Oct. 6, 1970 C. E. GRYCTKO ET AL 3,533,038

NON-INTERCHANGEABLE MEANS FOR CIRCUIT BREAKER FUSE CONNECTIONS

Filed June 22, 1967 4 Sheets-Sheet 1

FIG. 1.

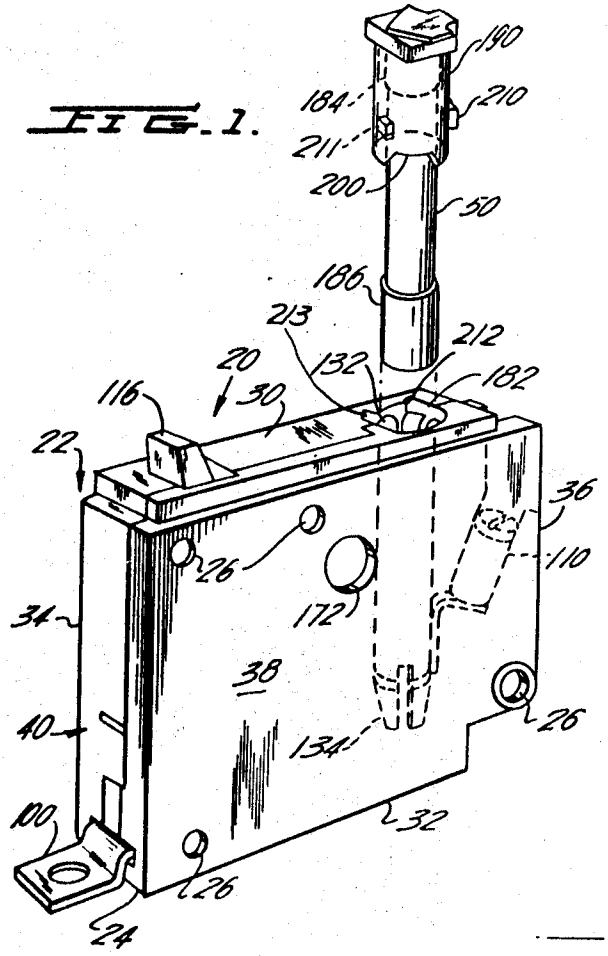
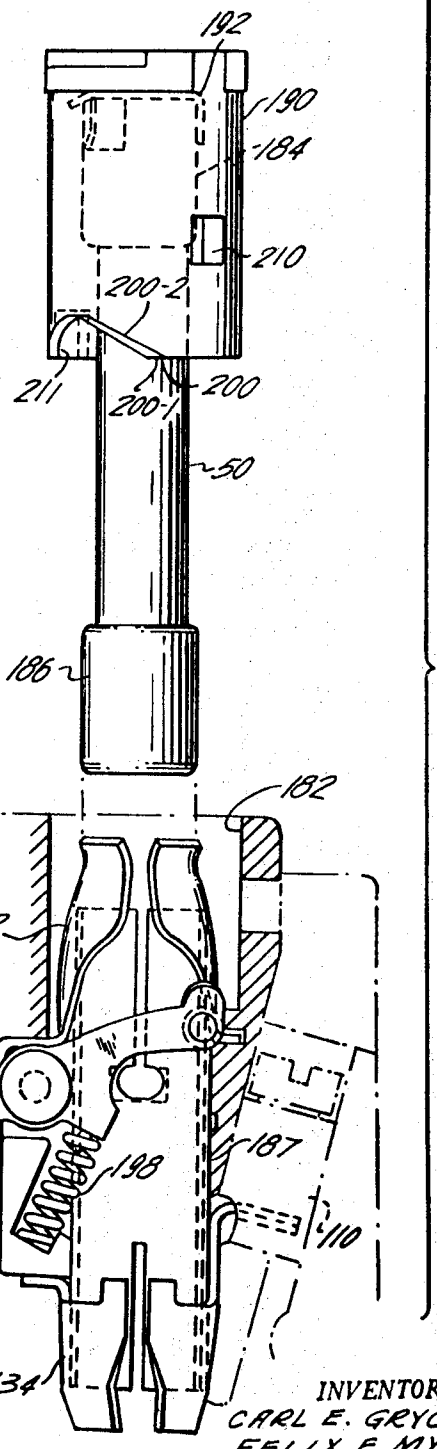


FIG. 3.



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NON-INTERCHANGEABLE MEANS FOR CIRCUIT BREAKER FUSE CONNECTIONS

Filed June 22, 1967 4 Sheets-Sheet 2

FIG. 4.

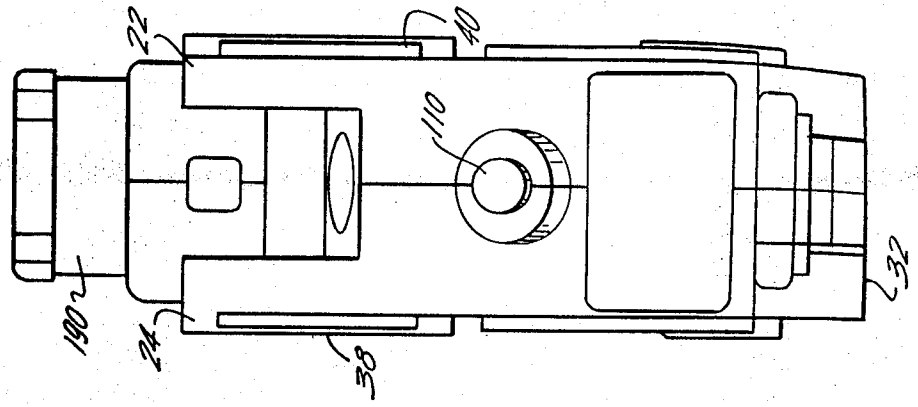
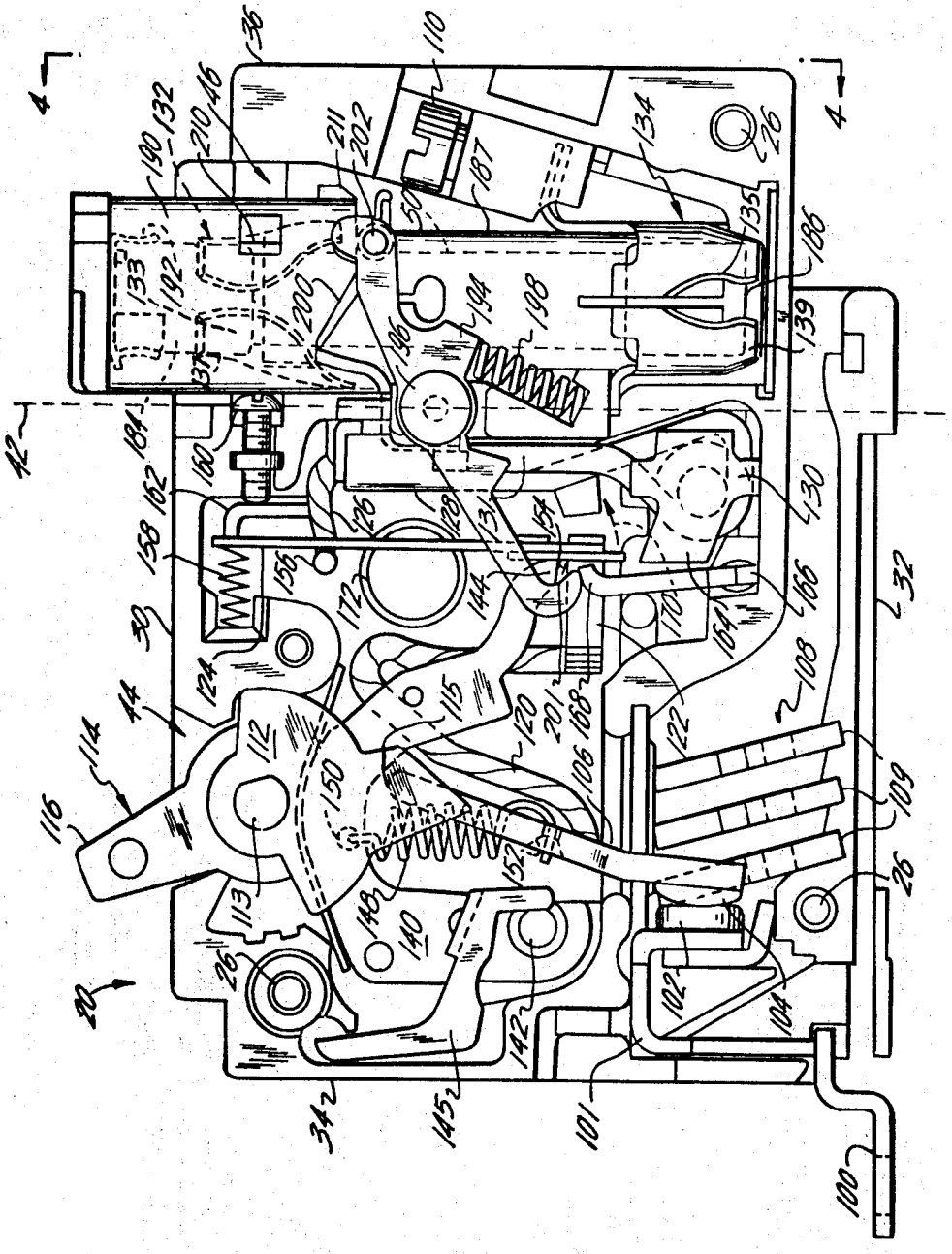


FIG. 2.



Oct. 6, 1970 C. E. GRYCTKO ET AL 3,533,038

NON-INTERCHANGEABLE MEANS FOR CIRCUIT BREAKER FUSE CONNECTIONS

Filed June 22, 1967 4 Sheets-Sheet 3

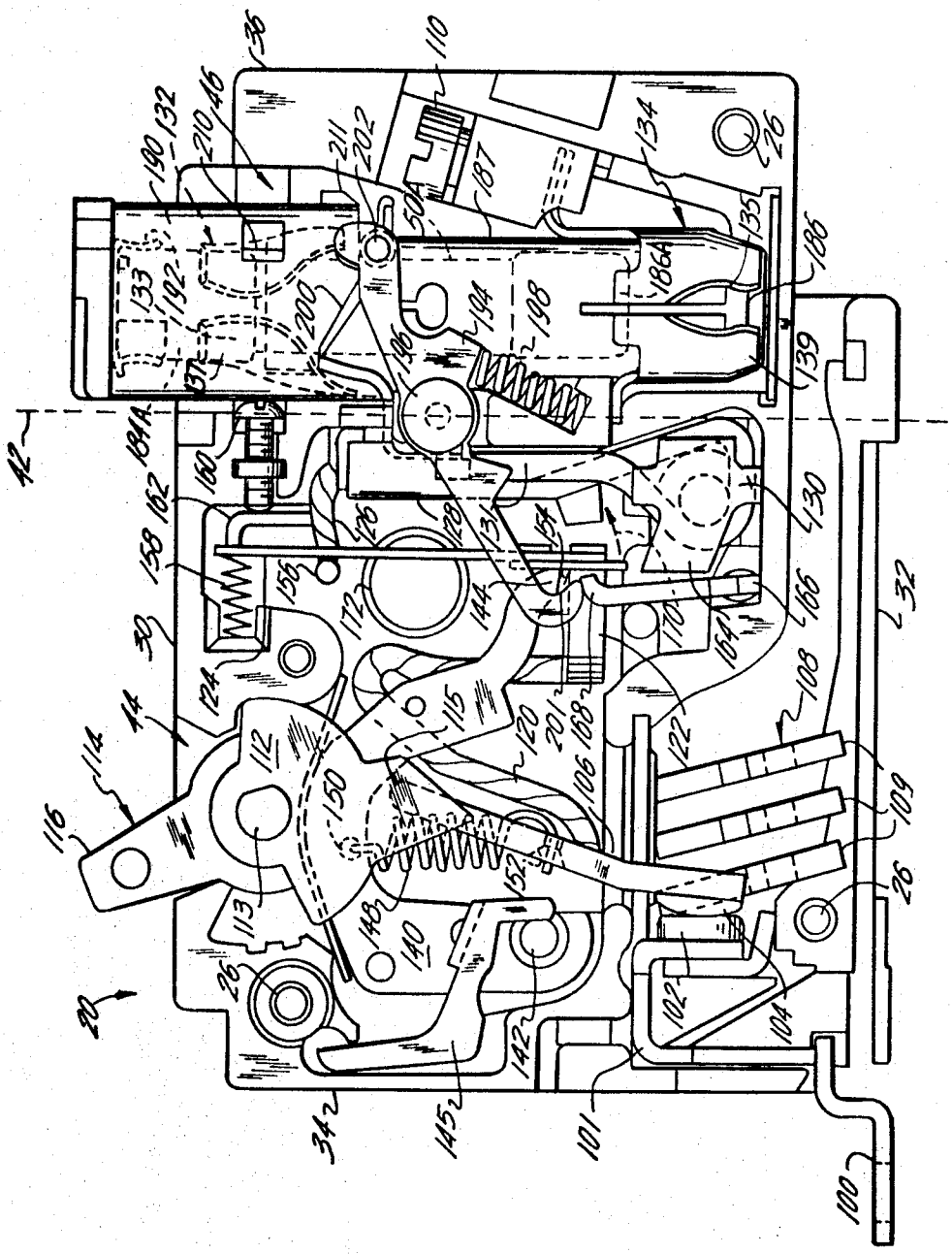


FIG. 5.

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NON-INTERCHANGEABLE MEANS FOR CIRCUIT BREAKER FUSE CONNECTIONS

Filed June 22, 1967 4 Sheets-Sheet 4

FIG. 6.

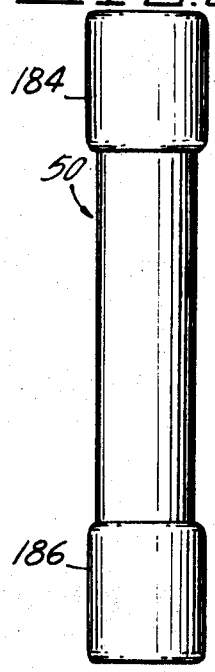


FIG. 6A.

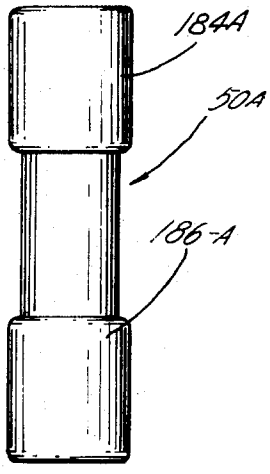


FIG. 7.

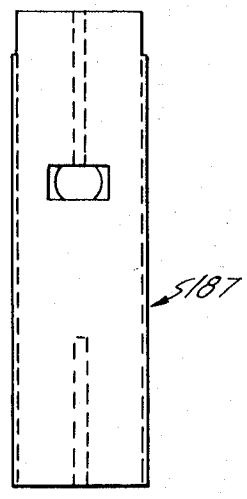


FIG. 7A.

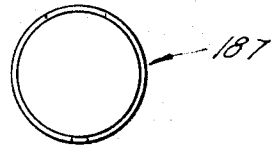


FIG. 8.

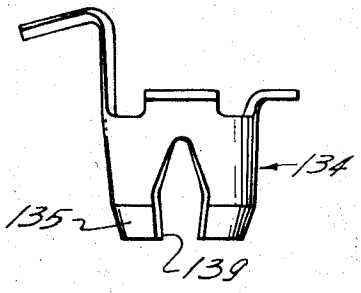


FIG. 9.

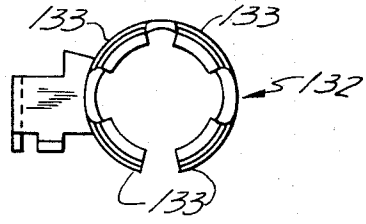


FIG. 8A.

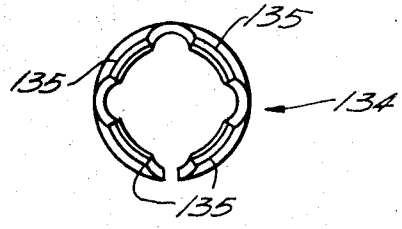
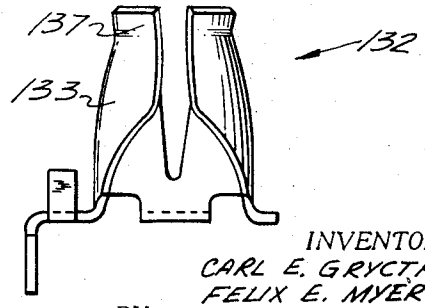


FIG. 9A.



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3,533,038

NON-INTERCHANGEABLE MEANS FOR CIRCUIT BREAKER FUSE CONNECTIONS

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Filed June 22, 1967, Ser. No. 648,049

Int. Cl. H01h 85/00, 85/24

U.S. Cl. 337—6 6 Claims

ABSTRACT OF THE DISCLOSURE

In a fuse receiving compartment, intended for receiving a fuse type of a particular rating, a reject means is provided for preventing a fuse of another rating from completing electrical contact with the terminals of the fuse compartment. In the particular illustrative embodiment, a unitized circuit breaker and current limiting fuse assembly is disclosed, wherein the current limiting fuse compartment includes the subject reject means, for preventing other than the properly coordinated fuse from completing the electrical circuit through the unitized device.

Our invention relates to a non-interchangeability reject means for preventing improperly rated fuses from making electrical contact with the terminal means of the fuse receiving compartment.

In copending U.S. patent application, entitled "Circuit Protection Arrangement Including Coordinated Operation of a Circuit Breaker and a Current Limiting Fuse," Ser. No. 647,999 filed on even date herewith in the name of Carl E. Gryctko and assigned to the assignee of the instant invention, there is disclosed a compact assembly of a circuit breaker and current limiting fuse. This assembly is intended to receive a fuse of a particular rating, in order to provide promptly coordinated operation between the circuit breaker device and current limiting fuse when subjected to predetermined abnormal fault conditions. In order to obtain the desired coordinated operation for proper circuit protection, it is necessary that only fuses of an intended rating be inserted in the fuse receiving compartment. In addition to providing maintenance instructions as to the proper rated fuse, it is desirable that a reject means be provided in the fuse compartment for preventing maintenance personnel from inadvertently installing an improperly rated fuse. That is, should an attempt be made to install a lower ampere rated fuse (which would result in nuisance tripping and inadequate protection), it is desirable that some means be provided for preventing a completion of the series circuit path between the line and load terminals of the unitized device. Hence, the maintenance personnel will immediately recognize that an improperly rated fuse has been installed, and the properly rated fuse will then have to be installed in order to complete the circuit (through the unitized device) between the power source and external load.

Our invention achieves these results in an extremely simplified manner, by the provision of an insulative member between the spaced terminal means of the fuse compartment and the fuse. The insulative member is of such a size and so placed that only those fuses of a particular size will make electrical contact engagement with the connecting portion of the fuse compartment terminal means.

In accordance with industrial standards, current limiting fuses of the type intended for operation in the device which is the subject of aforementioned U.S. patent application Ser. No. 647,999 are in graduated lengths according to their rating. As, for example, the type G

current limiting fuse manufactured by the Chase Shawmut Corporation has the following standard dimensions:

Fuse rating, amperes	Diameter, in.	Length, in.
15	$\frac{13}{32}$	$1\frac{5}{16}$
20	$\frac{13}{32}$	$1\frac{13}{32}$
30	$\frac{13}{32}$	$1\frac{5}{8}$
60	$\frac{13}{32}$	$2\frac{1}{4}$

Since the fuse terminals are in the form of ferrule contacts, at the end extremes, if the fuse receiving compartment is designed such that it will only make contact with the extreme tip portions of the ferrule terminals, with the intermediate portion of the fuse being shielded from the terminal clips by an insulative member, shorter fuses of a lesser rating will be incapable of completing the electrical contact engagement with the fuse compartment terminal means.

It is therefore seen that the basic concept of our invention resides in the provision of a simplified reject means within a fuse receiving compartment, for preventing lesser rated fuses from making electrical contact engagement with the fuse compartment terminal connectors.

It is therefore a primary object of our invention to provide a simplified means for preventing the utilization of improperly rated current limiting fuses in conjunction with a circuit breaker device.

A further object of our invention is to provide for the placement of a novel insulative member between the terminal means of a fuse compartment and the fuse, to prevent improperly rated fuses from making electrical contact engagement with the fuse compartment terminal means.

Another object of our invention is to provide, in combination with a circuit breaker and current limiting fuse, a reject means for preventing energization of the load in the event an attempt is made to install an improperly rated fuse.

An additional object of our invention is to provide a reject means for preventing electrical contact engagement between an under-rated fuse and the fuse compartment terminal means.

Still a further object of our invention is to provide such a reject means, which consists of a tubular insulative member, of a predetermined length, such that the properly rated fuse will extend beyond the end extremes of the insulative member, and an under-rated fuse will be prevented by the insulator member from making contact engagement with terminal clips.

These as well as other objects of our invention will become readily apparent upon a consideration of the following description and drawings, in which:

FIG. 1 is a simplified perspective view showing the utilized circuit breaker and current limiting fuse device, utilizing the instant invention, and depicting the manner in which the fuse may be readly inserted within its compartment.

FIG. 2 is a front view, with the cover removed and the fuse inserted, showing the manner in which the properly rated fuse makes electrical contact engagement with the fuse compartment terminal means.

FIG. 3 is a detailed view, showing the manner in which the current limiting fuse in its fuse holder may be readily inserted within the fuse receiving compartment.

FIG. 4 is an end view of the device shown in FIG. 1, as indicated by the arrows 4—4 of FIG. 2.

FIG. 5 is a front view, corresponding to FIG. 2, but showing the attempted installation of an under-rated fuse, and showing the manner in which our novel reject means prevents electrical contact engagement therewith.

FIG. 6 is a front view of the properly rated current limiting fuse intended for insertion in the fuse receiving compartment.

FIG. 6A is a similar view of a lower rated fuse, in accordance with industry standards.

FIGS. 7 and 7A are front and end views respectively of the insulative reject means, utilized to accomplish the non-interchangeability objectives of the instant invention.

FIGS. 8 and 8A are front and end views respectively of one of the fuse compartment terminal members.

FIGS. 9 and 9A are front and end views respectively of the other fuse compartment terminal members.

Referring initially to FIGS. 1–4, the non-interchangeability means of the subject application is illustratively shown in conjunction with a single phase embodiment of a unitized circuit protective device **20**, which is the subject of aforementioned U.S. patent application Ser. No. 647,999. It should, however, be understood that the inventive concepts of our invention for preventing the completion of an electrical circuit by an under-rated fuse may be utilized in conjunction with other devices intended to removably receive a fuse. Unitized device **20** includes a molded housing, having a base section **22**, and a complementary cover **24**. The housing sections are held together by rivets **26**.

The molded housing thus includes a pair of opposed top and bottom walls **30**, **32** respectively; a pair of opposed first and second side walls **34**, **36**, respectively; and a pair of opposed front and rear walls **38**, **40**, respectively. The internal volume bounded by the above-noted walls **30**, **32**, **34**, **36**, **38** and **40** is separated into two compartments by a dividing region, generally shown by the dotted line **42**. The first compartment **44** includes a circuit breaker device, generally constructed in accordance with the general teachings of aforementioned U.S. Pat. No. 2,996,589. The longitudinally adjacent second compartment **46** contains the current limiting fuse **50**, which is appropriately circuit connected to the circuit breaker device, in a manner which will henceforth be described, so as to provide a series circuit connection therebetween.

Unitized device **20** includes an external line terminal **100**, which is connected to an external source of electrical energy (not shown) in the conventional manner. Load terminal **110** is provided at the opposite side of the circuit breaker device **20** for connection to an external load (not shown). The circuit breaker device within compartment **44** is advantageously of a type which has achieved wide-scale utilization for home and light industrial use, and has advanced to the point where it is extremely reliable and efficient in operation, and may be rapidly and economically manufactured.

Compartment **44** includes a plurality of recesses for receiving and locating the various operating components of the circuit breaker. Located within these recesses is a stationary contact **102**, which is connected to line terminal **100**, via conductive member **101**. Cooperating with stationary contact **102** is a movable contact **104**, mounted to the lower end of a bifurcated contact arm **106**. Parallel plate arc extinguishing means **108** is provided within recesses **109**. The upper bifurcated end **115** of contact arm **106** abuts a suitable pivot formation of internally extending portions **112** of manual operating member **114**. Manual operating member **114** is pivoted about a housing protrusion **113**, which is entered into suitable aligned recesses of the molded base **22** and cover **24**. The manual operating member includes an outwardly extending portion **116** for manually moving the circuit breaker between its manual OFF and manual ON positions in the manner fully set forth in aforementioned U.S. Pat. No. 2,996,589.

Contact carrying arm **106** has a braid member **120**, secured thereto, with the opposite end of the braid member being connected to braid lug **122**. The electrical path then continues through bimetal **124**, braid **126**, conductor **128**, to the electromagnetic coil **130**. Electromagnetic coil **130** is, in turn, electrically connected via conductor **131** to fuse receiving terminal clip **132**. The circuit then continues through current limiting fuse device **50**, to the opposite fuse terminal clip **134**, which is connected to externally accessible load terminal **110**.

Thus, it should be recognized that device **20** includes a series circuit path from line terminal **100**, via stationary and movable contacts **102**, **104**, bimetal **124**, electromagnetic trip coil **130** and fuse **50**, terminating at the load terminal **110**.

The operating mechanism for bringing about the engagement and disengagement of cooperating contacts **102**, **104** comprises a latchable cradle member **140**, which is pivotally mounted at one end thereof, to base protrusion **142**. Cradle **140** also carries a kicker **145**, which gives contact arm **106** a hammer-like blow during the tripping operation to insure separation of the circuit breaker contacts.

One end of an operating spring **148** is connected to cradle **140** at aperture **150**, while the other end of operating spring **148** is connected to contact arm **106** at aperture **152**. Operating spring **148** is always in tension, thereby urging contact arm end **115** upwardly into engagement with its pivotal mounting to manual operating memer **114**, and latchable cradle member **140** clockwise about its pivotal mounting **142**. The force of operating spring **148** relative to the pivotal mounting of contact arm **106** also serves to urge the movable contact **104** into firm engagement with its cooperating stationary contact **102**, as shown in FIG. 2.

Latchable cradle member **140** includes a latchable tip **144**, which seats upon latch portion **154**, carried by the lower end of the elongated bimetallic member **124**. A bearing pin **156** is suitably secured to an intermediate region of elongated bimetallic member **124**, as by welding, and enters suitable circular recesses of the circuit breaker base **22**, and cover **24**, for pivotally mounting the bimetallic element. The bimetallic element **124** is biased in a clockwise direction about its pivot **156** by spring **158**. Calibrated adjustment of the trip unit is obtained by calibrating screw **160**, which bears against intermediate connecting member **162**.

The electromagnetic actuation of the circuit breaker device is provided by coil **130**, in conjunction with pole pieces **164**, which upon actuation draws the armature member **166** towards the pole pieces. As the armature member **166** is drawn towards the pole pieces, its upper end **168** will strike the lower end of bimetallic member **124**, thereby moving it in the direction shown by arrow **170**. Further, the sustaining of a moderate overload condition similarly deflects the elongated bimetallic element in the same direction of arrow **170**. Such movement of the lower end of the bimetallic element **124** serves to effect releasing of the latched engagement between cradle tip **144** and latch member **154**, so as to bring the circuit breaker mechanism to the overload tripped condition. An aperture **172** is provided for interpole tripping of a multiphase assembly. The details of such an interpole tripping arrangement are shown in aforementioned U.S. patent application Ser. No. 647,999. As shown therein, the provision of the interpole trip arrangement permits a side-by-side stacked assembly of single pole units **20**, appropriately coordinated for multipole operation, such that the actuation of one of the single pole units is transmitted to the adjacent units (by virtue of an interpole trip bar) (not shown), extending through aligned apertures **172** of the adjacently stacked units.

Fuse **50** includes opposed end ferrule terminals **184**, **186**, which when inserted in compartment **182** are electrically connected to fuse clip terminals **132**, **134**, respectively. Fuse **50** is retained within a rotatable fuse holder **190**, which includes a star-type resilient washer **192**, for frictionally engaging the ferrule end terminal **184** of the fuse.

Fuse **50**, as held by holder **190**, is inserted within an externally accessible opening **182** along the top wall **30** of compartment **46**. This manner of inserting or removing the fuse **50** is extremely convenient, since the top surface **30** (including the outwardly extending manual operator **116**) is normally accessible when the device is mounted within its panelboard location. The fuse compartment terminal means **132, 134** are in the form of tulip type terminal clips, including a number of circumferentially disposed spring fingers **133, 135** respectively. The spring fingers extend inwardly at their opposed end extremes **137, 139** respectively. At least one of the fuse ferrule terminals is intended to make contact only with the end extreme of the fuse compartment terminal means. This is shown in FIG. 2 by the engagement of fuse terminal **186** and spring finger portion **139**. We provide a tubular insulative member **187**, which is of a predetermined longitudinal extent, such that when an under-rated fuse is inserted, its terminal will no longer be exposed for electrical contact engagement with the end **139** of fuse compartment terminal **134**.

Referring to FIGS. 6 and 6A, it is seen that the lower rated fuse of FIG. 6A, in accordance with the industry standards, is of the same diameter as the fuse of FIG. 6, but of a shorter length. As shown in FIG. 2, when fuse **50** of the proper rating is inserted within the fuse compartment **46**, the extreme end region of terminal **186** projects beyond the insulative member **187** and makes electrical contact engagement with the regions of the fuse clip terminals. However, when the fuse **50A** of FIG. 6A is inserted within the fuse compartment **46**, such as shown in FIG. 5, the terminal **186–A** of this fuse will be longitudinally coextensive with the insulative member **187**, and hence the insulative member **187** will prevent fuse terminal **186–A** from making electrical contact engagement with compartment terminal means **134**. By preventing such electrical contact engagement between the fuse end terminals **186–A** and the compartment terminal means **134**, the insulative member serves as a reject means to prevent the establishment of an electrical circuit between line terminal **100** and load terminal **110**. The operating personnel will thus be immediately apprised that an improperly rated current limiting fuse **50–A** has been installed, and that the properly rated fuse (**50**) must be inserted in order to provide a flow of current to the load, properly protected in accordance with the circuit protection arrangement of above-mentioned patent application Ser. No. 647,999.

It should be further understood that by requiring the contact engagement between the fuse ferrules **184, 186** and the extreme ends **137, 139** of the compartment contacts, we also prevent the attempted insertion of the lower rated fuse **50–A** without the fuse holder **190**. That is, assuming that an attempt is made to so insert the fuse, only one of its contacts will be able to make engagement with a terminal. That is, assuming that it is pushed down all the way into the fuse compartment, such that contact **186–A** engages region **139** of terminal contact **134**, the upper contact **184–A** will be below region **137** of upper contact **132** and therefore out of firm electrical contact therewith. The insertion of tubular insulative member **187** provides an additional degree of safety.

An interlock trip lever **194** pivotally mounted at **196** cooperates with the cam surface **200** of the fuse holder, in the manner which is the subject of copending U.S. patent application Ser. No. 648,062 filed on even date herewith, to coordinate the tripping of the circuit breaker to the insertion and removal of the fuse **50**. It is sufficient to note for the purposes of the instant application that interlock lever **194** is biased counter-clockwise about its pivot **196**, by spring member **198**, such that the end **201** thereof is urged into engagement with the lower end of the bimetallic element **124**. This counter-clockwise movement of interlock lever **194** is restrained by the abutting engagement of cam follower protrusion **202** at the opposite end of interlock lever, with the annular cam surface **200** provided along the bottom of rotatable fuse holder **190**. With the fuse fully inserted as shown in FIG. 2, the interlock lever **194** is moved clockwise against the biasing action of spring **198** to its clockwise extreme, so as to prevent the engagement of end **201** with the elongated bimetal. Rotation of the fuse holder in the direction for removal of the fuse permits counter-clockwise movement of the interlock lever **194** about pivot **196**, such that its end **201** comes into engagement with the lower end of the bimetallic element **124**, to effect tripping of the circuit breaker device.

In order to provide proper safety, the cam surface **200** is inter-related in conjunction with the movement of interlock lever **194**, such that tripping of the circuit breaker mechanism will occur upon the first forty-five degrees of counter-clockwise rotation of fuse holder **91**, wherein 90° of rotation is required to remove the fuse holder. Thus, removal of the fuse will always be accompanied by tripping of the circuit breaker, and in multi-phase assemblies with the tripping of the associated phases. Conversely, the fuse **50** may only be inserted in device **20**, when the circuit breaker portion thereof is in the contact disengaged condition.

Appropriate registry means for the insertion of the fuse is achieved by protrusions **210** and **211**, which must be aligned with housing slots **212** and **213**. The fuse assembly may then be pushed down, to the point where the protrusions **210** and **211** meet annular guide slides within the fuse compartment **46**, to assist the rotation of the fuse holder **190** to the fully inserted condition, wherein cam follower **202** abuts fuse holder cam surface **200–1**.

It is therefore seen that our invention provides an extremely simpliled and reliable non-interchangeability means for insuring proper coordinated operation between a circuit breaker device and current limiting fuse, by preventing a lower rated fuse from making electrical contact engagement with the terminal means of the fuse compartment.

Although there has been described a preferred embodiment of this novel invention, many variations and modifications will now be apparent to those skilled in the art. Therefore, this invention is to be limited, not by the specific disclosure herein, but only by the appending claims.

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

1. The combination comprising:

a circuit breaker including a pair of cooperating contacts and a fault sensing operating means for initiating circuit interruption by initiating separation of said contacts, said separation initiation being in response to the occurrence of fault conditions up to a predetermined magnitude,

a current limiting fuse, series ciruit connected to said circuit breaker, for initiating circuit interruption by blowing said fuse in response to the occurrence of fault conditions in excess of said predetermined magnitude,

said fuse including a pair of spaced end terminals having a fixed predetermined longitudinal spacing in accordance with a first fuse rating,

a fuse receiving means including a pair of spaced terminal means adapted to removingly receive said fuse end terminals and make firm electrical contact therewith,

said terminal means circuit connected to said circuit breaker for providing a series circuit connection between said fuse and circuit breaker upon the insertion of said fuse end terminals in said terminal means and the making of firm electrical contact therebetween,

and reject means for preventing a fuse of a second lower rating, responsive to fault conditions below said predetermined magnitude, and having a spacing

between its end terminals differing from said fixed predetermined spacing, from making firm electrical contact with said terminal means, to thereby prevent blowing of said fuse to initiate circuit interruption in response to the occurrence of fault conditions below said predetermined magnitude where only said circuit breaker should respond to initiate circuit interruption,

said reject means being a longitudinally extending insulative member located between a portion of at least one of said fuse end terminals and its respective terminal means,

said fuse of fixed predetermined spacing including an end terminal portion projecting beyond said insulative member and engaging a longitudinally adjacent portion of said terminal means to provide said firm electrical contact,

said fuse of a second rating being of lesser length than said fuse of a first rating,

said one terminal of said fuse of a second rating longitiudinally coextensive with said insulative member, such that said insulative member prevents said one terminal from engaging its respective terminal means.

2. The combination comprising:

a circuit breaker including a pair of cooperating contacts and a fault sensing operating means for initiating separation of said contacts responsive to fault conditions up to a predetermined magnitude,

a current limiting fuse, series circuit connected to said circuit breaker, for initiating circuit interruption responsive to fault conditions in excess of said predetermined magnitude,

said fuse including a pair of spaced end terminals having a fixed predetermined longitudinal spacing in accordance with a first fuse rating,

a fuse receiving means including a pair of spaced terminal means adapted to removingly receive said fuse end terminals and make firm electrical contact therewith,

said terminal means circuit connected to said circuit breaker for providing a series circuit connection between said fuse and circuit breaker upon the insertion of said fuse end terminals in said terminal means and the making of firm electrical contact therebetween,

and reject means for preventing a fuse of a second lower rating, responsive to fault conditions below said predetermined magnitude, and having a spacing between its end terminals differing from said fixed predetermined spacing, from making firm electrical contact with said terminal means, to thereby prevent interruption of said fuse under fault conditions of a magnitude where only said circuit breaker should respond,

said reject means being a longitudinally extending insulative member located between a portion of at least one of said fuse end terminals and its respective terminal means,

said fuse of fixed predetermined spacing including an end terminal portion projecting beyond said insulative member and engaging a longitudinally adjacent portion of said terminal means to provide said firm electrical contact,

said fuse of a second rating being of lesser length than said fuse of a first rating,

said one terminal of said fuse of a second rating longitudinally coextensive with said insulative member, such that said insulative member prevents said one terminal from engaging its respective terminal means,

said end fuse terminal being in the form of ferrules,

said terminal means being in the form of spring biased clips,

the terminal means adjacent said insulative member having a contact region at its end extreme furthest removed from the other terminal means,

said contact region being of reduced cross-sectional area compared to the remaining longitudinal extent of said terminal means.

3. The combination, as set forth in claim **2**:

said insulative member being a tubular member extending between said terminal means, and insulating said fuse end terminals from all but the end extreme of said terminal means.

4. A circuit protective device, comprising a unitary housing including adjacent first and second compartments,

said unitary housing including a pair of opposed top and bottom walls, a pair of opposed first and second side walls, and a pair of opposed front and rear walls,

the distance between said opposed pair of front and rear walls substantially less than the distance between any of the other pairs of opposed walls,

a dividing region, extending parallel to said side-walls and defining the boundary between said first and second compartment,

said dividing region being substantially closer to said second side-wall than said first side-wall,

said first compartment bounded by said first side-wall, and dividing region, said top wall, bottom wall, front wall and rear wall,

said adjacent second compartment bounded by said dividing region, second side-wall, said top wall, bottom wall, front wall and rear wall;

said first compartment containing a circuit breaker including a pair of cooperating contacts and an operating means for moving said contacts between their engaged and disengaged conditions and for initiating circuit interruption by initiating separation of said contacts, said separation initiation being in response to the occurrence of fault conditions up to a predetermined magnitude;

said second compartment including means for removably receiving a current limiting fuse and mounting same substantially parallel to said side-walls;

circuit means extending between said compartments for electrically connecting said circuit breaker to said current limiting fuse;

a line terminal connecting means at said first side-wall for connecting said circuit breaker to an external source of electrical energy;

a load terminal connecting means at said second side-wall for connecting said current limiting fuse to an external load;

said circuit means series circuit connecting said circuit breaker and current limiting fuse, such that said circuit breaker and current limiting fuse are series circuit connected between the line and load, with said fuse initiating circuit interruption by blowing said fuse in response to the occurrence of fault conditions in excess of said predetermined magnitude;

said circuit breaker including a manually operable handle extending out of said top wall;

said second compartment including an access opening at said top wall;

a fuse holder for said current limiting fuse, insertable into said second compartment through said access opening;

said fuse including a pair of spaced end terminals having a fixed predetermined longitudinal spacing in accordance with a first fuse rating;

said second compartment including a pair of spaced terminal means at said top and bottom walls adapted to removingly receive said fuse end terminals and make firm electrical contact therewith, and

reject means for preventing a fuse of a second lower rating, responsive to fault conditions below said predetermined magnitude, and having a spacing between

its end terminals differing from said fixed predetermined spacing, from making firm electrical contact with said terminal means, to thereby prevent blowing of said fuse to initiate circuit interruption in response to the occurrence of fault conditions below said predetermined magnitude where only said circuit breaker should respond to initiate circuit interruption,

said reject means being a longitudinally extending insulative member located between a portion of at least one of said fuse end terminals and its respective terminal means,

said fuse of fixed predetermined spacing including an end terminal portion projecting beyond said insulative member and engaging a longitudinally adjacent portion of said terminal means to provide said firm electrical contact,

said fuse of a second rating being of lesser length than said fuse of a first rating,

said one terminal of said fuse of a second rating longitudinally coextensive with said insulative member, such that said insulative member prevents said one terminal from engaging its respective terminal means.

5. A circuit protective device, comprising a unitary housing including adjacent first and second compartments,

said unitary housing including a pair of opposed top and bottom walls, a pair of opposed first and second side-walls, and a pair of opposed front and rear walls,

the distance between said opposed pair of front and rear walls substantially less than the distance between any of the other pairs of opposed walls,

a dividing region, extending parallel to said side-walls and defining the boundary between said first and second compartment,

said dividing region being substantially closer to said second side-wall than said first side-wall,

said first compartment bounded by said first side-wall, and dividing region, said top wall, bottom wall, front wall and rear wall,

said adjacent second compartment bounded by said dividing region, second side-wall, said top wall, bottom wall, front wall and rear wall;

said first compartment containing a circuit breaker including a pair of cooperating contacts and an operating means for moving said contacts between their engaged and disengaged conditions and for initiating separation of said contacts responsive to fault conditions up to a predetermined magnitude;

said second compartment including means for removably receiving a current limiting fuse and mounting same substantially parallel to said side-walls;

circuit means extending between said compartments for electrically connecting said circuit breaker to said current limiting fuse;

a line terminal connecting means at said first side-wall for connecting said circuit breaker to an external source of electrical energy;

a load terminal connecting means at said second side-wall for connecting said current limiting fuse to an external load;

said circuit means series circuit connecting said circuit breaker and current limiting fuse, such that said circuit breaker and current limiting fuse are series circuit connected between the line and load, with said fuse initiating circuit interruption responsive to fault conditions in excess of said predetermined magnitude;

said circuit breaker including a manually operable handle extending out of said top wall;

said second compartment including an access opening at said top wall;

a fuse holder for said current limiting fuse, insertable into said second compartment through said access opening;

said fuse including a pair of spaced end terminals having a fixed predetermined longitudinal spacing in accordance with a first fuse rating;

said second compartment including a pair of spaced terminal means at said top and bottom walls adapted to removingly receive said fuse end terminals and make firm electrical contact therewith, and

reject means for preventing a fuse of a second lower rating, responsive to fault conditions below said predetermined magnitude, and having a spacing between its end terminals differing from said fixed predetermined spacing, from making firm electrical contact with said terminal means, to thereby prevent interruption of said fuse under fault conditions of a magnitude where only said circuit breaker should respond,

said reject means being a longitudinally extending insulative member located between a portion of at least one of said fuse end terminals and its respective terminal means,

said fuse of fixed predetermined spacing including an end terminal portion projecting beyond said insulative member and engaging a longitudinally adjacent portion of said terminal means to provide said firm electrical contact,

said fuse of a second rating being of lesser length than said fuse of a first rating,

said one terminal of said fuse of a second rating longitudinally coextensive with said insulative member, such that said insulative member prevents said one terminal from engaging its respective terminal means,

said end fuse terminal being in the form of ferrules,

said terminal means being in the form of spring biased clips,

the terminal means adjacent said insulative member having a contact region at its end extreme farthest removed from the other terminal means,

said contact region being of reduced cross-sectional area compared to the remaining longitudinal extent of said terminal means.

6. A circuit protective device, as set forth in claim 5:

said insulative member being a tubular member extending between said terminal means, and insulating said fuse end terminals from all but the end extremes of said terminal means.

References Cited

UNITED STATES PATENTS

2,996,589	8/1961	Myers	337—43
3,009,037	11/1961	Jones et al.	337—7
3,009,036	11/1961	Dorfman et al.	337—7
3,354,277	11/1967	Stanback et al.	337—8

FOREIGN PATENTS

49,401	8/1911	Austria.

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337—226