

Feb. 23, 1943.

A. C. SCHWAGER

2,311,699

POLE TYPE CIRCUIT BREAKER

Filed May 19, 1941

2 Sheets-Sheet 1

Fig. 3.

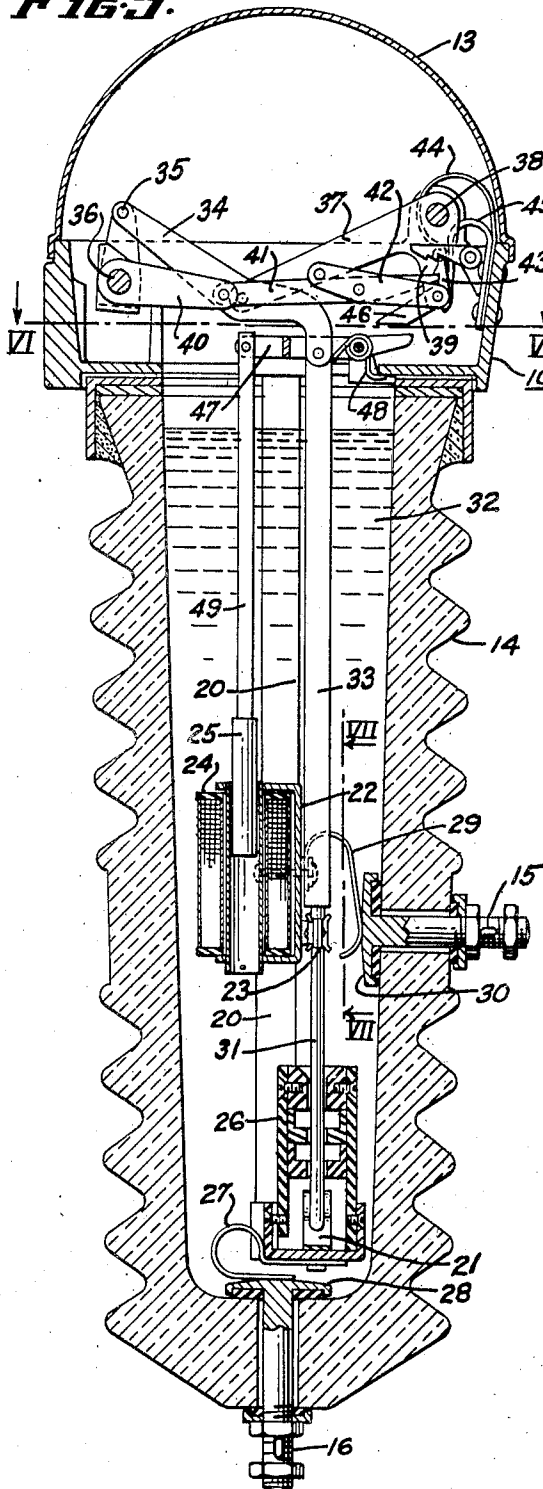


Fig. 1.

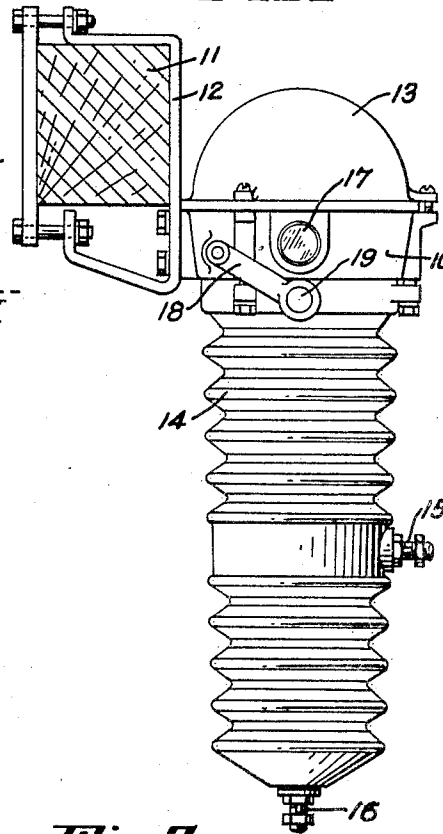
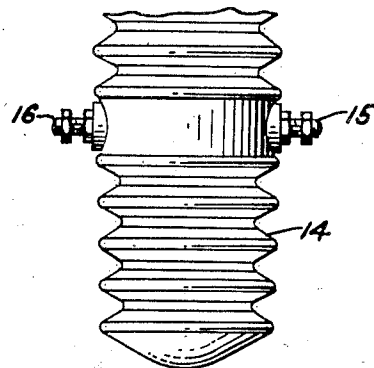


Fig. 2.



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2 Sheets-Sheet 2

Fig. 4.

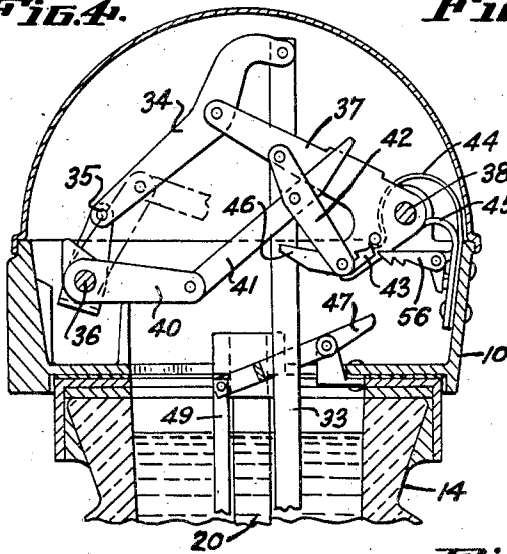


Fig. 5.

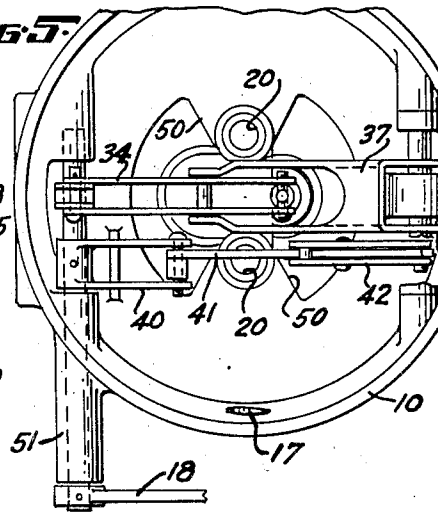


Fig. 7.

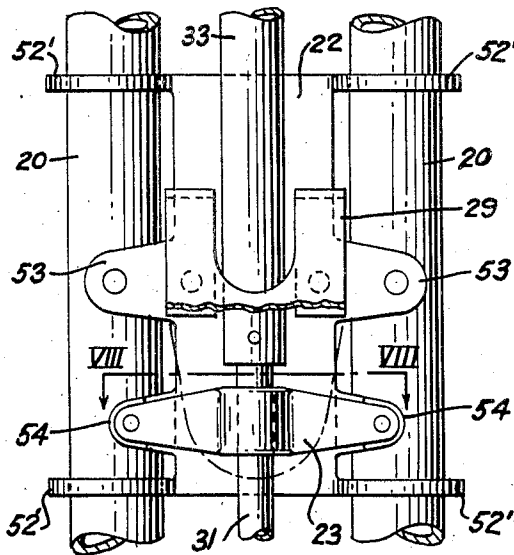


Fig. 6.

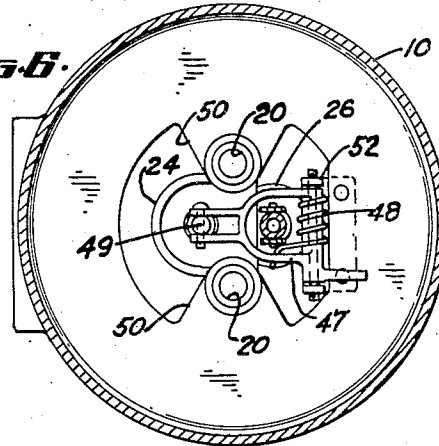


Fig. 9.

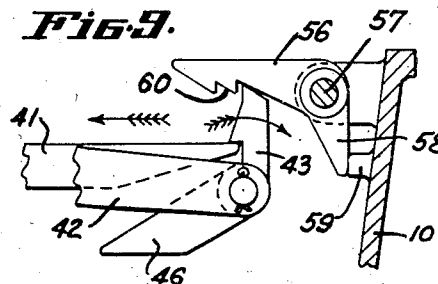
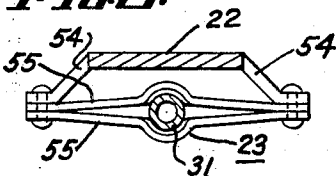


Fig. 8.



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UNITED STATES PATENT OFFICE

2,311,699

POLE TYPE CIRCUIT BREAKER

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Application May 19, 1941, Serial No. 394,082

11 Claims. (Cl. 200—106)

My present invention relates to oil circuit breakers, and more particularly to a single pole overload responsive circuit breaker for feeder lines that can be mounted in an elevated position upon a pole or cross arm as a substitute for the high capacity expulsion fuses now commonly used for that type of service.

It is an object of the present invention to provide an efficient and inexpensive overload responsive circuit breaker that can be conveniently mounted in an elevated position upon a pole or tower to control a high voltage electric circuit in a safe and convenient manner.

Another object of the invention is to provide a new and novel arrangement in which the circuit controlling contacts and the line terminals of a circuit breaker are supported and insulated from each other and from an operating mechanism with a single insulator.

Another object of the invention is to provide a new and novel insulating means for the circuit controlling elements of a circuit breaker in which the operating mechanism, operating at ground potential, and the line terminals of the circuit breaker are insulated from each other with a single oil filled porcelain insulator.

A further object of the invention is to provide a new and novel type of circuit breaker in which the live circuit controlling parts thereof are insulated from an operating mechanism at ground potential by means of a single porcelain bushing and in such a manner that the bushing will not be subjected to radial electrical stresses.

Another object of the invention is to provide a new and novel arrangement wherein a single oil filled bushing type insulator is adapted to completely enclose and insulate the live circuit controlling elements of the circuit breaker and also carry suitable terminals to which the conductors of a power line may be connected.

Another object of the invention is to provide a simple and effective operating mechanism and overload trip means for a single pole circuit breaker in which the live contacts of the circuit breaker and the overload responsive trip coil are submerged in an insulating fluid and insulated from the operating mechanism by a single bushing type insulator.

In the manufacture of oil circuit breakers of a type suitable for the service contemplated by the present invention, it is now generally the practice to enclose the circuit controlling contacts of the circuit breaker in a metallic tank that is secured to the under side of a suitable supporting housing which encloses the circuit breaker oper-

ating mechanism. With this type of circuit breaker, the power line connections are brought in through two spaced insulating bushings, generally of porcelain, which are mounted upon and extend through the top of the supporting housing. Under these conditions the insulating bushings are subjected to a considerable electrical stress at the point where they pass through the metallic wall of their supporting structure, and because of this electrical stress, which is in a radial direction, it is necessary that the porcelain of the bushings be of the highest quality. Therefore, in addition to the necessity for two bushing type insulators, these prior art circuit breakers also require the use of insulators which are quite expensive. It is known that the most frequent breakdown in insulators of this character occurs at the point where they are subjected to the above radially applied electrical stress. Whereas, these insulating bushings, even when of a poor quality, will stand many times the same electrical stress when applied axially as a creepage stress. It is, therefore, a further object of the invention to provide a new and novel circuit breaker construction in which the line terminals are insulated from each other and from the operating mechanism and its enclosing housing in a new and novel manner by a single bushing type insulator and in which the insulating bushing is not subjected to a radially applied electrical stress.

Other objects and advantages of the invention will be in part evident to those skilled in the art and in part pointed out hereinafter in connection with the accompanying drawings, wherein there is shown by way of illustration and not of limitation preferred embodiments thereof.

In the drawings;

Figure 1 is an external side view showing a circuit breaker constructed in accordance with the present invention as mounted upon the cross arm of a power line supporting pole,

Figure 2 is a view similar to Figure 1 showing a modified form of the invention,

Figure 3 is a vertical sectional view taken longitudinally through a circuit breaker constructed in accordance with a preferred embodiment of the invention and with the operating mechanism in its closed circuit position,

Figure 4 is a fragmentary view showing the operating mechanism in its open circuit position,

Figure 5 is a fragmentary plan view showing the operating mechanism of the circuit breaker,

Figure 6 is a fragmentary plan view of the trip lever taken along line VI—VI of Figure 3,

Figure 7 is a fragmentary side view taken along line VII—VII of Figure 3 looking in direction of arrows,

Figure 8 is a fragmentary plan view showing the upper circuit breaker contact, and

Figure 9 is a fragmentary view showing a manual latch tripping arrangement.

For the purpose of describing my invention, I have illustrated in the drawings a modification thereof that is particularly adapted for use in an elevated position, as upon a pole or transmission line tower, where it may be used instead of drop-out fuses and other fusible cutouts, such as are now generally used to protect against short circuits and overloads. This device has the advantage over fusible cutouts in that, upon an overload or short circuit, it will interrupt the circuit without throwing any sparks or dropping fused parts to the ground below, and further, it will be possible to again restore the circuit by a simple reclosing thereof without the replacement of any parts, such, for example, as the fusible link provided with fusible cutouts.

As shown in Figure 1 of the drawings, the device comprises a metallic supporting housing 19 that is adapted to be secured upon a cross arm 11 or other suitable support by means of a clamping bracket 12. The housing 19, as will hereinafter appear, carries an operating mechanism, and disposed over this operating mechanism, there is a cover 13. Depending downwardly from the housing 19 there is an oil containing receptacle 14 of insulating material in which cooperating circuit interrupting contacts are disposed. This oil containing receptacle 14 is preferably in the form of a cylindrical porcelain bushing and at its side it is provided with an outwardly extending terminal stud 15 to which one lead of the power line is connected. At its bottom, the receptacle 14 carries a second terminal stud 16 to which the other lead of the power line is connected. In this figure of the drawings it will be noted that the metallic housing 19 is provided with a sight opening 17 through which an oil level indicator may be viewed, and at its side the housing 19 also supports an exposed operating lever 18 by means of which the operating mechanism within the housing 19 may be actuated. This operating lever 18 is provided with an enlarged ring-like end 19 into which a hook at the end of a conventional switch operating pole may be inserted.

In Figure 2 of the drawings there is shown a modification of the invention in which the oil containing receptacle 14, in the form of a porcelain bushing, is shown as closed at its bottom end and as having the terminal studs 15 and 16 mounted intermediate its ends and in diametrically opposed relation to each other. In this modification of the invention, except for the changes that will be required due to the relocation of the terminal stud 16, the construction will be substantially identical with that to be hereinafter described.

Reference is now made to Figure 3 of the drawings for a more detailed description of the invention. In this figure of the drawings it will be noted that the metallic housing 19 is of a basin-like configuration and is open at its bottom. Supported by the housing 19 and depending downwardly therefrom, there are two insulating supports 20 which may be in the form of rods or tubes of fibre or like material. Upon the lower end of the supports 20 there is mounted a lower stationary contact 21, and intermediate

their ends there is secured a supporting frame 22 that carries a second or upper stationary contact 23. The supporting frame 22 is here shown as having outwardly extending flanges between which an overload trip coil 24 is mounted and they provide a magnetic frame in which a vertically movable armature 25 is adapted to move. The lower stationary contact 21 is shown as enclosed in an arc extinguishing chamber 26 of conventional design. Extending outwardly from the bottom of the arc extinguishing chamber 26 and in connection with the stationary contact 21, there is a bowed flexible circuit completing member 27 that is adapted to engage with an enlarged head 28 formed upon the inner end of the terminal stud 16. Likewise, the supporting frame 22 also carries an outwardly extending bowed flexible circuit completing member 29 that is adapted to engage an enlarged head 30 upon the terminal stud 15. The fixed end of the circuit completing member 29 is connected to one terminal of the overload trip coil 24 and the other terminal of the trip coil 24 is connected to the supporting frame 22 which is in contact with and carries the upper stationary contact 23. Cooperating with the stationary contacts 21 and 23 there is a vertically movable bridging member 31 that is adapted to complete a circuit therebetween. In this way, when the bridging member 31 is in the position shown, a circuit will be completed from the terminal stud 15 via the circuit completing member 29, through the trip coil 24 to the stationary upper contact 23, then through the vertically movable bridging member 31 to the lower stationary contact 21 and out through the circuit completing member 27 to the other terminal stud 16. From this it will be seen that all of the live parts of the circuit breaker will be immersed in the oil or other insulating fluid, designated by the numeral 32, carried by the oil containing receptacle 14 and also insulated from the operating mechanism within the housing 19. The bridging member 31 is here shown as secured to the lower end of a downwardly extending operating rod or tube 33 which may be of fibre or other insulating material. The operating rod 33 is shown as connected at its upper end to a split lever 34 that is pivotally secured upon a floating fulcrum 35 which is carried by a transversely extending shaft 36. The split lever 34 is shown as offset at its free end where it connects with the operating rod 33 and intermediate its ends it is connected to a bell crank lever 37 by means of which it is moved to produce a substantially straight line movement of the operating rod 33. The bell crank lever 37 is pivotally mounted upon a transversely extending shaft 38 and it has a downwardly extending arm 39. Connected between the downwardly extending arm 39 of the bell crank lever 37 and a lever 40 which is secured to the shaft 36, there is a pair of cooperating toggle links 41 and 42 that are adapted to be held in fixed and operative relation with each other by means of a latch 43 that is pivotally mounted upon the downwardly extending arm 39. Mounted adjacent the transversely extending shaft 38, the housing 19 carries two bowed springs 44 and 45 that are adapted to operate upon the bell crank lever 37 and move it in a clockwise direction when the connection formed by the toggle links 41 and 42 is collapsed by an operation of the latch 43. The latch 43 has a downwardly and inwardly disposed end 46 with which a tripping lever 47 is adapted to engage, and as here shown, the tripping lever 47 is biased

into an inoperative position by a coiled spring 48. The armature 25 of the overload trip coil 24 is also shown as connected to the tripping lever 47 by means of an insulating rod or tube 49. With the toggle forming links 41 and 42 arranged and secured in the position here shown, it will be seen that when the latch 43 is rotated clockwise by an actuation of the tripping lever 47, it will release the end of the link 41, with which it cooperates, and permit the toggle formed by the links 41 and 42 to collapse. This will permit the springs 44 and 45 to rotate the bell crank lever 37 upwardly and cause the split lever 34 to rotate about its floating fulcrum 35 in a counter-clockwise direction and thus, through the operating rod 33, carry the contact bridging member 31 out of contact making engagement with the lower stationary contact 21 and clear of the arc extinguishing housing 26 to thus open the circuit between the terminal studs 15 and 16 of the circuit breaker.

By referring now to Figure 4 of the drawings, it will be seen that when this collapse of the toggle formed by the links 41 and 42 occurs, the lever 40 carried by the shaft 36 will not move, but will remain in the position illustrated in Figure 3. Now, if it is desired to again close the circuit breaker by moving the bridging member 31 downwardly and into circuit making engagement with the lower stationary contact 21, this can be done by operating the lever 18, previously referred to in connection with Figure 1 of the drawings, upwardly. This will rotate the shaft 36 and thus carry the lever 40 into its upper position, indicated by dot and dash lines, where the toggle formed by the links 41 and 42 will be again locked in an extended and cooperating relation with each other by means of the latch 43, as will be clearly understood. Then, by a downward movement of the lever 18 by means of an operating pole, as previously described, the lever 40 can be again moved downwardly and through the extended toggle forming links 41 and 42, cause the bell crank lever 37 to rotate in a counterclockwise direction against the action of the springs 44 and 45 to again carry the lever 34 in a downward direction to thus cause the operating rod 33 to move the bridging member 31 into circuit forming engagement with the lower stationary contact 21. Should it now happen that the abnormal condition is still in existence upon the power line at the time of such a reclosing of the circuit breaker, it will be readily seen that the overload trip coil 24 will again operate upon its armature 25 as soon as the circuit is reestablished and, as a result, the tripping lever 47 will operate upon the latch 43 and thus again collapse the toggle formed by the links 41 and 42 and permit the bell crank lever 37, under the influence of the springs 44 and 45, to move the split lever 34 upwardly and thus again open the circuit in a trip free manner with respect to the operating levers 18 and 40 that are secured upon the shaft 36.

Upon referring to Figure 5 of the drawings, it will be seen that the downwardly extending insulating supports 20 are secured in parallel spaced relation upon flanges 50 that extend into the opening formed in the bottom of the metallic housing 10. These flanges 50 carry upstanding cylindrical bosses in which the upper ends of the supporting rods or tubes 20 are secured, either by a pin or by threading. As here shown, it will also be noted that the split lever 34 and the bell crank lever 37 are mounted upon their respective

shafts 36 and 38 so that they will operate in the central plane of the housing 10, and that the toggle operating lever 40 and the toggle links 41 and 42 are located to operate in a plane at one side of the levers 34 and 37. It will also be noted that the shaft 36 is extended outwardly from the housing 10 through a supporting boss 51 so that the operating lever 18 may be conveniently engaged by an operating pole.

In Figure 6 of the drawings the tripping lever 47 is shown as of a special construction that will permit its operation without interference with the free upward and downward movement of the operating rod 33 which controls the movement of the bridging member 31. The tripping lever 47 is also here illustrated as pivotally mounted upon a bracket 52 that is secured to the bottom of the housing 10.

Reference is now made to Figures 7 and 8 of the drawings for a description of the manner in which the upper contact 23 and the trip coil 24 are mounted upon the downwardly extending insulating supports 20. As here shown, the supporting frame 22 has outwardly extending portions 52' formed upon its upper and lower flanges through which the vertically disposed insulating supports 20 extend, and located between these flanges, the supporting frame 22 is also provided with two outwardly extending oppositely disposed ears 53 that are adapted to be secured to the insulating supports 20 to thus hold the supporting frame 22 in a fixed position. At this point it will also be noted that the flexible circuit completing member 29 is cut out or forked at its secured end to provide a clearance through which the operating rod 33 that carries the bridging member 31 may move. Below the outwardly extending ears 53 the supporting frame 22 also carries two oppositely extending and outwardly disposed supporting arms 54 between which, as is more clearly shown in Figure 8, two spring-like members 55, that form the lower contact 23, are mounted. These spring-like members 55 may be of bronze or other resilient conducting metal and they are preferably shaped at their centers so as to provide a good contact and also permit a free sliding movement of the bridging member 31 therebetween.

In Figure 9 of the drawings I have illustrated a means by which the circuit controlling contacts described above may be actuated manually, as where it may be desired to open the circuit breaker under normal operating conditions. For this purpose I provide a normally inactive latch 56 which is pivoted upon a fixed supporting shaft 57 that is carried by the housing 10. As here shown, the latch 56 has a downwardly depending end 58 that engages an abutment 59 which serves to hold the latch 56 in a position where it will cooperate with the upwardly extending end of the latch 43. With this arrangement, assuming the circuit breaker contacts are closed and that the operating lever 40 and the toggle forming links 41 and 42 are in their extended position, as shown in Figure 3 of the drawings, it will be seen that upon an upward operation of the lever 18 the links 41 and 42 and the latch 43 will be moved to the left and thus the upper extending end of the latch 43 will be brought into engagement with one of a series of overhanging teeth 60 upon the latch 56. When this occurs, the latch 43 will be held against further movement to the left and consequently it will rotate upon its supporting shaft relative to the link 42 and thus disengage the latched

cooperating end of the toggle forming link 41. This will permit the toggle formed by the links 41 and 42 to immediately collapse and the springs 44 and 45 will then be free to operate the circuit breaker with a quick opening action independently of the operating levers 18 and 40. The importance of this additional feature is that it prevents a slow circuit opening movement of the bridging member 31, such as might occur if the entire opening of the circuit breaker were controlled by an operating pole, and thus avoids a burning of the contacts and the generation of high explosive pressures within the arc extinguishing chamber 26.

While I have, for the sake of clearness and in order to disclose the invention so that the same can be readily understood, described and illustrated specific devices and arrangements, I desire to have it understood that this invention is not limited to the specific means disclosed, but may be embodied in other ways that will suggest themselves to persons skilled in the art. It is believed that this invention is new and all such changes as come within the scope of the appended claims are to be considered as part of this invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a pole type circuit breaker, the combination of an enclosing housing adapted to be secured upon an elevated structure, an insulating support extending downwardly from said housing, a pair of spaced contacts mounted upon said insulating support, a bridging member movable with respect to said contacts to establish and interrupt a circuit therebetween, means carried by said housing for operating said bridging member, a container of insulating material secured to said housing and enclosing said spaced contacts and said bridging member, a pair of line terminals mounted in spaced relation in the wall of said container and having an exposed contact surface at their inner ends, and cooperating connector forming means extending outwardly from each of said spaced contacts engageable with the exposed contact surface of an adjacent line terminal, whereby a circuit including said contacts and said bridging member will be established between said line terminals when said insulating container is secured in position upon said enclosing housing.

2. In a pole type circuit breaker, the combination of an enclosing housing adapted to be secured upon an elevated structure, an insulating support extending downwardly from said housing, a pair of spaced contacts mounted upon said insulating support, a bridging member movable with respect to said contacts to establish and interrupt a circuit therebetween, means carried by said housing for operating said bridging member, a hollow porcelain insulator suspended from said housing and enclosing said spaced contacts and said bridging member, said porcelain insulator being open at the top and closed at the bottom and adapted to carry an insulating oil in which said contacts and said bridging member are immersed, a pair of line terminals mounted in spaced relation in the wall of said insulator having an exposed contact surface at their inner ends, and cooperating connector forming means extending outwardly from each of said spaced contacts and engageable with the exposed contact surface of an adjacent line terminal, whereby a circuit including said contacts and said bridging member will be estab-

lished between said line terminals when said insulator is secured in position upon said enclosing housing.

3. In a pole type circuit breaker, the combination of a pair of stationary contacts mounted in spaced insulated relation to each other, a bridging member for establishing a circuit between said contacts, a receptacle of insulating material surrounding said stationary contacts and said bridging member and containing oil in which said contacts and said bridging member are immersed, a pair of spaced line terminals extending through the wall of said receptacle at spaced points having enlarged contact forming heads exposed within said receptacle, and current conducting members extending from said stationary contacts adapted to engage the contact forming heads of said spaced line terminals, whereby a circuit will be withheld between said stationary contacts and said spaced line terminals when said receptacle is positioned to enclose said stationary contacts.

4. In a pole type circuit breaker, the combination of a metallic housing adapted to be secured upon an elevated structure, a downwardly extending support of insulating material carried by said housing, a pair of spaced stationary contacts mounted upon said insulating support, a bridging member movable with respect to said spaced stationary contacts for opening and closing a circuit between said contacts, an operating mechanism for moving said bridging member carried by said metallic housing and having an insulated operating connection with said bridging member, a receptacle of insulating material adapted to enclose said stationary contacts and said bridging member and carry an arc extinguishing fluid in which said contacts are immersed, and a pair of line terminal forming members extending through the wall of said receptacle at spaced points and each having a connection with an adjacent stationary contact, whereby said line terminals will be insulated from each other and from said metallic housing by said receptacle of insulating material.

5. In a pole type circuit breaker, the combination of a metallic housing adapted to be secured upon an elevated structure, a downwardly extending support of insulating material carried by said housing, a pair of axially spaced stationary contacts mounted upon said insulating support one above the other, a vertically movable bridging member for establishing a circuit between said contacts, an operating mechanism carried by said metallic housing having an insulated operating connection for moving said bridging member, a single hollow insulator adapted to enclose said stationary contacts and said bridging member and carry an arc extinguishing fluid in which said contacts are immersed, and a pair of line terminal forming members extending through the wall of said insulator at spaced points and having connections with said stationary contacts, whereby said line terminal forming members will be insulated from each other and from said housing and operating mechanism by said single hollow insulator.

6. In a pole type circuit breaker, the combination of a metallic housing adapted to be secured upon a pole or cross arm, an operating mechanism mounted within said metallic housing, a downwardly extending insulating support having a stationary contact intermediate its ends and a second stationary contact at its extreme lower end, an overload trip coil mounted upon said

insulating support adjacent said first contact and having one of its terminals connected thereto, a flexible outwardly extending current conducting member fixed upon said insulating support to which the other end of said overload trip coil is connected, a second flexible current conducting member connected to and extending outwardly from said second contact, a contact bridging member controlled by the operating mechanism mounted within said metallic housing for establishing a circuit between said contacts, an enclosing receptacle of insulating material secured at its upper end to said metallic housing and in which said insulating support and said stationary contacts are disposed, and line terminals mounted in spaced relation upon and extending through the wall of said enclosing receptacle and engageable with a corresponding one of said flexible outwardly extending current conducting members, whereby a circuit including said stationary contacts said contact bridging member and said overload trip coil will be established between said line terminals when said enclosing receptacle is secured in position upon said metallic housing.

7. In a pole type circuit breaker, the combination of a metallic housing adapted to be secured upon a pole or cross arm, an operating mechanism mounted within said metallic housing, a downwardly extending insulating support having a stationary contact intermediate its ends and a second stationary contact at its extreme lower end, an overload trip coil mounted upon said insulating support adjacent one of said contacts and having one of its terminals connected thereto, a flexible outwardly extending current conducting member fixed upon said insulating support to which the other end of said overload trip coil is connected, a second flexible current conducting member connected to and extending outwardly from the other of said contacts, a contact bridging member controlled by the operating mechanism mounted within said metallic housing for establishing a circuit between said contacts, a substantially cylindrical insulator having its upper end open and secured to said metallic housing into which said insulating support and said stationary contacts are disposed, the lower end of said insulator being closed, an insulating fluid carried to said insulator into which said stationary contacts said trip coil and said bridging member are immersed, and line terminals mounted in spaced relation upon and extending through the wall of said enclosing receptacle and engageable with a corresponding one of said flexible outwardly extending current conducting members, whereby a circuit which will include said stationary contacts said contact bridging member and said overload trip coil will be established below the surface of said insulating fluid and between said line terminals when said enclosing receptacle is secured in position upon said metallic housing.

8. In a pole type circuit breaker, the combination of a metallic housing enclosing an operating mechanism and supporting a pair of cooperating circuit controlling contacts in insulated relation therebelow, an insulating receptacle of porcelain adapted to contain an insulating fluid and be suspended from said metallic housing and surround said cooperating contacts, a line terminal extending through the side of said insulating receptacle intermediate its ends, a second line terminal mounted in and extending through the bottom of said insulating receptacle, and means forming a con-

nection between said line terminals and a corresponding one of said circuit controlling contacts, whereby said line terminals will be insulated from each other and from said metallic housing by said insulating receptacle.

9. In a totally enclosed oil immersed circuit breaker, the combination of a metallic housing adapted to enclose an operating mechanism, said metallic housing having an open bottom through which insulated contact operating members extend, a support of insulating material carried by said metallic housing also extending downwardly through the bottom thereof, cooperating circuit controlling contacts mounted in spaced relation upon said support of insulating material and adapted to be operated to open and close a circuit by the operating mechanism in said metallic housing, an overload trip coil mounted upon said insulating support adjacent one of said contacts and connected at one end thereto, a substantially cylindrical closed bottom insulator of ceramic material having terminals mounted thereupon in spaced relation at points corresponding to the location of said cooperating contacts, means for securing said insulator with its open end in register with the open bottom of said metallic housing, and means for connecting said cooperating contacts with said terminals when said insulator is secured upon said metallic housing, whereby the entire circuit breaker mechanism will be completely enclosed.

10. In an overload responsive circuit breaker of the character described, the combination of a metallic housing having an open bottom and adapted to be mounted in an elevated position, a support of insulating material carried by and extending downwardly through the bottom of said metallic housing, a stationary contact mounted upon the lower end of said support, a second stationary contact secured upon said support in spaced relation above said first contact, a vertically movable current conducting member adapted to establish a connection between said stationary contacts, a manually controlled lever mechanism within said housing having an insulated connection with said vertically movable current conducting member for moving it into circuit establishing relation with said stationary contacts, spring means adapted to operate said lever mechanism in a reverse direction to move said current conducting member out of circuit establishing relation with said stationary contacts, a trippable latch for holding said lever mechanism against the action of said spring means, an overload trip coil mounted upon said insulating support having one terminal connected to the upper one of said stationary contacts, an insulated mechanical connection between said overload trip coil and said trippable latch, a substantially cylindrical porcelain insulator having an open upper end and a closed bottom adapted to contain an insulating fluid, means for securing said insulator with its open end in register with the open bottom of said metallic housing, a pair of line terminals mounted in spaced relation upon said insulator, an outwardly extending conductor connected to the other terminal of said trip coil and engageable with one of said line terminals, a second outwardly extending conductor carried by said first stationary contact adapted to engage the other one of said line terminals, whereby said stationary contacts said current conducting member and said overload trip coil will be operatively immersed in said insulating

fluid when said insulator is secured upon said metallic housing.

11. In an overload responsive circuit breaker of the character described, the combination of a metallic support adapted to be mounted in an elevated position, a centrally disposed downwardly extending support of insulating material, a stationary contact secured at the lower end of said support, a second stationary contact secured upon said support in spaced and aligned relation with said first contact, a vertically movable current conducting member adapted to establish a connection between said stationary contacts, a manually controlled lever mechanism having an insulated connection with said vertically movable current conducting member for moving it into circuit establishing relation between said stationary contacts, spring means adapted to operate said lever mechanism in a reverse direction to move said current conducting member out of circuit making engagement between said stationary contacts, a trippable latch for holding said lever mechanism against the action of said spring means, an overload trip coil mounted upon said insulating support and having one terminal connected to the upper one of said stationary contacts, an insulated mechanical connection between said overload trip

coil for operating said trippable latch, a substantially cylindrical porcelain insulator having a closed bottom and adapted to contain oil in which said stationary contacts said current conducting member and said overload trip coil are immersed, said insulator having a terminal contact mounted in the side thereof adjacent the upper one of said stationary contacts, a second terminal contact extending through the closed end of said insulator adjacent the first of said stationary contacts, an outwardly extending flexible conducting member carried by said insulating support and connected to the other terminal of said overload trip coil and adapted to establish a connection with said first terminal contact when said insulator is secured upon said support, a second outwardly extending flexible conducting member connected to said first stationary contact and engaging said second terminal contact, and means for securing said insulator in suspended relation upon said support, whereby said stationary contact said current conducting member and said overload trip coil will be operatively immersed in said insulating fluid and insulated from said metallic support by said insulator.

AUGUST C. SCHWAGER.

CERTIFICATE OF CORRECTION.

Patent No. 2,311,699.

February 23, 1943.

AUGUST C. SCHWAGER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 19, claim 3, for the word "withheld" read --established--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of July, A. D. 1943.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

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