

Drigard & Castro

Abogado

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

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Dep. 2020 NUECREACIONES
Trz: 11 PATENTEYI EYE 373 FASENACIONALI
Act 444 RESPUESTAREQUE Folio 192

Señores

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISION DE NUEVAS CREACIONES

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RESPUESTA A OFICIO 3175 DE MARZO 17, 2006

REF: Expediente No. 06 018.719 - Solicitud de Patente Entrada en Fase Nacional

Corresp. a la Solicitud Internacional PCT/US2004/023817

a favor de LEVITON MANUFACTURING CO., INC.

Titulada: INTERRUPTOR DE PALA BASCULANTE CON IMPULSOR DE LEVA
ARTICULADO

JUAN PABLO CADENA SARMIENTO, vecino de Bogotá, portador de la tarjeta profesional No. 57492, obrando como apoderado de la sociedad LEVITON MANUFACTURING CO., INC., según lo acredita el documento de poder presentado en esa División, para dar cumplimiento al requerimiento notificado por fijación en lista el 17 de Marzo de 2006, de acuerdo con los Artículos 38 y 39 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 SIC, me permito Allegar:

1. Dos (2) documentos donde consta la cesión del derecho a la Patente otorgado por los inventores al solicitante, debidamente apostillados, junto con sus correspondientes traducciones al castellano.
2. Copia del Reporte de Examen Preliminar efectuado por la IPEA (forma PCT/IPEA/409), junto con su correspondiente traducción al castellano.
3. Artes finales (2 de 12 cm X 12 cm y 1 de 6 cm X 6 cm).
4. Extracto para publicación y Tarjeta de Archivo Temático.

Adicionalmente anexo los siguientes documentos relacionados con la solicitud:

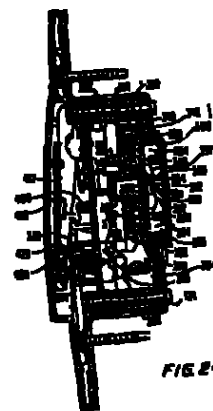
- Copias Certificadas por la Oficina de Patentes de Estados Unidos de las dos primeras solicitudes presentadas para la misma invención.
- Informe de Búsqueda Internacional (forma PCT/ISA/210), junto con su correspondiente traducción al castellano.
- Opinión Escrita (forma PCT/ISA/237), junto con su correspondiente traducción al castellano.

De la señora Jefe atentamente,


JUAN PABLO CADENA SARMIENTO
C.C. No. 80.410.337 de Usaquén
Cra 7 No. 16-56 Piso 9

Bogotá, 11 de mayo de 2006
CHP/MEV/her.

(21) N de solicitud 06 018 719		(22) Fecha de solicitud 24-02-2006	
(541) Clasificación internacional			
(71) Solicitante(s) LEVITON MANUFACTURING CO, INC			
(72) Inventor(es) Paul Endres Stephen R Kurek Anthony Tufano Dennis A Oddsen			
(74) Agente JUAN PABLO CADENA SARMIENTO			
(30) Prioridad	(31) No Prioridad	(32) Fecha	(33) País
	10/627 224	25-07-2003	US
	10/859 303	01-06-2004	US
(85) Fecha inicio fase nacional 02-25-2006		(87) Publicación internacional	
(86) Datos relativos a la presentación de la solíc PCT		Fecha: 10-02-2005	
Fecha de presentación de la solicitud 23-07-2004		No Publicación WO 2005/013851 A3	
No de solicitud PCT/US2004/023817			

**FIG 24**

(54) Título INTERRUPTOR DE PALA BASCULANTE CON IMPULSOR DE LEVA ARTICULADO

Reivindicación(es) 1 Un interruptor que comprende

UNA CARCASA

una paleta basculante acoplada con pivotamiento a dicha carcasa para asumir una primera posición hundida cuando se somete a una fuerza externa y una segunda posición de reposo cuando no se somete a una fuerza externa

CONTINUA AL RESPALDO

medios de leva adaptados para rotar alternadamente en una primera dirección y una segunda posición opuesta

medios de un impulsor de leva articulado acoplados para ser impulsados por dicha paleta basculante para obligar a dichos medios de leva a rotar en dicha dirección primera o segunda

medios de cursor acoplados para moverse alternadamente en una dirección lineal opuesta primera y segunda por la rotación de dichos medios de leva

un contacto estacionario y un contacto móvil acoplados a dicha carcasa del interruptor desviado dicho contacto móvil para contactar dicho contacto estacionario y obligados dichos medios de cursor para interrumpir el contacto con dicho contacto estacionario y

una ballesta dentro de dicha carcasa para ayudar a dichos medios de cursor a moverse en dichas direcciones primera y segunda

E-Mail:bricas@brigardycastro.com.co

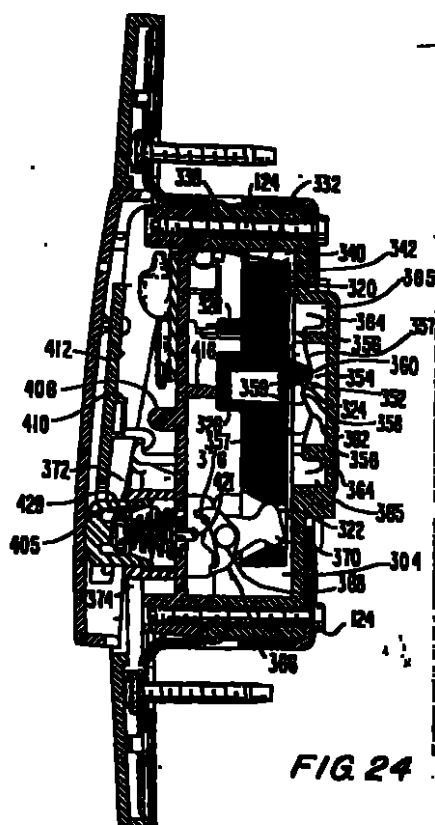


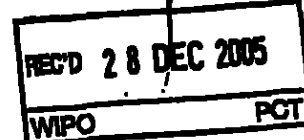
FIG 24

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 2030CIPCT	FOR FURTHER ACTION See Form PCT/IEPA/416	
International application No. PCT/US04/23817	International filing date (day/month/year) 23 July 2004 (23.07.2004)	Priority date (day/month/year) 25 July 2003 (25.07.2003)
International Patent Classification (IPC) or national classification and IPC IPC(7): H01H 13/00, 3/00 and US Cl.: 200/339, 323, 324, 341, 342, 347, 329, 353, 329, 357, 358, 363, 17R		
Applicant LEVITON MANUFACTURING CO., INC.		
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 <u>3</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☐ (sent to the applicant and to the International Bureau) a total of <u> </u> sheets, as follows: ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of 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. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) <u> </u>, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 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 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		
Date of submission of the demand 24 February 2005 (24.02.2005)	Date of completion of this report 19 December 2005 (19.12.2005)	
Name and mailing address of the IEPA/ US Mail Stop PCT, Attn: IEPA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer JOSE G. DEBS Telephone No. (571) 272-1607	

Form PCT/IEPA/409 (cover sheet) (April 2005)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No. 6/154

PCT/USD4/23817

208

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 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4(a))
- ☐ international preliminary examination (under 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 1-37 as originally filed/furnished
- pages* NONE received by this Authority on _____
- pages* NONE received by this Authority on _____
- ☒ the claims:
- pages 38-43 as originally filed/furnished
- pages* NONE as amended (together with any statement) under Article 19
- pages* NONE received by this Authority on _____
- pages* NONE received by this Authority on _____
- ☒ the drawings:
- pages 1-38 as originally filed/furnished
- pages* NONE received by this Authority on _____
- pages* NONE received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) - 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): _____
- ☐ any table(s) related to 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 _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (specify): _____
- ☐ any table(s) related to the sequence listing (specify): _____

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

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US04/23817

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

1. Statement

Novelty (N)	Claims 1-32	YES
	Claims NONE	NO
Inventive Step (IS)	Claims 1-32	YES
	Claims NONE	NO
Industrial Applicability (IA)	Claims 1-32	YES
	Claims NONE	NO

2. Citations and Explanations (Rule 70.7)

Claims 1-32 meet the criteria set out in PCT Article 35(2)-(3), because the prior art does not teach or fairly suggest a switch having an articulated sun driver means coupled to be driven by a rocker paddle to urge a cam to rotate in first or second opposite direction.

Claims 1-32 meet the criteria set out in PCT Article 35(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----
NONE

TRATADO DE COOPERACIÓN EN MATERIA DE PATENTES

TCP

INFORME DE BÚSQUEDA PRELIMINAR INTERNACIONAL SOBRE PATENTABILIDAD
(Capítulo II del Tratado de Cooperación en Materia de Patentes)

(Artículo 36 y Reglamento 70 del TCP)

Referencia de archivo del agente o del solicitante 2030CIPPCT	ACCIÓN ADICIONAL Consulte el Formulario PCT/IPEA/416
--	---

Solicitud internacional No. PCT/US04/23817 Fecha de presentación internacional (día/mes/año) 23 de julio de 2004 (23.07.2004) Fecha de prioridad (día/mes/año) 25 de julio de 2003 (25.07.2003)

Clasificación de patente internacional (CPI o IPC por sus siglas en inglés) o clasificación nacional e internacional

IPC(7): H01H 13/00, 3/00 y US Cl.: 200/339, 523, 524, 541, 542, 547, 529, 553, 329, 557, 558, 563, 17R

Solicitante

LEVITON MANUFACTURING CO., INC.

- Este es el informe de examen preliminar internacional, establecido por esta Administración de examen preliminar internacional de patentes de acuerdo al Artículo 35 y transmitido al solicitante de acuerdo al Artículo 36.
- Este INFORME consiste de un total de 3 hojas, incluyendo esta portada.
- Este informe está también acompañado por ANEXOS, que comprenden:
 - ☐ (enviado al solicitante y a la Oficina Internacional) un total de __ hojas, como sigue:
 - ☐ hojas de la descripción, las reivindicaciones y/o los dibujos que han sido enmendados y que representan las bases de este informe, y/o hojas que contienen rectificaciones autorizadas por esta Administración (ver Reglamento 70.16 y Sección 607 de las Instrucciones Administrativas).
 - ☐ hojas que reemplazan hojas anteriores, pero que esta Administración considera que contienen alguna enmienda que va más allá de lo revelado en la solicitud internacional según fue presentada, como se indica en el punto 4 de la Casilla No. I y en la Casilla suplementaria.
 - ☐ (sólo enviado a la Oficina Internacional) un total de (indique el tipo y número de transmisiones electrónicas) __, que contienen una lista de secuencia y/o tablas relacionadas, sólo en forma visible por computadora, como se indica en la Casilla suplementaria relacionada a la lista de secuencia (ver la Sección 802 de las Instrucciones administrativas).
- Este informe contiene indicaciones relacionadas con los siguientes puntos:
 - ☒ Casilla No. I Bases del informe
 - ☐ Casilla No. II Prioridad
 - ☐ Casilla No. III Falta de establecimiento de opinión con respecto a originalidad, grado de inventiva y aplicabilidad industrial
 - ☐ Casilla No. IV Falta de unidad de invención
 - ☒ Casilla No. V Declaración razonada de acuerdo al Artículo 35(2) con respecto a novedad, grado de inventiva o aplicabilidad industrial; menciones y aclaraciones de apoyo a dicha declaración
 - ☐ Casilla No. VI Ciertos documentos citados
 - ☐ Casilla No. VII Ciertos defectos en la solicitud internacional
 - ☐ Casilla No. VIII Ciertas observaciones en la solicitud internacional

180211

Fecha de presentación de la demanda 24 de febrero de 2005 (24.02.2005)	Fecha de terminación de este informe 19 de diciembre de 2005 (19.12.2005)
Nombre y dirección postal de IPEA/ US Mail Stop PCT, Atención: IPEA/US Comisionado de patentes P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Funcionario autorizado JOSE G . DEES Teléfono No. (571) 272-1607

**INFORME DE BÚSQUEDA PRELIMINAR INTERNACIONAL SOBRE
PATENTABILIDAD**

Solicitud internacional No.

PCT/US04/23817

Casilla No. 1 Bases del informe

1. Con respecto al idioma, este informe está basado en:

- ☐ la solicitud internacional en el idioma en que fue presentada.
- ☐ una traducción de la solicitud internacional a _____, que es el idioma de una traducción presentada con propósitos de:
 - ☐ búsqueda internacional (de acuerdo a los Reglamentos 12.3 y 23.1(b))
 - ☐ publicación de la solicitud internacional (de acuerdo al Reglamento 12.4(a))
 - ☐ examen preliminar internacional (de acuerdo a los Reglamentos 55.2(a) y/o 55.3(a))

2. Con respecto a los elementos de la solicitud internacional, este informe está basado en (hojas de reemplazo que han sido entregadas a la Oficina de recepción en respuesta a una invitación de acuerdo al Artículo 14 se refieren en este informe como "presentadas originalmente" y no se anexas a este informe):

☒ la solicitud internacional presentada originalmente

☒ la descripción:

páginas 1-37 _____ como se entregaron originalmente

páginas* NINGUNA _____ recibidas por esta Administración en _____

páginas* NINGUNA _____ recibidas por esta Administración en _____

☒ las reivindicaciones:

páginas 38-43 _____ como se entregaron originalmente

páginas* NINGUNA _____ como fueron enmendadas (junto con cualquier declaración) de acuerdo al Artículo 19

páginas* NINGUNA _____ recibidas por esta Administración en _____

páginas* NINGUNA _____ recibidas por esta Administración en _____

☒ los dibujos:

páginas 1-38 _____ como se entregaron originalmente

páginas* NINGUNA _____ recibidas por esta Administración en _____

páginas* NINGUNA _____ recibidas por esta Administración en _____

☐ una lista de secuencia y/o cualquier tabla relacionada - ver Casilla suplementaria relacionada a la lista de secuencia .

3. ☐ Las enmiendas han dado como resultado la cancelación de:

- ☐ la descripción, páginas _____
- ☐ las reivindicaciones, Nos. _____
- ☐ los dibujos, hojas/figs _____
- ☐ la lista de secuencia (*específica*): _____
- ☐ todas las tablas relacionadas con la lista de secuencia (*específica*): _____

4. ☐ Este informe ha sido establecido como si (algunas de) las enmiendas anexadas a este informe y listadas a continuación no hubiesen sido hechas, ya que se considera que van más allá de lo revelado al presentar la solicitud, como se indica en la Casilla suplementaria (Reglamento 70.2(c)).

☐ la descripción, páginas _____

☐ las reivindicaciones, Nos. _____

- ☐ los dibujos, hojas/figs _____
- ☐ la lista de secuencia (*especifique*): _____
- ☐ todas las tablas relacionadas con la lista de secuencia (*especifique*): _____

*** Si aplica el punto 4, todas estas hojas o algunas de ellas podrían estar marcadas como "sustituido".**

41 162
213

163
214

INFORME DE BÚSQUEDA PRELIMINAR INTERNACIONAL SOBRE PATENTABILIDAD	Solicitud internacional No. PCT/US04/23817
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Casilla No. V Declaración razonada de acuerdo al Artículo 35(2) con respecto a novedad, grado de inventiva o aplicabilidad industrial; menciones y aclaraciones de apoyo a dicha declaración

1. Declaración

Originalidad	Reivindicaciones <u>1-32</u>	<u>SI</u>
	Reivindicaciones <u>NINGUNA</u>	<u>NO</u>
Grado de inventiva	Reivindicaciones <u>1-32</u>	<u>SI</u>
	Reivindicaciones <u>NINGUNA</u>	<u>NO</u>
Aplicabilidad industrial	Reivindicaciones <u>1-32</u>	<u>SI</u>
	Reivindicaciones <u>NINGUNA</u>	<u>NO</u>

2. Citaciones y aclaraciones (Reglamento 70.7)

Las reivindicaciones 1-32 cumplen con los criterios establecidos en el Artículo 33(2)-(3) del Tratado de cooperación en materia de patentes (TCP), debido a que el arte (diseño) anterior no muestra ni sugiere un interruptor con un medio impulsor de leva articulado acoplado para ser accionado por una paleta basculante para hacer que una leva gire en una primera dirección o en una segunda dirección opuesta.

Las reivindicaciones 1-32 cumplen con los criterios establecidos en el Artículo 33(4) del Tratado de cooperación en materia de patentes (TCP), y por ello son aplicables industrialmente porque el tema reivindicado puede ser fabricado o usado industrialmente.

_____ NUEVAS CITACIONES _____
NINGUNA

AB 100537 1681
17 (12)
215

APOSTILLE
(Convention de La Haye du 5 octobre 1961)

1. Country: United States of America

This public document
2. has been signed by E. Bornett

3. acting in the capacity of Certifying Officer

4. bears the seal/stamp of Patent and Trademark Office

Certified

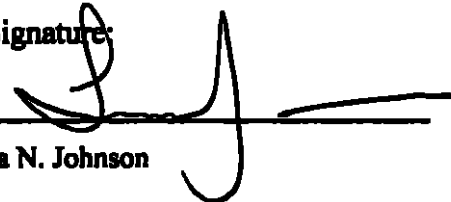
5. at Washington, D.C.

6. the twenty-first of March, 2006

7. by Assistant Authentication Officer, United States Department of State

8. No. 06015158-9

9. Seal/Stamp:

10. Signature:

Sonya N. Johnson

Apos hdee Colm hns
18ff
216

A 1440720

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

March 16, 2006

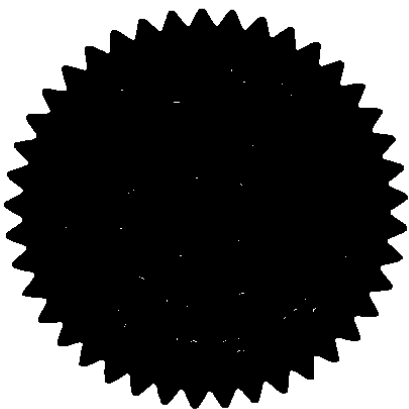
**THIS IS TO CERTIFY THAT ANNEXED IS A TRUE COPY FROM THE
RECORDS OF THIS OFFICE OF A DOCUMENT RECORDED ON
July 25, 2003.**

**By Authority of the
Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office**

E. Bornett

E. BORNETT

Certifying Officer



08-04-2003

Docket No.: 0267-001-2030

EET

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office



102515437

Tab settings

To the Honorable Director of the United States Patent and Trademark Office: Please record the attached original documents or copy thereof.

1. Name of conveying party(ies):

Paul Endres
Stephen R. Kurek
Anthony Tufano
Dennis Oddsen

7.25-03

2. Name and address of receiving party(ies):

Name: Leviton Manufacturing Co., Inc.

Internal Address: _____

2003 U.S. PTO
10/627224

Additional names(s) of conveying party(ies)

☐ Yes ☒ No

3. Nature of conveyance:

☒ Assignment

☐ Merger

☐ Security Agreement

☐ Change of Name

☐ Other _____

Street Address: 59-25 Little Neck Parkway

City: Little Neck State: NY ZIP: 11362

Execution Date: July 22, 2003

Additional name(s) & address(es) attached? ☐ Yes ☒ No

Application number(s) or patent number(s):

10627224

If this document is being filed together with a new application, the execution date of the application is: July 22, 2003

A. Patent Application No.(s)

B. Patent No.(s)

Additional numbers attached? ☐ Yes ☒ No

5. Name and address of party to whom correspondence concerning document should be mailed:

Name: Paul J. Sutton, Esq.

Internal Address: _____

08/04/2003 08:00:00 121:05 10627224

01 FC:0021 40.30 BA

Street Address: GREENBERG TRAURIG, LLP

885 Third Avenue

City: New York State: NY ZIP: 10022

6. Total number of applications and patents involved:

1

7. Total fee (37 CFR 3.41):.....\$ 40.00

☐ Enclosed - Any excess or insufficiency should be credited or debited to deposit account

☒ Authorized to be charged to deposit account

8. Deposit account number:

12-1185

DO NOT USE THIS SPACE

9. Statement and signature.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Paul J. Sutton

Name of Person Signing

Signature

July 23, 2003

Date

Total number of pages including cover sheet, attachments, and document:

3

Mail documents to be recorded with required cover sheet information to:

Mail Stop Assignment Recordation Services

Director of the United States Patent and Trademark Office, P.O. Box 1480, Alexandria, VA 22311-0480

PATENT
REEL: 014334 FRAME: 0361

ASSIGNMENT

WHEREAS, WE, Paul ENDRES, Stephen R. KUREK, Anthony TUFANO and Dennis ODDSEN, citizens of the United States of America, residing respectively at 4 Clearwater Drive, Plainview, NY 11803; 66-32 Alderton Street, Rego Park, NY 11374; 9 Carol Court, North Massapequa, NY 11758; and 54 Peterborough Drive, Eatons Neck, NY 11768, hereinafter called "Assignors", have made certain inventions in **ROBUST ROCKER SWITCH MECHANISM**, described in a specification executed by me preparatory to making application for Letters Patent therefor on even date herewith; and

WHEREAS, LEVITON MANUFACTURING CO., INC., a Delaware corporation, with a place of business at 59-25 Little Neck Parkway, Little Neck, NY 11362, hereinbelow called "Assignee", is desirous of securing an undivided One Hundred Percent (100%) of the entire right, title and interest in and to the said inventions, applications and Letters Patent, when granted, and in and to any divisions, continuations, continuations-in-part, improvements, reissues or extensions that may be made or granted on any of them;

NOW, THEREFORE, BE IT KNOWN that for and in consideration of the sum of One Dollar (\$1.00) to us in hand paid by the said Assignee, and other good and valuable consideration, the receipt of which is hereby acknowledged, we, the said Assignors, have sold, assigned, transferred and set over, and by these presents do hereby sell, assign, transfer and set over unto the said Assignee, its successors and assigns, an undivided One Hundred Percent (100%) of the entire right, title and interest throughout the world in and to the said inventions, applications and Letters Patent, when granted, and in and to any divisions, continuations, continuations-in-part, improvements, reissues or extensions that may be made or granted on any of them;

TO HAVE AND TO HOLD the same to the full end of the term or terms for which said Letters Patent may be granted, as fully and completely as the same might be held by us had this sale and assignment not been made.

For the consideration aforesaid, we hereby covenant and agree to and with the said Assignee, its successors and assigns that whenever its counsel or representative, or the counsel or representative of its successors or assigns, shall advise that formal application papers must be executed or an amendment to, or a division of, or any other proceeding or action in connection with said application or inventions, including interference proceedings, is lawful and desirable, or that a reissue or continuation, continuation-in-part or extension of said Letters Patent is lawful and desirable, we will sign all papers and drawings, take all rightful oaths and affidavits, and do all acts necessary or required to be done for the reissue or continuation, continuation-in-part or extension of same, and will do all acts necessary or required to secure to the said

PATENT
REEL: 014334 FRAME: 0362

Assignee, its successors and assigns, the title to and full benefit of all rights hereby assigned, without charge to said Assignee or its successors or assigns, but at its or their expense.

AND the Commissioner of Patents and Trademarks is requested to issue the said Letters Patent, when granted, in accordance with this sale and assignment.

For the consideration aforesaid, we have sold, assigned, transferred and set over and by these presents do sell, assign, transfer and set over unto the said Assignee, its successors and assigns, or the nominees of any of them, an undivided One Hundred Percent (100%) of the entire right, title and interest in and to any and all Letters Patent for said inventions which may be granted in countries foreign to the United States, and in and to any applications for Letters Patent which may be filed for said inventions in countries foreign to the United States, and in and to the inventions described in said applications; and we hereby authorize and empower said Assignee and its successors, assigns or nominees, to apply for Letters Patent or other form of protection on said inventions in its own name or in the name of its successors, assigns or nominees, in any or all countries where it may desire to file such applications, and where said applications may be filed by another other than the inventor; and we hereby covenant and agree to sign all papers and drawings, take all rightful oaths, execute all rightful affidavits, and do all acts necessary or required to be done for the procurement and maintenance of Letters Patent or other form of protection for said inventions in countries foreign to the United States, and for further investing or confirming the right and title thereto in the Assignee, its successors, assigns or nominees, but at its or their expense.

Paul Endres
Paul ENDRES

Stephen R. Kurek
Stephen R. KUREK

Anthony Tufano
Anthony TUFANO

Dennis Odden
Dennis ODDSEN

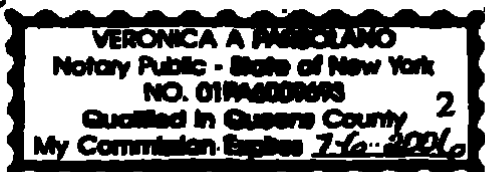
STATE OF NEW YORK)

)ss.:

COUNTY OF QUEENS)

On this 22 day of JULY, 2003 before me personally appeared Paul ENDRES, Stephen R. KUREK, Anthony TUFANO, and Dennis ODDSEN, to me personally known, and who signed the foregoing instrument in my presence, and duly acknowledged the same to be their free act and deed.

Veronica A. Passolano
Notary Public



RECORDED: 07/25/2003

PATENT
REEL: 014334 FRAME: 0363

✓ 170
220

**TRADUCCION AL ESPAÑOL del Documento de Cesión a Leviton
Manufacturing Co., Inc. firmado por los cedentes y el cesionario.**

APOSTILLA

(Convención de La Haya del 5 de octubre de 1961)

1. País: Estados Unidos de América

Este documento público

2. ha sido firmado por E. Bornett
3. actuando en capacidad de Funcionario que Certifica
4. lleva el sello/timbre de la Oficina de marcas y patentes

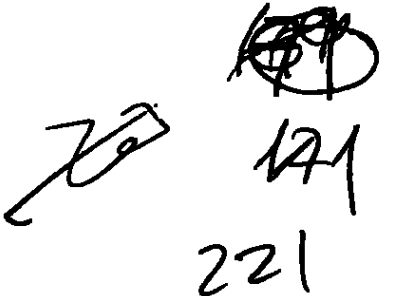
Certificado

5. en Washington D.C.
6. el veintiuno de marzo de 2006
7. por el Funcionario de autenticación asistente, Departamento de Estado
de Estados Unidos
8. No. 06015158-9
9. Sello/timbre

10. Firma

(Firma)

Sonya N. Johnson


221

**LOS ESTADOS UNIDOS DE AMÉRICA
A TODO AQUEL QUE PUEDA LLEGARLE LA PRESENTE:**

**DEPARTAMENTO DE COMERCIO DE ESTADOS UNIDOS
Oficina de Marcas y Patentes de Estados Unidos**

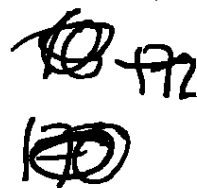
Marzo 16 de 2006

**ESTE ES PARA CERTIFICAR QUE EL ANEXO ES UNA COPIA
VERDADERA DE LOS ARCHIVOS DE ESTA OFICINA DE UN
DOCUMENTO ARCHIVADO EL Julio 25 de 2003.**

**Por autoridad del
Subsecretario de Comercio para la Propiedad Intelectual
y Director de la Oficina de Marcas y Patente de Estados Unidos**

**E. BORNETT
Funcionario que Certifica**

222



HOJA DE PORTADA DEL FORMULARIO DE REGISTRO SOLAMENTE PATENTES		Departamento de Comercio Oficina de Marcas y Patentes Expediente de abogado No. PR2027
Comisionado Asistente para patentes: Por favor archive los documentos originales anexos o copias de los mismos		
1. Nombre de la(s) parte(s) cedente(s): Paul Eudres Stephen R. Kurek Anthony Tufano Dennis Oddsan (Se anexo(n) nombre(s) adicional(es) de parte(s) cedente(s)? ☐ Si ☒ No)	2. Nombre y dirección de la(s) parte(s) receptora(s) Nombre: <u>Leviton Manufacturing Co., Inc.</u> Dirección interna: _____ Dirección: <u>59-25 Little Neck Parkway</u> Ciudad: <u>Little Neck</u> Estado: <u>NY</u> ZIP: <u>11362</u>	
3. Naturaleza del traspaso: ☒ Cesión ☐ Fusión ☐ Acuerdo de Seguridad ☐ Cambio de nombre ☐ Otro: _____ Fecha de Ejecución: <u>Julio 22 de 2003</u> ¿Se anexan Nombre(s) y dirección(es) adicional(es)? ☐ Si ☒ No		
4. Número(s) de solicitud o número(s) de patente: 10627224 Si este documento se presenta junto con una nueva solicitud, la fecha de ejecución de la solicitud es: <u>Julio 22 de 2003</u> A. Solicitud de patente No(s). B. Patente No(s). ¿Se anexan números adicionales? ☐ Si ☒ No		
5. Nombre y dirección de la parte a quien se le debe enviar la correspondencia: Nombre: <u>Paul J. Sutton, Lic.</u> Dirección interna: _____ Dirección: <u>GREENBERG TRAURIG, LLP</u> <u>885 Third Avenue</u> Ciudad: <u>New York</u> Estado: <u>NY</u> ZIP: <u>10022</u>	6. Número total de solicitudes y patentes involucradas: 1 7. Tarifa total (37 C.F.R. 3.41): \$40.00 ☐ Adjunta ☒ Autorizado para cargarla a cuenta de depósito 8. Número de cuenta de Depósito: 12-1185	
NO USE ESTE ESPACIO		
9. Declaración y firma. hasta donde se y creo, la información anterior es verdadera y correcta y cualquier copia anexa es una copia verdadera del documento original. <u>Paul J. Sutton</u> (Firma) <u>Julio 23 de 2003</u> Nombre de la persona que firma Firma Fecha Número total de páginas que comprenden portada, anexos y documento: <u>3</u>		

PATENTE
ROLLO: 014334 CUADRO 0361

223 ~~77~~ ~~77~~

CESIÓN

CONSIDERANDO QUE, NOSOTROS, Paul ENDRES, Stephen R. KUREK, Anthony TUFANO y Dennis ODDSEN, ciudadanos de Estados Unidos de América, residiendo respectivamente en 4 Clearwater Drive, Plainview, NY 11803; 66-32 Alderton Street, Rego Park, NY 11374; 9 Carol Court, North Massapequa, NY 11758; y 54 Petersborough Drive, Eatons Neck, NY 11768, en adelante denominados "Cedentes", hemos hecho ciertas invenciones en MECANISMO DE INTERRUPTOR DE BALANCIN ROBUSTO, descrito en una descripción ejecutada por mí en preparación a realizar la solicitud de patente para la misma en la misma fecha que la presente; y

CONSIDERANDO QUE, LEVITON MANUFACTURING CO., INC., una corporación de Delaware, con oficinas en 59-25 Little Neck parkway, Little Neck, NY 11362, en adelante denominado "Cesionario", esta deseosa de asegurar un cin por ciento (100%) sin dividir de la totalidad del derecho, título e interés en y para dichas invenciones y solicitudes de patente, cuando sean concedidas, y en y para cualquier división, continuación, continuación parcial, mejora, reemisión o extensión que puedan hacerse o concederse sobre cualquiera de ellas;

AHORA, POR LO TANTO, TÉNGASE POR SABIDO que por y en consideración de la suma de un dólar (\$1.00) que dicho Cesionario nos pagó en la mano, y otra consideración buena y valiosa, el recibo de la cual se reconoce por la presente, nosotros, los Cedentes, hemos vendido, cedido, transferido y traspasamos, y por la presente vendemos, cedemos, transferimos y traspasamos a dicho Cesionario, sus sucesores y cesionarios, un cien por ciento (100%) sin dividir de la totalidad del derecho, título e interés alrededor del mundo en y para dichas invenciones, solicitudes de patente, cuando se concedan, y en y para cualquier división, continuación, continuación parcial, mejora, reemisión o extensión que pueda hacerse o concederse sobre cualquiera de ellas;

PARA EL MISMO QUE SEA TENIDO hasta el fin del término o términos para los cuales se concedan dichas patentes, tan total y completamente como serían tenidos los mismos si no se hubiera hecho esta cesión.

Por consideración con lo antes dicho, por la presente acordamos y aceptamos para y con dicho Cesionario, sus sucesores y cesionarios que cuando sea que su abogado o representante, o el abogado o representante de sus sucesores o cesionarios, aconsejen que se deban ejecutar documentos de cesión formales o una corrección a, o una división de, o cualquier otro procedimiento o acción en conexión con dicha solicitud o invenciones, incluyendo procesos de interferencia, sea legal y deseable, o que una continuación o reemisión, continuación parcial o extensión de dichas patentes sea legal o deseable, firmaremos todos los documentos y dibujos, tomaremos todos los juramentos y declaraciones juradas por escrito, y realizaremos todos los actos necesarios o que requieran para la reemisión o continuación, continuación parcial o extensión de las mismas, y haremos todos los actos necesarios o requeridos para asegurarle a dicho

PATENTE
ROLLO: 014334 CUADRO 0362

229 124

cesionario, sus sucesores o cesionarios, el título para y beneficio completo de todos los derechos cedidos sin cargo adicional a dicho Cesionario o sus sucesores o cesionarios, pero a costas suya o suyas.

Y se le solicita al Comisionado de Marcas y Patentes que emita dichas patentes, cuando se concedan, de acuerdo con esta venta y cesión.

Por consideración con lo antes dicho, hemos vendido, cedido, transferido y traspasado y por la presente vendemos, cedemos, transferimos y traspasamos a dicho Cesionario, sus sucesores o cesionarios, o los designados de cualquiera de ellos, un cien por ciento (100%) no dividido de la totalidad del derecho, título e interés en y para cualquier cualquiera y todas las patentes para dichas invenciones las cuales puedan ser concedidas en países extranjeros a Estados Unidos, y en y para cualquier solicitud de patente que pueda ser presentada para dichas invenciones en países extranjeros a Estados Unidos, y en y para las invenciones descritas en dichas solicitudes; y por la presente autorizamos y damos poder a dicho Cesionario y sus sucesores, cesionarios o designados, a solicitar patentes u otras formas de protección sobre dichas invenciones a su nombre o a nombre de sus sucesores, cesionarios o designados, en cualquiera o todos los países donde pueda ser deseable presentar tales solicitudes, y donde puedan presentarse dichas solicitudes por alguien diferente al inventor; y por la presente acordamos y aceptamos ceder todos los documentos y dibujos, tomar todos los juramentos apropiados, ejecutar todas la declaraciones juradas por escrito apropiadas, y realizar todos los actos necesarios o requeridos para obtener y mantener las patentes u otra forma de protección para dichas invenciones en países extranjeros a estados Unidos, y para investigar o confirmar el derecho y título de las mismas en el Cesionario, sus sucesores, cesionarios o designados, pero a expensas suyas.

(Firma)
Paul ENDRES

(Firma)
Stephen R. KUREK

(Firma)
Anthony TUFANO

(Firma)
Dennis ODDSEN

ESTADO DE NEW YORK)
) ss.:
CONDADO DE QUEENS)

En este 22 de julio de 2003, ante mi personalmente apareció Paul ENDRES, Stephen R. KUREK, Anthony TUFANO, y Dennis ODDSEN, a quienes conozco personalmente, y quien firmo el instrumento anterior, y quienes firmaron el instrumento anterior en mi presencia, y reconocieron debidamente que el mismo es su acto y acción libre.

(Firma)
Notario Público

Hay un sello que dice:
VERONICA A PARSOLANO
Notario Público – Estado de New York
NO. 01PA6009693
Calificado en el Condado de Queens
Mi comisión expira 7-6-2006

REGISTRADO: 07/25/2003

PATENTE
ROLLO: 014334 CUADRO 0363

AD: 100567 28
24
225
(2/2)

APOSTILLE
(Convention de La Haye du 5 octobre 1961)

1. Country: United States of America

This public document

2. has been signed by E. Bornett

3. acting in the capacity of Certifying Officer

4. bears the seal/stamp of Patent and Trademark Office

Certified

5. at Washington, D.C.

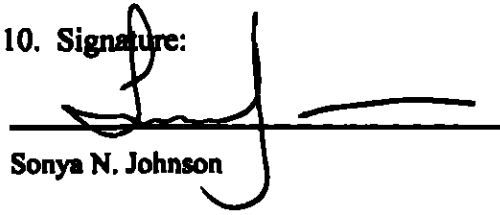
6. the twenty-first of March, 2006

7. by Assistant Authentication Officer, United States Department of State

8. No. 06015158-7

9. Seal/Stamp:

10. Signature:


Sonya N. Johnson

Appshlee
Cotton. m. 178
21
226

A 1440719



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

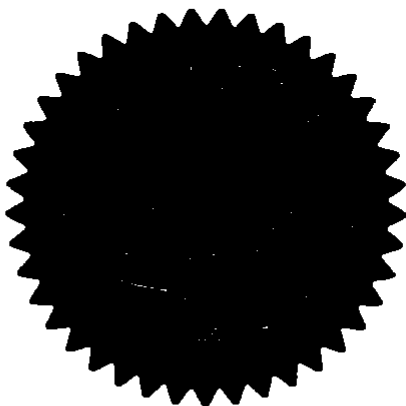
United States Patent and Trademark Office

March 16, 2006

**THIS IS TO CERTIFY THAT ANNEXED IS A TRUE COPY FROM THE
RECORDS OF THIS OFFICE OF A DOCUMENT RECORDED ON
August 11, 2004.**

By Authority of the

**Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office**



E. BORNETT

Certifying Officer

227

Form PTO-1595 (Rev. 06/04)
OMB No. 0651-0027 (exp. 06/30/2005)U.S. DEPARTMENT OF COMMERCE
United States Patent and Trademark OfficeRECORDATION FORM COVER SHEET
PATENTS ONLY

To the Director of the U.S. Patent and Trademark Office: Please record the attached documents or the new address(es) below.

1. Name of conveying party(ies)/Execution Date(s):

Paul ENDREB
Stephen R. KUREK
Anthony TUFANO
Dennis A. ODDSEN

2. Name and address of receiving party(ies)

Name: LEVITON MANUFACTURING CO., INC.

Internal Address: _____

Street Address: 59-25 Little Neck ParkwayCity: Little NeckState: New YorkCountry: U.S.A.Zip: 11566Additional name(s) & address(es) attached? ☐ Yes ☒ NoExecution Date(s) 08/10/2004Additional name(s) of conveying party(ies) attached? ☐ Yes ☒ No

3. Nature of conveyance:

- ☒ Assignment ☐ Merger
☐ Security Agreement ☐ Change of Name
☐ Government Interest Assignment
☐ Executive Order 9424, Confirmatory License
☐ Other _____

4. Application or patent number(s):

☐ This document is being filed together with a new application.

A. Patent Application No.(s)

10/659,303

B. Patent No.(s)

Additional numbers attached? ☐ Yes ☒ No

5. Name and address to whom correspondence concerning document should be mailed:

Name: Paul J. Sutton

Internal Address: _____

Street Address: 995 Third AvenueCity: New YorkState: New YorkZip: 10022Phone Number: 212.601.2108Fax Number: 212.699.2449

Email Address: _____

6. Total number of applications and patents involved:

1

7. Total fee (37 CFR 1.21(h) & 3.41) \$ 40.00

- ☐ Authorized to be charged by credit card
☒ Authorized to be charged to deposit account
☐ Enclosed
☐ None required (government interest not affecting fee)

8. Payment Information

a. Credit Card Last 4 Numbers _____
Expiration Date _____b. Deposit Account Number 12-1185Authorized User Name Paul J. Sutton

9. Signature:

Signature

August 11, 2004

Date

Paul J. Sutton

Name of Person Signing

Total number of pages including cover sheet, attachments, and documents:

5

Documents to be recorded (including cover sheet) should be filed to (703) 308-6000, or mailed to:
Mail Stop Assignment Recordation Services, Director of the USPTO, P.O. Box 1469, Alexandria, V.A. 22313-1469

700104540

PATENT
REEL: 015022 FRAME: 0426

0267-001-2030CIP

228

**CONFIRMATORY
ASSIGNMENT**

WHEREAS, WE, Paul ENDRES of 4 Clearwater Drive, Plainview, New York 11803; Stephen R. KUREK of 66-32 Alderton Street, Rego Park, New York 11374; Anthony TUFANO of 9 Carol Court, North Massapequa, New York 11758 and Dennis A. ODDSEN of 54 Peterborough Drive, Eatons Neck, New York 11768, citizens of the United States of America, hereinafter called "Assignors", have made certain inventions identified and described in Schedule A, hereto (hereinafter the "Inventions"); and

WHEREAS, LEVITON MANUFACTURING CO., INC., a Delaware corporation, with a place of business at 59-25 Little Neck Parkway, Little Neck, NY 11362, hereinbelow called "Assignee", was our employer as of the time the Inventions were made and is desirous of confirming it has secured an undivided One Hundred Percent (100%) of the entire right, title and interest in and to the said inventions, applications and Letters Patent, when granted, and in and to any divisions, continuations, continuations-in-part, improvements, reissues or extensions that may be made or granted on any of them;

NOW, THEREFORE, BE IT KNOWN that for and in consideration of the sum of One Dollar (\$1.00) to us in hand paid by the said Assignee, and other good and valuable consideration, the receipt of which is hereby acknowledged, we, the said Assignors, hereby confirm that we have sold, assigned, transferred and set over, and by these presents do hereby sell, assign, transfer and set over unto the said Assignee, its successors and assigns, an undivided One Hundred Percent (100%) of the entire right, title and interest throughout the world in and to the said Inventions, applications and Letters Patent, when granted, and in and to any divisions, continuations, continuations-in-part, improvements, reissues or extensions that may be made or granted on any of them;

TO HAVE AND TO HOLD the same to the full end of the term or terms for which said Letters Patent may be granted, as fully and completely as the same might be held by us had this sale and assignment not been made.

For the consideration aforesaid, we hereby covenant and agree to and with the said Assignee, its successors and assigns that whenever its counsel or representative, or the counsel or representative of its successors or assigns, shall advise that formal application papers must be executed or an amendment to, or a division of, or any other proceeding or action in connection with said application(s) or Inventions, including interference proceedings, is lawful and desirable, or that a reissue or continuation, continuation-in-part or extension of said Letters Patent is lawful and desirable, we will sign all papers and drawings, take all rightful oaths and affidavits, and do all acts necessary or required to be done for the reissue or continuation, continuation-in-part or extension of same, and will do all acts necessary or required to secure to the said Assignee, its successors and assigns, the title to and full benefit of all rights hereby assigned, without charge to said Assignee or its successors or assigns, but at its or their expense.

AND the Commissioner of Patents and Trademarks is requested to issue the said Letters Patent, when granted, in accordance with this sale and assignment.

For the consideration aforesaid, we have sold, assigned, transferred and set over and by these presents do sell, assign, transfer and set over unto the said Assignee, its successors and assigns, or the nominees of any of them, an undivided One Hundred Percent (100%) of the entire right, title and interest in and to any and all Letters Patent for said Inventions which may be granted in countries foreign to the United States, and in and to any applications for Letters Patent which may be filed for said Inventions in countries foreign to the United States, and in and to the Inventions described in said applications; and we hereby authorize and empower said Assignee and its successors, assigns or nominees, to apply for Letters Patent or other form of protection on said Inventions in its own name or in the name of its successors, assigns or nominees, in any or all countries where it may desire to file such applications, and where said applications may be filed by another other than the inventor; and we hereby covenant and agree to sign all papers and drawings, take all rightful oaths, execute all rightful affidavits, and do all acts necessary or required to be done for the procurement and maintenance of Letters Patent or other form of protection for said Inventions in countries foreign to the United States, and for further investing or confirming the right and title thereto in the Assignee, its successors, assigns or nominees, but at its or their expense further investing or

0267-001-2030CIP

230

confirming the right and title thereto in the Assignee, its successors, assigns or nominees, but at its or their expense.

Paul Endres

Paul ENDRES

Stephen R. Kurek

Stephen R. KUREK

Anthony Tufano

Anthony TUFANO

Dennis A. Oddsen

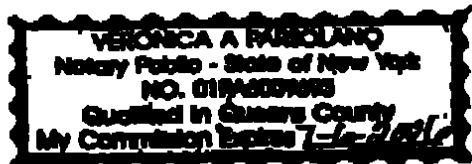
Dennis A. ODDSEN

STATE OF NEW YORK)
)ss.:
COUNTY OF QUEENS)

On this 10 day of AUGUST, 2004 before me personally appeared Paul ENDRES, Stephen R. KUREK, Anthony TUFANO and Dennis A. ODDSEN to me personally known, and who signed the foregoing instrument in my presence, and duly acknowledged the same to be their free act and deed.

Veronica A. Pansolano

Notary Public



231 ~~152~~

(Convención de La Haya del 5 de octubre de 1961)

- Este documento público**

- ## Certificado

5. en Washington D.C.
6. el veintiuno de marzo de 2006
7. por el Funcionario de autenticación asistente, Departamento de Estado de Estados Unidos
8. No. 06015158-7
9. Sello/timbre
10. Firma

(Firma)

Sonya N. Johnson

42 108
232

**LOS ESTADOS UNIDOS DE AMÉRICA
A TODO AQUEL QUE PUEDA LLEGARLE LA PRESENTE:**

**DEPARTAMENTO DE COMERCIO DE ESTADOS UNIDOS
Oficina de Marcas y Patentes de Estados Unidos**

Marzo 16 de 2006

**ESTE ES PARA CERTIFICAR QUE EL ANEXO ES UNA COPIA
VERDADERA DE LOS ARCHIVOS DE ESTA OFICINA DE UN
DOCUMENTO ARCHIVADO EL Agosto 11 de 2004.**

**Por autoridad del
Subsecretario de Comercio para la Propiedad Intelectual
y Director de la Oficina de Marcas y Patente de Estados Unidos**

**E. BORNETT
Funcionario que Certifica**



233

HOJA DE PORTADA DEL FORMULARIO DE REGISTRO SOLAMENTE PATENTES		Departamento de Comercio Oficina de Marcas y Patentes Expediente de abogado No. PR2027		
Comisionado Asistente para patentes: Por favor archive los documentos originales anexos o copias de los mismos				
1. Nombre de la(s) parte(s) cedente(s): Paul Eudres Stephen R. Kurek Anthony Tufano Dennis Oddean Fecha(s) de ejecución: <u>08/10/2004</u> (Se anota(n) nombre(s) adicional(es) de parte(s) cedente(s)? ☐ Si ☒ No)	2. Nombre y dirección de la(s) parte(s) receptora(s) Nombre: <u>Leviton Manufacturing Co., Inc.</u> Dirección interna: _____ Dirección: <u>59-25 Little Neck Parkway</u> Ciudad: _____ <u>Little Neck</u> Estado: _____ <u>NY</u> País: <u>EE.UU.</u> ZIP: <u>11362</u> ¿Se anota Nombre(s) y dirección(es) adicional(es)? ☐ Si ☒ No			
3. Naturaleza del traspaso: ☒ Cesión ☐ Fusión ☐ Acuerdo de Seguridad ☐ Cambio de nombre ☐ Cesión de interés del gobierno ☐ Orden ejecutiva 9424, licencia confirmatoria ☐ Otro: _____	4. Numero(s) de solicitud o número(s) de patente: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> A. Solicitud de patente No(s). <u>10/858,303</u> </td> <td style="width: 50%; border: none; vertical-align: top;"> B. Patente No(s). _____ </td> </tr> </table> ¿Se anota número(s) adicionales? ☐ Si ☒ No		A. Solicitud de patente No(s). <u>10/858,303</u>	B. Patente No(s). _____
A. Solicitud de patente No(s). <u>10/858,303</u>	B. Patente No(s). _____			
5. Nombre y dirección de la parte a quien se le debe enviar la correspondencia: Nombre: <u>Paul J. Sutton</u> Lic. _____ Dirección interna: _____ Dirección: <u>885 Third Avenue</u> Ciudad: <u>New York</u> Estado: <u>New York</u> ZIP: <u>10022</u> Número telefónico: <u>212.801.2108</u> Número de fax: <u>212.688.2449</u> Dirección de correo electrónico: _____	6. Numero total de solicitudes y patentes involucradas: 1 7. Tarifa total (37 C.F.R. 3.41): <u>\$40.00</u> ☐ Autorizado para cargarlo a tarjeta de crédito ☒ Autorizado para cobrarlo a cuenta de depósito ☐ Adjunto ☐ No se requiere (el interés del gobierno no afecta el título) 8. Información de pago a. Tarjeta de crédito últimos 4 números _____ fecha de vencimiento _____ b. Número de cuenta de depósito <u>12-1158</u> Nombre de usuario autorizado: <u>Paul J. Sutton</u>			
9. Firma: _____ <u>Agosto 11 de 2004</u> (Firma) Fecha <u>Paul J. Sutton</u> Nombre de la persona que firma Número total de páginas incluyendo la hoja de portada, anexos y documentos: 5				

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PATENTE
ROLLO: 015022 CUADRO 0426

23A
25/ 135

Expediente No. 0267-001-2030CIP

CESIÓN

CONSIDERANDO QUE, NOSOTROS, Paul ENDRES de 4 Clearwater Drive, Plainview, New York 11803; Stephen R. KUREK de 66-32 Alderton Street, Rego Park, New York 11374; Anthony TUFANO de 9 Carol Court, North Massapequa, New York 11785 y Dennis ODDSEN de 54 Peterborough Drive, Eatons neck, New York 11768, ciudadanos de Estados Unidos de América, en adelante denominados "Cedentes", hemos hecho ciertas invenciones identificadas y descritas en el Anexo A /en adelante las "Invenciones"); y

CONSIDERANDO QUE, LEVITON MANUFACTURING CO., INC., una corporación de Delaware, con oficinas en 59-25 Little Neck parkway, Little Neck, NY 11362, en adelante denominado "Cesionario", esta deseosa de asegurar un cien por ciento (100%) sin dividir de la totalidad del derecho, título e interés en y para dichas invenciones y solicitudes de patente, cuando sean concedidas, y en y para cualquier división, continuación, continuación parcial, mejora, reemisión o extensión que puedan hacerse o concederse sobre cualquiera de ellas;

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PARA EL MISMO QUE SEA TENIDO hasta el fin del término o términos para los cuales se concedan dichas patentes, tan total y completamente como serían tenidos los mismos si no se hubiera hecho esta cesión.

PATENTE
ROLLO: 015022 CUADRO 0427

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Por consideración con lo antes dicho, por la presente acordamos y aceptamos para y con dicho Cesionario, sus sucesores y cesionarios que cuando sea que su abogado o representante, o el abogado o representante de sus sucesores o cesionarios, aconsejen que se deban ejecutar documentos de cesión formales o una corrección a, o una división de, o cualquier otro procedimiento o acción en conexión con dicha solicitud o invenciones, incluyendo procesos de interferencia, sea legal y deseable, o que una continuación o reemisión, continuación parcial o extensión de dichas patentes sea legal o deseable, firmaremos todos los documentos y dibujos, tomaremos todos los juramentos y declaraciones juradas por escrito, y realizaremos todos los actos necesarios o que requieran para la reemisión o continuación, continuación parcial o extensión de las mismas, y haremos todos los actos necesarios o requeridos para asegurarle a dicho cesionario, sus sucesores o cesionarios, el título para y beneficio completo de todos los derechos cedidos sin cargo adicional a dicho Cesionario o sus sucesores o cesionarios, pero a costas suya o suyas.

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Por consideración con lo antes dicho, hemos vendido, cedido, transferido y traspasado y por la presente vendemos, cedemos, transferimos y traspasamos a dicho Cesionario, sus sucesores o cesionarios, o los designados de cualquiera de ellos, un cien por ciento (100%) no dividido de la totalidad del derecho, título e interés en y para cualquier cualquiera y todas las patentes para dichas invenciones las cuales puedan ser concedidas en países extranjeros a Estados Unidos, y en y para cualquier solicitud de patente que pueda ser presentada para dichas invenciones en países extranjeros a Estados Unidos, y en y para las invenciones descritas en dichas solicitudes; y por la presente autorizamos y damos poder a dicho Cesionario y sus sucesores, cesionarios o designados, a solicitar patentes u otras formas de protección sobre dichas invenciones a su nombre o a nombre de sus sucesores, cesionarios o designados, en cualquiera o todos los países donde pueda ser deseable presentar tales solicitudes, y donde puedan presentarse dichas solicitudes por alguien diferente al inventor; y por la presente acordamos y aceptamos ceder todos los documentos y dibujos, tomar todos los juramentos apropiados, ejecutar todas la declaraciones juradas por escrito apropiadas, y

PATENTE
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(Firma)
Paul ENDRES

(Firma)
Stephen R. KUREK

(Firma)
Anthony TUFANO

(Firma)
Dennis ODDSEN

ESTADO DE NEW YORK)
) ss.:
CONDADO DE QUEENS)

En este 10 de agosto de 2004, ante mi personalmente aparecieron Paul ENDRES, Stephen R. KUREK, Anthony TUFANO, y Dennis ODDSEN, a quienes conozco personalmente, y quien firmo el instrumento anterior, y quienes firmaron el instrumento anterior en mi presencia, y reconocieron debidamente que el mismo es su acto y acción libre.

(Firma)
Notario Público

Hay un sello que dice:
VERONICA A PARSOLANO
Notario Público – Estado de New York
NO. 01PA6009693
Calificado en el Condado de Queens
Mi comisión expira 7-6-2006

REGISTRADO: 08/11/2004

PATENTE
ROLLO: 015022 CUADRO 0429

PA 1440661



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THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

March 20, 2006

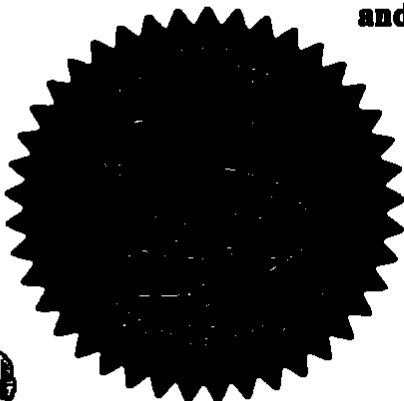
THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE UNDER 35 USC 111.

APPLICATION NUMBER: 10/627,224

FILING DATE: July 25, 2003

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US10/627,224

**By Authority of the
Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office**



M. Tarver

**M. TARVER
Certifying Officer**

238 100

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)*(Only for new nonprovisional applications under 37 CFR 1.53(b))*Docket No.
0267-001-2030Total Pages in this Submission
42**TO THE COMMISSIONER FOR PATENTS**Mail Stop Patent Application
P.O. Box 1450
Alexandria, VA 22313-1450

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

ROBUST ROCKER SWITCH MECHANISM

and invented by:

Paul ENDRES; Stephen R. KUREK; Anthony TUFANO; Dennis ODDSENIf a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 30 pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☐ Cross References to Related Applications (if applicable)
 - c. ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
 - d. ☐ Reference to Sequence Listing, a Table, or a Computer Program Listing Appendix
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings (if filed)
 - h. ☒ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☒ Abstract of the Disclosure

189/189

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
0267-001-2030

239

Total Pages in this Submission
42

Application Elements (Continued)

3. ☒ Drawing(s) (when necessary as prescribed by 35 USC 113)
- a. ☒ Formal Number of Sheets 19
- b. ☐ Informal Number of Sheets _____
4. ☒ Oath or Declaration
- a. ☒ Newly executed (original or copy) ☐ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional application only)
- c. ☒ With Power of Attorney ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference (usable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ CD ROM or CD-R in duplicate, large table or Computer Program (Appendix)
7. ☐ Application Data Sheet (See 37 CFR 1.76)
8. ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all must be included)
- a. ☐ Computer Readable Form (CRF)
- b. ☐ Specification Sequence Listing on:
- I. ☐ CD-ROM or CD-R (2 copies); or
- II. ☐ Paper
- c. ☐ Statement(s) Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

9. ☒ Assignment Papers (cover sheet & document(s))
10. ☐ 37 CFR 3.73(B) Statement (when there is an assignee)
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations
13. ☐ Preliminary Amendment
14. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☒ Certificate of Mailing
- ☐ First Class ☒ Express Mail (Specify Label No.): EL 729381494 US

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

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Docket No.
0267-001-2030

206

Total Pages in this Submission
42

Acc mpanying Application Parts (C ntinued)

17. ☐ Additional Enclosures (please identify below):

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

18. ☐ Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
0267-001-2030

241

Total Pages in this Submission
42

Fee Calculation and Transmittal

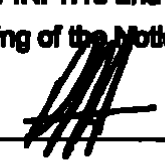
CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	25	- 20 =	5	x \$18.00	\$90.00
Indep. Claims	3	- 3 =	0	x \$84.00	\$0.00
Multiple Dependent Claims (check if applicable) ☐					\$0.00
BASIC FEE					\$750.00
OTHER FEE (specify purpose) _____					\$0.00
TOTAL FILING FEE					\$840.00

- ☐ A check in the amount of _____ to cover the filing fee is enclosed.
- ☒ The Director is hereby authorized to charge and credit Deposit Account No. 12-1185 as described below.
- ☒ Charge the amount of \$840.00 as filing fee.
- ☒ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Dated: July 23, 2003

cc:



Signature
Paul J. Sutton, Esq.
Reg. N. 24,201
GREENBERG TRAURIG, LLP
885 Third Avenue
New York, NY 10022
Tel. No. 212.801.2108

ROBUST ROCKER SWITCH MECHANISM

BACKGROUND OF THE INVENTION

Field of the Invention

5 The present invention relates generally to the field of electrical wiring devices such as, by way of example only, electrical switches and receptacles of the type installed in building walls, and more specifically to a robust electrical wiring device system whose components may be modular and interchangeable and which provide a substantially unified blended appearance when combined with one another. The present patent specification describes such a robust system and, 10 in whole or in part, is common in part to several patent applications whose claims vary and/or are directed to portions and/or components of the robust system.

Description of the Related Art

15 When modifying the wiring in an existing building, whether public, commercial or residential by adding a wiring device such as a switch, a receptacle or a combination of a receptacle and a switch, it is necessary to cut a hole in a wall of the building, install a box within the hole, attach the box to a vertical stud, for example, and install the wiring device(s) into the box. In new construction, the box is attached to a stud of an open wall and, thereafter, the wall, which may be sheet rock having an opening for access to the box, is placed over the studs. The conventional wall box has pairs of mounting ears for mounting the wiring devices to the box. 20 After the wiring devices are connected to the various conductors they will service, each is fastened with threaded fasteners (sometimes referred to as bolts or screws, and these terms are used interchangeably herein) to a pair of ears on the box. The process of connecting a wiring device to various conductors and then attaching the wiring device with the attached wires to the box is done for each wiring device located within the box. Thereafter, a wall plate is typically 25 positioned around or over each of the wiring devices in the box.

 Typical installations can include a single wiring device or multiple wiring devices positioned side by side in a common box. In installations where there are multiple wiring devices in a common box, the installation of the wall plate can be time consuming. This is so

198
243

because a wall plate for use with multiple wiring devices has a separate window opening for each wiring device. Thus, the wiring devices must be aligned with each other, must be positioned parallel to each other and must be spaced from each other by a distance that is dictated by the spacing between the openings or windows in the wall plate. Misalignment and positioning problems are often caused by wall boxes that are skewed relative to the wall or by walls which may not be flat. It is only after all of the wiring devices are accurately positioned relative to each other that a wall plate can be installed around the wiring devices.

A common type of electrical wiring device in use today is the rocker type Decora-branded electrical switch whose activating member pivots about a centrally located horizontal axis. The trademark Decora is owned by the assignee of the present invention. To operate, the rocker switch actuating member is pushed in at the top to supply electricity to a load such as a light, and is pushed in at the bottom to disconnect the source of electricity from the load. Thus, with two or more rocker type of switches positioned side by side in a box, the actuating members of the switches can be in opposite positions at any one time. For example, with two rocker type switches positioned side-by-side in a box, what will be called the top edge associated with the "on state or position" of the actuating member of one switch will be flush with the top surface of the wall plate when in its on position while, at the same time, the top edge of the adjacent switch will be flush with the bottom surface defining the opening of the wall plate when in its off position. This in-out positioning of adjacent switches can also occur when both switches are in their on or off state if one or each of the switches is a 3-way or 4-way switch. The irregular in-out positioning of adjacent switches, particularly with 3-way and 4-way switches, can create operational uncertainty in the mind of the user as to which switch is in the on position and which switch is in the off position when subsequent activation or deactivation of less than all of the rocker switches is required by a user.

Thus, what is needed is a rocker type of switch that is always in the same position i.e., bottom edge out, top edge in, regardless of its state of conduction, i.e., on or off. What is also needed is a switch which, when positioned side by side with another or other switches in a common box, that the switches are always aligned with each other regardless of whether they are in their on state or off state.

SUMMARY OF THE INVENTION

There is disclosed a robust on-off switch operated by pushing on the lower portion of a rocker paddle to turn the switch on or off. The lower edge of the rocker paddle pivots in and out about its top or upper edge. Bias means urges the lower portion of the rocker paddle to always be in its out position whether the switch is in the "on" state or position or the "off" state or position. The rocker paddle of the switch is not located within a frame and has, along its vertical axis, a contour of positive first differential and zero second differential, comprised of a combination of splines which extend between points of varying distances from a datum plane. The contour has zero second differential when the rate of height increase of individual splines is constant.

An actuator coupled to the rocker paddle (the face) of the switch causes a cam to rotate in a clockwise direction and in a counter clockwise direction as the rocker paddle is alternately depressed.

The rocker paddle pivots about its top edge and repeated pressing on the lower portion of the rocker paddle, the face plate, causes the actuator to alternately rotate the cam in a clockwise direction and in a counter-clockwise direction. Alternate rotation of the cam drives a slider member having a triangular shaped position determining cam follower along a first and a second opposite direction along a common linear axis. A cam shaped leaf spring cooperates with the triangular shaped cam follower to aid in the movement of the slider and determines its at rest position. An indicator such as a light can be used to indicate the state of conduction of the switch.

The foregoing has outlined, rather broadly, a preferred blending feature, for example, of the present invention so that those skilled in the art may better understand the detailed description of the invention that follows. Additional features of the invention will be described hereinafter that form the subject of the claims of the invention. Those skilled in the art should appreciate that they can readily use the disclosed conception and specific embodiment as a basis for designing or modifying other structures for carrying out the same purposes of the present invention and that such other structures do not depart from the spirit and scope of the invention in its broadest form.

BRIEF DESCRIPTION OF THE DRAWINGS

Other aspects, features, and advantages of the present invention will become more fully apparent from the following detailed description, the appended claim, and the accompanying drawings in which similar elements are given similar reference numerals.

5 Fig 1 is a front perspective view of a wall plate installed around a rocker switch of a prior art device;

Fig. 2 is an exploded view of the switch, attachment plate and wall plate of the prior art device of Fig. 1;

10 Fig. 3 is a front perspective view of a rocker paddle switch in accordance with the principles of the instant invention installed within a wall plate;

Fig. 4 is an exploded view of the rocker paddle switch, alignment plate and wall plate;

Fig. 5 is a front perspective view of the alignment plate for a single wiring device;

15 Fig. 6 is a front perspective view of the rocker paddle switch of Fig. 3 and an exploded view of a multi-function clip attached to each end of the ground strap of the rocker paddle switch;

Fig. 7 is a front perspective view of the wall plate;

Figs. 8A-8D are sectional views along the lines 8A-8A to 8D-8D of Fig. 7.

Fig. 9 is a view along the line 9-9 of Fig. 7;

20 Fig. 10 is a side sectional view of the wall plate of Fig. 7 being held in place by the latching pawls of multi-function clips;

Fig. 11 is a fragmentary enlarged side elevation of the latching pawl of the multi-function clip engaging the saw-tooth rack of the wall plate;

Fig. 12 is a fragmentary, enlarged side elevation in section of the wall plate and tab of the alignment plate to indicate how the two components can be separated following latching;

25 Fig. 13 is a bottom perspective view of the rocker paddle switch;

Fig. 14 is an exploded view of a single pole rocker paddle switch;

Fig. 15 is a perspective of the single pole rocker paddle switch base assembly;

Fig. 16 is an exploded view of the single pole rocker paddle switch base assembly;

Fig. 17 is another exploded view of the single pole rocker paddle switch;

Fig. 18 is still another exploded view of the single pole rocker paddle switch;

Fig. 19 is a view along the line 19-19 of Fig. 3;

Fig. 20 is an exploded view of a box, alignment plate and wall plate for two wiring devices;

Fig. 21 is an exploded view of an alignment plate and wall plate for three wiring devices; and,

Fig. 22 is an exploded view of an alignment plate and wall plate for four wiring devices.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to Fig. 1, there is illustrated a front perspective view of a Decora electrical wall-type switch 18, a wall plate 16, as part of an assembly 10 of the prior art. Referring to Fig. 2, there is shown an exploded view of wall box 13, switch 18, attachment plate 30 and wall plate 16 of the prior art device of Fig. 1. A suitable aperture is cut into a wall to provide access for the box 13 mounted to a stud 15, or to permit installation of a suitable box to an adjacent stud or directly to the material of the wall (such as plasterboard). The box 13 is chosen to be large enough to accept as many wiring devices as are needed to be mounted therein. The box 13 is made of metal or plastic, depending upon local Code requirements and has one or more openings in its sides or back to permit the introduction of electrical wiring or cables into the interior of the box 13. Box 13 has mounting means 19 to permit the box to be anchored to the adjacent stud 15. The box supports a pair of mounting ears 21 for each wiring device that is to be mounted within the box. Each mounting ear contains a threaded aperture 23 to which can be fastened the threaded mounting bolts (sometimes referred to as screws) of the wiring device such as, for example, rocker switch 18 or a receptacle. In the normal order of assembly, electrical cables are passed through knock out openings 17, for example, to the interior of the box. The ends of the electrical cables are stripped of insulation and attached to terminals (contacts) on the side or rear

197
247

of the body 20 of the switch 18 or a receptacle. After the electrical cables are attached to terminals on the side or rear of the body of the switch, the switch is pushed into the box and held in position by screws (not shown) that are passed through clearance openings such as elongated mounting slots 25 and threaded into openings 23 of ears 21 so as to mount switch 18 within and to the box 13. Thereafter, attachment plate 30 is positioned around the front of the switch and secured to the switch with mounting screws 26 which pass through clearance openings 32 in the attachment plate and are threaded into openings 24 formed in the mounting/ground strap of the wiring device. Attachment plate 30 also contains a main aperture 34 of a shape complimentary with the profile of the front of the switch 18 which extends through it. The aperture 34 in Fig. 2 is rectangular to accept the front of the switch 18. The head of the screw which passes through aperture 25 of switch 18 and engages threaded opening 23 of mounting ears 21 is larger than the aperture 25 and, therefore, holds switch 18 captive to the box 13 and to the wall surface (not shown). In a similar manner, the head of the screw which passes through aperture 32 of the attachment plate 30 and engages threaded opening 24 of the ground strap of the switch is larger than the aperture 32 and, therefore, holds attachment plate 30 captive to the switch 18.

At each of the ends 36, 38 respectively, of attachment plate 30 are two latching pawls 40, 42. Pawls or edges 40 and 42 are formed as extensions of attachment plate 30 but are thinner in cross-section. Each end 36, 38 also terminates in an angled leg 48 which extends at about a 45 degree angle with respect to the horizontal edge of ends 36, 38 of wall plate 30.

Wall plate 16 is proportioned to fit around attachment plate 30 and over the front of the box 13 into which the single wiring device, rocker switch 18, is placed and to which it is fastened.

To attach wall plate 16 to attachment plate 30, pawls 40, 42 of attachment plate 30 are made to engage saw-tooth shaped racks 80 on the inner surfaces of end walls 70 and 72 of wall plate 16 as the wall plate is pushed in.

Fig. 3 is a front perspective view of a wiring device such as a rocker paddle switch 110 and wall plate 138 in accordance with the principles of the present invention. The switch can include a small window 111 behind which is located a light source to indicate the state of operation of the switch. Thus, the presence of light can indicate that the switch is "off", and the absence of light can indicate that the switch is "on". The switch is actuated, i.e., turned off and

on, by pressing in on the lower end 112 of the face of the rocker paddle. Release of finger pressure on the paddle allows the paddle to return to its at rest "out" position. Repeated pressing and releasing of finger pressure on the lower end of the paddle alternately turns the switch "on" and "off". A slot 74 located in the bottom end of the wall plate 138 is provided to facilitate removal of the wall plate. Fig. 4 is an exploded view of the embodiment of the present invention illustrated in Fig. 3. Fig. 4 illustrates an alignment plate 114 (more fully disclosed in Fig. 5, and the description that relates thereto) having alignment pins 118 positioned to engage what is described in this specification as a multi-function clip 130 (more fully disclosed in Fig. 6 and the description that relates thereto) located on the ends 122 of the ground strap 123 of rocker paddle switch 110. The ground strap 123 can be of sheet metal and provides a cradle like support for holding the switch in a wall box. As shown in Fig. 2, (but not in Fig. 4) a box large enough to accept as many wiring devices as are needed is mounted in a wall. The box is made of metal or plastic, has one or more openings in its side or back to permit the introduction of cables into the interior of the box and has mounting means to permit the box to be anchored to an adjacent stud. Electrical cables are passed through knock out openings to the interior of the box and the ends of the electrical cables are stripped of insulation in preparation for attaching the cables to the switch. The box supports pairs of mounting ears. Each mounting ear contains a threaded aperture to receive a mounting screw of a wiring device such as, for example, rocker paddle switch 110. After the wires in the box are attached to terminals on the switch, the switch is attached to alignment plate 114 by multi-function clips 130 which engage alignment pins 118 on the alignment plate 114, and the switch and alignment plate are then coupled to the box and wall surface by means of screws 108. Thereafter, wall plate 138 is placed around the switch, the alignment plate 114 and the box assembly and held in place by outwardly extending edges 140 or pawls at the ends of the multi-function clips which, in turn, engage saw tooth racks on the wall plate 138 as described in detail below.

The rocker paddle switch 110 of the present invention can be implemented in a number of preferred embodiments, including single-pole, single-throw; single-pole, double-throw; double-pole, single-throw; and double-pole, double throw for 3 wire or 4 wire circuit arrangements.

Referring to Fig. 5, there is shown a perspective view of the alignment plate 114 of Fig. 4. Alignment plate 114, which can be composed of metal such as cold rolled steel or the like, is

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formed with a centrally located opening 116 sized to accept the body of a wiring device such as switch 110 or a receptacle. Centrally located at opposite ends of the opening 116 and contiguous with the opening 116 are two clearance openings 117 which provide clearance for mounting screws 108 used to secure the switch 110 or a receptacle and alignment plate 114 to box 13.

- 5 Located beyond the outer edge of each clearance opening 117 is an alignment pin 118. The alignment pins are used to engage openings (134 of Fig. 6) in multi-function clips 130 attached to the ends 122 of the ground strap 123 of the rocker paddle switch or a receptacle. Alignment plate 114 supports a tab 120 that projects outward from an end 119 (typically the lower end when on a wall) and is used to facilitate removal of a wall plate from around the face of a switch or
- 10 receptacle. The outside dimensions of the alignment plate are such that it can extend beyond at least one dimension of the box in which the switch is installed and has length and width dimensions which are less than the wall plate to which it is attached. The alignment plate illustrated in Fig. 5 is formed or configured for a single wiring device.

- The alignment plate 114 helps to overcome difficulties encountered with respect to
- 15 mounting and positioning wiring devices such as multiple switches, a switch and a receptacle, or multiple receptacles to a box prior to attaching a wall plate. Some of the difficulties encountered are positioning the wiring devices to be in alignment with each other, positioning the wiring devices to be parallel to each other, adjusting the spacing between the devices to be equal and uniform and positioning all of the devices to be flat against the wall. These deficiencies are
- 20 overcome by the alignment plate 114 which has a single opening 116 with no separating members, is sized to receive one or more wiring devices, has a pair of alignment pins 118 for receiving, holding and accurately positioning each wiring device, contains clearance openings 117 aligned with each set of alignment pins 118 for receiving mounting screws and supports at least one tab 120 which can be used when it is desired to remove the wall plate from the wiring
- 25 device. Each set of alignment pins on the alignment plate is located on a vertical axis which substantially defines the center for a wiring device and each wiring device has a multi-function clip 130 at each end of the ground strap 123 for frictionally receiving and holding captive an alignment pin 118. The alignment pins 118 accurately position, align and locate all of the wiring devices relative to each other. The alignment plate is attached to the wiring device and the
- 30 assemblage is attached to a wall box by means of mounting screws. Thereafter during the installation process, a wall plate 138 is positioned around the wiring devices without requiring

further adjustments, and the wall plate is attached by simply pressing the wall plate in toward the wall.

Referring to Fig. 6, there is illustrated an electrical wall-type rocker paddle switch 110 around which the wall plate 138 can be positioned. The switch 110 has a rocker paddle 112 that pivots about an axis at its upper end and is biased by a spring member located beneath the paddle to assume the same at-rest out position when either in its on position or off position. Repeated pressing and releasing on the face of the switch rocker paddle 112 alternately closes and opens a set of contacts within the switch to alternately connect and disconnect a load such as a light from a source of electricity each time the paddle is pressed and released. Thus, regardless of whether adjacent switches are on-off switches, 3-way switches or 4-way switches, the top and bottom edges of all of the switches will always be aligned with each other. An on-off indicator such as a light 111, or a flag, mechanical protrusion of the like can be provided to indicate to a user when the switch is in its on position or off position. The rocker paddle of the switch is frameless, it is not located within a frame, and has a face surface which follows or blends with the contour and shape of the wall plate, thereby presenting a substantially unified and aesthetically pleasing appearance. However, because there is no frame, care must be exercised to ensure that the sides of the rocker paddle do not touch, bind or interfere with the wall plate. The rocker paddle of the switch has a length-width ratio dimension that is proportioned to provide a finger contact surface of increased area to allow a user to more easily and quickly identify and operate a specific switch.

Switch 110 (Fig. 6) contains a mounting/ground strap 123 having ends 122 which provide support for multi-function clips 130 by means of fasteners 121 such as screws, rivets, spot welds or the like. Each end 122 can be rectangular in shape and supports two openings 126 and 128. Opening 126 can be oval, square or rectangular in shape and is a clearance opening for mounting screws 108 which may be provided by the manufacturer of the wiring device for attaching the wiring device to the box. The distance between centers of openings 126 of ends 122 on the ground strap 123 is substantially equal to the distance between the centers of openings 23 in ears 21 of box 13 (see Fig. 2) to allow mounting screws 108 in openings 126 to engage and be held captive by the threaded openings 23. It is to be noted that clearance openings 117 in alignment plate 114 (see Fig. 5) are clearance openings for mounting screws 108. Openings 128 in the lugs 122 are clearance openings for alignment pins 118 of alignment plate 114.

251

Continuing with Fig. 6, multi-function clips 130 can be composed of, for example, phosphor bronze, spring brass, spring steel or the like and are securely attached to the ends 122 of the ground strap 123 of switch 110. Each clip 130 contains a first opening 132 which is aligned during assembly with opening 126 in strap end 122 and a second opening 134 which is aligned during assembly with opening 128 in the strap end. Opening 132 can be oval or rectangular in shape to allow a mounting screw to be positioned off-center. A substantially centrally aligned projection 136 bent at a slight downward angle toward the body of the switch is provided to engage and hold captive the threaded body of mounting screw 108. Engagement of projection 136 with the mounting screw 108 additionally provides a good electrical connection between the ground strap 123 of the switch 110, the mounting screw and the box to insure that the switch is electrically connected to ground. The screw which passes through openings 132 and 126 of the switch and opening 117 of the alignment plate 114, threads into opening 23 in the box to hold the switch and alignment plate to the box. The openings 132 and 126 are sized to allow the screw to be moved laterally to compensate for slight misalignments that may occur. Opening 134 in multi-function clip 130 is substantially circular and supports three inwardly projecting members 133 bent outward at a slight angle away from the switch body. The ends of the three projecting members 133 form an opening slightly smaller than the outer diameter of alignment pins 118 on alignment plate 114 and are designed to resiliently flex slightly as the alignment pin is inserted into and through opening 134 from the rear. The ends of projecting members 133 frictionally engage and hold captive alignment pins 118 to prevent the easy removal of the alignment pins from the multi-function clips. Located at the end of clip 130 are two tabs 140 which function to engage and hold a wall plate. The end of each tab 140 has a double bend similar to a zero to 360 degree sine wave curve which engage saw tooth racks 80 on the inside ends of the wall plate to hold the wall plate captive (See Figs. 10 and 11, and the description which relates thereto). It should be clear by now and from the further description below that multi-function clip 130 is just that, a device which substantially simultaneously serves a plurality of functions in a manner unknown to the prior art.

The multi-function clip overcomes the difficulties encountered with respect to mounting one or more electrical wiring devices to a common box and then accurately positioning the wiring devices relative to each other prior to attaching a wall plate. Some of the difficulties encountered when attaching a wall plate around wiring devices are, by way of example:

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positioning the wiring devices to be in alignment with each other, locating the wiring devices to be parallel to each other, adjusting the spacing between the different wiring devices to be equal, uniform and non-interfering, and fixing all of the wiring devices to be flat against the wall. Each wiring device according to the present invention has at an end of the ground strap 123 a multi-function clip 130 that has locating openings 134 for engaging alignment pins 118 on the alignment plate 114. The pins 118 on the alignment plate, when engaged by the close clearance locating openings in the multi-function clips, accurately positions the wiring devices relative to each other to allow a wall plate to be attached around the wiring devices without any initial or subsequent adjustment being needed. Each set or pair of alignment pins 118 on the alignment plate are located on a substantially vertical axis which accurately defines the center of the wiring device, although other alignments can also be provided. The openings 134 in a pair of multi-function clips receive and hold captive a pair of cooperating alignment pins 118. The multi-function clips, in cooperative combination with the alignment pins, serve to accurately position and align all of the wiring devices mounted on the attachment plate. After the wiring device(s) are attached to the alignment plate, the attachment plate and attached wiring devices are attached to a wall box by means of mounting screws which pass through openings 132 of the multi-function clips and opening 117 of attachment plate 114 to provide a substantially flat rigid support for the wiring devices.

During assembly, the electrical cables in the box are stripped of insulation and are attached to terminals on the side or back of the switch. After the wires are attached to the switch, the alignment plate is held vertically in front of the switch and parallel to the switch. The top of the switch is now rotated what will be called downward from its vertical position, until it is horizontal and, while in its horizontal position, the end of the switch that was initially up is passed through opening 116 of the alignment plate which is in its vertical position. After the switch is passed completely through the opening of the alignment plate, the switch is rotated back to its initial vertical position. At this time the alignment plate is positioned around the electrical wires and is located behind the switch. The distance between the alignment plate and the switch is now reduced until the front face of the alignment plate contacts the back face of the ends of the ground strap. As the alignment plate is moved toward the wiring devices, or vice versa, the alignment pins 118 of the alignment plate enter openings 128 in the strap 123 and openings 134 in multi-function clips 130. As the alignment pins enter openings 134, they force

the upwardly bent projections 133 to resiliently move and spread apart to allow the alignment pins 118 to fully enter openings 134. The ends of the upwardly bent projections 133 engage and hold captive the alignment pins 118. The switch which is now attached to the alignment plate and is connected to the electrical wires, is inserted into the box. As the switch is being inserted into the box, screws 108 located in openings 132 in the multi-function clips and clearance openings 117 in alignment plate 114 are aligned with and threaded into openings 23 of the box to hold both the alignment plate and switch to the box and wall surface. The head of the screw which passes through opening 126 of the end of the mounting strap of the switch and opening 132 in the clip is larger than either opening and, therefore, holds switch 110 and alignment plate 114.

The wall plate is now placed over the installed switch. It is to be noted (see Figs. 3, 4 and 6) that the rocker paddle 112 of the switch 110 is not located within a frame. Thus, the switch must be accurately positioned to insure that the rocker paddle is free to move in and out without contacting or interfering with an adjacently positioned wiring device or the wall plate. Each multi-function clip 130 contains at least two projecting latching pawls 140. See Fig. 6. Each latching pawl has a double curve similar to a three hundred sixty degree sine wave-type curve. After the switch is attached to the alignment plate, the two latching pawls 140 of a multi-function clip will be located on either side of tab 120 of the alignment plate. Tab 120 functions as a tool pivot point to allow the wall plate 138 to be removed from around the switch. A slot 74 in the lower edge of the wall plate 138 provides access for the insertion of a small flat tool such as a screw driver to facilitate removal of the wall plate from the switch.

Wall plate 138 is proportioned to fit over alignment plate 114 as well as the box within which the switch 110 is located. The wall plate 138 is located around the switch and held in position by pawls 140 which engage saw tooth shaped teeth on an inside edge of the wall plate.

Referring to Figs. 7-12, for a single wiring device, the width of the face of the rocker paddle switch, is approximately 55% of the width of the wall plate along the horizontal axis and approximately 56% of the length of the wall plate along the vertical axis. The face of the switch has a vertical axis along its length and a horizontal axis along its width where the face of the rocker paddle along its vertical axis has a contour of positive first differential comprised of a combination of splines drawn between points of varying distances from a datum plane and zero

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second differential when the rate of height increase of the individual splines is constant. The horizontal axis has a surface with a contour of a positive first differential and negative second differential comprised of a combination of splines drawn between points of varying distance from a datum plane. For a single wiring device, the wall plate is substantially more or less 4.92 inches in length by 3.28 inches in width and has a single opening 100 with no dividing members encircling a wiring device, such as a rocker paddle switch that is substantially more or less 2.82 inches in length by 1.83 inches in width. The width of the wall plate varies depending upon how many boxes are ganged together and the number of wiring devices that are to be located in side-by-side relationship. The front surface of the wall plate here disclosed has a complex or compound contoured shape such that the face surface at the opening for the wiring device is further from the wall than it is at the outer edge of the wall plate. More specifically, referring to Fig. 8B, there is illustrated a view along the line 8B-8B of Fig. 7 of a portion of the front surface, along the horizontal centerline, between point K, the outer left edge, and point L, the inner edge of the opening for the wiring device. As illustrated in Fig. 8B, the surface lies between two profile boundaries 0.002 inches apart, perpendicular to datum plane A, equally disposed about the true profile and positioned with respect to a datum plane. The basic dimensions and the profile tolerance establish a tolerance zone to control the shape and size of the surface. The surface is more or less 0.726 inches in length. Within that length, a contour is defined by the dimensions of equidistant points which are 0.0726 inches apart. Each dimension indicates that point's distance to datum plane A, the back (flat) surface of the wall plate, which begins at point K. Moving from left to right, the dimensions increase more or less from 0.228 to 0.287 inches. This progression indicates a shape or contour of increasing height, positive first differential, when the points are connected by individual splines. The points are not connected by a single arc and the rate at which the contour height increases is not constant. The rate of height increase of the individual splines decreases from left to right, and the second differential of the contour is negative. That is, the difference between the first point's distance dimension and the second is larger than the difference between the second and the third, etc. Thus, the surface has a contour of positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distance from a datum plane. This description substantially describes the wall plate's contours for sections along lines 8A-8A, 8C-8C, and 8D-8D of Fig. 7.

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Fig. 8A is a section along the line 8A-8A of Fig. 7; Fig. 8B is a section along the line 8B-8B of Fig. 7; Fig. 8C is a section along the line 8C-8C of Fig. 7; and, Fig. 8D is a section along the line 8D-8D of Fig. 7.

The section along line 9-9, which runs along the vertical centerline of the wall plate defines a surface having a positive first differential and zero second differential, comprised of a combination of splines drawn between points of varying distance from a datum plane. This contour has zero second differential because the rate of height increase of the individual splines is constant; the difference between any two sequential point dimensions is substantially more or less 0.0037 inches.

When the wiring device used according to the system of the present invention is a switch, the front surface follows the contours, and shape of the wall plate, so that their surface contours or lack thereof blend with one another to provide a substantially unified aesthetic appearance to the viewer thereof. The wall plate has no exposed mounting screws or other visible metal hardware. When the wall plate is attached to the switch, the only visible parts are the wall plate 138 and the switch or receptacle.

Referring to Figs. 9-12, formed in the bottom end wall 70 of wall plate 138 is a slot 74 which provides access to the tab 120 as is seen in Fig. 12. A small, flat tool blade such as a screw driver blade 76, or the like, is moved through slot 74 in end wall 70 to contact both the outer surface of tab 120 and the back wall of slot 74. By moving the blade 76 using the back wall of slot 74 as a fulcrum, the force applied to tab 120 will separate wall plate 138 from the switch. To attach wall plate 138 to the switch, the pawls 140 of clips 130 are positioned to engage saw-tooth shaped racks 80 located on the inner surfaces of the end walls 70 of wall plate 138. There are two racks on each end wall 70 of the wall plate 138. Each rack 80 contains a number of saw-tooth shaped teeth 82 each having an inclined front face 84 and a vertical back face 86. As seen in Fig. 11, as latching pawl 140 engages the inclined front face 84 of a tooth, the pawl deflects and moves past the tip of the first tooth 82. Once pawl 140 is past the tip of tooth 82, it can return to its initial position and take a position between the vertical back face 86 of first tooth 82 and the inclined front face 84 of a second tooth 82. This operation can be repeated as many times as needed to position the bottom edges of wall plate 138 as close to the wall as possible. As racks 80 and pawls 140 are independently operated, it is possible to locate

the wall plate 138 to closely follow the wall contour, even when the wall is not flat. This ability to follow the wall contour is even more appreciated where the wall plate 138 is large, such as with a wall plate that is positioned around a multitude of wiring device.

Once the latching pawl 140 returns to its original position, it becomes difficult to dislodge the wall plate 16 from the pawl 140. However, as tool 76 can apply a great deal of force to tab 120, it is possible to separate the pawl 140 from engagement with the teeth and thus the wiring device from the wall plate.

Referring to Fig. 13, there is shown an isometric of the bottom of a rocker paddle switch in accordance with the principles of the invention. The switch supports a ground strap 123 of sheet metal secured to the switch with screws, rivets or any convenient fastening means 124 and supports a ground terminal screw 125 for receiving a ground wire connection. Screw terminals located on either side of the body or the switch are provided to receive phase and neutral wire conductors, not shown.

Fig. 14 is an exploded view of a single pole rocker paddle switch showing the base assembly 300 and frame assembly 400 which, when joined together form the switch housing. The rocker paddle 112 is the top portion of the switch. Referring to Fig. 15, there is shown an enlarged view of the base assembly 300. Base assembly 300 consists of shell member 302 composed of electrically insulating material having a channel 304 which extends substantially along the length of member 302 and is centrally located between the side walls 306, 308 of member 302. Channel 304 is adapted to receive a slider 320. Located at each end of channel 304 is a clearance opening 310 adapted to receive fastening means 124 (see Figs. 13, 18 and 19). The fastening means can be rivets, screws or the like and pass through and lock the ground strap 123, base assembly 300 and frame assembly 400 together to form the switch housing. Side wall 308 of the shell member supports an opening 309 for receiving a stationary terminal assembly 312 and side wall 306 supports an opening 336 for receiving brush terminal assembly 346 more fully disclosed in Fig. 16.

Stationary terminal 312 comprises a rectangular plate 313 which can be composed of brass and supports a substantially nonyielding contact bearing arm 314 having a contact 316. An inverted U shaped slot 318 located in rectangular plate 313 is sized to loosely receive terminal screw 320 and be sandwiched between terminal screw 320 and a pressure plate 323. Terminal

screw 320 threads into pressure plate 323 and, as terminal screw 320 is tightened, the head of the screw 320 and a side of the pressure plate 323 clamp the rectangular plate 313 therebetween.

Stationary terminal assembly 312 is adapted to be connected to an electrical conductor by either placing a turn of the conductor under the head of the screw or inserting a straight end of the

5 conductor between the pressure plate 323 and the rectangular plate 313 and tightening the screw 320 to lock the conductor between the plates 313 and 323. Looking at side wall 308 of shell member 302, each of the two edges 311 of opening 309 contain a narrow vertical slot or rail 315 of uneven length adapted to receive and hold the side edges of the rectangular plate 313. Thus, by sliding the rectangular plate 313 of the stationary terminal assembly 312 down into the slots
10 or rails 315 in the edges of the opening 309, the stationary terminal assembly is held in position within the opening 309 of the side wall 308 of the shell member 302.

Brush terminal assembly 346 comprises a rectangular plate 380 which can be composed of brass and supports a yieldable contact bearing arm 344 having a contact 317. An inverted U shaped slot 381 located in rectangular plate 380 is sized to loosely receive terminal screw 386
15 and be sandwiched between terminal screw 386 and a pressure plate 388. Terminal screw 386 threads into pressure plate 388 and, as terminal screw 386 is tightened, the head of the screw 386 and a side of the pressure plate 388 clamp the rectangular plate 380 therebetween. Brush terminal assembly 346 is adapted to be connected to an electrical conductor by either placing a turn of the conductor under the head of the screw or inserting a straight end of the conductor
20 between the pressure plate 388 and the rectangular plate 380 and tightening the screw 386 to lock the conductor between the plates 380 and 388. Looking at side wall 306 of shell member 302, each of the two edges 303 of opening 384 contain a narrow vertical slot or rail 317 of uneven length adapted to receive and hold the side edges of the rectangular plate 380. Thus, by sliding the rectangular plate 380 of the brush terminal assembly 346 down into the slots or rails 317 in
25 the edges of the opening 384, the brush terminal assembly is held in position within the opening 384 of the side wall 306 of the shell member 302.

The materials of the stationary terminal assembly 312 and the brush terminal assembly 346 are all conductive so that a circuit can be completed between conductor wires held in the assemblies. Preferably, these conductive components are all of substantial grade, and good
30 quality electrical materials are used so that substantial currents, for example 10 or 20 amperes, can repeatedly be carried for extended periods of time without significant heat generation,

electrical losses or excessive arcing. Such materials include silver alloys for the contacts, beryllium copper alloy for the brush arm and brass for the remaining conductive components.

Slider 320 located within channel 304 of shell member 302. Referring to Figs. 16 and 19 (wherein the left end of Fig. 16 corresponds to the right end of Fig. 19), slider 320 is sized to
5 freely slide back and forth between the side walls 319, 321 of channel 304. Slider 320 has, at one end, a substantially rectangular funnel shaped slot opening 322 which extends completely through the slider and is provided to receive a cam follower 370 of cam 366. Projecting downward from the bottom surface of slider 320 is a triangular shaped cam follower 324. Projecting upward from the top surface of the slider 320 is a hold down projection 326, and also
10 projecting upward from the top of the slider is a brush terminal control projection 327. A space 329 located between hold down projection 326 and brush terminal control projection 327 is provided to receive the spring contact arm 344 of brush terminal assembly 346 to control the back and forth motion and final position of arm 344. A bumper support member 328 projects outward from a side of the slider. Positioned around bumper support member 328 is a rubber O
15 ring 330. When the slider is located within slider receiving channel 304, O ring 330 moves back and forth between ends 332, 334 of opening 336 in side wall 321 as the slider is driven from one end of channel 304 to the other. The O ring is provided to cushion the stopping of the slider 320 by engaging ends 332, 334 of opening 336 in wall 321. Some versions of the switch, such as the single pole switch as here shown, may utilize a helper spring 338 to help offset the spring force
20 that movable spring contact arm 344 exerts on the slider when the slider is moving the spring contact arm 344 to open the switch contacts. Helper spring 333 also helps to balance the feel of the rocker paddle as the switch is operated.

In the embodiment disclosed, the movable spring contact arm 344 is spring biased to move toward the stationary terminal assembly. Therefore, more force is needed by the slider to
25 move the spring contact arm 344 out of engagement with the stationary contact than is needed to close the contacts. Helper spring 338 can be used to equalize this force. Helper spring 338 consists of two plates 337, 339 connected together at the top ends by two spring strips 341 and oriented relative to each other to form an inverted V spring member. The inverted V helper spring 338 fits in chamber 340 located at the left end of channel 304 (see Fig. 15). As slider 320
30 is moved to the left, the spring bias of spring contact arm 344 assists in this movement to close the contacts 316, 317. As the contacts close, the end 342 of slider 320 contacts and moves plate

259

339 of helper spring 338 toward plate 337. As this happens, helper spring 338 is compressed and biases slider 320 to move to the right. When the contacts of the switch are opened, slider 320 is moved to the right against the force of spring contact arm 344 and, as the slider moves to the right to open the contacts, the helper spring 338 helps the slider to move against the force of the spring contact arm 344. Thus, helper spring 338 is used to help overcome the force exerted by the spring contact arm 344 of the brush terminal 344 on the slider when the spring contact arm 34 is being moved to the right to open the switch contacts.

Wall 348 of chamber 340 contains a slot opening 350 which allows the end 342 of the slider to enter chamber 340 to engage and move plate 339 toward plate 337 of helper spring 338. Wall 348 also helps to retain the helper spring 338 within the chamber 340.

As best seen in Fig. 19, located directly beneath the slider receiving channel 304 and opening into channel 304 is spring chamber 354 which receives cam shaped leaf spring 352. Spring chamber 354 is elongated, has a rectangular cross section and is sized to receive flat cam shaped leaf spring 352. The spring chamber 354 is centrally and symmetrically disposed with regard to the center of the switch base 300 and contains spring support bars 356 at each end. Located beyond the spring support bars 356 are end pockets 365. The overall length of the chamber 354 depends upon the length of the flat cam shaped leaf spring 352.

Cam shaped leaf spring 352 is pressed to shape out of a flat resilient steel strip, preferably spring steel, and has the profile shown in Fig. 19. The forces applied to the triangular shaped cam 324 by the leaf spring 352 and the forces applied to the leaf spring by the cam 321 effects the movement and operation of the slider as is more fully explained below. Referring to flat cam shaped leaf spring 352, its profile is symmetrical about a center apex 358 from which a short cam portion 359 extends downwardly on each side of the apex 358 at an obtuse angle to each other, to a depression 360, 362 at the end of the cam portions and on each side of the apex, and then to support sections 357 on each side of the depressions. The support sections 357 are supported by bars 356 and terminate in U shaped outer end portions 364 which resides in end pockets 365. The apex 358, the centrally located rise of the spring, is relatively sharp. This is to say that the flat short cam portions 359 of each side of the apex are joined by support sections 357 which provide a surface discontinuity rather than a smooth transition in proceeding over the apex.

Continuing with Fig. 19, a cam 366 is used to move the slider back and forth between its left hand position and right hand position. Cam 366 has two projections 368, which extend out from each side and which are rotatably received in support bearing openings located in side walls 319, 321 of the slider receiving channel 304. Cam 366 rocks back and forth in a clockwise direction and a counterclockwise direction about an axes defined by the projections 368. Extending downward and below the projections is cam follower 370 which is adapted to be received by cam follower opening 322 located in slider 320 with minimum clearance. Extending upward from the projections 368 is cam control surface 372 having a first pocket 374 located to the left of the axes of rotation of the cam and a second pocket 376 located to the right of the axes of rotation of the cam. Looking at the profile of the cam 366 as shown in Fig. 19, pocket 372 is to the right of the axes of rotation of the cam, and pocket 374 is to the left of the axes of rotation of the cam. Thus, application of a downward force on pocket 372 will cause the cam to rotate in a clockwise direction and the cam follower 370 will cause the slider 320 to move to the left. In a similar way, the application of a downward force on pocket 374, when the slider is at its left hand position, will cause the cam to rotate in a counterclockwise direction and the cam follower will cause the slider to move to the right. As just noted, pressing down on pocket 372 causes the cam to rotate clockwise which causes the cam follower to move the slider to the left. Thereafter, pressing down on pocket 374 will now cause the cam to rotate counterclockwise to cause the cam follower to move the slider to the right. Pressing alternately on pockets 372 and 374 will cause the slider to slide back and forth first in one direction and then in the other direction.

Referring to Fig. 14, frame assembly 400 is adapted to fit on top of base assembly 300 and provides support for two contacts 390 which project through the frame assembly and make contact with rectangular plate 313 of the stationary terminal assembly and rectangular plate 380 of the brush terminal assembly 346. A resistor 392 connected in series with a lamp 394 such as an LED are connected across the two contacts 390. Lamp 394 indicates the conductive state of the switch by being "on" or "off". In operation, lamp 394 will be "on" when the contacts of the switch are open, and the lamp will be "off" when the contacts of the switch are closed.

Projecting upward from the frame assembly 400 are two hook members 396 which engage and pivotly hold rocker assembly 398 to frame assembly 400. In addition, frame assembly 400 includes a clearance opening 402 aligned with the top of cam 366 to permit the actuator 404 which is secured to the rocker assembly 398 to pass through the frame assembly

400 to engage and operate cam 366. A small projection 406 located on the frame assembly is used to engage the lower end of helical spring 408. The outside diameter of the projection 406 is less than the inside diameter of the helical spring 408 and fits within the helical spring. The upper end of spring 408 is located within and is held captive in a pocket 410 located in a subplate 412 secured to the underside of the rocker assembly.

Referring to Figs. 17 and 19, there is shown a view of the bottom of base assembly 300, frame assembly 400 and the rocker assembly 398 of a single pole switch. Referring to the frame assembly 400, projecting out from the bottom surface are two projections 414 which are positioned to contact the top surface of projections 368. Projections 368 keep the projections in the bearing surfaces in the side walls of the slider receiving channel. Also projecting downward from the bottom surface is a slider hold down projection 416 which slidably contacts holding down projection 326 on the slider 320. Projection 416, by contacting projection 326, prevents slider 320 from being pushed up and out of channel 304 by the upward force of cam profile leaf spring 352 acting on triangular shaped cam follower 324.

As noted above, subplate 412 is attached to the bottom of rocker paddle 112. Attached to and projecting down from subplate 412 is an actuator 404 made of a single strip of thin, flat spring steel bent to form a U shaped member having a generous radius at the bend. The ends of the U shaped member are bent outward to form two outwardly projecting legs. A small hole punched in each leg of actuator 404 is used to rivet or heat staked the actuator to the subplate 412. The thin flat spring steel actuator 404 can flex slightly towards the front and back of the switch. The ability of the actuator 404 to flex permits it to more easily engage the first pocket 374 and the second pocket 376 of the cam 366. By alternately pressing the rocker paddle 112 the actuator 404 alternately engages the pocket of the cam to alternately open and close the switch contacts. Two hooks 418 which project down from the surface of the subplate 412 are positioned to engage hooks 396 on the frame assembly 400. Hooks 418, when engaged by hooks 396 allow limited movement of the rocker assembly relative to the frame assembly and prevent the rocker assembly 398 from being separated from the frame assembly 400. Two circular projections 420, one on the outside surface of an end of each of two legs 422 which project from the subplate are designed to snap into openings 424 in the frame assembly 400 to form a hinge about which the subplate pivots relative to the frame assembly and base assembly. The subplate is heat staked to the bottom surface of the rocker paddle 112 to form a unitary assembly.

Referring to Fig. 19, to assemble the rocker paddle switch, the helper spring 338 is inserted into end chamber 340, leaf spring 352 is place into spring chamber 354 and slider 320 is placed into channel 304. The end 342 of the slider faces the helper spring 338 and the triangular shaped cam follower 324 which projects from the bottom of the slider slidably engages the top surface of leaf spring 352. The projections 368 of the cam 366 are placed within the bearing surfaces 378 of side walls 319, 321 of channel 304 with the cam follower 370 being positioned within opening 322 of alider 320. Stationary terminal assembly 312 is positioned in the opening 309, and brush terminal assembly 346 is positioned within opening 384. As the brush terminal assembly 346 is being placed in position, the spring contact arm 344 is moved backward against the force of the spring arm and is positioned within the slot 329 located between the holding down projection 326 and the spring contact arm control member 327. At this time all the various components (see Fig. 16) have been placed within the switch base 300 and the assemblage resembles that shown in Fig. 15.

The frame assemblage 400, which may include the lamp 394, resistor 392 and contacts 390, is now placed over the switch base, a ground strap is placed along the bottom and ends of base assembly 300, and screws, drive pins, rivets or the like 124 are used to lock the ground strap, switch base assemblage and frame assemblage together. Following this, helical return spring 408 is placed over projection 406, care being taken to locate the top of the return spring within the spring pocket of the subplate, and the projections 420 on the legs 422 are snapped into the openings 424 in the frame assembly 400 to form the hinge for rocker assembly 398 and the frame assembly 400 to move relative to each other. Then the rocker assembly 398 which includes the subplate, is pressed down toward the frame assembly until the hooks 418 engage the hooks 396. At this time the actuator 404, which has been attached to the subplate extends down through the clearance opening 402 in the frame 400 and is positioned to engage the cam eccentric surface 372.

Referring to Fig. 19, there is shown a sectional view of a single pole switch where the contacts of the switch are closed and the switch is in its conducting state. The next time the face of the rocker paddle is pressed, the actuator 404 moves down, contacts the ramp 430 of cam surface 372 and slides toward the right and enters pocket 376. Continued pressing on the rocker paddle causes the actuator 404 to continue to move down and to rotate the cam 366 clockwise about the projections 368. This causes cam follower 370 to rotate in a clockwise direction to

move slider 320 to the left. As the slider 320 moves toward the left, the triangular shaped cam follower 324 starts to move out of depression 360 and across the right support section 359 of the centrally located apex 358 of the cam shaped leaf spring 352. As the slider continues to move to the left, triangular shaped cam 324 deflects leaf spring 352 downward because projection 326 on slider 320, in cooperation with holding projection 416, prevents the slider 320 from moving upward. As the triangular shaped cam 324 moves passed the top of the apex 358 to the left support section 359 of the apex, the leaf spring starts to spring back to its original unstressed position by moving up. This upward movement of the leaf spring acts on the shaped cam follower 324 and helps drive the cam follower 324 and the slider 320 to the left until the cam follower 324 comes to rest in depression 362. At this time the contacts of the switch are separated from each other. Thus, the cam shaped leaf spring 352, in combination with the cam follower 324 helps to move the slider to either the left or right depressions 362, 360 and to rapidly open and close the contacts. The next time that the rocker is depressed, the actuator 404 will engage pocket 374 of the cam to cause it to rotate in a counterclockwise direction which will cause the slider to depress the leaf spring as it moves to the right. As the cam follower 324 continues to move to the right and as it passes apex 358, the depressed leaf spring starts to spring up to return to its original position. This upward movement of the leaf spring causes the cam follower 324 to move toward the right until it reaches depression 360 at which time the switch contacts are closed. Continued pressing and releasing the rocker paddle of the switch alternately opens and closes the contacts of the switch. If desired, the state of conduction of the switch can be displayed to a user by the lamp-resistor combination connected in series across the stationary and brush terminal assemblies. When the contacts of the switch are closed, there is no potential difference across the lamp-resistor combination and the lamp will remain dark. When the contacts of the switch are open, there will be a potential difference across the lamp-resistor combination and the lamp will be lit.

Referring to Fig. 20, there is illustrated a wall plate for positioning two wiring devices such as two rocker paddle switches positioned side by side. It is to be noted that there is no partition or dividing member located in either the wall plate opening or the alignment plate opening to separate the two wiring devices. The two wiring devices can be placed in a double ganged box 160 made up, as an example, of two single boxes joined by fasteners 162 extending through the threaded apertures 164 of two joining ears 166. Alignment plate 114 has a single

opening 116, four clearance openings 117 and four alignment pins 170 for receiving two wiring devices such as two switches, a receptacle and a switch, or two receptacles.

Looking at the wall plate 138, there can be four racks 80 on the interior of the top and bottom end walls for receiving four pawls where the two center racks receive one pawl from each wiring device. Also, there can be two tabs 120, which will be accessible via slots 74 in end wall 70 of cover plate 138. Because of the independent operation of the pawls 140 with their respective racks 80, the wall plate 138 can compensate somewhat for lack of flatness of the wall in which the wiring devices are installed.

Referring to Fig. 21 there is shown an alignment plate 114 having a single opening 116 and a wall plate 138 for three wiring devices mounted in three boxes (not illustrated) ganged together. Wall plate 138 has a single opening 100 with no dividing or separating members for receiving three wiring devices positioned side by side and can have four sets of racks 80 where the two end racks each receive a single pawl and the two center racks receive two pawls. The alignment plate 114 has a single opening 116 with no dividing or separating members, three sets of clearance openings 117 and three sets of alignment pins 170 for receiving three wiring devices.

Fig. 23 shows an alignment plate 114 having a single opening 116 with no dividing or separating members and wall plate 138 for four wiring devices mounted in four boxes (not illustrated) ganged together. Wall plate 138 has a single opening 100 with no dividing or separating members for receiving four wiring devices positioned side by side and the alignment plate 114 has a single opening 116 with no dividing or separating members for receiving four wiring devices positioned side by side.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to the preferred embodiments, it will be understood that various omissions and substitutions and changes of the form and details of the devices illustrated and in their operation may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. An electrical rocker paddle switch comprising:

a switch housing:

a manually movable rocker paddle coupled to the housing;

5 actuator means having a first end and a second end, said actuator means attached to the rocker paddle at the first end and movable in response to the movement of the rocker paddle;

cam means driven by the second end of the actuator means to alternately rotate in a first and second opposite direction as the rocker paddle is alternately depressed;

10 slider means having a slider position determining cam follower coupled to be moved alternately in a first and a second opposite direction along a common linear axis by rotation of the cam means in the first and second opposite direction;

a fixed stationary contact and a movable brush contact mounted to the switch housing, the movable brush contact biased to contact the fixed stationary contact to thereby electrically close the switch, the movable brush contact being movable by the slider means to disengage the
15 fixed stationary contact to thereby electrically open the switch; and

a cam shaped leaf spring positioned within the switch housing and coupled to the slider position determining cam follower on the slider means to aid in the movement of the slider means.

20 2. The electrical rocker paddle switch of claim 1 wherein the actuator means comprises a flat strip member that can flex in a direction along the length of the switch.

3. The electrical rocker paddle switch of claim 1, wherein the slider means comprises a tapered opening for receiving therein the cam means, the tapered opening having predetermined
25 dimensions to provide a fit with the cam means inserted therein whereby substantially all of the rotating motion of the cam means is applied to the slider means to move the movable brush contact.

4. The electrical rocker paddle switch of claim 1, wherein the switch housing further
30 comprises a switch base having separate chambers therein for individually housing the slider and the cam shaped leaf spring.

5. The electrical rocker paddle switch of claim 4 wherein the chamber for housing the cam shaped leaf spring has a length greater than that of the cam shaped leaf spring such that the ends of the spring are not constrained.

5

6. The electrical rocker paddle switch of claim 4 wherein the rocker paddle is pivotly coupled to the switch housing.

7. The electrical rocker paddle switch of claim 6 further comprising a window in the rocker paddle to pass light from illumination means mounted in the switch housing.

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8. The electrical rocker paddle switch of claim 7 wherein the illumination means comprises a light bulb and a voltage dropping resistor connected in series with the light bulb.

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9. The electrical rocker paddle switch of claim 4 further comprising front and rear wire clamp means mounted to the switch housing and coupled to the fixed stationary contact and the movable brush contact.

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10. The electrical rocker paddle switch of claim 4 further comprising a unitary mounting strap attached to the switch housing, the mounting strap providing a cradle like support for holding the switch in a wall box.

11. The electrical rocker paddle switch of claim 10 wherein the mounting strap is made of sheet metal.

25

12. An electrical rocker paddle switch comprising:

a switch housing;

a manually movable rocker paddle coupled to the housing;

actuator means having a first end and a second end, said actuator means attached to the

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rocker paddle at the first end and movable in response to the movement of the rocker paddle;

cam means driven by the second end of the actuator means to alternately rotate in a first and second opposite direction as the rocker paddle is alternately depressed

slider means having a slider position determining cam follower coupled to be moved alternately in a first and a second opposite direction along a common linear axis by rotation of the cam means in the first and second opposite direction;

a fixed stationary contact and a movable brush contact mounted to the switch housing, the movable brush contact biased to contact the fixed stationary contact to thereby electrically close the switch, the movable brush contact being movable by the slider means to disengage the fixed stationary contact to thereby electrically open the switch; and

a cam shaped leaf spring positioned within the switch housing and coupled to the slider position determining cam follower on the slider means to aid in the movement of the slider means;

the cam shaped leaf spring being substantially symmetrical about a central apex comprised of two relatively short cam portions which extend downward, respectively on each side of the apex forming an obtuse angle where, at each end of each short cam portions there is an upward extending portion to form a depressions with each relatively short cam portion, where, thereafter, each upward extending portion rests on support means and the ends of the upward extending portions beyond the support means are bent downward.

13. An electrical rocker paddle switch comprising:

a switch housing:

a manually movable rocker paddle coupled to the housing;

actuator means having a first end and a second end, said actuator means attached to the rocker paddle at the first end and movable in response to the movement of the rocker paddle;

cam means driven by the second end of the actuator means to alternately rotate in a first and second opposite direction as the rocker paddle is alternately depressed

slider means having a slider position determining cam follower coupled to be moved alternately in a first and a second opposite direction along a common linear axis by rotation of the cam means in the first and second opposite direction;

a fixed stationary contact and a movable brush contact mounted to the switch housing, the movable brush contact biased to contact the fixed stationary contact to thereby electrically

close the switch, the movable brush contact being movable by the slider means to disengage the fixed stationary contact to thereby electrically open the switch; and

a cam shaped leaf spring positioned within the switch housing and coupled to the slider position determining cam follower on the slider means to aid in the movement of the slider

5 means;

the cam shaped leaf spring being substantially symmetrical about a central apex comprised of two relatively short cam portions which extend downward, respectively on each side of the apex forming an obtuse angle where, at each end of each short cam portions there is an upward extending portion to form a depressions with each relatively short cam portion, where,

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thereafter, each upward extending portion rests on support means and the ends of the upward extending portions beyond the support means are bent downward;

the switch housing further including a switch base having separate chambers therein for individually housing the slider means and the cam shaped leaf spring.

15

14. The electrical rocker paddle switch of claim 1 wherein

the manually movable rocker paddle has a vertical axis along its length and a horizontal axis along its width wherein the surface of the rocker paddle along its vertical axis has a contour of positive first differential comprised of a combination of splines drawn between points of varying distances from a datum plane

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15. The electrical rocker paddle switch of claim 14 wherein the surface along the vertical axis has a contour of zero second differential comprised of splines drawn between points of varying distance from a datum plane when the rate of height increase of the individual splines is constant.

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16. The electrical rocker paddle switch of claim 14 wherein a section along the horizontal axis has a surface with contour of a positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distances from the datum plane.

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17. The electrical rocker paddle switch of claim 14 wherein a section along the vertical axis of the surface of the paddle has a contour of positive first differential, comprised of splines drawn between points of varying distance from a datum plane, and a section along the horizontal axis has a surface contour of a positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distances from the datum plane.

18. The electrical rocker paddle switch of claim 17 wherein the section along the vertical axis of the surface has a contour of zero second differential comprised of splines drawn between points of varying distances from a datum plane when the rate of height increase of the individual splines is constant.

19. The electrical rocker paddle switch of claim 14 wherein the paddle is not within a frame.

20. The electrical rocker paddle switch of claim 12 wherein the manually movable rocker paddle has a vertical axis along its length and a horizontal axis along its width wherein the surface of the paddle along its vertical axis has a contour of positive first differential comprised of a combination of splines drawn between points of varying distances from a datum plane

21. The electrical rocker paddle switch of claim 20 wherein the surface along the vertical axis has a contour of zero second differential comprised of splines drawn between points of varying distance from a datum plane when the rate of height increase of the individual splines is constant.

22. The electrical rocker paddle switch of claim 20 wherein a section along the horizontal axis has a surface with contour of a positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distances from the datum plane.

23. The electrical rocker paddle switch of claim 20 wherein a section along the vertical axis of the surface of the paddle has a contour of positive first differential, comprised of splines drawn between points of varying distance from a datum plane, and a section along the horizontal axis has a surface contour of a positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distances from the datum plane.

24. The electrical rocker paddle switch of claim 23 wherein the section along the vertical axis of the surface has a contour of zero second differential comprised of splines drawn between points of varying distances from a datum plane when the rate of height increase of the individual splines is constant.

25. The electrical rocker paddle switch of claim 20 wherein the paddle is not within a frame.

ABSTRACT

There is disclosed a robust on-off rocker paddle switch operated by pushing on the lower portion of a rocker paddle to turn the switch "on" or "off". The lower edge of the rocker paddle pivots in and out about its top or upper edge. Bias means urges the lower portion of the rocker paddle to always be in its out position whether the switch is in the "on" state or position or the "off" state or position. The rocker paddle of the switch is not located within a frame and the surface of the switch has, along its vertical axis, a contour of positive first differential and zero second differential, comprised of a combination of splines which extend between points of varying distances from a datum plane. The contour has zero second differential when the rate of height increase of individual splines is constant. An actuator coupled to the rocker paddle (the face) of the switch causes a cam to rotate in a clockwise direction and in a counter clockwise direction as the rocker paddle is alternately depressed. The rocker paddle pivots about its top edge and repeated pressing on the lower surface of the rocker paddle causes the actuator to alternately rotate the cam in a clockwise direction and in a counter-clockwise direction. Alternate rotation of the cam drives a slider member having a triangular shaped cam follower along a first and a second opposite direction along a common linear axis. A cam shaped leaf spring cooperates with the triangular shaped cam follower to aid in the movement of the slider and determines its at rest position. An indicator such as a light can be used to indicate the state of conduction of the switch.

Docket No.
0267-001-2030

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled
ROBUST ROCKER SWITCH MECHANISM

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on _____ as United States Application No. or PCT International
Application Number _____
and was amended on _____

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

(Number) (Country) (Day/Month/Year Filed)

☐

(Number) (Country) (Day/Month/Year Filed)

☐

(Number) (Country) (Day/Month/Year Filed)

☐

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

_____	_____
(Application Serial No.)	(Filing Date)
_____	_____
(Application Serial No.)	(Filing Date)
_____	_____
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 385(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

_____	_____	_____
(Application Serial No.)	(Filing Date)	(Status)
		(patented, pending, abandoned)
_____	_____	_____
(Application Serial No.)	(Filing Date)	(Status)
		(patented, pending, abandoned)
_____	_____	_____
(Application Serial No.)	(Filing Date)	(Status)
		(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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Fifth inventor's signature	Date
Residence	
Citizenship	
Post Office Address	

Full name of sixth inventor, if any	
Sixth inventor's signature	Date
Residence	
Citizenship	
Post Office Address	

76 276

1 / 19

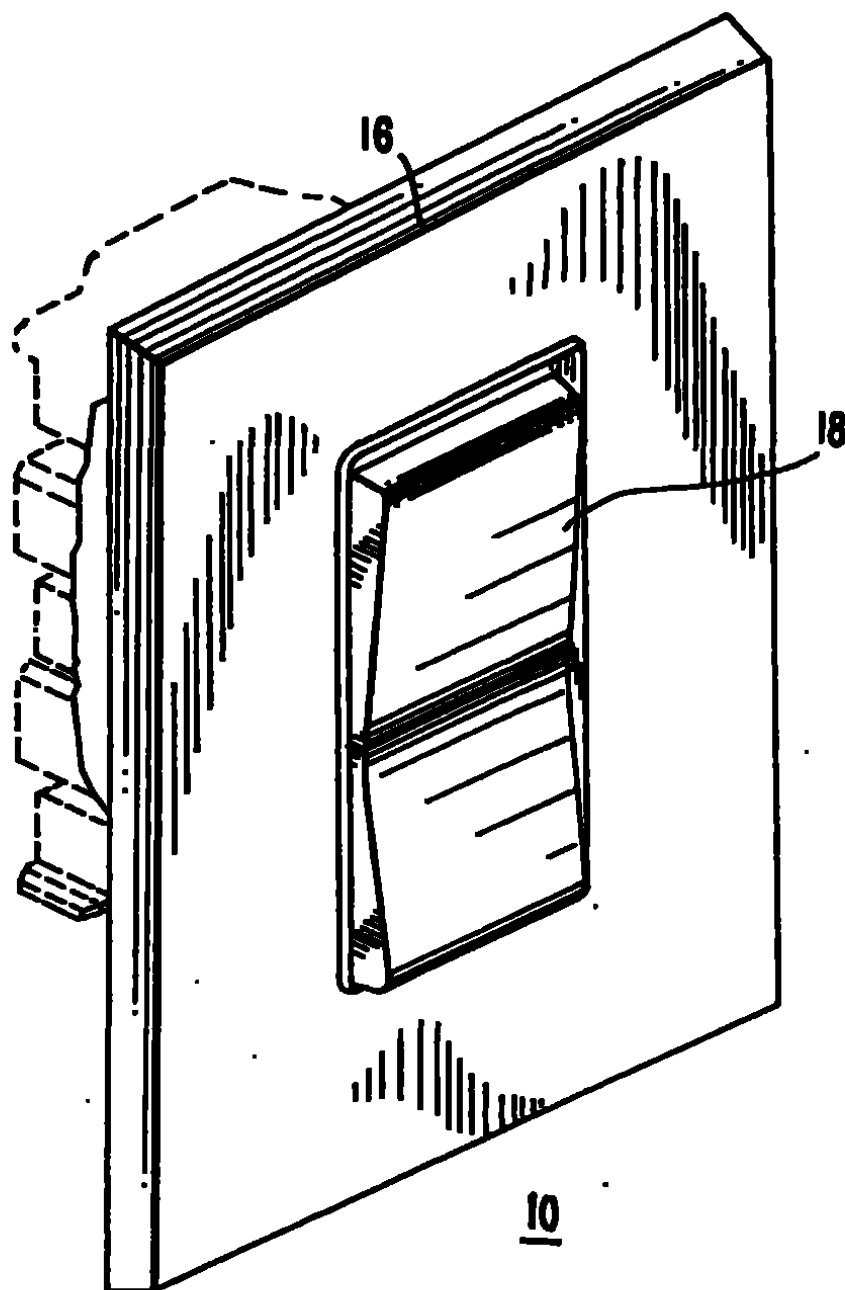


FIG. 1
PRIOR ART

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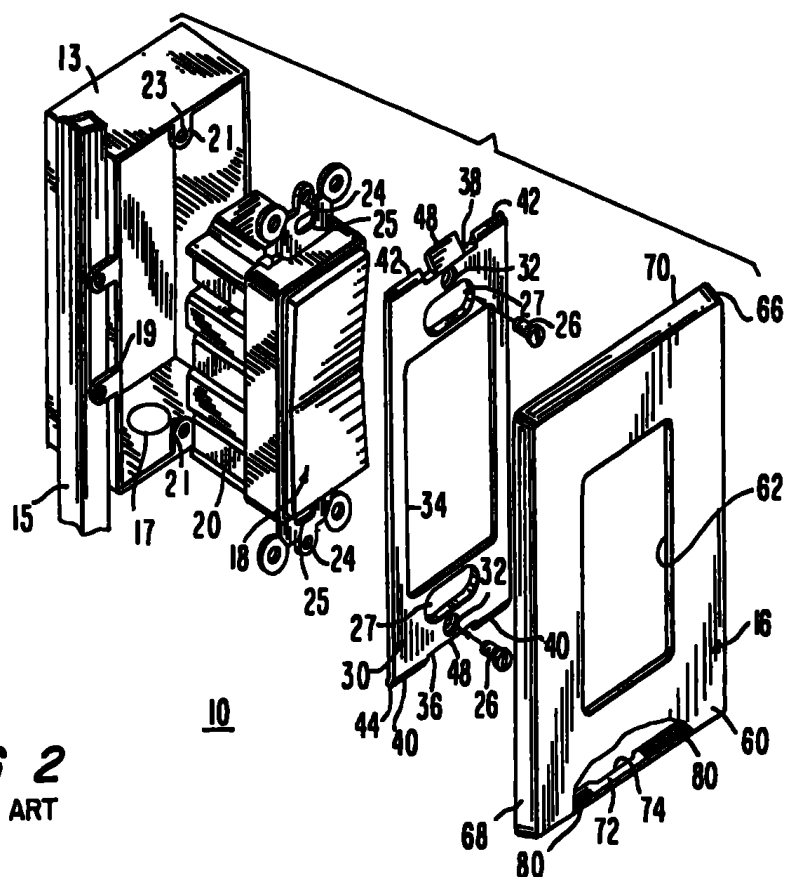


FIG 2
PRIOR ART

278

3/19

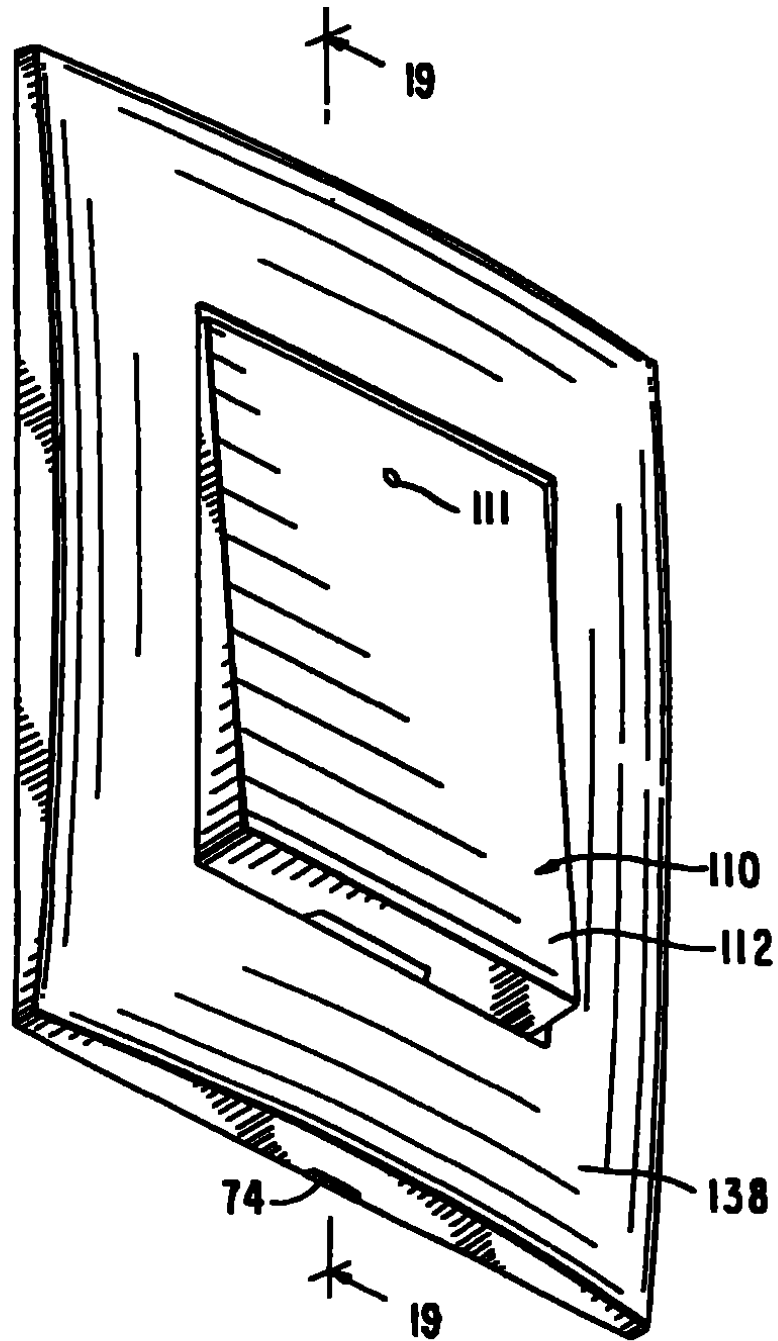


FIG. 3

279

4/19

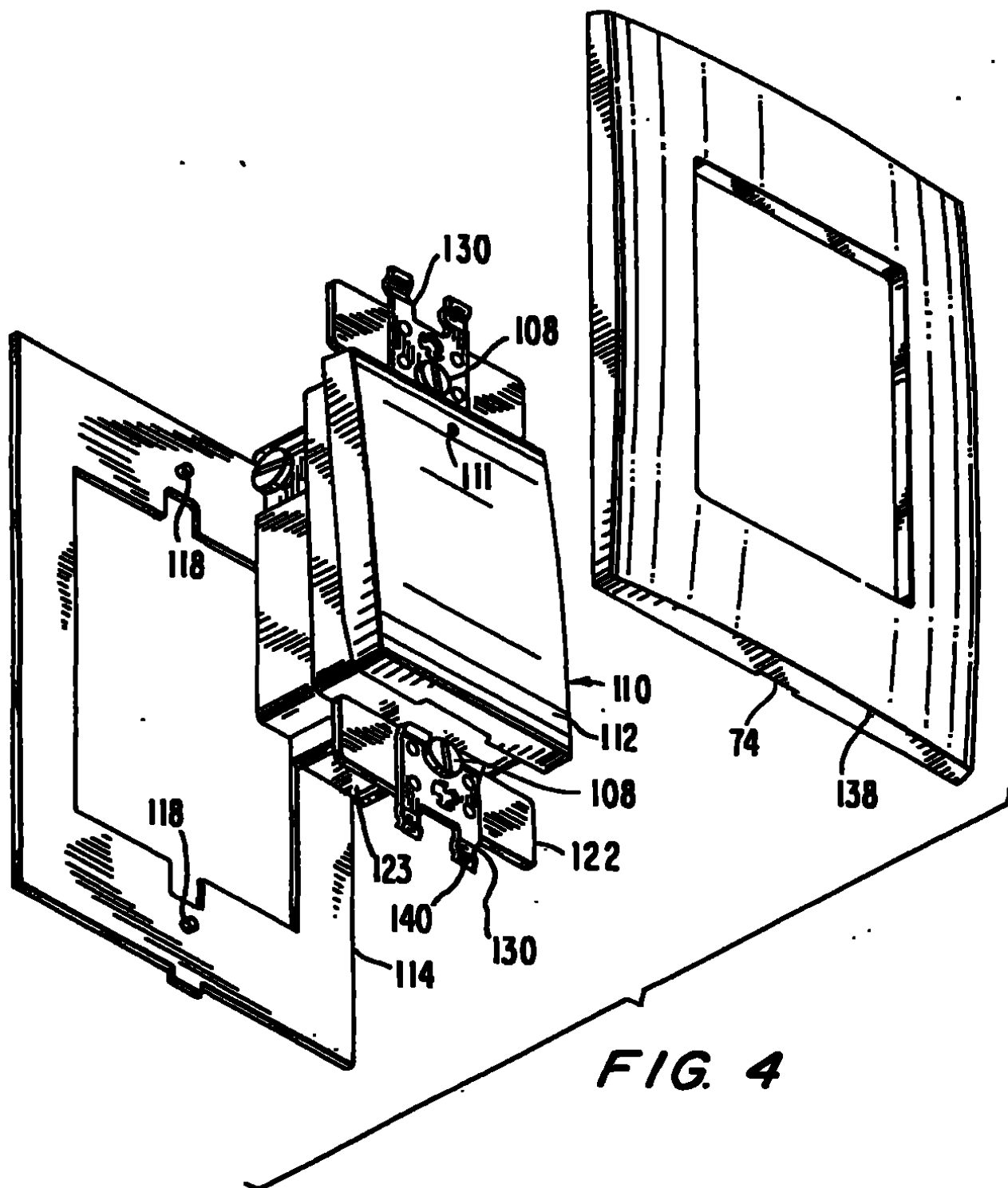


FIG. 4

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280

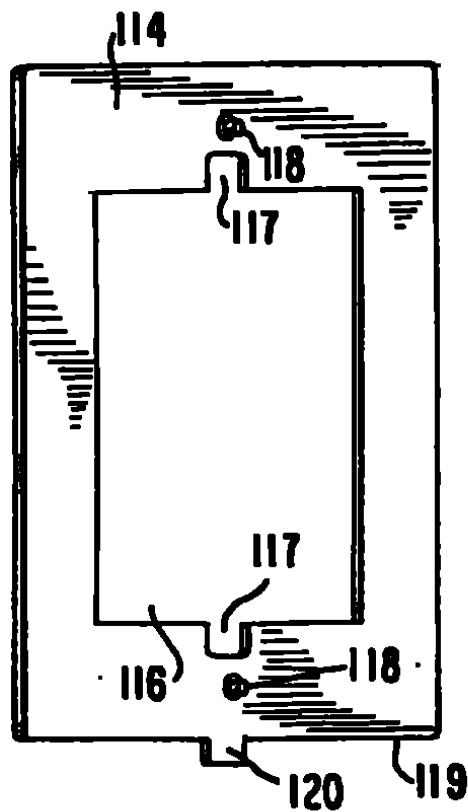


FIG. 5

281

6/19

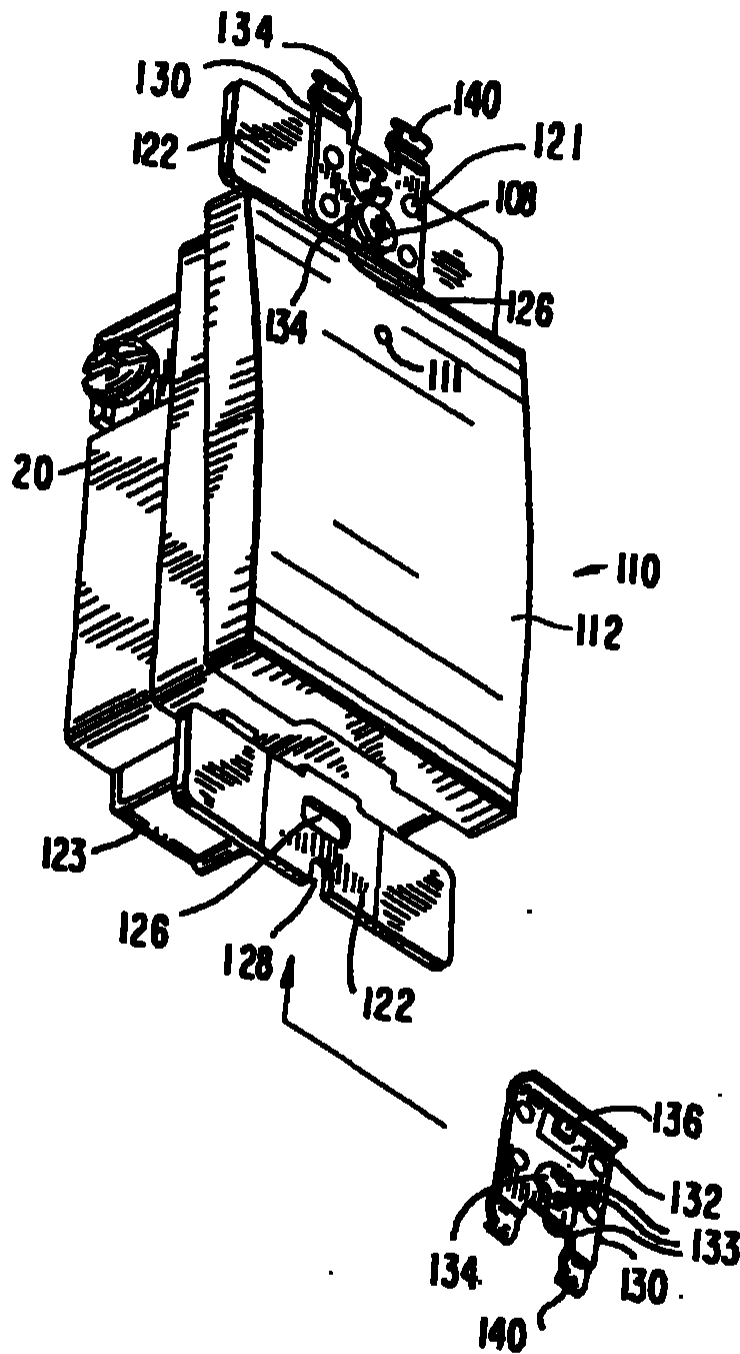


FIG. 6

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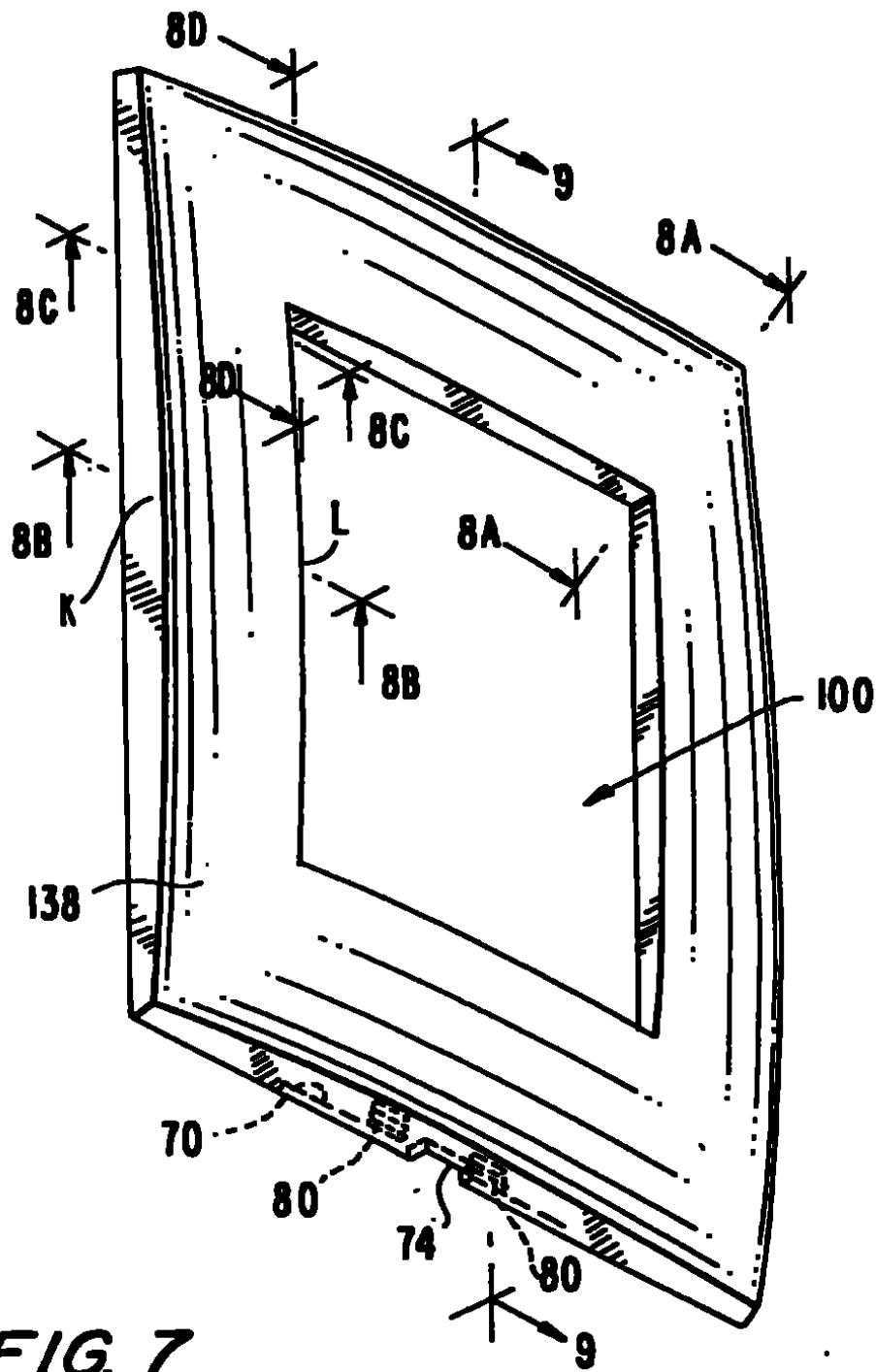


FIG. 7

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8 / 19

FIG. 8A

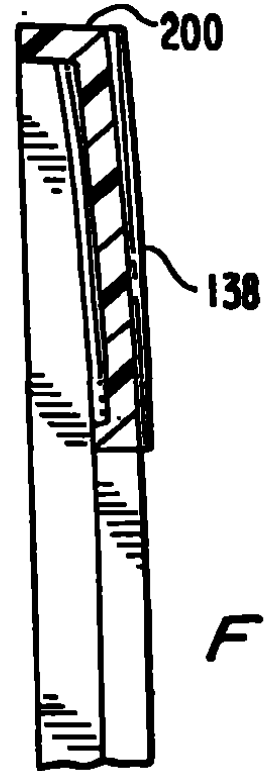
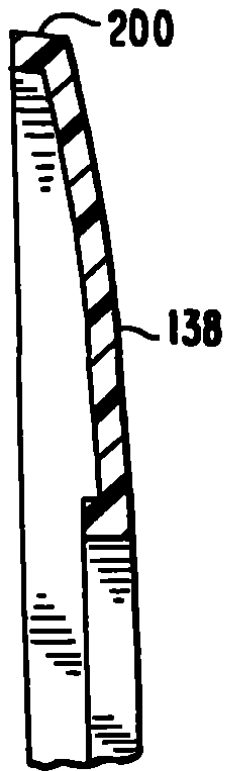


FIG. 8D

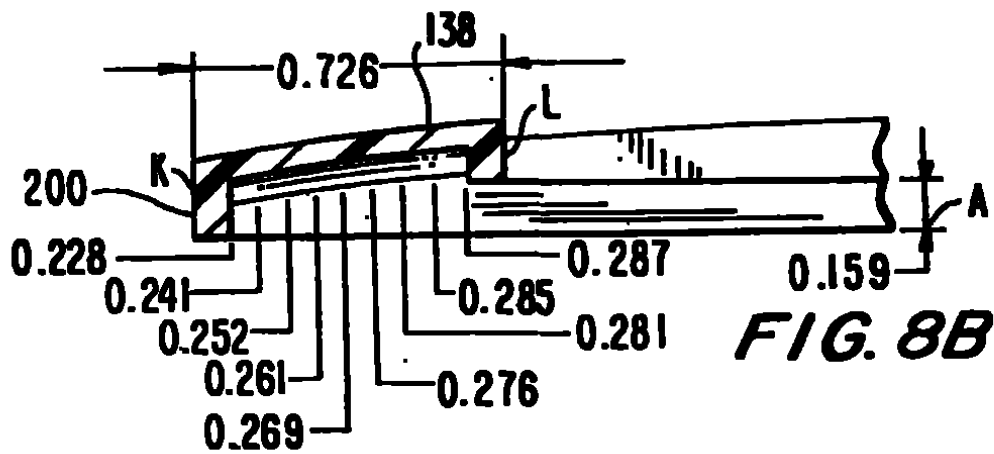
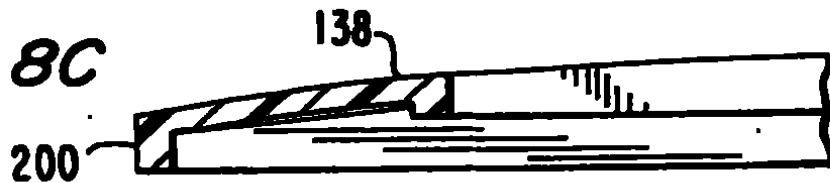


FIG. 8B

FIG. 8C



284

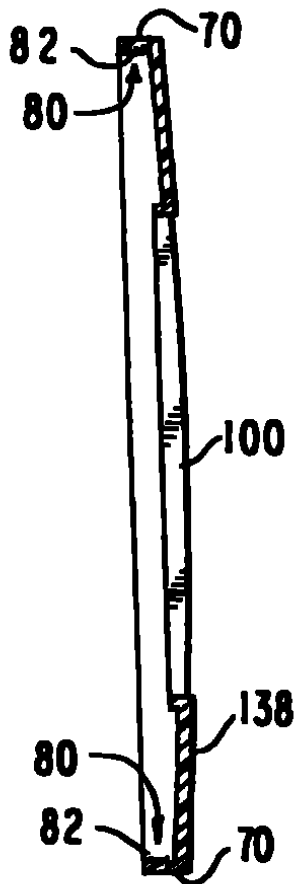


FIG. 9

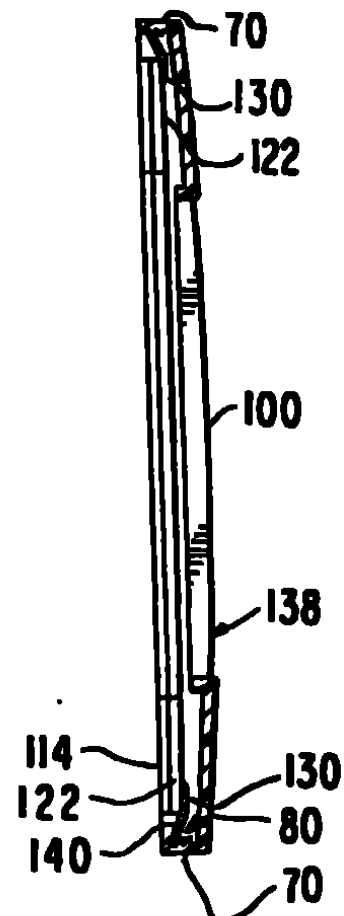


FIG. 10

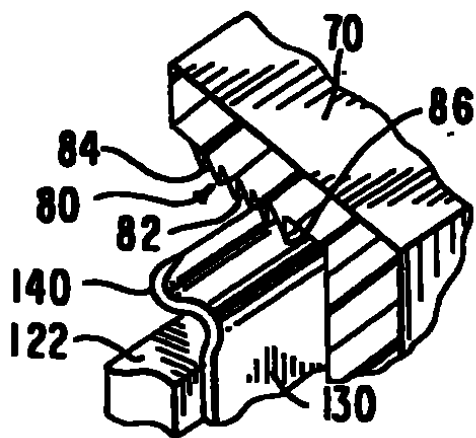


FIG. 11

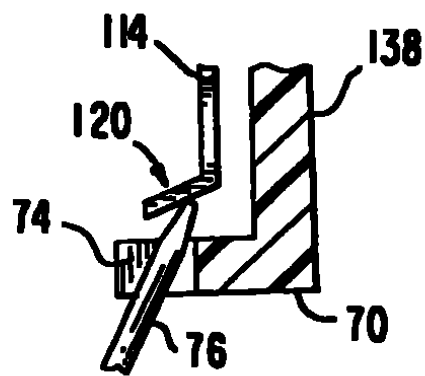


FIG. 12

285

10/19

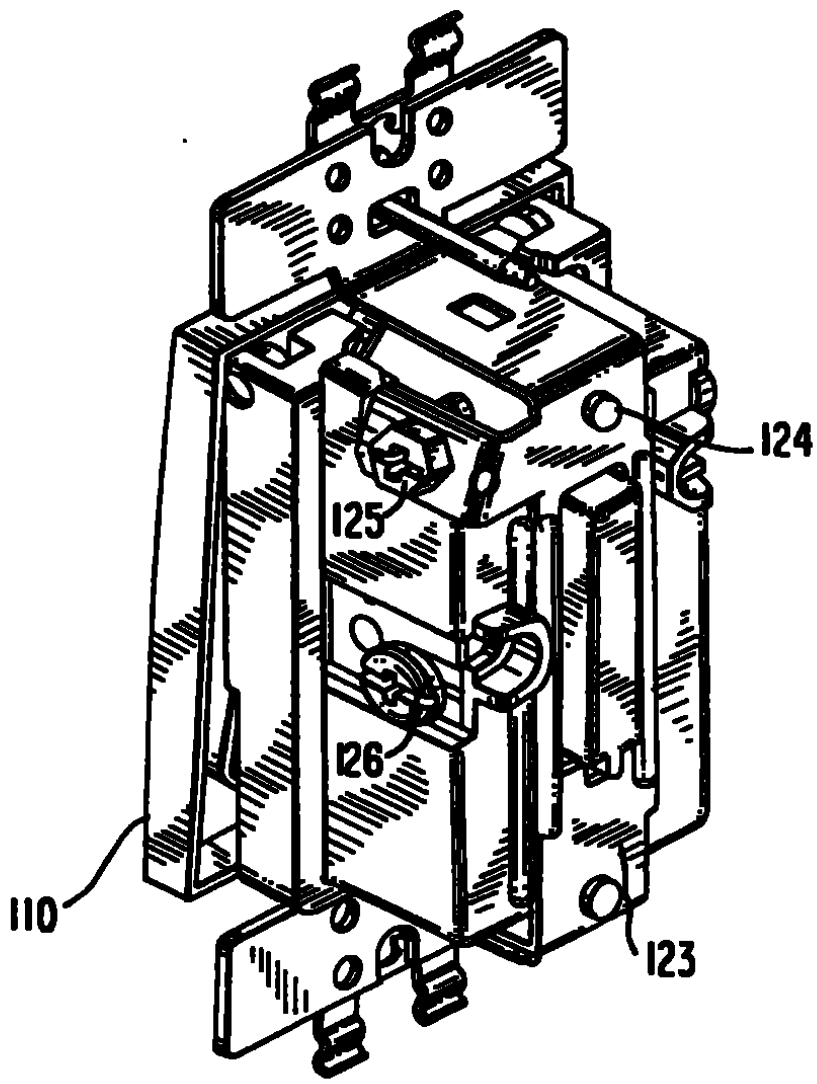


FIG. 13



287

12/19

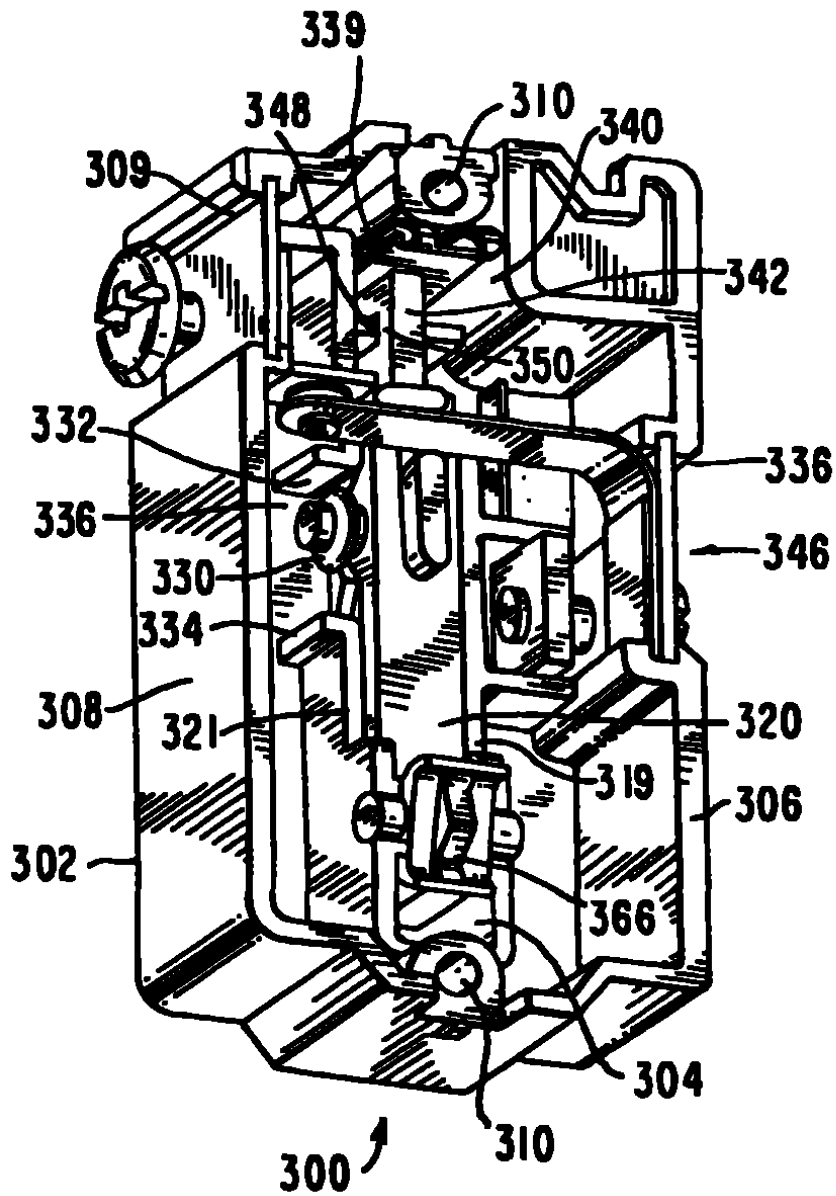
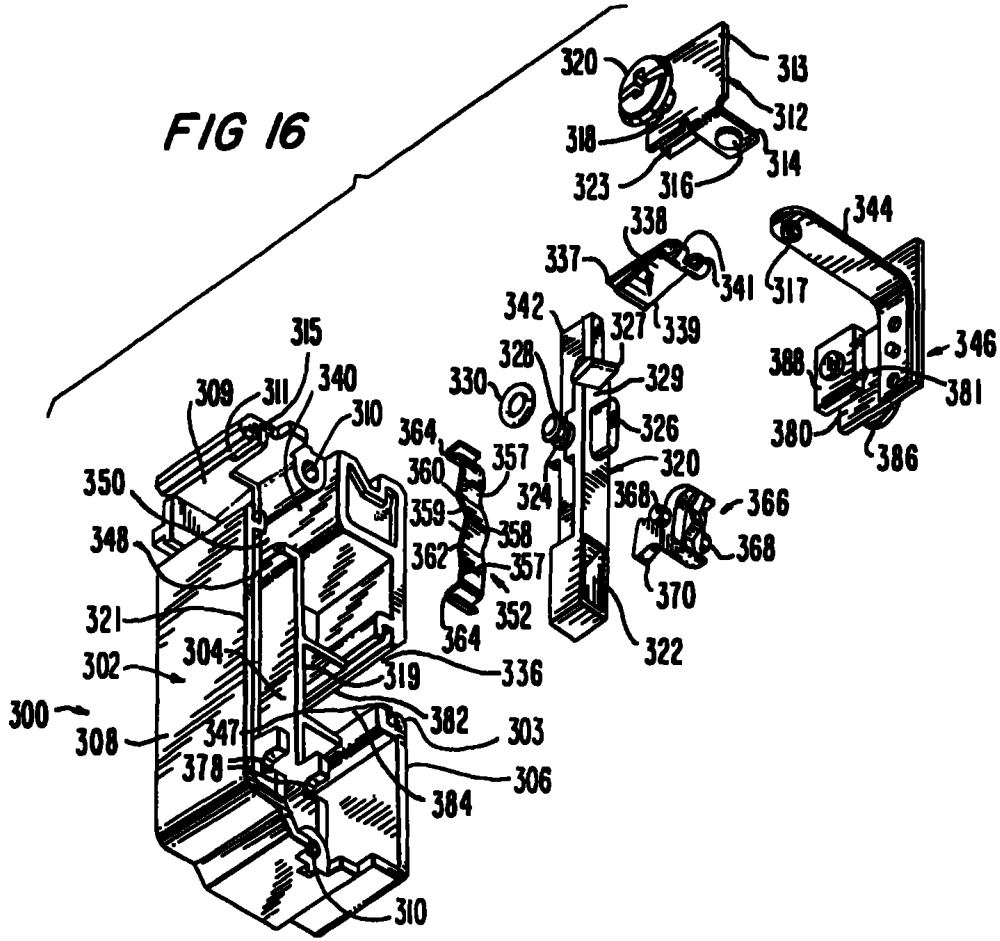


FIG. 15

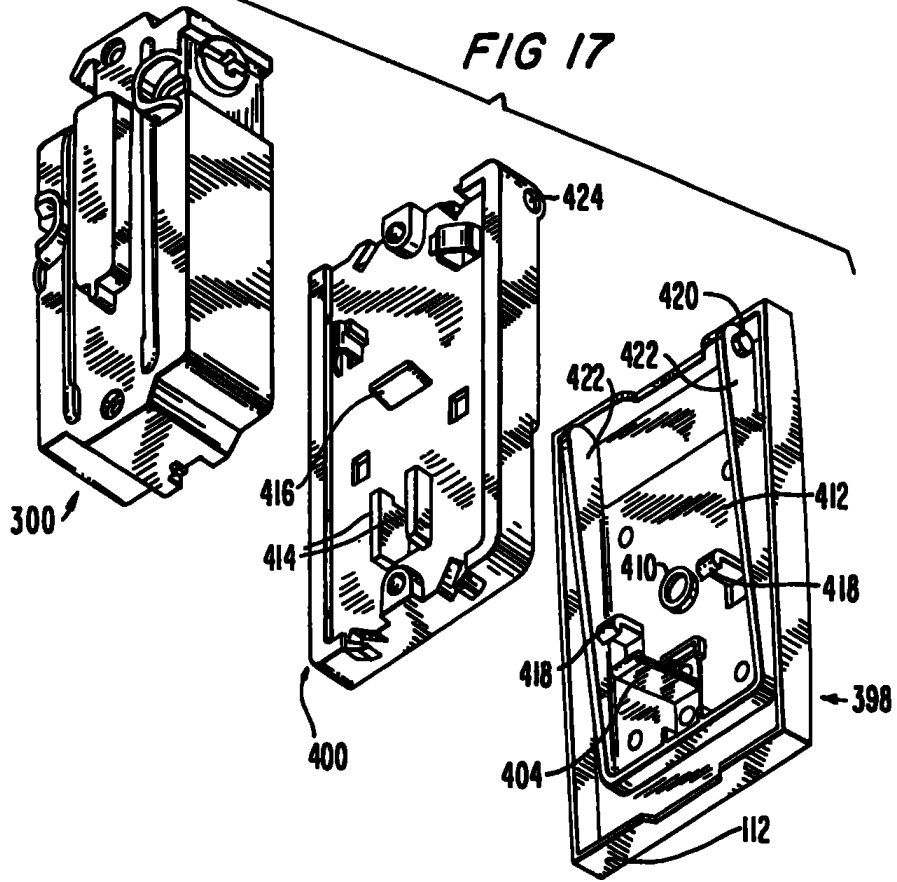
FIG 16



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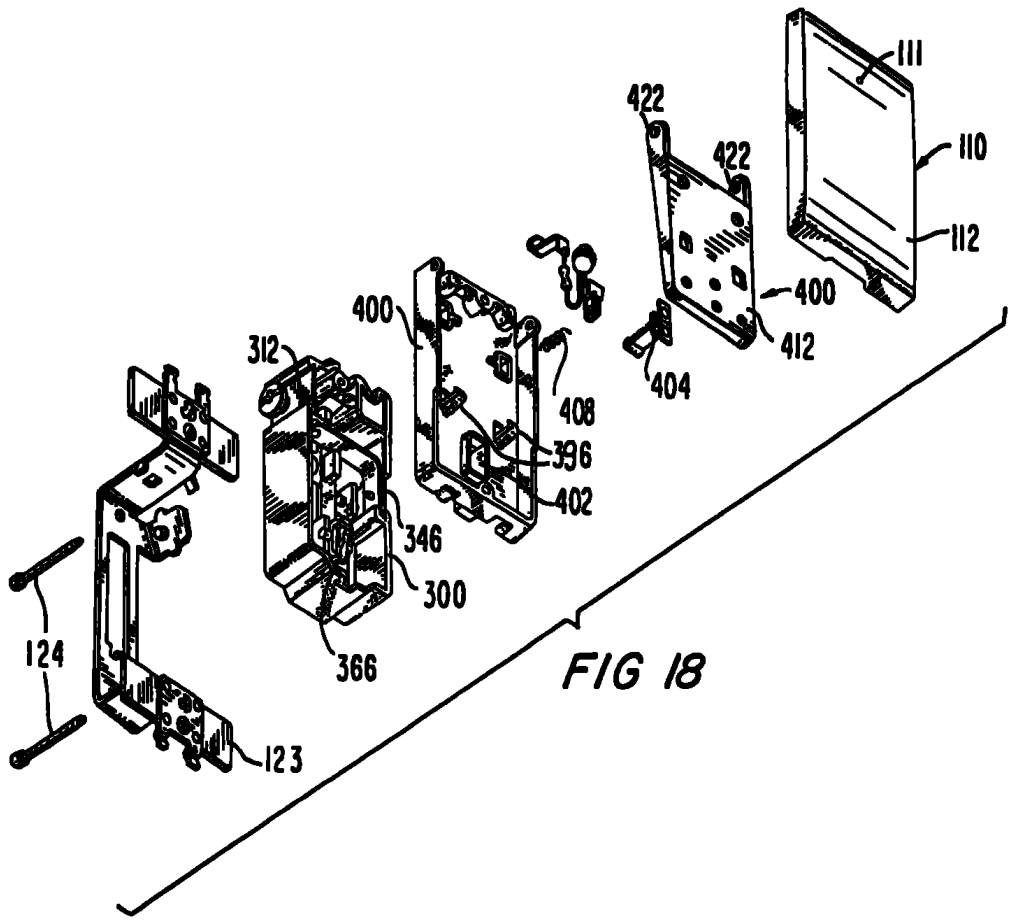
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FIG 17



14/19

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16/19

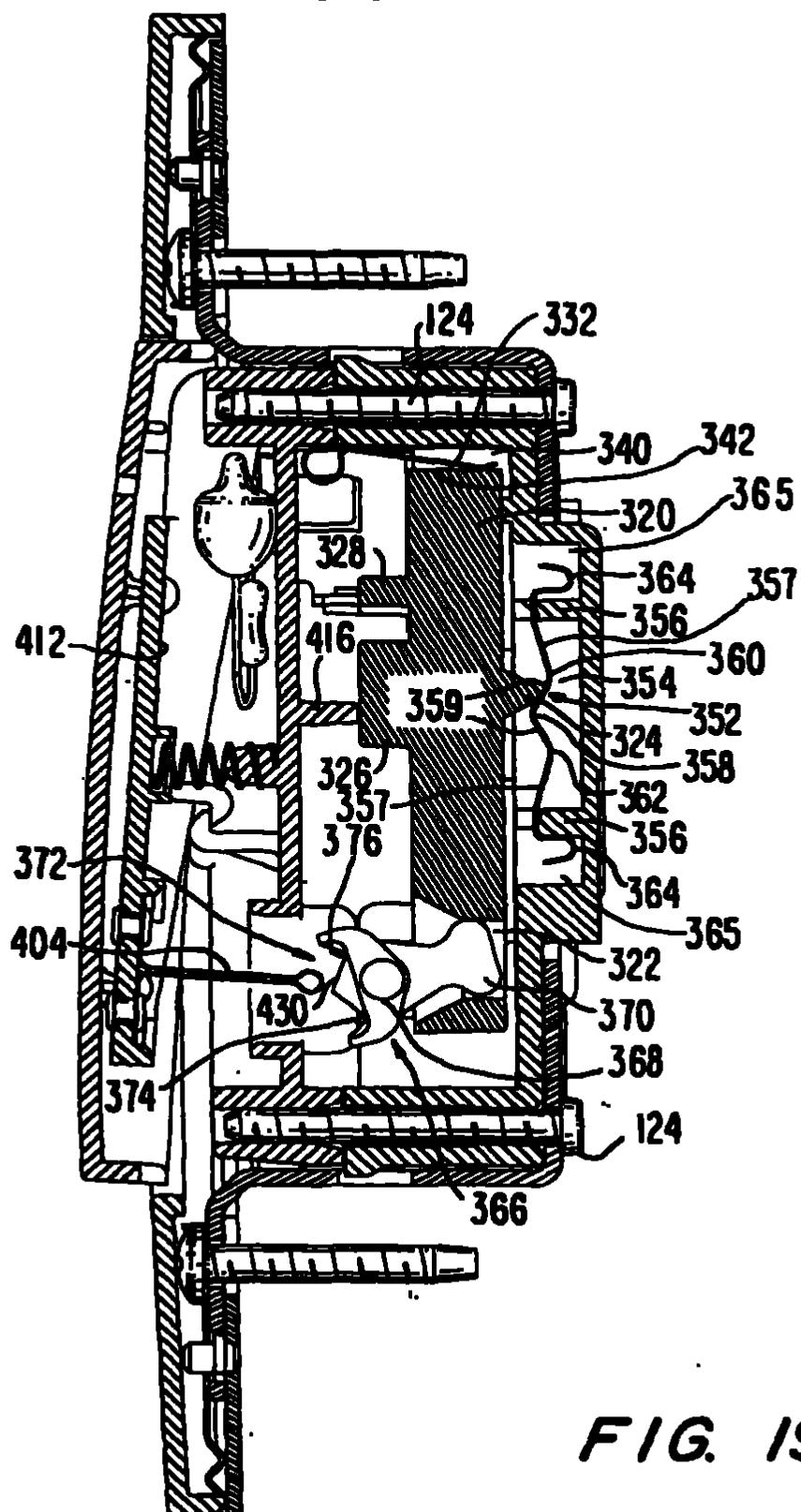


FIG. 19

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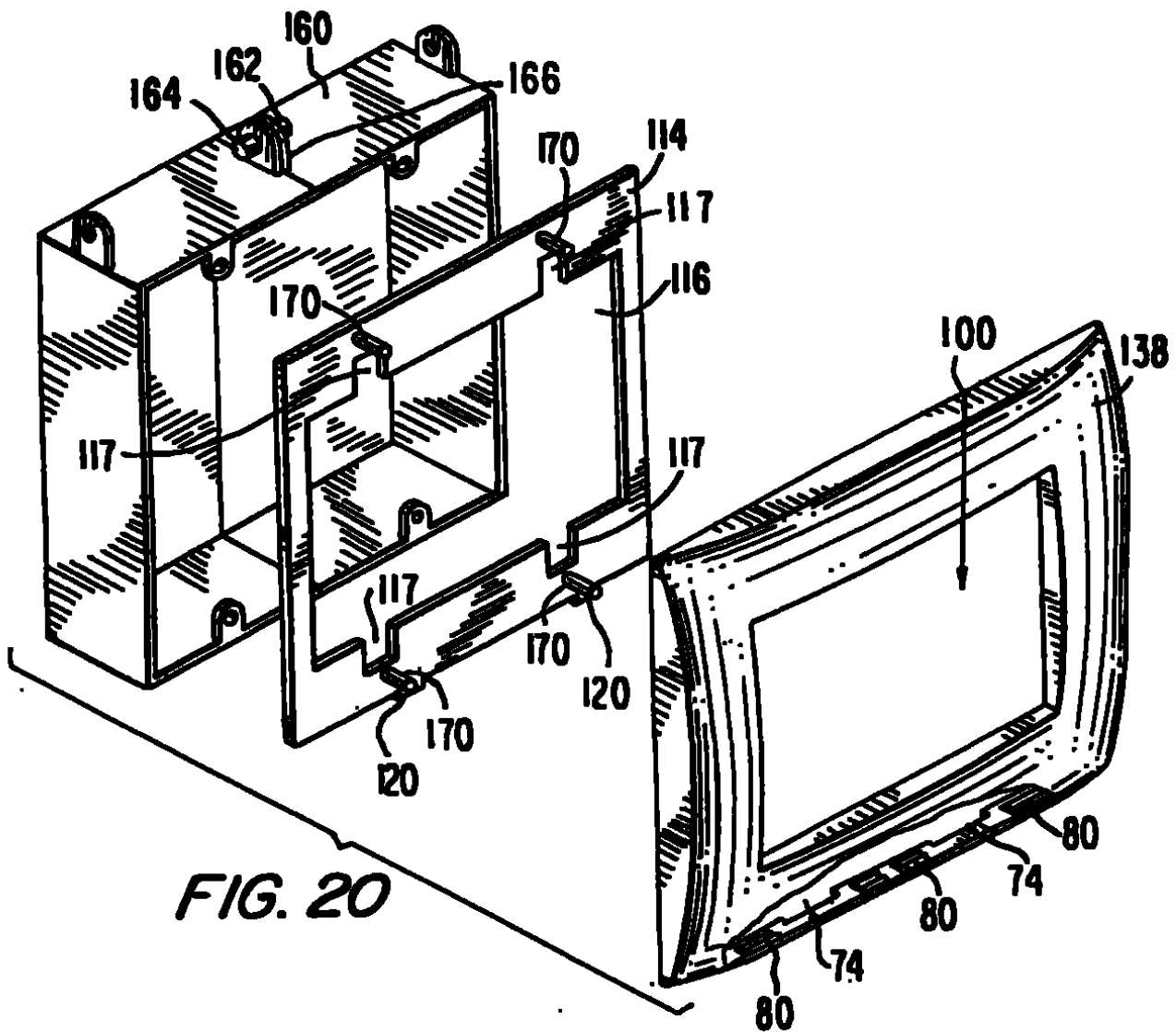


FIG. 20

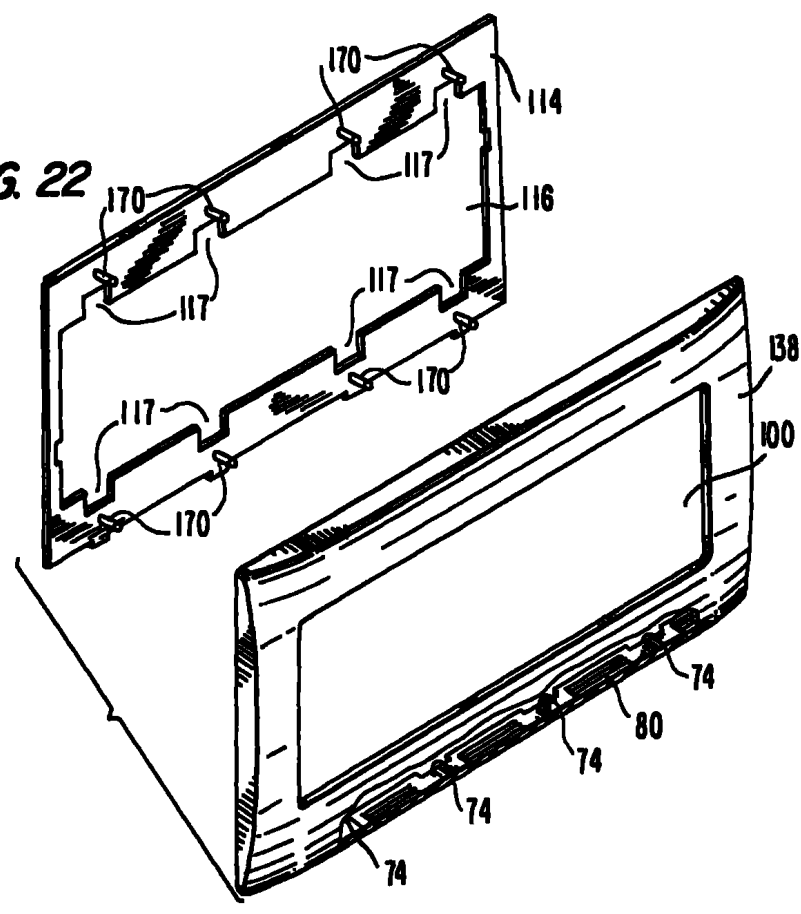


299

19/19

OK

FIG. 22



INTERNATIONAL SEARCH REPORT

International application No. **9**

PCT/US04/23817

295

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(7) : H01H 13/00, 3/00		
US CL : 200/339		
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) U.S. : 200/339, 523, 524, 541, 542, 547, 529, 533, 329, 557, 558, 563, 17R		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NONE		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,118,234 A (MARCELLUS et al) 12 September 2000 (12.09.2000), see entire document.	1-32
A	US 5,826,710 A (KUREK et al) 27 October 1998 (27.10.1998), see entire document.	1-32
A	US 5,500,498 A (KUREK et al) 19 March 1996 (19.03.1996), see entire document.	1-32
A	US 5,382,768 A (KUREK et al) 17 January 1995 (17.01.1995), see entire document.	1-32
A	US 5,041,706 A (OSIKA et al) 20 August 1991 (20.08.1991), see entire document.	1-32
A	US 4,300,026 A (BULL) 10 November 1981 (10.11.1981), see entire document.	1-32
A	US 3,609,268 A (SANCHEZ) 28 September 1971 (28.09.1971), see entire document.	1-32
☐ 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 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	"A" 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 11 July 2005 (11.07.2005)	Date of mailing of the international search report 19 JUL 2005	
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer JOSE G. DERS Telephone No. (571) 272-1607 	


296

INFORME DE BÚSQUEDA INTERNACIONAL	Solicitud internacional No. PCT/US04/23817
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A. CLASIFICACIÓN DE ASUNTO

IPC(7) : H01H 13/00, 3/00
 US CL : 200/339

Clasificación de patente internacional (CPI o IPC por sus siglas en inglés) o tanto clasificación nacional como internacional

B. CAMPOS DE BÚSQUEDA

Documentación mínima incluida en la búsqueda (sistema de clasificación seguida por símbolos de clasificación)
 U.S.: 200/339, 523, 524, 541, 542, 547, 529, 553, 329, 557, 558, 563, 17R

Documentación incluida en la búsqueda distinta de la documentación mínima, hasta el punto que dichos documentos se incluyen en los campos incluidos en la búsqueda
 NINGUNA

Base de datos electrónicos consultada durante el proceso de búsqueda internacional (nombre de la base de datos y, cuando sea práctico, términos de búsqueda utilizados)
 NINGUNA

C. DOCUMENTOS CONSIDERADOS RELEVANTES

Categoría *	Citación de documento, con indicación, donde sea apropiado, de los pasajes relevantes	Con relevancia a la reivindicación No.
A	US 6,118,234 (MARCELLUS et al) 12 de septiembre, 2000 (12.09.2000) ver el documento completo	1-32
A	US 5,826,710 A (KUREK et al) 27 de octubre, 1998 (27.10.1998), ver el documento completo.	1-32
A	US 5,500,498 A (KUREK et al) 19 de marzo, 1996 (19.03.1996), ver el documento completo.	1-32
A	US 5,382,768 A (KUREK et al) 17 de enero, 1995 (17.01.1995), ver el documento completo.	1-32
A	US 5,041,706 A (OSIKA et al) 20 de agosto, 1991 (20.08.1991), ver el documento completo.	1-32
A	US 4,300,026 A (BULL) 10 de noviembre, 1981 (10.11.1981), ver el documento completo.	1-32
A	US 3,609,268 A (SANCHEZ) 28 de septiembre, 1971 (28.09.1971), ver el documento completo.	1-32

☐ Más documentos aparecen listados en la continuación de la Casilla C. ☐ Ver anexo de familia de patentes.

	Categorías especiales de documentos citados:	"T"	documento posterior publicado después de la fecha de presentación internacional o de la fecha de prioridad y no en conflicto con la solicitud, pero citado para comprender los principios o la
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98 292

			teoría en la que se basa la invención
"A"	documento que define el estado general del arte, que no se considera particularmente relevante	"X"	documento particularmente relevante; la invención reivindicada no puede ser considerada novel ni se puede considerar que involucre un grado de inventiva cuando el documento se considera por sí mismo
"E"	solicitud anterior o patente publicada en la fecha de presentación internacional o posteriormente a ésta		
"L"	documento que puede crear dudas en reivindicaciones de prioridad, o que es citado para establecer la fecha de publicación de otro documento citado u otra razón especial (según se especifique)	"Y"	documento particularmente relevante; no se puede considerar que la invención reivindicada involucre un grado de inventiva cuando el documento se combina con uno o más de otros dichos documentos, tal combinación siendo obvia a una persona hábil en el arte
"O"	documento que se refiere a una revelación oral, uso, exhibición u otros medios		
"P"	documento publicado con anterioridad a la fecha de presentación internacional, pero con posterioridad a la fecha de prioridad reivindicada	"&"	documento miembro de la misma familia de patente

Fecha de terminación real de la búsqueda internacional 11 de julio, 2005 (12.07.2005)	Fecha de envío postal del informe de búsqueda internacional 19 JUL 2005
Nombre y dirección postal de ISA/US Mail Stop PCT, Atención: ISA/US Comisionado de patentes P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsímile No. (703) 305-3230	Funcionario autorizado JOSE G. DEES Teléfono No. (571) 272-1607

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 21 JUL 2005

WIPO

PCT

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bIs.1)

Date of mailing
(day/month/year) 19 JUL 2005

Applicant's or agent's file reference

FOR FURTHER ACTION

See paragraph 2 below

2030CIPPCT

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/US04/23817

23 July 2004 (23.07.2004)

25 July 2003 (25.07.2003)

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

IPC(7): H01H 13/00, 3/00 and US Cl.: 200/399, 523, 524, 541, 542, 547, 529, 553, 329, 557, 538, 563, 17R

Applicant

LEVITON MANUFACTURING CO., INC.

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/ US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1430
Alexandria, Virginia 22313-1430

Facsimile No. (703) 305-3230

Authorized officer

JOSE G. DEBS

Telephone No. (571) 272-1607

Form PCT/ISA/237 (cover sheet) (January 2004)

298

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No. **201**

PCT/US04/23817

299

Box No. I 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, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, 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

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table 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.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

102/300
International application No.
PCT/US04/23817

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

1. Statement

Novelty (N)	Claims 1-32	YES
	Claims NONE	NO
Inventive step (IS)	Claims 1-32	YES
	Claims NONE	NO
Industrial applicability (IA)	Claims 1-32	YES
	Claims NONE	NO

2. Citations and explanations:

Claims 1-32 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a switch having an articulated cam driver means coupled to be driven by a rocker paddle to urge a cam to rotate in first or second opposite direction.

Claims 1-32 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

TRATADO DE COOPERACIÓN EN MATERIA DE PATENTES

De la
ADMINISTRACIÓN A CARGO DE LA BÚSQUEDA INTERNACIONAL.
Para:
PAUL J. SUTTON
GREENBERG TRAURIG, LP
885 THIRD AVENUE
NUEVA YORK, NUEVA YORK 10022

RECIBIDO 21 JUL 2005

WIPOPCT

TCP

OPINIÓN POR ESCRITO DE LA
ADMINISTRACIÓN A CARGO DE LA BÚSQUEDA INTERNACIONAL
(Reglamento 43bis.1 del PCT)

Fecha de envío postal
(día/mes/año) 19 de julio de 2005

Referencia de archivo del agente o del solicitante 2030CIPPCT		ACCIÓN ADICIONAL Ver el párrafo 2 a continuación	
Solicitud internacional No. PCT/US04/23817	Fecha de presentación internacional (día/mes/año) 23 de julio de 2004 (23.07.2004)	Fecha de prioridad (día/mes/año) 25 de julio de 2003 (25.07.2003)	
Clasificación de patente internacional (CPI o IPC, por sus siglas en inglés) o tanto clasificación nacional como internacional IPC(7): H01H 13/00, 3/00 y US Cl.: 200/339, 523, 524, 541, 542, 547, 529, 553, 329, 557, 558, 563, 17R			
Solicitante LEVITON MANUFACTURING CO., INC.			

1. Esta opinión contiene indicaciones relacionadas con los siguientes puntos:
- ☒ Casilla No. I Bases de la opinión
 - ☐ Casilla No. II Prioridad
 - ☐ Casilla No. III Falta de establecimiento de opinión con respecto a originalidad, grado de inventiva y aplicabilidad industrial
 - ☐ Casilla No. IV Falta de unidad de la invención
 - ☒ Casilla No. V Declaración razonada de acuerdo al Reglamento 43bis.1(a)(i) con respecto a novedad, grado de inventiva o aplicabilidad industrial; menciones y aclaraciones de apoyo a dicha declaración
 - ☐ Casilla No. VI Ciertos documentos citados
 - ☐ Casilla No. VII Ciertos defectos en la solicitud internacional
 - ☐ Casilla No. VIII Ciertas observaciones en la solicitud internacional

2. ACCIÓN ADICIONAL

168 302

Si se hace una petición de examen preliminar internacional, esta opinión será considerada como opinión por escrito de la Administración encargada del examen preliminar internacional de patentes ("IPEA" por sus siglas en inglés) con la excepción de que esto no se aplica cuando el solicitante elige una Administración distinta a ésta para ser la Administración encargada del examen preliminar internacional y la Administración encargada del examen preliminar internacional seleccionada ha notificado a la Oficina internacional, de acuerdo al Reglamento 66.1*bis*(b), que opiniones por escrito de esta Administración a cargo de la búsqueda internacional no serán consideradas.

Si esta opinión, según se indica anteriormente, se considera una opinión por escrito de la Administración encargada del examen preliminar internacional, se invita al solicitante a presentar a la Administración encargada del examen preliminar internacional una respuesta por escrito junto, cuando sea necesario, con enmiendas, antes de la fecha de expiración 3 meses después de la fecha de envío postal del Formulario PCT/ISA/220 o antes de la fecha de expiración 22 meses después de la fecha de prioridad, la que sea posterior.

Para ver más opciones, vea el Formulario PCT/ISA/220.

3. Para ver más detalles, vea las notas en el Formulario PCT/ISA/220.

Nombre y dirección postal de ISA/ US Mail Stop PCT, Atención: ISA/US Comisionado de patentes P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Funcionario autorizado JOSE G. DIES Teléfono No. (517) 272-1607
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OPINIÓN POR ESCRITO DE LA ADMINISTRACIÓN A CARGO DE LA BÚSQUEDA INTERNACIONAL	Solicitud internacional No. PCT/US04/23817
Casilla No. I Bases de esta opinión	

1. Con respecto al idioma, esta opinión ha sido establecida basada en la solicitud internacional en el idioma en que fue presentada, a menos que se indique lo contrario en este punto.
- ☐ Esta opinión ha sido establecida basada en la traducción del idioma original al siguiente idioma _____, que es el idioma de una traducción entregada con el propósito de realizar la búsqueda internacional (de acuerdo a los Reglamentos 12.3 y 23.1(b)).
2. Con respecto a cualquier secuencia de nucleótidos y/o aminoácidos indicada en la solicitud internacional y necesaria a la invención reivindicada, esta opinión ha sido establecida en base a:
- a. tipo de material

☐ lista de secuencia

☐ todas las tablas relacionadas con la lista de secuencia:

b. formato del material

☐ en formato por escrito

☐ para ser vista en computadora

c. momento de presentación/entrega

☐ contenida en la solicitud internacional según fue presentada.

☐ presentada junto con la solicitud internacional para ser vista en computadora.

☐ entregada posteriormente a esta Administración con el propósito de búsqueda.
3. ☐ Además, en caso de que más de una versión o copia de una lista de secuencia y/o tabla relacionada haya sido presentada o entregada, según corresponda, se entregaron las declaraciones requeridas que indican que la información en las copias adicionales o posteriores es idéntica a aquella contenida en la solicitud tal y como se presentó o no va más allá de la solicitud tal y como se presentó.
4. Comentarios adicionales:

106304

OPINIÓN POR ESCRITO DE LA ADMINISTRACIÓN A CARGO DE LA BÚSQUEDA INTERNACIONAL	Solicitud internacional No. PCT/US04/23817
Casilla No. V Declaración razonada de acuerdo al Reglamento 43 <i>bis</i> .1(a)(i) con respecto a novedad, grado de inventiva o aplicabilidad industrial; menciones y aclaraciones de apoyo a dicha declaración	

1. Declaración

Originalidad	Reivindicaciones 1-32	SÍ
	Reivindicaciones NINGUNA	NO
Grado de inventiva	Reivindicaciones 1-32	SÍ
	Reivindicaciones NINGUNA	NO
Aplicabilidad industrial	Reivindicaciones 1-32	SÍ
	Reivindicaciones NINGUNA	NO

2. Menciones y aclaraciones:

Las reivindicaciones 1-32 cumplen con los criterios establecidos en el Artículo 33(2)-(3) del Tratado de cooperación en materia de patentes (TCP o PCT por sus siglas en inglés), debido a que el arte (diseño) anterior no muestra ni sugiere un medio impulsor de leva articulado acoplado para ser impulsado por una paleta basculante para hacer girar una leva en una dirección y luego en la dirección opuesta.

Las reivindicaciones 1-32 cumplen con los criterios establecidos en el Artículo 33(4) del Tratado de cooperación en materia de patentes (TPC o PCT por sus siglas en inglés), y por ello son aplicables industrialmente porque el tema reivindicado puede ser fabricado o usado industrialmente.

PA 1440886



157 100537
(2/2)
305

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

March 17, 2006

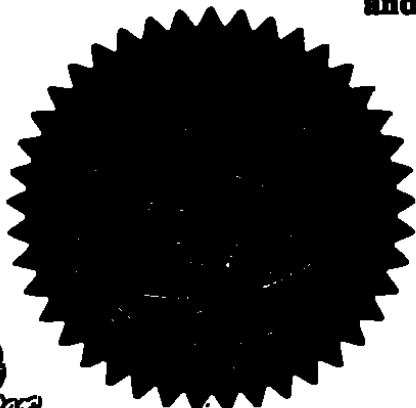
THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE UNDER 35 USC 111.

APPLICATION NUMBER: 10/859,303

FILING DATE: June 01, 2004

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US10/859,303

**By Authority of the
Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office**



N. Williams
N. WILLIAMS

Certifying Officer

180 306

17236 U.S. PTO

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
0267-001-2030CIP

Total Pages in this Submission
84

TO THE COMMISSIONER FOR PATENTS

Mail Stop Patent Application
P.O. Box 1450
Alexandria, VA 22313-1450

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

ROCKER PADDLE SWITCH WITH ARTICULATED CAM DRIVER

Invented by:

Anthony Tufano; Dennis Oddsen; Paul Endres; Stephen R. Kurek

17497 U.S. PTO
10/859303

If a CONTINUATION APPLICATION, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☒ Continuation-in-part (CIP) of prior application No.: 10/627,224

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 41 pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☐ Cross References to Related Applications (if applicable)
 - c. ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
 - d. ☐ Reference to Sequence Listing, a Table, or a Computer Program Listing Appendix
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings (if filed)
 - h. ☒ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☒ Abstract of the Disclosure

✓ 307

UTILITY PATENT APPLICATION TRANSMITTAL (Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
0267-001-2030CIP

Total Pages in this Submission
84

Application Elements (Continued)

3. ☒ Drawing(s) (when necessary as prescribed by 35 USC 113)
- a. ☒ Formal Number of Sheets 38
- b. ☐ Informal Number of Sheets _____
4. ☐ Oath or Declaration
- a. ☐ Newly executed (original or copy) ☐ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional application only)
- c. ☐ With Power of Attorney ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference (usable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ CD ROM or CD-R in duplicate, large table or Computer Program (Appendix)
7. ☐ Application Data Sheet (See 37 CFR 1.76)
8. ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all must be included)
- a. ☐ Computer Readable Form (CRF)
- b. ☐ Specification Sequence Listing on:
- I. ☐ CD-ROM or CD-R (2 copies); or
- II. ☐ Paper
- c. ☐ Statement(s) Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

9. ☐ Assignment Papers (cover sheet & document(s))
10. ☐ 37 CFR 3.73(B) Statement (when there is an assignee)
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure Statement/PTO-1449. ☐ Copies of IDS Citations
13. ☐ Preliminary Amendment
14. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☒ Certificate of Mailing
- ☐ First Class ☒ Express Mail (Specify Label No.): EV 316898482 US

HW 308

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
0267-001-2030CIP

Total Pages in this Submission
84

Accompanying Application Parts (Continued)

17. ☐ Additional Enclosures (please identify below):

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

18. ☐ Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

111 309

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
0267-001-2030CTP

Total Pages in this Submission
84

Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	32	- 20 =	12	x \$18.00	\$216.00
Indep. Claims	3	- 3 =	0	x \$84.00	\$0.00
Multiple Dependent Claims (check if applicable) ☐					\$0.00
BASIC FEE					\$770.00
OTHER FEE (specify purpose)					\$0.00
TOTAL FILING FEE					\$986.00

- ☐ A check in the amount of _____ to cover the filing fee is enclosed.
- ☒ The Director is hereby authorized to charge and credit Deposit Account No. 12-1185 as described below.
- ☒ Charge the amount of \$986.00 as filing fee.
- ☒ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.18 and 1.17..
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Signature

Paul J. Sutton, Esq.
Reg. No. 24,201
GREENBERG TRAURIG, LLP
885 Third Avenue
New York, NY 10022
Tel. No. 212.901.2108

Dated: June 1, 2004

cc:

112 310

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)

Applicant(s): Anthony Tufano et al.

Docket No.

0267-001-2030CIP

Serial No. TBD	Filing Date 06/01/2004	Examiner TBD	Group Art Unit TBD
--------------------------	----------------------------------	------------------------	------------------------------

Invention: ROCKER PADDLE SWITCH WITH ARTICULATED CAM DRIVER

I hereby certify that the following correspondence:

New Patent Application including 41 pages of specs., claims, Abstract; 38 sheets of formal drawings; Utility Patent Application Transmittal

(Identify type of correspondence)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on

June 1, 2004
(Date)

Marilyn Dawkins
(Typed or Printed Name of Person Mailing Correspondence)

Marilyn Dawkins
(Signature of Person Mailing Correspondence)

EV 316898482 US
("Express Mail" Mailing Label Number)

Note: Each paper must have its own certificate of mailing.

ROCKER PADDLE SWITCH WITH ARTICULATED CAM DRIVER

This application is a continuation in part of application Ser. No. 10/627,224, filed July 25, 2003.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to the field of electrical wiring devices such as, by way of example only, electrical switches and receptacles of the type installed in building walls, and more specifically to a robust electrical wiring device system whose components may be modular and interchangeable and which provide a substantially unified blended appearance when combined with one another. The present patent specification describes such a robust system and, in whole or in part, is common in part to several patent applications whose claims vary and/or are directed to portions and/or components of the robust system.

Description of the Related Art

When modifying the wiring in an existing building, whether public, commercial or residential by adding a wiring device such as a switch, a receptacle or a combination of a receptacle and a switch, it is necessary to cut a hole in a wall of the building, install a box within the hole, attach the box to a vertical stud, for example, and install the wiring device(s) into the box. In new construction, the box is attached to a stud of an open wall and, thereafter, the wall, which may be sheet rock having an opening for access to the box, is placed over the studs. The conventional wall box has pairs of mounting ears for mounting the wiring devices to the box. After the wiring devices are connected to the various conductors they will service, each is fastened with threaded fasteners (sometimes referred to as bolts or screws, and these terms are used interchangeably herein) to a pair of ears on the box. The process of connecting a wiring device to various conductors and then attaching the wiring device with the attached wires to the box is done for each wiring device located within the box. Thereafter, a wall plate is typically positioned around or over each of the wiring devices in the box.

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Typical installations can include a single wiring device or multiple wiring devices positioned side by side in a common box. In installations where there are multiple wiring devices in a common box, the installation of the wall plate can be time consuming. This is so because a wall plate for use with multiple wiring devices has a separate window opening for each wiring device. Thus, the wiring devices must be aligned with each other, must be positioned parallel to each other and must be spaced from each other by a distance that is dictated by the spacing between the openings or windows in the wall plate. Misalignment and positioning problems are often caused by wall boxes that are skewed relative to the wall or by walls which may not be flat. It is only after all of the wiring devices are accurately positioned relative to each other that a wall plate can be installed around the wiring devices.

A common type of electrical wiring device in use today is the rocker type Decora-branded electrical switch whose activating member pivots about a centrally located horizontal axis. The trademark Decora is owned by the assignee of the present invention. To operate, the rocker switch actuating member is pushed in at the top to supply electricity to a load such as a light, and is pushed in at the bottom to disconnect the source of electricity from the load. Thus, with two or more rocker type of switches positioned side by side in a box, the actuating members of the switches can be in opposite positions at any one time. For example, with two rocker type switches positioned side-by-side in a box, what will be called the top edge associated with the "on state or position" of the actuating member of one switch will be flush with the top surface of the wall plate when in its on position while, at the same time, the top edge of the adjacent switch will be flush with the bottom surface defining the opening of the wall plate when in its off position. This in-out positioning of adjacent switches can also occur when both switches are in their on or off state if one or each of the switches is a 3-way or 4-way switch. The irregular in-out positioning of adjacent switches, particularly with 3-way and 4-way switches, can create operational uncertainty in the mind of the user as to which switch is in the on position and which switch is in the off position when subsequent activation or deactivation of less than all of the rocker switches is required by a user.

Thus, what is needed is a rocker type of switch that is always in the same position i.e., bottom edge out, top edge in, regardless of its state of conduction, i.e., on or off. What is also needed is a switch which, when positioned side by side with another or other switches in a common box, that the switches are always aligned with each other regardless of whether they are in their on state or off state.

SUMMARY OF THE INVENTION

There is disclosed an on-off switch operated by pushing on the lower portion of a rocker paddle to turn the switch on or off. The lower edge of the rocker paddle pivots in and out about its upper edge. The rocker paddle of the switch is not located within a frame and has, along its vertical axis, a surface of positive first differential and zero second differential, comprised of a combination of splines which extend between points of varying distances from a datum plane. The surface has zero second differential when the rate of height increase of individual splines is constant.

An articulated cam driver coupled to the rocker paddle of the switch causes a cam to rotate in a clockwise direction and in a counter clockwise direction each time the rocker paddle is depressed. Alternate rotation of the cam drives a slider member having a cam follower back and forth along a linear axis. A shaped leaf spring cooperates with the cam follower to assist in the movement of the slider and to determine its rest positions. A spring, which is part of the articulated cam driver urges the lower portion of the rocker paddle to be in its out position when the switch is in its on and off position. An indicator such as an LED is used to indicate the state of conduction of the switch.

The foregoing has outlined, rather broadly, a preferred blending of features, for example, of the present invention so that those skilled in the art may better understand the detailed description of the invention that follows. Additional features of the invention will be described hereinafter that form the subject of the claims of the invention. Those skilled in the art should appreciate that they can readily use the disclosed conception and specific embodiment as a basis for designing or modifying other structures for carrying out the same purposes of the present invention and that such other structures do not depart from the spirit and scope of the invention in its broadest form.

BRIEF DESCRIPTION OF THE DRAWINGS

Other aspects, features, and advantages of the present invention will become more fully apparent from the following detailed description, the appended claim, and the accompanying drawings in which similar elements are given similar reference numerals.

Fig. 1 is a front perspective view of a prior art switch and wall plate;

Fig. 2 is a perspective exploded view of a prior art switch, attachment plate and wall plate, and a box for receiving said prior art device;

Fig. 3 is a front perspective view of a switch and wall plate in accordance with the principles of the invention;

Fig. 4 is a front perspective view of the switch shown in Fig. 3 showing the ground/mounting strap and multi-function clips;

Fig. 5 is an exploded view of attachment plate, switch and wall plate according to the principles of the invention;

Fig. 6 is a front view of a receptacle and wall plate according to the principles of the invention;

Fig. 7 is a front perspective view of a receptacle shown in Fig. 6 showing the ground/mounting strap and multi-function clips;

Fig. 8 is an exploded view of the attachment plate, receptacle and wall plate according to the principles of the invention;

Fig. 9 is a front perspective view of alignment plate for a single wiring device;

Fig. 10 is a perspective view of ground/mounting strap for a wiring device;

Figs. 11 and 11A are bottom perspective views showing ground/mounting strap attached to a switch (Fig. 11) and a receptacle (Fig. 11A);

Fig. 12 is a plan view of multi-function clip normally attached to the bottom end of the ground/mounting strap;

Fig. 12A is a side view of the multi-function clip of Fig. 12;

Fig. 13 is a plan view of multi-function clip normally attached to the top end of the ground/mounting strap;

Fig. 13A is a sectional view of the multi-function clip along line A-A of Fig. 13;

Fig. 14 is an exploded view of a switch in accordance with the principles of the invention;

Fig. 15 is a perspective view of the base assembly of the switch of Fig. 14;

11/3/05

Fig. 16 is an exploded view of the base assembly of Fig. 15;

Fig. 17 is another exploded view of the switch;

Fig. 18 is still another exploded view of the switch;

Fig. 19 is a partial sectional exploded view of the cam driver of the switch;

Fig. 20 is a perspective exploded view of the switch showing the light assembly board;

Fig. 21A is a plan view of the light assembly board;

Fig. 21B is a bottom perspective view of the light assembly board;

Fig. 22 is a perspective exploded view showing the light pipe in the paddle of the switch;

Fig. 23 is a perspective view of the light pipe;

Fig. 24 is a sectional view along the line 24-24 of Fig. 3;

Figs. 25A-25C are sectional views along the line 25A-25A, 25B-25B, 25C-25C of the paddle of Fig. 14;

Fig. 26 is a perspective exploded view of the switch with another cam driver;

Fig. 27 is a sectional view along the line 24-24 of Fig. 3 where the cam driver is that of

Fig. 26;

Fig. 28 is a perspective exploded view of the switch with still another cam driver;

Fig. 29 is a sectional view along the line 24-24 of Fig. 3 where the cam driver is that of Fig. 28;

Fig. 30 is a front perspective view of a wall plate for a single wiring device;

Fig. 31A-31C are sectional views along the lines 31A-31A to 31C-31C of the wall plate of Fig. 30;

Fig. 32 is a sectional view of the bottom edge of the wall plate along the line 32A-32A of Fig. 30;

Fig. 33 is a sectional view of the top edge of the wall plate along the line 33A-33A of Fig. 30;

Figs. 34, 34A are views of the top edge of the wall plate of Fig. 30 showing the channel and identifying structure;

11/2 316

Fig. 35 is a fragmentary, enlarged perspective of the latching pawl of the multi-function clip engaging the tooth rack of the wall plate;

Fig. 36 is a fragmentary, enlarged sectional side view of the wall plate and tab of the alignment plate to indicate how the two components can be separated following latching;

5 Fig. 37 is an exploded perspective view of a box, alignment plate and wall plate for two wiring devices;

Fig. 38 is an exploded view of alignment plate and wall plate for three wiring devices;

Fig. 39 is an exploded view of alignment plate and wall plate for four wiring devices;

Fig. 40 is an exploded view of alignment plate and wall plate for five wiring devices; and

10 Fig. 41 is an exploded view of alignment plate and wall plate for six wiring devices.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to Fig. 1, there is illustrated a front perspective view of a "Decora" type electrical wall-type switch 18 and wall plate 16, as part of an assembly 10 of the prior art.

15 Referring to Fig. 2, there is shown a perspective exploded view of the prior art device of Fig. 1 of wall box 13, electrical wiring device such as switch 18, attachment plate 30 and wall plate 16. A suitable aperture is cut into a wall to provide access for the box 13 for mounting to a stud 15, or to permit installation of a suitable box to an adjacent stud or directly to the material of the wall (such as plasterboard). The box 13 is chosen to be large enough to accept as many wiring
20 devices as are to be mounted therein. The box 13 is made of metal or plastic, depending upon local Code requirements, and has one or more openings in its sides or back to permit the introduction of electrical wiring or cables into the interior of the box 13. Box 13 has mounting means 19 to permit the box to be anchored to the adjacent stud 15. The box supports a pair of mounting ears 21 for each wiring device that is to be mounted within the box. Each mounting
25 ear contains a threaded aperture 23 to which is fastened a mounting screw of the wiring device such as, for example, rocker switch 18 or a receptacle. In the normal order of assembly, electrical cables are passed through knock out openings 17, for example, to the interior of the box. The ends of the electrical cables are stripped of insulation and attached to terminals (contacts) on the side or rear of the body 20 of the switch 18 or a receptacle. After the electrical

cables are attached to terminals on the side or rear of the body of the switch, the switch is pushed into the box and held in position by screws (not shown) that are passed through clearance openings such as elongated mounting slots 25 and threaded into openings 23 of ears 21 to mount switch 18 within and to the box 13. Thereafter, attachment plate 30 is positioned around the front of the switch and secured to the switch with mounting screws 26 which pass through clearance openings 32 in the attachment plate and are threaded into openings 24 formed in the mounting/ground strap of the wiring device. Attachment plate 30 also contains a main aperture 34 of a shape complimentary with the profile of the front of the switch 18 which extends through it. Aperture 34 in Fig. 1 is rectangular to accept the front of the switch 18 or a receptacle. The head of the screw which passes through aperture 25 of switch 18 and engages threaded opening 23 of mounting ears 21 is larger than the aperture 25 and, therefore, holds switch 18 or a receptacle captive to the box 13 and to the wall surface (not shown). In a similar manner, the head of the screw which passes through aperture 32 of the attachment plate 30 and engages threaded opening 24 of the ground strap of the switch is larger than the aperture 32 and, therefore, holds attachment plate 30 captive to the switch 18.

At each of the ends 36, 38 respectively, of attachment plate 30 are two latching pawls 40, 42 which are formed as extensions of attachment plate 30 but are thinner in cross-section. One end 36 also terminates in an angled leg 48 which extends at about a 45 degree angle with respect to the horizontal edge of end 38 of wall plate 30 and is used to help release an attached wall plate.

Wall plate 16 is proportioned to fit over attachment plate 30 and box 13 into which the single wiring device, such as rocker switch 18, or a receptacle is placed and to which it is fastened.

To attach wall plate 16 to attachment plate 30, pawls 40, 42 of attachment plate 30 are made to engage saw-tooth shaped racks 81 on the inner surfaces of end walls 70 and 72 of wall plate 16 as the wall plate is pushed in.

Fig. 3 is a front perspective view of a wiring device such as switch 110 and wall plate 138 in accordance with the principles of the present invention; Fig. 4 is a front perspective view of the switch 110 of Fig. 3 showing ground/mounting strap and multi-function clips; and Fig. 5 is an exploded view of Fig. 3 showing attachment plate, switch and wall plate. Referring to Figs. 4 and 5, the switch 110 has an actuating paddle 111 which pivots about an axis at its upper end and

120

318

is biased by an internally located spring member to assume the same at-rest position when in its "on" and "off" position. Repeated pressing and releasing on the face of the paddle 111 of the switch alternately closes and opens a set of contacts within the switch body to alternately connect and disconnect a load such as a light with a source of electricity each time the paddle is pressed and released. Thus, regardless of whether ganged switches are on-off switches, 3-way switches or 4-way switches, the top and bottom edges of each switch will always be aligned with the top and bottom edges of all the other switches of the gang. An on-off indicator such as a light 112 is provided in the paddle to indicate to a user when the switch is in its on position or off position. For example, when the light 112 is on, the switch will be in its off position, and when the light is off, the switch will be in its on position. The paddle 111 of the switch is not located within a frame and functionally complements the wall plate 138. The paddle of the switch has a length-width ratio dimension and surface configuration which provides a contact surface of increased size which is more easy to identify and use.

The switch 110 is attached to a ground/mounting strap 123 having ends 122 which provide increased surface area for contact with the surface of a wall and provides support for multi-function clips 130, 151 attached to the ends 122 by fastener means such as screws, rivets, spot welds, pressure bonding, TOX process or the like.

Referring to Fig. 10, there is shown a perspective view of the ground/mounting strap 123 for a wiring device such as switch 110. Strap 123 has a base support member 150 located between two intermediate support members 152 bent at right angles to the base member 150 and which terminate with an outward projecting end 122. The two intermediate support members 152 and the base support member cradles and are securely attached to the wiring device, such as switch 110, with rivets, screws or the like 155 (see Fig. 11 which is a bottom perspective view showing ground/mounting strap attached to a switch) which pass through openings 154 in the base support member. A ground terminal 163 which projects out from the ground/mounting strap and having a threaded opening for receiving a screw 125 is provided for connection to a ground wire. Each end 122 of the strap 123 is rectangular in shape and has two openings 126 and 128. Opening 126 can be circular, oval, square or rectangular and is a clearance opening for mounting screws 108 which can be provided by the manufacturer of the wiring device for attaching the wiring device to a box. The distance between centers of openings 126 in ends 122 of the ground/mounting strap is equal to the distance between the centers of openings 23 in ears 21 of box 13 (see Fig. 2) to allow mounting screws 108 to engage and be held captive by

12/319

threaded openings 23. Opening 128 in each end 122 of the strap is a clearance opening for an alignment pin which is a part of and is located on an alignment plate. Additional openings can be provided in the ends 122 for attaching and/or aligning a clip to the end of the ground/mounting strap. The ends 122 are flat rectangular members which provide an increased area for increased contact with a wall surface. See Fig. 2 which shows the relatively small ends of a prior art ground/mounting strap where, if the scored washers 31 are removed from the strap, the only surface left for contact with a wall surface is the material around the opening of the mounting ear 21.

The end 122 of ground /mounting strap 122 has a width "X" of about 1.563 inches and a depth "Y" of about 0.318 inches. These dimensions are not critical. However, the distance between the edges 129 of the ends 122 of the strap should not be greater than 4.6 inches to allow a wall plate to fit over and cover the ground/mounting strap. The ground/mounting strap 123 can be of sheet metal and is secured to the switch with screws, rivets or any convenient fastening means 155. Screw terminals 126 located on either side of the body of the switch are provided to receive phase and neutral wire conductors, not shown.

Multi-function clips 130, 151 are attached to the ends 122 of the ground/mounting strap. The multi-function clips can be composed of phosphor bronze, spring brass, spring steel or the like. Referring to Fig. 12, there is shown a plan view of multi-function clip 130 normally attached to the bottom end of the ground/mounting strap, and Fig. 12A is a side view of the multi-function clip 130 of Fig. 12. Clip 130 is the clip that is attached to the bottom end 122 of ground/mounting strap 123 and has openings 132 and 134. When clip 130 is attached to the end of ground/mounting strap, opening 132 is aligned with opening 126 of the ground/mounting strap, and opening 134 is aligned with opening 128 in the strap end 122. Opening 132 is a clearance opening for a threaded fastener such as screw 108 used to couple the wiring device to a box. Opening 132 can be round, square, oval or rectangular to allow the threaded fastener to be moved up, down and sideways so the fastener can be aligned with the threaded opening in the box when connecting the wiring device to the box.

Opening 134 in clip 130 is substantially circular and has three inwardly projecting members 133 bent upward at an angle of between 10 degrees and 30 degrees toward the face of the wiring device. An angle of 20 degrees was found to be preferred. The ends of the three projecting members 133 form an opening slightly smaller than the outer diameter of an alignment

122 320

pin 118 on an alignment plate (see Fig. 9) and flex or bend upward as the alignment pin enters the opening 134 from the rear. The ends of the projecting members 133 frictionally engage and hold captive the alignment pin to inhibit its easy removal from the multi function clip. Located at the end 147 of clip 130 are latching pawls 140 each slightly more than one-half of an inch in length. The end 149 of each latching pawl 140 is bent upward at an angle of between 20 degrees and 60 degrees and is used to engage tooth shaped racks on the inside surface of the ends of a wall plate to hold the wall plate captive (see Fig. 35). The ends 149 of the latching pawls 140 capture and securely hold the wall plate when the upward bend of the latching pawl 140 is between 20 degrees and 60 degrees, where a bend of about 40 degrees was found to be preferable. The multi-function clip 130 is just that, a clip which performs a plurality of functions not disclosed in the prior art.

The opening 143 in the multi-function clips can be provided for attaching the clip to the end of the ground/mounting strap with, for example, rivets, screws, the TOX process etc. Openings 145 can be provided for alignment purposes when attaching the clip to the end of the strap. The distance between the side edges 154 of the clip should not exceed 1.533 inches to allow the clip to be attached to the end of the mounting/ground strap without extending over the side edges of the strap 123. The clip shown in Figs. 12 and 12A is the clip that is attached to the bottom end of the ground/mounting strap.

Referring to Figs. 13, there is shown a plan view of the multi-function clip normally attached to the top end of the ground/mounting strap and Fig. 13A is a sectional side view of the multi-function clip along line AA of Fig. 13. The clip shown in Figs. 13 and 13A is similar to the clip shown in Figs. 12 and 12A except that end 157 of clip 151 is bent upward and opening 153 for the threaded fastener has a tab 155 which extends into opening 153, and is bent at a slight downward angle toward the back of the switch. Tab 155 is provided to engage and hold captive the threaded body of fastener 108 and, in addition, helps to provide a ground connection between the strap and the threaded fastener to insure that the switch is connected to ground. As with clip 130, openings 153 in clip 151 and opening 126 in the strap are aligned with each other during assembly to permit the fastening means to be aligned with the threaded opening in the box as the switch is being attached to the box. The distance between the edges 147 of the clips should not exceed 1.533 inches to allow the clip to be attached to the end of the ground/mounting strap without extending over the side edges of the ends 122 of the strap 123.

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Referring to Fig. 6, there is shown a front view of a receptacle and wall plate according to the principles of the invention; Fig. 7 is a front perspective view of the receptacle 520 of fig. 7 showing ground/mounting strap and multi-function clips; and Fig. 8 is an exploded view of Fig. 6 showing attachment plate, receptacle plate, receptacle and wall plate. Referring to Figs. 7 and 8, the receptacle 520 is intended for 15 Amp. 125 VAC to 20 Amp. 125 VAC (not illustrated) where, according to NEMA specification 5-15R, each individual receptacle has two slot openings 524 and 526 for receiving the flat blades of a suitable plug and a semi-circular ground blade opening 528. Opening 526 is larger than the opening 524 to allow a two blade plug to be inserted in only one way to maintain correct electrical polarization. The contact in the larger slot is connected to the neutral conductor and, by maintaining the correct polarization, the external metal parts of appliances such as toasters, TV's etc. can be grounded through the neutral conductor. The semi-circular ground blade prevents a plug from making a reverse polarity connection with the receptacle.

Receptacle 520 is attached to a ground/mounting strap 123 having ends 122 which provide increased surface area for contact with the surface of a wall and provides support for multi-function clips 130, 151 attached to the ends 122 by fastening mean such as screws, rivets, spot welds, pressure bonding, TOX process or the like.

Referring to Fig. 10, there is shown a perspective view of the ground/mounting strap 123 for a wiring device such as receptacle 520. Strap 123 has a base support member 150 located between two intermediate support members 152 bent at right angles to the base member 150 and which terminates with an outward projecting end 122. The two intermediate support members 152 and the base support member cradles and are securely attached to the receptacle 520 with rivets, screws or the like (see Fig. 11A which is a bottom perspective view showing ground/mounting strap attached to a receptacle) which pass through openings 154 in the base support member. A ground terminal 163 which projects out from the ground/mounting strap and having a threaded opening for receiving a screw 125 is provided for connection to a ground wire. Each end 122 of the strap 123 is rectangular in shape and has two openings 126 and 128. Opening 126 can be circular, oval, square or rectangular and is a clearance opening for mounting screws 108 which can be provided by the manufacturer of the wiring device for attaching the wiring device to a box. The distance between centers of openings 126 in ends 122 of the ground/mounting strap is equal to the distance between the centers of openings 23 in ears 21 of box 13 (see Fig. 2) to allow mounting screws 108 to engage and be held captive by threaded

openings 23. Openings 128 in each end 122 of the strap is a clearance opening for an alignment pin which is a part of and is located on an alignment plate. Additional openings can be provided in the ends 122 for attaching and/or aligning a clip to the end of the ground/mounting strap. The ends 122 are flat rectangular members which provide an increased area for increased contact with a wall surface. See Fig. 2 which shows the relatively small ends of a prior art ground/mounting strap where, if the scored washers 31 are removed from the strap, the only surface left for contact with a wall surface is the material around the opening of the mounting ear 21. The end 122 of ground /mounting strap 122 has a width "X" of about 1.563 inches and a depth "Y" of about 0.318 inches. These dimensions are not critical. However, the distance between the edges 129 of the ends 122 of the strap should not be greater than 4.6 inches to allow a wall plate to fit over and cover the ground/mounting strap. The ground/mounting strap 123 can be of sheet metal and is secured to the receptacle with screws, rivets or any convenient fastening means 155. Screw terminals 126 located on either side of the body of the receptacle are provided to receive phase and neutral wire conductors, not shown.

Multi-function clips 130, 151 are attached to the ends 122 of the ground/mounting strap. The multi-function clips can be composed of phosphor bronze, spring brass, spring steel or the like. Referring to Fig. 12, there is shown a plan view of multi-function clip 130 normally attached to the bottom end of the ground/mounting strap, and Fig. 12A is a side view of the multi-function clip 130 of Fig. 12. Clip 130 is the clip that is attached to the bottom end 122 of ground/mounting strap 123 and has openings 132 and 134. When clip 130 is attached to the end of the ground/mounting strap, opening 132 is aligned with opening 126 of the ground/mounting strap, and opening 134 is aligned with opening 128 in the strap end 122. Opening 132 is a clearance opening for a threaded fastener such as screw 108 used to couple the wiring device to a box. Opening 132 can be round, square, oval or rectangular to allow the threaded fastener to be moved up, down and sideways so the fastener can be aligned with the threaded opening in the box when connecting the wiring device to the box.

Opening 134 in clip 130 is substantially circular and has three inwardly projecting members 133 bent upward at an angle of between 10 degrees and 30 degrees toward the face of the wiring device. An angle of 20 degrees was found to be preferred. The ends of the three projecting members 133 form an opening slightly smaller than the outer diameter of an alignment pin 118 on an alignment plate (see Fig. 9) and flex or bend upward as the alignment pin enters the opening 134 from the rear. The ends of the projecting members 133 frictionally engage and

125 323

hold captive the alignment pin to inhibit its easy removal from the multi function clip. Located at the end 147 of clip 130 are latching pawls 140 each slightly more than one-half of an inch in length. The end 149 of each latching pawl 140 is bent upward at an angle of between 20 degrees and 60 degrees and is used to engage tooth shaped racks on the inside surface of the ends of a wall plate to hold the wall plate captive (see Fig. 35). The ends 149 of the latching pawls 140 capture and securely hold the wall plate when the upward bend of the latching pawl 140 is between 20 degrees and 60 degrees, where a bend of about 40 degrees was found to be preferable. Multi-function clip 130 is just that, a clip which performs a plurality of functions not disclosed in the prior art.

The opening 143 in the multi-function clips can be provided for attaching the clip to the end of the ground/mounting strap with, for example, rivets, screws, the TOX process etc. Openings 145 can be provided for alignment purposes when attaching the clip to the end of the strap. The distance between the side edges 154 of the clip should not exceed 1.533 inches to allow the clip to be attached to the end of the mounting/ground strap without extending over the side edges of the strap 123. The clip shown in Figs. 12 and 12A is the clip that is attached to the bottom end of the ground/mounting strap.

Referring to Fig. 13, there is shown a plan view of multi-function clip normally attached to the top end of the ground/mounting strap and Fig 13A is a sectional side view of the multi-function clip along line A-A of Fig. 13. The clip of Figs. 13, 13A is attached to the top of the ground/mounting strap. The clip shown in Figs. 13 and 13A is similar to the clip shown in Figs. 12 and 12A except that end 157 of the clip 151 is bent upward and opening 153 for the threaded fastener has a tab 155 which extends into opening 153 and is bent at a slight downward angle toward the back of the receptacle. Tab 155 is provided to engage and hold captive the threaded body of fastener 108 and, in addition, helps to provide a ground connection between the strap and the threaded fastener to insure that the receptacle is connected to ground. As with clip 130, openings 153 in clip 151 and opening 126 in the strap are aligned with each other during assembly to permit the fastening means to be aligned with the threaded opening in the box as the receptacle is being attached to the box. The distance between the edges 147 of the clips should not exceed 1.522 inches to allow the clip to be attached to the end of the ground/mounting strap without extending over the side edges of the ends 122 of the strap 123.

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Referring to Fig. 9, there is shown a front perspective view of alignment plate 114 of Fig. 5 for a single wiring device such as a switch or a receptacle. Alignment plate 114, which can be composed of any suitable material such as brass, aluminum, cold rolled steel, plastic, a plastic coated with a conducting material, etc., has a centrally located opening 116 sized to accept the body of a wiring device. Centrally located at opposite top and bottom ends of opening 116 and either opening into or separated from opening 116 are two clearance openings 117 for mounting screws 108 used to secure the wiring device, a switch or a receptacle, and alignment plate 114 to box 13. Located between the outer edge of each clearance opening 117 and the end 121 of plate 114 is an alignment pin 118. Clearance openings 117 in alignment plate 114 which can have an open end as shown in Fig. 9 or be an opening fully encircled by material. When the alignment plate is attached to the ground/mounting strap, openings 128 in the ends 122 of the ground/mounting strap are clearance openings for alignment pins 118 and are aligned with openings 134 in the multi-function clips 130, 151. Thus, the alignment pins are positioned to enter openings 134 in multi-function clips 130, 151 attached to the lower and upper ends of the ground/mounting strap 123 of the wiring device as the wiring device is being attached to the alignment plate. Alignment plate 114 can have two ribs 119 and has a downwardly extending tab 120 which extends from the bottom edge and is used to facilitate removal of a wall plate from around the face of the wiring device. The alignment plate 114, when attached to the wiring device, covers the box in which the wiring device is installed. The alignment plate 114 shown in Fig. 9 is for a single wiring device.

The alignment plate 114 helps to overcome difficulties encountered with respect to mounting and positioning wiring devices such as one or more switches, a switch and/or a receptacle, or one or more receptacles to a box prior to placing a wall plate around the wiring devices. Prior to mounting a wall plate, various difficulties can be encountered such as aligning the wiring devices with each other, positioning the wiring devices to be parallel to each other, adjusting the spacing between the wiring devices to be equal and uniform and fixing all of the wiring devices to be flat against the wall. These difficulties are overcome with alignment plate 114 which has a single opening and a pair of alignment pins in combination with multi-function clips. The opening in the alignment plate is sized to receive one or more wiring devices which are to be positioned side by side in a box and the alignment plate has a pair of alignment pins 118 which hold and accurately position each of the wiring device relative to each other and along a flat plane. Each set of alignment pins on the alignment plate is located on a vertical axis which

127 325

defines the center for a wiring device and each wiring device has a multi-function clip at each end of the ground/mounting strap for frictionally receiving and holding captive the alignment pins on the alignment plate. When being assembled, the wiring devices are first attached to the alignment plate and the alignment plate, which now holds captive the wiring devices, is attached to a wall box by means of mounting screws. Thereafter, a wall plate is positioned around the wiring devices without requiring any further adjustments by simply pressing the wall plate in toward the wall to allow the ends 149 of the latching pawls 140 of the multi-function clips to engage teeth on the inside ends of the wall plate.

The multi function clips, in addition to clamping the wall plate to the ground/mounting strap, helps to overcome various difficulties encountered with respect to mounting and positioning one or more electrical wiring devices to a box to allow a wall plate to be quickly and easily positioned around the wiring devices and to also be flat against the wall. Each wiring device according to the present invention has at each end of the ground/mounting strap a multi-function clip that has locating openings 134 for receiving and engaging alignment pins 118 on the alignment plate 114. The pins on the alignment plate, when engaged by the close clearance locating openings 134 in the multi-function clips, accurately positions each wiring device in all directions, sideways, up, down, and the plate itself positions the wiring device along a flat plane to allow a wall plate to be positioned around a single wiring device or a gang of wiring devices without any initial or subsequent adjustment being required. Each pair of alignment pins on the alignment plate is located on a substantially vertical axis which accurately defines the center of a wiring device, although it is within the scope of the present invention to provide other alignments, as well. The opening 134 in each multi-function clip receives and holds captive an alignment pin 118. The multi-function clips, in cooperation with the alignment pins, accurately positions and aligns all wiring devices mounted on the alignment plate. As is disclosed below, the alignment plate can be made to receive one or more wiring devices. After the wiring device(s) are attached to the alignment plate, the wiring device(s), together with an alignment plate are attached to a wall box by means of threaded fasteners such as screws which pass through openings 132 of the multi-function clips, openings 127 in the ground/mounting strap and openings 117 of the alignment plate. The alignment plate provides a substantially flat rigid support for the wiring devices and insures that all the wiring devices are accurately positioned to allow a wall plate to be placed around the wiring devices without requiring any further adjustment.

✓ 128 326

During assembly, the electrical cables in the box are stripped of insulation and are attached to terminals on the side or back of a wiring device such as a switch or receptacle. After the wires are attached to the wiring device, the alignment plate is positioned behind the wiring device by threading the wiring device through the opening in the alignment plate. The front face of the alignment plate is now moved toward the back face of the ends of the ground/mounting strap. As the alignment plate moves toward the wiring device, the alignment pins 118 on the alignment plate enter openings 128 in the strap and openings 134 in clips 130. As the alignment pins enter the openings 134, they force the upwardly bent projections 133 to resiliently move upward and spread slightly apart to allow the alignment pins to fully enter openings 134. The ends of the upwardly bent projections engage and hold captive alignment pins 118 and strongly resist backward movement and withdrawal of the pins from the openings 134. The switch or receptacle which is now attached to the alignment plate and is connected to the electrical wires, is inserted into the box. As the wiring device is inserted into the box, screws 108 located in openings 132 in the multi-function clips and clearance openings 117 in alignment plate are aligned with and threaded into openings 23 to hold both the alignment plate and wiring device(s) to the box and wall surface. The head of the screw which passes through opening 126 of the end of the ground/mounting strap of the wiring device and opening 132 in the clip is larger than either opening and, therefore, holds the wiring device and alignment plate 114.

The wall plate is now placed over the installed wiring devices. It is to be noted (see Figs. 3, 4 and 5) when the wiring device is the switch here disclosed, the paddle of switch 110 is frameless. It is not located within a frame. Thus, the switch must be accurately positioned within the wall plate to insure that the paddle is free to move without touching any surface of the wall plate or a side surface of an adjacently positioned wiring device.

Each multi-function clip 130, 151 contains two side-by-side latching pawls 140. See Figs. 12-13A. Each latching pawl 140 is bent downward toward the back of the wiring device by about 40 degrees. After the wiring device is attached to the alignment plate, the two latching pawls 140 of the multi-function clip at the bottom end of the wiring device straddles tab 120 on the alignment plate. Tab 120 (see Fig. 36) functions as a tool pivot point to allow the wall plate 138, when attached to the alignment plate, to be easily removed from around the switch or receptacle. A slot 74 in the lower edge of the wall plate 138 provides access for the insertion of a small flat tool such as a screw driver to facilitate removal of the wall plate from the wiring device.

124
327

Wall plate 138 is proportioned to fit over alignment plate 114, the ends 122 of the ground/mounting strap 123 and the box within which the wiring device is located. The wall plate 138 is located around the wiring device and locked in position by pushing the wall plate toward the wiring device until the ends of the latching pawls 140 engage teeth on the inside wall of the top and bottom edges of the wall plate.

Referring to Figs. 14-24, there is shown in detail multiple views of the switch and components of the switch of Figs. 3-5. More specifically, Fig. 14 is an exploded view of a switch in accordance with the principles of the invention; Fig. 15 is a perspective view of the base assembly of the switch of Fig. 14; Fig. 16 is an exploded view of the base assembly of Fig. 15; Fig. 17 is another exploded view of the switch; Fig. 18 is still another exploded view of the switch; Fig. 19 is a partial sectional exploded view of the cam driver of the switch; Fig. 20 is a perspective exploded view of the switch showing the light assembly board; Fig. 21A is a plan view of the light assembly board; Fig. 21B is a bottom perspective view of the light assembly board; Fig. 22 is a perspective exploded view showing the light pipe in the paddle of the switch; Fig. 23 is a perspective view of the light pipe; and, Fig. 24 is a sectional view along the line 24-24 of Fig. 3.

Referring to Fig. 14, there is shown an exploded view of base assembly 300 and frame assembly 400 which, when joined together and coupled to paddle 112 forms a single pole switch, and Fig. 15 which shows a perspective view of the base assembly 300. Base assembly 300 includes shell member 302 composed of electrically insulating material and having a longitudinal channel 304 which extends along the length of shell member 302 and is centrally located between the side walls 306, 308 of member 302. Channel 304 is sized to receive a slider 320 (see Fig. 16) which slides back and forth in channel 304. Located in shell member 302 and beyond each end of channel 304 are clearance openings 310 for receiving fastening means 124 such as rivets, screws or the like to lock the ground/mounting strap 123, the base assembly 300 and the frame assembly 400 together. Side wall 308 of the shell member has an opening 309 adapted to receive a stationary terminal assembly 312 and side wall 306 has an opening 336 for receiving brush terminal assembly 346, each more fully shown in Fig. 16.

Referring to Fig. 16, stationary terminal 312 consists of a rectangular plate 313 and a substantially non-yielding contact bearing arm 314 bent at a right angle to the plate and having a contact 316. Stationary terminal 312 is of conducting material such as brass, etc. An inverted U

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328

shaped slot 318 located in rectangular plate 313 is a clearance opening for terminal screw 320 which threads into pressure plate 323 located behind plate 313. In operation, as terminal screw 320 is tightened, the bottom surface of the head of screw 320 and pressure plate 323 move toward each other to clamp the rectangular plate 313. Stationary terminal assembly 312 is adapted to be connected to an electrical conductor by either placing a turn of electrical conductor such as a wire under the head of the screw 320 or by inserting a straight end of the conductor between the pressure plate 323 and the rectangular plate 313, and then tightening screw 320 to lock the conductor between either plates 313 and 323, or the plate 313 and the head of the screw 320. Looking at side wall 308 of shell member 302, each of the two side edges 311 of opening 309 contain a vertical slot or rail 315 provided to receive and hold the side edges of rectangular plate 313. Sliding the rectangular plate 313 of the stationary terminal assembly 312 down into the slots or rails 315 in the edges of the opening 309 positions and holds the stationary terminal assembly 312 in position within the opening 309 of side wall 308 of shell member 302.

Brush terminal assembly 346 includes a rectangular plate 380 composed of electrical conducting material such as brass etc., which supports a yieldable contact bearing arm 344 having a contact 317. An inverted U shaped slot 381 located in rectangular plate 380 is a clearance opening for terminal screw 386. Terminal screw 386 freely passes thru clearance opening 381 and threads into pressure plate 388. Tightening terminal screw 386 clamps the rectangular plate 380 between the bottom surface of the head of the screw 386 and the pressure plate 388. Brush terminal assembly 346 is adapted to be connected to an electrical conductor by either placing a turn of the conductor under the head of the screw or inserting a straight end of the conductor between the pressure plate 388 and the rectangular plate 380. Tightening the screw 386 locks the conductor between the screw head and plate 380, or between plate 380 and pressure plate 388. Looking at side wall 306 of shell member 302, the two edges 303 of opening 384 each has a narrow vertical slot or rail 317 for receiving and holding the side edges of rectangular plate 380. Sliding rectangular plate 380 of brush terminal assembly 346 down into slots or rails 317 in the edges of opening 384 positions and holds the brush terminal assembly in opening 384 of the side wall 306 of the shell member 302.

The stationary terminal assembly 312 and the brush terminal assembly 346 are made of conductive material so that a circuit can be completed between the conductive wires connected to screw terminals 320, 386. Preferably, the conductive components are all of substantial grade, good quality electrical materials so that substantial currents, for example 10 or 20 amperes, can

13/ 329

repeatedly be carried for extended periods of time without significant heat generation, electrical losses or excessive arcing. Such materials can include silver alloys for the contacts, beryllium copper alloy for the brush arm and brass for the remaining conductive components.

Referring to Figs. 15 and 16, slider 320, when positioned within channel 304 can freely slide back and forth between the side walls 319, 321 from one end of the channel to the other end of the channel. Slider 320 has, at one end, a rectangular funnel shaped slot opening 322 which extends completely through the slider and is provided to receive cam follower 370 of cam 366. It is understood that the rectangular funnel shaped slot opening 322 is not restricted to an end of the slider, but can be located anywhere along the slider to a place where it is convenient to do so.

Projecting downward from the bottom surface of slider 320 and about mid-way between the ends of the slider is a triangular shaped cam follower 324. Projecting upward from the top surface of the slider 320 and about mid-way between the slider ends is a hold down projection 326. Also projecting upward from the top surface of the slider is a brush terminal control projection 327. The space 329 between hold down projection 326 and brush terminal control projection 327 is provided to receive spring contact arm 344 of brush terminal assembly 346. Movement of the slider 320 in direction "A" causes projection 327 to urge contact arm 344 to bend downward and move away from stationary contact 316. Movement of the slider 326 in direction "B" causes projection 327 to move up which allows contact arm 344 to spring back and allow contact 317 to make electrical contact with contact 316. A bumper support member 328 which projects outward from the side of the slider 320 provides support for a rubber O ring 330. With the slider located in slider receiving channel 304, O ring 330 moves back and forth between stops 332, 334 of opening 336 in side wall 321 (see Fig. 15) as the slider is driven from one end of channel 304 to the other. The O ring is used to cushion the stopping of the slider 320 by contacting stops 332, 334 located at the ends of opening 336 in wall 321. Contact 317 of brush terminal assembly 346 (see Fig. 16) is biased by spring arm 344 to move upward toward stationary contact 316. To help offset some of the upward force exerted by arm 344 which moves contact 317 toward contact 316 as the slider is moved down, a helper spring 338 is provided. Helper spring 338 also helps to balance the feel of the rocker paddle as the switch is operated.

Movable spring contact arm 344 of brush terminal assembly 346 is spring biased to move contact 317 up toward stationary contact 316. Therefore, more force is needed by the slider 320 to move contact 317 on spring contact arm 344 out of engagement with stationary contact 316 than is needed to close the contacts. Referring to Fig. 16, helper spring 338 is used to help

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overcome this force. Helper spring 338 is a strip of flat spring metal folded about its center with a generous radius to have two legs 337, 339 which forms an inverted V. The inverted V shaped helper spring 338 fits in chamber 340 located at the top end of channel 304 (see Fig. 16) with the apex of the V being at the top of the channel. As slider 320 is moved up, the spring bias of spring contact arm 344 assists in closing contacts 316, 317. As the slider moves up and the contacts close, the end 342 of slider 320 contacts leg 339 of helper spring 338 and urges it to move toward leg 337. At this time, helper spring 338 is compressed and now biases slider 320 to move down. When the contacts 316, 317 are being opened, helper spring 338 urges slider to move down against the force of the spring contact arm 344. Thus, spring 338 helps to overcome the force exerted by the spring contact arm 344 of the brush terminal 344 on the slider when the spring contact arm 344 is being moved down to open the contacts 316, 317.

Wall 348 at the end of chamber 340 contains a slot opening 350 which allows the end 342 of slider 320 to enter chamber 340 to engage and move leg 339 toward leg 337 of helper spring 338. Wall 348 helps to keep helper spring 338 within the chamber 340.

As seen in Fig. 24, located directly beneath slider receiving channel 304 and opening into channel 304 is spring chamber 354. Spring chamber 354 is elongated, has a rectangular cross-section and contains a flat cam shaped leaf spring 352. The spring chamber 354 can be centrally and symmetrically disposed in the switch base 300 and has support bars 356 at each end for supporting flat cam shaped leaf spring 352. Located beyond each support bar 356 is an end pocket 365. The overall length of chamber 354 is determined by the length of the flat cam shaped leaf spring 352.

Cam shaped leaf spring 352 is formed from a flat resilient steel strip, preferably spring steel, and has a profile substantially similar to that shown in Fig. 22. The flat cam shaped leaf spring 352 has a profile that is symmetrical about a center apex 358. Moving along the spring 352 from the apex to the ends, the spring has a short down sloping cam portion 359 on each side of the apex 358 which, together with support sections 357 forms a depression 360, 362 at each side of the apex. The support sections 357 rest on support bars 356 and terminate in U shaped outer end portions 364 which resides in end pockets 365. The apex 358, the centrally located rise of the spring and the flat short cam portions 359 on each side of the apex and joined by support sections 357 provide a surface discontinuity rather than a smooth transition for the cam 324 as it travels over the apex.

123 331

Referring to Figs. 16 and 24, cam 366 is used to move the slider back and forth between its left and right hand positions which corresponds to the off and on position of the switch. Cam 366 has two cylindrical shaped projections 368 which are aligned with each other and extend out from the sides to form an axel support shaft rotatably received by support bearing openings 378 located in side walls 319, 321 of the slider receiving channel 304. In operation, cam 366 can rock back and forth in a clockwise and counterclockwise direction about the axel defined by the projections 368. Extending downward and below projections 368 is cam follower 370 which fits in the rectangular funnel shaped slot opening 322 in slider 320 with minimum clearance. Extending upward from projections 368 is cam control surface 430 having a first pocket 374 located at the left of the cam, and a second pocket 372 located at the right of the cam. Looking at the profile of the cam 366 as shown in Fig. 24, pocket 372 is at the right side of the axes of rotation of the cam, and pocket 374 is at the left side of the axes of rotation of the cam. Thus, when the slider is at its right hand position, application of a downward force on pocket 372 will cause the cam follower 370 to rotate in a clockwise direction to cause slider 320 to move to the left. In a similar way, application of a downward force on pocket 374, when the slider is at its left hand position, will cause the cam follower 370 to rotate in a counterclockwise direction to cause the slider to move to the right. Thus, pressing down on pocket 372 causes the cam to rotate clockwise which causes the cam follower 370 to move the slider to the left. Thereafter, pressing down on pocket 374 will now cause the cam to rotate counterclockwise to cause the cam follower to move the slider to the right. Alternately pressing on pockets 372 and 374 will cause the slider to move back and forth, first in one direction and then in the other direction.

Projecting upward from the bottom member 401 of frame assembly 400, and of the same material as the bottom member, are two hook members 396 (see Fig. 16 and 18) which engage and pivotly hold cooperating hook members 418 (see Fig. 17) which project down from subplate 412 of the rocker assembly 398. Frame assembly 400 includes a rectangular clearance opening 402 located in bottom member 401 which is aligned with the top of cam 366 and through which an actuator 405 (see Figs. 18 and 19) of cam driver 431 projects to engage and operate cam 366.

The cam 366 is operated by articulated cam driver 431 (Fig. 19) which consists of a cylindrical shaped member 409, a plunger 403, an actuator 405, and a conical shaped coil spring 407. The cam driver 431 engages and drives cam 366, first in a clockwise direction, then in a counter-clockwise direction each time plunger 403 is moved down. The open ended cylindrical shaped member 409 supports two ears 411, each having a threaded opening for receiving a

holding member such as a screw to secure the member 409 to frame assembly 400. Member 409 contains a first opening 413 at its lower end and a second opening 415 at its upper end. The first opening 413 at the lower end of the cylindrical shaped member 409 is sufficiently large to avoid obstructing or interfering with the rectangular clearance opening 402 when the member 409 is mounted to bottom member 401 of the frame assembly 400 and is positioned over opening 402. The cylindrical shaped member 409 supports an internal, inwardly projecting ridge 417 located between the first 413 and second 415 openings.

Plunger 403 slidably fits within member 409. The outside diameter of plunger 403 is slightly smaller than the diameter of the second opening 415 in the upper end of cylindrical shaped member 409 which allows the plunger to move up and down in opening 415 without binding. Plunger 403 has a skirt 429 which has, at its end, an external, outwardly projecting ridge 433. Shoulder 417 in cylindrical shaped member 409 and ridge 433 on the plunger 403 engage each other to keep plunger 403 captive within member 409.

Actuator 405, which can be composed of cold rolled steel or a plastic having suitable characteristics supports an elongated shaft 421 having a generous radius at one end and first 423 and second 425 collars at the other end. Collar 423 is smaller in diameter than collar 425 and is adapted to be frictionally connected to the smaller diameter end of conical spring 407. The end of the second collar 425 is located within opening 428 of plunger 403 and contacts internal projection 427.

Coil spring 407 has a conical shape, the apex of which is wrapped around and frictionally engages collar 423 and the base of spring 407 is sufficiently large in diameter to extend beyond the rectangular clearance opening 402 to avoid interfering with shaft 421 as it pivots back and forth in the rectangular clearance opening 402. Opening 402 has a long dimension along the length of the switch and a small dimension along the width of the switch. The small dimension of opening 402 is slightly larger than the diameter of shaft 421 to permit the shaft 421 to move in opening 402 without binding and the long dimension of opening 402 allows shaft 421 to engage and operate cam 366 without binding.

A small projection 406 which extends upward from the bottom 401 of frame assembly 400 and of the same material as the bottom member can be used to engage the lower end of a helper helical spring 408 which is provided to urge the rocker paddle 112 to its out position. In normal use, the spring 407 will provide sufficient force to urge the paddle 112 away from frame

15/ 333

assembly 400. However, in those instances where additional force may be desired, helper spring 408 can be present. The outside diameter of the projection 406 is slightly less than the inside diameter of helical helper spring 408 and fits within an end of the helical helper spring. The upper end of helical helper spring 408 is located within and held captive in a pocket 410 (see Fig. 17) located in subplate 412. Subplate 412 is secured to the underside of the rocker paddle 112 by adhesive, by plastic projections which extend from the underside of the rocker paddle and, after passing through openings in the subplate are staked over, or the like.

Referring to Fig. 17, there is shown a perspective exploded view of the bottom of base assembly 300, frame assembly 400 and rocker assembly 398 of a single pole switch. Referring to the frame assembly 400 which can be a unitary member formed of a suitable plastic, two projections 414 project out from the bottom surface and are positioned to contact the top surface of the axel support shaft formed by aligned cylindrical projections 368 of the cam 366. Projections 414 prevent the cylindrical projections 368 from moving out of their bearing surfaces in the side walls of the slider receiving channel. Also projecting downward from the bottom surface of the frame assembly 400 is a slider hold down projection 416 which slidably contacts projection 326 on the slider 320. Projection 416, by contacting projection 326 on slider 330, prevents slider 320 from being pushed up and out of channel 304 by the upward force of cam profile leaf spring 352 pushing up on triangular shaped cam follower 324.

The subplate 412 is attached to the underside of paddle 112 and is a unitary member of a plastic material having two hook shaped members 418 formed thereon which project down from the bottom surface. The hook shaped members 418 are positioned to engage hooks 396 on the frame assembly 400. Hooks 418, when engaged by hooks 396, allow the rocker assembly to move toward and away from the frame assembly 400 and, at the same time, prevent the subplate and attached rocker paddle from being separated from the frame assembly 400. A downward extending ring 410 on the subplate 412 is aligned with projection 406 on the frame assembly to provide an anchor for the top end of helper spring 408 when a helper spring is used. The inside diameter of ring 410 is slightly larger than the outside diameter of the helper spring to permit the end of the helper spring to be placed within ring 410. Two arms 422 which project beyond the rear end of the subplate 412 each supports a circular stud 420, one on the outside end of each arm, are axially aligned with each other to form a common axel. The studs snap into openings 424 in the frame assembly 400 to form a hinge about which the subplate and the rocker paddle 112 to pivot relative to the frame and base assemblies. The subplate 412 is secured to the bottom

surface of the rocker paddle 112 to form a unitary assembly with an adhesive, by heat staking or the like.

The switch here disclosed can have an on-off indicating means such as a light to indicate when the switch is in its conducting state and when in its non-conducting state. The on-off
5 indicating light can be of a color or white. In practice, a blue light was found to be preferred. Referring to Figs. 21A and 21B, there is shown the top and bottom of a Printed Circuit Board (PCB) which fits within the frame assembly 400. Located on the top surface of the board 430 is a resistor 432, a diode 434 and an LED 436 connected together and to spring terminals 390. Referring to Fig. 14, frame assembly 400 fits on top of base assembly 300 and provides support
10 for the PCB and has openings for the spring contacts 390 to project through the frame assembly and make contact with plate 313 of the stationary terminal assembly and plate 380 of the brush terminal assembly 346. LED 436 indicates the conductive state of the switch by being "on" or "off". In operation, lamp 394 will be "on" when the contacts of the switch are open, and the lamp will be "off" when the contacts of the switch are closed.

Referring now to Fig. 23, there is shown a light pipe 440 which is connected to the underside of the paddle (see Fig. 22) to optically connect the LED to a window 442 in the lower end of the paddle. The end of the light pipe adjacent to the LED has a spherical face for receiving light from the LED, and the other end of the light pipe has a diffuser texture exit surface which is the window in the edge of the paddle.

Referring to Fig. 24, to assemble the switch, the helper spring 338 is inserted into end chamber 340, leaf spring 352 is place into spring chamber 354 and slider 320 is placed into channel 304. The end 342 of the slider faces the helper spring 338 and the triangular shaped cam follower 324 which projects from the bottom of the slider slidably engages the top surface of leaf spring 352. Projecting cylindrical studs 368 of cam 366 are placed within bearing surface
25 openings 378 in side walls 319, 321 of channel 304 with cam follower 370 being positioned within opening 322 of slider 320. Stationary terminal assembly 312 is positioned in the opening 309, and brush terminal assembly 346 is positioned within opening 384. As the brush terminal assembly 346 is being placed in position, the spring contact arm 344 is moved backward against the force of the spring arm and is positioned within slot 329 located between the holding down
30 projection 326 and the spring contact arm control member 327 of slider 320. At this time all the

137 335

various components have been placed within the switch base 300 and the assemblage resembles that shown in Fig. 24.

Referring now to the frame assembly 400 and the cam driver 431, plunger 403 is positioned within the cylindrical shaped member 409 by inserting the plunger 403 through the bottom opening of the cylindrical shaped member 409 until the outwardly extending ridge 421 at the end of the skirt of the plunger engages inwardly projecting ridge 417 of the plunger. Thereafter, actuator 405 is inserted through the bottom opening of the cylindrical shaped member 409 and into the plunger until the top surface of collar 425 contacts internal projection 427 which extends downward from the inside surface of the top of the plunger 403. Conical shaped coil spring 407 is now inserted through the bottom opening of the cylindrical shaped member 409 and placed around the actuator 405 with the apex of the coil spring being positioned around the collar 423. At this time the assembled cam driver 431 is positioned onto the bottom member 401 of the frame 400 with the actuator being positioned to freely move through elongated opening 402 and the clearance openings in the frame being aligned with the threaded openings in the ears of the cylindrical shaped member.

The frame assemblage 400, which includes the LED, resistor, diode and contacts 390, is now placed over the switch base, a ground/mounting strap is placed along the bottom and ends of base assembly 300, and screws, drive pins, rivets or the like 124 are used to lock the ground/mounting strap, switch base assemblage and frame assemblage together. In the embodiment shown, the conical shaped coil spring 407 exerts an upward force on the actuator and the plunger to maintain the plunger in its extended most outward position. The subplate has a cutout 433 through which the plunger 403 passes to contact the underside of the rocker paddle 112. Thus, top surface of the plunger contacts the bottom surface of the rocker and it is the upward force of the spring 407 that biases the rocker to its outward position and that a user must overcome when the switch is being operated. In some instances, it may be desirable to have a switch which requires a greater force to operate. If a greater force is desired, it can be obtained with a helical spring 429 where the lower end is placed over projection 406 on the frame and the top is placed within the spring pocket 410 of the subplate. The projections 420 on the legs 422 are snapped into the openings 424 in the frame assembly 400 to form the hinge which allows the rocker assembly 398 and the frame assembly 400 to pivot relative to each other. Thereafter the rocker assembly 398 which includes the subplate, is pressed down toward the frame assembly until hooks 418 engage hooks 396. At this time the bottom or underside of the rocker assembly

✓ 336

contacts the top surface of the plunger 403 and the application of finger pressure on the rocker assembly will move it toward the frame assembly against the force of spring 407 to drive the elongated shaft 421 of the actuator 405 down through the opening 402 to engage the cam eccentric surface 372.

5 Fig. 24 is a sectional view of a single pole switch where the contacts of the switch are closed and the switch is in its conducting state. The next time the face of the rocker paddle is pressed, plunger 421, acting against the force of spring 407, is urged to move down to contact the ramp 430 of cam 366 and slide toward the right and enters pocket 372. Continued pressing on the rocker paddle causes the actuator 405 to continue to move down and rotate cam 366
10 clockwise about cylindrical projections 368. This causes cam follower 370 to rotate in a clockwise direction and move slider 320 to the left. As slider 320 moves toward the left, the triangular shaped cam follower 324 moves out of depression 360 of the spring and across the right support section 359 toward the centrally located apex 358 of the cam shaped leaf spring 352. As the slider continues to move to the left, triangular shaped cam 324 deflects leaf spring
15 352 downward because projection 326 on slider 320, in cooperation with holding projection 416, prevents the slider 320 from moving upward. As the triangular shaped cam 324 moves over the top of the apex 358 of the spring and toward the left support section 359 of the apex, the leaf spring starts to spring back to its original unstressed position by moving up. This upward movement of the leaf spring acts on the shaped cam follower 324 and helps drive and accelerate the cam follower 324 and the slider 320 to the left until the cam follower 324 comes to rest in depression 362. At this time the contacts of the switch are separated from each other. Thus, the cam shaped leaf spring 352, in combination with the cam follower 324 helps to move the slider to either the left or right depressions 362, 360 to rapidly open and close the contacts. The next time
25 that the rocker is depressed, the actuator 405 will enter pocket 374 of the cam to cause it to rotate in a counterclockwise direction which will cause the slider to depress the leaf spring as it moves to the right. As the cam follower 324 continues to move to the right and as it passes apex 358, the depressed leaf spring starts to spring up to return to its original position. This upward movement of the leaf spring causes the cam follower 324 to move toward the right until it reaches depression 360 at which time the switch contacts are closed. Continued pressing and
30 releasing the rocker paddle of the switch alternately opens and closes the contacts of the switch. The state of conduction of the switch can be displayed to a user by light from an LED, a neon lamp or a pilot light connected across the stationary and brush terminal assemblies. When the

134 337

contacts of the switch are closed, there is no potential difference across the lamp-resistor combination and the lamp will remain dark. When the contacts of the switch are open, there will be a potential difference across the lamp-resistor combination and the lamp will be lit.

Referring to Figs. 25A, 25B and 25C, there is shown sectional views of paddle 112 of the switch of Fig. 14. Fig. 25A is a section along the line A-A of Fig. 14; Fig. 25B is a section along the line B-B of Fig. 14; and, Fig. 25C is a section along the line C-C of Fig. 14. The width of the paddle is 1.79 inches and the length of the paddle is 2.77 inches. The face of the paddle has a vertical axis along its length and a horizontal axis along its width where the face of the paddle along its vertical axis has a contour of positive first differential comprised of a combination of splines drawn between points of varying distances from a datum plane and zero second differential when the rate of height increase of the individual splines is constant. The horizontal axis has a surface with a contour of a positive first differential and negative second differential comprised of a combination of splines drawn between points of varying distance from a datum plane. Referring to Fig. 25A, the surface along line A-A lies between two profile boundaries substantially 0.139 inches apart, perpendicular to datum plane A, equally disposed about the true profile and positioned with respect to a datum plane. The basic dimensions and the profile tolerance establish a tolerance zone to control the shape and size of the surface. The surface is about 2.77 inches in length. Within that length, a contour is defined by the dimensions of about twenty equidistant points which are about 0.139 inches apart. Each dimension indicates that point's distance to a datum plane A, the back, flat surface of the paddle. Moving from left to right in Fig. 25A, the dimensions increase from about 0.277 to about 0.328 inches at the center, and then decreases to about 0.278 inches at the right end. This progression defines a contour of increasing and then decreasing height where the points are connected by individual splines. The points are not connected by a single arc and the rate at which the contour height increases is not constant. The rate of height increase of the individual splines decreases from left to right to the center, and then increases from the center to the right end. Thus, the second differential of the contour is negative from each end toward the center. That is that the difference between some of the points distance dimension from an end toward the center decreases. Thus, from an end to the center, the surface has a contour of positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distance from a datum plane. This description substantially describes the paddle's face along the lines A-A, B-B and C-C of Fig. 14.

148 338

The section along line B-B of Fig. 14 which runs along the horizontal center line of the paddle is shown in Fig. 25B and defines a surface having positive first differential and substantially negative second differential from an end to the center line. The second differential is substantially negative because not all successive points have a constant increase.

5 The section along line C-C of Fig. 14 which runs along the diagonal of the paddle is shown in Fig. 25C and defines a surface having a positive first differential and substantially negative second differential from an end to the center line. The second differential is substantially negative because not all successive points have a constant increase.

10 Figs. 25A-C discloses, in detail, the dimensions of the paddle and, therefore, in the interest of brevity, the dimensions shown in the Figs. 25A-C are not here repeated.

15 Referring to Fig. 26, there is shown an exploded view of the switch with another cam driver; and, Fig. 27 is a sectional view along line 24-24 of Fig. 3 where the cam driver is that of Fig. 26. In this embodiment, the articulated cam driver 431 shown in Fig. 19 is replaced with a flexible cam driver with blunt end 600. Flexible cam driver with blunt end 600 is composed of a flat ribbon of flexible material such as spring steel bent back upon itself at its center with a generous radius to form the blunt end 602 having a diameter which fits within the pockets 372, 374 of cam 366. The ends of the flexible cam driver are bent at 90 degrees and each end has an opening for receiving a holding member for attaching the flexible cam driver to the subplate 412. In this embodiment, subplate 412 does not have a cutout 433, but is continuous to provide support for and allow the flexible cam driver 600 to be attached to the subplate. Cam driver 600 can be attached to the subplate with rivets, plastic projections which protrude from the subplate and pass through the openings in the ends of the cam driver and are deformed with heat to secure the cam driver to the subplate, or by any other method. Except for the substitution of the flexible cam driver with blunt end 600 for the articulated cam driver 431 disclosed in Fig. 19, the construction and operation of the switch of the embodiment disclosed in Figs. 26 and 27 is the same in all aspects as that of the switch disclosed in Figs. 14-25C.

20 Referring to Fig. 28, there is shown an exploded view of the switch with still another cam driver, and Fig 29, is a sectional view along line 24-24 of Fig. 3 where the cam driver is that of Fig. 28. In this embodiment, the articulated cam driver 431 shown in Fig. 19 is replaced with a semiflexible cam driver having a sharp end 700 such as a closely wound coil spring 700 having a conical shaped tip 702. In this embodiment, subplate 412 does not have a cutout 433, but is

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continuous to provide support for and to allow the semiflexible cam driver 700 to be attached to the subplate. The subplate has a small projection which extends down from the bottom of the subplate and has a diameter the fits snugly within the top end of the closely wound spring. The closely spring 700 is attached to the subplate by being placed over the projection on the subplate.

5 The lower end of the closely wound spring 700 supports a conical shaped tip 702 having a cylindrical back end having a diameter which is substantially equal to that of the inside diameter of the spring 700 and which is inserted into and held securely by the closely wound spring. The very tip of the conical shaped tip 702 has a small diameter which allows it to fit into pockets 372 and 374 of cam 366. Except for the substitution of the semiflexible cam driver with sharp end

10 for the articulated cam driver 431 disclosed in Fig. 19, the construction and operation of the switch of the embodiment disclosed in Figs. 28 and 29 is the same in all aspects as that of the switch disclosed in Figs. 14-25C.

Referring to Figs. 30-35, for a single wiring device, the width of the face of the wiring device is approximately 55% of the width of the wall plate along the horizontal axis and

15 approximately 56% of the length of the wall plate along the vertical axis. When the wiring device is a receptacle, the contour along the width of the receptacle face is flat in one plane and is complex along the length of the face of the receptacle with a constant radius that is greater than 10 inches and less than 40 inches, a preferred radius being substantially 30.724 inches. The shape of the receptacle face is different from that of the switch to allow for the proper seating of an inserted plug. When the wiring device is a switch, its face has a vertical axis along its length and a horizontal axis along its width where the face of the paddle along its vertical axis has a contour of positive first differential comprised of a combination of splines drawn between points of varying distances from a datum plane and zero second differential when the rate of height increase of the individual splines is constant. The horizontal axis has a surface with a contour of

25 a positive first differential and negative second differential comprised of a combination of splines drawn between points of varying distance from a datum plane. Referring to Fig. 30, there is shown a front perspective view of a wall plate for a single wiring device. The wall plate is substantially 4.92 inches in length by 3.28 inches in width and has a single opening 100 with no dividing members for receiving a wiring device, either a switch which has no frame or a

30 receptacle each of which is slightly less than 2.82 inches in length by 1.83 inches in width to fit within the opening 100. The width of the wall plate varies depending upon how many wiring devices are ganged together and located in side-by-side relationship. The front surface of the

wall plate here disclosed has a complex or compound contoured shape such that the surface at the opening for the wiring device is further from the wall than it is at the outer edge of the wall plate. Referring to Fig. 31B, there is shown a view along the line 31B-31B of Fig. 30. Figs. 31A-31C are sectional views along the lines 31A-31A to 31C-31C of the wall plate of Fig. 30 along the horizontal centerline, between point K, the outer right edge, and point L, the inner edge of the opening for the wiring device. As shown in Fig. 31B, the surface lies between two profile boundaries substantially 0.002 inches apart, perpendicular to datum plane A, equally disposed about the true profile and positioned with respect to a datum plane. The basic dimensions and the profile tolerance establish a tolerance zone to control the shape and size of the surface. The surface is about 0.73 inches in width. Within that width, a contour is defined by the dimensions of about ten equidistant points which are about 0.073 inches apart. Each dimension indicates that point's distance to datum plane A, the back (flat) surface of the wall plate, which begins at point K. Moving from left to right, the dimensions increase from about 0.243 to about 0.302 inches. This progression defines a contour of increasing height, positive first differential, when the points are connected by individual splines. The points are not connected by a single arc and the rate at which the contour height increases is not constant. The rate of height increase of the individual splines decreases from left to right, and the second differential of the contour is negative. That is, the difference between the first point's distance dimension and the second is larger than the difference between the second and the third, etc. Thus, the surface has a contour of positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distance from a datum plane. Fig. 31A is a sectional view along the line 31A-31A of Fig. 30; Fig. 31B is a sectional view along the line 31B-31B of Fig. 30; and Fig. 31C is a sectional view along the line 31C-31C of Fig. 30. Figs. 31A-C clearly shows the wall plate's contours for sections along lines 31A-31A, 31B-31B and 31C-31C of Fig. 30.

The section along line 31C-31C (see Fig. 31C), which runs along the vertical centerline of the wall plate defines a surface having a positive first differential and zero second differential, comprised of a combination of splines drawn between points of varying distance from a datum plane. This contour has zero second differential because the rate of height increase of the individual splines is constant; the difference between any two sequential point dimensions is substantially 0.0037 inches.

The wall plate 138 for a single wiring device shown in Fig. 30 includes, along the inside top edge, and the inside bottom edge, a plurality of teeth for engagement with the ends of

341

latching pawls 140 of the multi-function clips 130, 151. See Fig. 32 which is a sectional view of the bottom edge of the wall plate along the line 32A-32A of Fig. 30; and Fig. 33 which is a sectional view of the top edge of the wall plate along the line 33A-33A of Fig. 30. The top outside edge (see Fig. 33), has a recessed area such as a channel having raised identifying nomenclature structure such as letters of the alphabet, numbers and/or a symbol which can, for example, identify the manufacturer of the device. Referring to Fig. 33, there is also shown a sectional view along the line E-E of Fig. 30 of the top rail of the wall plate 138. Figs. 34, 34A show views of a portion of the top edge of the wall plate of Fig. 30 showing the channel and identifying nomenclature structure. In Figs. 34 and 34A, a channel 217 (see Fig. 33) is formed in the top outside edge of the wall plate. The channel is about three-quarters of an inch in length and has a width which is less than the width of the edge of the rail. As shown in Figs. 33, 34, 34A, channel 217 is a walled rectangular depression defined by four walls which define the channel. Located within the channel or depression is raised identifying structure such as the name of the manufacturer, i.e., "LEVITON". The height of the raised identifying structure can be 0.010 of an inch where the top surface of the raised identifying structure is substantially flush with the surface of the edge of the wall plate.

When the wiring device of the present invention is a switch, the surface of the paddle of the switch is a continuation of contours of the wall plate, so that their surfaces complement each other. When the wiring device is a receptacle, the contour along the width of the receptacle face is flat in one plane and is complex along the length of the face of the receptacle with a constant radius. The shape of the receptacle face is different from that of the switch to allow for the proper seating of an inserted plug. The wall plate has no exposed mounting screws or other visible metal hardware. When the wall plate is placed around the wiring device, the only visible parts are the wall plate 16 and the switch or receptacle. No fastening means such as screws for holding the wall plate in place are visible.

To attach the wall plate 138 to the wiring device, the edges of pawls 140 of the bottom and top clips 130, 151 engage tooth shaped racks 80 located on the inner surfaces of the top and bottom end walls 70 of wall plate 138. There are two racks on each end wall 70 of the wall plate 138. Each rack 80 contains a number of tooth shaped teeth 82 each having an inclined front face 84 and an inclined back face 86. Referring to Fig. 35, which is a fragmentary, enlarged perspective of the latching pawl of the multi-function clip engaging the tooth rack of the wall plate as the end of latching pawl 140 engages the inclined front face 84 of a tooth, the pawl

148 342

deflects and moves past the tip of the first tooth 82. Once pawl 140 is past the tip of tooth 82, it can return to its initial position and take a position between the inclined back face 86 of first tooth 82 and the inclined front face 84 of a second tooth 82. This operation can be repeated as many times as is needed to position the top and bottom ends of wall plate 138 as close to the wall as possible. As racks 80 and pawls 140 are independently operated, it is possible to position the wall plate 138 to closely follow the wall contour, even when the wall is not flat. This ability to follow the wall contour is even more appreciated when the wall plate 138 is large, such as a wall plate positioned around multiple wiring devices.

Referring to Fig. 36, there is shown a fragmentary, enlarged sectional side view of the wall plate and tab of the alignment plate to indicate how the two components can be separated following latching. Once the ends of latching pawl 140 is positioned in a valley between two teeth, it becomes difficult to dislodge the wall plate 138 from the pawl 140. To help in the removal of the wall plate a slot 74 is formed in the bottom end 70 of wall plate 138 to provide access to tab 120. A small, flat tool blade such as a screw driver blade 76, or the like, can be moved through slot 74 in end 70 to contact both the outer surface of tab 120 and the back wall of slot 74. By moving the blade 76 using the back wall of slot 74 as a fulcrum, the force applied to tab 120 will separate wall plate 138 from the wiring device. As tool 76 can apply a great deal of force to tab 120, it is possible to separate the pawl 140 from engagement with the teeth and thus the wiring device from the wall plate.

Referring to Fig. 37, there is shown an exploded view of alignment plate and a wall plate for two wiring devices. There is no partition or dividing member located in either the wall plate opening or the alignment plate opening to separate the two wiring devices. The two wiring devices can be placed in a double ganged box 160 made up, for example, of two single boxes joined by fasteners 162 extending through the threaded apertures 164 of two joining ears 166. Alignment plate 114 has a single opening 116, four clearance openings 117 and four alignment pins 170 for receiving two wiring devices such as two switches, a receptacle and a switch, or two receptacles.

Wall plate 138 can have four racks 80 on the interior of the top and bottom end walls for receiving four pawls where the two center racks receive one pawl from each wiring device. Also, there are two tabs 120, which are accessible via slots 74 in end wall 70 of cover plate 138. Because of the independent operation of the pawls 140 with their respective racks 80, the wall

343

plate 138 can compensate somewhat for lack of flatness of the wall in which the wiring devices are installed.

Referring to Fig. 38, there is shown an exploded view of alignment plate 114 having a single opening 116 and a wall plate 138 for three wiring devices mounted in three boxes (not illustrated) ganged together. Wall plate 138 has a single opening 100 with no dividing or separating members for receiving three wiring devices positioned side by side and has four sets of racks 80 where the two end racks each receive a single pawl and the two center racks receive two pawls. Alignment plate 114 has a single opening 116 with no dividing or separating members, three sets of clearance openings 117 and three sets of alignment pins 170 for receiving three wiring devices.

Referring to Fig. 39, there is shown an exploded view of alignment plate 114 having a single opening 116 with no dividing or separating members and wall plate 138 for four wiring devices mounted in four boxes (not illustrated) ganged together. Wall plate 138 has a single opening 100 with no dividing or separating members for receiving four wiring devices positioned side by side and the alignment plate 114 has a single opening 116 with no dividing or separating members for receiving four wiring devices positioned side by side.

Fig. 40 is an exploded view of alignment plate 114 having a single opening 116 with no dividing or separating members and wall plate 138 having a single opening 100 for five wiring devices mounted in five boxes (not illustrated) ganged together. The single opening 100 in wall plate 138 has no dividing or separating members and the alignment plate 114 has a single opening 116 with no dividing or separating members for receiving five wiring devices positioned side by side.

Fig. 41 is an exploded view of alignment plate 114 having a single opening 116 with no dividing or separating members and wall plate 138 having a single opening 100 for six wiring devices mounted in six boxes (not shown) ganged together. The single opening 100 in wall plate 138 has no dividing or separating members and the alignment plate 114 has a single opening 116 with no dividing or separating members for receiving six wiring devices positioned side by side.

Each wall plate shown in the Figs, can be made of conductive material or of non-conductive material. Where the wall plate is made of non-conductive material such as plastic, a conductive coating can be sprayed, plated, etc. to the front, back or both the front and back surfaces of the wall plate to provide a conductive path from the wall plate to ground through the

46 344

alignment plate. In those instances where the wall plate is coupled to the wiring device by means other than the alignment plate here shown, such as, for example, with screws etc., then the conductive path from the wall plate to ground is via the means that attaches the wall plate to the wiring device and/or box.

5 The present invention contemplates a system wherein multiple electrical wiring devices in numbers not expressly set forth hereinabove may be utilized, without departing from the spirit or lawful scope of the invention.

10 While there have been shown and described and pointed out the fundamental novel features of the invention as applied to the preferred embodiments, it will be understood that various omissions and substitutions and changes of the form and details of the devices illustrated and in their operation may be made by those skilled in the art without departing from the spirit of the invention.

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14/ 345

What is claimed is:

1. A switch comprising:
a housing:

5 a rocker paddle pivotally coupled to said housing to assume a first depressed position when subjected to an external force and a second at rest position when not subjected to an external force;

cam means adapted to alternately rotate in a first direction and a second opposite direction;

10 articulated cam driver means coupled to be driven by said rocker paddle to urge said cam means to rotate in said first or said second direction;

slider means coupled to be moved alternately in a first and a second opposite linear direction by rotation of said cam means;

15 a stationary contact and a movable contact coupled to said switch housing, said movable contact biased to contact said stationary contact and urged by said slider means to break contact with said stationary contact; and

a leaf spring within said housing to assist said slider means to move in said first and second directions.

2. The switch of claim 1 wherein said articulated cam driver means comprises:
a first member adapted to be coupled to said housing;
a second member slidably coupled within said first member;
spring means; and

25 an actuator interposed between said second member and said spring means wherein said second member is urged to move in a first direction to engage said cam means when the rocker paddle is subjected to an external force and in a second opposite direction out of engagement with the cam means by said spring means when said rocker paddle is not subjected to an external force.

30 3. The switch of claim 2 wherein said second member is held slidably captive within said first member.

14/1 346

4. The switch of claim 3 wherein said actuator is a shaft.

5. The switch of claim 3 wherein said actuator is a shaft having a first end for engaging said cam means and a second end having a collar for engaging both an end of said spring and said second member.

6. The switch of claim 5 comprising a clearance opening located between said first member and said cam means for receiving said shaft.

7. The switch of claim 6 wherein said clearance opening is elongated.

8. The switch of claim 7 wherein said elongated opening has a long dimension along the length of the switch and a short dimension along the width of the switch.

9. The switch of claim 7 wherein said elongated clearance opening is rectangular.

10. The switch of claim 1 wherein said articulated cam driver means comprises:
a cylindrical member coupled to said housing having a first opening at one end and a second opening at the other end;
a plunger slidably coupled to move into said cylindrical member when said rocker paddle is subjected to an external force;
an actuator driven by said plunger to rotate said cam means as said plunger is moved into said cylindrical member; and
a spring coupled to urge said actuator and said plunger to urge said rocker paddle to move to its second at rest position when said paddle is not subjected to an external force.

11. The switch of claim 1, wherein the slider means comprises a tapered opening for receiving said cam means where rotation of said cam means causes said slider means to move said movable contact.

18/11/11 347

12. The switch of claim 1, wherein said housing further comprises a base having separate chambers for receiving said slider means and said leaf spring.

5 13. The switch of claim 12 wherein the chamber for housing said leaf spring has a length greater than that of said leaf spring such that the ends of said spring are not constrained.

14. The switch of claim 12 further comprising a window in the rocker paddle to pass light from illumination means in said housing.

10 15. The switch of claim 14 wherein said illumination means comprises an LED.

16. The switch of claim 12 further comprising front and rear wire clamp means for wire conductors mounted to said housing and coupled to the stationary contact and the movable contact.

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17. The switch of claim 2 further comprising a ground/mounting strap attached to said housing, said ground/mounting strap providing a cradle like support for holding said switch to a wall box.

18. The switch of claim 17 wherein said ground/mounting strap is made of sheet metal.

19. A switch comprising:
a housing:

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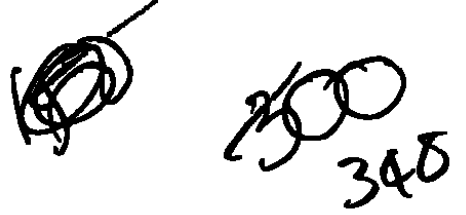
a rocker paddle pivotally coupled to said housing to assume a first depressed position when subjected to an external force and a second at rest position when not subjected to an external force;

cam means adapted to alternately rotate in a first and second opposite direction;

articulated cam driver means coupled to urge said paddle to its second position and

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coupled to be driven by said rocker paddle to drive said cam means in said first or second direction when said rocker paddle is subjected to an external force,



slider means coupled to be moved alternately in a first and a second opposite direction by said cam means;

a stationary contact and a movable contact coupled to said housing, the movable contact biased to contact said stationary contact and urged by said slider means to break contact with said stationary contact;

a leaf spring within said housing to assist said slider means to move in said first and second directions; wherein

said leaf spring is substantially symmetrical about a central apex and having on each side of said apex a relatively short cam portion which extend downward from the apex where, at the end of each short cam portion there is an upward extending member which forms a depression there between; and wherein each upward extending member rests on support means and the end of each upward extending portion beyond the support means is bent downward.

20. A switch comprising:

a housing:

a rocker paddle pivotally coupled to said housing to assume a first depressed position when subjected to an external force and a second at rest position when not subjected to an external force;

cam means adapted to alternately rotate in a first and second opposite direction;

articulated cam driver means coupled to urge said paddle to its second position and coupled to be driven by said rocker paddle to drive said cam means in said first or second direction when said rocker paddle is subjected to an external force,

slider means coupled to be moved in a first and a second opposite direction by said cam means;

a stationary contact and a movable contact coupled to said housing, the movable contact biased to contact said stationary contact and urged by said slider means to break contact with said stationary contact;

a leaf spring within said housing to assist said slider means to move in said first and second directions; wherein

said leaf spring is substantially symmetrical about a central apex and having on each side of said apex a relatively short cam portion which extend downward from the apex where, at the end of each short cam portion there is an upward extending member which forms a depression

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there between; and wherein each upward extending member rests on support means and the end of each upward extending portion beyond the support means is bent downward; and

said switch housing further including a switch base having separate chambers therein for individually housing the slider means and the cam shaped leaf spring.

5

21. The switch of claim 1 comprising:

a surface along the length of said paddle of positive first differential comprised of a combination of splines drawn between points of varying distances from a datum plane

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22. The switch of claim 21 wherein said paddle along its length has a surface of zero second differential comprised of splines drawn between points of varying distance from a datum plane when the rate of height increase of the individual splines is constant.

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23. The switch of claim 21 wherein said paddle along its width has a surface of a positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distances from the datum plane.

24. The switch of claim 21 wherein said paddle along its length has a surface of positive first differential, comprised of splines drawn between points of varying distance from a datum plane and, along its width a surface of a positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distances from the datum plane.

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25. The switch of claim 24 wherein said paddle along its length has a surface of zero second differential comprised of splines drawn between points of varying distances from a datum plane when the rate of height increase of the individual splines is constant.

26. The switch of claim 21 wherein the paddle is not within a frame.

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27. The switch of claim 20 wherein said paddle along its length has a surface of positive first differential comprised of a combination of splines drawn between points of varying distances from a datum plane

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28. The switch of claim 27 wherein

said paddle along its length has a surface of zero second differential comprised of splines drawn between points of varying distance from a datum plane when the rate of height increase of the individual splines is constant.

29. The switch of claim 27 wherein

said paddle along its width has a surface of a positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distances from the datum plane.

30. The switch of claim 27 wherein

said paddle along its length has a surface of positive first differential, comprised of splines drawn between points of varying distance from a datum plane, and along its width a surface of a positive first differential and negative second differential, comprised of a combination of splines drawn between points of varying distances from the datum plane.

31. The switch of claim 30 wherein the paddle along its length has a surface of zero

second differential comprised of splines drawn between points of varying distances from a datum plane when the rate of height increase of the individual splines is constant.

32. The switch of claim 27 wherein the paddle is not within a frame.



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ABSTRACT

There is disclosed a paddle switch operated by pushing on the lower portion of a rocker paddle to turn the switch "on" or "off". The lower edge of the paddle pivots in and out about its upper edge. The switch includes articulated driver means coupled to be driven by the rocker paddle when it is depressed and to urge the rocker paddle back to its out position. When the rocker paddle is pushed in, it urges the articulated driver means to rotate a cam means in a first, clock wise direction, or a second, counter clockwise direction. Alternate rotation of the cam drives a slider member having a cam follower back and forth along a linear axis. A shaped leaf spring cooperates with the cam follower to assist in the movement of the slider and to determine its rest positions. An indicator such as an LED is used to indicate the state of conduction of the switch. When the rocker paddle is released, it is biased by the articulated drive means to pivot back to its initial position. The rocker paddle of the switch is not located within a frame and has surface along its vertical axis of positive first differential and zero second differential, comprised of a combination of splines which extend between points of varying distances from a datum plane. This surface has zero second differential when the rate of height increase of individual splines is constant.

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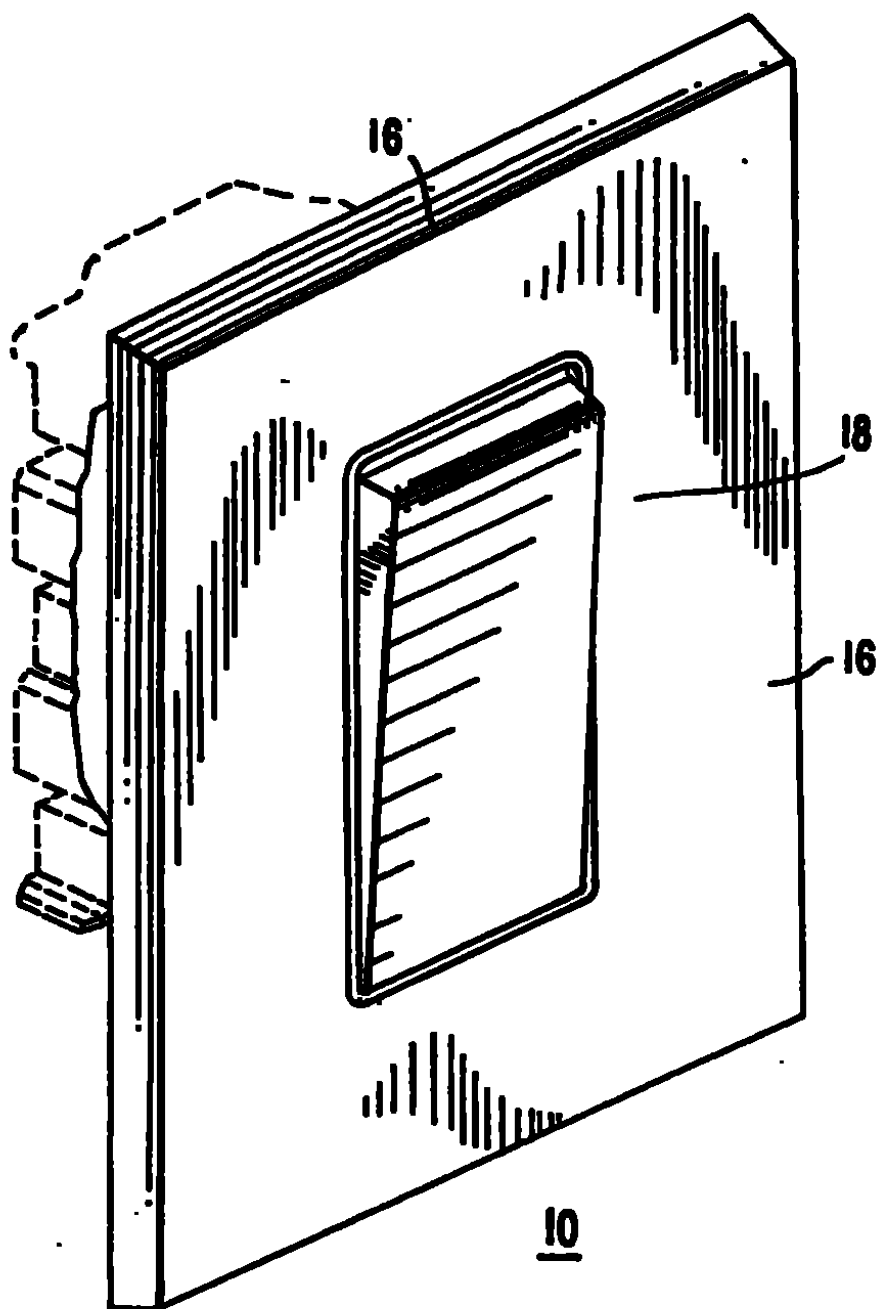


FIG. 1
PRIOR ART

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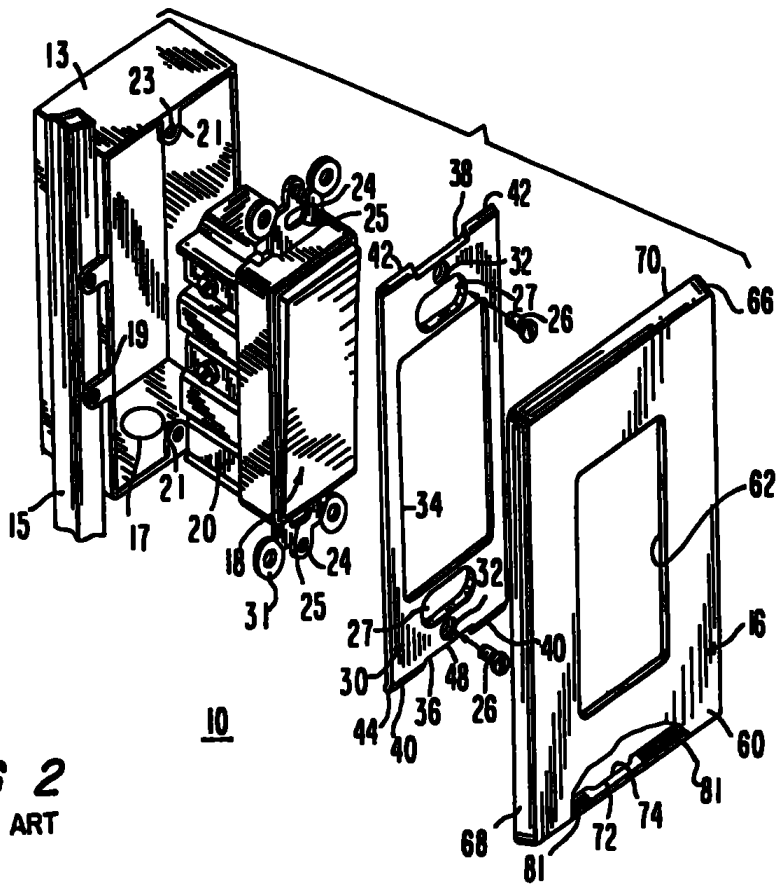


FIG 2
PRIOR ART

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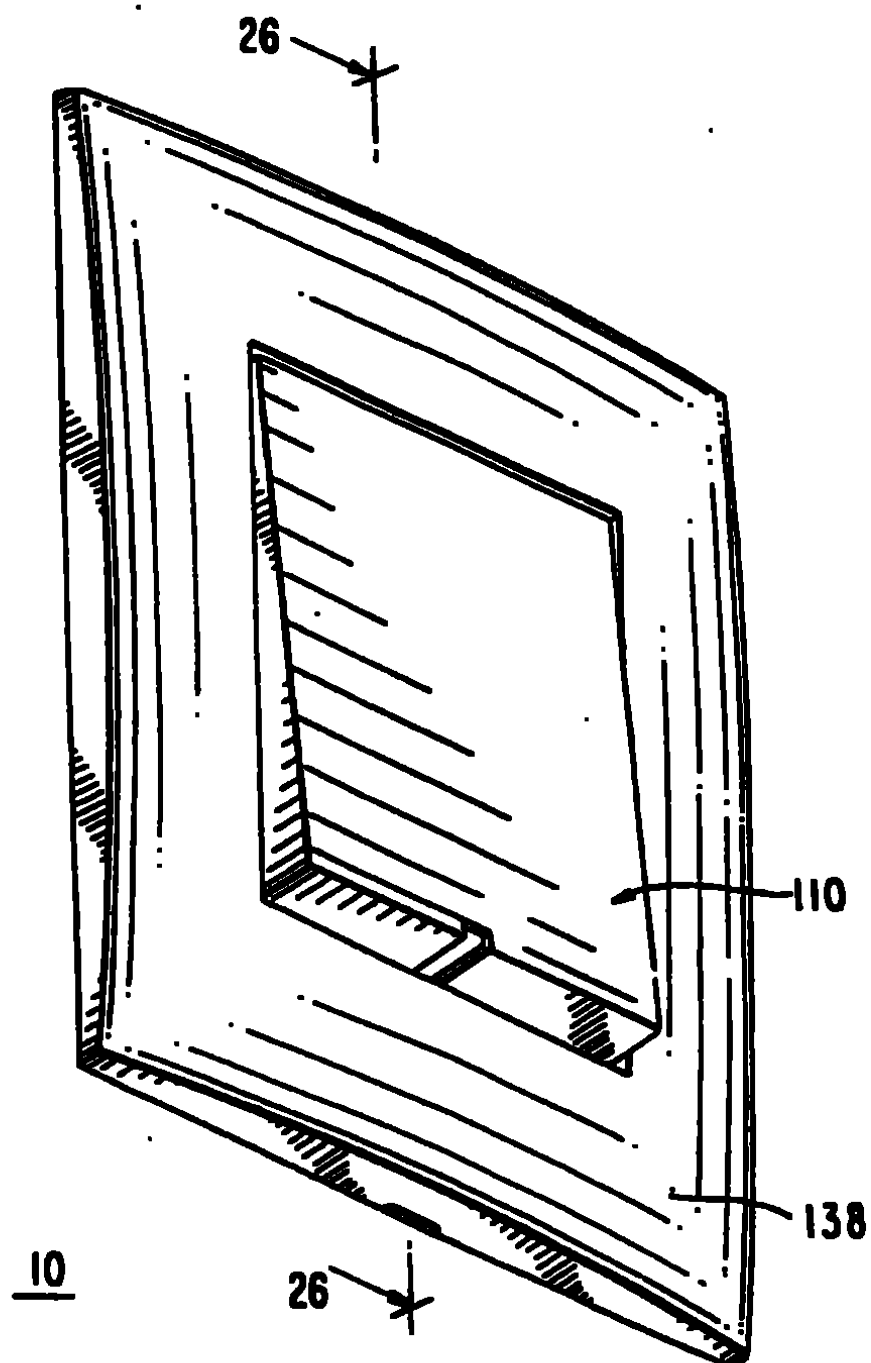


FIG. 3

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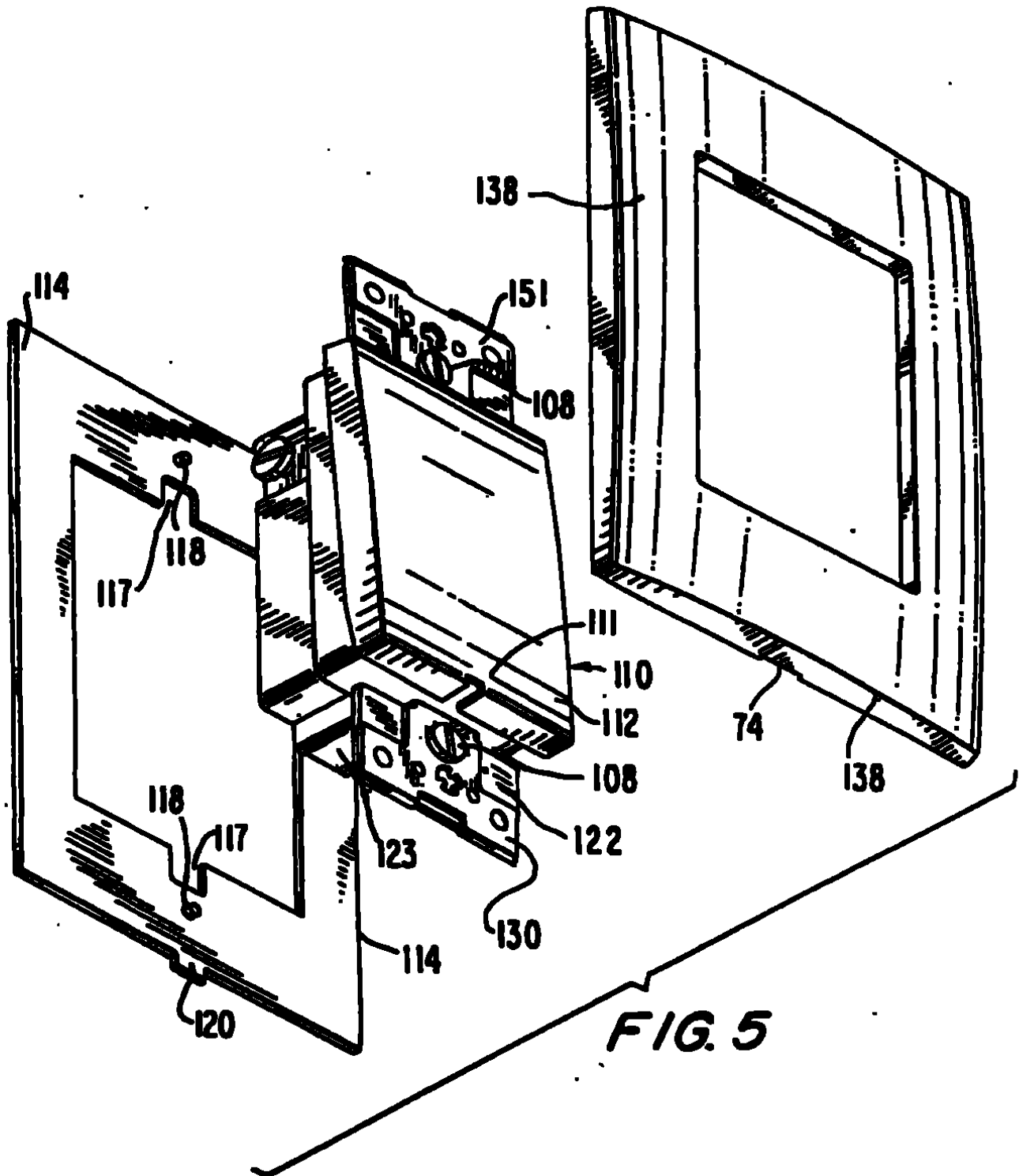


FIG. 5

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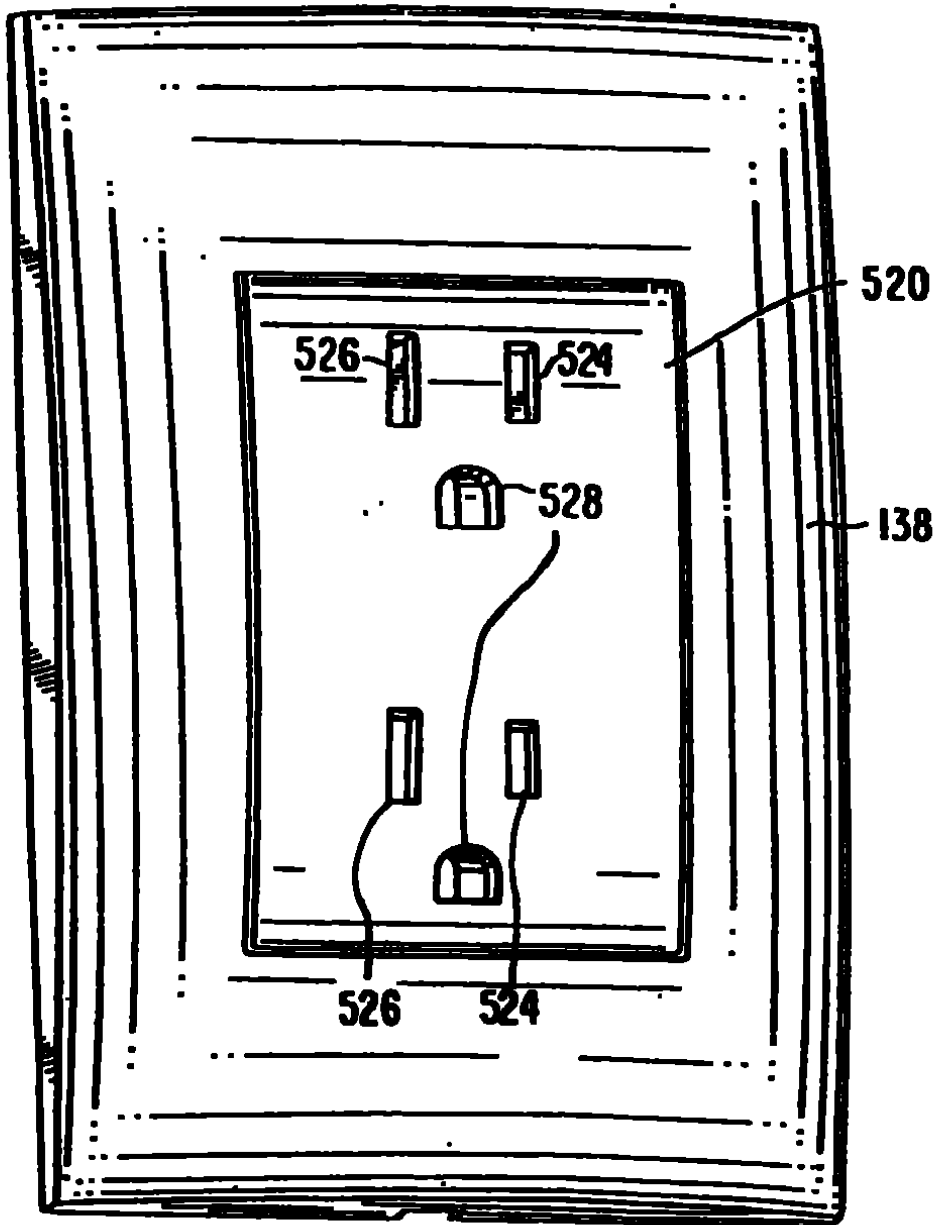


FIG. 6

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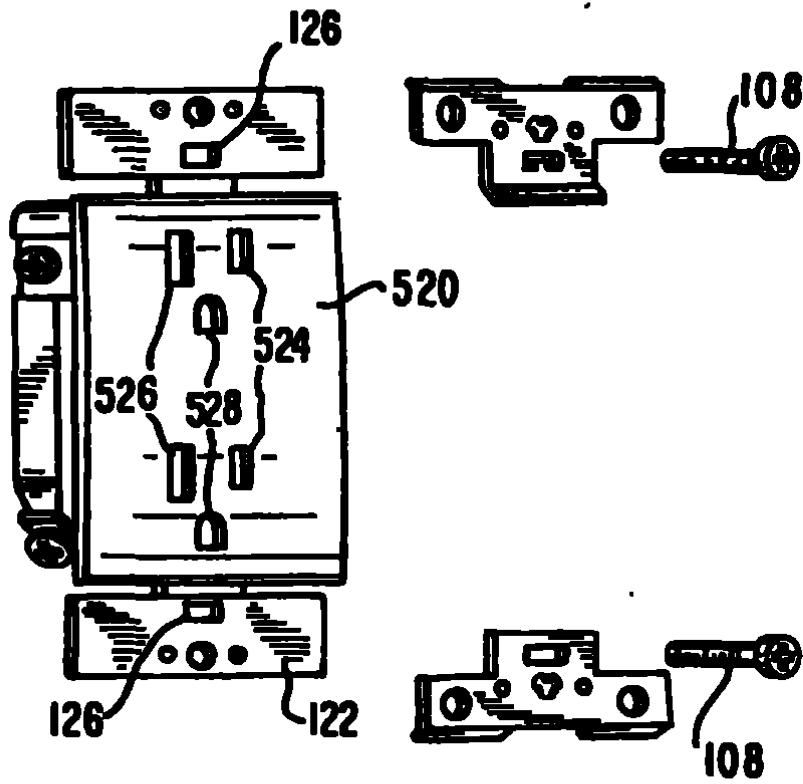


FIG. 7

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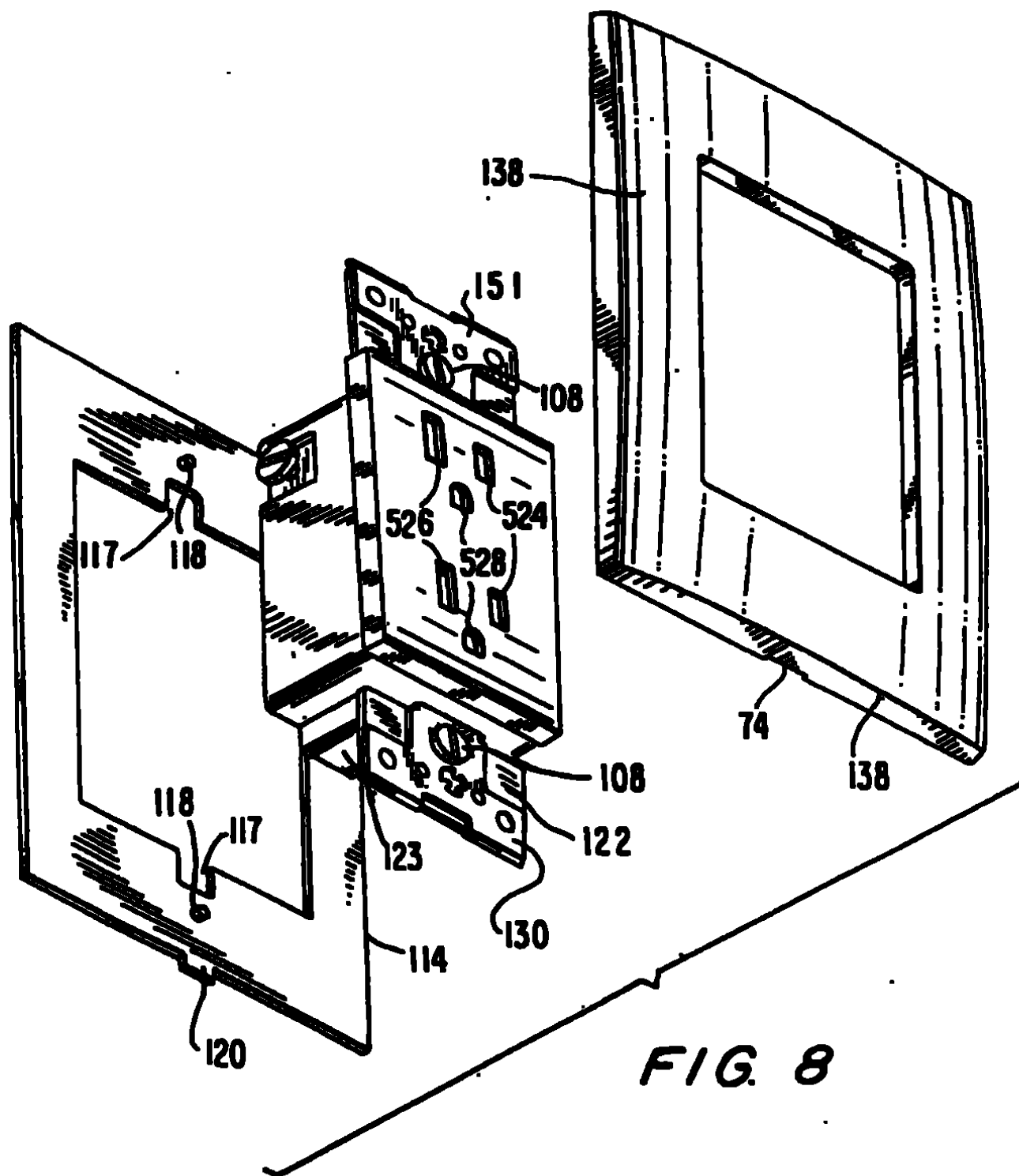


FIG. 8

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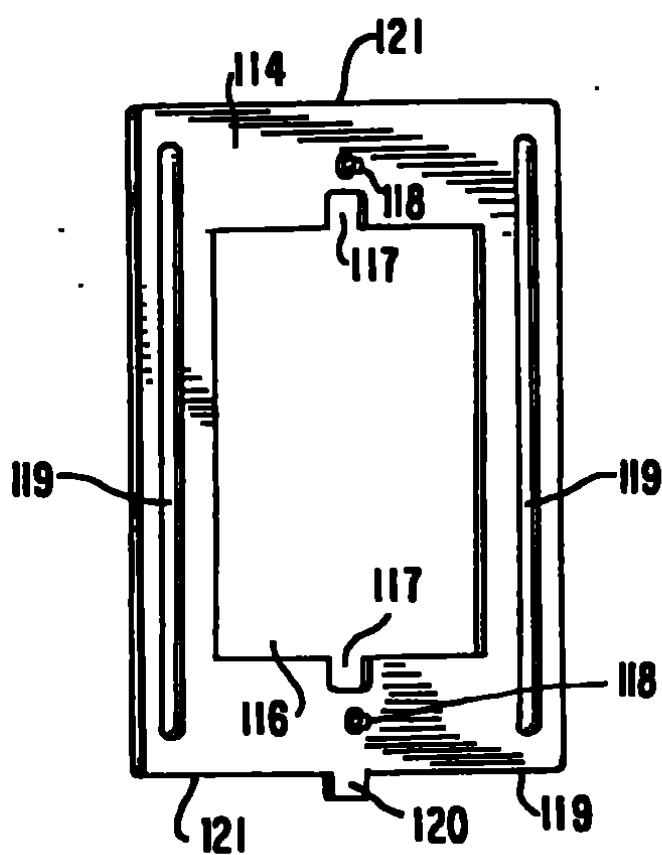
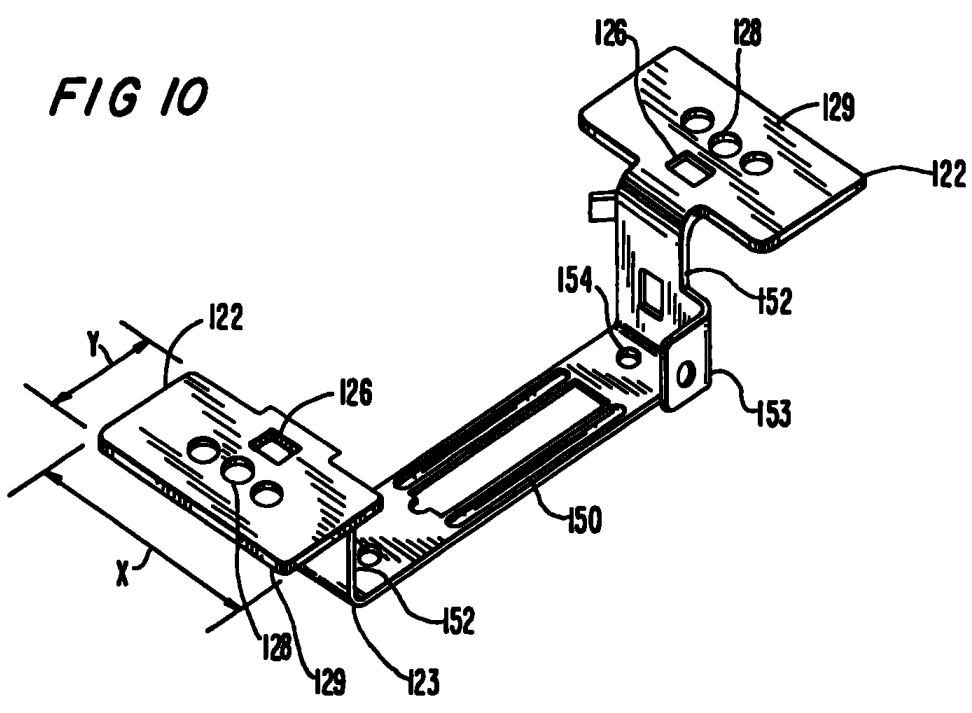


FIG. 9

FIG 10



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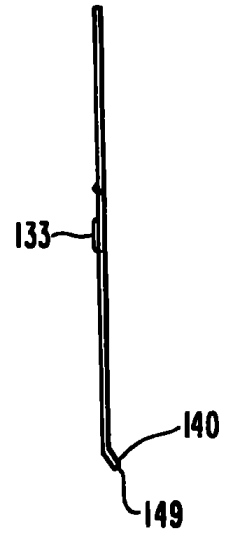
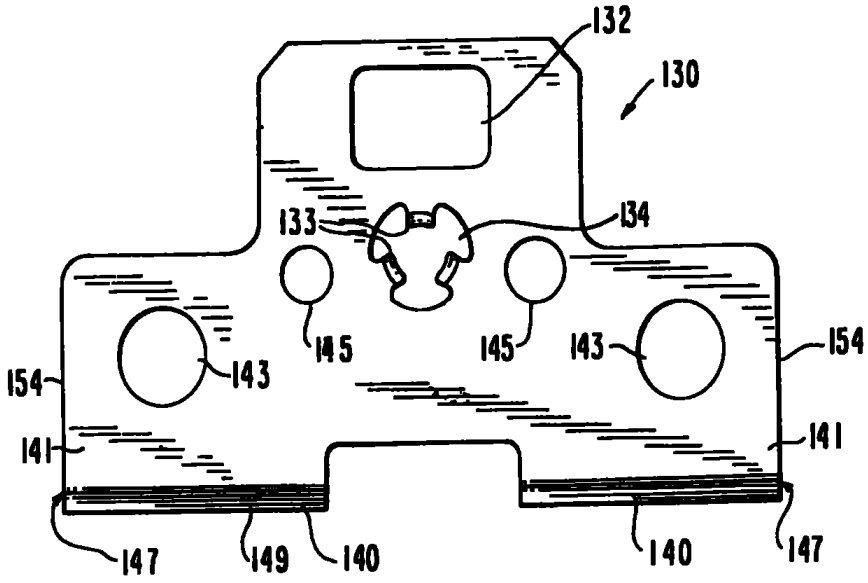
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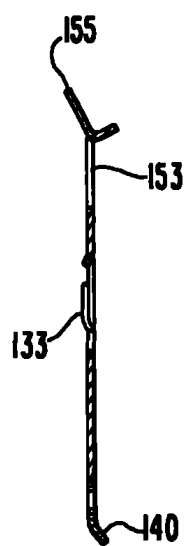
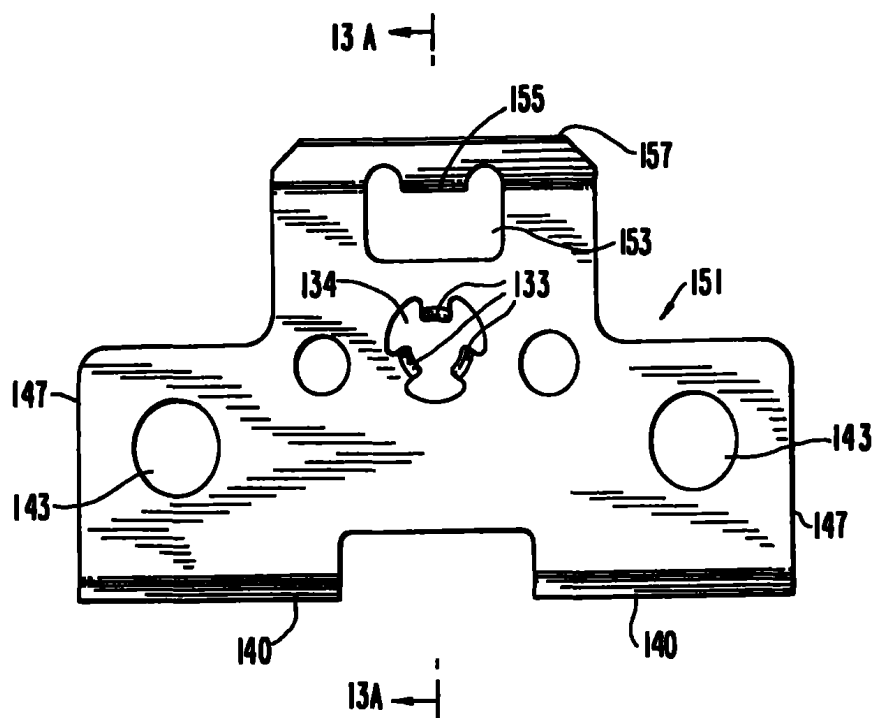




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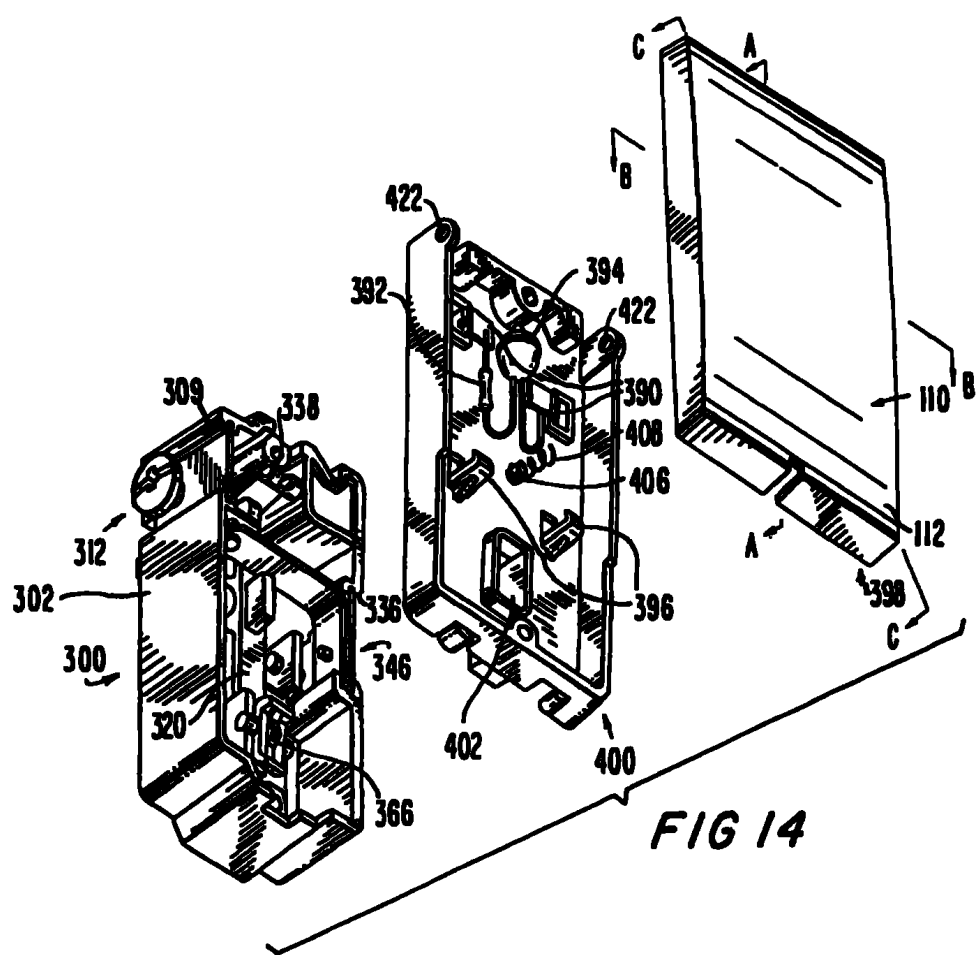


13/38

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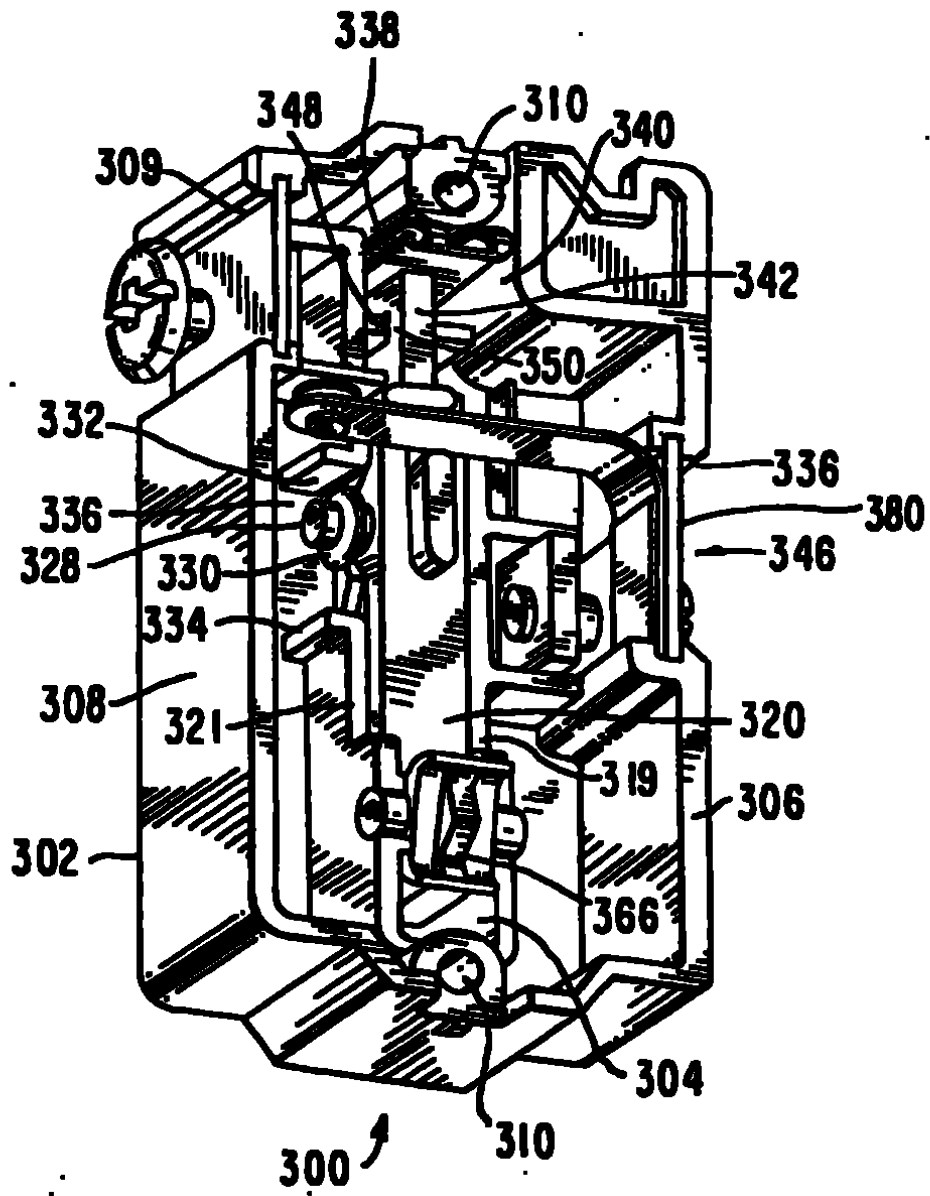
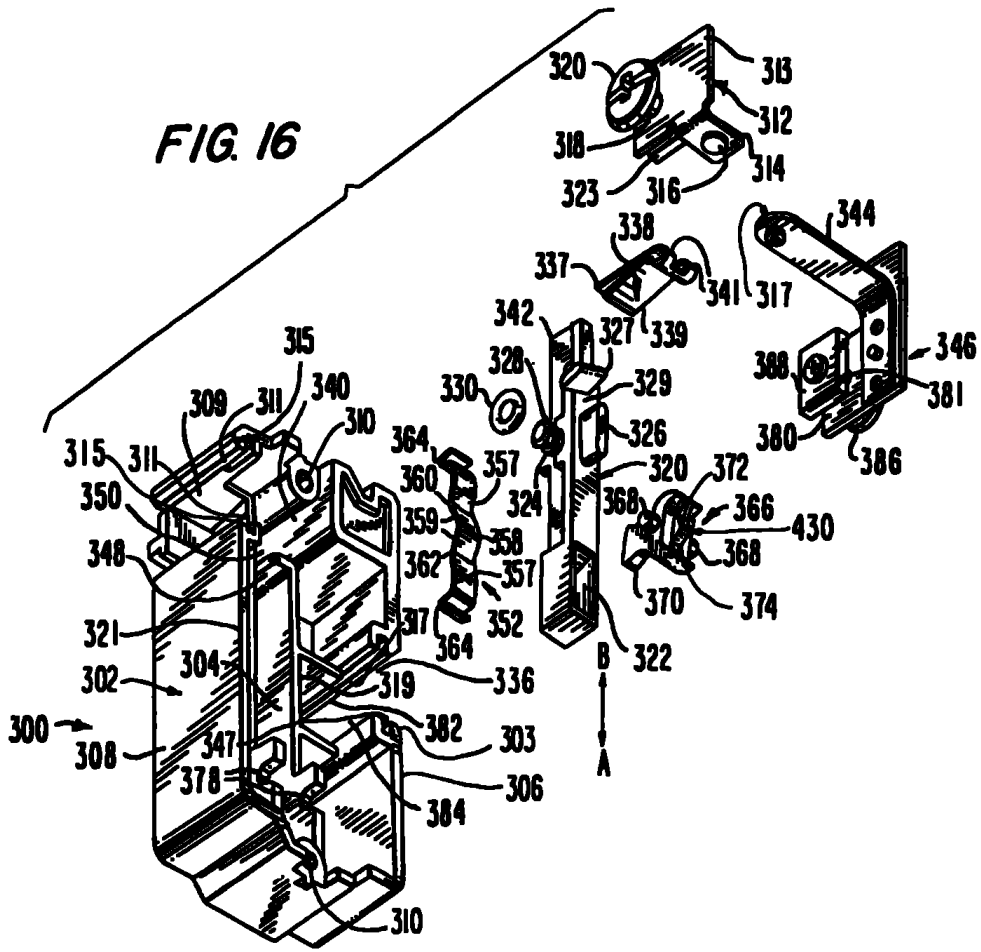


FIG. 15

FIG. 16



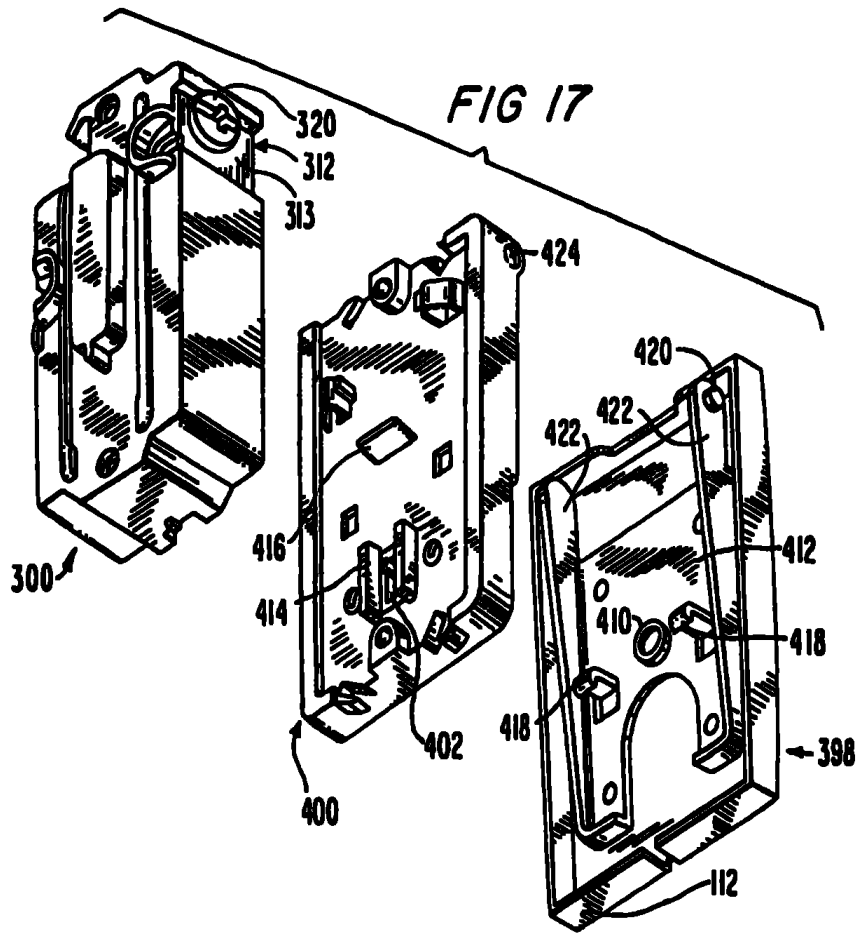
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16/38

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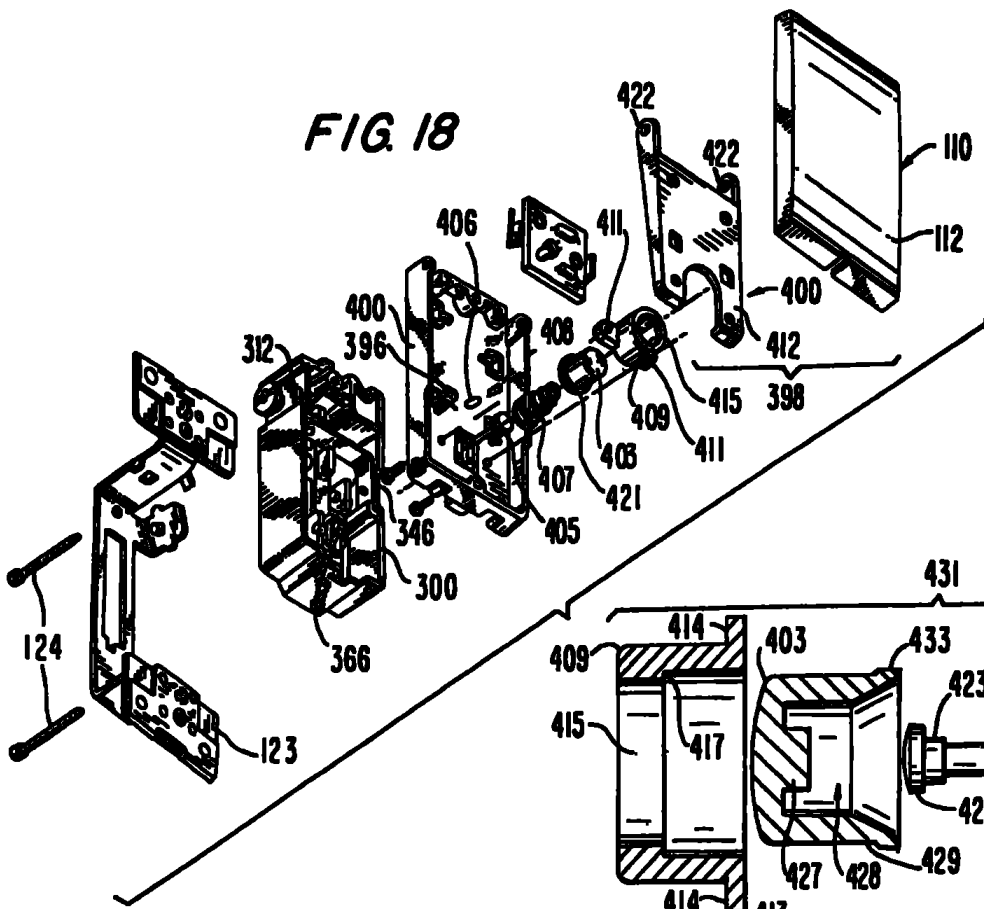
FIG 17



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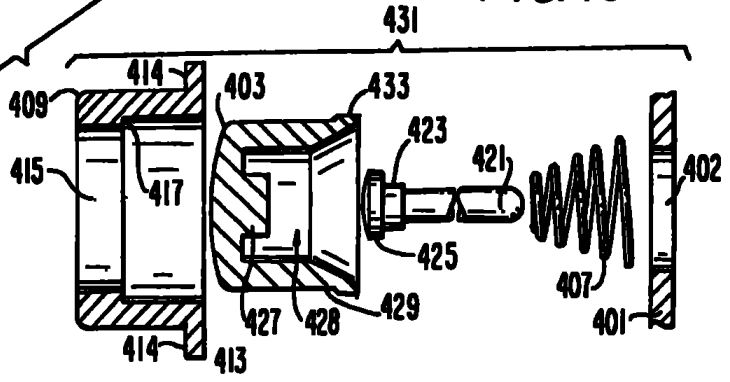
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FIG 18



18/38

FIG 19



Handwritten signature or mark.

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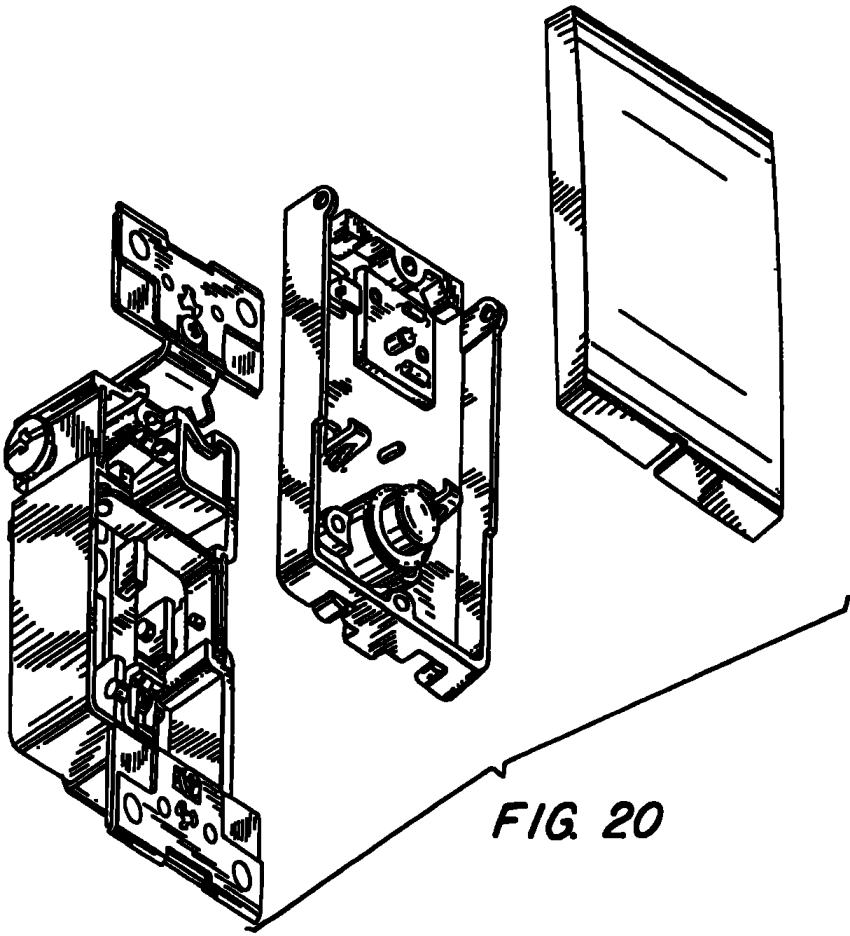


FIG 20

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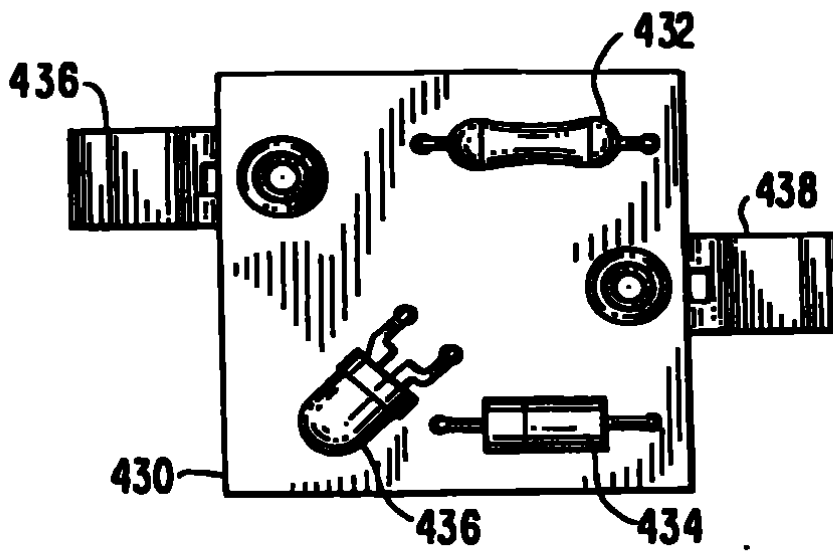


FIG. 21A

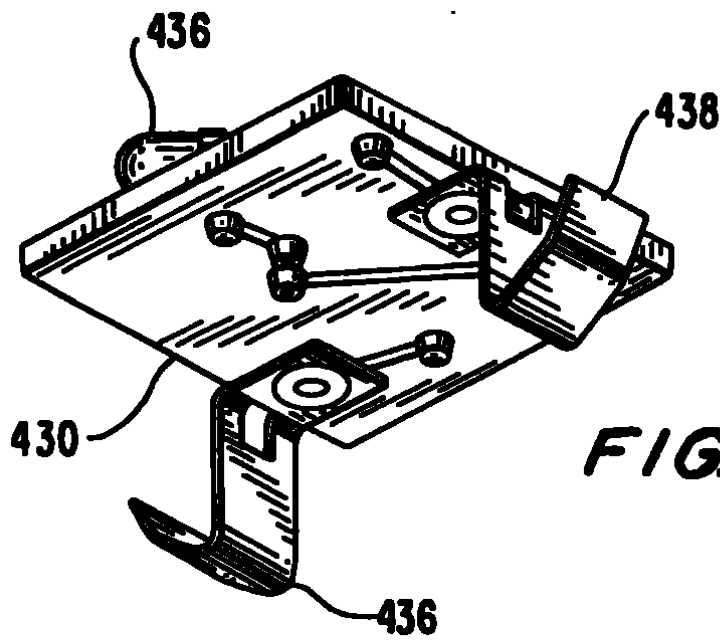


FIG. 21B

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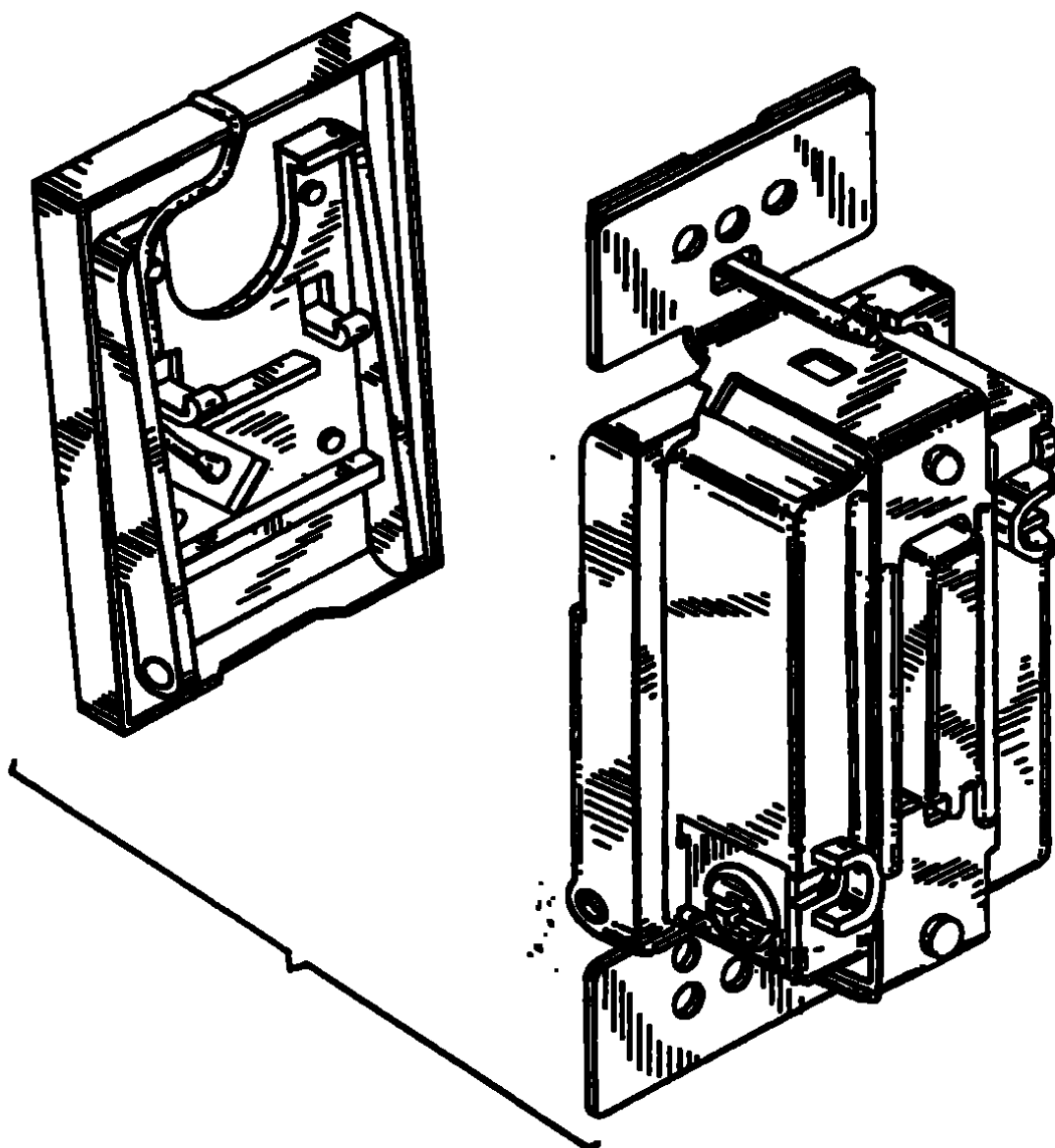


FIG. 22

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22/38

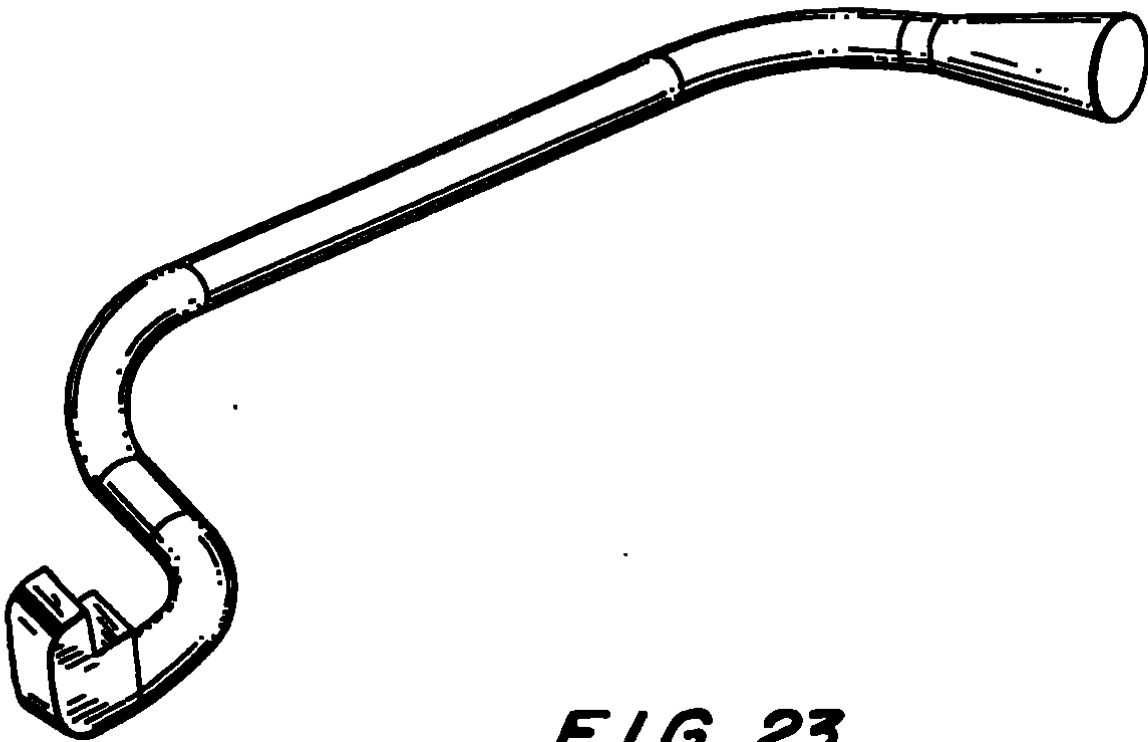


FIG. 23

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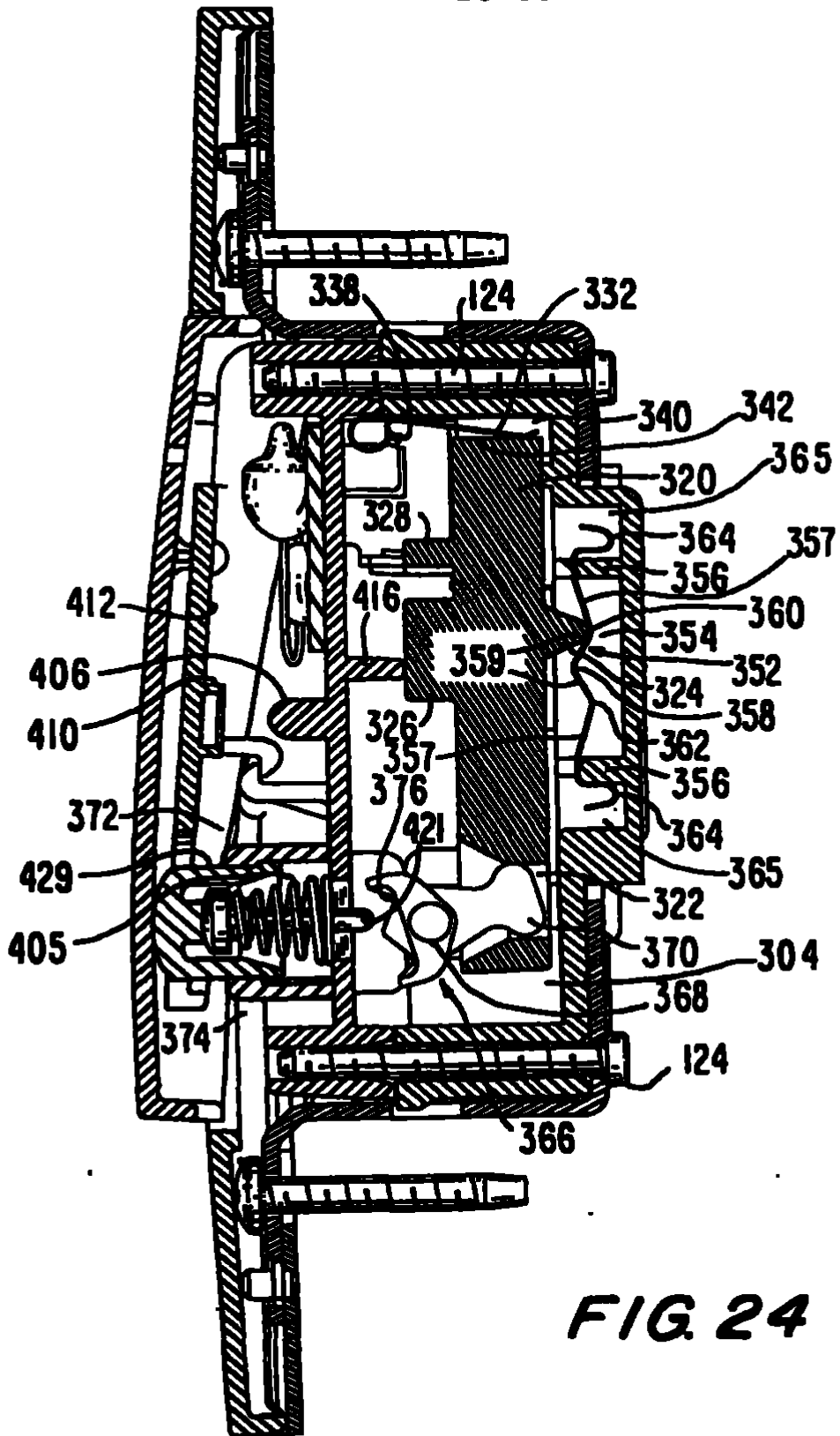


FIG. 24

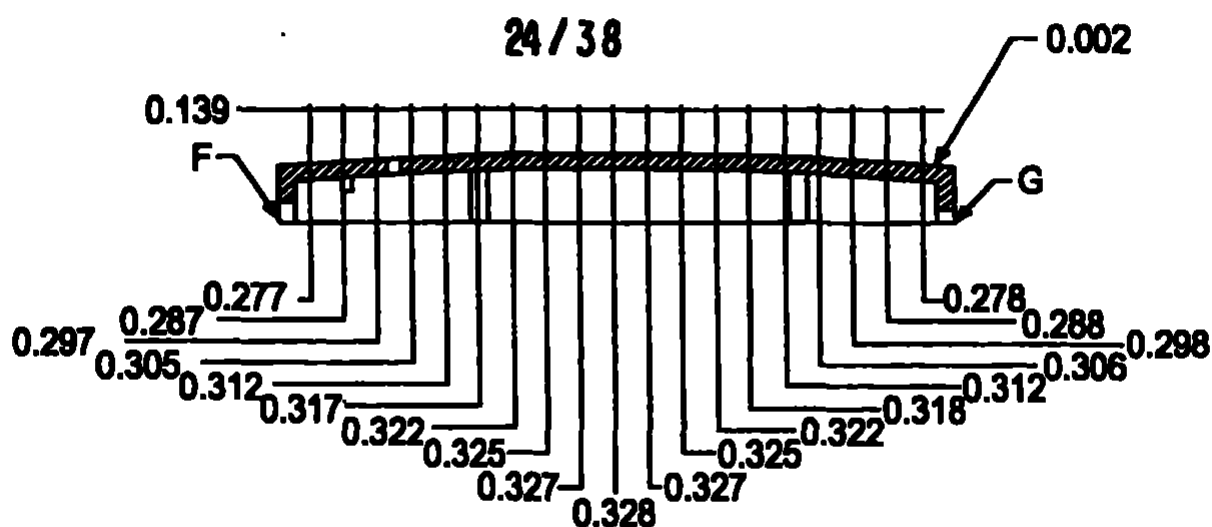


FIG. 25A

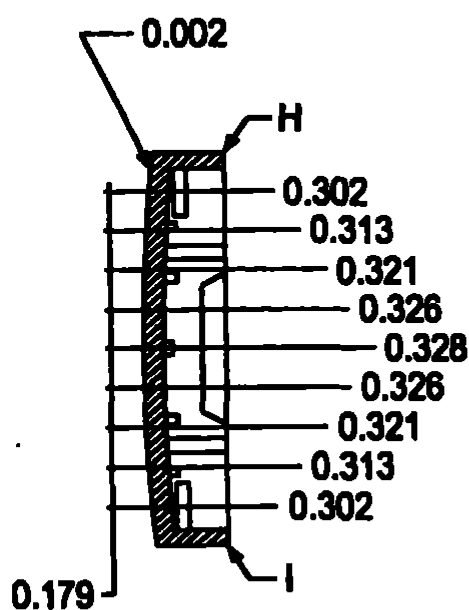


FIG. 25B

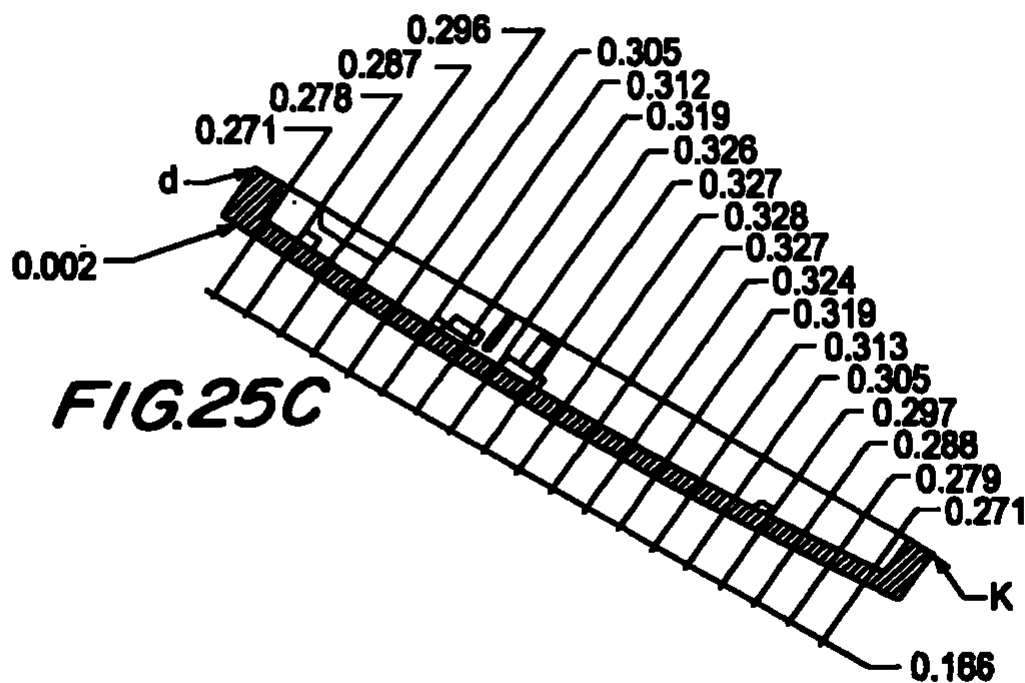


FIG. 25C

25/38

17/324
326

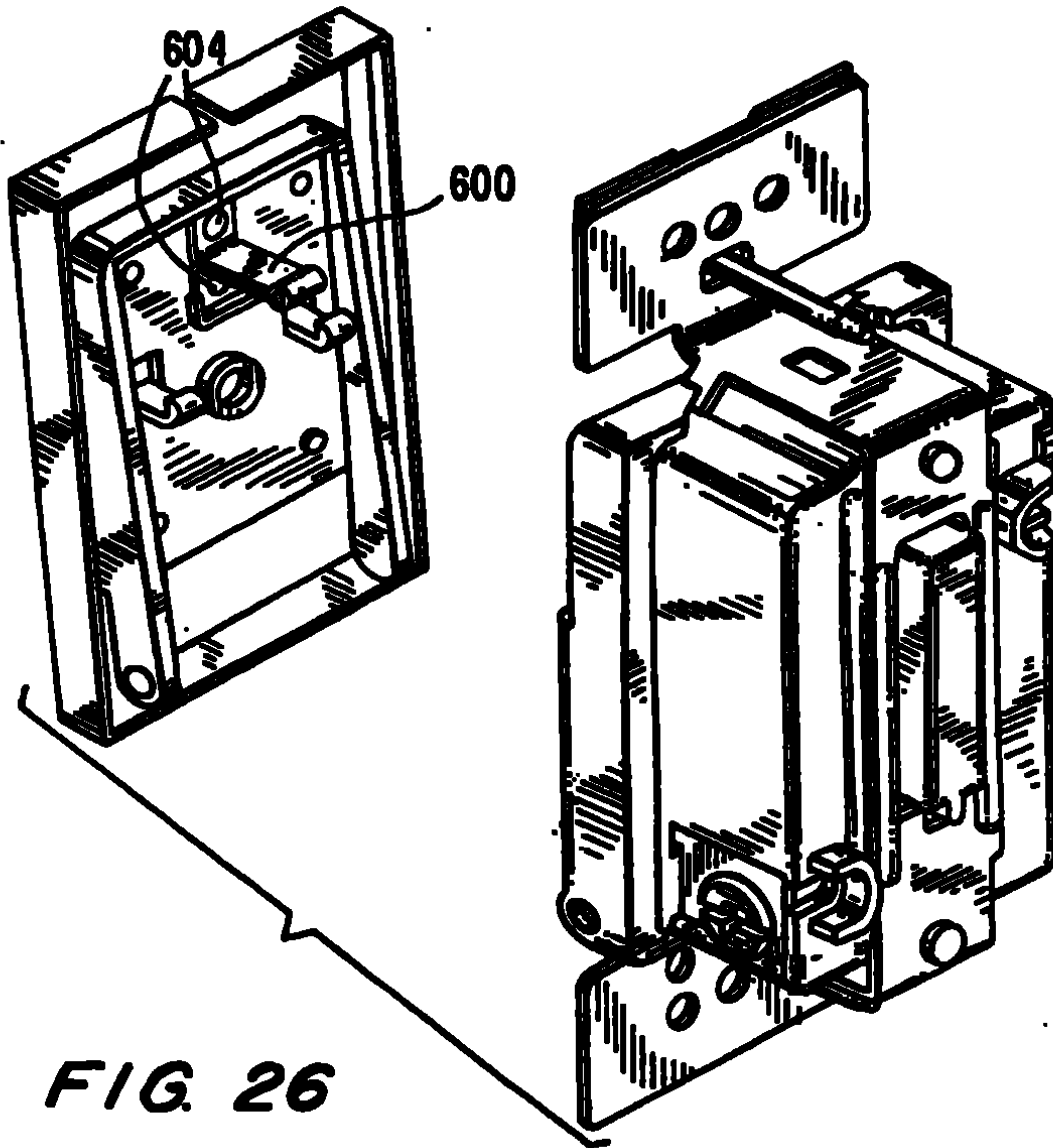


FIG. 26

26/38

117 330
377

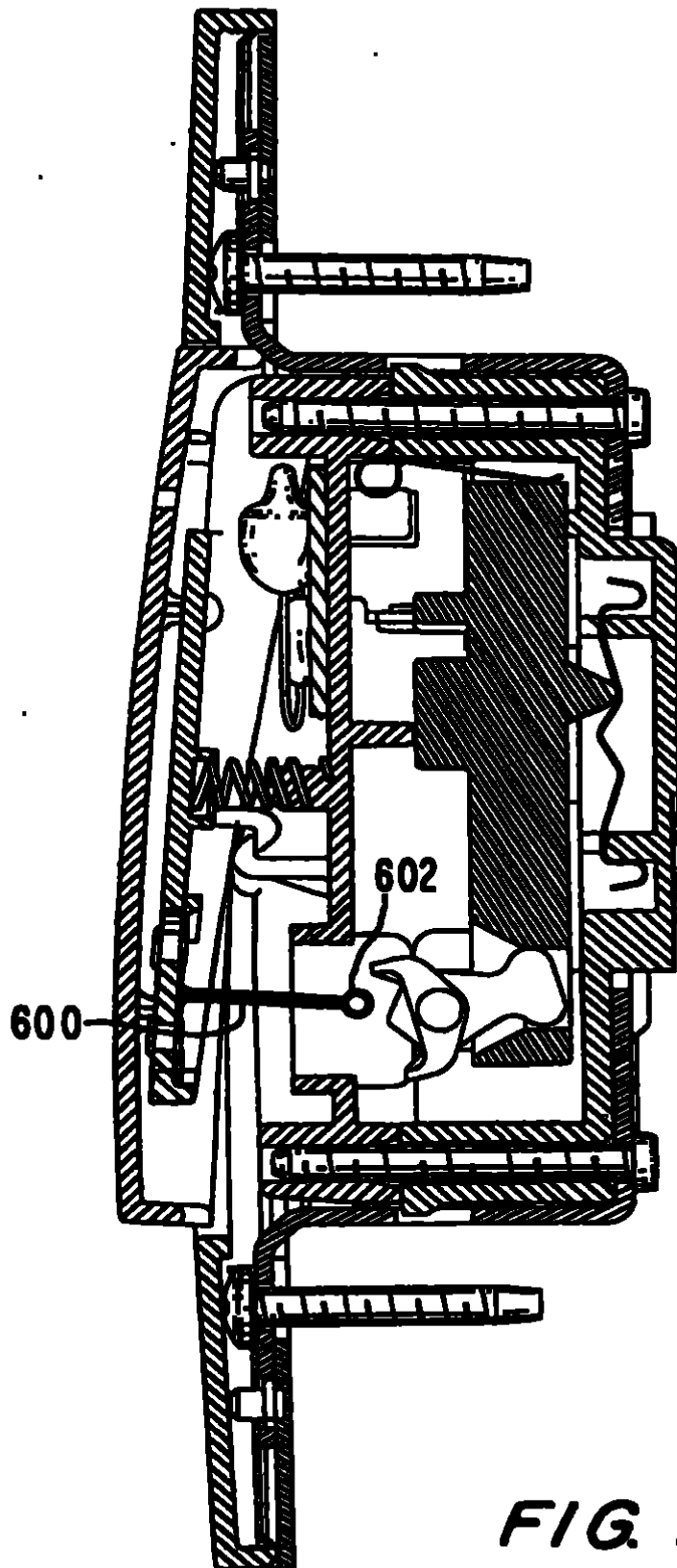


FIG. 27

~~120~~ 37A
378

27/38

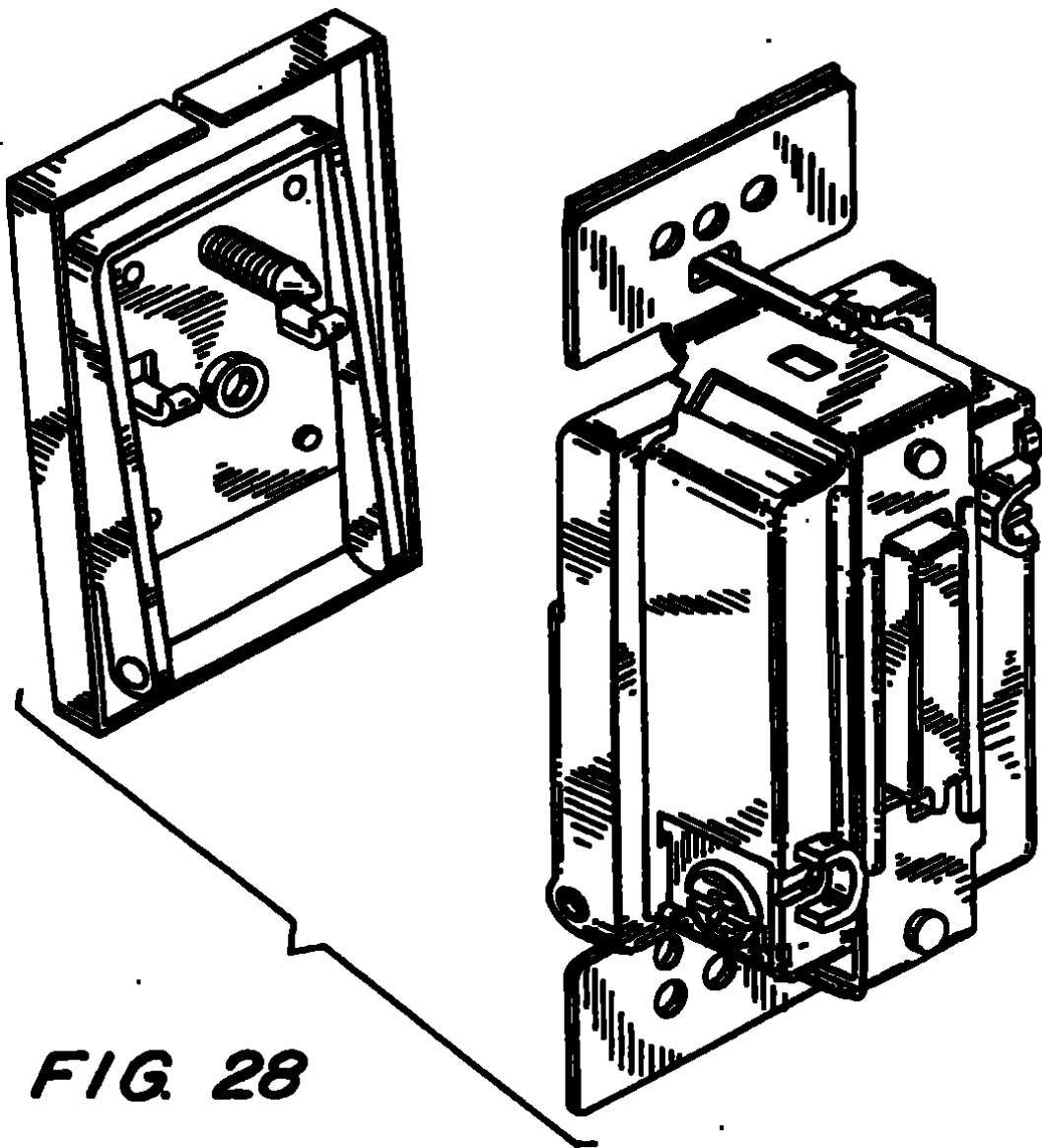


FIG. 28

28/38

379

379

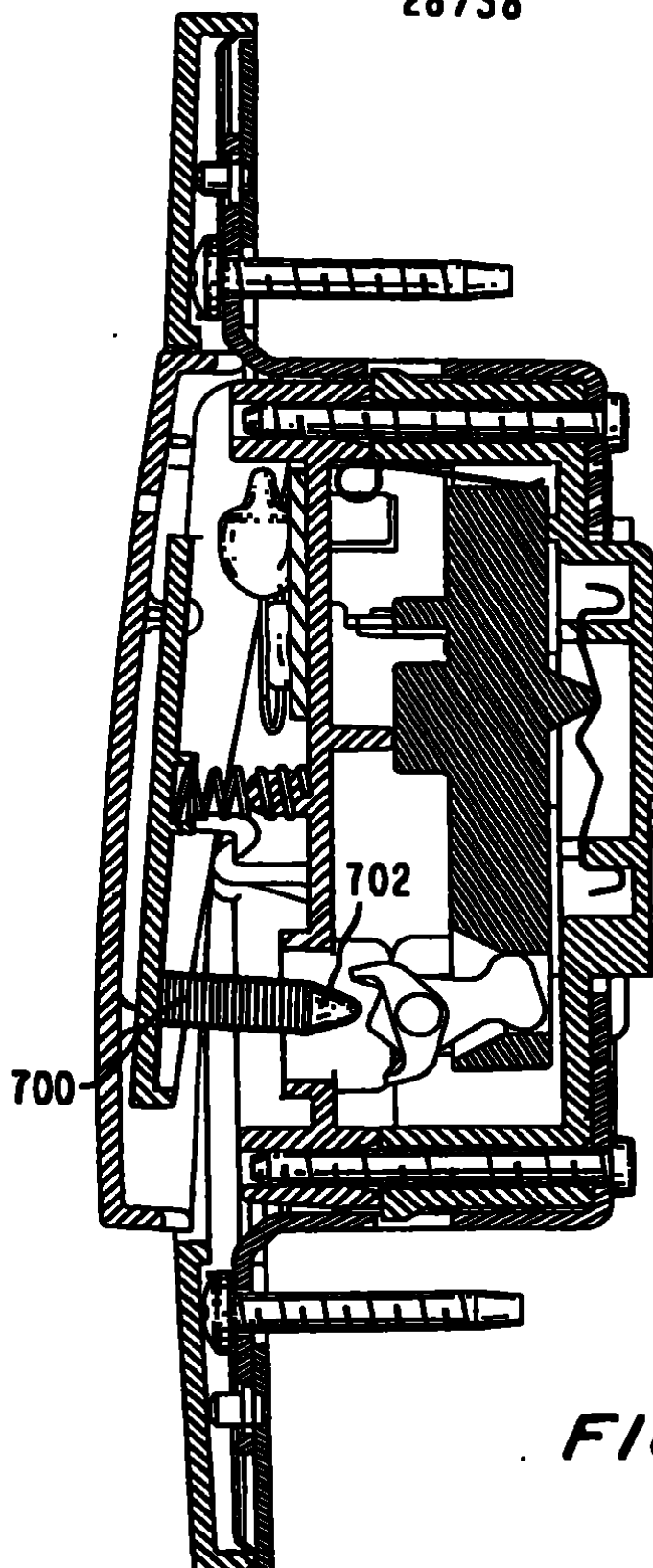
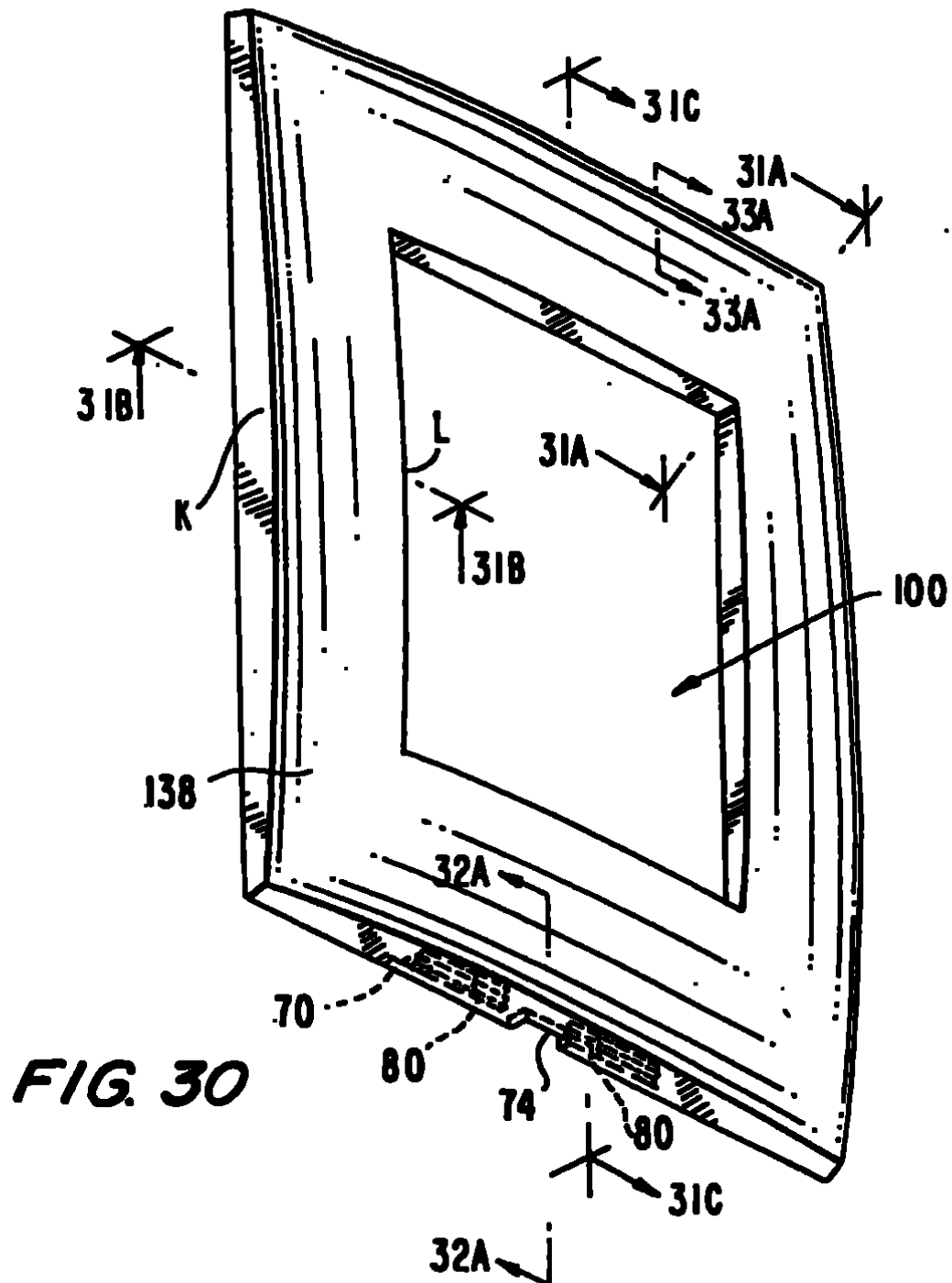
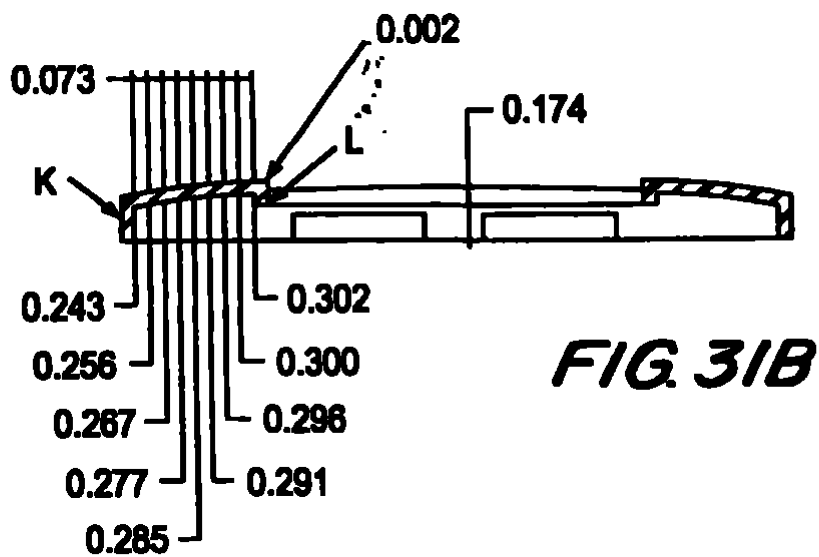
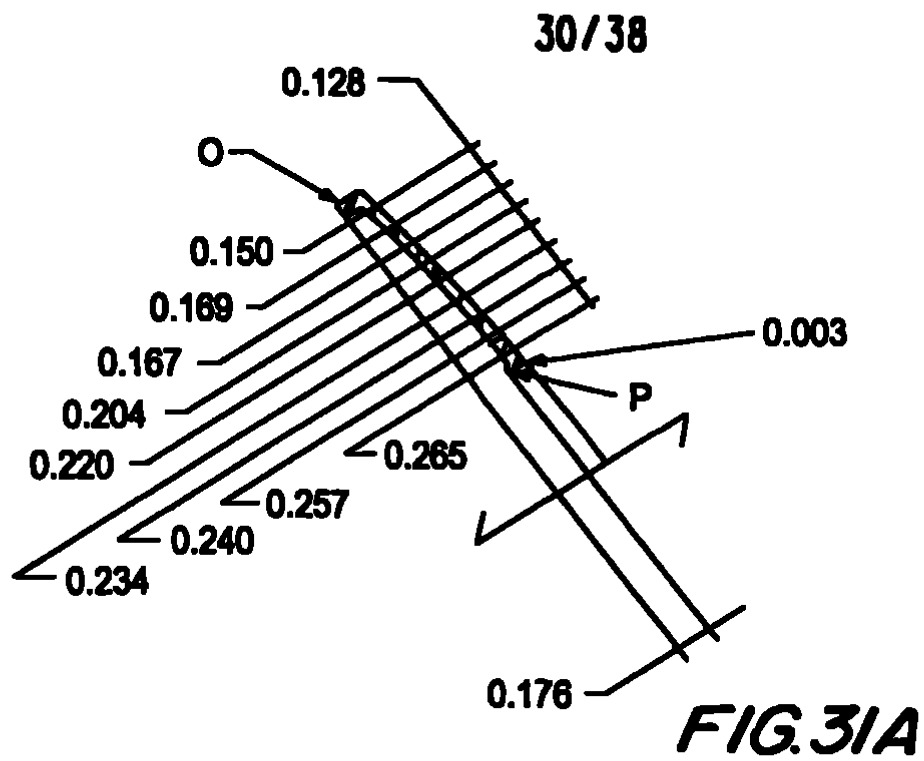


FIG. 29

~~142~~ 333
380



~~129~~ 23A
 381



31/38

14/338
382

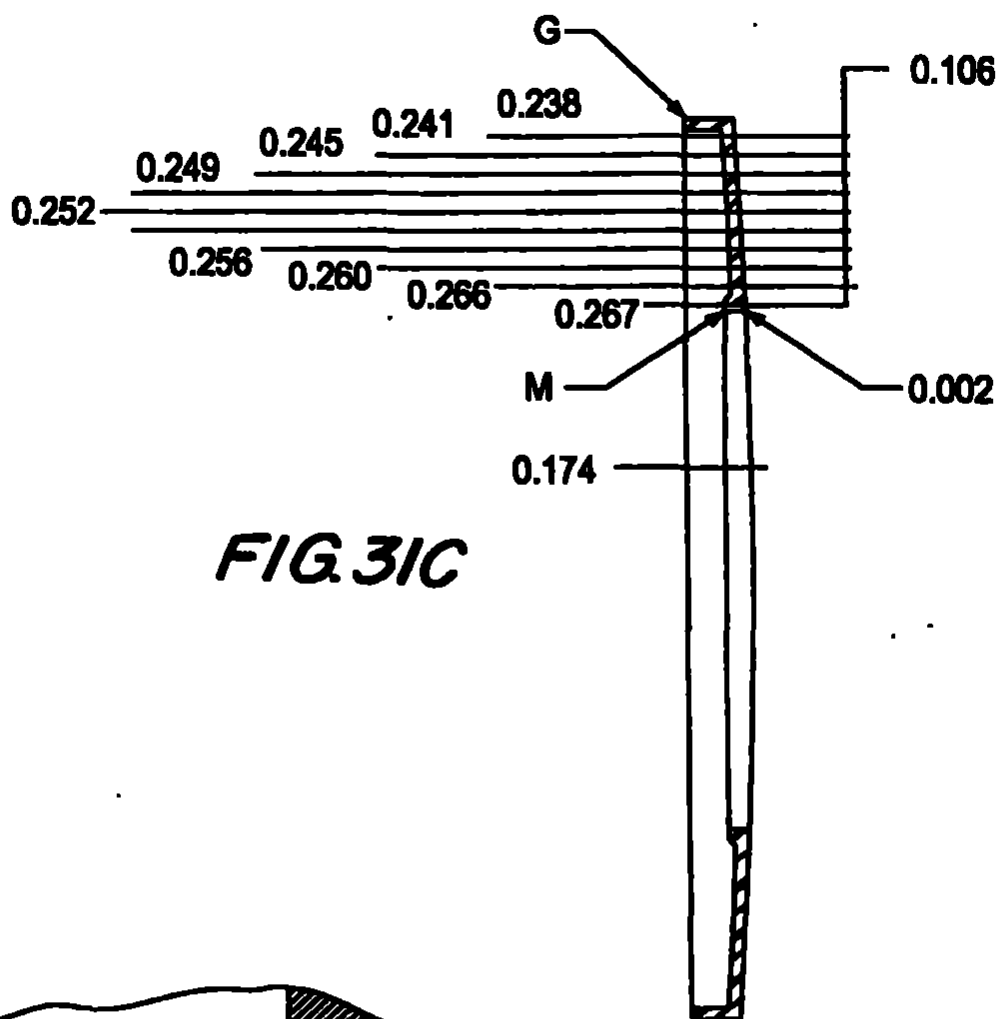


FIG. 31C

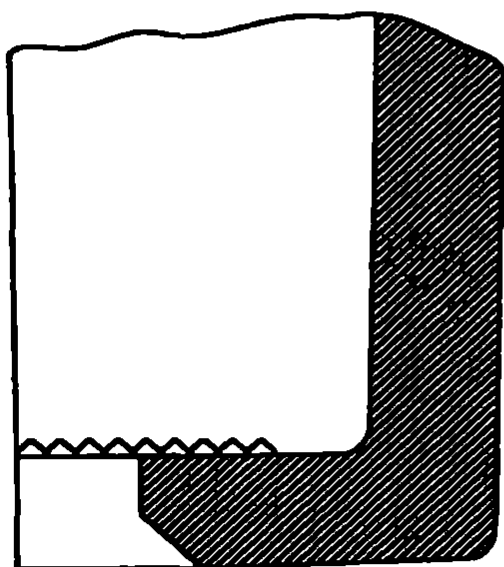


FIG. 32

118 ✓ 289 336

32/38

383

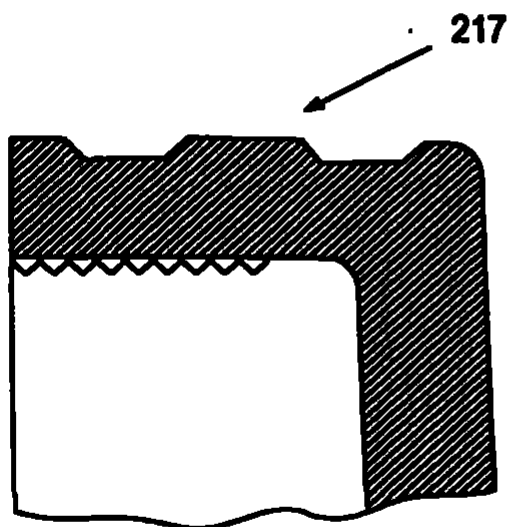


FIG. 33

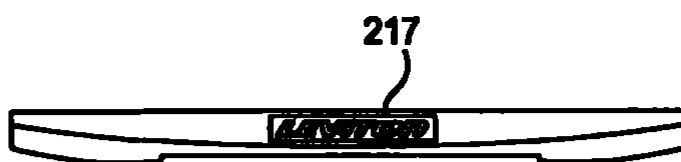


FIG. 34



FIG. 34A

~~337~~
384

33/38

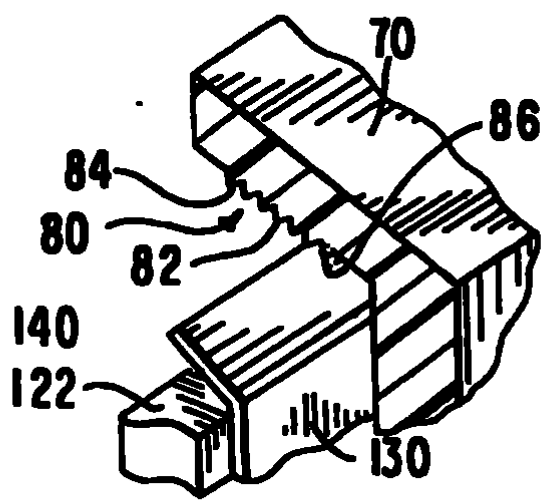


FIG. 35

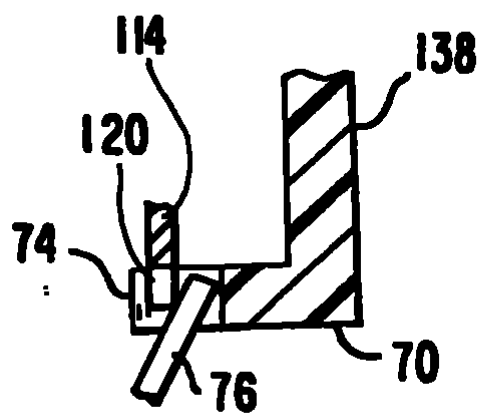


FIG. 36



~~339~~ 339
386

35/38

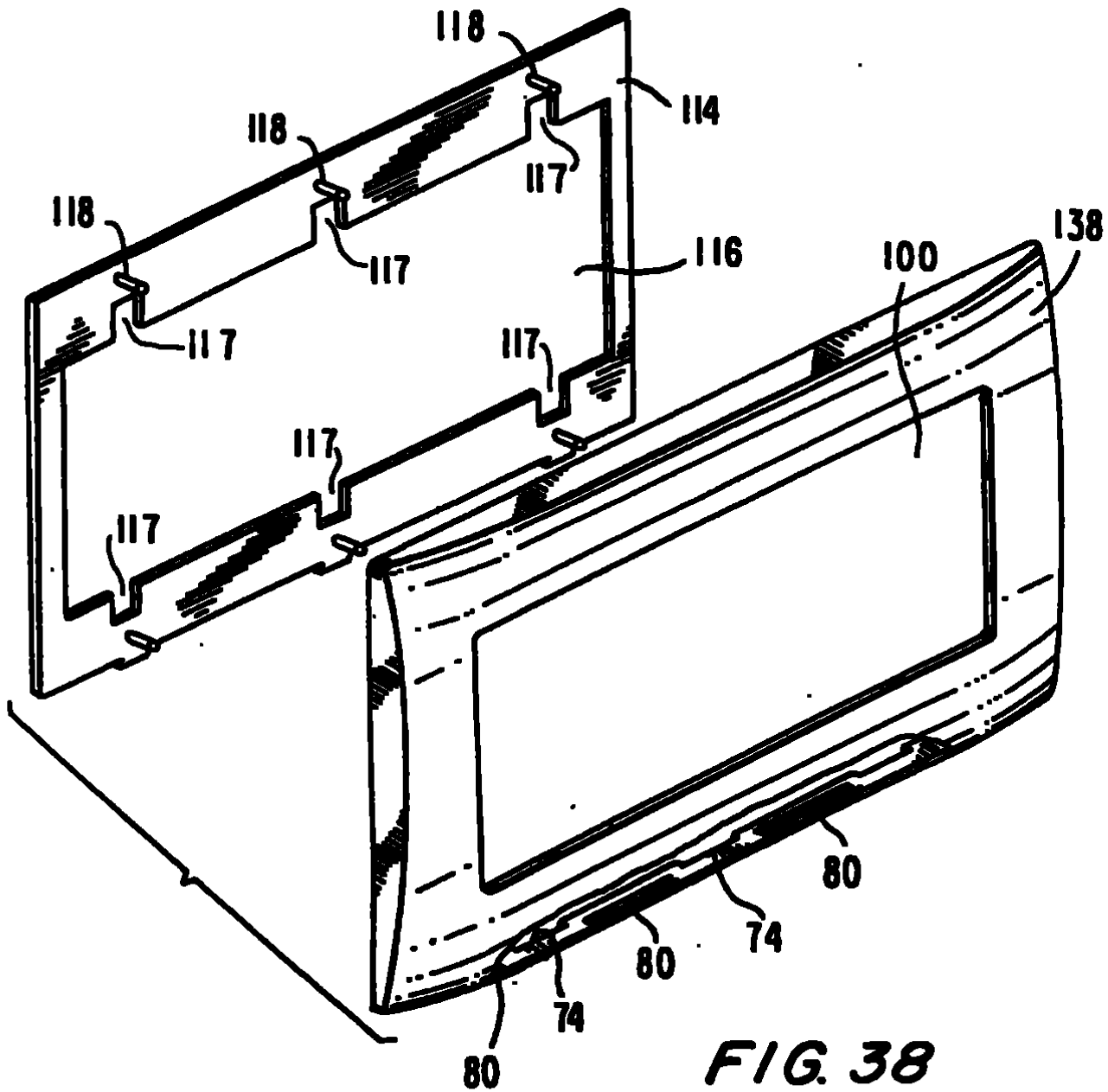


FIG. 38

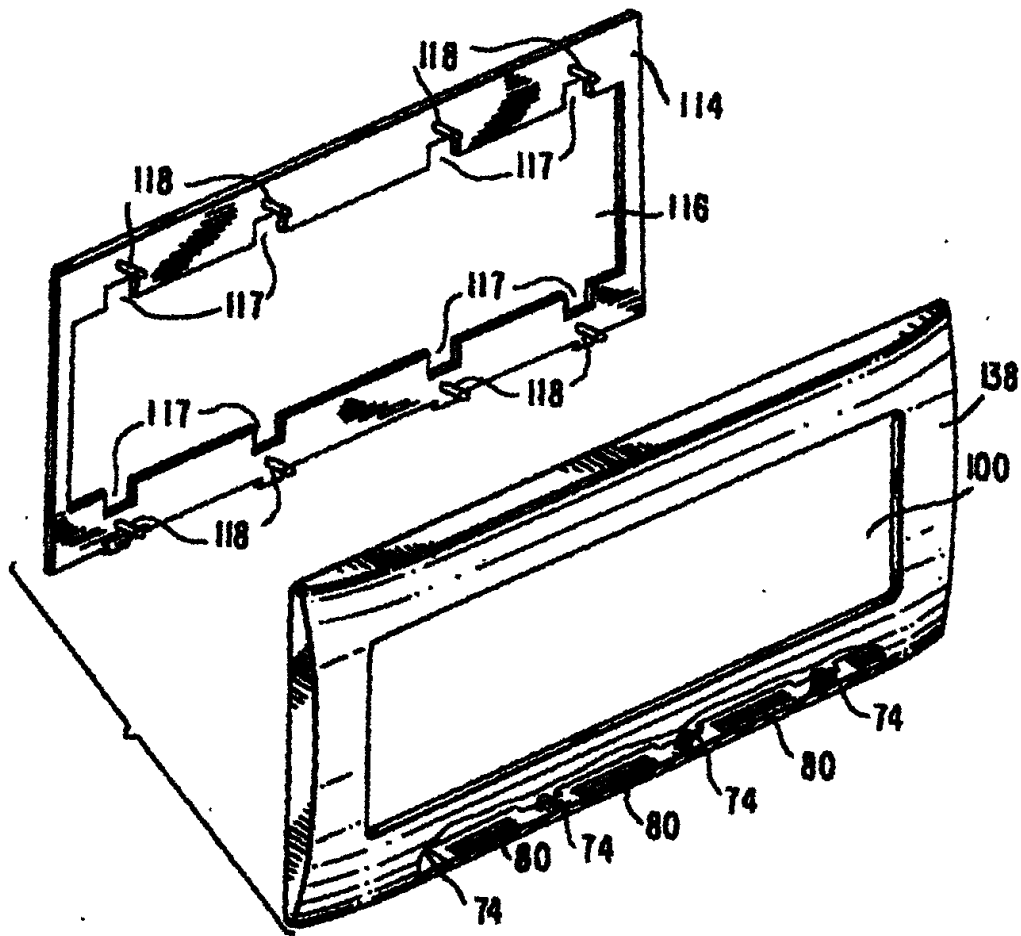
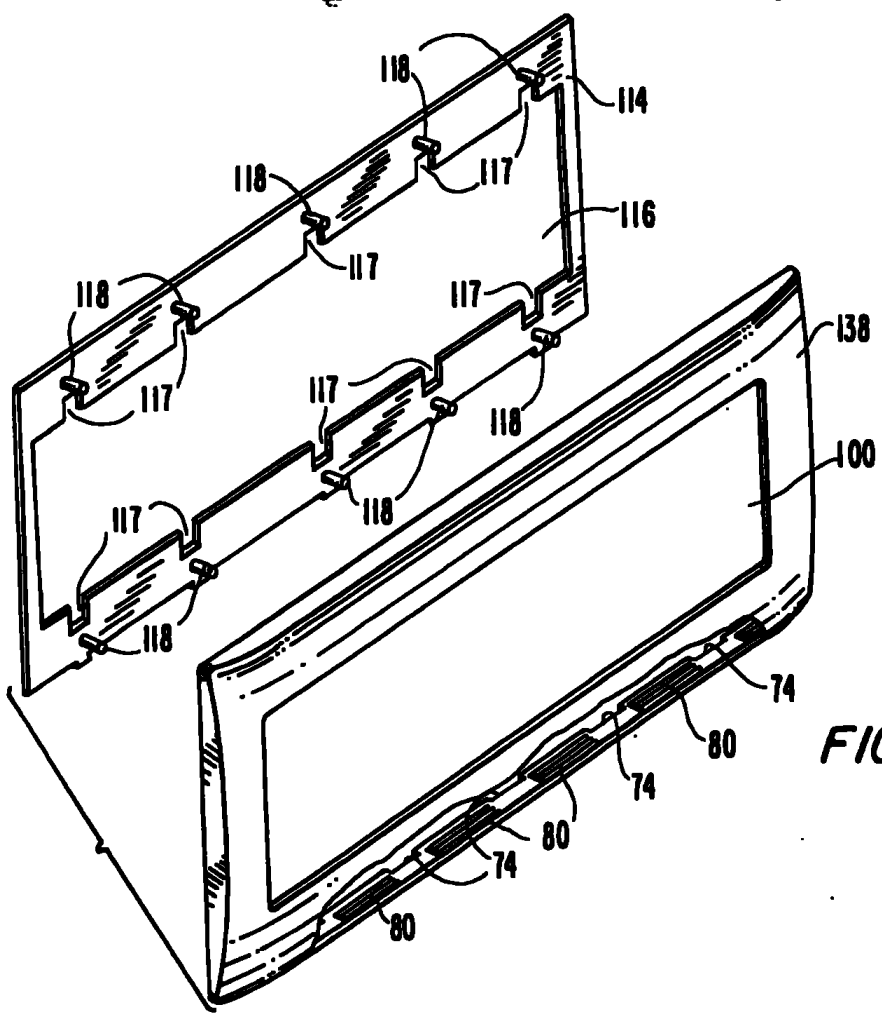


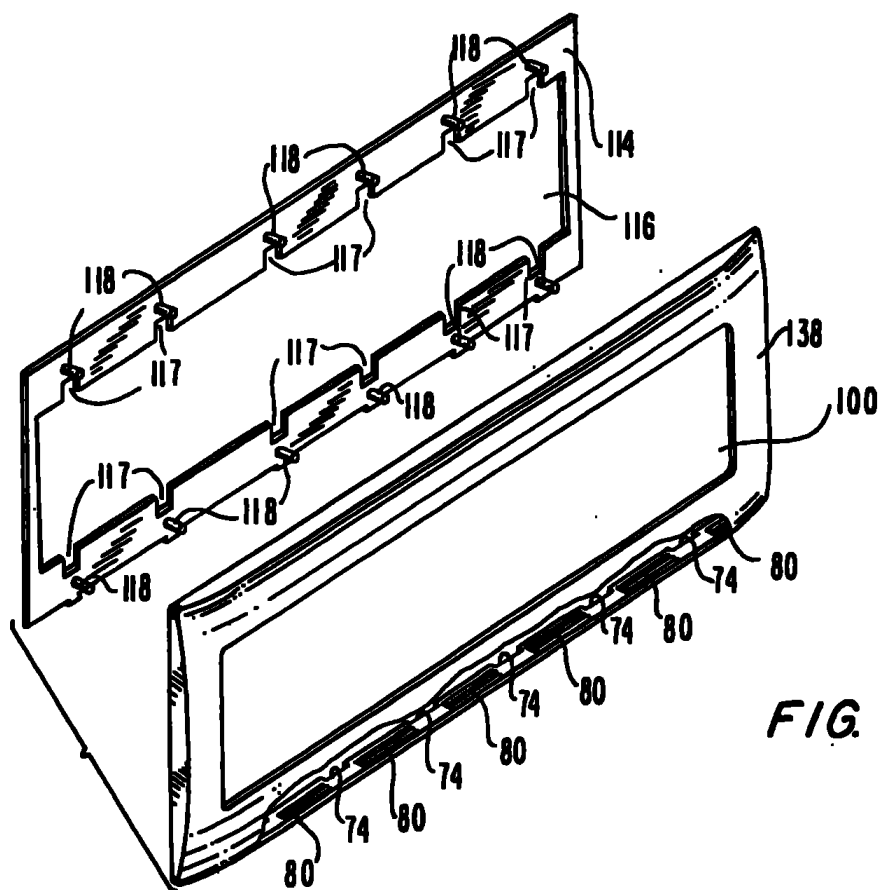
FIG. 39

388

37/38

341





38/38

34

390

REPUBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

Folio 343

2020
Bogotá D.C.,

Doctor(a)
CADENA SARMIENTO JUAN PABLO
Apoderado(a) y/o Representante de
LEVITON MANUFACTURING CO., INC.

REFERENCIA	Radicación No.	06 18719
	Solicitud internacional	PCT/US2004/023817
	Fecha inicio fase nacional	27/02/06
	Trámite	11
	Evento	379
	Actuación	416
	Oficio No.	2712
	Folios	1

Teniendo en cuenta que la solicitud de privilegio de patente que se tramita bajo el expediente indicado en la referencia, reúne los requisitos de forma establecidos en la Decisión 486 de la Comisión de la Comunidad Andina, el Tratado de Cooperación en Materia de Patentes (PCT), el Reglamento y la Circular Única de la Superintendencia de Industria y Comercio, se envía el extracto de la solicitud a la Oficina de Comunicaciones para efecto de su publicación en la Gaceta de Propiedad Industrial.

Cúmplase
Dado en Bogotá DC

27 FEB 2007

ALIX CARMENZA CESPEDES DE VERGEL
Jefe de la división de Nuevas Creaciones

projas