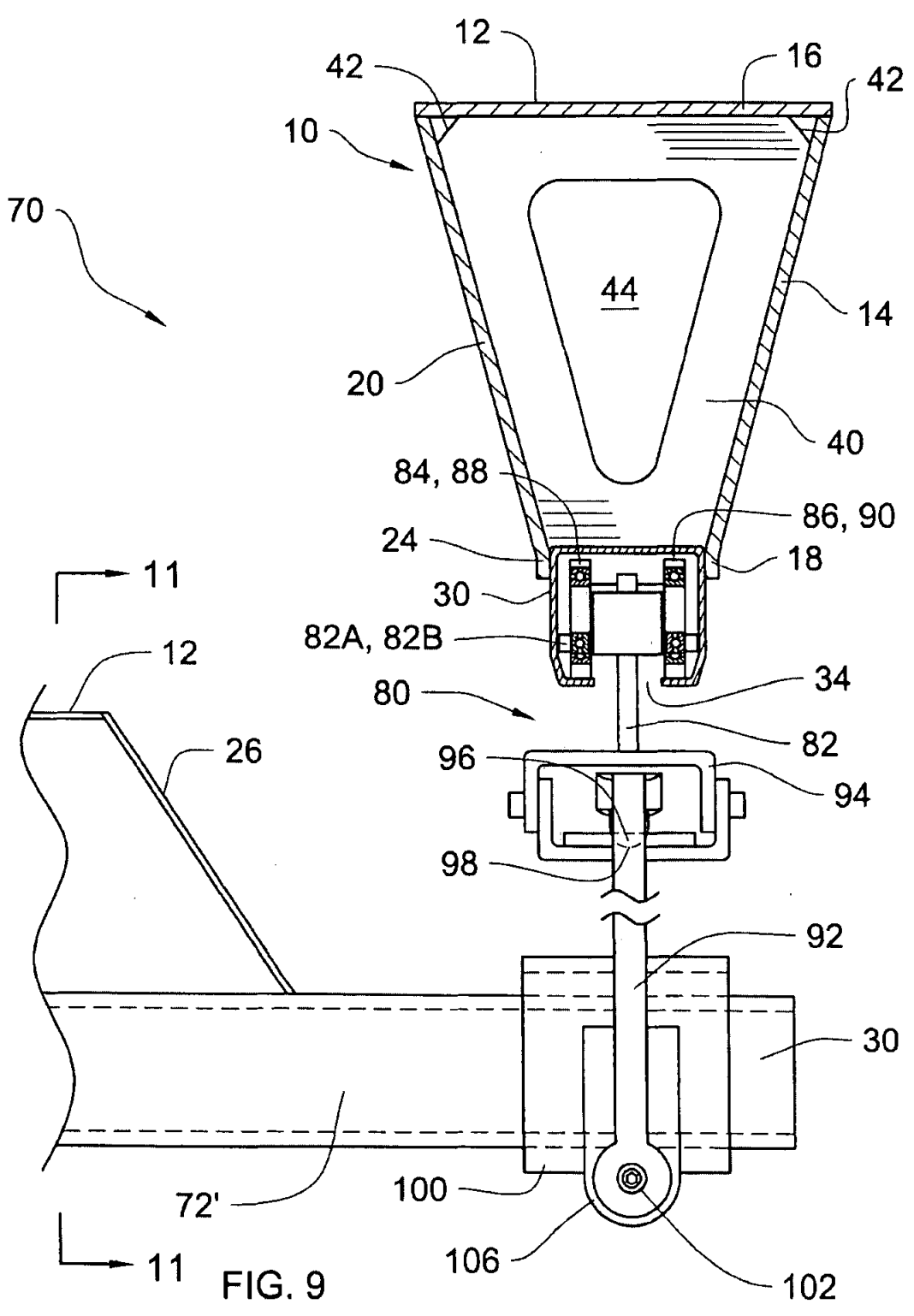
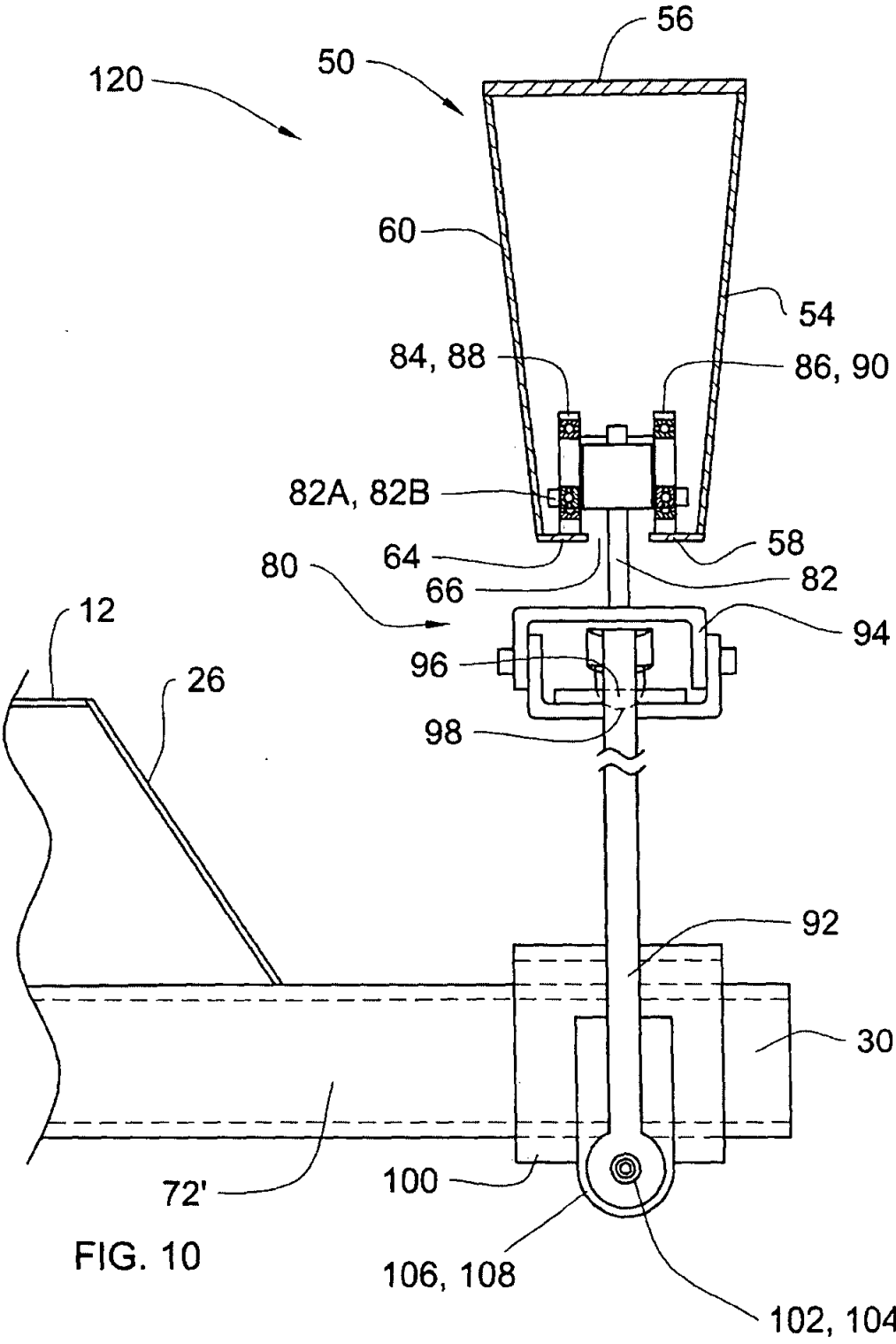


FIG. 8





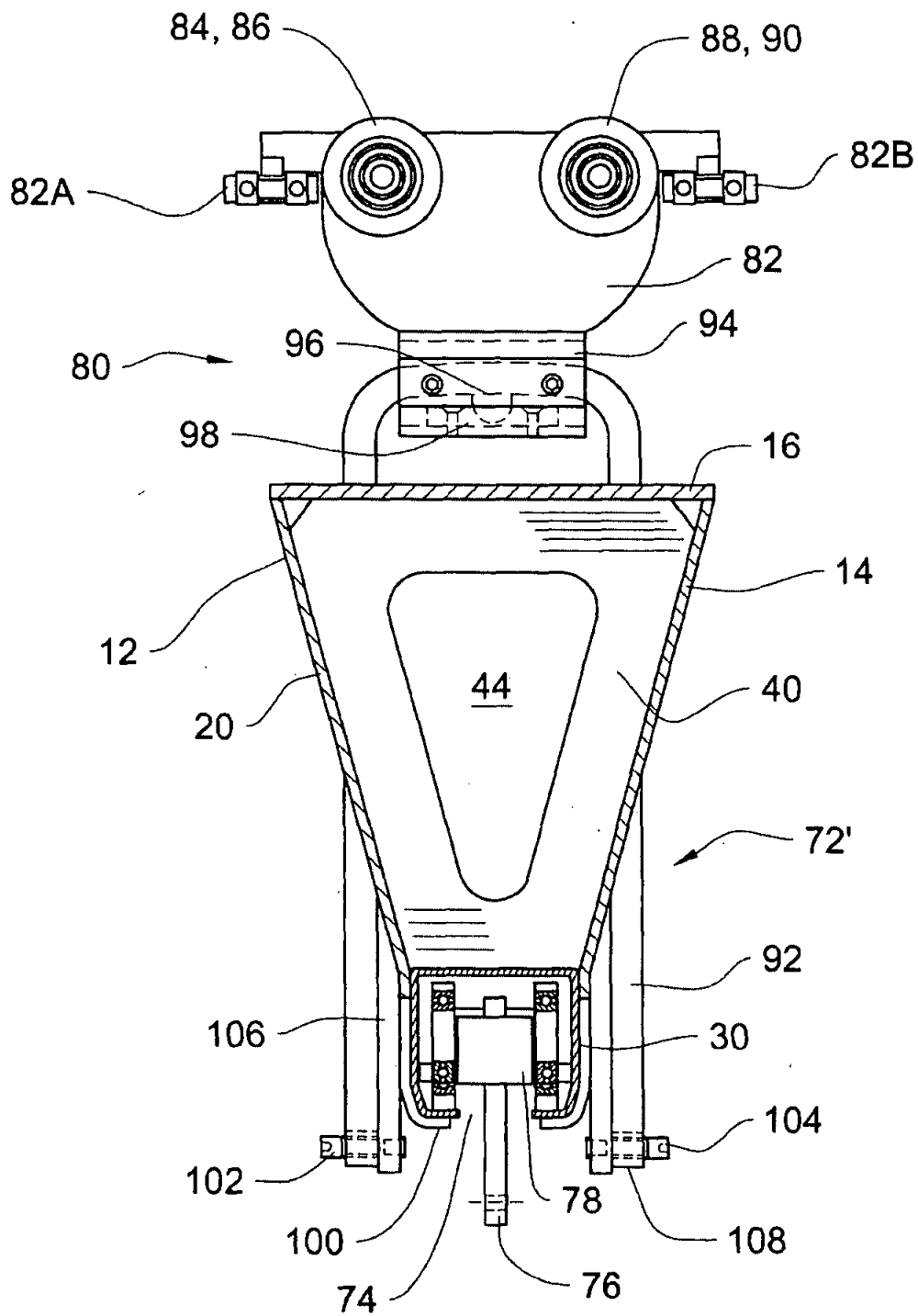


FIG. 11

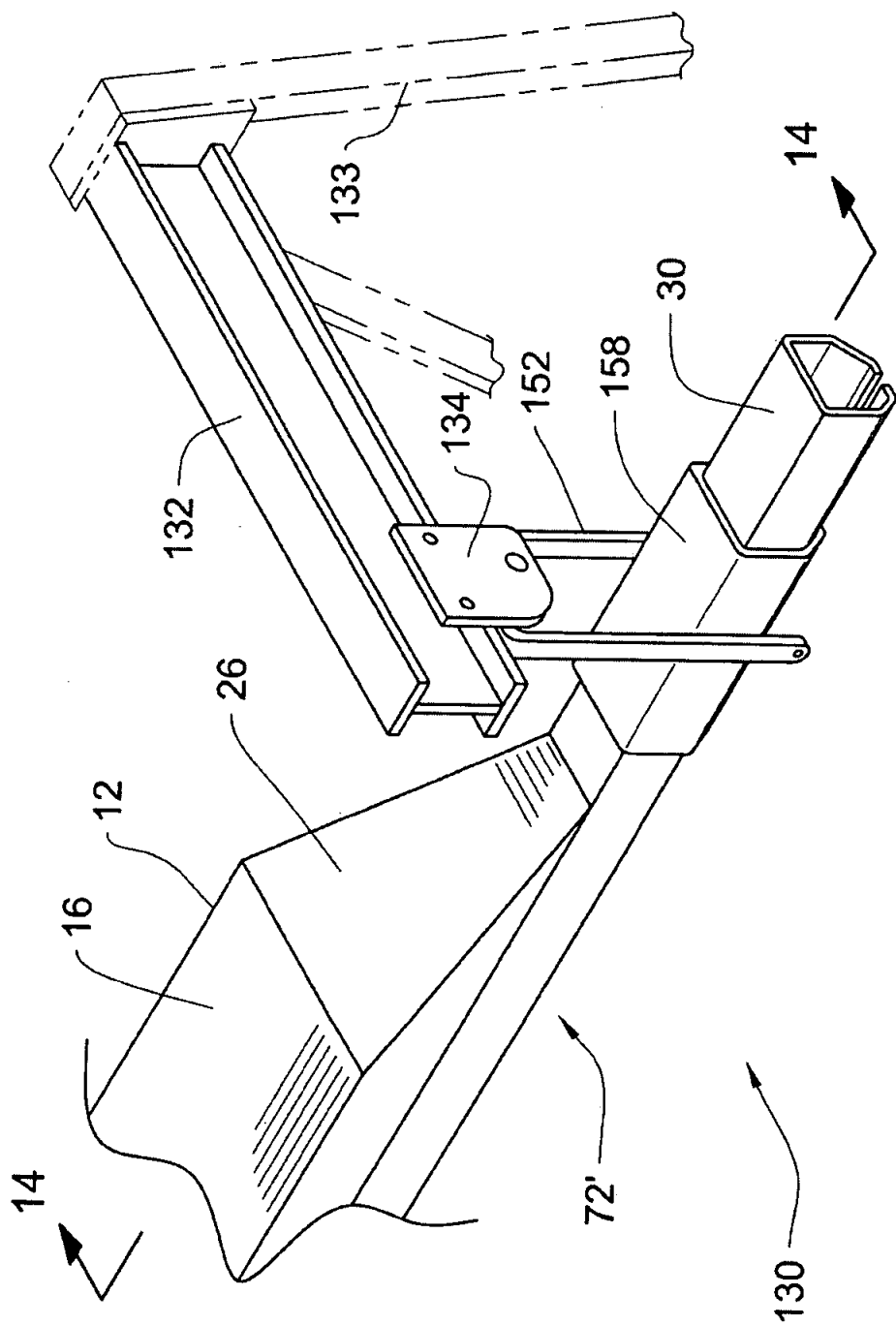


FIG. 13

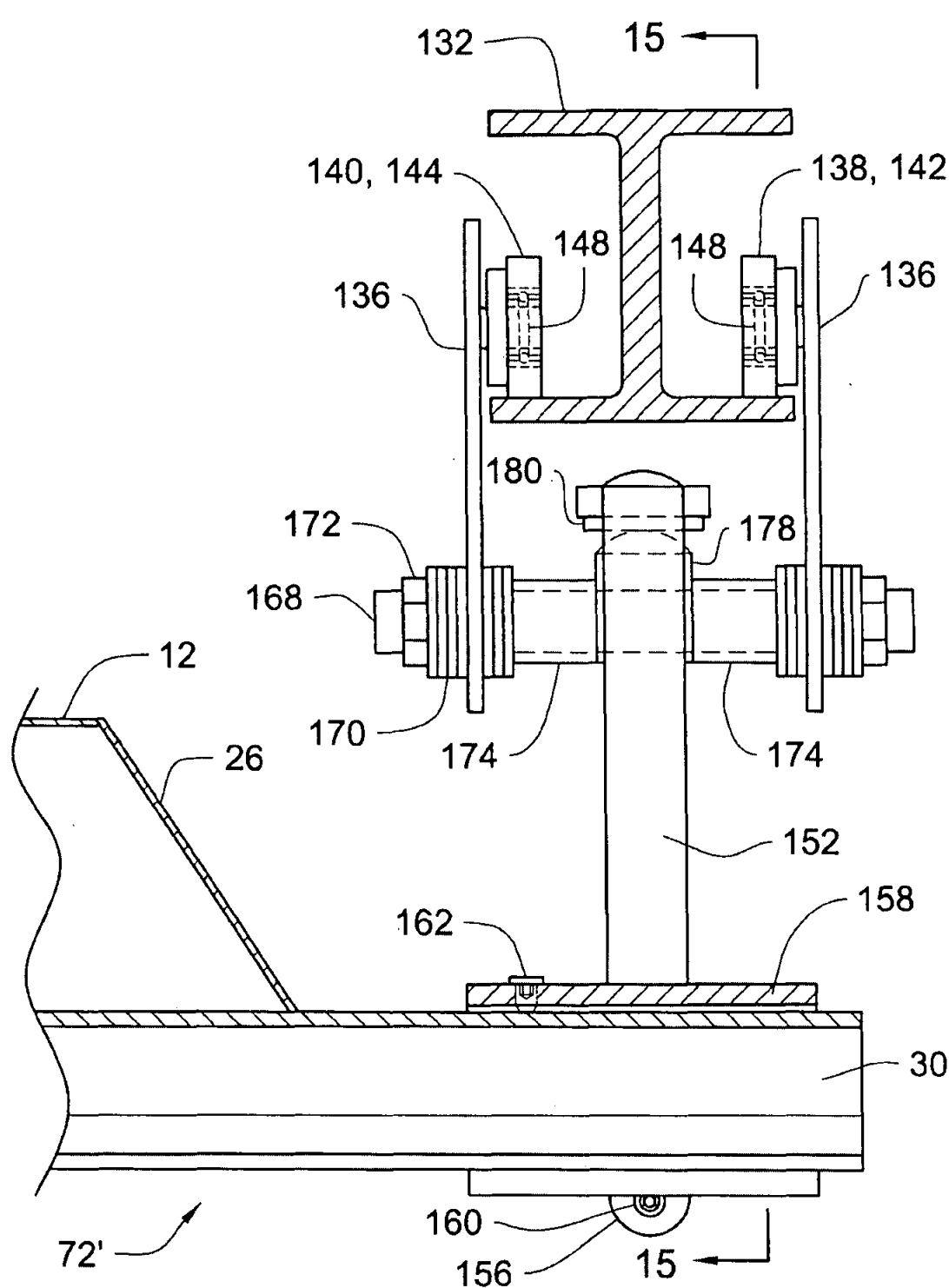


FIG. 14

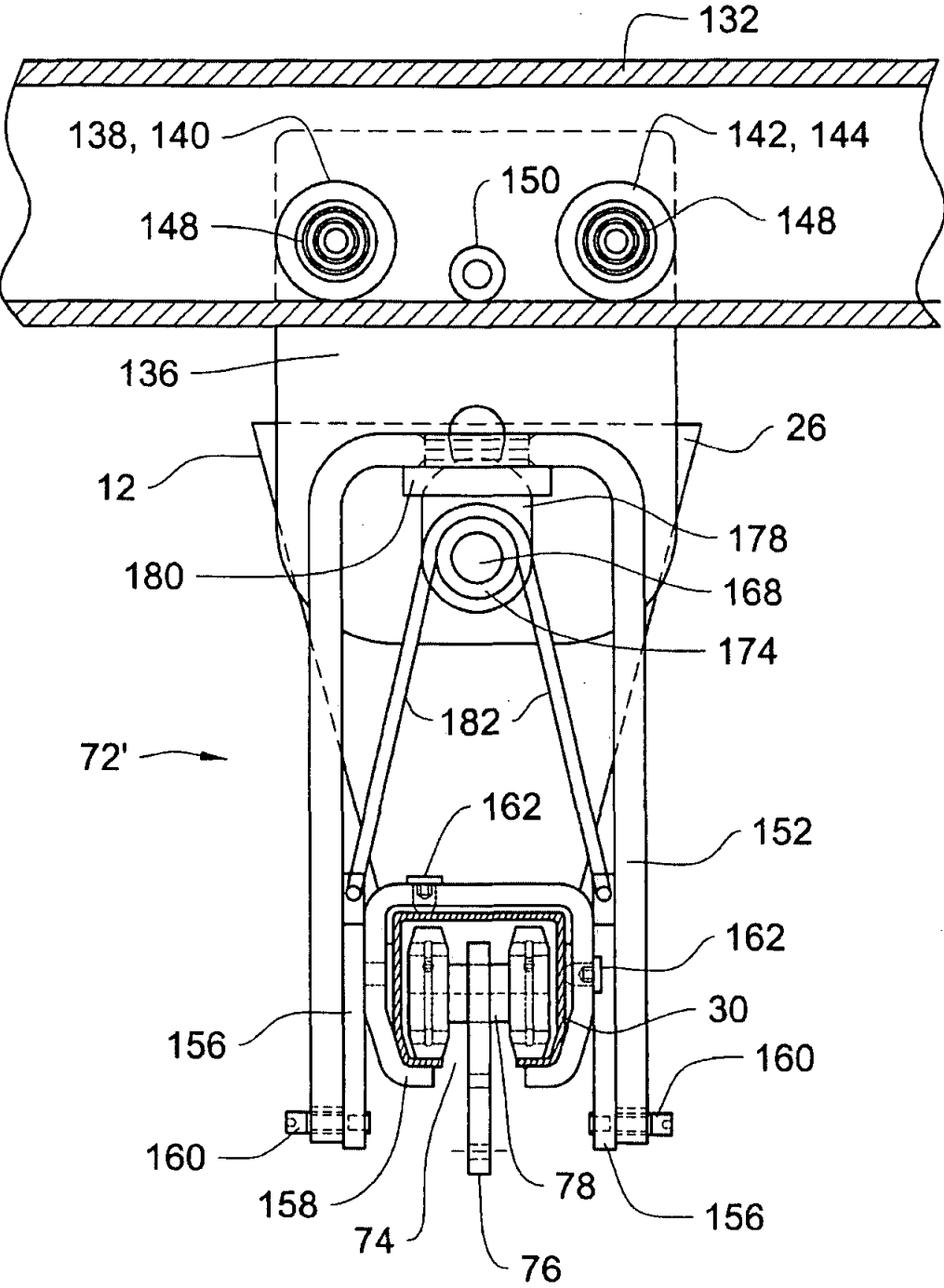


FIG. 15

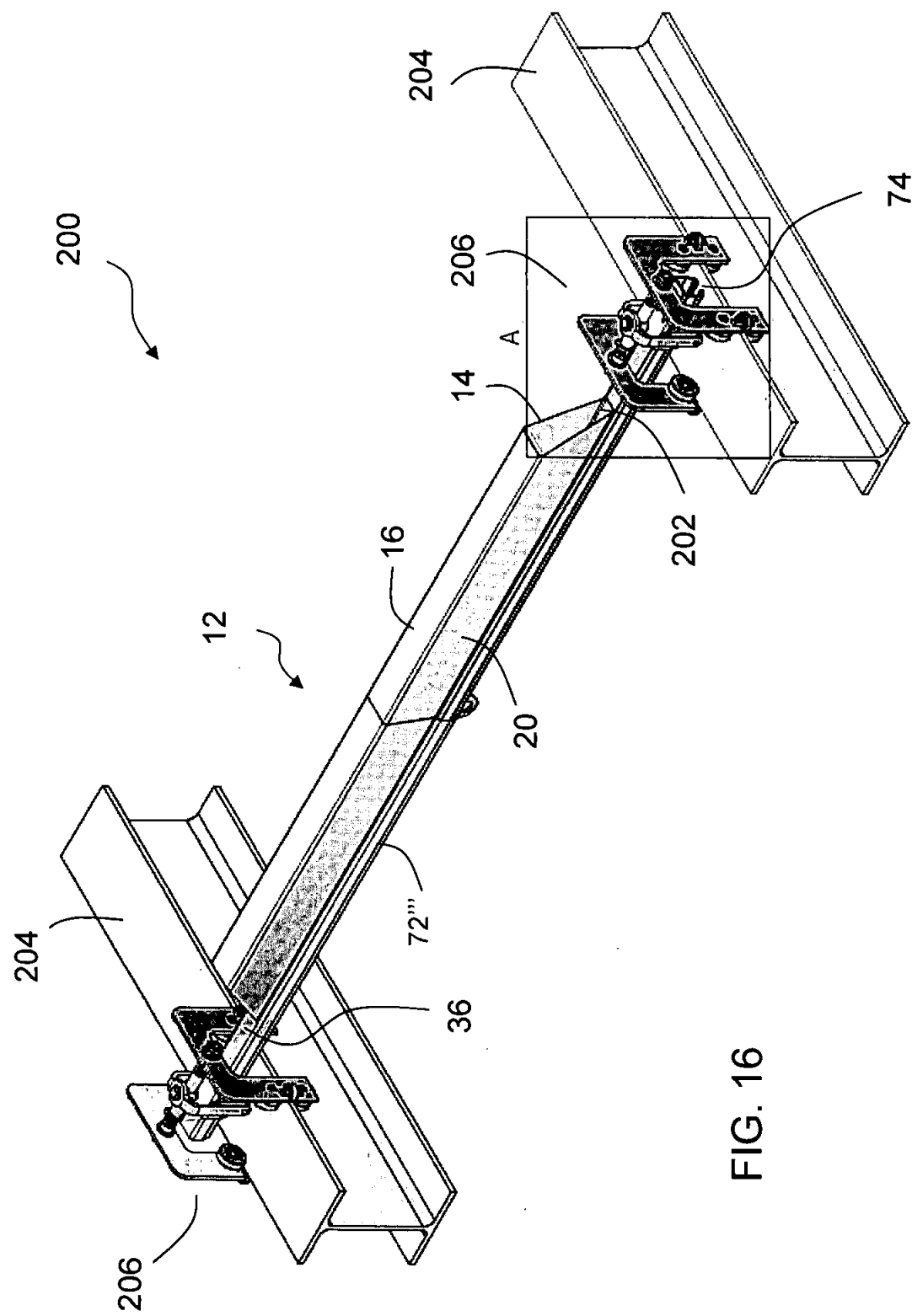


FIG. 16

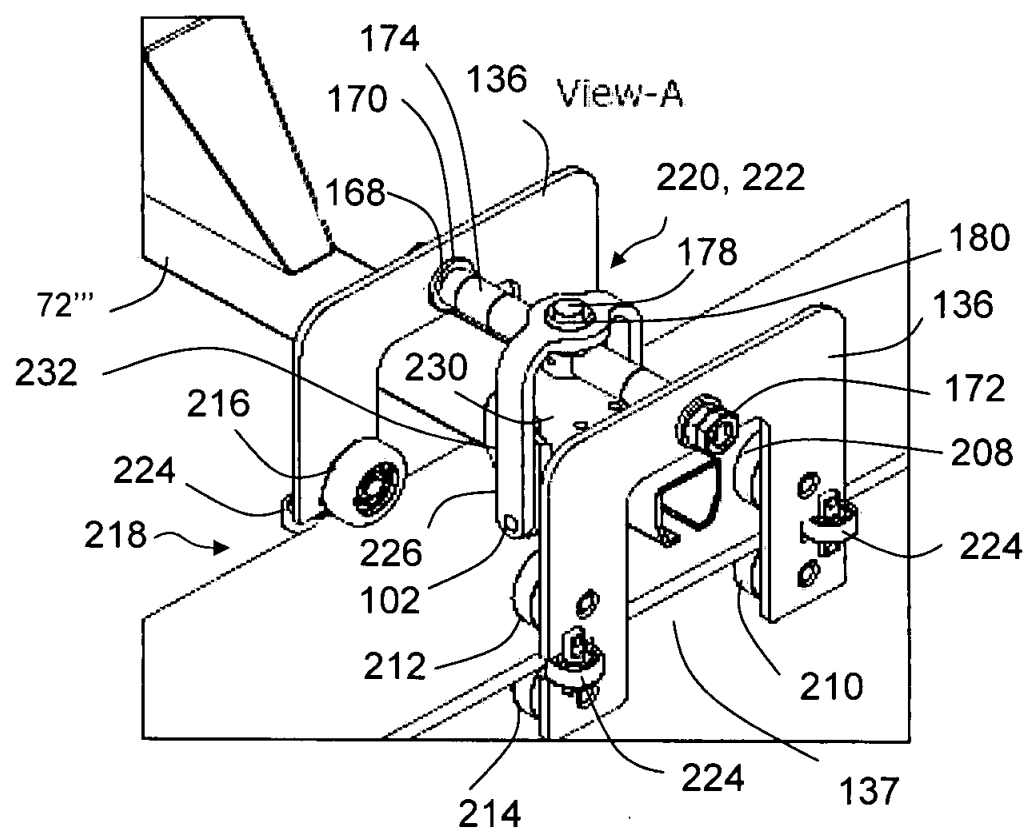


FIG. 17

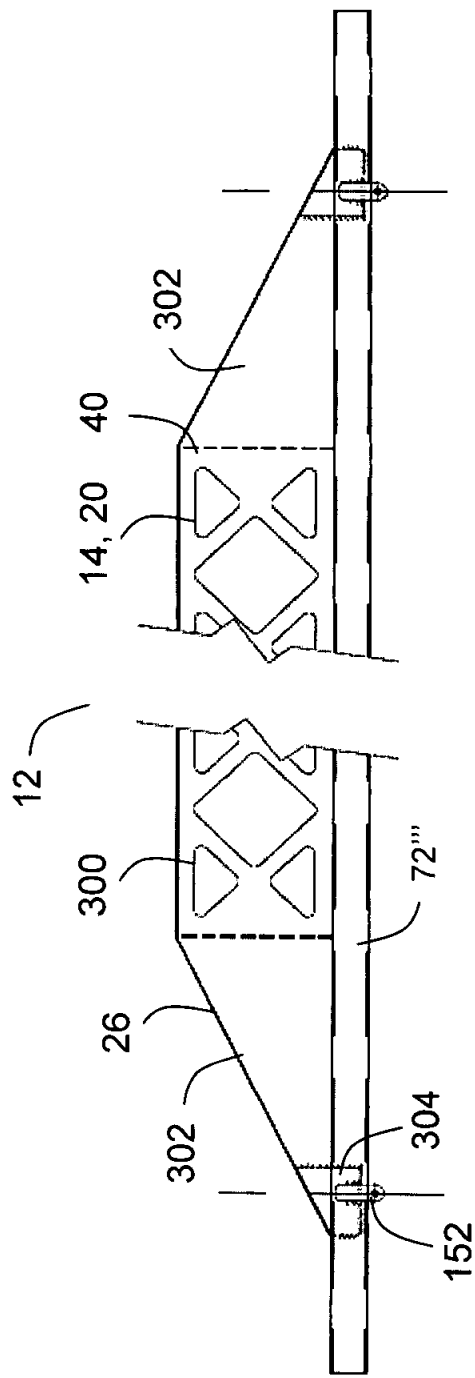


FIG. 18

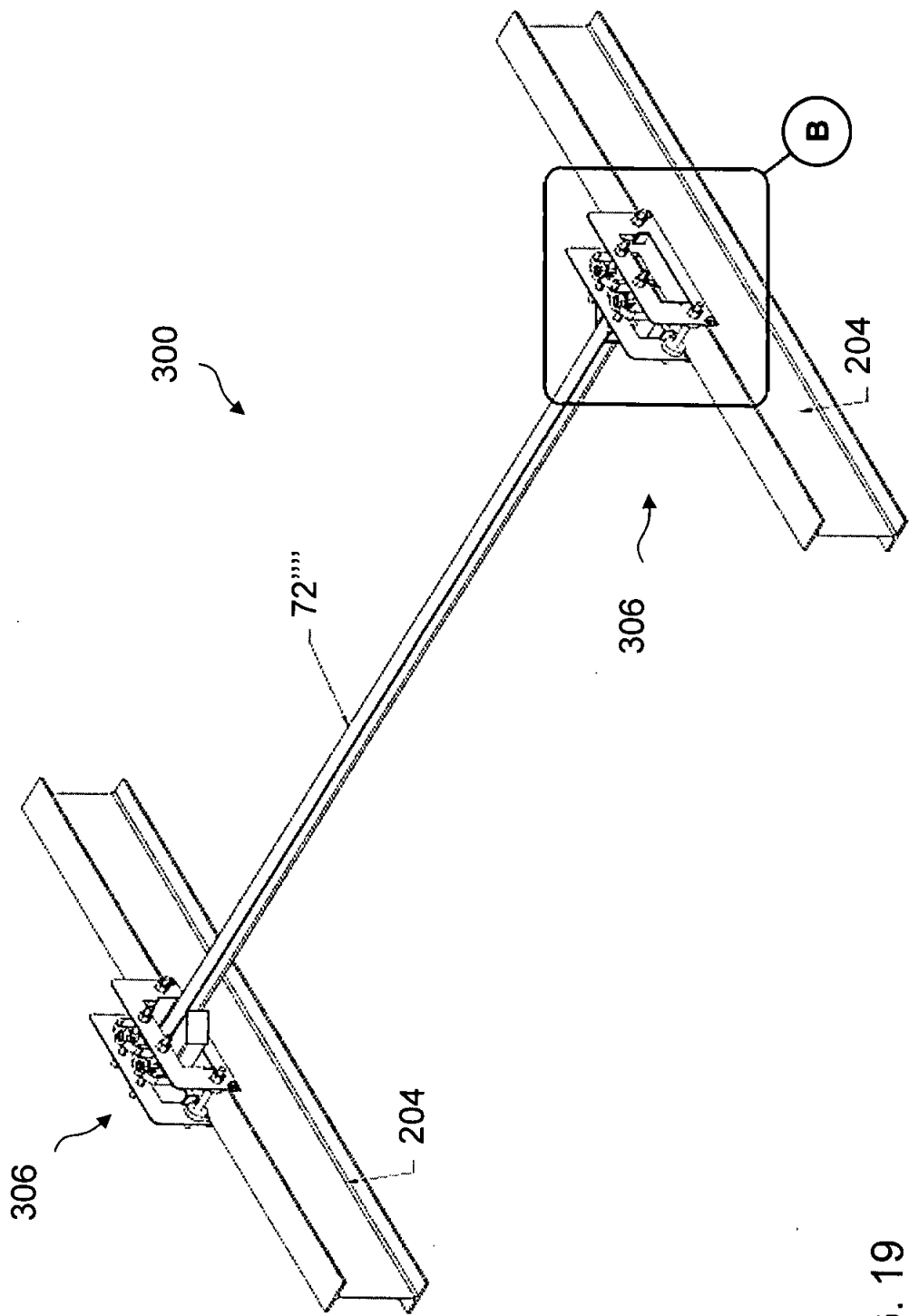


FIG. 19

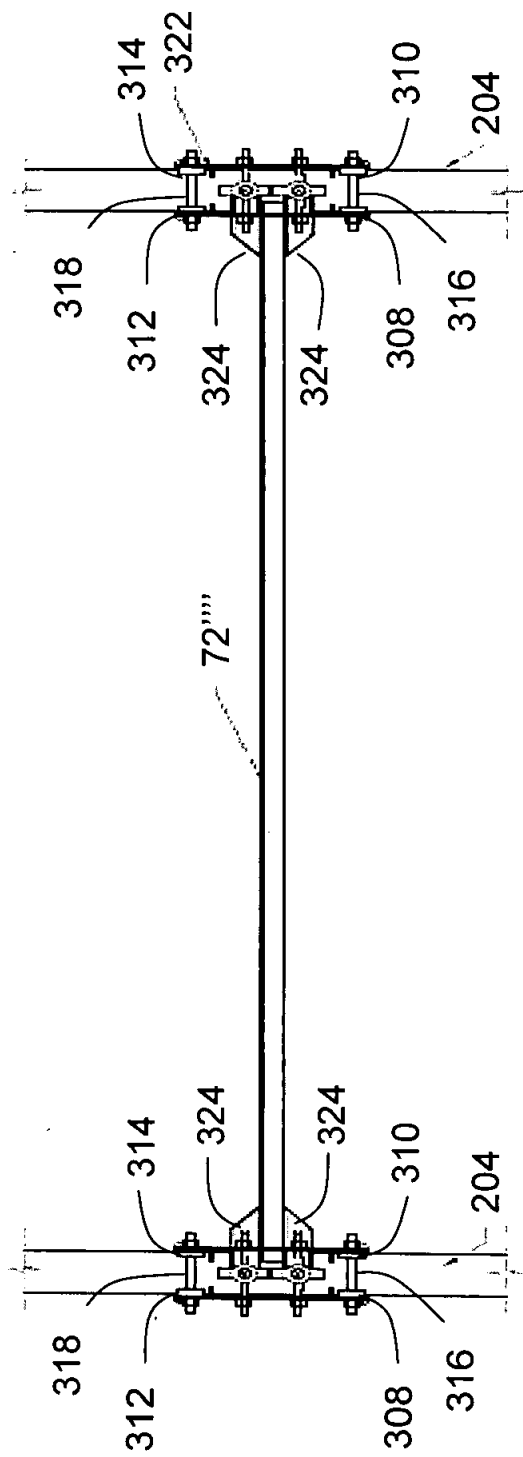


FIG. 20

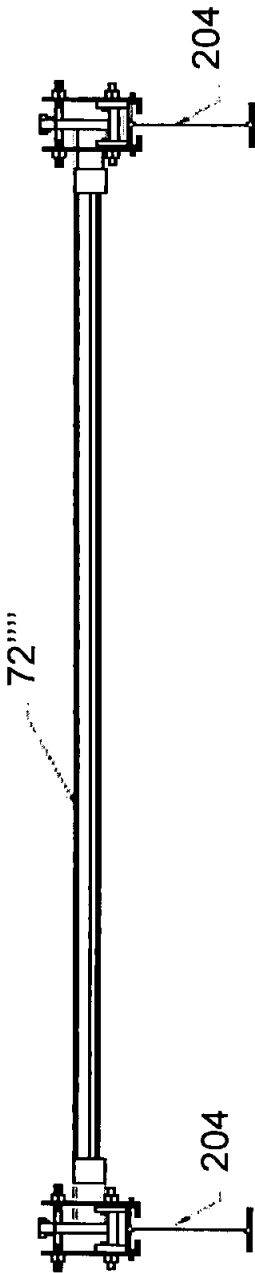
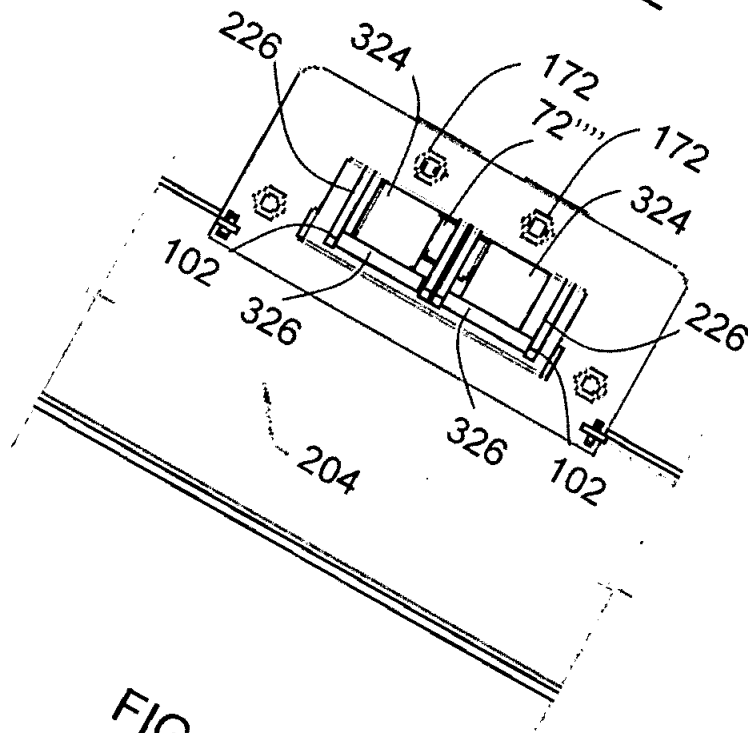
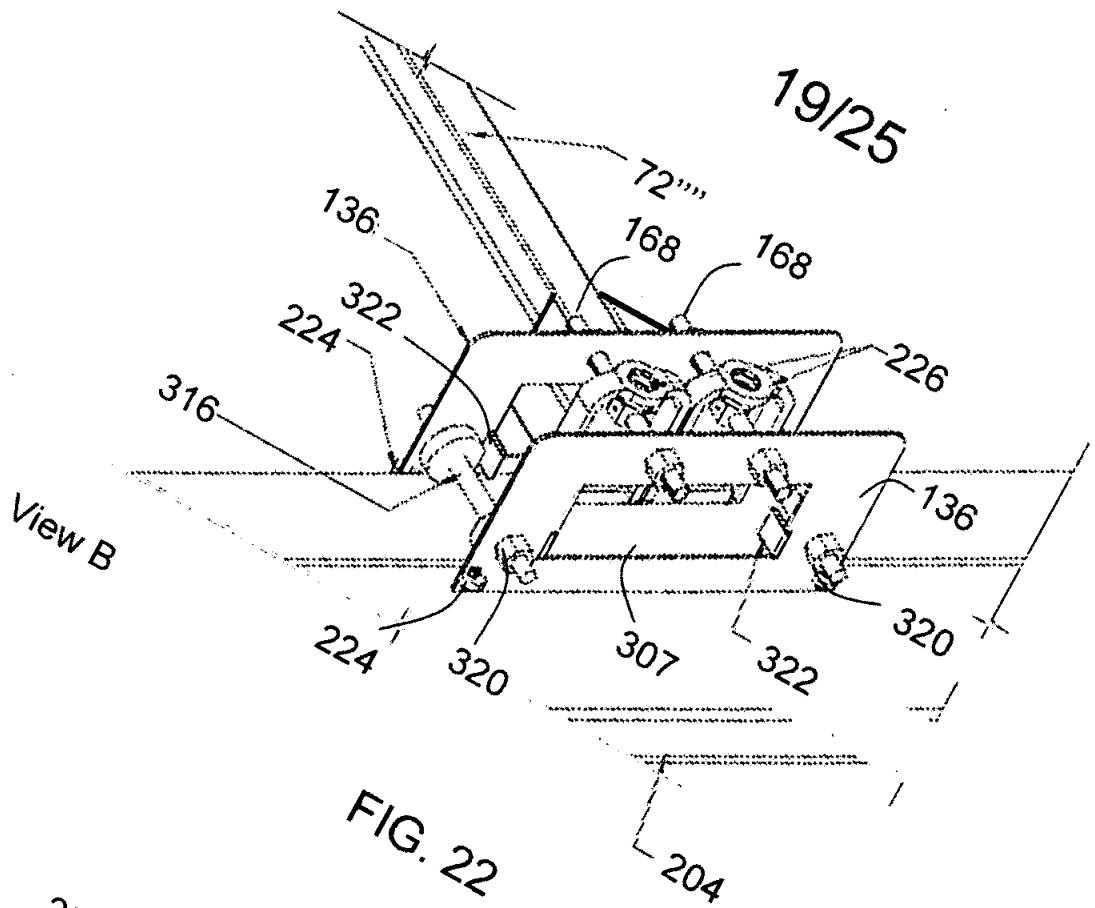
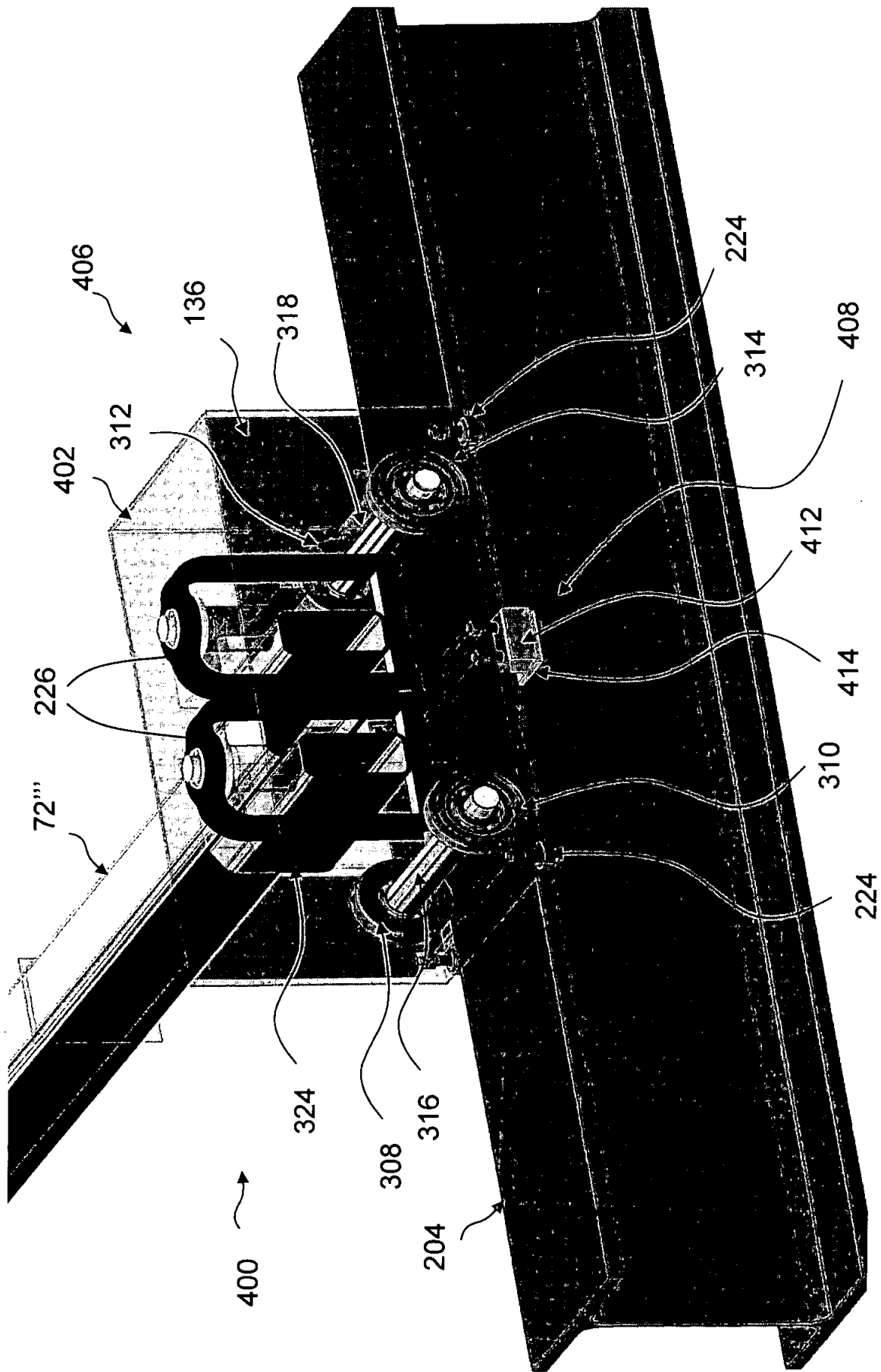


FIG. 21





21/25

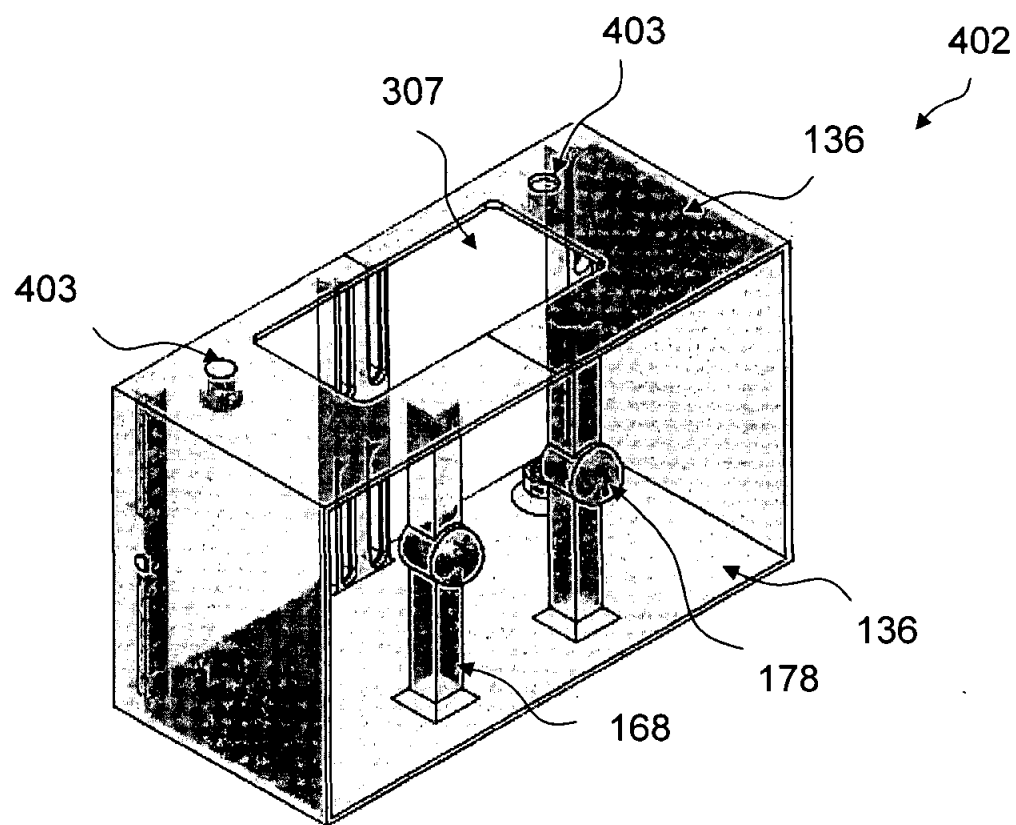


FIG. 25

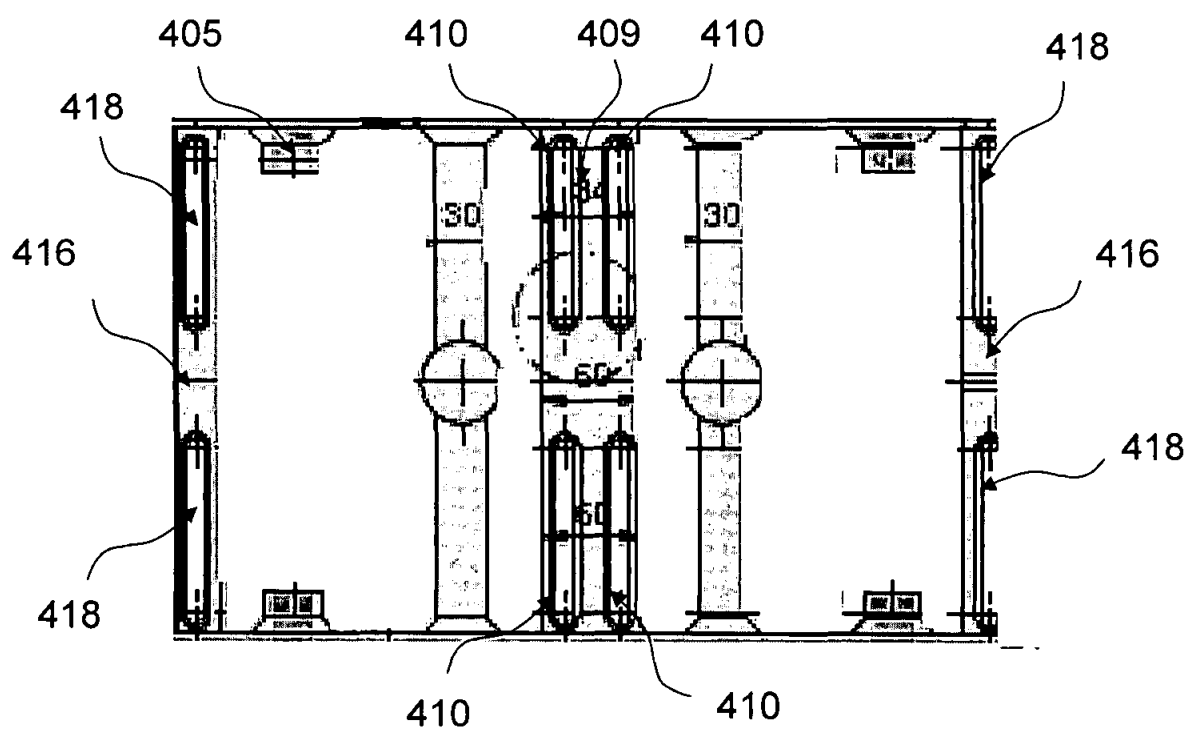


FIG. 26

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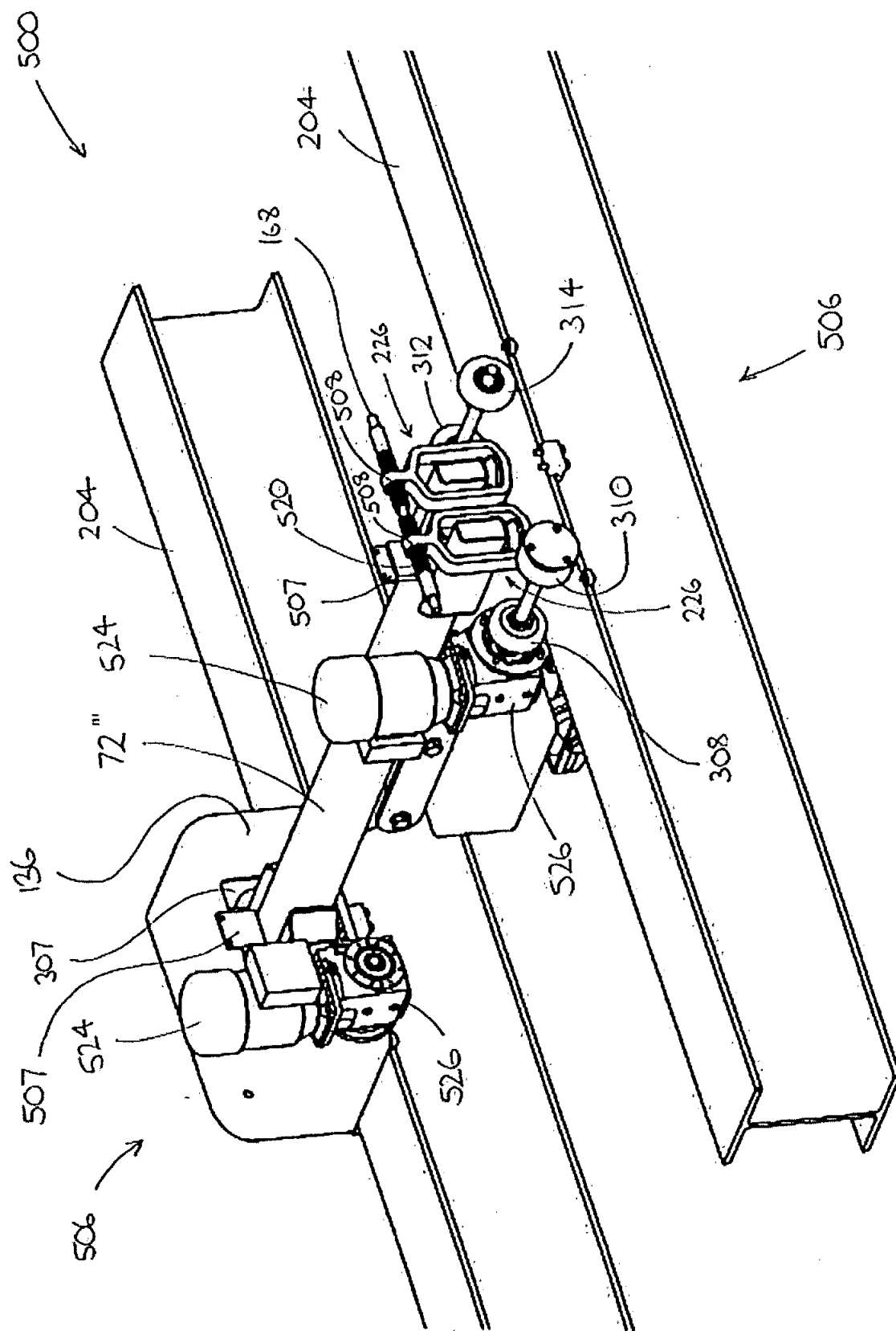


FIG 27

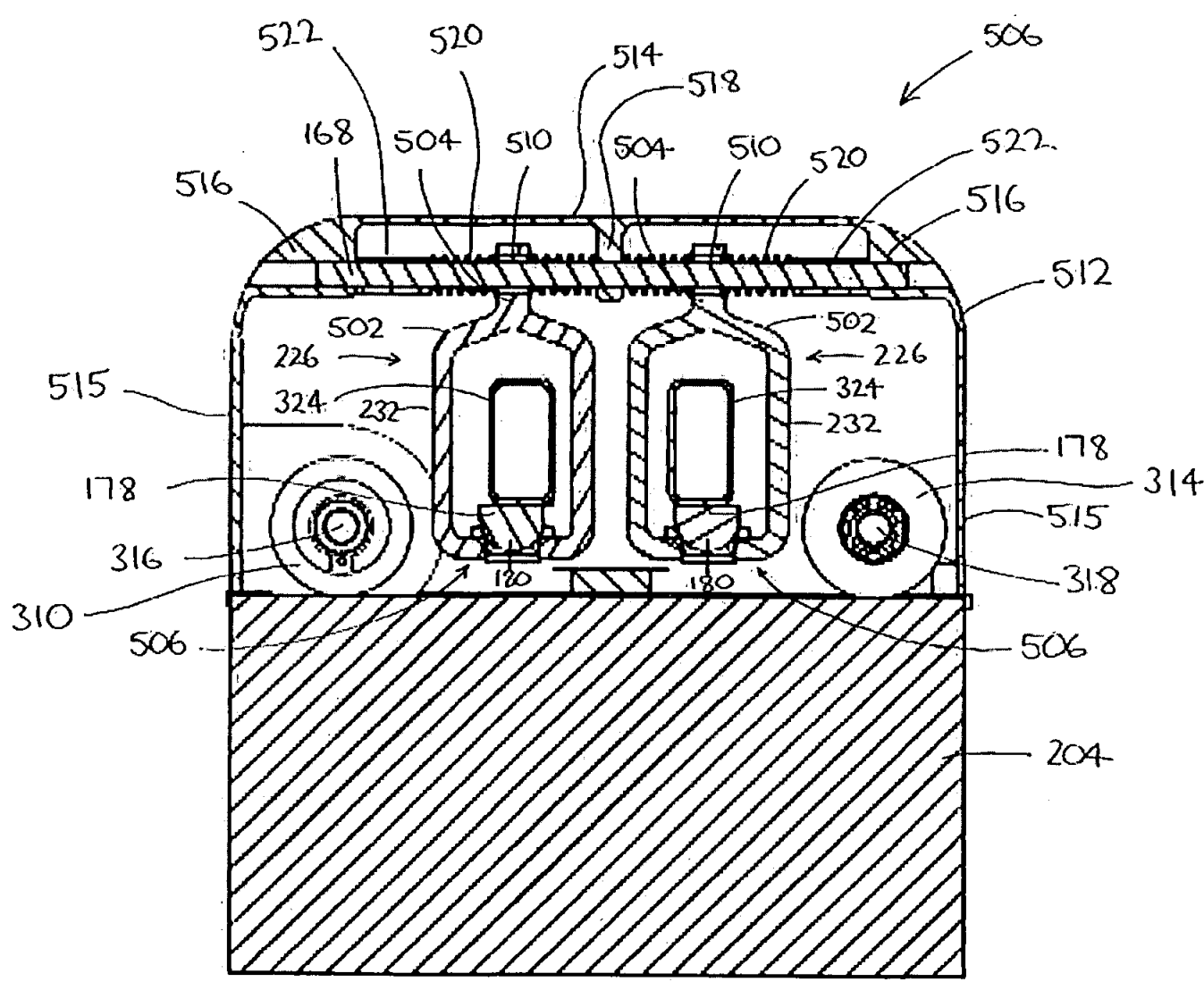


FIG 30

(19) World Intellectual Property Organization
International Bureau



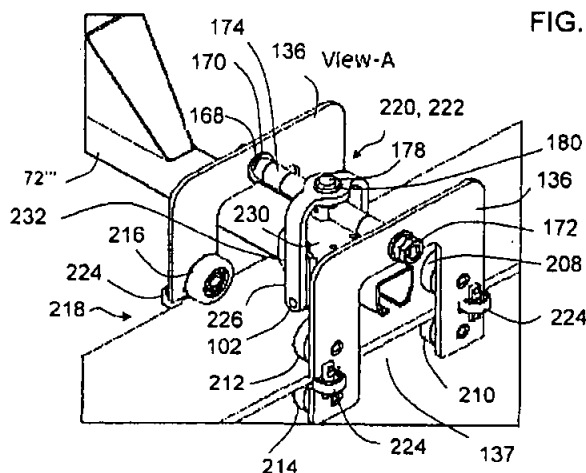
(43) International Publication Date
28 May 2009 (28.05.2009)

PCT

(10) International Publication Number
WO 2009/065183 A1

- (51) International Patent Classification:
B66C 5/00 (2006.01) B66C 9/00 (2006.01)
B66C 17/00 (2006.01) B66C 19/00 (2006.01)
- (21) International Application Number:
PCT/AU2008/001731
- (22) International Filing Date:
24 November 2008 (24.11.2008)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
2007906386 22 November 2007 (22.11.2007) AU
2008903491 8 July 2008 (08.07.2008) AU
- (71) Applicant (for all designated States except US): GLOBAL TRACK TECHNOLOGIES PTY LTD [AU/AU]; 68 Station Street, Norlane, Victoria 3214 (AU).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): MCKAY, Douglas, McGregor [NZ/AU]; 68 Station Street, Norlane, Victoria 3214 (AU).
- (74) Agent: FISHER ADAMS KELLY; Level 29 Comalco Place, 12 Creek Street, Brisbane, Queensland 4000 (AU).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(54) Title: LIFTING ASSEMBLIES INCLUDING TRAPEZOIDAL STRONG BACK BEAM SYSTEMS



(57) Abstract: Bridge crane assemblies, trapezoidal strong back beam systems and carriages for bridge crane assemblies are disclosed. According to some embodiments, a bridge crane assembly comprises a trapezoidal beam and a bridge attachable to an underside of the trapezoidal beam. The bridge comprises an attachment means for supporting a lifting device for the crane assembly. At least one guide track is attachable to a support structure and at least one carriage is longitudinally movable along the at least one guide track. Each carriage comprises a pair of spaced apart mounting plates and a plurality of rollers rotatably mounted to the mounting plates in a substantially vertical orientation. An axle extends between and is pivotally secured to the mounting plates. A displacement arm has a first end pivotally coupled to the axle and at least one second end for pivotal connection to the bridge.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2008/001731

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

B66C 5/00 (2006.01)

B66C 17/00 (2006.01)

B66C 9/00 (2006.01)

B66C 19/00 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC & WPI: IPC B66C 5/-, 9/-, 17/-, 19/-, 25/-, F16C 11/-, F16D 3/- AND KEYWORDS (GANTRY, ROTATE, ARM, ROLL AND LIKE TERMS)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	WO 2003/101878 A1 (McKAY) 11 December 2003 See figures 3, 5 and 6	1-11, 34 12-21
A	US 6082562 A (RIIKONEN) 4 July 2000	1-21, 34
A	US 6058849 A (OSTHOLT et al.) 9 May 2000	1-21, 34



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"E" earlier application or patent but published on or after the international filing date

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"O" document referring to an oral disclosure, use, exhibition or other means

"&"

document member of the same patent family

"P" document published prior to the international filing date but later than the priority date claimed

Date of the actual completion of the international search

18 March 2009

Date of mailing of the international search report

24 MAR 2009

Name and mailing address of the ISA/AU

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Authorized officer

PARMINDER SINGH

AUSTRALIAN PATENT OFFICE
(ISO 9001 Quality Certified Service)

Telephone No. : +61 2 6225 6135

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2008/001731

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

[Continued in Supplemental Box]

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-21 and 34

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2008/001731

Supplemental Box

(To be used when the space in any of Boxes I to IV is not sufficient)

Continuation of Box No: BOX NO. III

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

In assessing whether there is more than one invention claimed, I have given consideration to those features which can be considered to potentially distinguish the claimed combination of features from the prior art. Where different claims have different distinguishing features they define different inventions.

This International Searching Authority has found that there are different inventions as follows:

- Claims 1-21 and 34 are directed to a carriage (or a bridge crane assembly comprising a carriage) comprising a pair of mounting plates, an elongate member extending between the mounting plates and a displacement arm pivotally coupled at a first end to the elongate member, the displacement arm having at least one second end for pivotal connection to a bridge. It is considered that the underlined part comprises a first distinguishing feature.
- Claims 22-33 are directed to a bridge crane comprising a trapezoidal beam, a bridge, a guide track and a carriage. It is considered that a bridge crane comprising a trapezoidal beam comprises a second distinguishing feature.

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

The only feature common to all of the claims is a carriage (comprising a pair of spaced apart mounting plates, a plurality of rollers, an elongate member extending between the mounting plates and a displacement arm pivotally coupled at a first end to the elongate member, the displacement arm having at least one second end for pivotal connection to the bridge). However this concept is not novel (see figures 3 and 4) in the light of:

WO 2003/101878 A1 (McKAY) 11 December 2003

This means that the common feature can not constitute a special technical feature within the meaning of PCT Rule 13.2, second sentence, since it makes no contribution over the prior art.

Because the common feature does not satisfy the requirement for being a special technical feature it follows that it cannot provide the necessary technical relationship between the identified inventions. Therefore the claims do not satisfy the requirement of unity of invention *a posteriori*.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2008/001731

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member			
WO 03101878	AU	2003232922	CA	2485303	CN	1656008
	EP	1507734	NZ	536470	RU	2004136275
	US	2004238473				
US 6082562	EP	0960848	FI	981191	JP	2000153987
US 6058849	CA	2222826	DE	19748949	EP	0845435
	JP	10167660				
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.						
END OF ANNEX						

PATENT COOPERATION TREATY

From the:
INTERNATIONAL SEARCHING AUTHORITY

To:

Fisher Adams Kelly
GPO Box 1413
BRISBANE QLD 4001

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (day/month/year) 24 MAR 2009	
Applicant's or agent's file reference 17776PC2-ADC	FOR FURTHER ACTION See paragraph 2 below
International application No. PCT/AU2008/001731	International filing date (day/month/year) 24 November 2008
Priority date (day/month/year) 22 November 2007	
International Patent Classification (IPC) or both national classification and IPC Int. Cl. B66C 5/00 (2006.01) B66C 17/00 (2006.01) B66C 9/00 (2006.01) B66C 19/00 (2006.01)	
Applicant GLOBAL TRACK TECHNOLOGIES PTY LTD et al	

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. +61 2 6283 7999	Date of completion of this opinion 18 March 2009	Authorized Officer PARMINDER SINGH AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61 2 6225 6135
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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/AU2008/001731

Box No. 1

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
 - ☒ The international application in the language in which it was filed
 - ☐ A translation of the international application into, _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established on the basis of:
 - a. type of material
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/AU2008/001731

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos: 22-33

because:

☐ the said international application, or the said claim Nos.

relate to the following subject matter which does not require an international search (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos.
are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos.
are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

☒ no international search report has been established for said claims Nos. 22-33

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13/ter. I(a) or (b).

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-bis of the Administrative Instructions, and such tables were not available to the International Searching Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See Supplemental Box for further details.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has, within the applicable time limit:
- ☐ paid additional fees
 - ☐ paid additional fees under protest and, where applicable, the protest fee
 - ☐ paid additional fees under protest but the applicable protest fee was not paid
 - ☒ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:

[Continued in Supplemental Box]

4. Consequently, this opinion has been established in respect of the following parts of the international application:
- ☐ all parts
 - ☒ the parts relating to claims Nos. 1-21 and 34

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/AU2008/001731

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 2, 3, 6, 9, and 12-21	YES
	Claims 1, 4, 5, 7, 8, 10, 11 and 34	NO
Inventive step (IS)	Claims 12-21	YES
	Claims 1-11 and 34	NO
Industrial applicability (IA)	Claims 1-21 and 34	YES
	Claims NONE	NO

2. Citations and explanations:

The following documents identified in the International Search Report have been considered for the purposes of this opinion:

D1: WO 2003/101878 A1

D2: US 6082562 A

D3: US 6058849 A

Novelty (N) Claims 1-21, 34:

The invention defined in claims 1, 4, 5, 7, 8, 10, 11 and 34 is not novel when compared with D1.

With regards to the independent claim 1, D1 discloses a carriage for a bridge crane assembly comprising:

- a pair of spaced apart mounting plates (30) – refer figures 5 and 6
- a plurality of rollers (32, 34, 36, 38) mounted on the mounting plates for longitudinal movement of the carriage
- an elongate member extending between the mounting plates
- a displacement arm (40) coupled at a first end (at 44) to the elongate member
- the displacement arm having at least one second end for pivotal connection to a bridge (14)
- the bridge comprising an attachment means for supporting a lifting device (12) of the bridge crane assembly

With regards to the dependent claims 4, 5, 7, 8, 10, 11 and 34, D1 discloses:

- Claim 4: displacement arm is pivotally connected to a bridge sleeve (50) for receiving one end of the bridge
- Claim 5: the displacement arm comprises a pair of appendages (56), each appendage pivotally connected to the bridge sleeve by a fastener (54) – refer figures 3 and 5
- Claim 7: the carriage moves on top of the respective guide track (18)
- Claim 8: guide track is in the form of an I-beam
- Claims 10 & 11: the carriage comprises pair of end rollers (30B) mounted in a horizontal orientation to the mounting plate
- Claim 34: bridge having an attachment means for supporting a lifting device, guide track attachable to a support structure, carriage movable along the track

Therefore the subject matter of claims 1, 4, 5, 7, 8, 10, 11 and 34 is not new and does not meet the requirements of Article 33(2) of the PCT with regard to novelty.

[Continued in Supplemental Box]

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International Application No.

PCT/AU2008/001731

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX NO. IV SECTION 3

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

In assessing whether there is more than one invention claimed, I have given consideration to those features which can be considered to potentially distinguish the claimed combination of features from the prior art. Where different claims have different distinguishing features they define different inventions.

This International Searching Authority has found that there are different inventions as follows:

- Claims 1-21 and 34 are directed to a carriage (or a bridge crane assembly comprising a carriage) comprising a pair of mounting plates, an elongate member extending between the mounting plates and a displacement arm pivotally coupled at a first end to the elongate member, the displacement arm having at least one second end for pivotal connection to a bridge. It is considered that the underlined part comprises a first distinguishing feature.
- Claims 22-33 are directed to a bridge crane comprising a trapezoidal beam, a bridge, a guide track and a carriage. It is considered that a bridge crane comprising a trapezoidal beam comprises a second distinguishing feature.

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

The only feature common to all of the claims is a carriage (comprising a pair of spaced apart mounting plates, a plurality of rollers, an elongate member extending between the mounting plates and a displacement arm pivotally coupled at a first end to the elongate member, the displacement arm having at least one second end for pivotal connection to the bridge). However this concept is not novel (see figures 3 and 4) in the light of:

WO 2003/101878 A1 (McKAY) 11 December 2003

This means that the common feature can not constitute a special technical feature within the meaning of PCT Rule 13.2, second sentence, since it makes no contribution over the prior art.

Because the common feature does not satisfy the requirement for being a special technical feature it follows that it cannot provide the necessary technical relationship between the identified inventions. Therefore the claims do not satisfy the requirement of unity of invention *a posteriori*.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International Application No.

PCT/AU2008/001731

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX NO. V SECTION 2

Claims 2, 3, 6, 9 and 12-21 meet the criteria set forth in PCT Article 33(2) for novelty. The prior art published before the priority date does not disclose the features defined in these claims.

Inventive Step (IS) Claims 1-21, 34:

The invention defined in claims 1, 4, 5, 7, 8, 10, 11 and 34 is not novel for the reasons given above and hence does not involve an inventive step.

The invention defined in claims 2, 3, 6 and 9 does not involve an inventive step in light of D1. The claimed invention differs from the cited art in the ball bearing (44) is a pivot bearing, the elongate member is an axle pivotally secured to the mounting plates as compared with a shaft, mounting plates having an aperture for bridge and there are rollers underneath the web. I consider that these differences constitutes no more than mere workshop improvements. It is an arrangement that any competent worker in the art would be expected to make directly and without difficulty and by routine steps alone.

Therefore the subject matter of claims 1-11 and 34 is obvious and does not meet the requirements of Article 33(3) of the PCT with regard to inventive step.

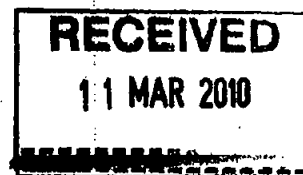
Claims 12-21 meet the criteria set out in PCT Article 33(3) with regard to the requirement of Inventive Step because the prior art does not obviously suggest to a person skilled in the art a carriage as defined.

Industrial Applicability (IA) Claims 1-21, 34:

The invention defined in the claims is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.

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PATENT COOPERATION TREATY



From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

To: Fisher Adams Kelly GPO Box 1413 BRISBANE QLD 4001		Date of mailing (day/month/year)	9 MAR 2010
Applicant's or agent's file reference 17776PC2-ADC		IMPORTANT NOTIFICATION	
International application No. PCT/AU2008/001731	International filing date (day/month/year) 24 November 2008	Priority date (day/month/year) 22 November 2007	
Applicant GLOBAL TRACK TECHNOLOGIES PTY LTD et al			

- The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
- A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
- Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.
- REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. +61 2 6283 7999	Authorized officer M. BREMERS AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61 2 6283 2052
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TITLE

LIFTING ASSEMBLIES INCLUDING TRAPEZOIDAL STRONG BACK BEAM SYSTEMS

FIELD OF THE INVENTION

5 The present invention relates to lifting assemblies, and in particular, but not limited to, trapezoidal strong back beam systems, for use in connection with manual bridge cranes. The present invention also relates to carriages for bridge cranes. The trapezoidal strong back beam system has particular utility in connection with manually operated
10 suspended bridge crane assemblies and lifting devices. However, it will be appreciated that the present invention has broader application and is not limited to that particular use.

BACKGROUND OF THE INVENTION

15 Trapezoidal strong back beam systems are desirable for bridge crane designs because they allow for the bridge weight to be reduced compared with using rectangular hollow section (RHS) structural beams.

The use of trapezoidal beams is known in the prior art. For example: United States Patent Number 6,868,646; United States Patent Number 6,574,818; United States Patent Number 2,336,622; United States Patent Number 5,426,906; United States Patent Number
20 6,189,854; United States Patent Number 1,552,474; United States Patent Number 4,610,117; United States Patent Number 2,367,291; and United States Patent Number 3,708,937.

Existing suspended crane assemblies generally include a crane, which is suspended from a trolley that is, in turn, suspended from at least one bridge. The trolley is
25 capable of longitudinal movement along the at least one bridge. The at least one bridge is movably supported at either end from a pair of parallel tracks or guides. The tracks or guides are generally mounted to a building ceiling or roof structure. Alternatively, the tracks or guides (hereinafter referred to simply as "guides") could be supported from a steel superstructure. This is a particularly attractive option in situations where the building
30 ceiling or roof structure concerned is not designed to bear loads.

One problem with existing suspended crane assemblies and bridge beams is that they do not allow for the design of bridges with reduced weight and with comparable strength to RHS beams or other standard structural beams. Reducing the weight of the bridges would allow for easier installation and operation and reduce the overall cost of

manufacture. Additionally, the reduced weight of the bridges would reduce the stress and load on the structure to which the trapezoidal strong back beam system is attached.

While the above-described devices fulfill their respective, particular objectives and requirements, the aforementioned patents do not describe a trapezoidal strong back beam system that allows for reduced weight of manually operated suspended bridge crane assemblies.

Therefore, a need exists for a new and improved trapezoidal strong back beam system that can be used for manually operated suspended bridge crane assemblies.

Another problem with existing manually operated bridge crane assemblies, and not just those with trapezoidal beams, occurs when an operator attempts to initiate movement of the bridge in either direction relative to the guides. The effort required to initiate such movement is often considerable, at least in part owing to the fact that movement of the other end of the bridge is initiated. This can cause the bridge to twist relative to the stationary guides, and thereby jam and prevent further movement. Furthermore, with existing assemblies, the guides must be aligned parallel or very close to parallel during installation, otherwise the bridge tends to jam in the guides preventing further movement.

The aforementioned jamming problems have been addressed to an appreciable extent with the inventor's crane assembly as disclosed in International Patent Application Publication No. WO 03/101878. However, this crane assembly is only applicable to specific bridge crane designs and includes some limitations. For example, the under slung bridge of the crane assembly limits the head room available in the environment in which the crane assembly is installed.

OBJECT OF THE INVENTION

It is a preferred object of the present invention to provide a new and improved crane assembly that avoids, or at least ameliorates, one or more of the aforementioned disadvantages of the prior art.

SUMMARY OF THE INVENTION

The inventor has identified various modifications and improvements to his crane assembly such that embodiments of the present invention reside in an improved bridge crane assembly, an improved carriage for bridge crane assemblies and an improved bridge crane assembly comprising a trapezoidal strong back beam.

According to one aspect, embodiments of the present invention reside in a carriage for a bridge crane assembly, the carriage comprising:

a pair of spaced apart mounting plates;

5 a plurality of rollers rotatably mounted in a substantially vertical orientation to the mounting plates for longitudinal movement of the carriage along a respective guide track of the bridge crane assembly;

an elongate member extending between the mounting plates; and

10 a displacement arm pivotally coupled at a first end to the elongate member, the displacement arm having at least one second end for pivotal connection to a bridge, the bridge comprising an attachment means for supporting a lifting device of the bridge crane assembly.

The displacement arm may be pivotally coupled to a pivot post via a pivot post bearing, the pivot post extending from the elongate member.

The elongate member may be an axle pivotally secured to the mounting plates.

15 Suitably, the displacement arm is pivotally connected to a bridge sleeve for receiving one end of the bridge.

Suitably, the displacement arm comprises a pair of appendages, each appendage pivotally connected to the bridge sleeve by a fastener.

20 Preferably, at least one of the mounting plates comprises an aperture through which the bridge protrudes.

The respective guide track may be in the form of an I-beam and the carriage moves on top of one web of the I-beam.

Preferably, some of the plurality of rollers are positioned on top of one web of the I-beam and some of the plurality of rollers are positioned underneath the web.

25 The carriage may further comprise one or more end rollers, each end roller abutting and capable of rolling along a respective edge of the web of the I-beam.

Preferably, a pair of end rollers is rotatably mounted in a substantially horizontal orientation to each mounting plate.

The carriage may further comprise:

30 a second elongate member spaced apart from the elongate member, the second elongate member extending between the mounting plates; and

a second displacement arm pivotally coupled at a first end to the second elongate member, the displacement arm having at least one second end for pivotal connection to the bridge.

The second elongate member may be an axle pivotally secured to the mounting plates.

The carriage may further comprise a shoulder either side of the bridge at the end of the bridge, each shoulder pivotally connected to a respective displacement arm.

5 The underside of each shoulder may comprise a support for receiving a pair of fasteners for pivotal connection to a respective displacement arm.

The carriage may further comprise projections extending inwardly from the mounting plates adjacent the rollers to prevent derailment of the rollers from the guide track.

10 The mounting plates and the first and second elongate members may form part of a cast box.

The carriage may further comprise a first base member for mounting at least one anti-derailment member. The first base member may comprise a plurality of elongate apertures for variable mounting of the at least one anti-derailment member.

15 The carriage may further comprise at least one end base member for mounting one or more end rollers, each end roller abutting and capable of rolling along a respective edge of a web of an I-beam of the respective guide track.

The at least one end base member may comprise a plurality of elongate apertures for variable mounting of the one or more end rollers.

20 According to another aspect, embodiments of the present invention reside in a bridge crane assembly comprising:

 a trapezoidal beam;

 a bridge attachable to an underside of the trapezoidal beam, the bridge comprising an attachment means for supporting a lifting device;

25 at least one guide track attachable to a support structure;

 at least one carriage longitudinally movable along the at least one guide track, the carriage comprising:

 a pair of spaced apart mounting plates;

 a plurality of rollers rotatably mounted in a substantially vertical orientation to

30 the mounting plates;

 an axle extending between and pivotally secured to the mounting plates; and

 a displacement arm pivotally coupled at a first end to the axle, the displacement arm having at least one second end for pivotal connection to the bridge.

Suitably, the trapezoidal beam has a top section, a first side rigidly secured to the top section and a second side rigidly secured to the top section opposite the first side, the first and second sides tapering inwardly toward each other from the top section to the guide track.

5 Alternatively, the top section has a first top section rigidly secured to the first side, and a second top section rigidly secured to the second side, wherein the first top section is rigidly secured to the second top section in a generally overlapping manner.

Suitably, at least part of the first side and/or at least part of the second side comprises a lattice structure.

10 The at least one carriage may be top running or under slung with respect to the guide.

Suitably, the bridge beam can be constructed with only the trapezoidal beam, wherein the trapezoidal beam features a first flange extending from a first beam opposite the top section and a second flange extending from a second beam opposite the top section, the first and second flanges orientated toward each other. The configuration of
15 the first and second flanges and the first and second sides allow for a bridge crane component to be received therein.

Embodiments of the invention may also include a plurality of diaphragm stiffeners in the interior of the first and second sides.

20 According to a further aspect, embodiments of the present invention reside in a bridge crane assembly comprising:

a trapezoidal beam;

at least one guide track attachable to an underside of the trapezoidal beam;

at least one carriage longitudinally movable within the at least one guide track;

25 a bridge comprising an attachment means for supporting a lifting device;

at least one displacement arm having a first end pivotally connected to the at least one carriage and at least one second end pivotally connected to a bridge, the bridge comprising an attachment means for supporting a lifting device; and

30 a universal joint provided between the at least one displacement arm and the at least one carriage to absorb rotational and lateral motions of the bridge when a force is applied to the attachment means.

According to yet a further aspect, embodiments of the present invention reside in bridge crane assembly comprising:

a bridge having an attachment means for supporting a lifting device;

at least one guide track attachable to a support structure; and
at least one carriage as claimed in claim 1 longitudinally movable along the at least one guide track.

It is to be appreciated that the assembly does not include the lifting device, or part thereof. The inclusion of the lifting device in the discussion of the present invention is merely provided to define the context of the invention.

Further aspects of the present invention will become apparent from the following detailed description. Numerous features and advantages of the present invention will be readily apparent to those of ordinary skill in the art upon a reading of the following detailed description of presently preferred, but nonetheless illustrative, embodiments of the present invention when taken in conjunction with the accompanying drawings. In this respect, before explaining the current embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways.

BRIEF DESCRIPTION OF THE DRAWINGS

By way of example only, preferred embodiments of the invention will be described more fully hereinafter with reference to the accompanying drawings, wherein:

Figure 1 is a perspective view of a trapezoidal strong back beam system in accordance with embodiments of the present invention.

Figure 2 is a side view of the trapezoidal strong back beam system of Figure 1.

Figure 3 is a cross-sectional view of the trapezoidal strong back beam system taken along line 3 in Figure 2.

Figure 4 is a cross-sectional view of the trapezoidal strong back beam system taken along line 4 in Figure 3.

Figure 5 is a perspective view of an alternative embodiment of the trapezoidal strong back beam system in accordance with embodiments of the present invention.

Figure 6 shows front views of alternative embodiments of the trapezoidal strong back beam system in accordance with embodiments of the present invention.

Figure 7 is a perspective view of an alternative embodiment of the trapezoidal strong back beam system in accordance with embodiments of the present invention.

Figure 8 is a partial cross-sectional view of the alternative embodiment of the trapezoidal strong back beam system illustrated in Figure 7.

Figure 9 is a partial cross-sectional view of the alternative embodiment of the trapezoidal strong back beam system taken along line 9 in Figure 8.

5 Figure 10 is a partial cross-sectional view of the alternative embodiment of the trapezoidal strong back beam system illustrated in Figure 9.

Figure 11 is a partial cross-sectional view of the alternative embodiment of the trapezoidal strong back beam system taken along line 11 in Figure 9.

10 Figure 12 is a partial cross-sectional view of an alternative embodiment of the trapezoidal strong back beam system illustrated in Figure 11.

Figure 13 is a perspective view of an alternative embodiment of the trapezoidal strong back beam system in accordance with embodiments of the present invention.

Figure 14 is a partial cross-sectional view of the alternative embodiment of the trapezoidal strong back beam system taken along line 14 in Figure 11.

15 Figure 15 is a partial cross-sectional view of the alternative embodiment of the trapezoidal strong back beam system taken along line 15 in Figure 14.

Figure 16 is a perspective view of a further alternative embodiment of the trapezoidal strong back beam system in accordance with embodiments of the present invention.

20 Figure 17 is an enlarged view of part of the trapezoidal strong back beam system shown in Figure 16.

Figure 18 is a side view of a further alternative embodiment of the trapezoidal strong back beam system in accordance with embodiments of the present invention.

25 Figure 19 is a perspective view of another alternative embodiment of a crane assembly in accordance with embodiments of the present invention.

Figure 20 is a plan view of the crane assembly shown in Figure 19.

Figure 21 is a side view of the crane assembly shown in Figure 19.

Figure 22 is an enlarged view of the crane assembly shown in Figure 19.

Figure 23 is an end view of the crane assembly shown in Figure 19.

30 Figure 24 is a perspective view of another alternative embodiment of a carriage for a crane assembly in accordance with embodiments of the present invention.

Figure 25 is a rotated perspective view of a box of the carriage shown in Figure 24.

Figure 26 is a plan view of the box shown in Figure 25.

Figure 27 is a perspective view of a bridge crane assembly comprising further alternative embodiments of a carriage where the carriages are powered.

Figure 28 is a plan view of the bridge crane assembly of Figure 27.

Figure 29 is a side view of the bridge crane assembly of Figure 27.

Figure 30 is sectional view of a carriage of the bridge crane assembly of Figure 27.

Figure 31 is partial sectional plan view of components of the carriage of the assembly of Figure 27.

Figure 32 is a partial sectional end view of components of the carriage of the assembly of Figure 27.

The same reference numerals refer to the same parts throughout the various figures.

DETAILED DESCRIPTION OF THE INVENTION

5 Referring now to the drawings a trapezoidal strong back beam system according to embodiments of the present invention are shown and generally designated by the reference numeral 10.

10 In Figure 1, a new and improved trapezoidal strong back beam system 10 of the present invention for reducing the weight of bridge cranes is illustrated and will be described. More particularly, the trapezoidal strong back beam system 10 has a trapezoidal beam 12, a guide track 30, and an end cap 26. The trapezoidal beam 12 includes a first side 14, a second side 20 and a top section 16 adjacent the first and second sides 14, 20 that are rigidly secured to each other through means such as, but not limited to, welds along their edges or seams, rivets, fasteners, adhesives, or clamps. The
15 guide track 30 is attached to the ends of the first and second sides 14, 20 opposite the overlapping top sections. The end cap 26 is attached to the first and second sides 14, 20 above the guide track 30, so as to cover the first and second sides 14, 20 and their overlapping top sections.

The guide track 30 has an opening 34 and is in the form of an open channel beam, preferably a C-section beam. The guide track 30 and opening 34 are adapted to receive a
20 bridge crane component. The guide track 30 is made of a metal, but any other material having similar strength can be used, such as composites, or alloys.

As illustrated in Figure 2, the trapezoidal beam 12 has a plurality of diaphragm stiffeners 40 that are attached to the interior of the trapezoidal beam 12 and spaced
25 incrementally along its longitudinal length. The trapezoidal beam 12 is attachable, preferably rigidly secured, to a support structure 13, which can be a building ceiling, roof, separate superstructure, or a support frame. The trapezoidal beam 12 is made of a metal, but any other material having similar strength can be used, such as composites, or alloys.

The guide track 30 can extend past the trapezoidal beam 12 so as to be able to
30 connect to additional guide tracks 30 through a guide track coupler 38.

Referring now to Figure 3, the trapezoidal beam 12 further includes a first flange 18 opposite the top section 16 of the first side 14, and a second flange 24 opposite the top section 16 of the second side 20. The top section 16 is rigidly secured to the first and second sides 14, 20 along their entire lengths. The first and second sides 14, 20 taper

inwardly from the top section 16 to their respective flanges 18, 24. The angle at which the first and second sides 14, 20 taper relate to the height of the trapezoidal beam 12 and the width of the guide track 30.

Alternatively, as shown in Figure 3, the trapezoidal beam 12 can include a first top section 22 adjacent the first side 14, a second top section 22' adjacent the second side 20, a first flange 18 opposite the first top section 22 of the first side 14 and a second flange 24 opposite the second top section 22' of the second side 20. The first and second top sections 22, 22' are oriented parallel and adjacent to each other to produce a flush contact along their entire length. The first and second sides 14, 20 taper inwardly from their respective top sections 22, 22' to their respective flanges 18, 24. The angle at which the first and second sides 14, 20 taper relate to the height of the trapezoidal beam 12 and the width of the guide track 30. The first top section 22 is placed above the second top section 22' so as to leave a gap between the edges of the first and second top sections 22, 22' and the first and second sides 14, 20, thereby allowing for the first and second top sections 22, 22' to be rigidly fixed together, such as by, but limited to, welding along the first and second top sections 22, 22' edges.

The guide track 30 has sides 32 and a top portion 36 adjacent to the sides 32, thereby producing an open channel beam. The first and second flanges 18, 24 extend down from the first and second sides 14, 20 to receive the sides 32 of guide track 30. The first and second flanges 18, 24 are rigidly fixed to the sides 32, such as by, but not limited to, welding along the first and second flanges 18, 24 edges.

The diaphragm stiffeners 40 are configured to correspond to the interior shape of the trapezoidal beam 12, thereby allowing the diaphragm stiffeners 40 to be securely inserted therein. The diaphragm stiffeners 40 each have chamfered top corners 42, and a centrally located opening 44. The chamfered top corners 42 are configured to receive the edge of the first or second top sections 22, 22', depending on the orientation of the top sections. The bottom section of the diaphragm stiffeners 40 are configured to abut against the top portion 36 of the guide track 30. The diaphragm stiffeners 40 are rigidly fixed to the interior of the trapezoidal beam 12 and the top portion 36 of the guide track 30. It is to be appreciated that the diaphragm stiffeners 40 increase the strength and rigidity of the trapezoidal strong back beam system 10.

As best illustrated in Figure 4, the guide track coupler 38 has a shape that corresponds to that of guide track 30 and which is larger so as to allow the guide track coupler 38 to slide over the guide track 30, thereby allowing an additional guide track 30 to

be inserted in the free end of the guide track coupler 38, as best illustrated in Figures 2 and 4. The guide track coupler 38 is rigidly fixed to both ends of the guide tracks 30 inserted therein.

Additionally, the guide track coupler 38 can be configured to the shape of guide track 30, but which is smaller in size so as to allow the guide track coupler 38 to be inserted into two adjoining guide tracks 30 (not illustrated).

It is appreciated that the guide track 30, as described above, can be adapted to receive through the opening 34, a carriage, trolley, traveling crane, or any other traveling crane or bridge crane component.

An alternative embodiment trapezoidal strong back beam system 50 is illustrated in Figure 5. The alternative embodiment trapezoidal strong back beam system 50 has a first side 54, a second side 60, and a top section 56 that is rigidly secured to the first and second sides 54, 60 through means such as, but not limited to, welds along their flange seams, rivets, fasteners, adhesives, or clamps.

Alternatively, with additional reference to Figure 6, the trapezoidal strong back beam system 50 can include a first top section 62 adjacent the first side 54, a second top section 62' adjacent the second side 60, a first flange 58 opposite the first top section 62 of the first side 54, a second flange 64 opposite the second top section 62' of the second side 60 and an opening 66 between the first and second flanges 58, 64. The first and second top sections 62, 62' are oriented parallel and adjacent to each other to produce a flush contact along their entire length. The first top section 62 is placed above the second top section 62' so as to leave a gap between the edges of the first and second top sections 62, 62' and the first and second sides 54, 60, thereby allowing for the first and second top sections 62, 62' to be rigidly fixed together, such as by, but limited to, welding along the edges of the first and second sides 54, 60.

Additionally, diaphragm stiffeners (not illustrated) can be inserted into the trapezoidal strong back beam system 50 in a way that leave a space between the bottom of the stiffener and the first and second flanges 58, 64.

The first and second flanges 58, 64 are angled inwardly toward each other. Preferably, the angle orientates the first and second flanges 58, 64 parallel with the top section 56, as best illustrated in Figure 6. This first flange 58, second flange 64 and opening 66 configuration substantially produces a guide or track system adapted to receive a carriage, trolley, or traveling crane or bridge crane component.

The first and second sides 54, 60 taper inwardly from the top section 56 to their

respective flanges 58, 64. The angle at which the first and second sides 54, 60 taper relate to the desired width of the opening 66.

It is appreciated that the alternative embodiment trapezoidal strong back beam system 50, as described above, produces a combination trapezoidal beam and guide track
5 which can be adapted to receive through the opening 66, a carriage, trolley, traveling crane, or any other traveling crane or bridge crane component.

Figure 7 illustrates another alternative embodiment trapezoidal strong back beam system 70, which includes a lifting assembly. A lifting device in the form of a manually operated crane (not illustrated) may be suspended from the lifting assembly by attachment
10 means 76. The attachment means 76 could be a hook, chain or other suitable device. It is to be appreciated that the lifting device could adopt any suitable form. For example, the lifting device could be a manually or an electrically operated crane.

The attachment means 76 is connected to a trolley 78, which is illustrated in further detail, for example, in Figure 8. The trolley 78 is movably suspended from a bridge 72,
15 which can have a similar configuration to the guide track 30. Additionally, the bridge 72 could be in the form of an open channel section, an I-beam, or any other suitable form. The trolley 78 includes trolley rollers being wheels, ball bearings or other suitable propulsion means. The rollers are capable of rolling longitudinally along the bridge 72. The trolley rollers could adopt any suitable form. In this respect, the trolley rollers could
20 include plastic coated rolling surfaces for silent running. Alternatively, the rollers, including the roller surfaces, could be constructed from steel. Alternatively, other mechanisms could be used in place of rollers, such that the trolley 78 is movable along the length of the bridge 72.

The attachment means 76 extends through an opening 74 provided in the
25 underside of the bridge 72. In this way the attachment means 76 and crane are movable along the length of the bridge 72. Where the bridge 72 does not have a slot, the attachment means 76 is connected to the trolley 78 or bridge 72. It is to be appreciated that the attachment means 76 could be movably connected to two or more bridges 72.

As shown in Figure 7, two substantially parallel trapezoidal strong back beam
30 systems 10 are provided. The bridge 72 is movable longitudinally relative to the parallel guide tracks 30 of the trapezoidal strong back beam systems 10. In the illustrated embodiment, the bridge 72 is manually movable relative to the parallel guide tracks 30. However, it is to be appreciated that the bridge 72 could be electrically movable relative to the parallel guide tracks 30.

The parallel guide tracks 30 of the trapezoidal strong back beam systems 10 as shown are formed from an open channel C-section which are respectively provided with openings 34.

As best illustrated in Figure 9, the parallel guide tracks 30 are each rigidly secured
5 to the first and second flanges 18, 24 of the trapezoidal beams 12, thereby forming the trapezoidal strong back beam system 10 to which the lifting assembly is attached, thereby producing the alternative embodiment trapezoidal strong back beam system 70. The top section 16 of the trapezoidal beams 12 is then rigidly secured to a building ceiling, roof or separate superstructure. However, it is to be appreciated that the parallel guide tracks 30
10 could be provided with some movement relative to their mountings, if desired. End caps 26 are rigidly secured to the ends of the trapezoidal beams 12 so as to cover the first and second sides 14, 20 and the top section 16.

It can be appreciated the guide track couplers 38 can be attached to the ends of the guide tracks 30 to allow for the attachment of additional guide tracks 30 to the alternate
15 embodiment trapezoidal strong back beam system 70.

The bridge 72 includes carriages 80, which are provided for traveling along a respective one of the parallel guide tracks 30. The relationship and configuration of the carriages 80 and the guide tracks 30 are substantially identical. Therefore, the following description, with reference to Figures 8 and 9, in part, refers only to one carriage 80 and
20 guide track 30. Additionally, the carriages 80 can be motorized or provided with a motor and drive system.

The parallel guide tracks 30 of the trapezoidal strong back beam system 10 are illustrated in Figures 7, 8 and 9 as being open channels in profile and therefore include an internal track system. The trapezoidal beams 12 each include a plurality of diaphragm
25 stiffeners 40 rigidly secured therein. It is to be appreciated, however, that the guide tracks 30 could adopt other suitable profiles, including I-beam (or external track) profiles (not illustrated).

The carriage 80, or similar device, is movable along the parallel guide tracks 30 of the trapezoidal strong back beam system 10 and includes at least one mounting plate 82.
30 The mounting plate 82 is configured to travel longitudinally along the parallel guide track 30 by way of rollers 84, 86, 88, 90 which are rotatably mounted to the mounting plate 82. The carriages 80 bear the weight of the bridge 72 and the crane (not illustrated), which is, in turn, borne by the parallel guide tracks 30. An additional mounting plate 82 may be used external of the profile (I-beam).

Preferably, the rollers 84, 86, 88, 90 include tapered surfaces thereby enabling the rollers 84, 86, 88, 90 to roll efficiently along the guide tracks 30. The rollers 84, 86, 88, 90 include plastic (or rubber) coated rolling surfaces. The plastic coated rolling surfaces are provided to reduce rolling noise of the rollers 84, 86, 88, 90. It is to be appreciated, however, that the rollers 84, 86, 88, 90 need not include plastic coated rolling surfaces. The rollers 84, 86, 88, 90 could instead include, for example, steel rolling surfaces.

Furthermore, it is to be appreciated that the rollers 84, 86, 88, 90 could be replaced by another suitable arrangement such as, for example, a bearing arrangement.

Existing crane assemblies tend to jam when an operator initiates movement of the bridge along the assembly guides. This is, in part, a result of the rigid connection in existing crane assemblies of the bridge to the carriage.

To address this problem, the present invention includes a displacement arm 92. The displacement arm 92 is constructed from mild steel, or higher-grade steel, generally from steel plate or steel strip. Alternatively, the displacement arm 92 could be constructed from any other suitable material. The displacement arm 92 is pivotally connected to a sleeve 94. The sleeve 94 is rigidly fastened (by any suitable means) to the mounting plate 82. The mounting plate 82 is preferably welded to the sleeve 94, but other means of rigid attachment such as bolting could be used. The pivotal connection between the displacement arm 92 and the sleeve 94 is by way of a ball bearing 96. The ball bearing 96 is retained in place by a ball bearing seat 98 provided in the displacement arm 92 and the sleeve 94. The ball bearing 96 could be manufactured from any suitable grade of steel, or any other suitable material. The bearing seat is formed from a plastic, such as nylon, to minimize friction, but could be formed from other suitable materials.

The displacement arm 92 is pivotally connected to a bridge sleeve 100, as illustrated in Figures 8 and 9, which, in turn, is securely connected to one end of the bridge 72. The bridge sleeve 100 is constructed from steel. Any suitable grade steel, or any other material, could be used in the construction of the bridge sleeve 100. The displacement arm 92 is pivotally connected to the bridge sleeve 100 by two fasteners 102, 104 via displacement arm appendages 106, 108. The fasteners 102, 104 provide a pivotal connection between the displacement arm 92 and the bridge sleeve 100.

The above arrangement forms a universal joint that provides the necessary relative pivoting and lateral movement between the carriage 80 and the bridge 72 to at least reduce the incidence of jamming of the alternative embodiment trapezoidal strong back beam system 70, upon initiating movement of the bridge 72 relative to the parallel guide

tracks 30 of the trapezoidal strong back beam systems 10.

It is to be appreciated that the pivotal connection of the carriages 80 to the bridge 72 could adopt configurations different to that specifically described above. The pivotal connection could instead, for example, include a rod end, or other pivotal or rotatable linkage arrangement.

The mounting plate 82 includes a safety mechanism in the form of anti-derailment means 82A, 82B. The anti-derailment means 82A, 82B are ball bearings or similar, which ensure the carriages 80 remain engaged with the guide tracks 30 of the trapezoidal strong back beam system 10. The anti-derailment means 82A, 82B are provided to prevent the bridge 72 and crane crashing to the ground in the event of failure of the rollers 84, 86, 88, 90 or other parts of the carriage 80.

The bridge 72 and the parallel guide tracks 30 are formed from cold-rolled steel in tube or bar. It can also be appreciated that the bridge 72 can be in the form of trapezoidal beam system 10, 50, thereby forming a trapezoidal beam bridge 72', as best illustrated in Figures 9 and 10. Bridge 72 can consist of trapezoidal beam 12, and guide track 30, wherein the portion of guide track 30 that extends past trapezoidal beam 12 is received in the bridge sleeve 100.

Reference is now made to Figure 10, which illustrates another alternative embodiment trapezoidal strong back beam system 120. The alternative embodiment trapezoidal strong back beam system 120 is similar to the alternative embodiment trapezoidal strong back beam system 70 of Figure 7 except that the parallel guide tracks 30 and the trapezoidal beams 12 of the alternative embodiment trapezoidal strong back beam system 70 are replaced with parallel alternative embodiment trapezoidal beams 50 of Figures 5 and 6.

The trapezoidal beam 50 has a first side 54, a top section 56, a first flange 58, a second side 60, and a second flange 64. The top section 56 is rigidly secured to the first and second sides 54, 60 through means such as, but not limited to, welds along their flange seams, rivets, fasteners, adhesives, or clamps.

The top section 56 is adjacent the first side 54 and the second side 60. The first flange 58 is opposite of the top section 56 of the first side 54, and the second flange 64 is opposite the top section 56 of the second side 60. An opening 66 is defined between the first and second flanges 58, 64.

The first and second flanges 58, 64 are angled inwardly toward each other. Preferably, the angle orientates the first and second flanges 58, 64 parallel with the top

section 56, as best illustrated in Figure 10.

The first and second sides 54, 60 taper inwardly from the top sections 56 to their respective flanges 58, 64. The angle at which the first and second sides 54, 60 taper relate to the desired width of the opening 66.

5 The bridge 72 includes carriages 80. The carriages 80 are provided for traveling along the first and second flanges 58, 64 of the alternate embodiment trapezoidal strong back beam system 50 respectively. The relationship and configuration of the carriages 80 and the first and second flanges 58, 64 are substantially identical. Therefore, the following description, with reference to Figure 10, in part, refers only to one carriage 80 and the first
10 and second flanges 58, 64 of a single alternative embodiment trapezoidal strong back beam system 50. Additionally, the carriages 80 can be motorized or provided with a motor and drive system.

15 The first and second flanges 58, 64 of the alternative embodiment trapezoidal strong back beam system 50 form an internal track system. The alternative embodiment trapezoidal strong back beam system 50 can each include a plurality of diaphragm stiffeners 40 rigidly secured therein (not illustrated). It is to be appreciated, however, that the first and second flanges 58, 64 could adopt other suitable profiles, including I-beam, or external track profiles (not illustrated).

20 The carriage 80, or similar device, is movable along the first and second flanges 58, 64 of the trapezoidal strong back beam system 50 and includes at least one mounting plate 82. The mounting plate 82 is configured to travel longitudinally along the first and second flanges 58, 64 by way of rollers 84, 86, 88, 90, which are rotatably mounted to the mounting plate 82. The carriages 80 bear the weight of the bridge 72 and the crane (not
25 illustrated), which is, in turn, borne by the first and second flanges 58, 64 of the trapezoidal strong back beam system 50. An additional mounting plate 82 may be used external of the profile (I-beam).

30 Preferably, the rollers 84, 86, 88, 90 include tapered surfaces thereby enabling the rollers 84, 86, 88, 90 to roll efficiently along the first and second flanges 58, 64. The rollers 84, 86, 88, 90 include plastic (or rubber) coated rolling surfaces. The plastic coated rolling surfaces are provided to reduce rolling noise of the rollers 84, 86, 88, 90. It is to be appreciated, however, that the rollers 84, 86, 88, 90 need not include plastic coated rolling surfaces. The rollers 84, 86, 88, 90 could instead include, for example, steel rolling surfaces.

Furthermore, it is to be appreciated that the rollers 84, 86, 88, 90 could be replaced

by another suitable arrangement such as, for example, a bearing arrangement.

Existing crane assemblies tend to jam when an operator initiates movement of the bridge along the assembly guides. This is, in part, a result of the rigid connection in existing crane assemblies of the bridge to the carriage.

5 To address this problem, this alternative embodiment of the present invention includes a displacement arm 82. The displacement arm 92 is constructed from mild steel, or higher-grade steel, generally from steel plate or steel strip. Alternatively, the displacement arm 92 could be constructed from any other suitable material. The displacement arm 92 is pivotally connected to a sleeve 94. The sleeve 94 is rigidly
10 fastened (by any suitable means) to the mounting plate 82. The mounting plate 82 is preferably welded to the sleeve 94, but other means of rigid attachment such as bolting could be used. The pivotal connection between the displacement arm 92 and the sleeve 94 is by way of a ball bearing 96. The ball bearing 96 is retained in place by a ball bearing seat 98 provided in the displacement arm 92 and the sleeve 94. The ball bearing 96 could
15 be manufactured from any suitable grade of steel, or any other suitable material. The bearing seat is formed from a plastic, such as nylon, to minimize friction, but could be formed from other suitable materials.

The displacement arm 92 is pivotally connected to a bridge sleeve 100, as illustrated in Figure 10, which, in turn, is securely connected to one end of the bridge 72.
20 The bridge sleeve 100 is constructed from steel. Any suitable grade steel, or any other material, could be used in the construction of the bridge sleeve 100. The displacement arm 92 is pivotally connected to the bridge sleeve 100 by two fasteners 102, 104 via displacement arm appendages 106, 108. The fasteners 102, 104 provide a pivotal connection between the displacement arm 92 and the bridge sleeve 100.

25 The above arrangement forms a universal joint that provides the necessary relative pivoting and lateral movement between the carriage 80 and the bridge 72 to at least reduce the incidence of jamming of the alternative embodiment lifting assembly 120, upon initiating movement of the bridge 72 relative to the first and second flanges 58, 64 of the alternate embodiment trapezoidal strong back beam system 50.

30 It is to be appreciated that the pivotal connection of the carriages 80 to the bridge 72 could adopt a configuration(s) different to that specifically described above. The pivotal connection could instead, for example, include a rod end, or other pivotal or rotatable linkage arrangement.

The mounting plate 82 includes a safety mechanism in the form of anti-derailment

means 82A, 82B. The anti-derailment means 82A, 82B are ball bearings or similar, which ensure the carriages 80 remain engaged with the first and second flanges 58, 64 of the alternative embodiment trapezoidal strong back beam system 50. The anti-derailment means 82A, 82B are provided to prevent the bridge 72 and crane crashing to the ground in the event of failure of the rollers 84, 86, 88, 90 or other parts of the carriage 80.

It can also be appreciated that the bridge 72 can be in the form of trapezoidal beam system 10, 50, thereby forming a trapezoidal beam bridge 72'. Bridge 72 can consist of trapezoidal beam 12, and guide track 30, wherein the portion of guide track 30 that extends past trapezoidal beam 12 is received in the bridge sleeve 100.

Referring now to Figure 11 which illustrates the alternative embodiment of the trapezoidal strong back beam system 70 having the bridge 72 consisting of the trapezoidal beam 12 and guide track 30, thereby forming a trapezoidal beam bridge 72'. All the elements and their functions of the above-described trapezoidal strong back beam system 70 are incorporated herein to the alternative embodiment illustrated in Figure 11.

The trapezoidal beam bridge 72' consists of the trapezoidal beam 12 and the guide track 30, including all their structural elements as described above.

The displacement arm 92 can be modified to accommodate the trapezoidal beam bridge 72' therein. The displacement arm 92 is pivotally connected to a bridge sleeve 100, as illustrated in Figure 11, which, in turn, is securely connected to the guide track 30 of the trapezoidal beam bridge 72'. The bridge sleeve 100 is constructed from steel. Any suitable grade steel, or any other material, could be used in the construction of the bridge sleeve 100. The displacement arm 92 is pivotally connected to the bridge sleeve 100 by two fasteners 102, 104 via displacement arm appendages 106, 108. The fasteners 102, 104 provide a pivotal connection between the displacement arm 92 and the bridge sleeve 100. The displacement arm 92, sleeve 94 and carriage 80 are identical to that described above in Figures 8-10.

Referring now to Figure 12 which illustrates another alternative embodiment trapezoidal beam bridge 70' consisting of the trapezoidal beam bridge 72' and carriage 80'.

The trapezoidal beam bridge 72' includes carriages 80', only one of which is illustrated.

The carriage 80' is provided for traveling along the parallel guide tracks 30 respectively, as described above in relation to Figures 7 and 8. The relationship and configuration of the carriage 80' and the guide tracks 30 are substantially identical. Therefore, the following description, with reference to Figure 12, in part, refers only to one carriage 80'. Additionally, the carriages 80' can be motorized or provided with a motor and drive system.

The carriage 80', or similar device, is movable along the parallel guide tracks 30 of the trapezoidal strong back beam system 70 and includes at least one mounting plate 82. The mounting plate 82 is configured to travel longitudinally along the parallel guide track 30 by way of rollers 84, 86, 88, 90, which are rotatably mounted to the mounting plate 82.

5 The carriages 80' bear the weight of the trapezoidal beam bridge 72' and the crane (not illustrated), which is, in turn, borne by the parallel guide tracks 30. An additional mounting plate 82 may be used external of the profile (I-beam).

10 Preferably, the rollers 84, 86, 88, 90 include tapered surfaces thereby enabling the rollers 84, 86, 88, 90 to roll efficiently along the guide tracks 30. The rollers 84, 86, 88, 90 include plastic (or rubber) coated rolling surfaces. The plastic coated rolling surfaces are provided to reduce rolling noise of the rollers 84, 86, 88, 90. It is to be appreciated, however, that the rollers 84, 86, 88, 90 need not include plastic coated rolling surfaces. The rollers 84, 86, 88, 90 could instead include, for example, steel rolling surfaces.

15 The mounting plate 82 includes a safety mechanism in the form of anti-derailment means 82A, 82B. The anti-derailment means 82A, 82B are horizontally mounted wheels or similar, which ensure the carriages 80' remain engaged with the guide tracks 30 of the trapezoidal strong back beam system 70. The anti-derailment means 82A, 82B are provided to prevent the trapezoidal beam bridge 72' and crane crashing to the ground in the event of failure of the rollers 84, 86, 88, 90 or other parts of the carriage 80'.

20 The displacement arm 92 can be modified to accommodate the trapezoidal beam bridge 72' therein. The displacement arm 92 is pivotally connected to a bridge sleeve 100, as illustrated in Figure 12, which, in turn, is securely connected to the guide track 30 of the trapezoidal beam bridge 72'. The bridge sleeve 100 is constructed from steel. Any suitable grade steel, or any other material, could be used in the construction of the bridge sleeve 100.

25 The displacement arm 92 is pivotally connected to the bridge sleeve 100 by two fasteners 102, 104 via displacement arm appendages 106, 108. The fasteners 102, 104 provide a pivotal connection between the displacement arm 92 and the bridge sleeve 100. A plurality of set screws 110 are used to secure the guide track 30 of the trapezoidal beam bridge 72' to the bridge sleeve 100.

30 The trapezoidal beam bridge 72' is adapted to receive the trolley 78 therein, with the trolley 78 being supported by the guide track 30 of the trapezoidal beam bridge 72'. The attachment means 76 of trolley 78 is thereby received within the opening 74 of the guide track 30 of the trapezoidal beam bridge 72'.

A hanger rod 112 pivotally connects the displacement arm 92 to the mounting plate

82, while a pair of cables 114 connect the displacement arm appendages 106, 108 to the mounting plate 82. The hanger rod 112 passes through the top of the displacement arm 92, a pivot post bearing 116, and a pivot nut 118. A rolling pin 120 supports the displacement arm 92 to the hanger rod 112.

5 Referring now to Figures 13-15, which illustrate another alternative embodiment trapezoidal strong back beam system 130 consisting of the trapezoidal beam bridge 72' and carriage 134 which is adapted to travel along parallel I-beams 132 respectively, only one of which is illustrated. The relationship and configuration of the carriage 134 and the I-beams 132 are substantially identical. Therefore, the following description, with
10 reference to Figures 13-15, in part, refers only to one carriage 134. The I-beams 132 can be attached to a support structure or a surface (133).

The carriage 134, or similar device, is movable along the I-beams 132 of the trapezoidal strong back beam system 130 and includes at least one mounting plate 136. Figure 14 shows an embodiment comprising two mounting plates 136. The mounting plate
15 136 is configured to travel longitudinally along the parallel I-beam 132 by way of rollers 138, 140, 142, 144 which are rotatably mounted to the mounting plate 136. Rollers 138, 142 are positioned on one web of the I-beam 132, while the rollers 140, 144 are positioned on the other web of the I-beam 132, as best illustrated in Figure 14. The carriages 134 bear the weight of the trapezoidal beam bridge 72' and the crane (not illustrated), which is,
20 in turn, borne by the I-beams 132. Additionally, the carriages 134 can be motorized or provided with a motor and drive system.

Preferably, the rollers 138, 140, 142, 144 include deep groove ball bearings 148 thereby enabling the rollers 138, 140, 142, 144 to roll efficiently along the I-beams 132. The rollers 138, 140, 142, 144 include plastic (or rubber) coated rolling surfaces. The
25 plastic coated rolling surfaces are provided to reduce rolling noise of the rollers 138, 140, 142, 144. It is to be appreciated, however, that the rollers 138, 140, 142, 144 need not include plastic coated rolling surfaces. The rollers 138, 140, 142, 144 could instead include, for example, steel rolling surfaces.

The mounting plate 136 includes a safety mechanism in the form of anti-derailment
30 pins 150. The anti-derailment pins 150 ensure the carriages 134 remain engaged with the I-beam 132 of the alternate embodiment trapezoidal strong back beam system 130. The anti-derailment pins 150 are provided to prevent the trapezoidal beam bridge 72' and crane crashing to the ground in the event of failure of the rollers 138, 140, 142, 144 or other parts of the carriage 134.

The displacement arm 152, which is in the configuration of a U-hanger, can be modified to accommodate the trapezoidal beam bridge 72' therein. The displacement arm 152 is pivotally connected to a bridge sleeve or cross travel hanger plates 156, as best illustrated in Figures 14 and 15, which, in turn, is securely connected to a bridge sleeve or cross travel hanger 158. The bridge sleeve or cross travel hanger 158 is securely connected to the guide track 30 of the trapezoidal beam bridge 72'. The bridge sleeve or cross travel hanger 158 is constructed from steel. Any suitable grade steel, or any other material, could be used in the construction of the bridge sleeve or cross travel hanger 158.

The displacement arm 152 is pivotally connected to the bridge sleeve or cross travel hanger 158 by two fasteners 160 via the bridge sleeve or cross travel hanger plates 156. The fasteners 106 provide a pivotal connection between the displacement arm 152 and the bridge sleeve or cross travel hanger 158. A plurality of set screws 162 is used to secure the guide track 30 of the trapezoidal beam bridge 72' to the bridge sleeve or cross travel hanger 158.

The trapezoidal beam bridge 72' is adapted to receive the trolley 78 therein, with the trolley 78 being supported by the guide track 30 of the trapezoidal beam bridge 72'. The attachment means 76 of trolley 78 thereby received within the opening 74 of the guide track 30 of the trapezoidal beam bridge 72'.

The displacement arm 152 is pivotally connected to the mounting plates 136 by way of a main axle 168. The main axle 168 passes through the mounting plates 136 and is pivotally secured to the mounting plates 136 by washers 170 and lock nuts 172. Main axle spacers 174 are positioned between the mounting plates 136 and a pivot post 178. The displacement arm 152 is pivotally connected to the pivot post 178 via a pivot post bearing 180. Additionally, cables 182 connect the travel hanger plates 156 to the main axle 168.

Referring now to Figure 16, another embodiment of the present invention comprises a trapezoidal strong back beam system 200 comprising a trapezoidal beam 12 having a top section 16, an inwardly tapering first side 14 and an inwardly tapering second side 20 as described above in relation to other embodiments. A bottom section 202 opposite the top section 16 extends between the first and second sides 14, 20. A top portion 36 of the bridge 72'', which can have a similar configuration to the guide track 30 as described above, is secured to the bottom section 202 of the trapezoidal beam 12 by any suitable means known in the art, such as, but not limited to, welds along their flange seams, rivets, fasteners, adhesives, or clamps. As described above in relation to previous embodiments, bridge 72'' comprises an opening 74 through which attachment means 76 for a lifting

device extends. The attachment means is connected to a trolley movable along the inside of the bridge 72" as described above.

The embodiment shown in Figure 16 comprises a pair of parallel, spaced apart guide tracks 204 having I-beam profiles, which provide external tracks for a top running trapezoidal strong back beam system. As illustrated in Figure 16, the trapezoidal beam 12 extends substantially perpendicularly between, and is supported by, the parallel, spaced apart guide tracks 204 via respective carriages 206, or similar devices. The carriages 206 bear the weight of the trapezoidal beam 12 and the crane (not illustrated), which is, in turn, borne by the parallel guide tracks 204, thus forming a bridge crane.

With reference to enlarged view in Figure 17, each carriage 206 comprises at least one mounting plate 136. In this embodiment, each carriage 206 comprises a pair of spaced apart, substantially u-shaped mounting plates 136. At least one mounting plate 136, and in this embodiment both mounting plates 136, comprise(s) an opening 137 through which the bridge 72" protrudes, as described in further detail below. Each carriage 206 is movable longitudinally along its respective guide track 204 by virtue of rollers 208, 210, 212, 214, 216, 218, 220, 222 rotatably mounted in a substantially vertical orientation to the mounting plates 136. Although rollers 218, 220, 222 are not visible in Figure 17, the arrangement of the rollers is the same on each mounting plate 136. Rollers 208, 212, 216, 220 are positioned on one web of the I-beam of the guide track 204 and rollers 210, 214, 218, 222 are positioned underneath the web. Hence, each carriage 206 comprises four pairs of rollers, each pair having a roller above and below the web.

Each carriage 206 further comprises one or more end rollers 224 that abut and roll along the edge of the web of the I-beam. In the embodiment illustrated, a pair of end rollers 224 is rotatably mounted in a substantially horizontal orientation to each mounting plate 136.

The rollers 208, 210, 212, 214, 216, 218, 220, 222, 224 can include any one of the following as described above in relation to previous embodiments: deep groove ball bearings, plastic or rubber coated rolling surfaces, steel rolling surfaces.

The bridge 72" is coupled to each carriage 206 via a displacement arm 226 and an elongate member in the form of a main axle 168 extending between and pivotally secured to the mounting plates 136. The displacement arm 226 is constructed from mild steel, or higher-grade steel, generally from steel plate or steel strip, but any other suitable material can be used. The displacement arm 226 is pivotally connected to a bridge sleeve 230, which receives and is securely connected to one end of the bridge 72". The bridge sleeve

230 is constructed from any suitable grade steel, or any other suitable material. The displacement arm 226 is pivotally connected to the bridge sleeve 230 by fasteners 102 either side of the displacement arm 226 via displacement arm appendages 232. The fasteners 102 provide a pivotal connection between the displacement arm 92 and the bridge sleeve 230.

The main axle 168 is pivotally secured to each mounting plate 136 with washers 170 either side of the mounting plate 136 and locking nuts 172 on the outside of the mounting plates 136. Main axle spacers 174 are positioned between the mounting plates 136 and a pivot post 178 extending from the main axle 168. The displacement arm 226 is pivotally connected at the first end to the pivot post 178 via a pivot post bearing 180, which can be in the form of a lubricated plastic bush.

Appendages 232 give the displacement arm 226 a generally inverted U-shape configuration such that the first end is pivotally connected to the pivot post 178 and second ends of each appendage 232 pivotally connected to the bridge sleeve 230 by fasteners 102.

The above arrangement forms a universal joint that provides the necessary relative pivoting and lateral movement between the carriages 206 and the bridge 72". The fluid motion of the arrangement avoids jamming, particularly upon initiating movement of the bridge 72" forming the crane bridge relative to the parallel guide tracks 204 of the trapezoidal strong back beam system 200.

It is to be appreciated that the pivotal connection of the carriages 206 to the bridge 72" could adopt configurations different to that specifically described above. The pivotal connection could instead, for example, include a rod end, or other pivotal or rotatable linkage arrangement.

In some alternative embodiments of the present invention, the carriages 206 can be replaced with the carriages disclosed in the Applicant's International patent application publication no. WO 03/101878, the contents of which are incorporated herein by reference.

With reference to Figure 18, according to some further alternative embodiments of the present invention, at least part of the first and second sides 14, 20 of the trapezoidal beam 12 comprise a lattice or cut-out structure 300 rather than solid sides as described in relation to previous embodiments herein. According to some embodiments, the majority of the first and second sides 14, 20, apart from solid ends 302, comprise the lattice structure 300, which allows for further reduction in the bridge weight whilst retaining sufficient

strength. As described above in relation to previous embodiments, this embodiment comprises end caps 26 attached to the first and second sides 14, 20 above the bridge 72" and diaphragm stiffeners 40 within the trapezoidal beam 12, which can also be provided adjacent vertical elements of the lattice structure 300.

5 As a yet further alternative to the embodiment shown in Figure 18, the bridge 72" is omitted and flat steel plates 304 are welded to and extend from the bottom section 202 of the trapezoidal beam 12 to provide a track. The trolley 78 comprising the displacement arm 152 depending therefrom as described above runs on the flat steel plates 304 forming the track instead of the bridge 72".

10 Referring now to Figures 19-21, another embodiment of the present invention comprises a lifting assembly 300 comprising a bridge 72"', which can have a similar configuration to the guide track 30. As described above in relation to previous embodiments, bridge 72"' comprises an opening 74 in an underside thereof through which attachment means 76 for a lifting device extends. The attachment means is connected to
15 trolley 78 (shown in Figure 7) movable along the inside of the bridge 72"' as described above.

The embodiment shown in Figures 19-21 comprises a pair of parallel, spaced apart guide tracks 204 having I-beam profiles, which provide external tracks for a top running bridge crane. As illustrated in Figures 19-21, the bridge 72"' extends substantially
20 perpendicularly between, and is supported by, the parallel, spaced apart guide tracks 204 via respective carriages 306, or similar devices. The carriages 306 bear the weight of the bridge 72"' and the crane (not illustrated), which is, in turn, borne by the parallel guide tracks 204, thus forming a bridge crane.

With additional reference to the enlarged views in Figures 22 and 23, each carriage
25 306 comprises at least one mounting plate 136. In this embodiment, each carriage 306 comprises a pair of spaced apart, substantially rectangular mounting plates 136 each having an aperture 307 therethrough. Each carriage 306 is movable longitudinally along its respective guide track 204 by virtue of rollers 308, 310, 312, 314, rotatably mounted in a substantially vertical orientation to the mounting plates 136 via respective shafts 316, 318.
30 This arrangement is most clearly shown in Figure 20. Shafts 316, 318 can be in the form of threaded bolts passing through apertures in the mounting plates 136 and secured in place with bolts 320. Bolts and/or spacers can be used to maintain the position of the rollers 308, 310, 312, 314 along the respective shafts 316, 318. Rollers 308, 310, 312, 314 are positioned on one web of the I-beam of the guide track 204. Each carriage 306

comprises projections 322 extending inwardly from the mounting plates 136 adjacent the rollers 308, 310, 312, 314. Projections 322 extend inwardly above one web of the I-beam of the guide track 204 and act as anti-derailment plates to prevent derailment of the rollers 308, 310, 312, 314 and therefore the carriages 306 from the guide track 204.

Each carriage 306 further comprises one or more guide rollers 224 that abut and roll along the edge of the web of the I-beam. In the embodiment illustrated, a pair of guide rollers 224 is rotatably mounted in a substantially horizontal orientation to each mounting plate 136 with a guide roller 224 at each end of the mounting plate 136.

The rollers 308, 310, 312, 314 and guide rollers 224 can include any one of the following as described above in relation to previous embodiments: deep groove ball bearings, plastic or rubber coated rolling surfaces, steel rolling surfaces.

The bridge 72''' is coupled to each carriage 306 via a pair of displacement arms 226 pivotally secured to a respective elongate member in the form of a main axle 168 extending between the mounting plates 136. The displacement arms 226 are constructed from mild steel, or higher-grade steel, generally from steel plate or steel strip, but any other suitable material can be used. Each displacement arm 226 is pivotally connected to the bridge 72''' via a shoulder 324 securely connected to one end of the bridge 72'''. A pair of shoulders 324 are, for example, welded in a parallel arrangement to each side of the bridge 72''' at the end thereof as shown in Figures 19-23. As shown in Figure 23, each shoulder 324 comprises a support in the form of an anti-drop plate 326 welded to an underside of each shoulder 324. Each support 326 comprises an aperture in each end thereof for receiving a fastener 102 in the form of a rod. Each displacement arm 226 is pivotally connected to a respective shoulder 324 by fasteners 102 extending through either side of the displacement arm 226 and into the apertures in each end of support 326. The fasteners 102 provide a pivotal connection between the displacement arm 226 and the shoulders 324 of the bridge 72'''. According to some embodiments, the apertures extend through the length of the support 326 and a pair of rods are used such that a single rod passes through each displacement arm 226 and respective support 326.

The main axles 168 can be in the form of threaded bolts and are secured to each mounting plate 136 with washers 170 either side of the mounting plate 136 and locking nuts 172 on the inside and outside of the mounting plates 136, as described above in relation to earlier embodiments. Only locking nuts 172 on the outside of the mounting plates 136 are shown in Figures 19-23. Although not shown in Figures 19-23, as described previously herein, (with reference to, for example, Figure 14), according to some

embodiments, main axle spacers 174 can be positioned between the mounting plates 136 and a respective pivot post 178. The displacement arms 226 are pivotally connected to respective pivot posts 178 via a pivot post bearing 180, which can be in the form of a lubricated plastic bush.

5 The above arrangement forms a universal joint that provides the necessary relative pivoting and lateral movement between the carriages 306 and the bridge 72". The fluid motion of the arrangement avoids jamming, particularly upon initiating movement of the bridge 72" forming the crane bridge relative to the parallel guide tracks 204 of the lifting assembly 300. Aperture 307 through each mounting plate 136 allows sufficient movement
10 of the guide track 30 and shoulders 324. Shoulders 324 provide for attachment to the pair of displacement arms 226 and the space between the shoulders 324 allows for fitting of the trolley 78 to the bridge 72".

It is to be appreciated that the pivotal connection of the carriages 306 to the bridge 72" could adopt configurations different to that specifically described above. The pivotal
15 connection could instead, for example, include a rod end, or other pivotal or rotatable linkage arrangement.

Although the embodiments shown in Figures 19-23 show a plain bridge 72", the aforementioned trapezoidal strong back beam system can be used with the embodiments shown in Figures 19-23.

20 A further variation to the embodiments shown in Figures 19-23 is shown in Figures 24-26. In this embodiment, the lifting assembly 400 comprises a bridge 72" having a pair of shoulders 324 provided at each end for pivotal coupling to respective displacement arms 226 of a respective carriage 406 as described above. However, in this embodiment, the mounting plates 136 form two walls of a cast box 402, which can be cast from any
25 suitable metal, such as high tensile steel grade 4140. In this embodiment, one of the mounting plates 136 on a side closest the bridge 72" comprises an aperture 307 through which the bridge 72" protrudes to allow pivotal connection of the shoulders 324 to the displacement arms 226. The mounting plate 136 on the outside is a plain wall and does not comprise an aperture.

30 Elongate members 168, comprising pivot posts 178, have a square cross section and are cast with the box 402. Elongate members 168 may however have other cross sectional shapes. Therefore, elongate members 168 are fixed rather than in the form of pivoting main axles as described above in relation to the embodiments shown in Figures 16, 17 and 19-23.

Each carriage 406 is movable longitudinally along its respective guide track 204 by virtue of rollers 308, 310, 312, 314, rotatably mounted in a substantially vertical orientation to the mounting plates 136 via respective shafts 316, 318 as described above. Mounting plates 136 on either side of the cast box 402 comprise apertures 403 and collars 405 for mounting shafts 316, 318.

Each carriage 406 comprises at least one anti-derailment member 408 and in this embodiment a pair of anti-derailment members 408 are mounted to an underside of the cast box 402 beneath mounting plates 136 on either side of the cast box 402. Box 402 is cast with a first base member 409 in a substantially central position comprising a plurality of elongate apertures 410. In this embodiment, four elongate apertures 410 are provided and anti-derailment members 408 are fixed to first base member 409 with fasteners, such as nuts and bolts. Anti-derailment members 408 comprise a block 412 that abuts or runs very close to the web of the I-beam of the guide track 204 and a plate 414 attached to the block 412 by the fasteners that is positioned beneath the web of the I-beam to prevent derailment of the rollers 308, 310, 312, 314 and therefore the carriage 406 from the guide track 204. Elongate apertures 410 allow accurate positioning and variable mounting of the anti-derailment members 408 with respect to the guide track 204 and enable the carriage 406 to be used with a wide range of guide tracks of different sizes and shapes.

Each carriage 406 further comprises one or more guide rollers 224 that abut and roll along the edge of the web of the I-beam. In the embodiment illustrated, a pair of guide rollers 224 is rotatably mounted in a substantially horizontal orientation to a respective end base member 416 of the cast box 402 with fasteners, such as nuts and bolts. Each base member 416 comprises a pair of elongate apertures 418 to allow accurate positioning and variable mounting of the guide rollers 224.

The embodiment shown in Figures 24-26 has superior strength than some of the previous embodiments and is cheaper to produce because it is cast as a single unit rather than being formed from separately cut and machined components.

It is to be appreciated that part(s) of the above-described arrangements could be incorporated into existing assemblies. In this respect, the Applicant envisages that the arrangements illustrated in Figures 7-26 in their entirety or in part, could be incorporated into existing assemblies. The Applicant envisages that at least the arrangements comprising top running carriages described herein can be motorized rather than moved by hand.

Embodiments of the present invention comprising motorized top running carriages will now be described with reference to Figures 27-32.

Con formato: Fuente: Sin Negrita

Figures 27-29 show a bridge crane assembly 500 comprising a pair of spaced apart guide tracks 204 attachable to a support structure (not shown) and a pair of carriages 506 longitudinally movable along a respective one of the guide tracks 204. As with some of the previous embodiments described above, bridge 72''' comprises a pair of shoulders 324 at each end of the bridge. A shoulder 324 is attached either side of the bridge 72''' by any suitable means, such as welding, and each shoulder 324 protrudes beyond the end of the bridge 72'''.

With additional reference to Figure 30, each shoulder 324 of the bridge 72''' is pivotally connected to a respective displacement arm 226. In this embodiment, each displacement arm 226 is in the form of a stirrup 502. Each stirrup 502 can be considered as comprising a pair of spaced apart displacement arm appendages 232 which join together at a first end forming a flange 504 and which join together at a second end forming a base 506 of the stirrup 502. Each shoulder 324 is pivotally connected to a respective stirrup 502 at the second end via a pivot post 178 and a pivot post bearing 180 mounted to the base 506.

Flange 504 of each stirrup 502 comprises an aperture 508 for housing a spherical bearing 510. Aperture 508 and spherical bearing 510 slidably and rotatably receive an elongate member in the form of main axle 168. The main axle 168 is supported by a body 512 of the carriage 506, which covers the components of the carriage 506. Body 512 can be considered to comprise a pair of transverse mounting plates 515 forming end walls of the body 512 and mounting plates 136 forming side walls of the body 512. As shown in Figure 27, an inner mounting plate 136 comprises an aperture 307 through which the bridge 72''' and/or the shoulders 324 of the bridge protrude for pivotal coupling to the stirrups 502. Plates 507 are attached to the inner mounting plates 136 above the bridge 72''' to prevent any upward travel of the bridge relative to the carriage 506, thus preventing the shoulders 324 from hopping off the pivot posts 178 and pivot post bearings 180.

Body 512 also comprises a roof 514 attached to the transverse mounting plates 515 and the mounting plates 136. In Figures 27-29, body 512 has been omitted from the carriage 506 on the right hand side to show the internal components. Part of the roof 514 and/or the transverse mounting plates 515 can be curved, as shown most clearly in Figures 27 and 30. As shown in Figure 30, main axle 168 is supported at each end by reinforced portions 516, which can be part of the transverse mounting plates 515 or part of

the roof 514. Main axle 168 is also supported in a substantially central region by reinforced portion 518 depending downwardly from the roof 514. However, it will be appreciated that in alternative embodiments, main axle 168 can be supported at each end by transverse mounting plates 515 of the body 512.

As shown most clearly in Figures 30 and 31, carriage 506 also comprises at least one biasing means 520 slidably mounted on the main axle 168 adjacent the flange 504 at the first end of the stirrup 502. In the embodiment shown, biasing means 520 in the form of helical springs are provided either side of the flange 504 of each stirrup 502 to keep the stirrups 502 aligned with respective shoulders 324 of the bridge and prevent the stirrups 502 fouling of the main axle 168 and/or the shoulders 324 supporting the bridge 72". At least one spacer 522 is slidably mounted on the main axle 168 between the biasing means 520 and the body 512. In the embodiment shown, a spacer 522 is slidably mounted outside each of the outer biasing means 520 for each stirrup 502. The inner biasing means 520 also abut central reinforced portion 518 of the body 512.

The bridge crane assembly 500 also comprises a drive means 524 coupled to each carriage 506 via a gearbox 526 for driving each carriage along its respective guide track 204. The drive means can take any suitable form, such as an electric motor, and the drive means for each carriage are synchronized via a wired or wireless connection such that both carriages 506 are driven in the same direction simultaneously to move the bridge 72" along the guide tracks 204. The gearbox 526 can be mounted to the body 512 by any suitable means and coupled to one of the shafts 316 or 318 to which rollers 308 and 310 or rollers 312 and 314 are mounted respectively to drive the carriage along the guide track 204.

With reference to Figure 29, the bridge 72" comprises an attachment means 76 for supporting a lifting device of the bridge crane assembly 500. Figure 29 shows a pair of attachment means 76, each of which is attached to a trolley 78, which can be in the form of a double trolley assembly, which runs within the hollow structure of the bridge 72" as described above. A lift motor box 528 is attached to the attachment means 76 for motorized operation of the lifting device.

With reference to Figure 32, anti-derailment members 408 are attached to an underside of the body 512, for example, as described above. In this embodiment, anti-derailment members 408 are unitary structures rather than formed from a separate block 412 and plate 414 as described above in relation to Figure 24. Roller 310 is secured in place on shaft 316 via locking ring 530 and washer 532. Figure 32 also shows a circular

plate 530, which is a cover plate attached to the body 512.

Con formato: Fuente: Negrita, Cursiva

Whilst the embodiments described with reference to Figures 27-32 comprise a pair of displacement arms 226 in the form of stirrups 502, it should be appreciated that embodiments of the present invention can include a single displacement arm 226 in the form of a stirrup 502 pivotally connected to the bridge 72''' via pivot post 178 and pivot post bearing 180, optionally via a bridge sleeve, thus omitting the shoulders 324.

Hence, according to another aspect, the present invention resides in a carriage 506 for a bridge crane assembly 500, the carriage comprising a body 512 having a pair of spaced apart transverse mounting plates 515, a pair of mounting plates 136 and a roof 514. The carriage 506 comprises a plurality of rollers 308, 310, 312, 314 rotatably mounted in a substantially vertical orientation to the body 512 for longitudinal movement of the carriage 506 along a respective guide track 204 of the bridge crane assembly 500. The carriage 506 also comprises an elongate member supported by the body and at least one displacement arm 226 in the form of a stirrup 502 slidably and rotatably coupled at a first end to the elongate member, for example via a spherical bearing. The stirrup 502 has at least one second end for pivotal connection to the bridge 72''', for example via pivot post and a pivot post bearing.

Con formato: Fuente: Sin Negrita

The alternative embodiments of the bridge crane assembly 500 comprising carriages 506 provide improved travel of the carriages 506 along the guide tracks 204 and reduced likelihood of jamming compared with existing assemblies. This is a result of the pivotal connection of the bridge 72''' to the second ends of the stirrups 502. This is also a result of the coupling of the stirrups 502 at the first end via the spherical bearings 510. Substantially maintaining the position of the stirrups 502 via biasing means 520 also contribute to reduced likelihood of jamming and smooth travel of the carriages 506. It will therefore be appreciated that the aforementioned coupling of the bridge 72''' to the carriages 506 can also be used for manually operated bridge cranes such that drive means 524 and gearbox 526 are omitted.

The alternative embodiment trapezoidal strong back beam systems 10, 50, 70, 70', 130, 200 allow for the bridge weight to be reduced by approximately 35% compared with using RHS beams as a strong back beam.

Furthermore, without the use of the trapezoidal strong back beams 10, 50, 70, 70', 130, 200, a current 1 tonne 12 metre bridge design weighs 513kg. Using the trapezoidal strong back beams 10, 50, 70, 70', 130, 200 according to embodiments of the invention, a 2 tonne 12 metre bridge design weighs 440kg. Embodiments of the present invention also

allow bridge lengths of up to at least 15 metres for manual bridge cranes and considerably longer bridge lengths for motorized bridge cranes. The benefit of using the trapezoidal strong back beam 10, 50, 70, 70', 130, 200 according to embodiments of the invention on bridge cranes can thus be appreciated.

5 The alternative embodiment trapezoidal strong back beam systems 10, 50, 70, 70', 130, 200 and lifting assemblies 300, 400, 500 of the present invention have been found to at least reduce the incidence of jamming experienced by existing assemblies. This applies to both the manually operated and motorized versions. Additionally, alternative embodiment trapezoidal strong back beam systems 10, 50, 70, 70', 130, 200 and lifting
10 | assemblies 300, 400, 500 of the present invention have also been found to require less operator effort to initiate movement of the bridge 72, 72', 72'', 72''' along the parallel beams 10, 50, 132, 204 when compared to existing assemblies. The assemblies 200, 300, 400, 500 in particular also provide more head room in comparison with some of the existing assemblies.

15 Moreover, the present invention is particularly useful, because it can be relatively easily incorporated into existing assemblies.

 While preferred embodiments of the trapezoidal strong back beam system have been described in detail, it should be apparent that modifications and variations thereto are possible, which will fall within the scope of the invention. With respect to the above
20 | description, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

25 Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described and accordingly, all suitable modifications and equivalents that may be resorted to, fall within the scope of the invention.

36. The carriage of claim 35, wherein the at least one displacement arm is in the form of a stirrup comprising an aperture at the first end for slidably and rotatably receiving the elongate member.

Con formato: Numeración y viñetas

Con formato: Fuente: Sin Negrita

37. The carriage of claim 36, wherein the aperture comprises a spherical bearing.

Con formato: Sangría: Izquierda: 0,63 cm

Con formato: Numeración y viñetas

38. The carriage of claim 35, further comprising at least one biasing means slidably mounted on the elongate member adjacent the first end of the at least one displacement arm.

Con formato: Sangría: Izquierda: 0,63 cm

Con formato: Numeración y viñetas

39. The carriage of claim 38, further comprising at least one spacer slidably mounted on the elongate member between the biasing means and the body.

Con formato: Numeración y viñetas

40. The carriage of claim 35, wherein the at least one displacement arm is pivotally connected to the bridge at the second end via a pivot post and a pivot post bearing.

Con formato: Numeración y viñetas

41. The carriage of claim 35, further comprising a shoulder either side of the bridge at the end of the bridge, each shoulder pivotally connected to a respective displacement arm in the form of a stirrup.

Con formato: Numeración y viñetas

42. A bridge crane assembly comprising:

Con formato: Numeración y viñetas

a pair of spaced apart guide tracks attachable to a support structure; and

a pair of carriages as claimed in claim 35, each carriage longitudinally movable along a respective guide track.

43. The bridge crane assembly of claim 42, further comprising a drive means coupled to a shaft of each carriage via a gearbox, the shaft comprising a plurality of rollers.

Con formato: Numeración y viñetas

Con formato: Sangría: Izquierda: 0,63 cm

44. The bridge crane assembly of claim 43, wherein the drive means for each carriage is synchronized.

Con formato: Numeración y viñetas

PATENT COOPERATION TREATY
PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 17776PC2-ADC	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/AU2008/001731	International filing date (<i>day/month/year</i>) 24 November 2008	(Earliest) Priority Date (<i>day/month/year</i>) 22 November 2007
Applicant GLOBAL TRACK TECHNOLOGIES PTY LTD et al		
This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau. This international search report consists of a total of 5 sheets. ☐ It is also accompanied by a copy of each prior art document cited in this report.		
1. Basis of the report a. With regard to the language, the international search was carried out on the basis of: ☒ The international application in the language in which it was filed. ☐ A translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)). b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)). c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I. 2. ☐ Certain claims were found unsearchable (See Box No. II). 3. ☒ Unity of invention is lacking (See Box No. III). 4. With regard to the title, ☒ the text is approved as submitted by the applicant. ☐ the text has been established by this Authority to read as follows: 5. With regard to the abstract, ☒ the text is approved as submitted by the applicant. ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority. 6. With regard to the drawings, a. the figure of the drawings to be published with the abstract is Figure No. 17 ☒ as suggested by the applicant. ☐ as selected by this Authority, because the applicant failed to suggest a figure. ☐ as selected by this Authority, because this figure better characterizes the invention. b. ☐ none of the figures is to be published with the abstract.		

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2008/001731

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

[Continued in Supplemental Box]

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-21 and 34

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2008/001731

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
WO	03101878	AU	2003232922	CA	2485303	CN	1656008
		EP	1507734	NZ	536470	RU	2004136275
		US	2004238473				
US	6082562	EP	0960848	FI	981191	JP	2000153987
US	6058849	CA	2222826	DE	19748949	EP	0845435
		JP	10167660				
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.							
END OF ANNEX							

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ AU

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:

The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty.

For International Preliminary Examining Authority use only		
Identification of IPEA		Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Applicant's or agent's file reference 17776PC2-ADC/OYX
International application No. PCT/AU2008/001731	International filing date (day/month/year) 24/11/08	(Earliest) Priority date (day/month/year) 22/11/07
Title of invention LIFTING ASSEMBLIES INCLUDING TRAPEZOIDAL STRONG BACK BEAM SYSTEMS		
Box No. II APPLICANT(S)		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country) Global Track Technologies Pty Ltd 68 Station Street, Norlane, Victoria 3214 AUSTRALIA		Telephone No. 03 5275 3252
		Facsimile No. 03 5275 7647
		Applicant's registration No. with the Office
State (that is, country) of nationality: AU		State (that is, country) of residence: AU
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country) MCKAY, Douglas McGregor 68 Station Street, Norlane, Victoria 3214 AUSTRALIA		
State (that is, country) of nationality: NZ		State (that is, country) of residence: AU
☐ Further applicants are indicated on a continuation sheet.		

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCEThe following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: (Family name followed by given name; for a legal entity, full official designation.
The address must include postal code and name of country.)**FISHER ADAMS KELLY**
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Agent's registration No. with the Office

☐ Address for correspondence: Mark this check-box where no agent or common representative is has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:**

1. The applicant wishes the international preliminary examination to start on the basis of:

☐ the international application as originally filedthe description ☐ as originally filed☒ as amended under Article 34the claims ☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☒ as amended under Article 34the drawings ☐ as originally filed☒ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ Where the IPEA wishes to start the international preliminary examination at the same time as the international search in accordance with Rule 69.1(b), the applicant requests the IPEA to postpone the start of the international preliminary examination until the expiration of the applicable time limit under Rule 69.1(d).4. ☐ The applicant expressly wishes the international preliminary examination to start earlier than at the expiration of the applicable time limit under Rule 54bis.1(a).

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**

The filing of this demand constitutes the election of all Contracting States which are designated and are bound by Chapter II of the PCT.

Sheet No. **3**

International application No.
PCT/AU2008/001731

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | | |
|--|---|-----------|--------|
| 1. translation of international application | : | _____ | sheets |
| 2. amendments under Article 34 | : | 36 | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | _____ | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | _____ | sheets |
| 5. letter | : | 2 | sheets |
| 6. other (specify) | : | _____ | sheets |

For International Preliminary Examining Authority use only

- | received | not received |
|--------------------------|--------------------------|
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |
| ☐ | ☐ |

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. ☒ fee calculation sheet | 5. ☐ statement explaining lack of signature |
| 2. ☐ original separate power of attorney | 6. ☐ sequence listing in electronic form |
| 3. ☐ original general power of attorney | 7. ☐ tables in electronic form related to a sequence listing |
| 4. ☐ copy of general power of attorney; reference number, if any: | 8. ☐ other (specify): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

**Global Track Technologies Pty Ltd; MCKAY, Douglas McGregor
by Their Patent Attorneys
FISHER ADAMS KELLY**

**Andrew Gale
Registered patent Attorney**

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.
☐ The applicant has been informed accordingly.
4. ☐ The date of receipt of the demand is WITHIN the time limit of 19 months from the priority date as extended by virtue of Rule 80.5.
5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

6. ☐ The date of receipt of the demand is AFTER the expiration of the time limit under Rule 54bis.1(a) and item 7 or 8, below, does not apply.
7. ☐ The date of receipt of the demand is WITHIN the time limit under Rule 54bis.1(a) as extended by virtue of Rule 80.5.
8. ☐ Although the date of receipt of the demand is after the expiration of the time limit under Rule 54bis.1(a), the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

PCT

FEE CALCULATION SHEET

Annex to the Demand

International application No. PCT/AU2008/001731	For International Preliminary Examining Authority use only
Applicant's or agent's file reference 177/76PC2-ADC/OYV	Date stamp of the IPEA
Applicant Global Track Technologies Pty Ltd	
CALCULATION OF PRESCRIBED FEES	
1. Preliminary examination fee	550.00 P
2. Handling fee (<i>Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.</i>)	247.00 H
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box	797.00 TOTAL
MODE OF PAYMENT <i>(Not all modes of payment may be available at all IPEAs)</i>	
☐ authorization to charge deposit account with the IPEA (see below)	☐ cash
☐ cheque	☐ revenue stamps
☐ postal money order	☐ coupons
☐ bank draft	☒ other (specify): Credit Card
AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT <i>(This mode of payment may not be available at all IPEAs)</i>	
☐ Authorization to charge the total fees indicated above.	IPEA/ _____
☐ <i>(This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.</i>	Deposit Account No.: _____
	Date: _____
	Name: _____
	Signature: _____

REIVINDICACIONES

1. Una composición farmacéutica, caracterizada porque consta de sibutramina o una sal farmacéuticamente aceptable de la misma en una cantidad de 10 mg a 15 mg y L-carnitina en una cantidad de 300 mg a 600 mg en combinación con un excipiente farmacéuticamente aceptable, misma que está formulada en una sola unidad de dosificación oral.
2. La composición farmacéutica de conformidad con la reivindicación 1, caracterizada además porque la L-carnitina se encuentra como Tartrato de L-carnitina.
3. La composición farmacéutica de conformidad con la reivindicación 1, caracterizada además porque la composición farmacéutica se encuentra en la forma farmacéutica de cápsula.

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 17776PC2-ADC	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/AU2008/001731	International filing date (<i>day/month/year</i>) 24 November 2008	Priority date: (<i>day/month/year</i>) 22 November 2007	
International Patent Classification (IPC) or national classification and IPC Int. Cl. B66C 5/00 (2006.01) B66C 9/00 (2006.01) B66C 17/00 (2006.01) B66C 19/00 (2006.01)			
Applicant GLOBAL TRACK TECHNOLOGIES PTY LTD et al			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 7 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (<i>sent to the applicant and to the International Bureau</i>) a total of 36 sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). ☒ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. ☐ (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3bis of Annex C of the Administrative Instructions). 4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ Box No. II Priority ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability ☒ Box No. IV Lack of unity of invention ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement ☐ Box No. VI Certain documents cited ☐ Box No. VII Certain defects in the international application ☐ Box No. VIII Certain observations on the international application			
Date of submission of the demand 22 September 2009		Date of completion of this report 03 March 2010	
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. +61 2 6283 7999		Authorized Officer M. BREMERS AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61 2 6283 2052	

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2008/001731

Box No. I Basis of the report

1. With regard to the language, this report is based on:

☒ The international application in the language in which it was filed☐ A translation of the international application into _____, which is the language of a translation furnished for the purposes of:☐ international search (under Rules 12.3(a) and 23.1 (b))☐ publication of the international application (under Rule 12.4(a))☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:☐ the international application as originally filed/furnished☒ the description:

pages 1-26 as originally filed/furnished

pages* 7a, 27-30 received by this Authority on 22 September 2009 with the letter of 22

September 2009

pages* received by this Authority on with the letter of

☒ the claims:

pages as originally filed/furnished

pages* as amended (together with any statement) under Article 19

pages* 31-36 received by this Authority on 22 September 2009 with the letter of 22 September

2009

pages* received by this Authority on with the letter of

☒ the drawings:

pages as originally filed/furnished

pages* 1-25 received by this Authority on 22 September 2009 with the letter of 22 September

2009

pages* received by this Authority on with the letter of

☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.3. ☐ The amendments have resulted in the cancellation of:☐ the description, pages☐ the claims, Nos.☐ the drawings, sheets/figs☐ the sequence listing (specify):4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).☒ the description, pages 7a, 27-30☒ the claims, Nos. 43 and 44☒ the drawings, sheets 22-25☐ the sequence listing (specify):5. ☐ This report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 70.2(e)).6. ☐ Supplementary international search report(s) from Authority(ies) _____ have been received and taken into account in drawing up this report (Rule 45bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/AU2008/001731

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos: 22-33, 38-41

because:

☐ the said international application, or the said claims Nos.
relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos.
are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos.
are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

☒ no international search report has been established for said claim Nos. 22-33, 38-41

☐ A meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13ter.1(a) or (b) and 13ter.2.

☐ See Supplemental Box for further details.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/AU2008/001731

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees the applicant has, within the applicable time limit:
- ☐ restricted the claims
 - ☐ paid additional fees
 - ☐ paid additional fees under protest and, where applicable, the protest fee
 - ☐ paid additional fees under protest but the applicable protest fee was not paid
 - ☐ neither restricted the claims nor paid additional fees
2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:
- ☐ complied with.
 - ☒ not complied with for the following reasons:
[Continued in Supplemental Box]
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-21, 34-37, 42

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/AU2008/001731

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-21, 34	YES
	Claims 35-37, 42	NO
Inventive step (IS)	Claims 1-21, 34	YES
	Claims 35-37, 42	NO
Industrial applicability (IA)	Claims 1-21, 34-37, 42	YES
	Claims NONE	NO

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this opinion:

D1: WO 2003/101878 A1

D2: US 6082562 A

D3: US 6058849 A

NOVELTY (N) CLAIMS 1-21, 34-37, 42:

The invention defined in claims 35-37 and 42 is not novel when compared with D1.

With regards to the independent claim 35, D1 discloses a carriage for a bridge crane assembly comprising:

- a pair of spaced apart mounting plates (30) – refer figures 5 and 6
- a plurality of rollers (32, 34, 36, 38) mounted on the mounting plates for longitudinal movement of the carriage
- an elongate member extending between the mounting plates
- a displacement arm (40) coupled at a first end (at 44) to the elongate member
- the displacement arm having at least one second end for pivotal connection to a bridge (14)
- the bridge comprising an attachment means for supporting a lifting device (12) of the bridge crane assembly

With regards to the dependent claims 36, 37 and 42, D1 discloses:

- Claims 36 & 37: displacement arm (40) in the form of a stirrup and the aperture comprising a spherical bearing – refer figure 2
- Claim 42: a bridge crane assembly as defined – refer abstract

Therefore the subject matter of claims 35-37 and 42 is not new and does not meet the requirements of Article 33(2) of the PCT with regard to novelty.

Claims 1-21 and 34 meet the criteria set forth in PCT Article 33(2) for novelty. The prior art published before the priority date does not disclose the carriage as defined in the claims.

INVENTIVE STEP (IS) CLAIMS 1-21, 34-37, 42:

The invention defined in claims 35-37 and 42 is not novel for the reasons given above and hence does not involve an inventive step.

Claims 1-21 and 34 meet the criteria set out in PCT Article 33(3) with regard to the requirement of Inventive Step because the prior art does not obviously suggest to a person skilled in the art a carriage as defined in the claims.

INDUSTRIAL APPLICABILITY (IA) CLAIMS 1-21, 34-37, 42:

The invention defined in the claims is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX NO. I SECTION 4

This opinion has been established as if the following amendments had not been made, since they have been considered to go beyond the disclosure as filed:

- Drawing sheets 22/25 to 25/25 and new description pages 7a, 27-30 disclose alternate embodiments of a carriages where the carriages are powered. These features were not disclosed in the specification as originally filed.
- Claims 43 and 44: a drive means coupled to a shaft of each carriage and that the drive means are synchronized, were also not disclosed in the specification as originally filed.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/AU2008/001731

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX NO. IV SECTION 3

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

In assessing whether there is more than one invention claimed, I have given consideration to those features which can be considered to potentially distinguish the claimed combination of features from the prior art. Where different claims have different distinguishing features they define different inventions.

This International Searching Authority has found that there are different inventions as follows:

- Claims 1-21, 34-37 and 42 are directed to a carriage (or a bridge crane assembly comprising a carriage) comprising a pair of mounting plates, an elongate member extending between the mounting plates and a displacement arm pivotally coupled at a first end to the elongate member, the displacement arm having at least one second end for pivotal connection to a bridge. It is considered that the underlined part comprises a first distinguishing feature.
- Claims 22-33 are directed to a bridge crane comprising a trapezoidal beam, a bridge, a guide track and a carriage. It is considered that a bridge crane comprising a trapezoidal beam comprises a second distinguishing feature.
- Claims 38 and 39 are directed to a carriage (or a bridge crane assembly comprising a carriage) comprising a biasing means slidably mounted on the elongate member adjacent the first end of the at least one displacement arm. It is considered that the biasing means slidably mounted on the elongate member comprises a third distinguishing feature.
- Claim 40 is directed to a carriage comprising a displacement arm pivotally connected to the bridge at an end via a pivot post and a pivot post bearing.
- Claim 41 is directed to a carriage comprising a shoulder either side of the bridge at the end of the bridge, each shoulder pivotally connected to a respective displacement arm in the form of a stirrup.

The only feature common to all of the claims is a carriage (comprising a pair of spaced apart mounting plates, a plurality of rollers, an elongate member extending between the mounting plates and a displacement arm pivotally coupled at a first end to the elongate member, the displacement arm having at least one second end for pivotal connection to the bridge). However this concept is not novel (see figures 3 and 4) in the light of:

D1: WO 2003/101878 A1 (McKAY) 11 December 2003

This means that the common feature can not constitute a special technical feature within the meaning of PCT Rule 13.2, second sentence, since it makes no contribution over the prior art. Because the common feature does not satisfy the requirement for being a special technical feature it follows that it cannot provide the necessary technical relationship between the identified inventions. Therefore the claims do not satisfy the requirement of unity of invention a posteriori.

NOTE: With regards to claims 35-42, all the features of claim 35 are disclosed in D1 (as in novelty objection). So, there is lack of unity a posteriori as described above.

Figure 27 is a perspective view of a bridge crane assembly comprising further alternative embodiments of a carriage where the carriages are powered.

Figure 28 is a plan view of the bridge crane assembly of Figure 27.

Figure 29 is a side view of the bridge crane assembly of Figure 27.

5 Figure 30 is sectional view of a carriage of the bridge crane assembly of Figure 27.

Figure 31 is partial sectional plan view of components of the carriage of the assembly of Figure 27.

Figure 32 is a partial sectional end view of components of the carriage of the assembly of Figure 27.

Embodiments of the present invention comprising motorized top running carriages will now be described with reference to Figures 27-32.

Figures 27-29 show a bridge crane assembly 500 comprising a pair of spaced apart guide tracks 204 attachable to a support structure (not shown) and a pair of carriages 506 longitudinally movable along a respective one of the guide tracks 204. As with some of the previous embodiments described above, bridge 72''' comprises a pair of shoulders 324 at each end of the bridge. A shoulder 324 is attached either side of the bridge 72''' by any suitable means, such as welding, and each shoulder 324 protrudes beyond the end of the bridge 72'''.

With additional reference to Figure 30, each shoulder 324 of the bridge 72''' is pivotally connected to a respective displacement arm 226. In this embodiment, each displacement arm 226 is in the form of a stirrup 502. Each stirrup 502 can be considered as comprising a pair of spaced apart displacement arm appendages 232 which join together at a first end forming a flange 504 and which join together at a second end forming a base 506 of the stirrup 502. Each shoulder 324 is pivotally connected to a respective stirrup 502 at the second end via a pivot post 178 and a pivot post bearing 180 mounted to the base 506.

Flange 504 of each stirrup 502 comprises an aperture 508 for housing a spherical bearing 510. Aperture 508 and spherical bearing 510 slidably and rotatably receive an elongate member in the form of main axle 168. The main axle 168 is supported by a body 512 of the carriage 506, which covers the components of the carriage 506. Body 512 can be considered to comprise a pair of transverse mounting plates 515 forming end walls of the body 512 and mounting plates 136 forming side walls of the body 512. As shown in Figure 27, an inner mounting plate 136 comprises an aperture 307 through which the bridge 72''' and/or the shoulders 324 of the bridge protrude for pivotal coupling to the stirrups 502. Plates 507 are attached to the inner mounting plates 136 above the bridge 72''' to prevent any upward travel of the bridge relative to the carriage 506, thus preventing the shoulders 324 from hopping off the pivot posts 178 and pivot post bearings 180.

Body 512 also comprises a roof 514 attached to the transverse mounting plates 515 and the mounting plates 136. In Figures 27-29, body 512 has been omitted from the carriage 506 on the right hand side to show the internal components. Part of the roof 514 and/or the transverse mounting plates 515 can be curved, as shown most clearly in Figures 27 and 30. As shown in Figure 30, main axle 168 is supported at each end by reinforced portions 516, which can be part of the transverse mounting plates 515 or part of

the roof 514. Main axle 168 is also supported in a substantially central region by reinforced portion 518 depending downwardly from the roof 514. However, it will be appreciated that in alternative embodiments, main axle 168 can be supported at each end by transverse mounting plates 515 of the body 512.

5 As shown most clearly in Figures 30 and 31, carriage 506 also comprises at least one biasing means 520 slidably mounted on the main axle 168 adjacent the flange 504 at the first end of the stirrup 502. In the embodiment shown, biasing means 520 in the form of helical springs are provided either side of the flange 504 of each stirrup 502 to keep the stirrups 502 aligned with respective shoulders 324 of the bridge and prevent the stirrups
10 502 fouling of the main axle 168 and/or the shoulders 324 supporting the bridge 72". At least one spacer 522 is slidably mounted on the main axle 168 between the biasing means 520 and the body 512. In the embodiment shown, a spacer 522 is slidably mounted outside each of the outer biasing means 520 for each stirrup 502. The inner biasing means 520 also abut central reinforced portion 518 of the body 512.

15 The bridge crane assembly 500 also comprises a drive means 524 coupled to each carriage 506 via a gearbox 526 for driving each carriage along its respective guide track 204. The drive means can take any suitable form, such as an electric motor, and the drive means for each carriage are synchronized via a wired or wireless connection such that both carriages 506 are driven in the same direction simultaneously to move the bridge 72"
20 along the guide tracks 204. The gearbox 526 can be mounted to the body 512 by any suitable means and coupled to one of the shafts 316 or 318 to which rollers 308 and 310 or rollers 312 and 314 are mounted respectively to drive the carriage along the guide track 204.

25 With reference to Figure 29, the bridge 72" comprises an attachment means 76 for supporting a lifting device of the bridge crane assembly 500. Figure 29 shows a pair of attachment means 76, each of which is attached to a trolley 78, which can be in the form of a double trolley assembly, which runs within the hollow structure of the bridge 72" as described above. A lift motor box 528 is attached to the attachment means 76 for motorized operation of the lifting device.

30 With reference to Figure 32, anti-derailment members 408 are attached to an underside of the body 512, for example, as described above. In this embodiment, anti-derailment members 408 are unitary structures rather than formed from a separate block 412 and plate 414 as described above in relation to Figure 24. Roller 310 is secured in place on shaft 316 via locking ring 530 and washer 532. Figure 32 also shows a circular

plate 530, which is a cover plate attached to the body 512.

Whilst the embodiments described with reference to Figures 27-32 comprise a pair of displacement arms 226 in the form of stirrups 502, it should be appreciated that embodiments of the present invention can include a single displacement arm 226 in the form of a stirrup 502 pivotally connected to the bridge 72''' via pivot post 178 and pivot post bearing 180, optionally via a bridge sleeve, thus omitting the shoulders 324.

Hence, according to another aspect, the present invention resides in a carriage 506 for a bridge crane assembly 500, the carriage comprising a body 512 having a pair of spaced apart transverse mounting plates 515, a pair of mounting plates 136 and a roof 514. The carriage 506 comprises a plurality of rollers 308, 310, 312, 314 rotatably mounted in a substantially vertical orientation to the body 512 for longitudinal movement of the carriage 506 along a respective guide track 204 of the bridge crane assembly 500. The carriage 506 also comprises an elongate member supported by the body and at least one displacement arm 226 in the form of a stirrup 502 slidably and rotatably coupled at a first end to the elongate member, for example via a spherical bearing. The stirrup 502 has at least one second end for pivotal connection to the bridge 72''', for example via pivot post and a pivot post bearing.

The alternative embodiments of the bridge crane assembly 500 comprising carriages 506 provide improved travel of the carriages 506 along the guide tracks 204 and reduced likelihood of jamming compared with existing assemblies. This is a result of the pivotal connection of the bridge 72''' to the second ends of the stirrups 502. This is also a result of the coupling of the stirrups 502 at the first end via the spherical bearings 510. Substantially maintaining the position of the stirrups 502 via biasing means 520 also contribute to reduced likelihood of jamming and smooth travel of the carriages 506. It will therefore be appreciated that the aforementioned coupling of the bridge 72''' to the carriages 506 can also be used for manually operated bridge cranes such that drive means 524 and gearbox 526 are omitted.

The alternative embodiment trapezoidal strong back beam systems 10, 50, 70, 70', 130, 200 allow for the bridge weight to be reduced by approximately 35% compared with using RHS beams as a strong back beam.

Furthermore, without the use of the trapezoidal strong back beams 10, 50, 70, 70', 130, 200, a current 1 tonne 12 metre bridge design weighs 513kg. Using the trapezoidal strong back beams 10, 50, 70, 70', 130, 200 according to embodiments of the invention, a 2 tonne 12 metre bridge design weighs 440kg. Embodiments of the present invention also

allow bridge lengths of up to at least 15 metres for manual bridge cranes and considerably longer bridge lengths for motorized bridge cranes. The benefit of using the trapezoidal strong back beam 10, 50, 70, 70', 130, 200 according to embodiments of the invention on bridge cranes can thus be appreciated.

5 The alternative embodiment trapezoidal strong back beam systems 10, 50, 70, 70', 130, 200 and lifting assemblies 300, 400, 500 of the present invention have been found to at least reduce the incidence of jamming experienced by existing assemblies. This applies to both the manually operated and motorized versions. Additionally, alternative embodiment trapezoidal strong back beam systems 10, 50, 70, 70', 130, 200 and lifting
10 assemblies 300, 400, 500 of the present invention have also been found to require less operator effort to initiate movement of the bridge 72, 72', 72", 72''' along the parallel beams 10, 50, 132, 204 when compared to existing assemblies. The assemblies 200, 300, 400, 500 in particular also provide more head room in comparison with some of the existing assemblies.

15 Moreover, the present invention is particularly useful, because it can be relatively easily incorporated into existing assemblies.

 While preferred embodiments of the trapezoidal strong back beam system have been described in detail, it should be apparent that modifications and variations thereto are possible, which will fall within the scope of the invention. With respect to the above
20 description, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

25 Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described and accordingly, all suitable modifications and equivalents that may be resorted to, fall within the scope of the invention.

CLAIMS:

1. A carriage for a bridge crane assembly, the carriage comprising:

a pair of spaced apart mounting plates, at least one of the mounting plates comprising an aperture;

a plurality of rollers rotatably mounted in a substantially vertical orientation to the mounting plates for longitudinal movement of the carriage along a respective guide track of the bridge crane assembly;

an elongate member extending between the mounting plates; and

a displacement arm pivotally coupled at a first end to the elongate member, the displacement arm having at least one second end for pivotal connection to a bridge, the bridge protruding through the aperture in at least one of the mounting plates and comprising an attachment means for supporting a lifting device of the bridge crane assembly.

2. The carriage of claim 1, wherein the displacement arm is pivotally coupled to a pivot post via a pivot post bearing, the pivot post extending from the elongate member.

3. The carriage of claim 1, wherein the elongate member is an axle pivotally secured to the mounting plates.

4. The carriage of claim 1, wherein the displacement arm is pivotally connected to a bridge sleeve for receiving one end of the bridge.

5. The carriage of claim 4, wherein the displacement arm comprises a pair of appendages, each appendage pivotally connected to the bridge sleeve by a fastener.

6. The carriage of claim 1, wherein both mounting plates comprise an aperture.

7. The carriage of claim 1, wherein the carriage moves on top of the respective guide track.

8. The carriage of claim 1, wherein the respective guide track is in the form of an I-beam and the carriage moves on top of one web of the I-beam.
- 5 9. The carriage of claim 8, wherein some of the plurality of rollers are positioned on top of one web of the I-beam and some of the plurality of rollers are positioned underneath the web.
- 10 10. The carriage of claim 8, further comprising one or more end rollers, each end roller abutting and capable of rolling along a respective edge of the web of the I-beam.
11. The carriage of claim 10, wherein a pair of end rollers is rotatably mounted in a substantially horizontal orientation to each mounting plate.
12. The carriage of claim 1, further comprising:
- 15 a second elongate member spaced apart from the elongate member, the second elongate member extending between the mounting plates; and
 a second displacement arm pivotally coupled at a first end to the second elongate member, the displacement arm having at least one second end for pivotal connection to the bridge.
- 20 13. The carriage of claim 12, wherein the second elongate member is an axle pivotally secured to the mounting plates.
14. The carriage of claim 12, further comprising a shoulder either side of the bridge at
25 the end of the bridge, each shoulder pivotally connected to a respective displacement arm.
15. The carriage of claim 14, further comprising a support on the underside of each shoulder for receiving a pair of fasteners for pivotal connection to a respective
30 displacement arm.
16. The carriage of claim 12, further comprising projections extending inwardly from the mounting plates adjacent the rollers to prevent derailment of the rollers from the guide track.

17. The carriage of claim 12, wherein the mounting plates and the first and second elongate members form part of a cast box.

5 18. The carriage of claim 17, further comprising a first base member for mounting at least one anti-derailment member.

10 19. The carriage of claim 18, wherein the first base member comprises a plurality of elongate apertures for variable mounting of the at least one anti-derailment member.

20. The carriage of claim 17, further comprising at least one end base member for mounting one or more end rollers, each end roller abutting and capable of rolling along a respective edge of a web of an I-beam of the respective guide track.

15 21. The carriage of claim 20, wherein the at least one end base member comprises a plurality of elongate apertures for variable mounting of the one or more end rollers.

22. A bridge crane assembly comprising:

- 20 a trapezoidal beam;
a bridge attached to an underside of the trapezoidal beam, the bridge comprising an attachment means for supporting a lifting device;
at least one guide track attachable to a support structure;
at least one carriage longitudinally movable along the at least one guide
25 track, the carriage comprising:
a pair of spaced apart mounting plates;
a plurality of rollers rotatably mounted in a substantially vertical orientation to the mounting plates;
an elongate member extending between the mounting plates; and
30 a displacement arm pivotally coupled at a first end to the elongate member, the displacement arm having at least one second end for pivotal connection to the bridge.

23. The bridge crane assembly of claim 22, wherein the trapezoidal beam has a top section, a first side rigidly secured to the top section and a second side rigidly secured to the top section opposite the first side, wherein the first and second sides taper inwardly toward each other from the top section to the bridge.

5

24. The bridge crane assembly of claim 23, wherein the top section has a first top section rigidly secured to the first side and a second top section rigidly secured to the second side, wherein the first top section is rigidly secured to the second top section in a generally overlapping manner.

10

25. The bridge crane assembly of claim 24, wherein at least part of the first side and/or at least part of the second side comprises a lattice structure.

26. The bridge crane assembly of claim 22, wherein the at least one carriage is top running or under slung with respect to the guide track.

15

27. The bridge crane assembly of claim 22, wherein the trapezoidal beam features a first flange extending from a first beam opposite the top section and a second flange extending from a second beam opposite the top section, the first and second flanges orientated toward each other.

20

28. The bridge crane assembly of claim 27, wherein the configuration of the first and second flanges and the first and second sides allow for a bridge crane component to be received therein.

25

29. The bridge crane assembly of claim 27, further comprising a plurality of diaphragm stiffeners in the interior of the first and second sides.

30. A bridge crane assembly comprising:

30

a trapezoidal beam;

at least one guide track attachable to an underside of the trapezoidal beam;

at least one carriage longitudinally movable within the at least one guide track;

a bridge comprising an attachment means for supporting a lifting device;

at least one displacement arm having a first end pivotally connected to the at least one carriage and at least one second end pivotally connected to a bridge, the bridge comprising an attachment means for supporting a lifting device; and

5 a universal joint provided between the at least one displacement arm and the at least one carriage to absorb rotational and lateral motions of the bridge when a force is applied to the attachment means.

10 31. The bridge crane assembly of claim 30, wherein the at least one carriage is top running or under slung with respect to the guide track.

32. The bridge crane assembly of claim 30, further comprising a trapezoidal beam attached to a top of the bridge.

15 33. The bridge crane assembly of claim 32, wherein a first side and/or a second side of the trapezoidal beam attached to the top of the bridge comprises a lattice structure.

34. A bridge crane assembly comprising:

a bridge having an attachment means for supporting a lifting device;

at least one guide track attachable to a support structure; and

20 at least one carriage as claimed in claim 1 longitudinally movable along the at least one guide track.

35. A carriage for a bridge crane assembly, the carriage comprising:

a body;

25 a plurality of rollers rotatably mounted in a substantially vertical orientation to the body for longitudinal movement of the carriage along a respective guide track of the bridge crane assembly;

an elongate member supported by the body; and

30 at least one displacement arm slidably and rotatably coupled at a first end to the elongate member, the at least one displacement arm having at least one second end for pivotal connection to a bridge, the bridge comprising an attachment means for supporting a lifting device of the bridge crane assembly.

36. The carriage of claim 35, wherein the at least one displacement arm is in the form of a stirrup comprising an aperture at the first end for slidably and rotatably receiving the elongate member.

5 37. The carriage of claim 36, wherein the aperture comprises a spherical bearing.

38. The carriage of claim 35, further comprising at least one biasing means slidably mounted on the elongate member adjacent the first end of the at least one displacement arm.

10 39. The carriage of claim 38, further comprising at least one spacer slidably mounted on the elongate member between the biasing means and the body.

15 40. The carriage of claim 35, wherein the at least one displacement arm is pivotally connected to the bridge at the second end via a pivot post and a pivot post bearing.

41. The carriage of claim 35, further comprising a shoulder either side of the bridge at the end of the bridge, each shoulder pivotally connected to a respective displacement arm in the form of a stirrup.

20 42. A bridge crane assembly comprising:

a pair of spaced apart guide tracks attachable to a support structure; and
a pair of carriages as claimed in claim 35, each carriage longitudinally movable along a respective guide track.

25 43. The bridge crane assembly of claim 42, further comprising a drive means coupled to a shaft of each carriage via a gearbox, the shaft comprising a plurality of rollers.

30 44. The bridge crane assembly of claim 43, wherein the drive means for each carriage is synchronized.

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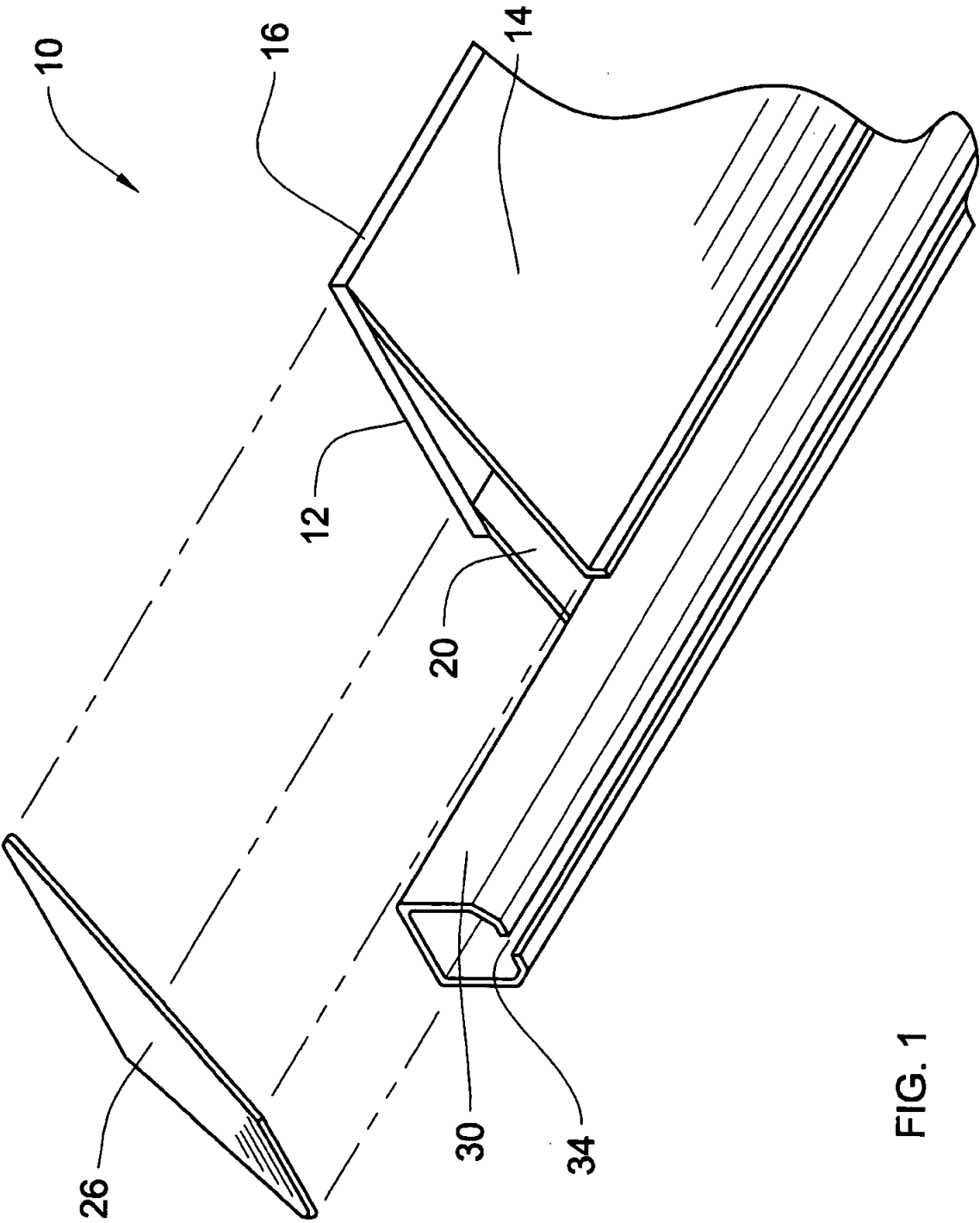
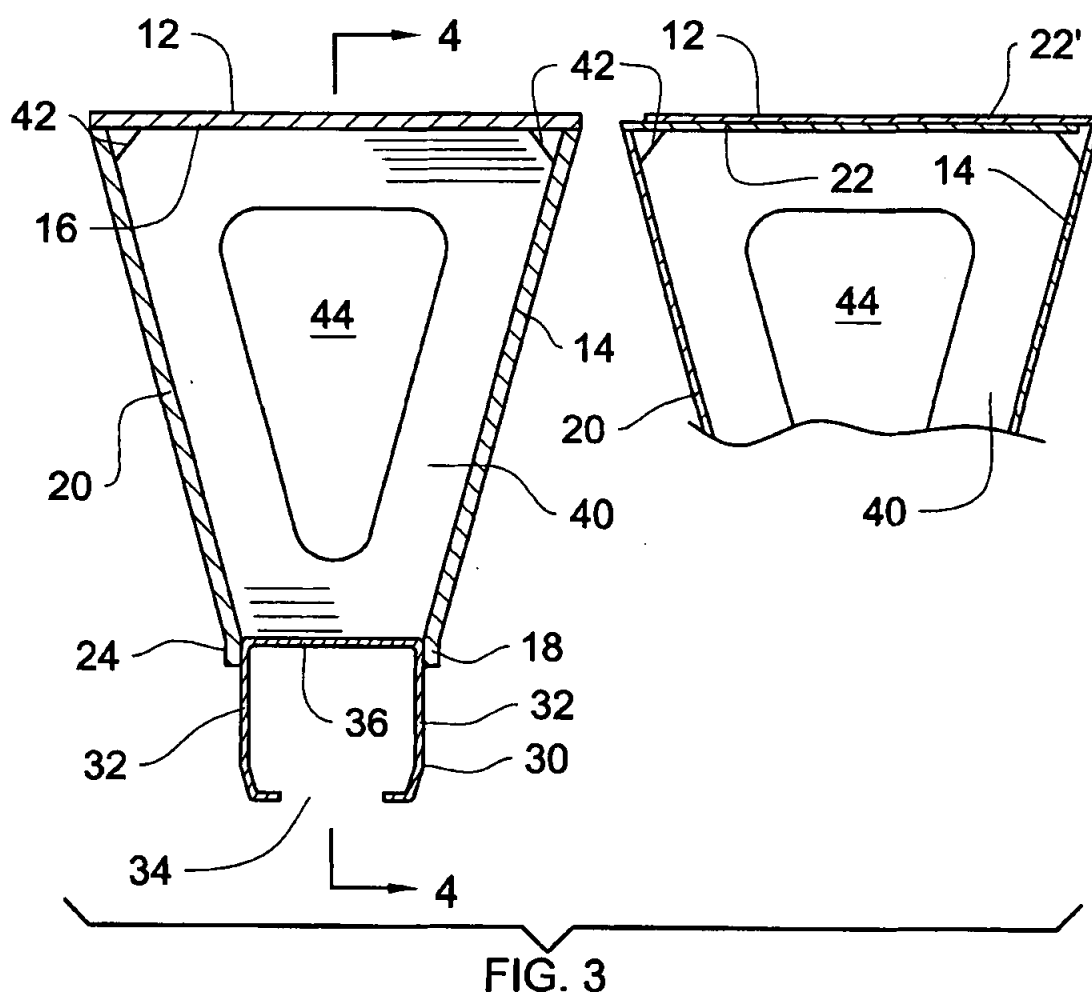
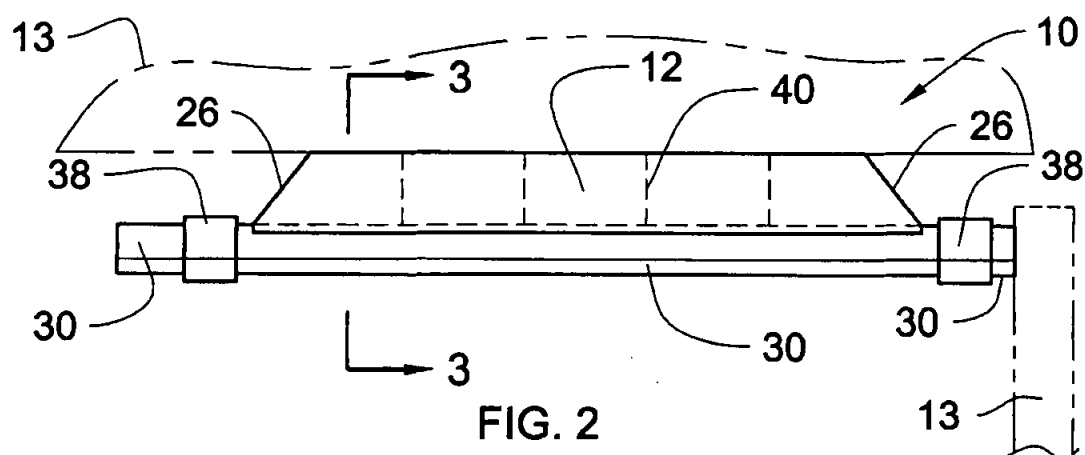


FIG. 1

2 / 25



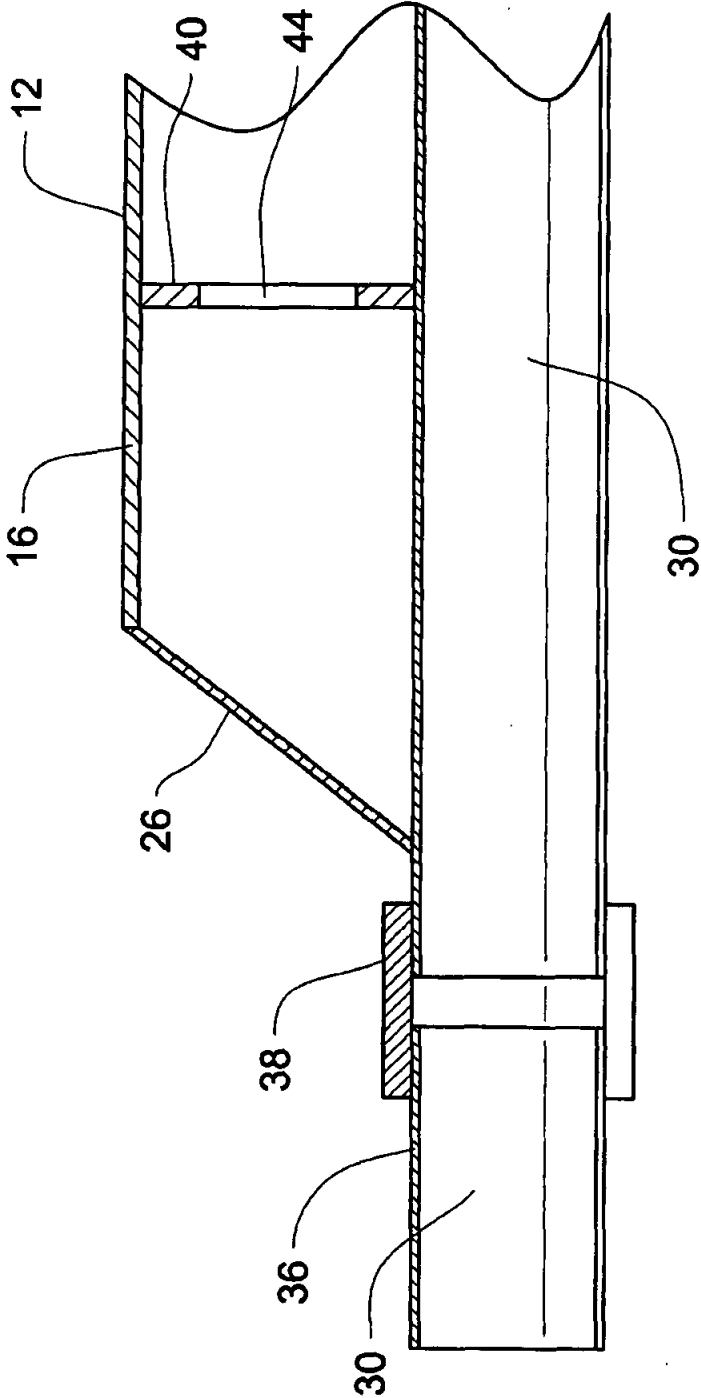
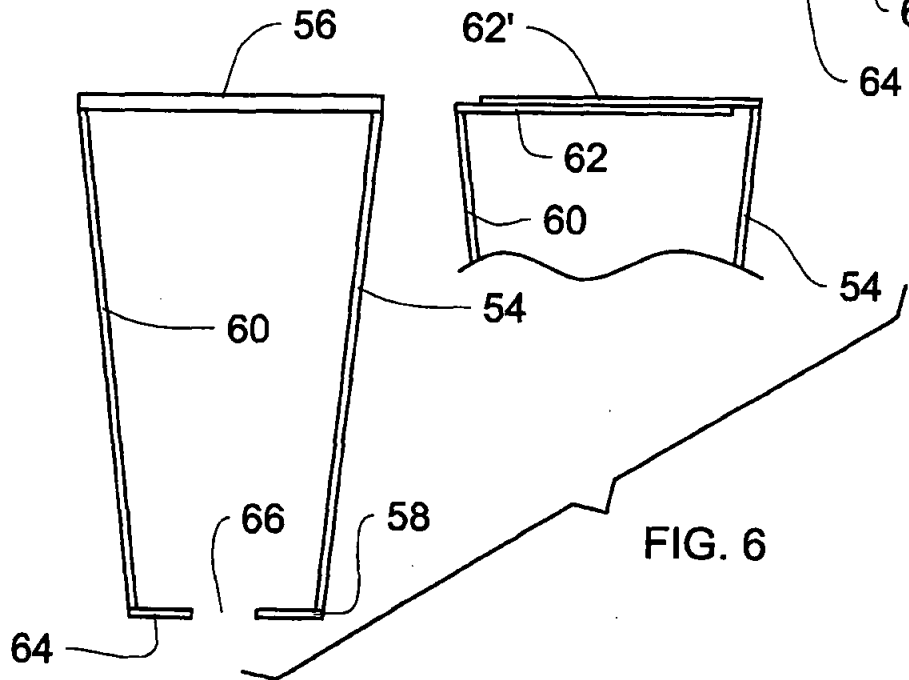
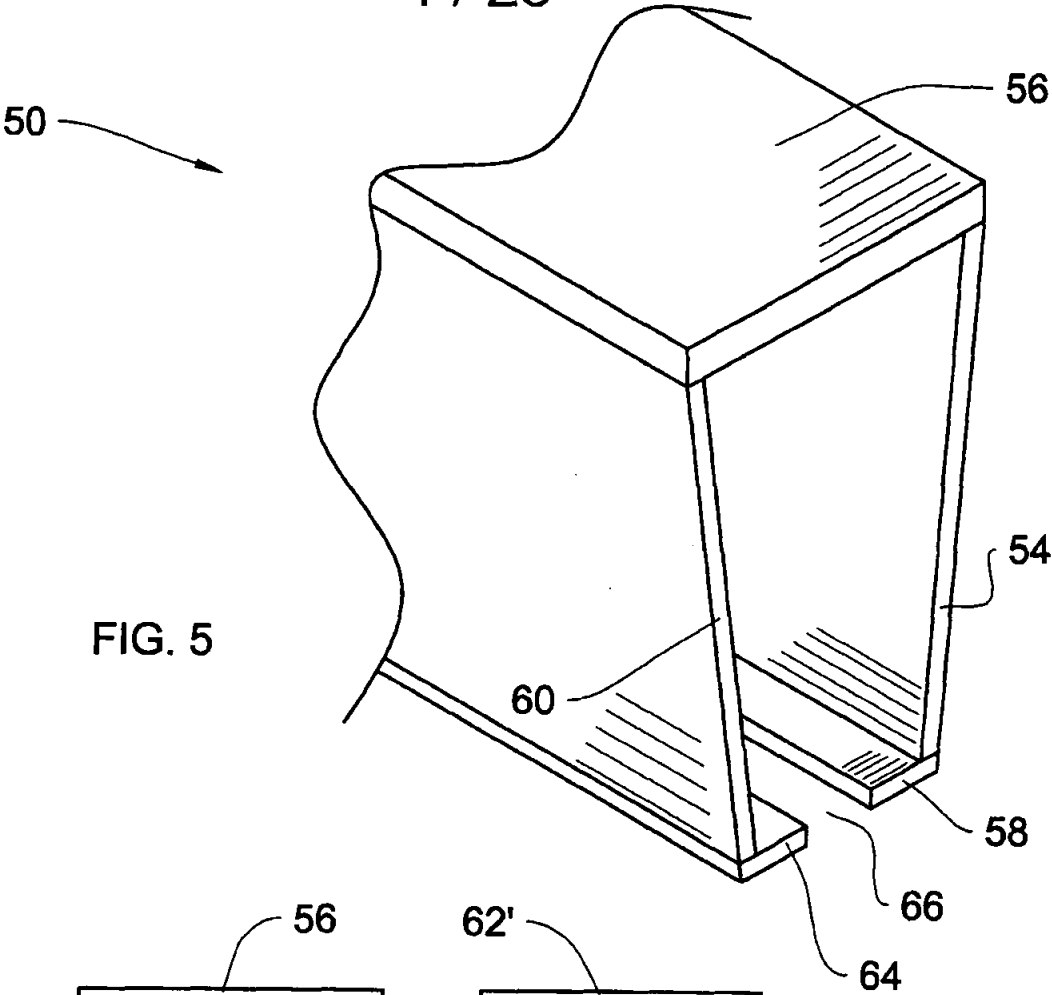


FIG. 4

4 / 25



5 / 25

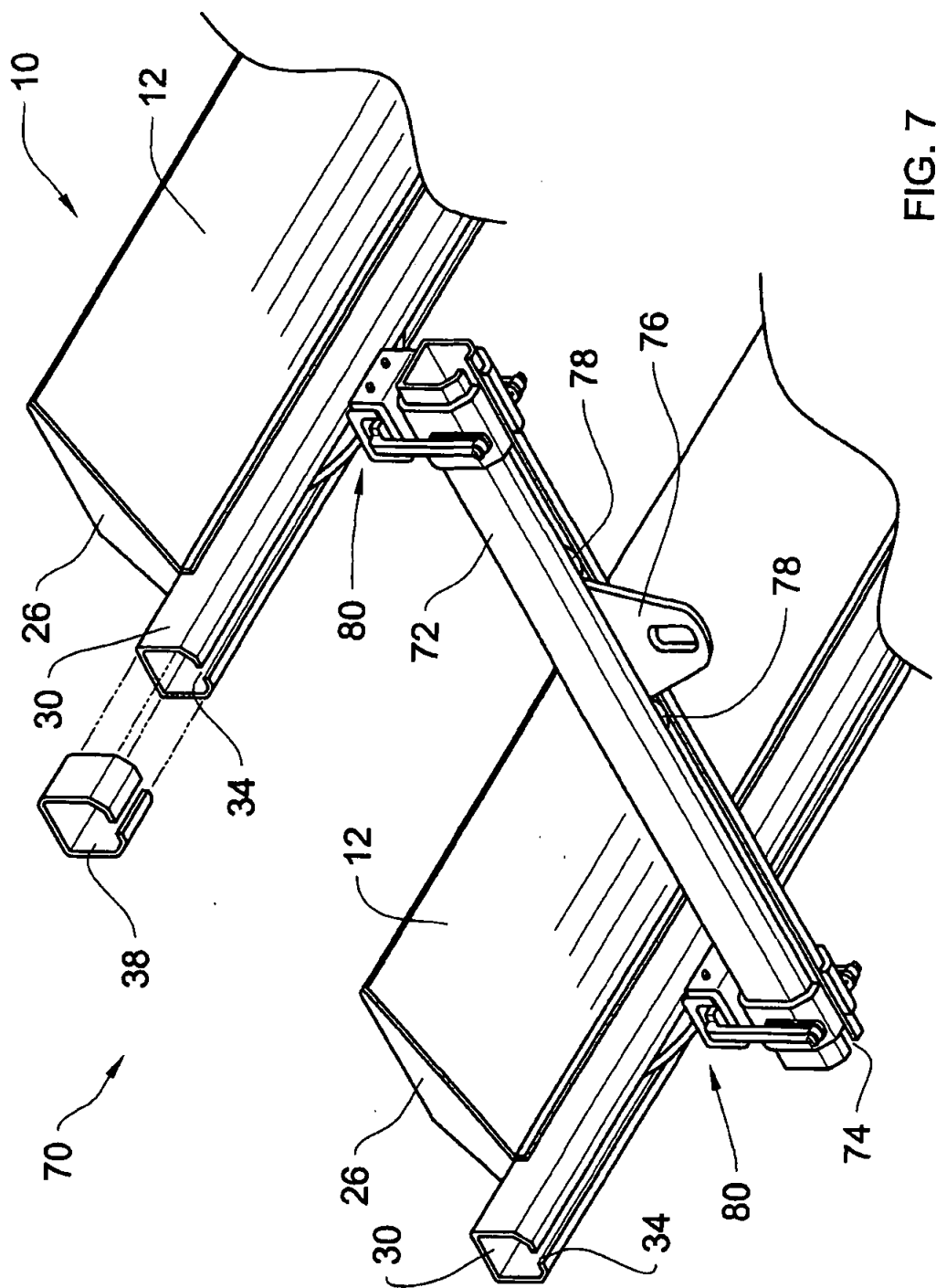


FIG. 7

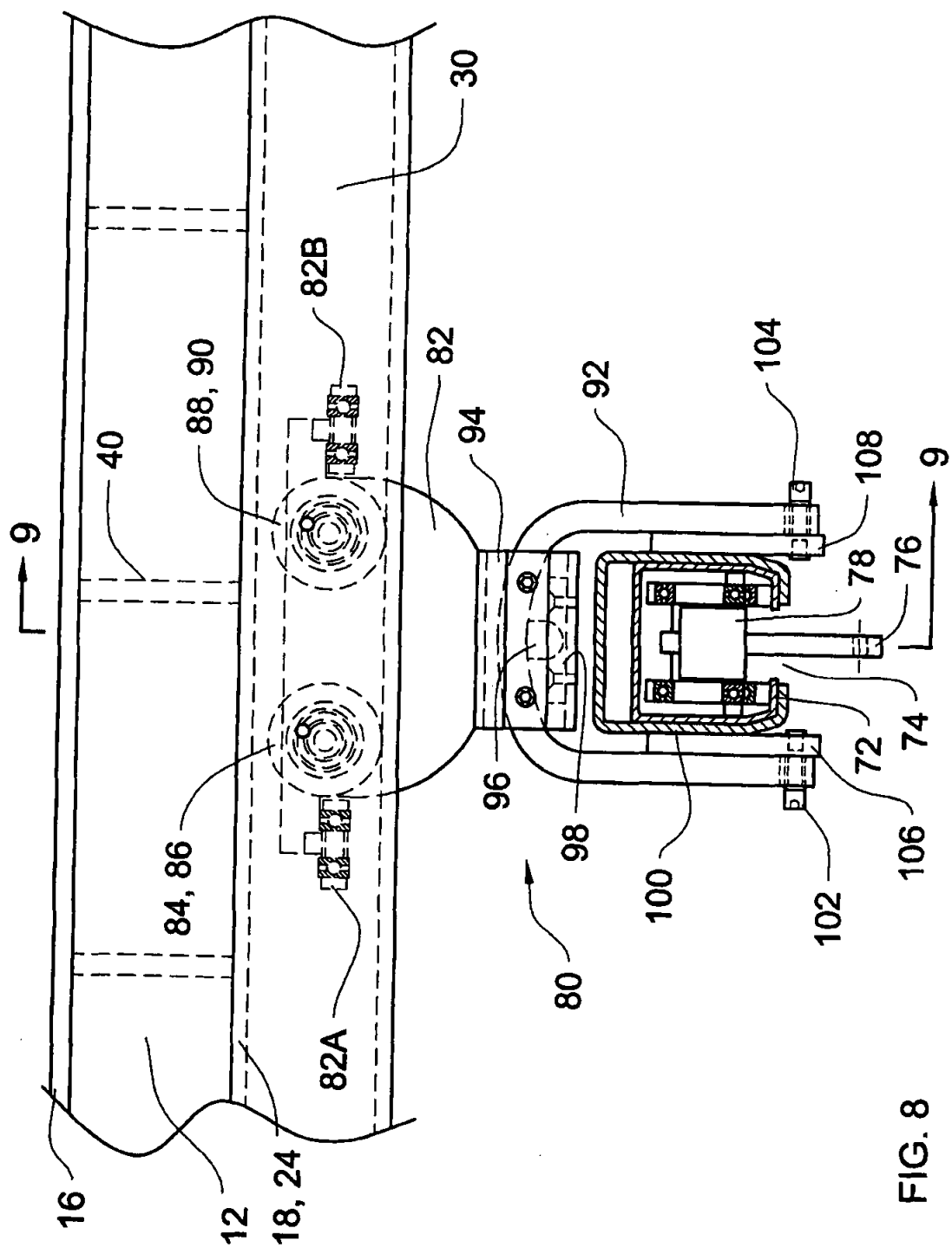
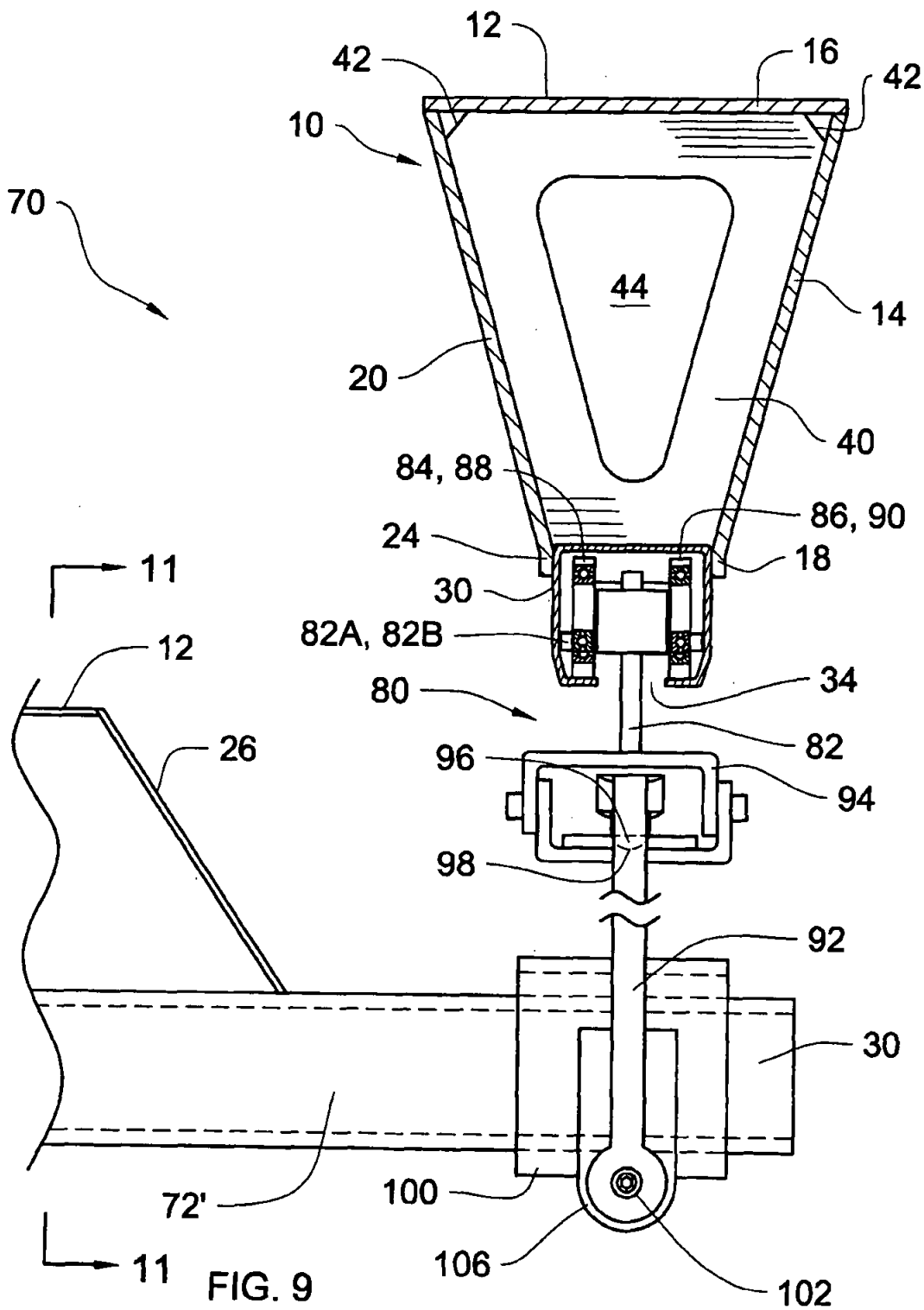


FIG. 8

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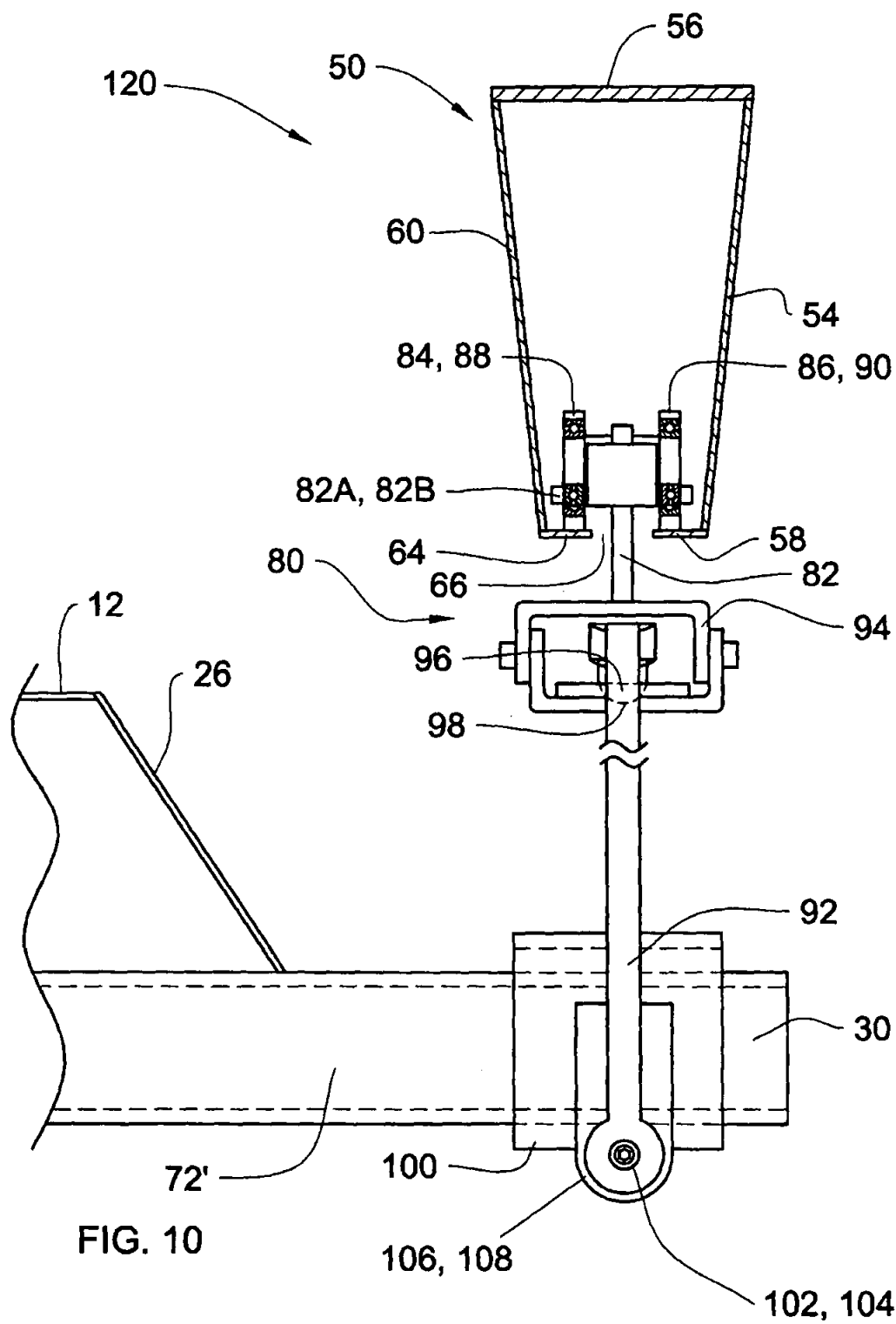


FIG. 10

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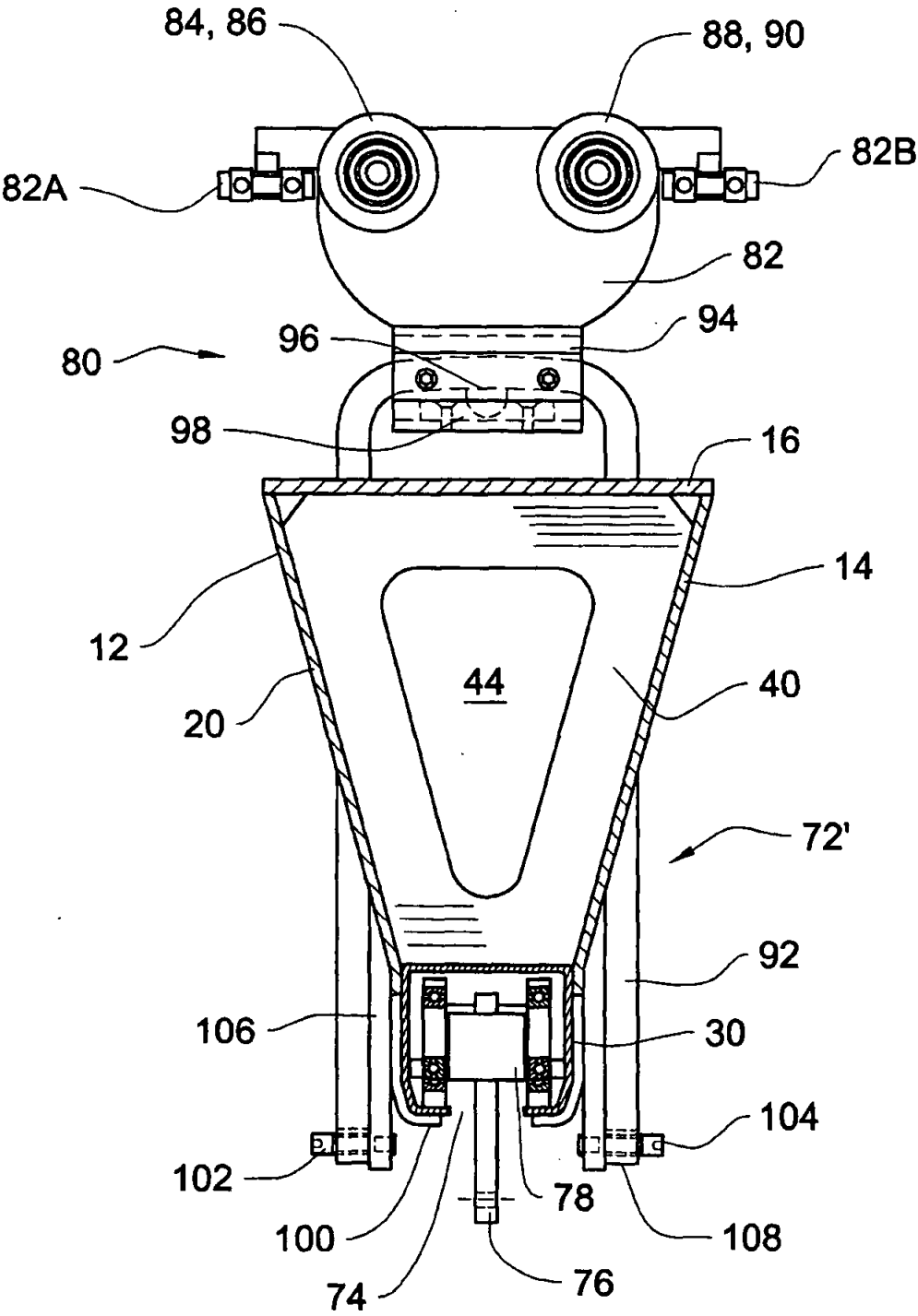


FIG. 11

10 / 25

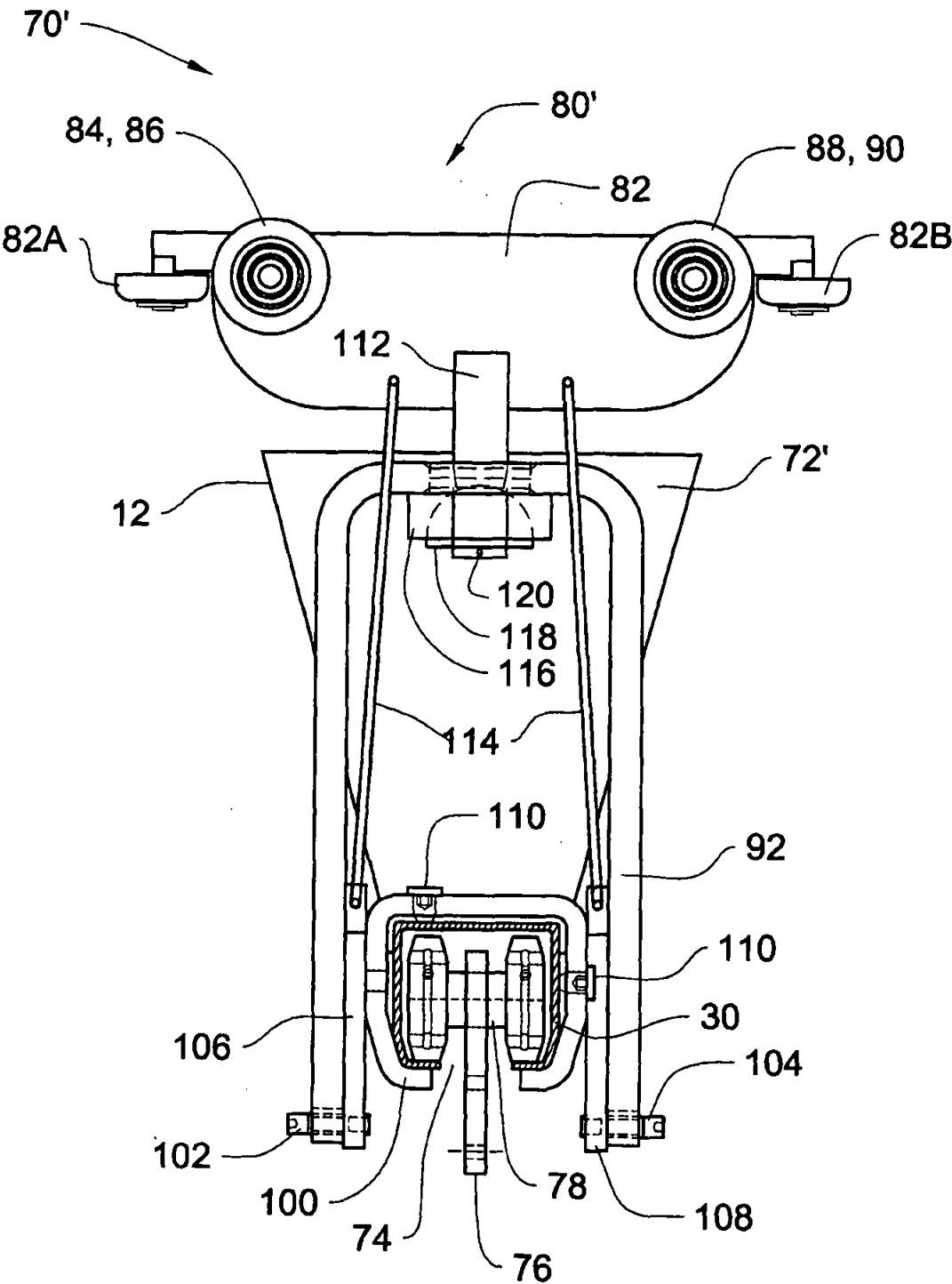
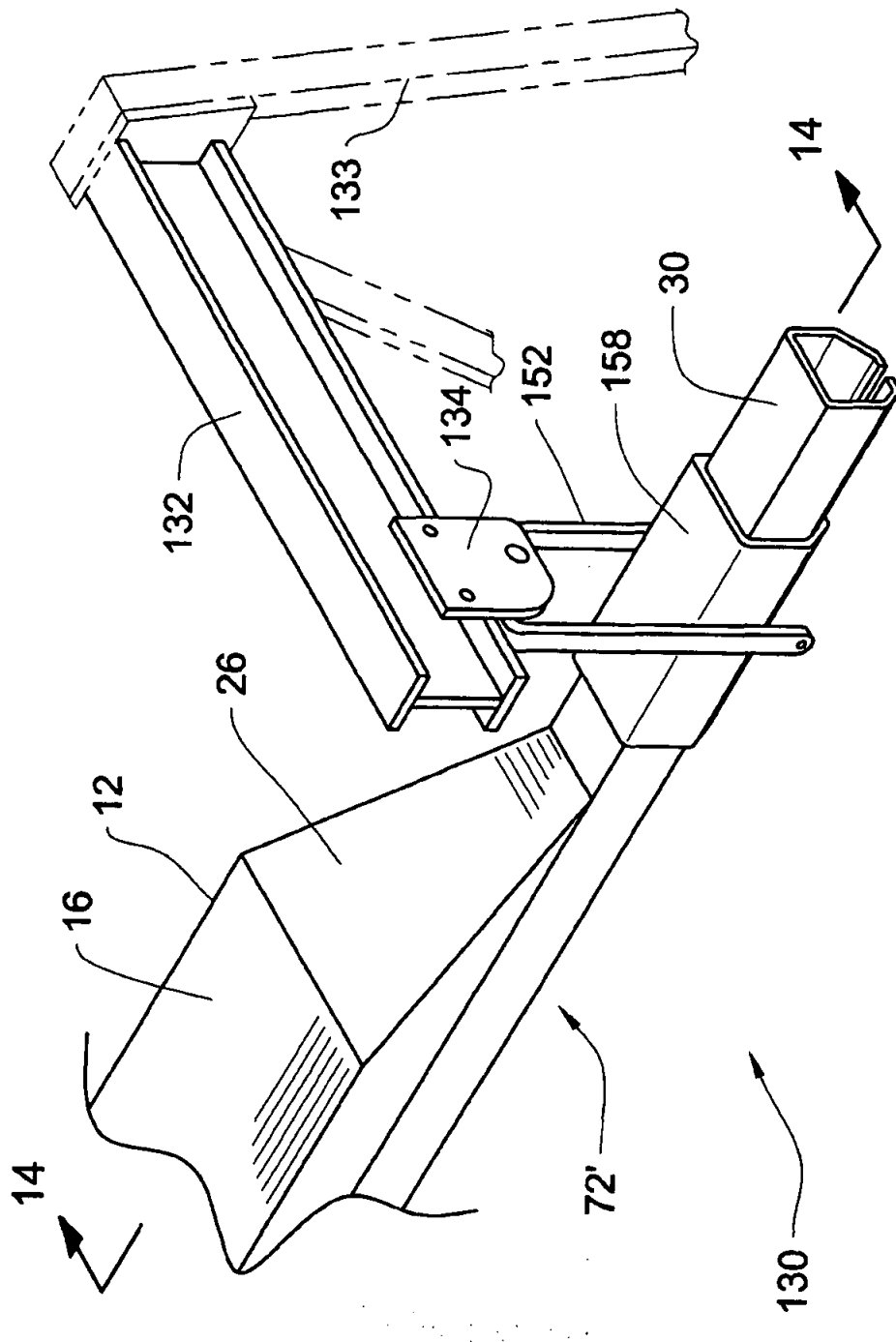


FIG. 12

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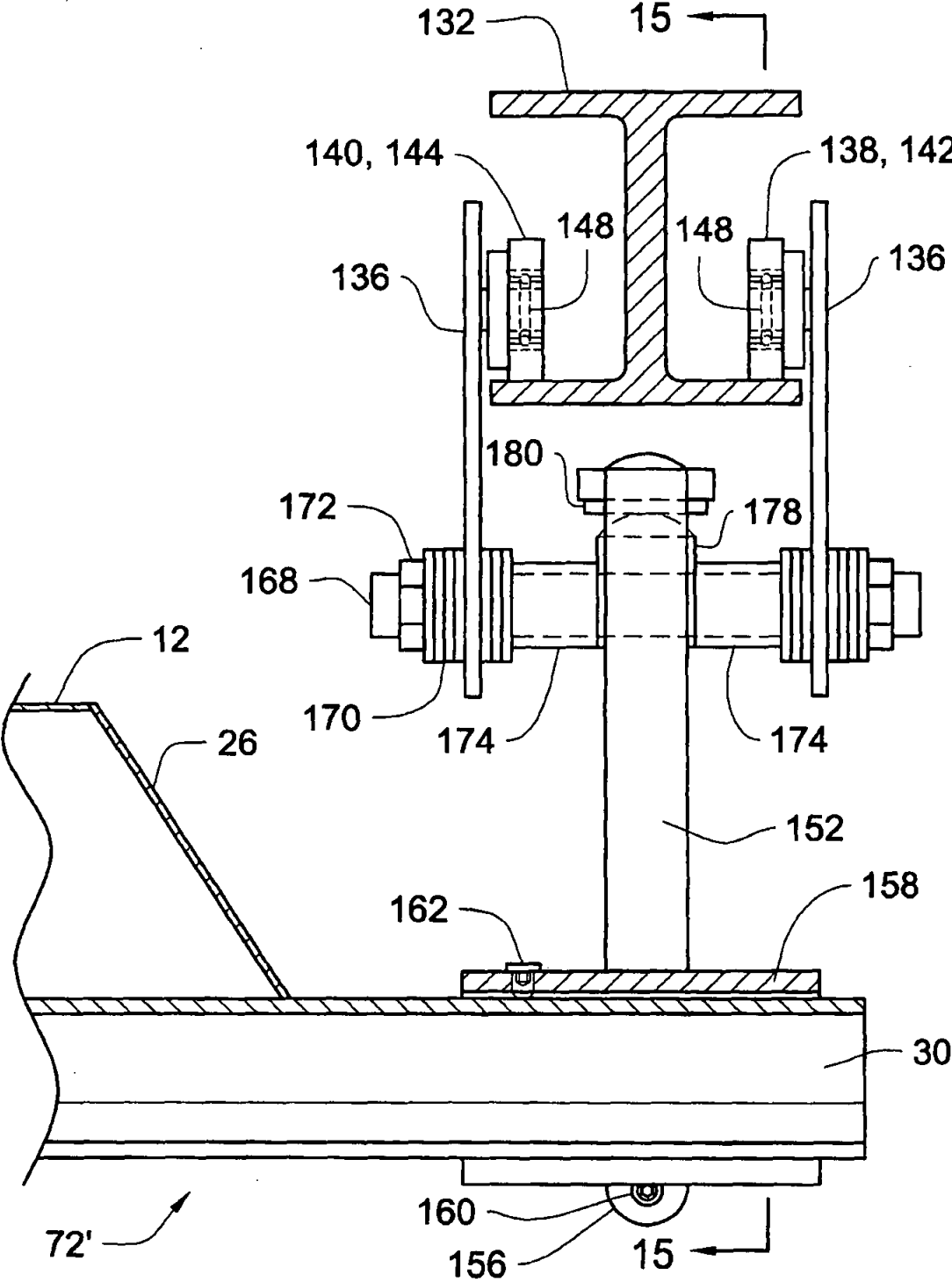


FIG. 14

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13 / 25

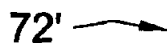
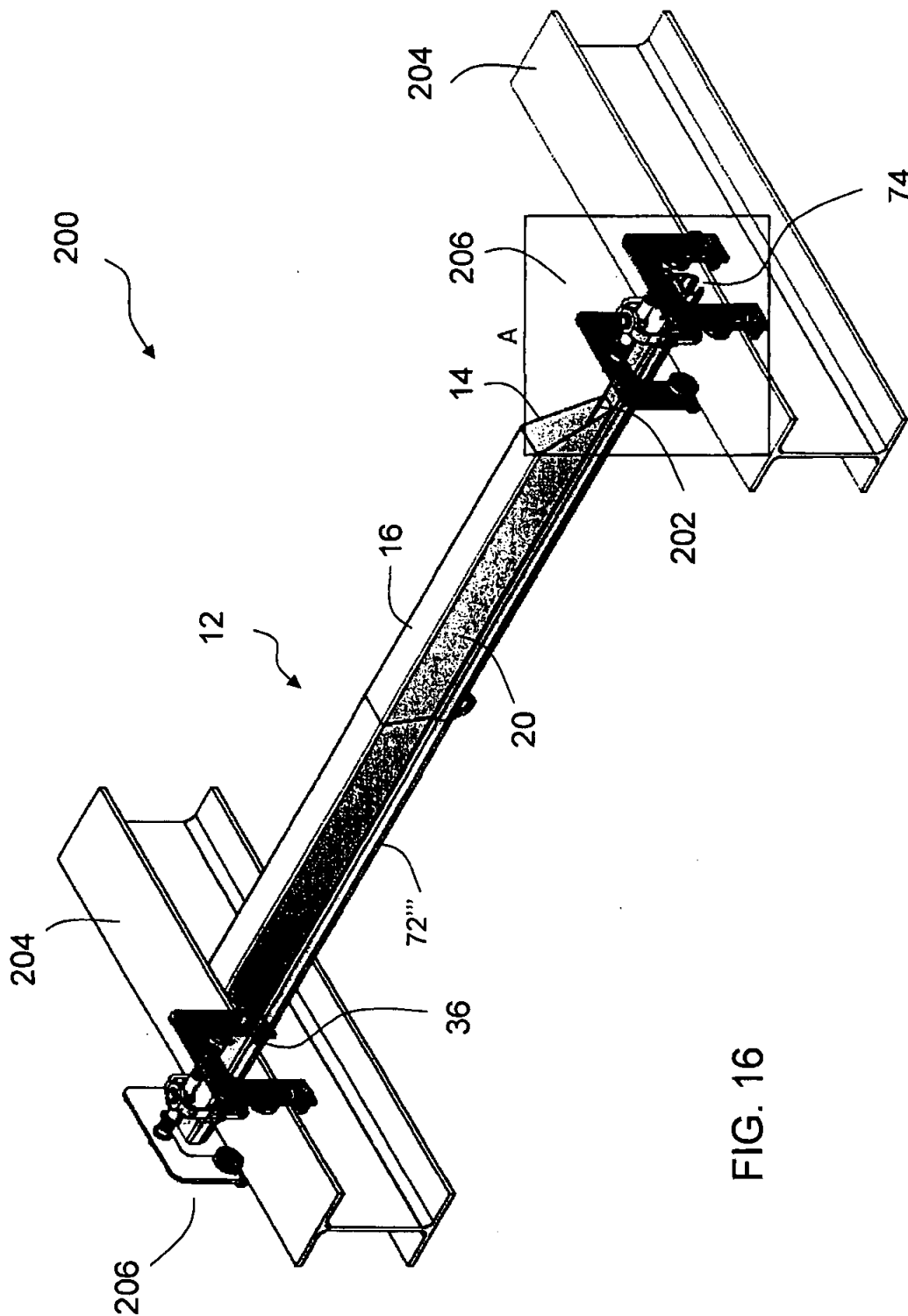


FIG. 15

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15/25

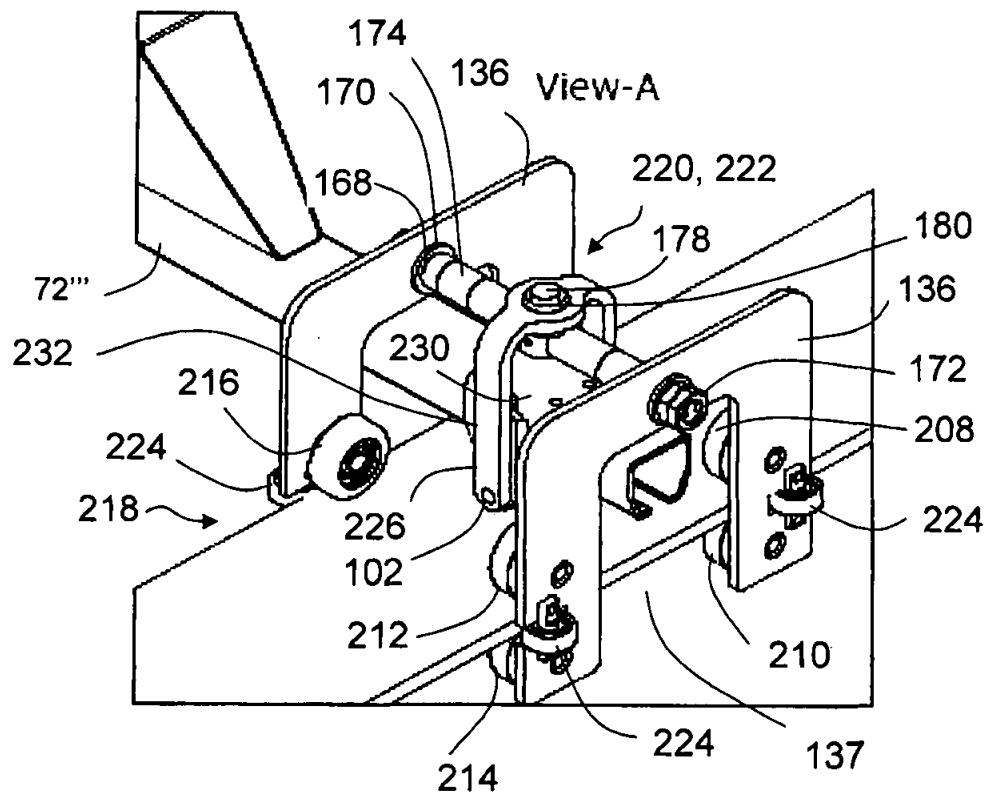


FIG. 17

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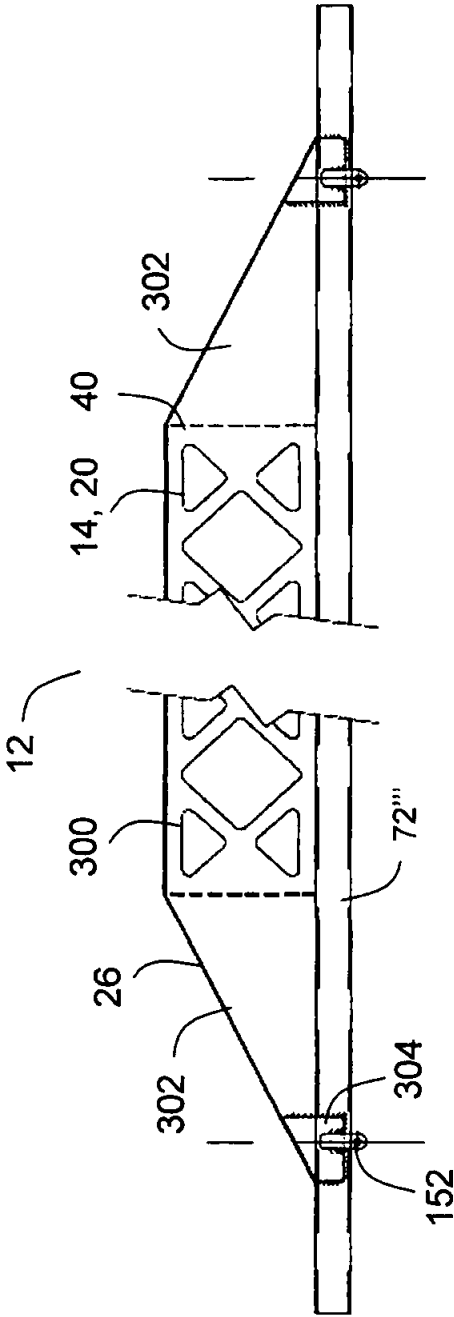


FIG. 18

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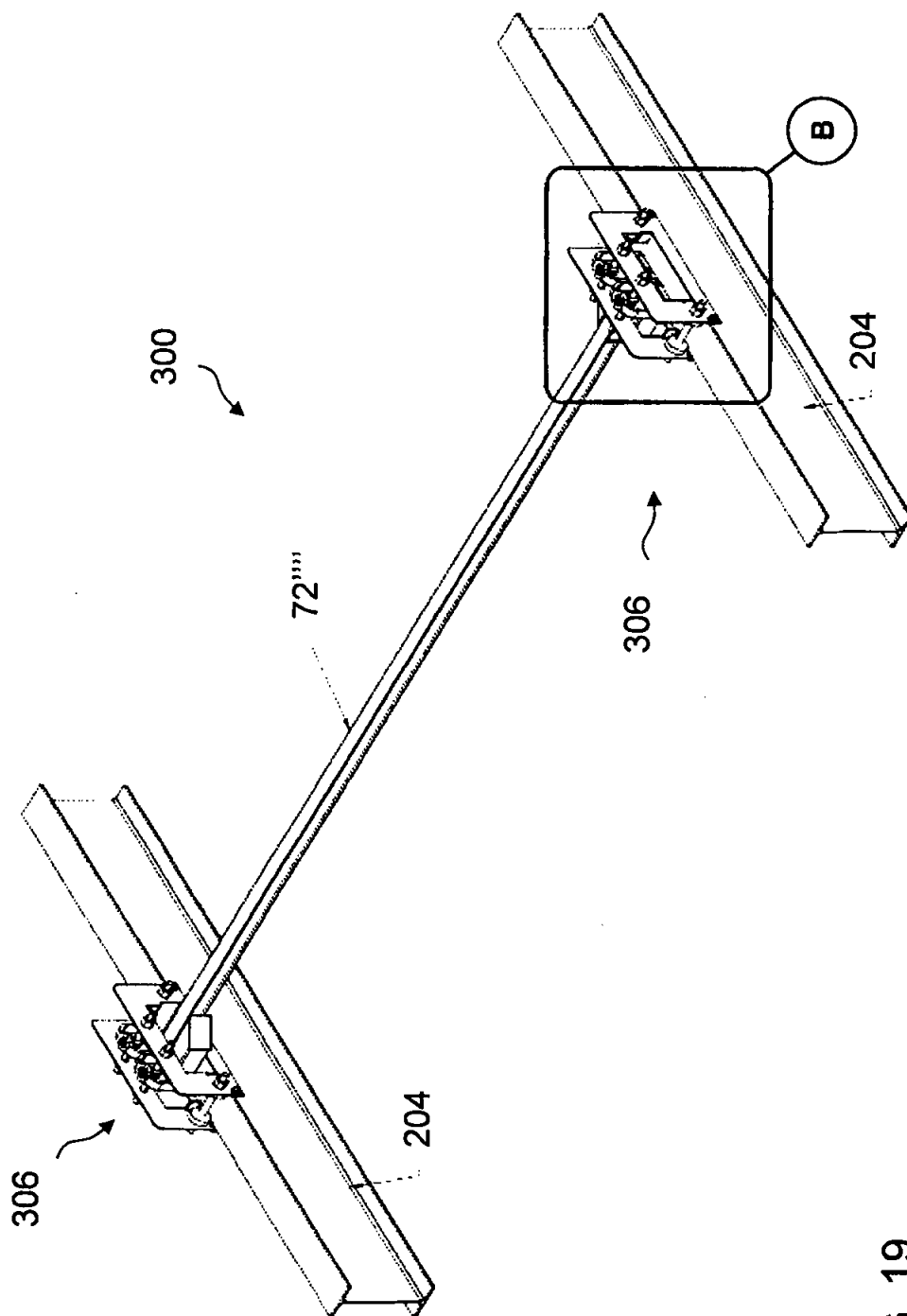


FIG. 19

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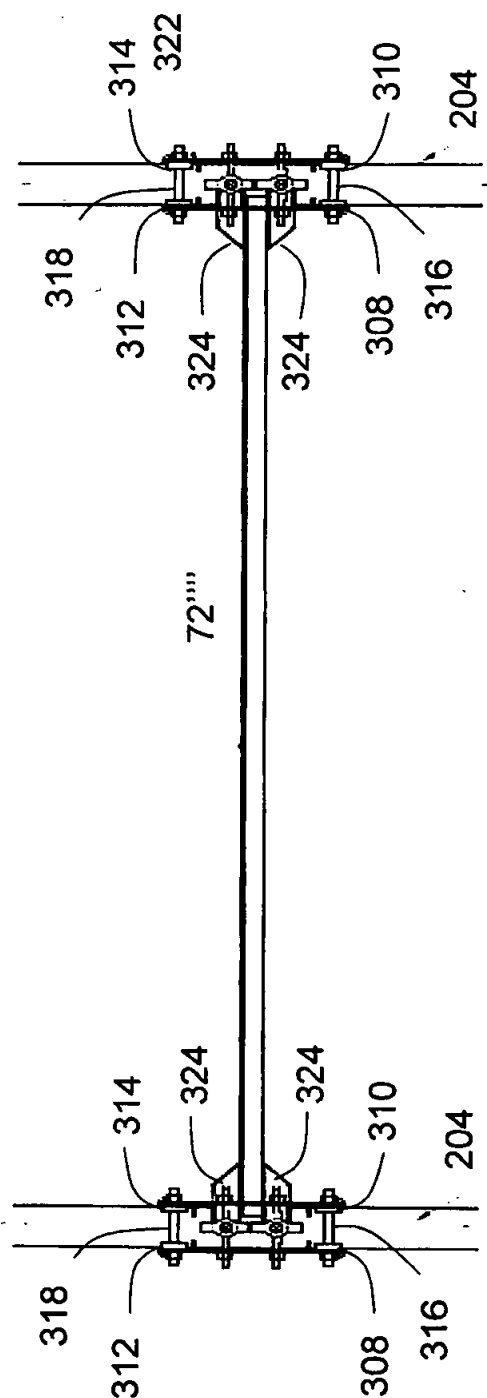


FIG. 20

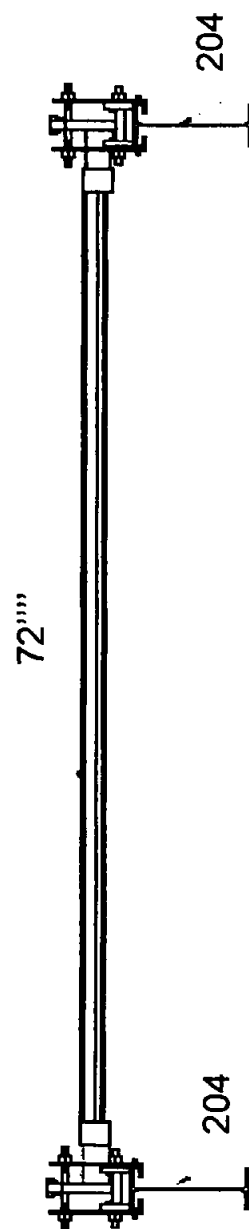
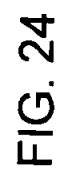


FIG. 21



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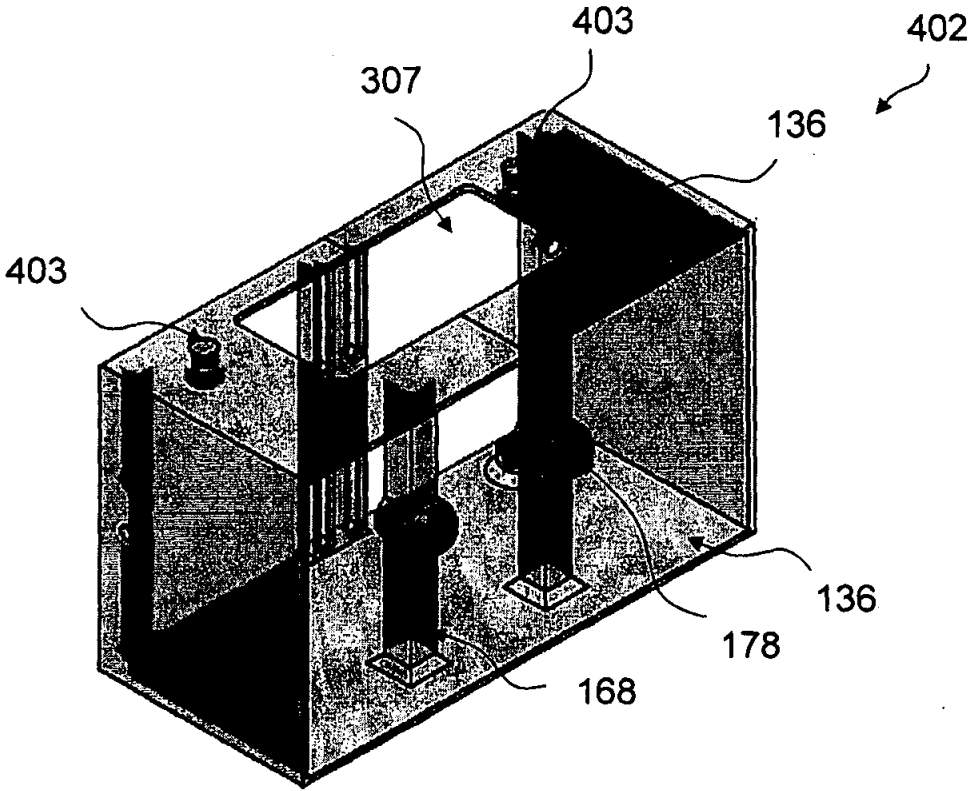


FIG. 25

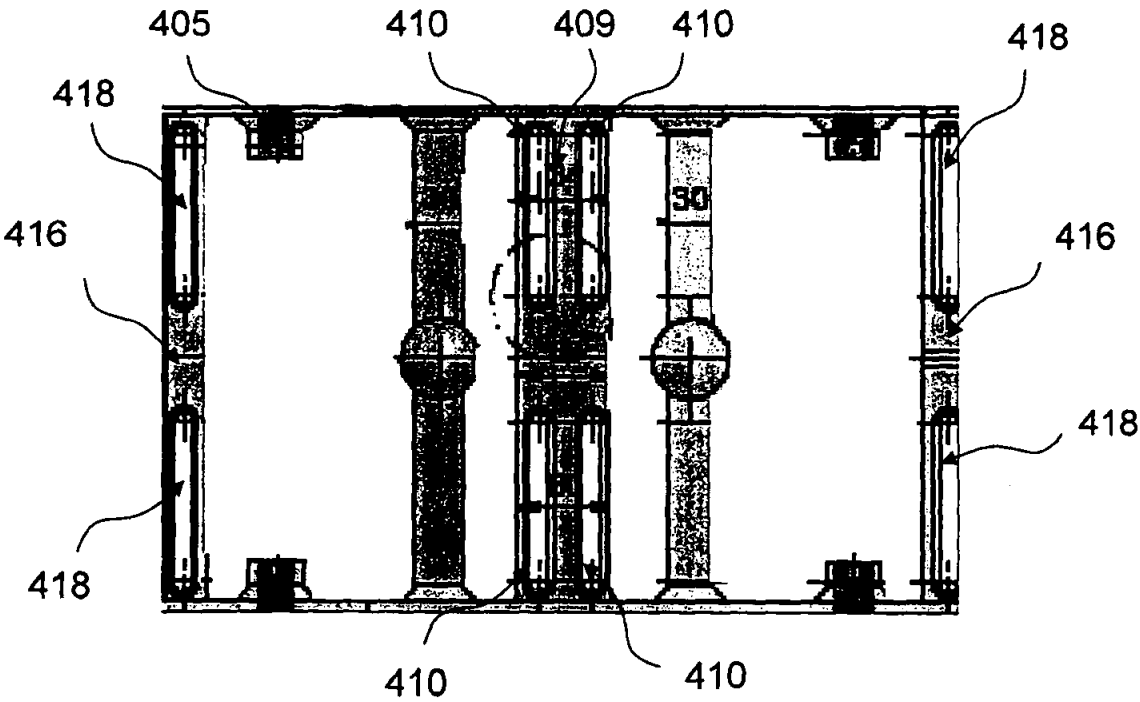


FIG. 26

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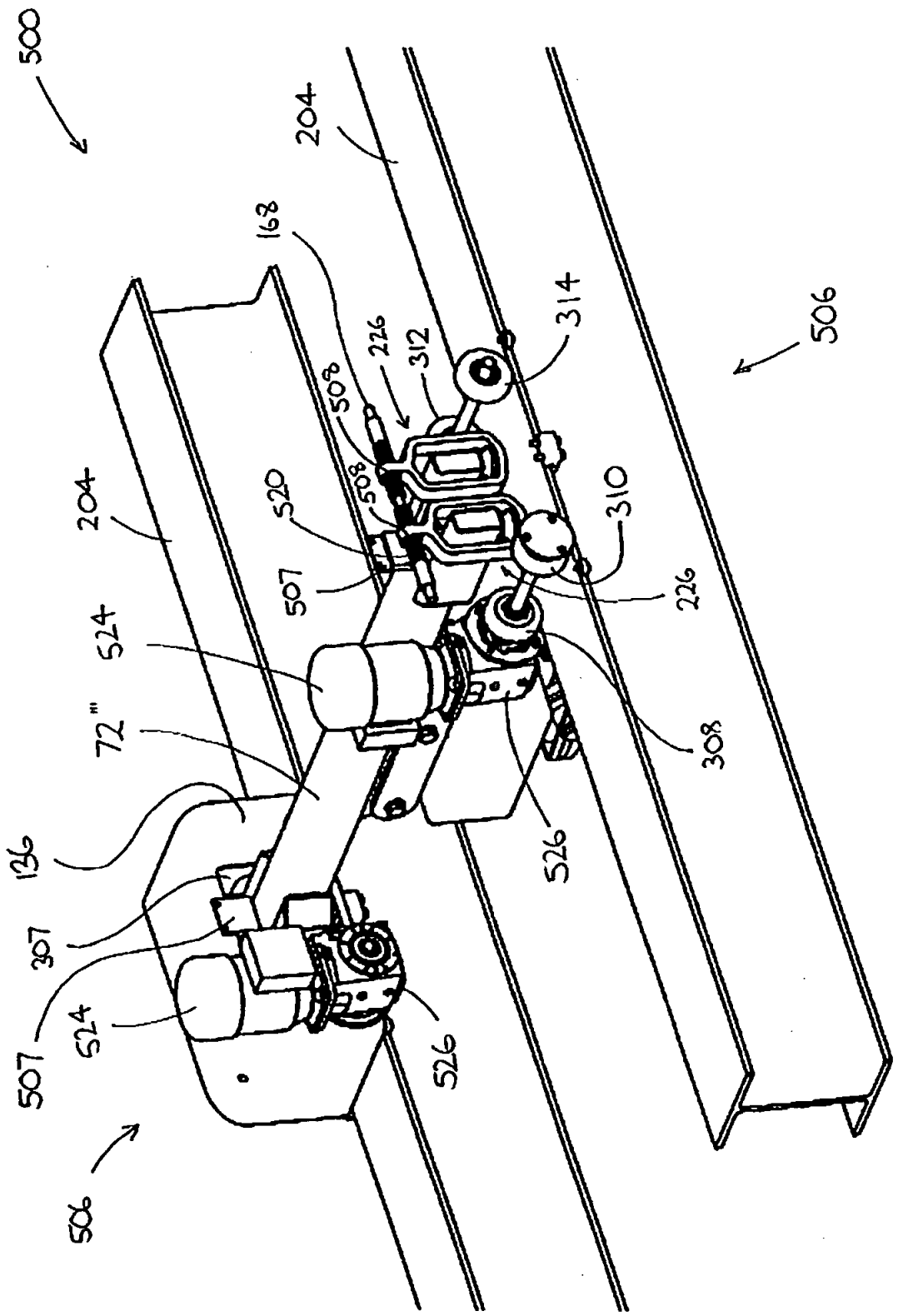


FIG 27

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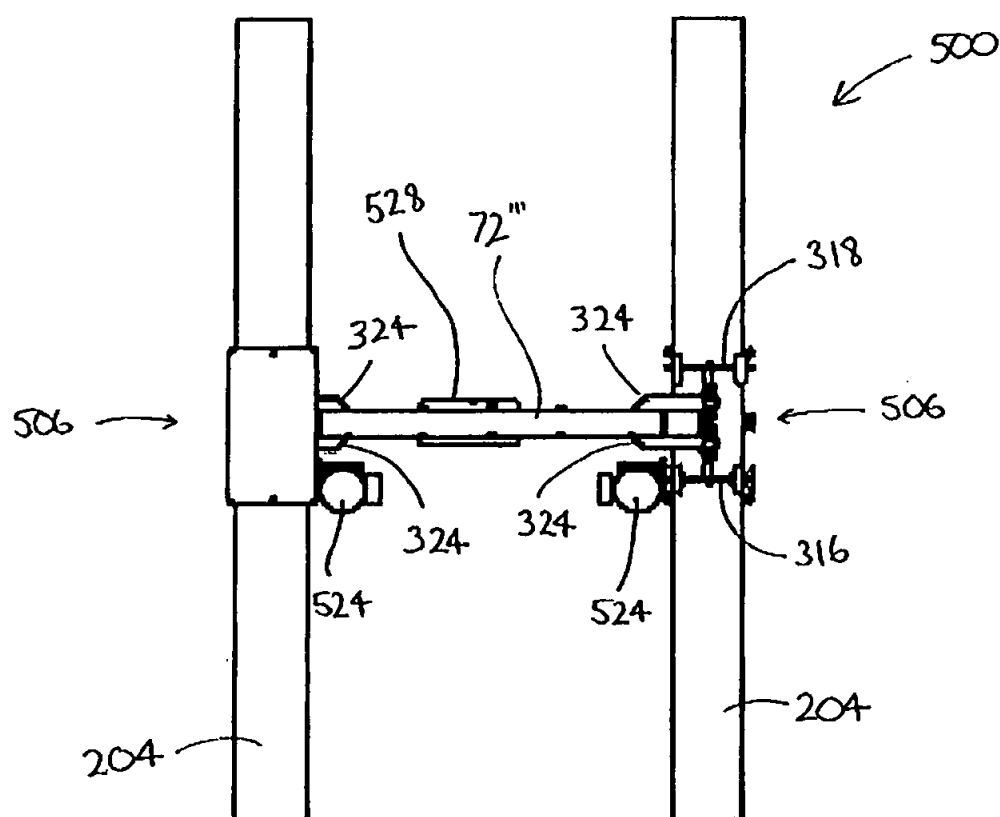


FIG 28

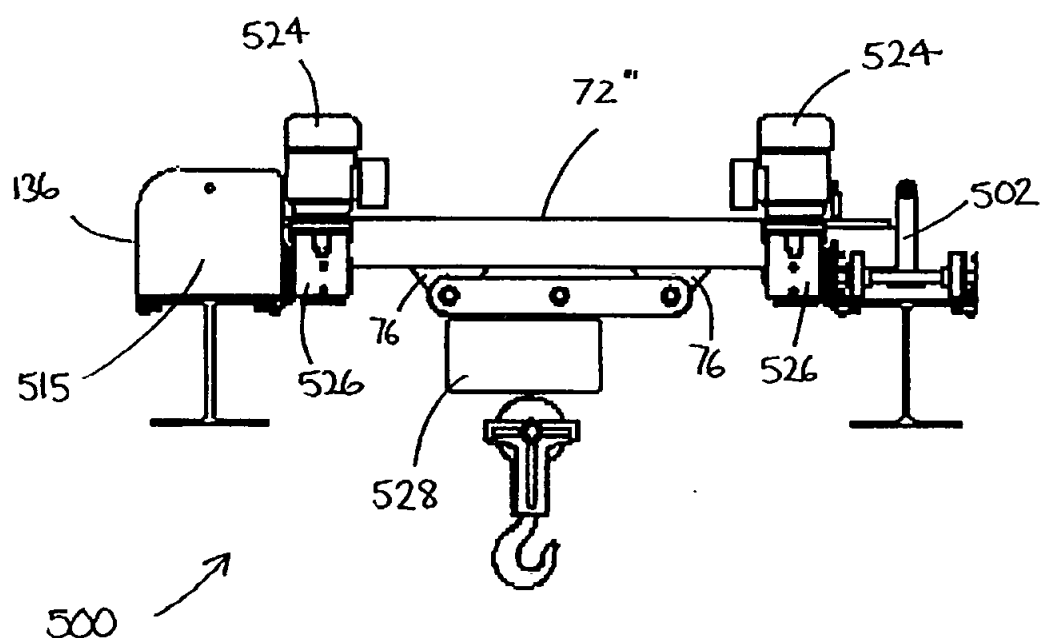


FIG 29

Amended Sheet
IPEA/AU

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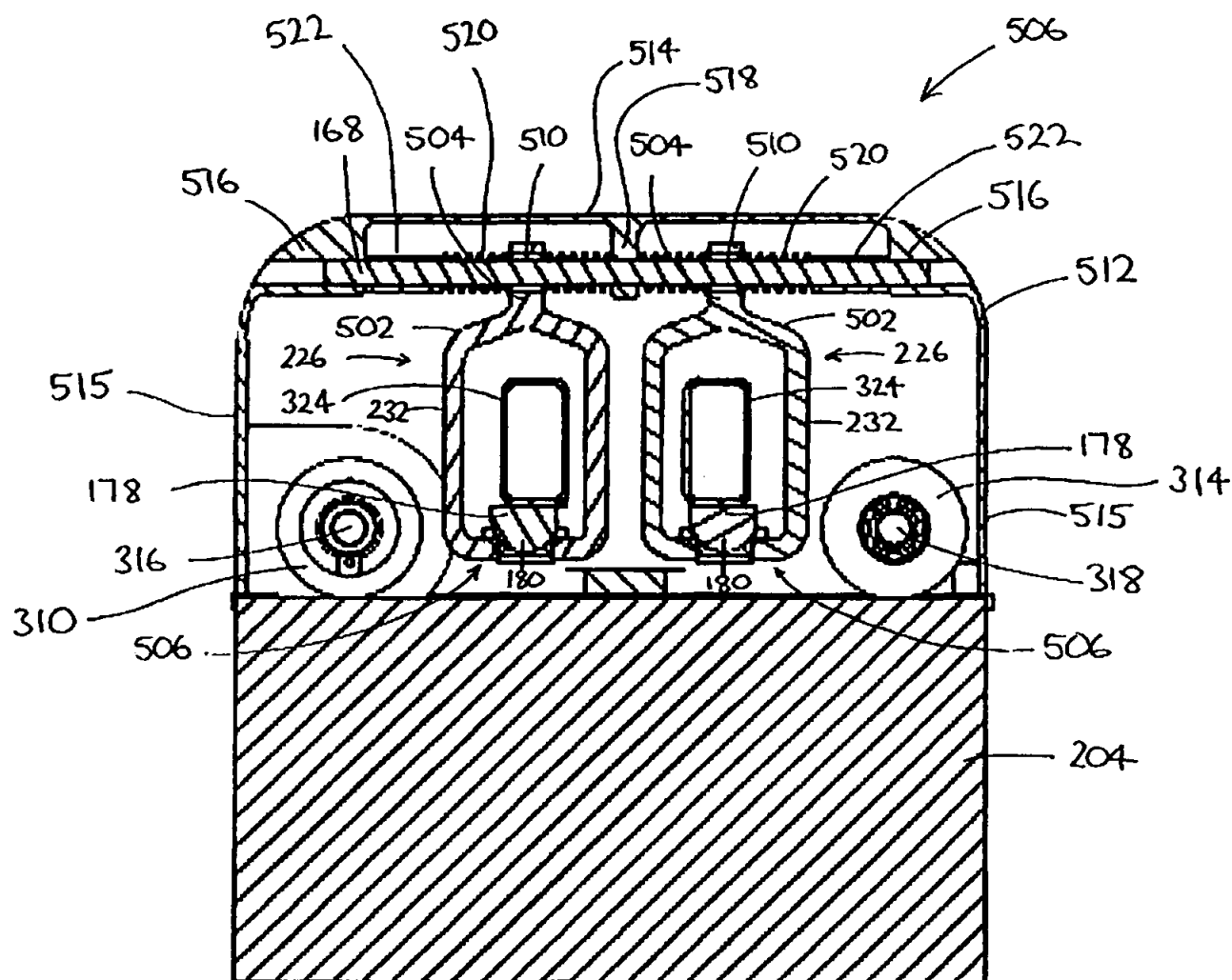


FIG 30

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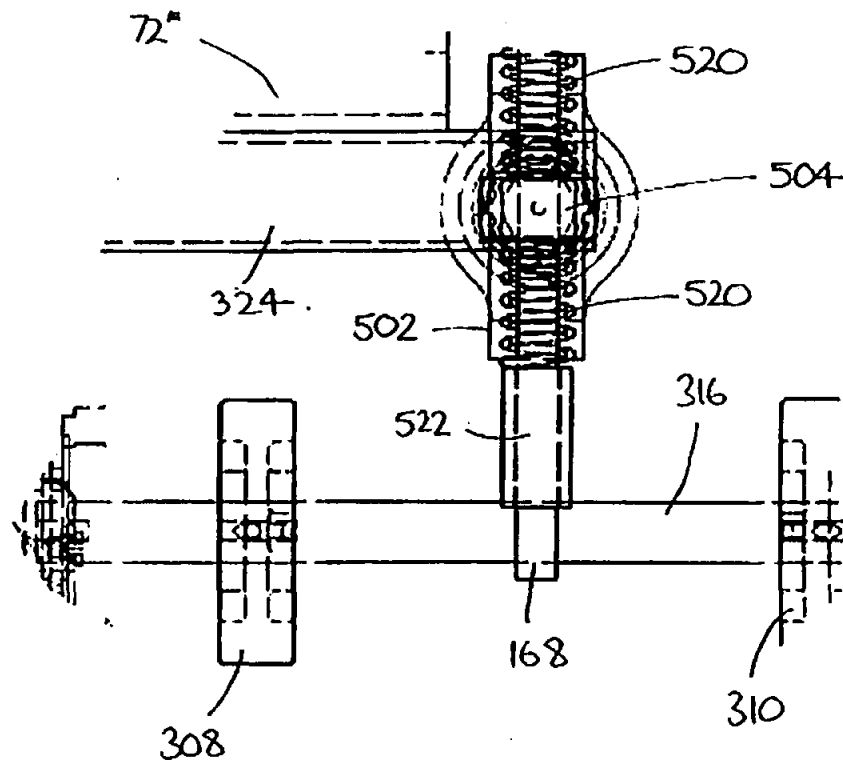


FIG 31

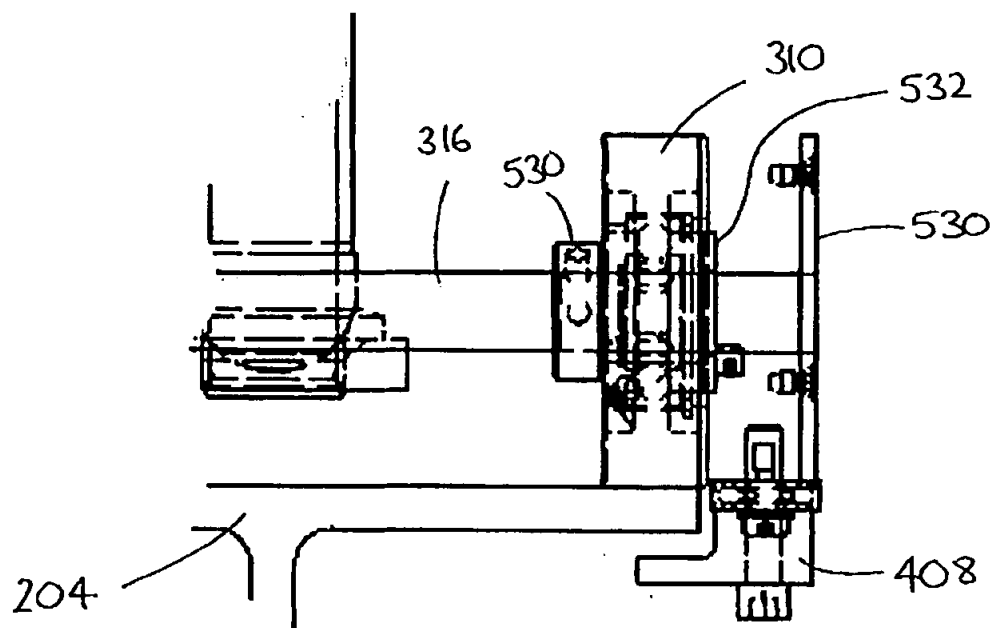


FIG 32

PCT REQUEST

Print Out (Original in Electronic Form)

0	For receiving Office use only	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form PCT/RO/101 PCT Request	
0-4-1	Prepared Using	PCT-SAFE Version 3.51.029.204 MT/FOP 20080917/0.20.5.12
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	Australian Patent Office (RO/AU)
0-7	Applicant's or agent's file reference	17776PC2-ADC
I	Title of Invention	LIFTING ASSEMBLIES INCLUDING TRAPEZOIDAL STRONG BACK BEAM SYSTEMS
II	Applicant	
II-1	This person is	applicant only
II-2	Applicant for	all designated States except US
II-4	Name	GLOBAL TRACK TECHNOLOGIES PTY LTD
II-5	Address	68 Station Street Norlane, Victoria 3214 Australia
II-6	State of nationality	AU
II-7	State of residence	AU
III-1	Applicant and/or inventor	
III-1-1	This person is	applicant and inventor
III-1-2	Applicant for	US only
III-1-4	Name (LAST, First)	MCKAY, Douglas, McGregor
III-1-5	Address	68 Station Street Norlane, Victoria 3214 Australia
III-1-6	State of nationality	NZ
III-1-7	State of residence	AU

PCT REQUEST

Print Out (Original In Electronic Form)

IV-1	Agent or common representative; or address for correspondence The person identified below is hereby/ has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name	FISHER ADAMS KELLY
IV-1-2	Address	Level 29 Comalco Place 12 Creek Street Brisbane, Queensland 4000 Australia
IV-1-3	Telephone No.	+61 7 3229 2655
IV-1-4	Facsimile No.	+61 7 3221 0597
IV-1-5	e-mail	mail@fak.com.au
V	DESIGNATIONS	
V-1	The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.	
VI-1	Priority claim of earlier national application	
VI-1-1	Filing date	22 November 2007 (22.11.2007)
VI-1-2	Number	2007906386
VI-1-3	Country	AU
VI-2	Priority claim of earlier national application	
VI-2-1	Filing date	08 July 2008 (08.07.2008)
VI-2-2	Number	2008903491
VI-2-3	Country	AU
VI-3	Priority document request The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):	VI-1, VI-2

PCT REQUEST

Print Out (Original in Electronic Form)

VI-4	Incorporation by reference : where an element of the international application referred to in Article 11(1)(iii)(d) or (e) or a part of the description, claims or drawings referred to in Rule 20.5(a) is not otherwise contained in this international application but is completely contained in an earlier application whose priority is claimed on the date on which one or more elements referred to in Article 11(1)(iii) were first received by the receiving Office, that element or part is, subject to confirmation under Rule 20.6, incorporated by reference in this international application for the purposes of Rule 20.6.		
VII-1	International Searching Authority Chosen	Australian Patent Office (ISA/AU)	
VIII	Declarations	Number of declarations	
VIII-1	Declaration as to the identity of the inventor	-	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	-	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	-	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	-	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	-	
IX	Check list	number of sheets	electronic file(s) attached
IX-1	Request (including declaration sheets)	4	✓
IX-2	Description	27	✓
IX-3	Claims	5	✓
IX-4	Abstract	1	✓
IX-5	Drawings	21	✓
IX-7	TOTAL	58	
	Accompanying Items	paper document(s) attached	electronic file(s) attached
IX-8	Fee calculation sheet	-	✓
IX-18	PCT-SAFE physical media	-	-
IX-20	Figure of the drawings which should accompany the abstract	17	
IX-21	Language of filing of the international application	English	

PCT REQUEST

Print Out (Original in Electronic Form)

X-1	Signature of applicant, agent or common representative	(PKCS7 Digital Signature)
X-1-1	Name	FISHER ADAMS KELLY
X-1-2	Name of signatory	ANDREW D CALE
X-1-3	Capacity	Registered Patent Attorney

FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/AU
10-6	Transmittal of search copy delayed until search fee is paid	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	
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PCT (ANNEX - FEE CALCULATION SHEET)

Print Out (Original in Electronic Form)

(This sheet is not part of and does not count as a sheet of the international application)

0	For receiving Office use only			
0-1	International Application No.			
0-2	Date stamp of the receiving Office			
0-4	Form PCT/RO/101 (Annex) PCT Fee Calculation Sheet Prepared Using	PCT-SAFE Version 3.51.029.204 MT/FOP 20080917/0.20.5.12		
0-9	Applicant's or agent's file reference	17776PC2-ADC		
2	Applicant	GLOBAL TRACK TECHNOLOGIES PTY LTD		
12	Calculation of prescribed fees	fee amount/multiplier	Total amounts (AUD)	
12-1	Transmittal fee T	⇒	150	
12-2-1	Search fee S	⇒	1600	
12-2-2	International search to be carried out by	AU		
12-3	International filing fee (first 30 sheets) i1	1353		
12-4	Remaining sheets	28		
12-5	Additional amount (X) i2	15		
12-6	Total additional amount i2	420		
12-7	i1 + i2 = I	1773		
12-12	Electronic Filing reduction (Image) R	-204		
12-13	Total International filing fee (I-R) I	⇒	1569	
12-14	Fee for priority document			
	Number of priority documents requested	2		
12-15	Fee per document (X) P	100		
12-16	Total priority document fee: P	⇒	200	
12-17	Fee for restoration of priority rights RP			
	Number of requests for restoration of priority rights	0		
	Total amount of fees for restoration of priority rights			
12-19	TOTAL FEES PAYABLE (T+S+I+P+RP)	⇒	3519	
12-21	Mode of payment	other : No payment for the time being		

Industria y Comercio
SUPERINTENDENCIA

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-074958- -00000-0000

Fecha: 2010-06-22 14:59:31 Dep. 2020 DIR NUEVASCR
Tra. 11 PATENTEIYII Eve. 379 FASENACIONALII
Act. 411 PRESENTACION Folios: 218

S

PATENTE DE INVENCION ☐

MODELO DE UTILIDAD ☐

Art 33 Decisión 486/00

☐
☐
☐
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☐

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 ☐



Bogotá D.C.,
2020

Doctor(a)
RODRIGUEZ D' ALEMAN DILIA MARIA
Apoderado(a) y/o Representante de
GLOBAL TRACK TECHNOLOGIES PTY LTD

REFERENCIA	Radicación No.	10 074958
	Solicitud internacional	PCT/AU2008/001731
	Fecha inicio fase nacional	22/06/2010
	Trámite	11
	Evento	379
	Actuación	430
	Oficio No.	

209464

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

1. La solicitud no contiene el poder debidamente otorgado, con el lleno de los requisitos exigidos por los artículos 63 y subsiguientes del Código de Procedimiento Civil. Adicionalmente, deberá presentar el documento que acredita la existencia y representación legal de la sociedad solicitante, cuando ésta fuere persona jurídica.

2. La solicitud no contiene la copia del documento en que consta la cesión del derecho a la patente del inventor al solicitante o a su causante, conforme a lo establecido por el artículo 26 literal k) de la Decisión 486 de la Comisión de la Comunidad Andina. Cuando se trate de documentos otorgados en el extranjero, estos deberán legalizarse de conformidad con lo dispuesto por los artículos 259 y 260 del Código de Procedimiento Civil. Cuando se trate de las declaraciones a que hace referencia la Regla 4.17 ii) del Tratado de Cooperación en Materia de Patentes PCT., el alcance de las tales declaraciones se determinará según indiquen claramente una cesión de derechos del inventor al solicitante o su causante, de conformidad con lo dispuesto en el numeral 5.2.15 del Capítulo Quinto, Título X de la Circular Única de Superintendencia de Industria y Comercio.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos 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.

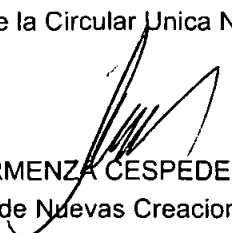
Continúa en la página siguiente...



Continuación radicado No: 10 074958



Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única No.10 de 2001.


ALIX CARMENZA CESPEDES DE VERGEL
Directora de Nuevas Creaciones (c)

El anterior requerimiento fue notificado por fijación en lista de fecha 30 JUL. 2010
adpa11