

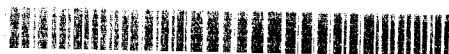
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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 06-100299- -00004-0000

Fecha: 2008-10-23 11:12:51 Dep: 2029 NULCRLACIONE
Tia: 7 PATENTILES Lve: 1 REGDLPOSITO
Act: 538 PETICION Folios: 2

Señora Jefe de la
DIVISION DE NUEVAS CREACIONES
Superintendencia de Industria y Comercio
E. S. D.

Trámite : 002
Evento : 001
Actuación : 538

Referencia : Expediente No. 06.100.299
Asunto : Solicitud de patente para **CORTACIRCUITO MULTI-POLO**
Solicitante : **LS INDUSTRIAL SYSTEMS CO., LTD**
Clase : H01H 071/008
Publicada en : La Gaceta No. 591 del 30 de abril de 2008
Fecha de Solicitud : 4 de octubre de 2006

1. Yo, Emilio FERRERO, identificado como aparece al pie de mi firma, actuando como apoderado en el asunto de la referencia, atentamente, solicito se efectúe el examen de patentabilidad de la solicitud en referencia. Para tal efecto presento junto con este escrito el recibo por valor de \$ 420.000.00, que corresponde a la tasa fijada según lo dispuesto en la resolución No. 44372 de 26 de diciembre de 2007.

2. Ruego atentamente a la Señora Jefe se sirva ordenar que se anexe este recibo para que se efectúe dicho examen y se continúe con el trámite de la solicitud.

Señora Jefe,

EMILIO FERRERO
T.P.A. No. 31.929

COLO-15477-801-004-6
SDC\SCT\ID-136854\WPC15477
No. M-2008-136854\SDC

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No. 06-100299-00004-0000

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10/2 PATENTES Lve: 1 REGDLPOSITO
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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

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FECHA : OCTUBRE 14 DE 2008

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CAVELIER ABOGADOS	CONSIGNACION	BANCO DE BOGOTA	062754387	80663800	14/10/2008	36,915,000.00

***** CONCEPTO *****

CONCEPTO	TOTAL CONCEPTO
1 50005-01-01 SOLICITUDES	
85 EXAMEN DE PATENTABILIDAD DE INVEN	420,000.00
TOTAL :	\$ 420,000.00

SDN: CUATROCIENTOS VEINTE MIL PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

15477-801-004-6

DIVISIÓN DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 06-100299

EL EXTRACTO DE LA PRESENTE SOLICITUD DE **PATENTE DE INVENCION**

FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No **591** DE

FECHA **30 DE ABRIL DE 2008** EL TÉRMINO HÁBIL SEÑALADO POR LA LEY

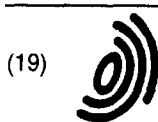
EXPIRA EL **30 DE JULIO DE 2008**

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____

NO X



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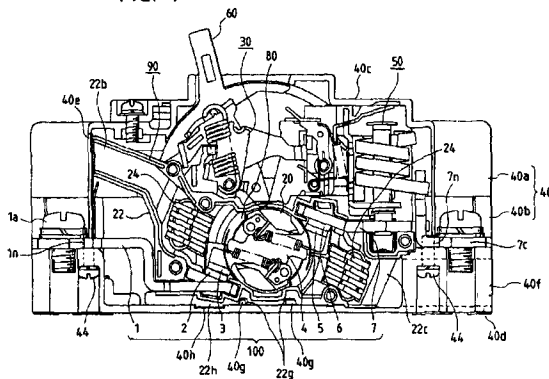
(54) Circuit breaker

(57) It is an object of the present invention to provide a circuit breaker excellent in safety by electrically insulating the trip unit from the main circuit, and capable of performing a proper wiping of the movable contact carrier, resulting in reduction of electrical resistance at the contacts. Further, a circuit breaker excellent in workability in assembling processes is also provided.

In the circuit breaker of the present invention, a housing means (22) contains a main circuit (100) including a power supply side stationary contact carrier (1) with a stationary contact (2), a movable contact carrier (4) with a power supply side movable contact (3) and a load side movable contact (5), and a load side stationary contact carrier (7) with a load side stationary contact (6).

The housing means is made of insulating material and disposed in the casing (40) also made of insulating material. The circuit breaker includes a make-and-break mechanism (30), a tripping mechanism (50). The tripping mechanism (50) is unitedly connected to the load side stationary contact carrier (7) and to the load side terminal (7c) therebetween. The tripping means (50) includes a converting mechanism (51) for converting electromagnetic force to mechanical force for tripping, which is supported on the housing means (22) and is electrically insulated from the main circuit (100). The make-and-break mechanism (30) is mounted on the housing means (22) and is electrically insulated from the main circuit (100).

FIG. 1



+32
131

Description

[0001] This invention relates to a circuit breaker, more particularly to a circuit breaker provided with a contact suitable for performing proper wiping when the circuit breaker is turned on.

[0002] A circuit breaker is connected between a power source and a load in a circuit of a power distribution line or a bus line of a transforming station, and sometimes in a circuit connected to a machine, etc. for breaking the circuit automatically when a defect, such as short circuit or overcurrent, occurs therein. In addition, when the current is within a rated value or a predetermined value, the circuit breaker is used to manually turning on and off the circuit as a switch.

[0003] A circuit breaker in the related art, as disclosed in Japanese Patent Application Laid-open No. Hei-6-52777 (Priority: FR 92 03142), has a movable contact provided at each end of a rotational contact bridge (movable contact carrier) and a pair of stationary contact provided so as to face each of those movable contacts. Consequently, a set of movable contact and stationary contact pair is provided at each end of the movable contact carrier. The set of those movable contact and the stationary contact pair are disposed symmetrically from a point (the rotational center) of the movable contact carrier so as to turn on or turn off the circuit at the same time practically.

[0004] In addition, as disclosed in Japanese Patent Application Laid-open No. Hei-6-325680 (Priority: FR 93 04296), a contact unit including a power side contact and a tripping unit including a tripping mechanism are formed separately and connected to each other with screws thereby to form a circuit breaker.

[0005] Further, as disclosed in Japanese Published Patent No. Hei-7-123021, a converting portion for converting an electromagnetic force of the tripping mechanism to a mechanical output is an electrically charged portion.

[0006] In the related art, the movable contact and the stationary contact pair are designed in such a manner that the movement of the movable contact carrier is stopped at a position where the movable contact comes in contact with the stationary contact, which prevents those contacts from sliding on their surfaces resulting in formation of an oxide film on the surface of the contacts. In addition, in the related art, since the power side contact unit and the tripping unit are formed separately and they are connected together at an assembly step within a casing, an additional process is required for fastening the units, and an operation check is possible only when the assembling is over. Further, the tripping unit in the related art employs a converting mechanism, where an electromagnetic force is converted to a mechanical output, is electrically connected to an electrically charged portion within the circuit breaker, i.e., the tripping unit is also a charged portion, which brings about an accidental electrical shock by careless touch during maintenance

or inspection. Furthermore, in such a circuit breaker as disclosed in the last related art, the make-and-breaker mechanism is an electrically charged portion, though not written explicitly. The make-and-break mechanism, is screwed through screw holes formed at the bottom of the cabinet case. The screws are insulated with a cover made of an insulating material and provided at the bottom of the case. The bottom of the case is thus double-structured, resulting in expansion of the size, increase of the weight and the number of assembling processes.

[0007] It is an object of the present invention to provide a circuit breaker excellent in safety by electrically insulating the trip unit from the main circuit.

[0008] It is another object of the present invention to provide a circuit breaker capable of performing a proper wiping of the movable contact carrier, resulting in reduction of electrical resistance at the contacts.

[0009] It is the third object of the present invention to provide a circuit breaker excellent in workability in assembling processes.

[0010] In view of the objective of solving the problems explained above, the construction of the circuit breaker comprises

a casing (40) made of electrically insulating material;

a main circuit (100) provided with a power supply side stationary contact carrier (1), a power supply side stationary contact (2), a power supply side movable contact (3), a movable contact carrier (4), a load side movable contact (5), a load side stationary contact (6), and a load side stationary contact carrier (7);

housing means (22) disposed in the casing (40) for housing the power supply side stationary contact (2), the power supply side movable contact (3), the movable contact carrier (4), the load side movable contact (5), and the load side stationary contact (6) therein, the housing means (22) being made of electrically insulating material;

a make-and-break mechanism (30) disposed in the casing (40) for making and breaking the main circuit (100) by moving the movable contact carrier (4);

a tripping mechanism (50) disposed in the casing (40) for tripping the make-and-break mechanism (30) when an abnormal current flows in the main circuit (100);

a movable contact carrier holder (20) disposed in the housing means (22) for supporting the movable contact carrier (4), the movable contact carrier holder (20) being made of electrically insulating material;

holding means (80) disposed in the housing means (22) for supporting the movable contact carrier holder (4) rotatably; and

transmitting means (25) for transmitting the make/break operation of the make-and-break mechanism (30) to the movable contact carrier holder (20),

wherein

the power supply side stationary contact carrier (1) and the load side stationary contact carrier (7) is partially exposed outside of the housing means (22) so as to be electrically connected to a power supply side terminal (1a) and a load side terminal (7c) respectively,

characterized in that

the tripping mechanism (50) is united to the load side stationary contact carrier (7) and to the load side terminal (7c), the tripping means (50) includes a converting mechanism (51) for converting electromagnetic force to mechanical force for tripping, the converting mechanism is supported on the housing means (22) and is electrically insulated from the main circuit (100), the transmitting means (25) is made of electrically insulating material, the make-and-break mechanism (30) is mounted on the housing means and is electrically insulated from the main circuit (100).

[0011] In another embodiment of the circuit breaker, the power supply side stationary contact carrier (1) and the load side stationary contact carrier (7) are composed in such a manner that an amount of wipe between the power supply side stationary contact (2) and the power supply side movable contact (3) differs from that between the load side movable contact (5) and the load side stationary contact (6) when the main circuit (100) makes.

[0012] In the second embodiment of the circuit breaker, the power supply side stationary contact carrier (1) and the load side stationary contact carrier (7) are composed in such a manner that a gap between contacts is formed at either one of the power supply side stationary contact (2) and the power supply side movable contact (3) pair or the load side movable contact (5) and the load side stationary contact (6) pair when the other contact pair makes.

[0013] In the third embodiment of the circuit breaker, the power supply side stationary contact carrier (1) and the load side stationary contact carrier (7) are composed in such a manner that the gap is formed between the power supply side stationary contact (2) and the power supply side movable contact (3) when the load side movable contact (5) and the load side stationary contact (6) pair makes.

[0014] In the fourth embodiment of the circuit breaker, the circuit breaker has a plurality of poles, and comprises,

a casing (40) made of electrically insulating material;

a plurality of main circuits (100) disposed at each of the poles, each of the main circuit (100) provided with a power supply side stationary contact carrier (1), a power supply side stationary contact (2), a power supply side movable contact (3), a movable contact carrier (4), a load side movable contact (5),

a load side stationary contact (6), and a load side stationary contact carrier (7);

a plurality of housing means (22) disposed in the casing (40), each of the housing means for housing the power supply side stationary contact (2), the power supply side movable contact (3), the movable contact carrier (4), the load side movable contact (5), and the load side stationary contact (6) therein for each pole, the housing means (22) being made of electrically insulating material;

a make-and-break mechanism (30) disposed in the casing (40) for making and breaking the plurality of main circuit (100) by moving the movable contact carrier (4) at each pole;

a plurality of tripping mechanisms (50) disposed in the casing (40), each of the tripping mechanisms (50) for tripping the make-and-break mechanism (30) when an abnormal current flows in at least one of the plurality of main circuits (100);

a movable contact carrier holder (20) disposed in the housing means (22) for supporting the movable contact carrier (4), the movable contact carrier holder (20) being made of electrically insulating material;

holding means (80) disposed in the housing means (22) for supporting the movable contact carrier holder (4) rotatably; and

transmitting means (25) for transmitting the make/break operation of the make-and-break mechanism (30) to all of the movable contact carrier holders (20) simultaneously, wherein

the power supply side stationary contact carrier (1) and the load side stationary contact carrier (7) is partially exposed outside of the housing means (22) so as to be electrically connected to a power supply side terminal (1a) and a load side terminal (7c) respectively,

characterized in that

the tripping mechanism (50) is united to the load side stationary contact carrier (7) and to the load side terminal (7c), the tripping means (50) includes a converting mechanism (51) for converting electromagnetic force to mechanical force for tripping, the converting mechanism is supported on the housing means (22) and is electrically insulated from the main circuit (100), the transmitting means (25) is made of electrically insulating material, the make-and-break mechanism (30) is mounted on one of the housing means (22) and is electrically insulated from the plurality of main circuits (100).

[0015] In the fifth embodiment of the circuit breaker, the power supply side stationary contact carrier (1) and the load side stationary contact carrier (7) are composed in such a manner that an amount of wipe between the power supply side stationary contact (2) and the power supply side movable contact (3) differs from that between the load side movable contact (5) and the load side stationary contact (6) when the main circuit (100)

FIG. 1

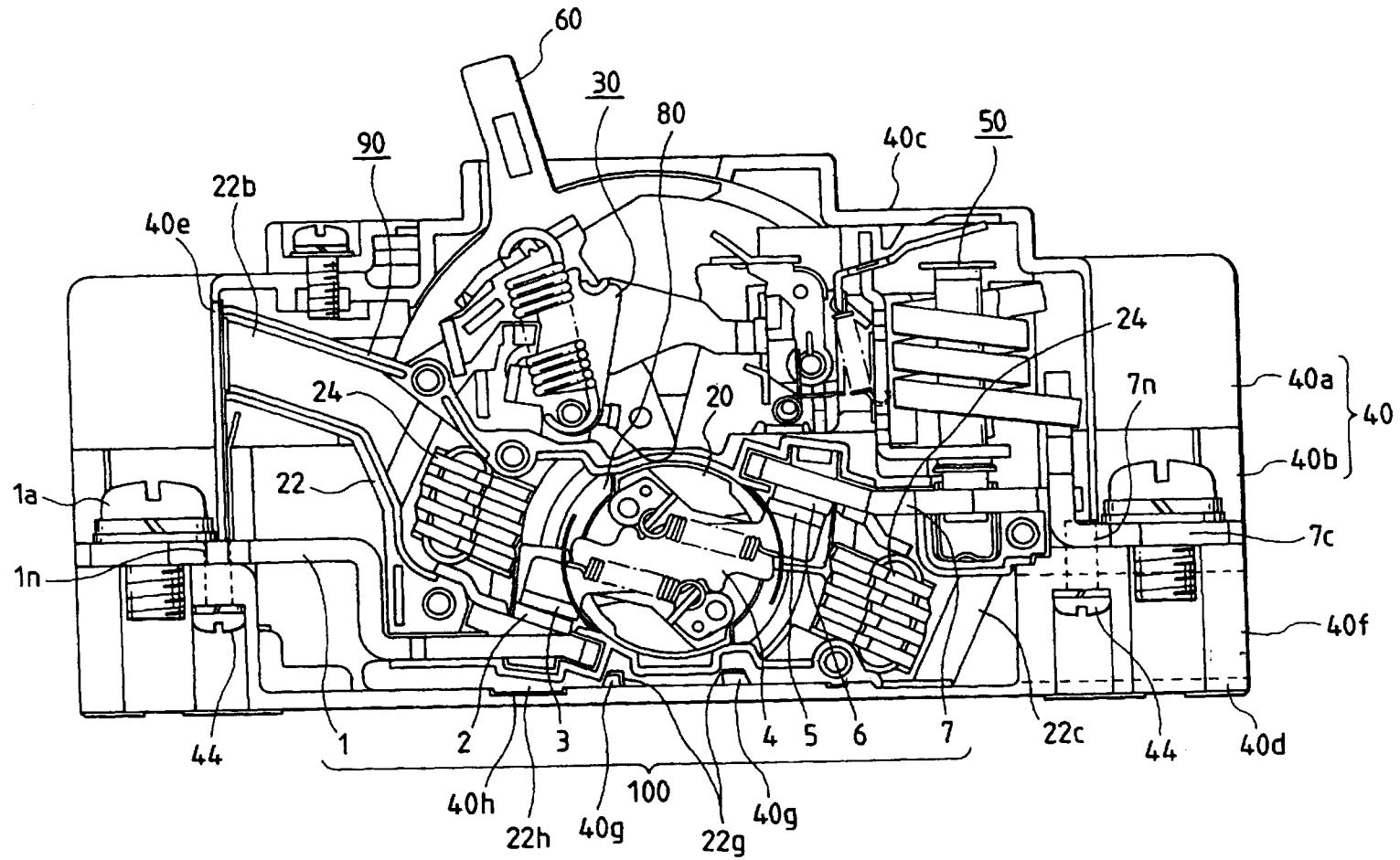
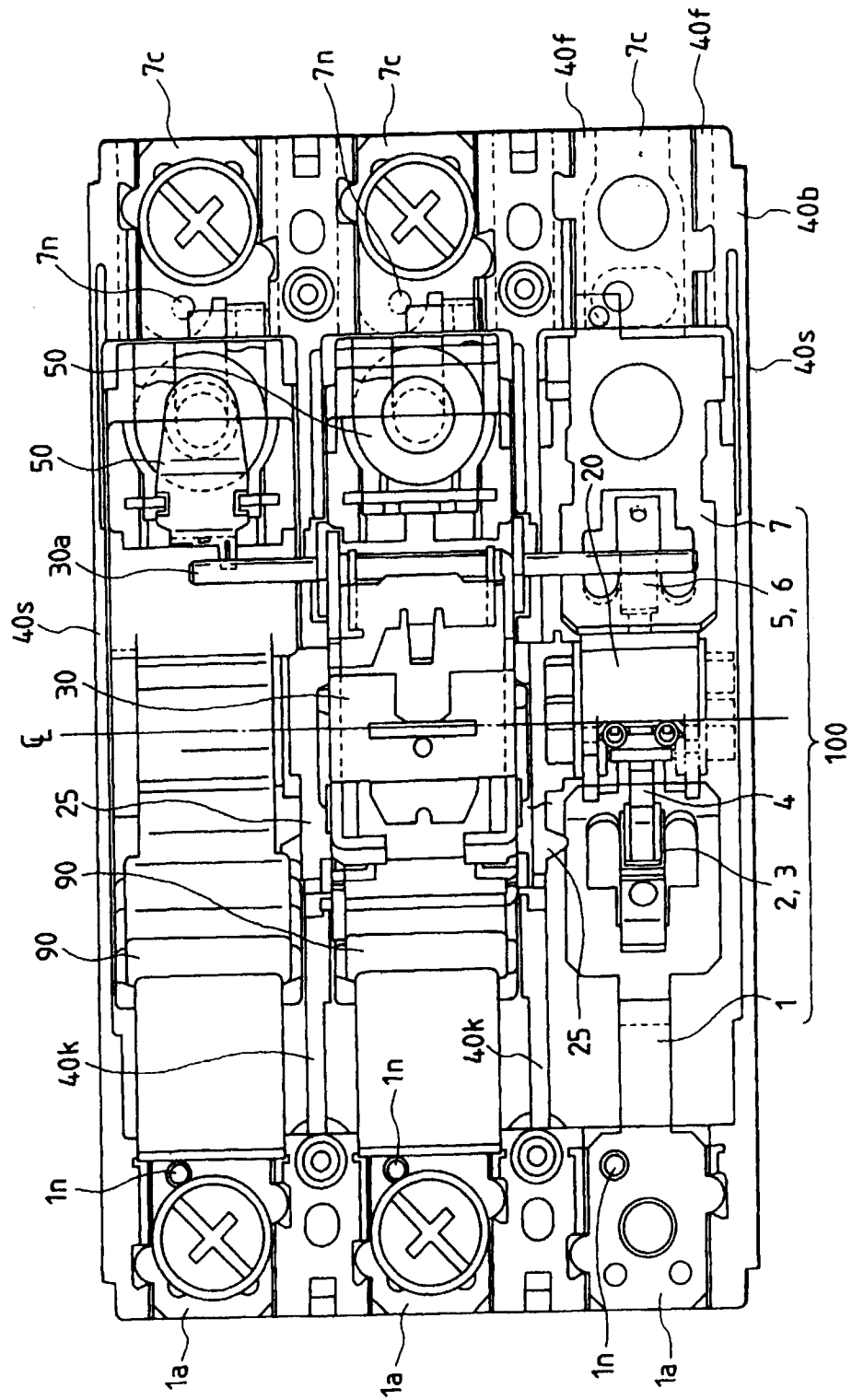


FIG. 2



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FIG. 16

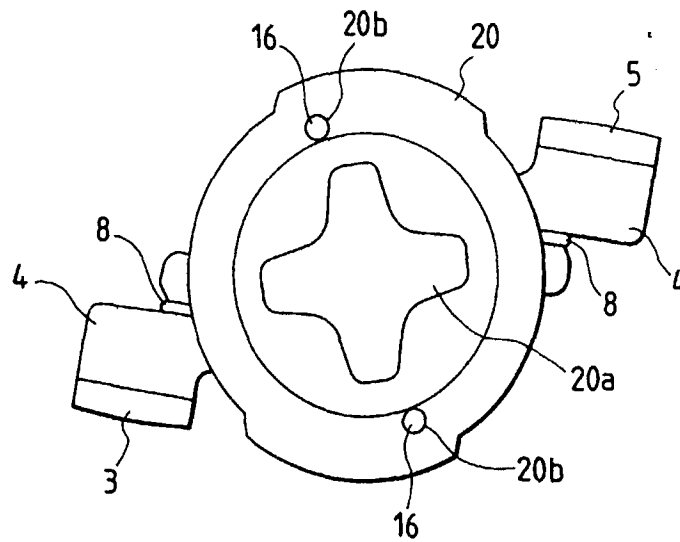


FIG. 17

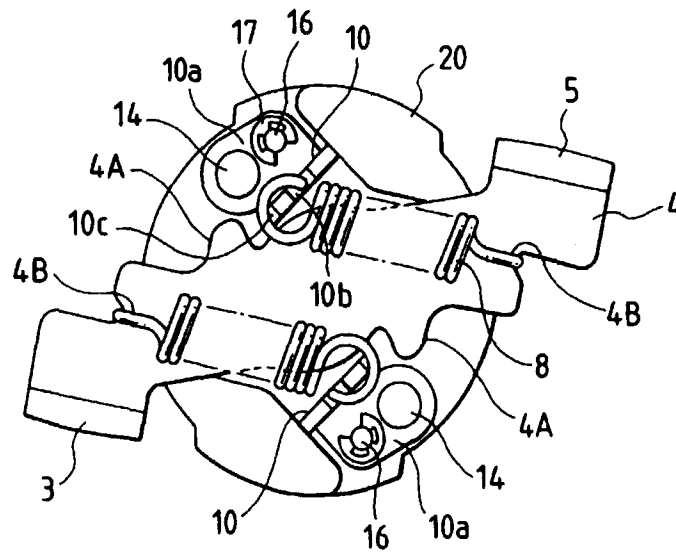


FIG. 18

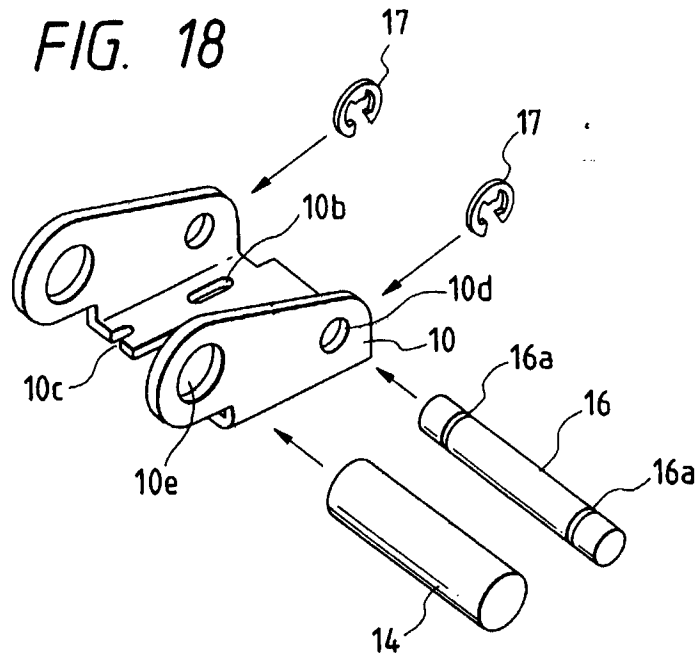
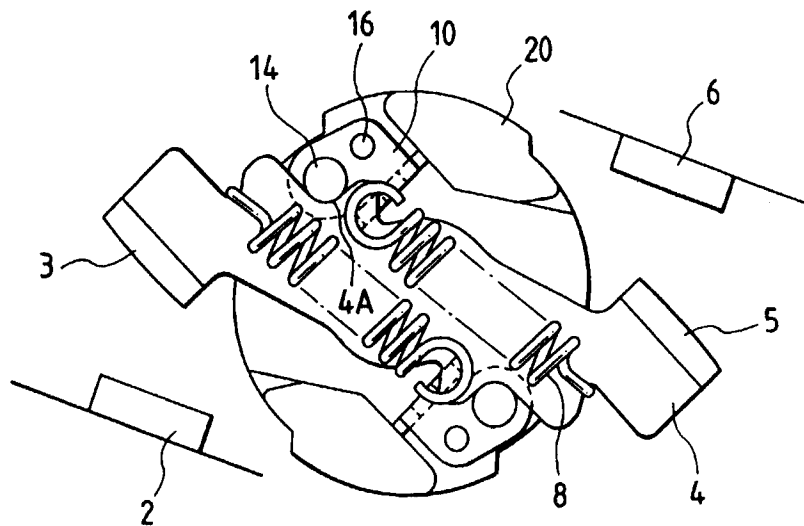


FIG. 19





US006639168B1

(12) **United States Patent**
Castonguay et al.

(10) **Patent No.:** **US 6,639,168 B1**
(45) **Date of Patent:** **Oct. 28, 2003**

(54) **ENERGY ABSORBING CONTACT ARM STOP**

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(*) Notice: Subject to any disclaimer, the term of this
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(21) Appl. No.: **09/655,647**

(22) Filed: **Sep. 6, 2000**

Related U.S. Application Data

(60) Provisional application No. 60/190,179, filed on Mar. 17,
2000.

(51) Int. Cl.⁷ **H01H 33/18**

(52) U.S. Cl. **218/22; 335/16; 335/46**

(58) Field of Search **335/23-25, 35-38,**
335/42-46, 16, 147, 195, 167, 176; 218/22,
155

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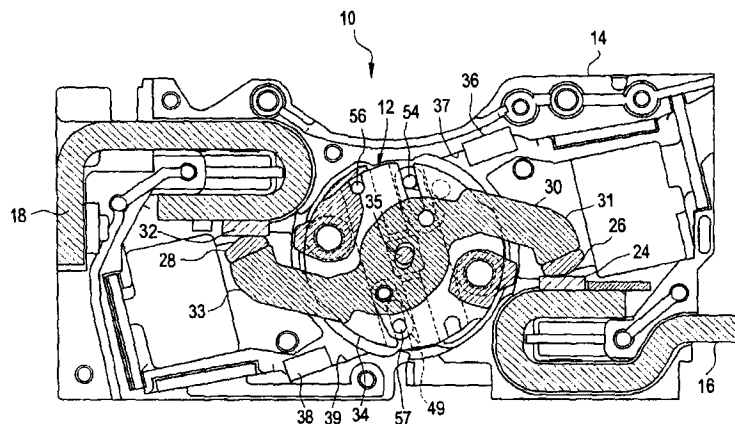
Primary Examiner—Tuyen T. Nguyen

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(57) **ABSTRACT**

A circuit breaker cassette comprises a housing having a fixed contact, and a movable contact on a contact arm. The contact arm is positionable in a closed position and an open position, wherein the contact arm is closed when the movable contact is in contact with said fixed contact. A spring biases the movable contact arm towards the closed position. A kinetic energy-absorbing stop is positioned to absorb kinetic energy of the contact arm resulting from magnetic repulsive forces forcing the movable contact and the fixed contact apart during a short circuit condition.

12 Claims, 5 Drawing Sheets



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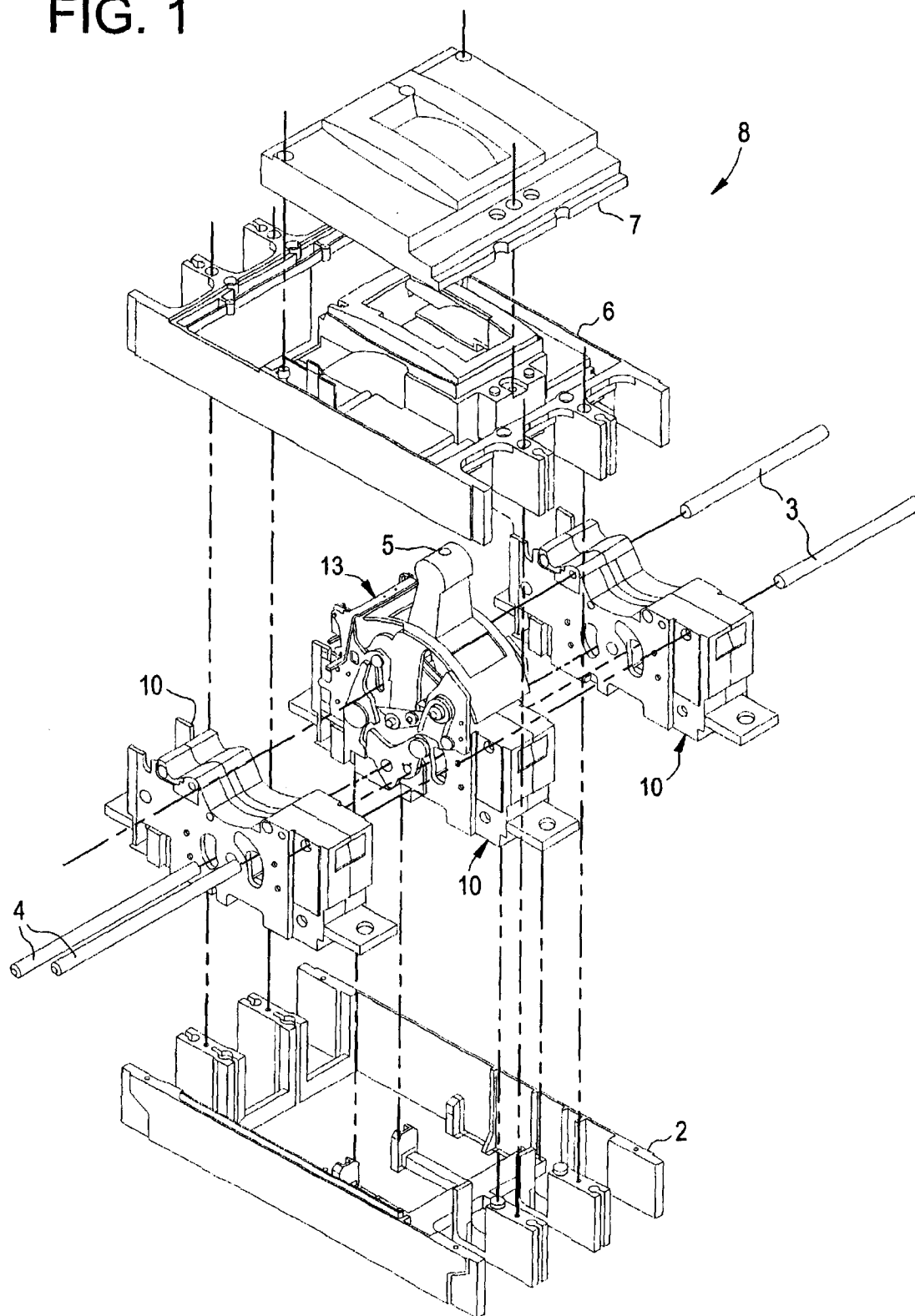
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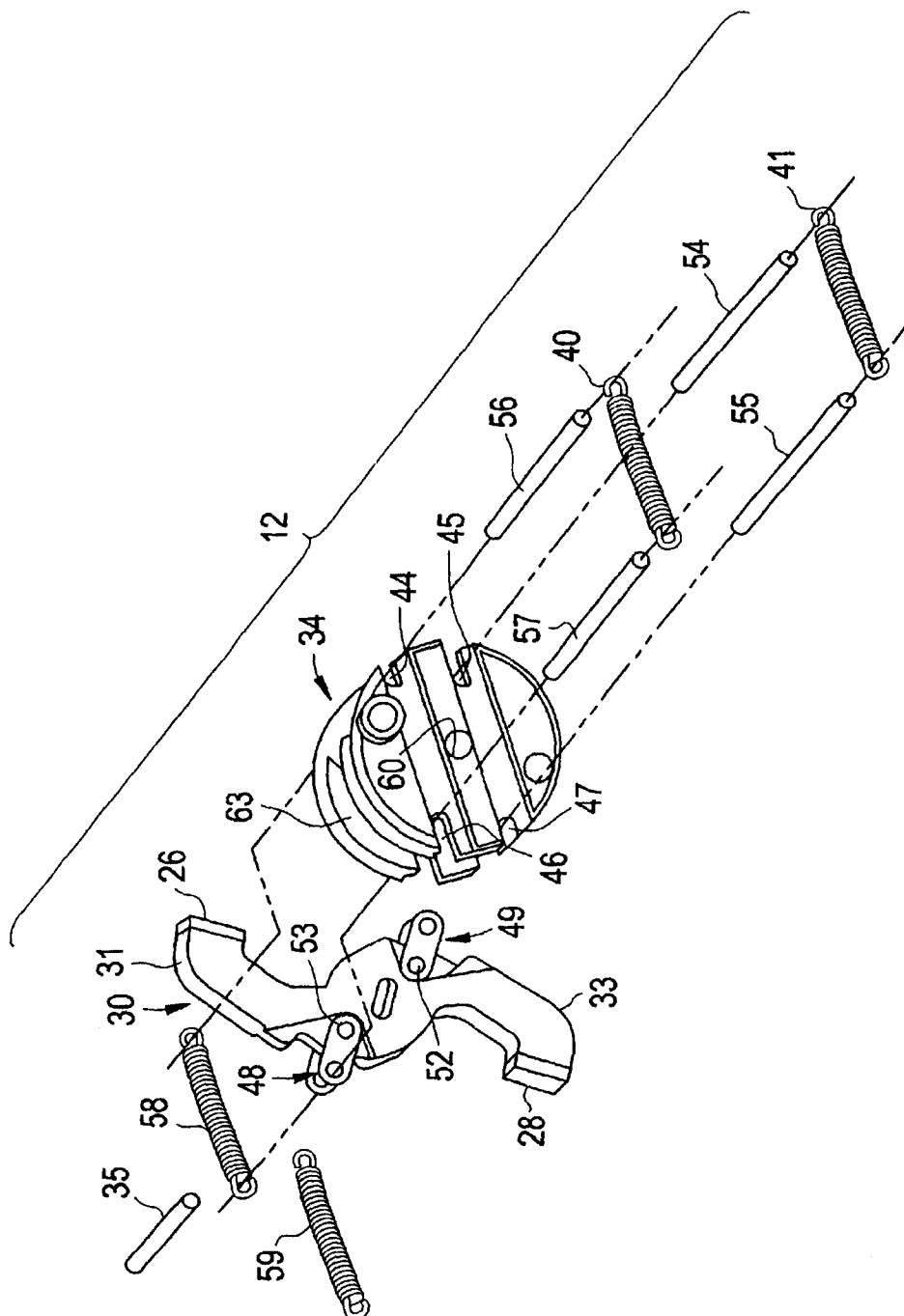
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FIG. 1



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FIG. 5



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ENERGY ABSORBING CONTACT ARM STOP

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims benefit of earlier-filed U.S. Provisional Application No. 60/190,179, filed Mar. 17, 2000, which is fully incorporated herein by reference.

BACKGROUND OF THE INVENTION

This invention relates to circuit breakers, and, more particularly, to a movable contact arm stop that provides a resilient bumper to absorb the opening energy of a movable contact arm.

In typical circuit breakers, one or more springs are employed for maintaining a contact between movable contacts and fixed contacts against magnetic repulsive forces that naturally build up between the contacts. During short circuit occurrences, magnetic repulsive forces are sufficient to accelerate the movable contact arm of a rotary contact assembly at a very high rate of speed. Contact made between the highly accelerated movable contact arm and surfaces on the inside of the rotary contact assembly may cause the movable contact arm to rebound, which can be undesirable.

Prior art designs attempt to reduce the opening energy by slowing down the speed at which the movable contact arm opens. Prior art designs also incorporate catchers and locks to retain the movable contact arms in the open positions. However, such mechanisms are complicated and expensive, and are not completely reliable.

BRIEF SUMMARY OF THE INVENTION

To overcome the above discussed and other disadvantages of the prior art, the present invention provides a circuit breaker cassette comprising a housing having a fixed contact mounted within the housing, and a movable contact mounted on a contact arm. The contact arm is positionable in a closed position and an open position, wherein the contact arm is closed when the movable contact is in contact with said fixed contact. A spring biases the movable contact arm towards the closed position. A kinetic energy-absorbing stop is positioned to absorb kinetic energy of the contact arm resulting from magnetic repulsive forces forcing the movable contact and the fixed contact apart during a short circuit condition. The kinetic energy-absorbing stop comprises a material more resilient than material forming said housing.

The above discussed and other features and advantages of the present invention will be appreciated and understood by those skilled in the art from the following detailed description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the exemplary drawings wherein like elements are numbered alike in the several FIGURES:

FIG. 1 shows an exploded view of a circuit breaker of the invention;

FIG. 2 and FIG. 3 show a plan of a circuit breaker cassette of the invention with part of its housing removed;

FIG. 4 shows a perspective view of the circuit breaker cassette shown in FIGS. 2 and 3; and

FIG. 5 shows an exploded view of a rotor and contact arm assembly.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows an exploded view of molded-case circuit breaker 8. Although a molded case circuit breaker is shown,

2

the invention is applicable to other circuit breakers types. Circuit breaker 8 comprises a case 2 holding three breaker cassettes 10. Each breaker cassette 10 operates to brake the current in one pole of the power circuit controlled by circuit breaker 8. Rods 3 tie cassettes 10 together into a unit and rods 4 mechanically link an operating mechanism 13 to cassettes 10 so that the contacts in all three cassettes 10 open and close in unison when operating mechanism 13 is tripped.

Operating mechanism 13 sits atop the center cassette 10 and includes handle 5 for manual operation of circuit breaker 8. A mid-cover 6 encloses cassettes 10 and includes an aperture allowing access to handle 5. Top-cover 7 protects accessories, trip units, and other components (not shown) that may be added to circuit breaker 8.

Referring to FIG. 2, a circuit breaker cassette 10 is shown with one cover removed to reveal aspects of the inner structure of cassette 10. Cassette 10 comprises a rotary contact assembly, shown generally at 12, in an electrically-insulated housing 14 intermediate a line-side contact strap 16, and a load-side contact strap 18. Line-side contact strap 16 is electrically connectable to line-side wiring (not shown) in an electrical distribution circuit, and load-side contact strap 18 is electrically connectable to load-side wiring (not shown) via a lug (not shown) or a device such as a bimetallic element or current sensor (not shown). As mentioned with regard to FIG. 1, a separate cassette 10 is employed for each pole of multi-pole molded-case circuit breaker 8.

Electricity travels through rotary contact assembly 12 of cassette 10 from line-side contact strap 16 to an associated fixed contact 24, through movable contacts 26, 28 secured to the ends of a movable contact arm shown generally at 30, and to an associated fixed contact 32 on load-side contact strap 18. Movable contact arm 30 is pivotally arranged between two halves of a rotor 34 and moves in conjunction with rotor 34 upon rotation of rotor 34 by operating mechanism 13 (FIG. 1). Rotor 34 is rotatably positioned on a rotor pivot axle 35, the ends of which are supported by inner parallel walls of electrically-insulated housing 14. When movable contact arm 30 is positioned such that movable contact 26 is in intimate contact with fixed contact 24 and such that movable contact 28 is in intimate contact with fixed contact 32, rotary contact assembly 12 is said to be in the "closed" position.

It should be noted that although a contact arm 30 is shown having two movable contacts 26 and 28 on distal ends 31 and 33 of contact arm 30, respectively, it is also possible to have a contact arm with only one distal portion and only one movable contact. In this case, the electrical connection continues from one of the contact straps, through a fixed contact to a movable contact on the contact arm, then through the contact arm and then a braided conductor connecting the contact arm to the other contact strap.

The inventive kinetic energy-absorbing stops 36, 38 are mounted within electrically-insulated housing 14 and are positioned to be engaged by movable contact arm 30 in the event that contact arm 30 is forced into an "open" position by magnetic forces generated during a short circuit condition. Energy-absorbing contact arm stops 36, 38 are fabricated of a material of sufficient resiliency to cushion movable contact arm 30 and absorb kinetic energy of the contact arm resulting from the rapid opening of movable contact arm 30. A medium-grade closed-cell resilient polyurethane foam is contemplated for use in this application.

FIGS. 3 and 4 show rotary contact assembly 12 with movable contact arm 30 in an "open" position as a result of an encountered overcurrent condition. Because of the over-

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current condition, movable contact arm 30 is forced into the "open" position by magnetic repulsive forces generated between pairs 24, 26 and 28, 32 of fixed and movable contacts during a short circuit condition. In opening the circuit, the magnetic repulsive forces act against the forces created by the contact springs 40, 41, 58, and 59 (FIG. 5), which tend to maintain contact arm 30 in a closed position. However, when the contact arm 30 is forced into the open position by magnetic forces, pivots 52 and 53, shown in FIGS. 3 and 5, and discussed in more detail below, are rotated around rotor pivot axle 35 positioning links 48 and 49 such that the torque applied by springs 40, 41, 58 and 59 is now in the counter-clockwise direction, biasing contact arm 30 in the open position shown in FIG. 3.

The mounting of energy-absorbing contact arm stops 36, 38 on inner surfaces 37, 39 cushions the contact made thereon when movable contact arm 30 is forced open. The resiliency of energy-absorbing contact arm stops 36, 38 then dissipates the energy generated by the force of the contact, reducing the likelihood that contact arm 30 would rebound to the closed position.

Referring especially to FIG. 5, rotary contact assembly 12 will now be more fully described. Contact arm 30 slides in opening 63 in rotor 34 and pivot axle 35 slides through both the elongated aperture in contact arm 30 and the apertures 59 in rotor 34, thereby allowing contact arm 30 to pivot about axle 35 independently of rotor 34. A first contact spring 40 is stretched across the face of rotor 34. First contact spring 40 is supported on one end by a first spring pin 56, which rests in slot 44. First contact spring 40 is supported on a second end by a second spring pin 57, which rests in slot 46. A second contact spring 41 is likewise supported on the same face of rotor 34 and is positioned to extend parallel to the first contact spring between pins 54 and 55 which in turn rest in slots 45 and 47, respectively. A third contact spring 58 is positioned on the opposing face of rotor 34 opposite spring 40, and is supported by spring pin 56. A fourth contact spring 59 is supported on the opposing face of rotor 34 parallel to the third contact spring and opposite spring 41, extending between pins 54 and 55. Pins 56 and 55 are pulled by springs 40 and 41 to the bottom of slots 44 and 47, respectively. Pins 57 and 54 pass through slots 46 and 45, and through links 48 and 49, respectively. The contact springs are thus connected to both rotor 34 and contact arm 30 in such a manner so as to bias contact arm 30 into a closed position relative to rotor 34, thereby ensuring an electrically sound connection between fixed contacts 24, 32 (see FIGS. 1-3) and movable contacts 26, 28.

While this invention has been described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

1. A circuit breaker cassette comprising:

- a housing with an inner surface;
- at least two fixed contacts within said housing;
- a movable contact assembly disposed within said housing, said movable contact assembly comprising at least two

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movable contacts on a contact arm, said contact arm being positionable in a closed position and a blown open position wherein said contact arm is closed when said at least two movable contacts are in contact with said at least two fixed contacts and said contact arm is blown open when said at least two movable contacts are repelled away from said at least two fixed contacts in response to a short circuit condition;

said movable contact assembly further comprising at least one contact spring, said at least one contact spring having an orientation that exerts a closing bias torque on said contact arm relative to said at least two fixed contacts when said contact arm is closed, said closing bias torque not increasing from a closed position to a blown open position of said movable contact arm; and at least one kinetic energy-absorbing stop disposed proximate to said inner surface, wherein a surface of said contact arm, said inner surface, and a surface of said at least one kinetic energy-absorbing stop are generally parallel to each other when said contact arm is in said blown open position, wherein said at least one kinetic energy-absorbing stop comprising a material that absorbs and dissipates the kinetic energy resulting from magnetic repulsive forces forcing said at least two movable contacts and said at least two fixed contacts apart during a short circuit condition so that said contact arm does not rebound to the closed position.

2. The circuit breaker cassette of claim 1 wherein:

said at least one kinetic energy-absorbing stop is formed from closed-cell polyurethane foam.

3. The circuit breaker cassette of claim 1 wherein:

said movable contact assembly further comprises a rotor rotably mounted within said housing;

said rotor and said contact arm pivot on a common axis.

4. The circuit breaker cassette of claim 1 wherein:

said contact arm comprises a first distal end and a second distal end;

said at least two movable contacts being disposed one on said first distal end and another on said second distal end;

said at least one kinetic energy absorbing stop comprising two kinetic energy absorbing stops each being positioned to absorb kinetic energy of said first and second distal ends of said contact arm, respectively.

5. A circuit breaker comprising:

a housing;

a cassette disposed within said housing, said cassette includes an inner surface;

at least two fixed contacts disposed within said cassette;

a rotar movable contact assembly disposed within said cassette, said movable contact assembly comprising at least two movable contacts on a contact arm, said contact arm being positionable in a closed position and a blown open position, wherein said contact arm is closed when said at least two movable contacts are in contact with said at least two fixed contacts and said contact arm is blown open when said at least two movable contacts are repelled away from said at least two fixed contacts in response to a short circuit condition;

said movable contact assembly further comprising at least one contact spring, said at least one contact spring having an orientation that exerts a closing bias torque on said contact arm relative to said at least two fixed

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIRECCIÓN DE NUEVAS CREACIONES

2020
Bogotá, D.C.,

Abogado:
EMILIO FERRERO

ASUNTO	Radicación	06-100299
	Trámite	002
	Evento	003
	Actuación	430
	Oficio	013
	Folios	013

107076

Patente de Invención ☒ Patente de Modelo de Utilidad ☐

Vía Nacional ☒

Vía PCT (fase nacional) ☐ Cap. I ☐ Cap. II ☐

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. Documentos estudiados

Descripción: Folios: 4 a 23 como se radicó inicialmente

Reivindicaciones: Folios: 24 a 26 como se radicó inicialmente

Dibujos: Folios: 28 a 39 como se radicó inicialmente

Prioridad: Folios: 65 a 113
(2005-10-04, KR, No. 10-2005-0093135)

2. Objeto de la invención

La presente solicitud se titula "CORTACIRCUITO MULTI-POLO" Folio N° 1.

El objeto de la presente solicitud se refiere a un sustrato para un dispositivos cortacircuitos dispuesto entre la unidad de cortacircuito de polo simple espaciada lejos del mecanismo de interrupción y la unidad de polo simple adyacente, sustrato que suministra un momento de rotación que compensa el movimiento de los ejes de impulsión del cortacircuitos.

De otra parte, el pliego reclama: un cortacircuito multi-polo de circuito relacionado en las reivindicaciones 1 a 5.

El objeto de la solicitud definido anteriormente se clasificó en la IPC H01H 71/08.

3. De la solicitud de Patente

3.1. Título

El título de la solicitud debe reflejar el objeto y el campo industrial con el cual se relaciona la invención y debe ser concordante con la materia descrita y las reivindicaciones de la solicitud.

El título de la presente solicitud en primer lugar es demasiado amplio, por cuanto se refiere de manera general a un cortacircuito multi-polo y, adicionalmente, este título no refleja el objeto de la solicitud, dado que según la materia descrita el aporte de la solicitud al estado del arte NO es un cortacircuitos como tal, sino el sustrato que compensa el movimiento de los ejes de impulsión. De acuerdo a esta materia es que debe dirigirse no solo el título de la solicitud sino también la materia reclamada.

3.2. Descripción (artículo 28 D 486)

El presente capítulo descriptivo contiene errores de redacción y traducción que inciden negativamente en la claridad del documento. De un lado la descripción presenta apartes inteligibles tal como el segundo párrafo de la página 13 (folio 16): *"En el caso donde el mecanismo interruptor 150..."*, ó la materia descrita desde las páginas 14 a 17 (folios 17 a 20).

De otro lado, el aparte denominado Descripción Detallada de la Invención, presenta problemas de numeración y referencia lo cual afecta la claridad de la materia descrita. En primer lugar presenta confusiones a la hora de numerar los elementos del cortacircuitos así por ejemplo en las figuras y algunos apartes de la descripción se referencia a lo ejes de impulsión con el numeral 52, pero en otros apartes (págs. 2, 3, 17) se referencia con el número 53 lo cual crea confusión.

De otra parte, la descripción hace referencia a elementos que no aparecen en las figuras, entre ellos están los ejes 53, el polo auxiliar 110e (págs. 8 y 9), las ranuras guía 182a (pág. 14) o las porciones de resorte 273 (pág. 19). Esto unido a la confusa redacción (o traducción) hace que la materia descrita no se entienda.

Con respecto a la descripción de las figuras, debe aclararse la numeración de estas, puesto que en la página 15 (folio 18) aparece una referencia a la figura 11 de la siguiente manera: *"cuando el cortacircuito es manipulado desde el estado desconectado () como lo muestra en la FIG. 11 al estado prendido como se muestra en la FIG. 10"*, esta afirmación no es lógica toda vez que la figura 11 es una vista ampliada de la figura 10, es decir ambas figuras corresponden al mismo estado, no a estados diferentes como afirma la descripción.

La oficina deja en claro que, el solicitante está obligado a divulgar la invención pues de lo contrario la patente podrá ser denegada. Dicha obligación se considerará cumplida, cuando la descripción contenga todas las indicaciones, que necesita la persona de nivel técnico medio, para ejecutar la invención, en especial, aquellas indicaciones que no estén comprendidas en el estado de la técnica.

Por los motivos anteriores, la solicitud presentada no cumple con los requisitos exigidos en el artículo 28 D 486, por tal razón la información calificada no permite ni evaluar ni ejecutar la invención.

3.3. Reivindicaciones (artículo 30 D 486)

El pliego reivindicatorio calificado no define el objeto que se pretende proteger, por cuanto se esta reclamando un cortacircuitos multi-polo cuando el verdadero objeto es un sustrato para compensar los ejes de impulsión. La solicitud debe especificar de manera clara la materia reclamada, ya que no se puede dar protección a un dispositivo tan general como el que presenta la solicitud.

La reivindicación 1 define un cortacircuitos que comprende una pluralidad de unidades cortacircuitos de polo simple un contactor movible, un mecanismo de interrupción y un par de ejes de impulsión. De acuerdo a la materia descrita y a las figuras 1 a 4, estos elementos son comunes en el estado del arte lo cual debería estar indicado en la reivindicación.

De esta forma, la reivindicación debe definir cual es la materia **característica** del cortacircuitos reclamado la cual se supone es el aporte de la solicitud al estado del arte. Elementos como los que se mencionan arriba deben especificarse en el preámbulo de la reivindicación, más no se debe reclamar protección sobre estos pues no son invención del solicitante.

Por otra parte, el sustrato, el mecanismo de enlace y los resortes, deben relacionarse de manera estructural, es decir se debe indicar la forma de acople de estos elementos, la disposición y demás características técnicas que permitan definir el objeto reclamado. Indicar que estos elementos suministran fuerza o que se ubican *relativamente* lejos son indicaciones que además de ser incompletas son indefinidas. Por claridad debe agregarse los numerales de referencia de los diferentes componentes del cortacircuitos.

La reivindicación 2 debe establecer las relaciones estructurales de los componentes especificados, ya que se esta reclamando es el uso del mecanismo de enlace. De otra parte debe mejorarse la redacción ya que se están utilizando expresiones inadecuadas: "*enlaces acoplantes suministrados con ranuras*", y se están usando términos indefinidos "*relativamente rotablemente*".

La reivindicación 3 presenta los mismos problemas indicados para la reivindicación 2. Adicionalmente, la materia especificada en esta reivindicación, contempla la misma materia de la reivindicación 2 lo cual afecta la concisión del pliego.

En la reivindicación 4 debe indicarse en donde se incluyen los miembros de soporte.

Finalmente la reivindicación 5 es completamente confusa dado que se presenta un mecanismo auxiliar, peor no se define de que se trata este mecanismo. Adicionalmente no se encuentra cual sería el sustento descriptivo para tal mecanismo.

En conclusión, el pliego reivindicatorio calificado no cumple los requisitos de claridad y concisión exigidos en el Art. 30 de la Decisión 486.

4. **Determinación del Estado de la Técnica**

Considerando que la solicitud reclama prioridad del 4 de Octubre de 2005, se buscaron documentos del estado de la técnica relacionados, con fecha de publicación anterior a esta. Se realizo búsqueda de documentos relevantes dentro del estado de la técnica, entendiendo como estado de la técnica la definición provista

No obstante, la solicitud presenta problemas de claridad, se realizó una búsqueda parcial la cual se complementara una vez se realicen los ajustes a la solicitud.

Se encontró como anterioridades los documentos relacionados a continuación que afectan la patentabilidad del objeto de la presente solicitud

N°	Documento*	Título	Fecha de publicación
D1	EP0978858	CIRCUIT BREAKER	2000-02-09
D2	US6639168	ENERGY ABSORBING CONTACT ARM STOP	2003-10-28

*El documento se anexa con el requerimiento.

5. Análisis de patentabilidad (artículo 14 D486)

En cumplimiento del Art. 14 D486 se procedió a evaluar los requisitos de novedad, nivel inventivo y aplicabilidad industrial, con el fin de establecer la patentabilidad de la invención reivindicada de la solicitud en estudio.

5.1. Novedad (artículo 16 D486)

El requisito de novedad se evaluó por comparación entre lo solicitado y los documentos encontrados en el estado de la técnica y que se relacionan con el objeto reivindicado. Para el examen de novedad solo se tuvo en cuenta las características técnicas de la invención.

La reivindicación 1 se refiere a un cortacircuitos multi-polo de circuito que incluye:

- Una pluralidad de unidades de cortacircuito de polo simple que tienen un par de contactores fijos, un contactor movable y ejes para soportar rotablemente el contacto movable.
- Un mecanismo de interrupción dispuesto sobre alguna de las unidades de cortacircuito.
- Un par de ejes de impulsión
- Un sustrato dispuesto entre la unidad cortacircuito de polo simple y la unidad cortacircuito de polo simple adyacente.
- Un mecanismo de enlace soportado sobre el sustrato
- Unos resortes que tienen unos extremos soportados por medio del sustrato y otros extremos soportados por medio del mecanismo de enlace.
- Donde el mecanismo de enlace comprende enlaces acoplantes con ranuras guía para recibir los ejes de impulsión.
- Donde el mecanismo de enlace incluye miembros de soporte.

Las unidades de cortacircuito, el mecanismo de interrupción y los ejes de accionamiento, son características conocidas en el estado del arte que el mismo solicitante reconoce de acuerdo a lo expuesto en las figuras 1 a 4, de manera que las características comparables con el estado de la técnica están en el sustrato y el mecanismo de enlace, que es lo que se evalúa a continuación:

La anterioridad D1 se refiere a un cortacircuito que aísla eléctricamente la unidad de disparo del circuito principal y capaz de realizar una apropiada limpieza del contacto móvil lo que resulta en una reducción de la resistencia eléctrica entre los contactos. Este sistema incluye:

- Una pluralidad de unidades de cortacircuito de polo simple **40** que tienen un par de contactores fijos **2, 6**, unos contactos móviles **3, 5** (Fig. 1).
- Un mecanismo de interrupción **30** dispuesto sobre alguna de las unidades de cortacircuito (Fig. 2).
- Un eje de impulsión **30a** para transmitir la operación del mecanismo de disparo (Fig. 2)
- Un sustrato **4** dispuesto entre la unidad cortacircuito de polo simple **40**.
- Un mecanismo de enlace **10** soportado sobre el sustrato **4** (Fig. 17)
- Unos resortes **8** que tienen unos extremos soportados por medio del sustrato **4B** y otros extremos soportados por medio del mecanismo de enlace **10** (Fig. 17).
- Donde el mecanismo de enlace comprende **10** enlaces acoplantes con ranuras guía **10d** y **10e** para recibir los ejes de impulsión (Fig. 18).
- Donde el mecanismo de enlace incluye miembros de soporte **16** (Fig. 18).

Como se puede ver, esta anterioridad comprende todas las características reclamadas en la solicitud, por lo cual afecta la novedad de la misma.

La anterioridad D2 se refiere a un cortacircuito que incorpora un resistente amortiguador en el contacto movable, el cual absorbe la enenergía de apertura del contacto movable. El cortacircuito presentado en este documento incluye las siguientes características:

- Una pluralidad de unidades de cortacircuito de polo simple **10** (Fig. 1) que tienen un par de contactos fijos **24, 32**, un contactor movable **12** (Fig. 2) y ejes **4** para soportar rotablemente el contacto movable (Fig. 1).
- Un mecanismo de interrupción **13** dispuesto sobre alguna de las unidades de cortacircuito **10** (Fig. 1).
- Un par de ejes de impulsión **4**.
- Un sustrato **34** dispuesto entre las unidades de polo simple **10**
- Un mecanismo de enlace **40** soportado sobre el sustrato (Fig. 5).
- Unos resortes **58** y **59** (Fig. 5).
- Ranuras guía en los mecanismos **40** para recibir los ejes de impulsión (Fig. 5).
- Donde el mecanismo de enlace incluye miembros de soporte **54 a 54** (Fig. 5).

Esta anterioridad comprende todas las características reclamadas en el pliego reivindicatorio de manera que también afecta la novedad de la solicitud.

En conclusión, al hacer la comparación elemento por elemento entre lo solicitado y el estado de la técnica, se encuentra que las características esenciales del objeto de esta solicitud son idénticas a lo comprendido en los documentos D1 y D2, razón por la cual la solicitud no cumple con los requisitos de novedad establecidos en el artículo 6 de la Decisión.

6. Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

Nº	Documento Nº	Reivindicaciones afectadas	Requisito que afecta
D1	EP0978858	1 a 5	Novedad
D2	US6639168	1 a 5	Novedad

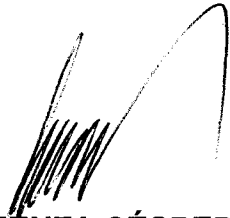
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Se recomienda, que tenga en cuenta que el replanteamiento de esos apartes NO podrá implicar una ampliación de la protección que correspondería a la divulgación contenida en la solicitud inicial, de acuerdo a lo que establece el artículo 34 de la Decisión 486.

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.



ALIX CARMENZA CÉSPEDES DE VERGEL
Directora Nuevas Creaciones (C)

El anterior requerimiento fue notificado por fijación en lista, de fecha

03 JUN. 2018

CONCEPTO TÉCNICO No. 1928	EXAMINADOR TÉCNICO Código No. 202082
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