United States Patent

[11] **3,549,840**

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[21] Appl. No. **745,934**
[22] Filed **July 18, 1968**
[45] Patented **Dec. 22, 1970**

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a corporation of Delaware

[54] **SWITCH CONSTRUCTION WITH LOAD BREAK DEVICE**
26 Claims, 17 Drawing Figs.

[52] **U.S. Cl.** **200/146,** 200/151
[51] **Int. Cl.** **H01n 9/38,** H01n 33/08
[50] **Field of Search** 200/146, 151; 337/279

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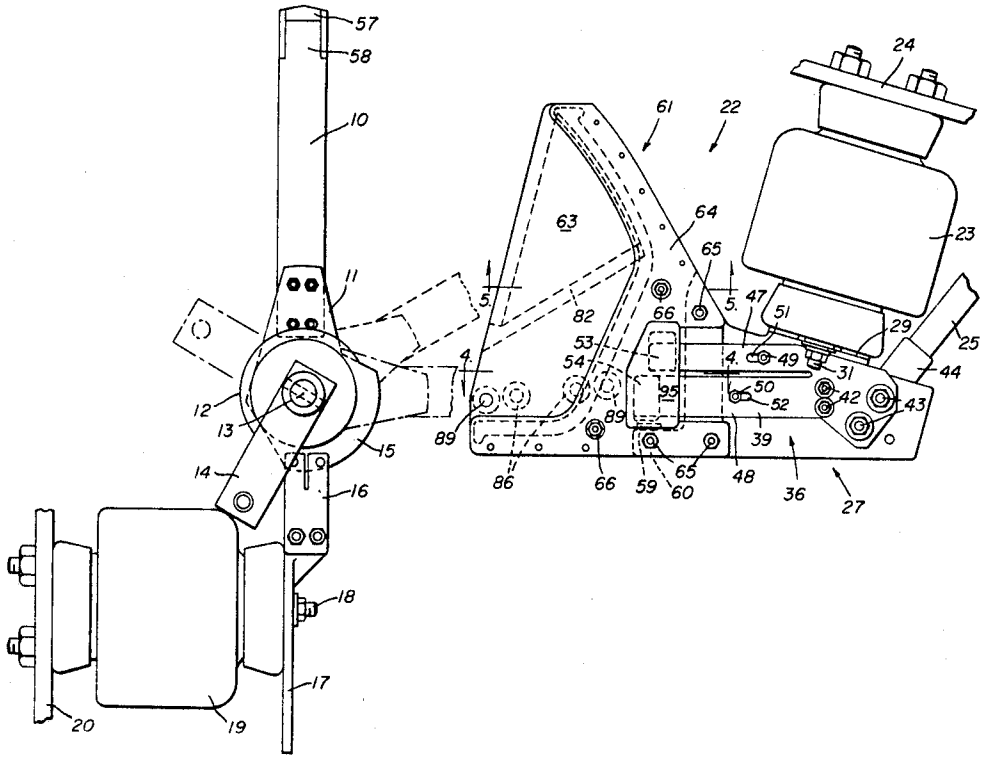
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Primary Examiner—Robert S. Macon
Attorney—Robert R. Lockwood

ABSTRACT: An arc extinguishing structure comprising plates of insulating arc extinguishing material movable relatively toward and away from each other is mounted on a stationary contact and is arranged to receive a rotatable switch blade that swings between the plates into and out of engagement with the contact. Expansible insulation biases the plates toward each other and acts as a seal against flow of arc products which also are confined by engagement of portions of the plates on circuit opening and by insulating covers extending from the plates and overlying the stationary contact. The plates have heat resistant inserts to hold them out of engagement with the switch blade in closed position.



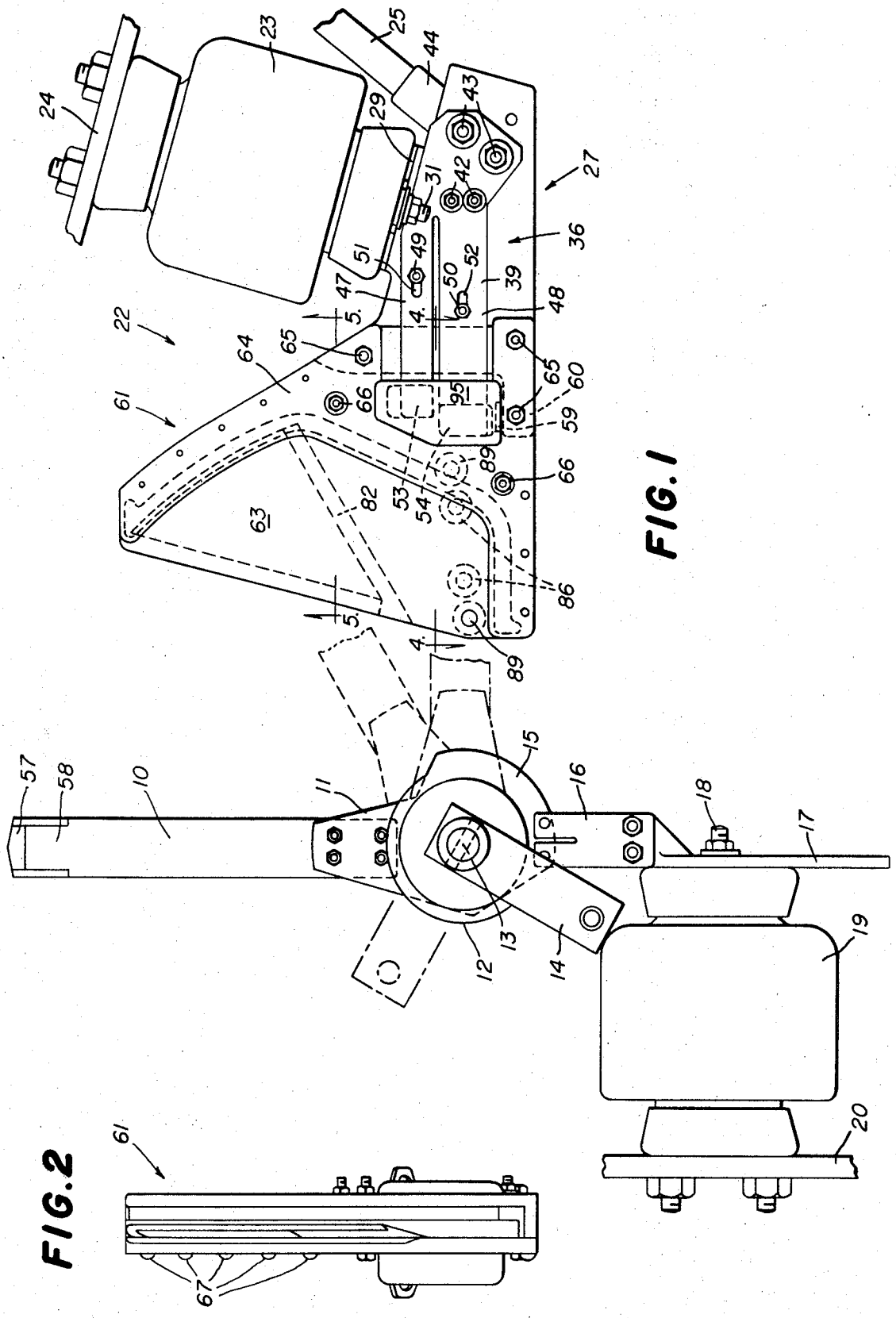

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FIG. 1

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FIG. 2

FIG. 3

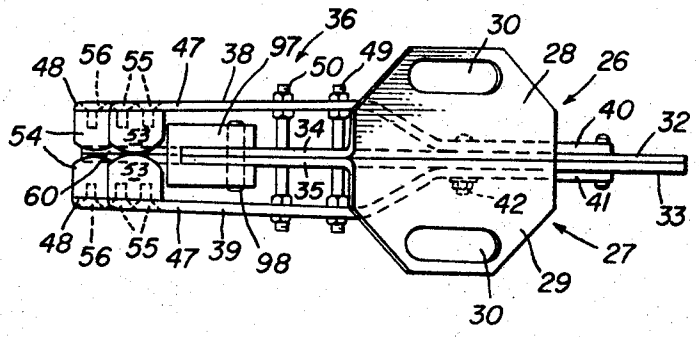


FIG. 4

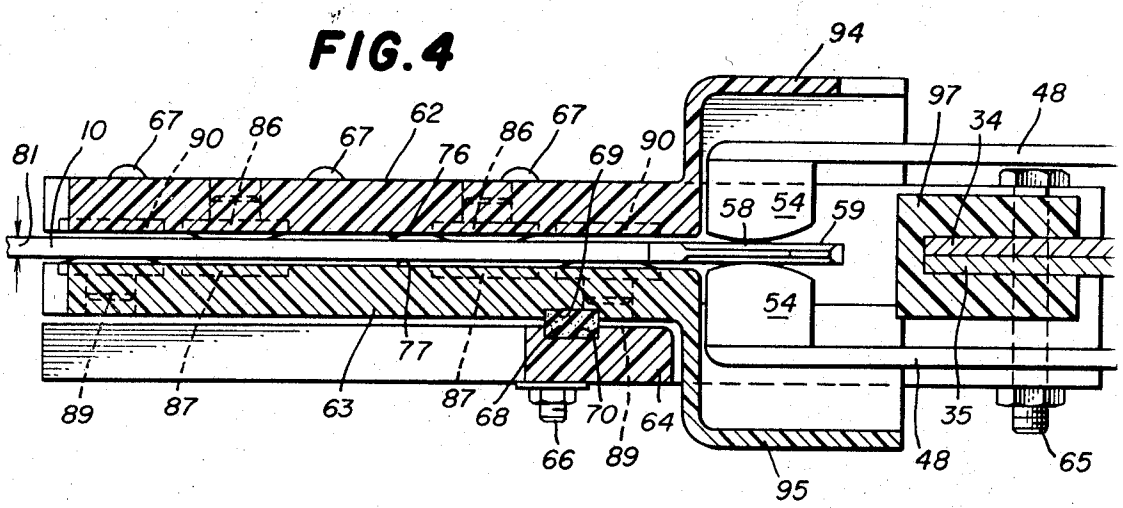


FIG. 5

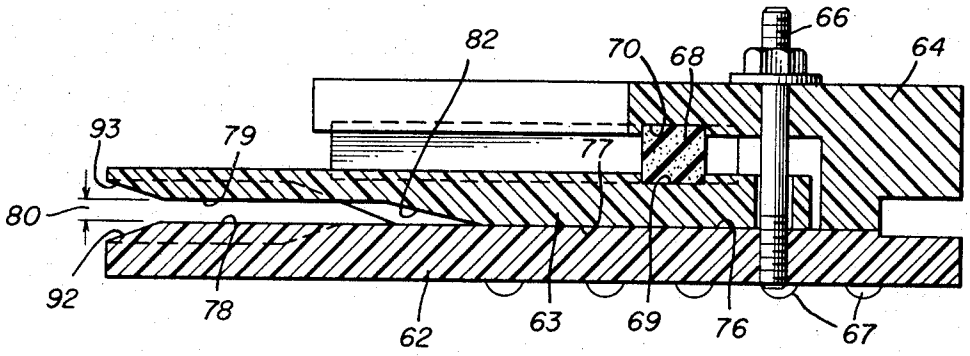


FIG. 6

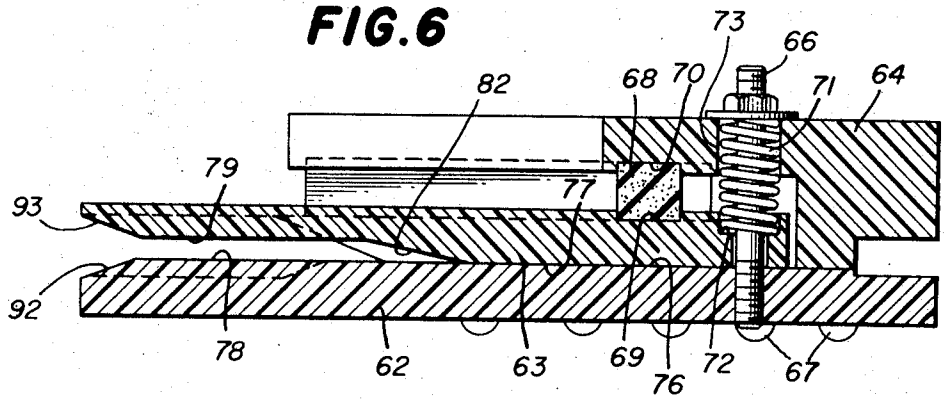


FIG. 7

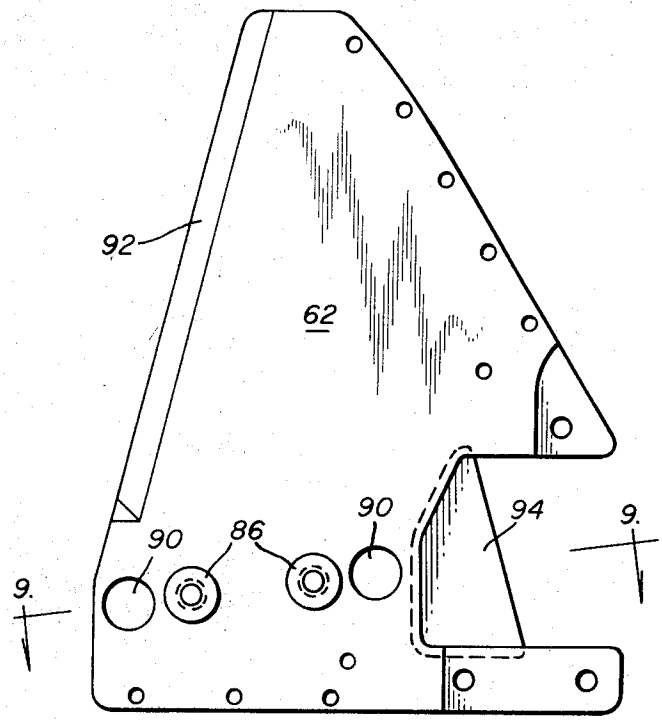


FIG. 8

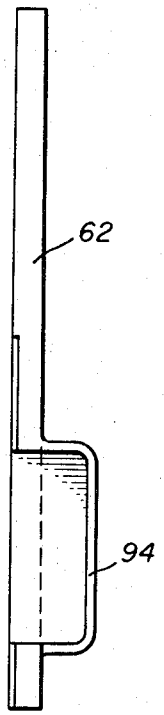


FIG. 9

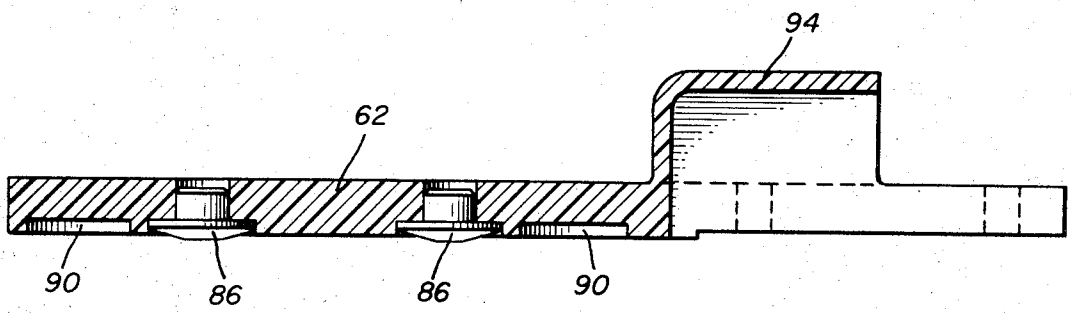


FIG. 10

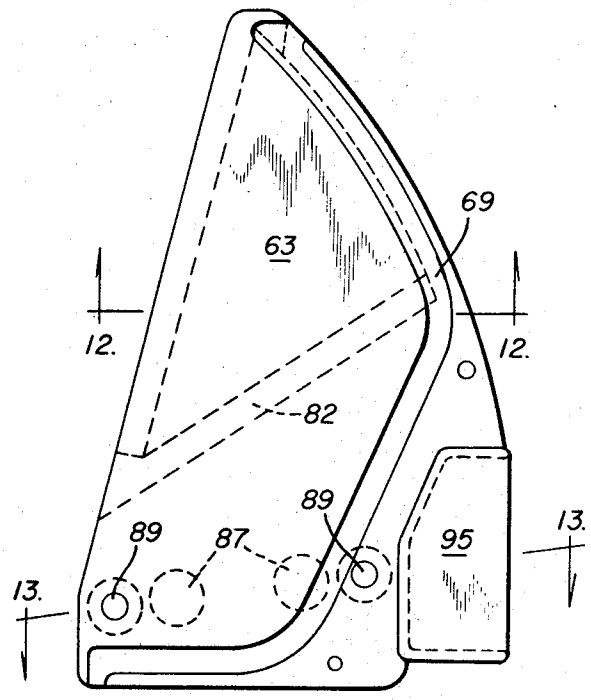


FIG. 11

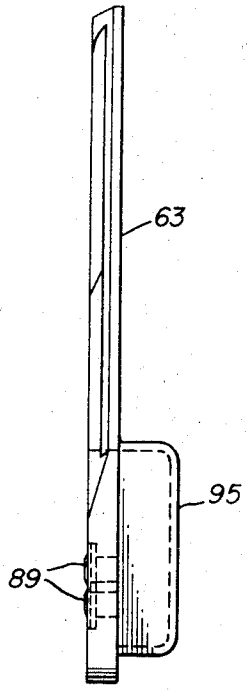
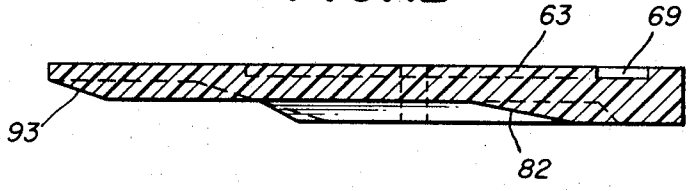


FIG. 12



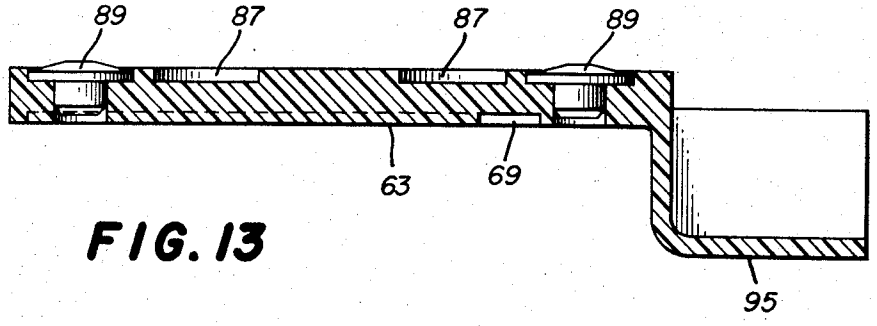


FIG. 13

FIG. 14

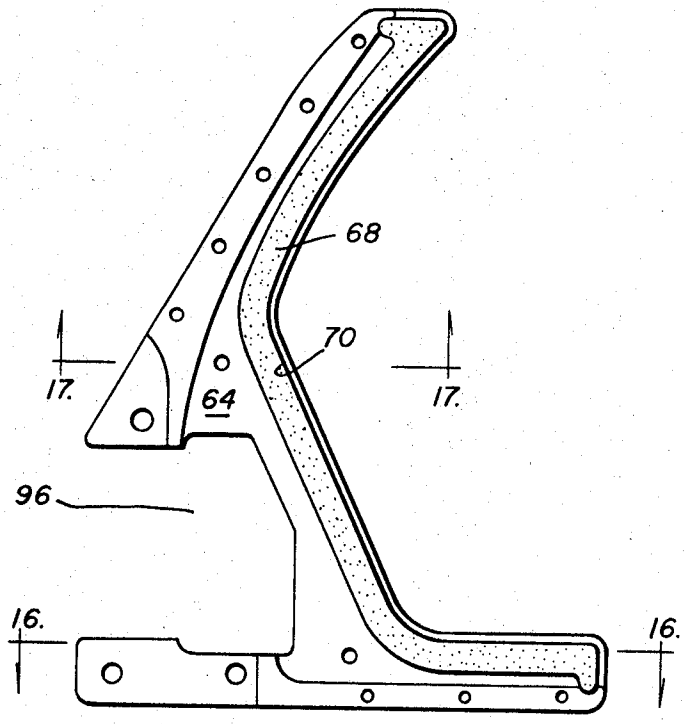


FIG. 15

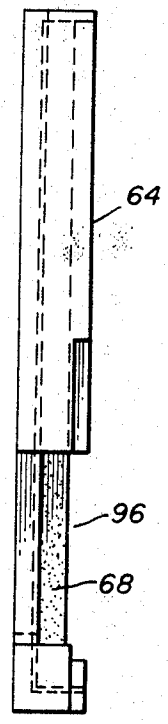


FIG. 16

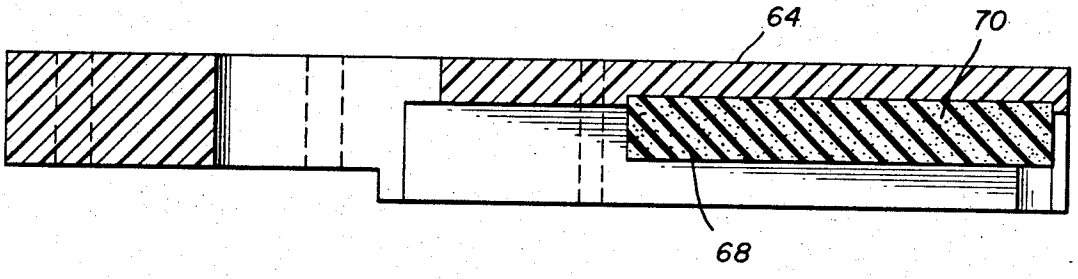
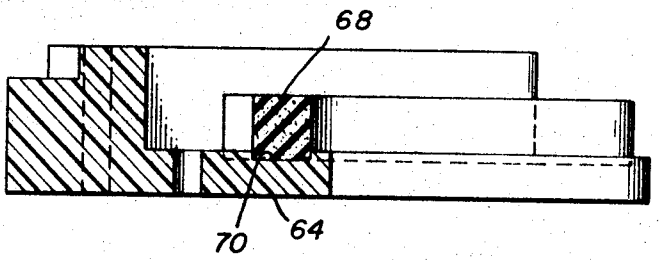


FIG. 17



SWITCH CONSTRUCTION WITH LOAD BREAK DEVICE

The switch construction here disclosed can be employed in the metal enclosed switchgear of Harner et al. U.S. Pat. No. 3,339,118, issued Aug. 29, 1967.

Among the objects of this invention are: To provide a switch for interrupting flow of power frequency current of the order of 400 to 600 amperes at a voltage of the order of 34.5 kv. and below by employing a switch blade rotating at relatively high speed and without the use of a separate auxiliary arcing blade; to employ for this purpose a pair of relatively movable plates of insulating material which are mounted on a stationary contact that is engageable with and disengageable by a switch blade, the plates being capable of evolving an arc extinguishing medium when subject to the heat of an arc and being biased toward each other to receive the switch blade therebetween; to construct the arc to produce greater turbulence and deionizing action by closing the plates; to prevent gas flow toward the lower end of the switch blade out the front of the plates and consequent flashover; to allow the plates to automatically adjust the spacing therebetween dependent on the gas pressure evolved; to prevent external flashover of the movable plate due to gas escaping from between fixed and movable interrupting plates; to confine the flow of arc products including gas, ionized particles and the like to the vicinity of the stationary contact; to employ expansible insulation between extensions of the interrupting plate structure for confining the flow of arc products; to utilize the expansible characteristics of the insulation to provide the force for biasing the relatively movable interrupter plates toward each other; to arrange for an entrance and exit part of said plates for the switch blade spaced apart a distance greater than the thickness of the switch blade, with the portions of the plates adjacent the stationary contact in engagement to provide a barrier to the escape of the arc products; to provide for a transition of the switch blade in its opening movement to the entrance and exit part such that the portions of the insulating plates adjacent the stationary contact engage initially along the outside edge remote from the stationary contact; in the closed position of the switch blade to provide insulating spacers to hold the plates out of engagement therewith to limit heat transfer from the switch blades to the plates, particularly during those times when the magnitude of the current flow is orders of magnitude greater than normal current flow, for example on the order of 20,000 amperes; and to provide main and auxiliary contact fingers for engagement with the switch blade, these contact fingers being offset to permit engagement of the auxiliary contact fingers first by the switch blade in closing and disengagement of the auxiliary contact fingers last by the switch blade on opening and at a location along the switch blade nearer its distal end than the location of the engagement between the switch blade and the main contact fingers.

According to this invention a switch blade is mounted for movement with a rotatable insulator to rotate into and out of engagement with a stationary bifurcated contact assembly having main and auxiliary contact fingers carrying contact tips at the ends of the furcations facing each other for receiving the switch blade therebetween on rotation across them. The auxiliary contact tips are offset from the main contact tips to be engaged first by the switch blade in closing and disengaged last by it in opening at a location nearer to its distal end than the location of the engagement between the switch blade and the main contact tips for the purpose of confining erosion of the switch blade to the former location. A stationary plate of insulating material is secured to the contact assembly. It has a cooperating plate of insulating material mounted on and biased toward it to receive the switch blade therebetween in its movement into and out of engagement with the stationary contact. The plates are capable of evolving an arc extinguishing medium when subjected to the heat of an arc formed between the switch blade and the auxiliary contact fingers for assisting in extinguishing it. Adjacent the contact assembly the plates are arranged to come into mutual contact engagement to provide a barrier between the contact assembly and the switch blade. This arrangement prevents gas flow out the front of the plate assembly and consequent flashover to the switch blade. Also it allows more efficient interruption due to construction of the arc, particularly at low current levels. Covers over the contacts primarily act in preventing external flashover from them to the switch blade. The covers prevent gas blast transverse to the plates and consequent phase to phase and to ground flashover. An expansible insulating seal is located in grooves and in an auxiliary extension plate and the relatively movable interrupter plate to further confine the flow of arc products and to prevent external flashover of the movable plate, particularly at high current. Advantage is taken of the expansible characteristic of the insulating seal to provide a force for biasing the stationary and movable interrupter plates toward each other. Metallic springs can also be used as an adjunct to the insulating seal. At the entrance and exit portion of the plates for the switch blade a space therebetween is provided having a width greater than the thickness of the switch blade when the portions adjacent the contact assembly are in engagement. The transition between these portions for the switch blade takes place along a beveled section so positioned that the portions of the plates adjacent the contact assembly first engage along the side adjacent the rotatable insulator upon opening of the switch blade. This construction and arrangement can be employed for both single-phase and three-phase applications.

In the drawings: FIG. 1 is a view, in side elevation, of a switch construction provided with a load break device in which this invention is embodied. FIG. 2 is a view in end elevation, looking from left to right, of the arc extinguishing structure shown in FIG. 1. FIG. 3 is a top plan view, at an enlarged scale, of the stationary contact assembly shown in FIG. 1. FIG. 4 is a sectional view, at an enlarged scale, taken generally along the line 4–4 of FIG. 1. FIG. 5 is a sectional view, at an enlarged scale, taken generally along the line 5–5 of FIG. 1. FIG. 6 is a view, similar to FIG. 5, showing how the movable plate can be biased by metallic springs toward the stationary plate. FIG. 7 is a view, in side elevation, of the stationary insulating and arc extinguishing plate. FIG. 8 is a view, in end elevation looking from right to left, of FIG. 7. FIG. 9 is a sectional view taken generally along the line 9–9 of FIG. 7 and showing certain details of construction at an enlarged scale. FIG. 10 is a view, in side elevation, of the movable insulating and arc extinguishing plate. FIG. 11 is a view, in end elevation, looking from left to right of FIG. 10. FIG. 12 is a sectional view taken generally along the line 12–12 of FIG. 10 and at an enlarged scale. FIG. 13 is a sectional view, taken generally along the line 13–13 of FIG. 10, and at an enlarged scale. FIG. 14 is a view, in side elevation, of the auxiliary insulating extension plate. FIG. 15 is a view, in end elevation, looking from left to right of FIG. 14. FIG. 16 is a sectional view, at an enlarged scale, taken generally along the line 16–16 of FIG. 14. FIG. 17 is a sectional view, at an enlarged scale, taken along the line 17–17 of FIG. 14.

Referring now to FIG. 1, the reference character 10 designates a switch blade that is mounted on a switch blade support 11 which is secured to and is movable with a rotatable insulator 12 that is arranged to be rotated about an axis 13 by an operating arm 14 to which a quick break, quick make operating mechanism is connected for moving the switch blade 10 at high speed to and from the switch closed position. The switch blade support plate 11 has an arcuate extension 15 that is engaged by a sliding contact 16 which extends from a terminal 17 that can be connected to a suitable load such as an industrial or institutional plant, power conducting cable, or the like. The terminal 17 is secured by a bolt 18 to an insulator 19 which is carried by a support plate 20 which forms a part of a support structure for the switch mechanism.

The switch blade 10 is arranged to be rotated into and out of engagement with a stationary contact assembly that is indicated, generally, at 22. The stationary contact assembly 22 is mounted on an insulator 23 which is carried by a support plate 24 that also forms a part of the support structure. A conductor 25 is connected to the stationary contact assembly 22

and is arranged to be connected to a suitable source of power. It will be understood that conductor 25 and the connection at 17 may be interchanged.

The stationary contact assembly 22, FIGS. 2 and 3, includes opposite hand support brackets 26 and 27 that may be formed of high strength material such as steel and are provided with flat outturned sections 28 and 29 having slots 30 therein for receiving bolts 31 to secure the structure to the insulator 23. The support brackets 26 and 27 have rear overlying extensions 32 and 33 and forward extensions 34 and 35. Mounted on the support brackets 26 and 27 is a bifurcated stationary contact that is indicated, generally, at 36. The stationary contact 36 includes furcations 38 and 39 of resilient good conducting material such as copper alloy and they have end portions 40 and 41 which overlie the rear extensions 32 and 33 of the support brackets 26 and 27 and are secured thereto by bolts 42. Bolts 43 extend through the assembly for clamping thereto the terminal 44 to which the conductor 25 is connected. The construction is such as to allow the resultant magnetic forces to act to increase contact pressure on flow of short circuit currents.

The furcations 38 and 39 of the bifurcated stationary contact 36 include upper or auxiliary resilient contact fingers 47 and lower or main resilient contact fingers 48. Spacer bolts 49 and 50 extend through the forward extensions 34 and 35 of the support brackets 26 and 27 and through slots 51 and 52 in the contact fingers 47 and 48 for maintaining them in proper spaced relation. At the distal ends of the upper or auxiliary contact fingers 47 auxiliary contact tips 53 are provided while main contact tips 54 are positioned at the distal ends of the lower or main contact fingers 48. Screws 55 and 56 serve to hold the contact tips 53 and 54 in position. The contact tips 53 and 54 can also be secured by brazing to the contact fingers 47 and 48.

It will be observed in FIG. 3 that the auxiliary contact tips 53 are spaced from the main contact tips 54. When the switch blade 10 is swung into engagement therewith its end portion 57 adjacent the distal end moves transversely of the auxiliary contact tips 53 into and out of engagement therewith while the portion 58 on the switch blade 10 nearer the axis of rotation 13 and spaced from the end portion 57 is arranged to engage and disengage the main contact tips 54. Since the portions 57 and 58 are spaced from each other along the switch blade 10, the principal erosion due to arcing takes place at the end portion 57 with little or no erosion taking place at portion 58 which constitutes the main current carrying part of the switch blade 10 in the switch closed position. Preferably the auxiliary contact tips 53 and end portion 57 of the switch blade 10 are formed of good arc resistance material.

As shown in FIG. 1 a bumper pad 59 is located on the upper side of forward extensions 60 of the support brackets 26 and 27 to be engaged by the distal end of the switch blade 10 in the fully closed position.

For confining and extinguishing any arc that may be drawn between the switch blade 10 and the auxiliary contact tips 53 an arc extinguishing structure, indicated generally at 61 in FIGS. 1 and 2, is employed. Sectional views, FIGS. 4 and 5, show certain details of construction. The arc extinguishing structure 61 is formed of three main parts. These parts include a stationary plate 62, FIGS. 7 and 8 and 9, a movable plate 63, FIGS. 10, 11, 12 and 13, and an arcuate platelike auxiliary extension member 64, FIGS. 14, 15, 16 and 17 which could be an integral extension of stationary plate 62. Each of the plates 62 and 63 and the platelike extension member 64 is formed of a suitable insulating material that is capable of evolving an arc extinguishing medium when subjected to the heat of the arc drawn between the switch blade 10 and the auxiliary contact tips 53. For this purpose various plastic materials, well known to those skilled in the art, can be employed.

The plate 63 is mounted for movement toward and away from the stationary plate 62 between it and the arcuate platelike extension member 64 which are secured together to provide a unitary structure by bolts 65 that are formed of insulating material. The bolts 65 also secure the arc extinguishing structure 61 to the forward extensions 34 and 35 of the support brackets 26 and 27. In addition insulating bolts 66 interconnect the stationary plate 62 and the platelike extension member 64 thereof. In addition insulating screws 67 serve to hold the platelike extension member 64 in position on the stationary plate 62.

It is desirable that a seal be provided between the movable plate 63 and the arcuate platelike extension member 64 in order to confine the arc products incident to the formation of an arc between the switch blade 10 and the auxiliary contact tips 53. For this purpose a strip 68 of expansible insulating sealing material is positioned therebetween and is confined in a groove 69 in an extension of the movable plate 63, FIG. 10, and a groove 70 along the margin of the arcuate platelike extension member 64, FIG. 14. Advantage is taken of the expansible characteristic of the insulating strip 68 to employ it to provide a biasing force for urging the movable plate 63 toward the stationary plate 62. Thus the strip 68 performs two functions, one to provide a seal between the movable plate 63 and the arcuate platelike extension member 64 and two, to provide the biasing force urging the plate 63 toward the stationary plate 62.

Additionally, as shown in FIG. 6, coil compression springs, one shown at 71, can be employed for urging the movable plate 63 toward the stationary plate 62. For this purpose a counterbore 72 is formed in the movable plate 63 for each spring 71 and a clearance opening 73 is formed in the arcuate platelike extension 64 with the insulating bolt 66 extending therethrough.

As shown in FIGS. 5 and 6 the plate 63 is biased toward the stationary plate 62 as the result of the biasing action provided by the expansible insulating sealing strip 68 along or in combination with the coil compression metal spring 71. In the absence of the switch blade 10 surface 76 of the stationary plate 62 is engaged by surface 77 of the movable plate 63. This provides a barrier against the flow of arc products formed when an arc is established between switch blade 10 and the auxiliary contact tips 53 and prevents them from flowing outwardly over and past the plate 63. At the outer portions of the plates 62 and 63 juxtaposed surfaces 78 and 79 are spaced apart a distance slightly greater than the thickness of the switch blade 10. As indicated in FIG. 5, the spacing between the surfaces 78 and 79 when the surfaces 76 and 77 are engaged is indicated at 80 and this spacing is slightly greater than the spacing 81, FIG. 4, indicating the thickness of the switch blade 10.

In order to have a smooth transition for the switch blade 10 between the surfaces 76 and 77 and the surfaces 78 and 79 a beveled section 82 is provided on the movable plate 63. As shown in FIG. 1 the beveled section 82 on the movable plate 63 has a larger angle with respect to the bottom of the arc extinguishing structure 61 than the angle of the switch blade 10 as it moves through this area of the arc extinguishing structure 61. As the switch blade 10 moves away from the auxiliary contact tips 53 and draws an arc, the surfaces 76 and 77 engage initially as the beveled section 82 is reached at the extreme end of the movable plate 63 toward the rotatable insulator 12. They engage last close to the auxiliary arcing tips 53. The reason for this is to close the exhaust path to the front of the movable plate 63 as soon as possible to aid in preventing flashover to the switch blade 10. The reverse action takes place when the switch blade 10 is swung toward the closed position into engagement first with the auxiliary contact tips 53 and finally with the main contact tips 54.

When the switch blade 10 is in the switch closed position, FIG. 4, and engages the main contact tips 54, the movable plate 63 is biased toward the stationary plate 62 and, if provision is not made for preventing it, these plates would engage opposite sides of the switch blade 10. Under conditions of heavy current flow through the switch blade 10, particularly under short circuit conditions where the current flow may be of the order of 20,000 amperes, the temperature of the switch

blade 10 is increased to a point where damage might be done to the juxtaposed plates 62 and 63. In order to space the plates 62 and 63 from the switch blade 10 in the closed circuit position thereof heat resistant spacers 86 are positioned in the stationary plate 62, FIG. 7, and they are opposite recesses 87 in the movable plate 63, FIG. 10, to permit the surfaces 76 and 77 to engage in the absence of the switch blade 10. Likewise, heat resistant spacers 89 are positioned in the movable plate 63, FIG. 10, opposite recesses 90 in the stationary plate 62, FIG. 7. The heat resistant spacers 86 and 89 are formed of canvas filled plastic or similar material which is capable of withstanding temperatures substantially in excess of the temperature that would adversely affect the plates 62 and 63.

In order to facilitate entrance of the switch blade 10 between the surfaces 78 and 79 along the outer margins of the plates 62 and 63 beveled entrance surfaces 92 and 93, FIG. 5, are provided.

With a view to further confining the arc products incident to the arc drawn on separation of the switch blade 10 from the auxiliary contact tips 53, covers 94 and 95 are molded integrally with the stationary plate 62 and the movable plate 63. As shown more clearly in FIG. 4 the covers 94 and 95 overlie the distal ends of the main contact fingers 48 and likewise over the distal ends of the auxiliary contact fingers 47. A slot 96, FIG. 14, is formed in the arcuate platelike extension member 64 for the purpose of receiving the cover 95 on the movable plate 63 and permitting relative movement therewith.

Since the forward extensions 34 and 35 of the support brackets 26 and 27 are at the same potential as the bifurcated stationary contact 36, it is desirable to insulate them in the vicinity of the distal end of the switch blade 10 in the closed position so that when the switch blade 10 is swung to the open position an arc will not be struck therebetween. For this purpose a cover 97 of suitable plastic insulation overlies the forward extensions 34 and 35. As shown in FIG. 3 the cover 97 is held in place by a transverse pin 98 of insulating material. This arrangement facilitates removal or the arc extinguishing structure 61.

As shown more clearly in FIGS. 7, 8 and 9 the stationary plate 62 with the cover 94 is a one-piece molding of suitable plastic material. Likewise, the movable plate 63, as shown in FIGS. 10, 11, 12 and 13, is a one-piece molding with the cover 95 integrally formed therewith. Also, the arcuate platelike extension member 64, FIGS. 14, 15, 16 and 17, is a one-piece molding with the groove 70 formed as a part of the molding operation as well as the slot 96 although the platelike extension member 64, as herebefore stated, could be an integral part of the stationary plate 62.

I claim:

1. A circuit interrupter comprising: terminals for connecting said interrupter in a circuit;
- a movable switch blade;
- resilient stationary contact means including main current carrying members and auxiliary circuit making and breaking members mounted on one of said terminals;
- means mounting said switch blade on the other of said terminals for movement into and out of contact engagement at its distal end with said contact means;
- relatively movable plates of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc mounted on said contact means for receiving said switch blade between said plates;
- said switch blade being engageable with portions of said main and auxiliary contact members at points between said plates;
- said plates overlying said portions of said main and auxiliary contact members; and
- said switch blade being movable across the juxtaposed surfaces of said plates after entering the space therebetween and in moving into and out of engagement with said contacts.

2. The circuit interrupter according to claim 1 wherein expansible insulating means is positioned between the movable plate and an overlying stationary plate section to provide a seal against the discharge of ionized and conductive gases into the external volume about the movable plate likely to result in an external flashover.

3. The circuit interrupter according to claim 1 wherein:
- means rotatably mount said switch blade on said other terminal; and
- means bias said plates toward each other and they are moved apart by said switch blade during its rotation into engagement with said contact means.

4. The circuit interrupter according to claim 3 wherein said biasing means comprises expansible insulating means reacting against said movable plate to provide a seal against the discharge of ionized and conductive gases into the external volume about the movable plate likely to result in an external flashover.

5. The circuit interrupter according to claim 3 wherein said biasing means comprises spring means reacting against said plates.

6. The circuit interrupter according to claim 3 wherein:
- those portions of the surfaces of said plates traversed by said switch blade in entering and leaving said plates are spaced apart a distance greater than the thickness of said switch blade; and
- those portions of the surfaces of said plates adjacent said contact are in mutual engagement in the absence of said switch blade to close off the space between said switch blade and said contact means.
- those portions of the surfaces of said plates adjacent said contact are in mutual engagement in the absence of said switch blade to close off the space between said switch blade and said contact means.

7. The circuit interrupter according to claim 6 wherein a beveled section on one of said plates provides a transition for said switch blade between said portions of said surfaces such that the second-mentioned portions of said surfaces engage first at a location remote from said stationary contact as said switch blade rotates toward open circuit position.

8. The circuit interrupter according to claim 1 wherein insulating cover means extend from each of said plates in overlying relation to said contact means to limit flashover between said contact means and said switch blade after separation thereof and adjacent energized or grounded metallic parts.

9. A circuit interrupter comprising:
- terminals for connecting said interrupter in a circuit;
- a movable switch blade;
- resilient stationary contact means including main current members and auxiliary circuit making and breaking members mounted on one of said terminals;
- means mounting said switch blade on the other of said terminals for movement into and out of contact engagement at its distal end with said contact means;
- relatively movable plates of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc mounted on said contact means for receiving said switch blade between said plates;
- said switch blade being engageable with portions of said main and auxiliary contact members at points between said plates;
- said plates overlying said portions of said main and auxiliary contact members;
- said switch blade being movable across the juxtaposed surfaces of said plates after entering the space therebetween and in moving into and out of engagement with said contact; and
- heat resistant spacer means carried by said plates to engage opposite sides of said switch blade in its switch-closed position to hold said plates out of contact with said switch blade to limit heat transfer to said plates from said switch blade under conditions of relatively high current flow through said switch blade.

10. The circuit interrupter according to claim 9 wherein said heat-resistant spaced means includes a pair of inserts in

each plate projecting from the surface thereof into recesses in the other plate in the absence of said switch blade.

11. A circuit interrupter comprising:
a rotatable switch blade;
contact means;
means mounting said switch blade for rotation into and out of contact engagement at one end with said contact means;
relatively movable plates of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc mounted on said contact means for receiving said switch blade between said plates;
said switch blade being relatively rotatable across the juxtaposed surfaces of said plates and across said contact means;
expansible insulating means between said plates to seal off a portion of the space therebetween to provide a seal against the discharge of ionized and conductive gases into the external volume about the movable plate and consequently result in an external flashover;
means biasing said plates toward each other, said plates being moved apart by said switch blade during its rotation into engagement with said contact means;
those portions of the surfaces of said plates traversed by said switch blade in entering and leaving said plates being spaced apart a distance greater than the thickness of said switch blade; and
those portions of the surfaces of said plates adjacent said contact being in mutual engagement in the absence of said switch blade to close off the space between said switch blade and said contact means.

12. The circuit interrupter according to claim 11 wherein said expansible insulating means acts as said biasing means.

13. The circuit interrupter according to claim 12 wherein insulating cover means extends from each of said plates in overlying relation to said contact means to limit flashover between said contact means and said switch blade after separation thereof and adjacent energized or grounded metallic parts.

14. The circuit interrupter according to claim 12 wherein heat resistant spacer means carried by said plates engage opposite sides of said switch blade in its switch closed position to hold said plates out of contact with said switch blade to limit heat transfer to said plates from said switch blade under conditions of relatively high current flow through said switch blade.

15. The circuit interrupter according to claim 6 wherein an insulating cover extends from each of said plates in overlying relation to said contact means to limit flashover between said contact means and said switch blade after separation thereof and adjacent energized or grounded metallic parts.

16. The circuit interrupter according to claim 9 wherein:
means rotatably mount said switch blade on said other terminal;
means bias said plates toward each other and they are moved apart by said switch blade during its rotation into engagement with said contact means;
those portions of the surfaces of said plates traversed by said switch blade in entering and leaving said plates are spaced apart a distance greater than the thickness of said switch blade; and
those portions of the surfaces of said plates adjacent said contact are in mutual engagement in the absence of said switch blade to close off the space between said switch blade and said contact means.

17. The circuit interrupter according to claim 16 wherein said heat resistant spacer means includes a pair of inserts in each plate projecting from the surface thereof into recesses in the other plate in the absence of said switch blade.

18. The circuit interrupter according to claim 7 wherein expansible insulating means between said plates seal off a portion of the space about the movable plate to provide a seal against the discharge of ionized and conductive gases into the external volume about the movable plate and consequently result in an external flashover.

19. The circuit interrupter according to claim 18 wherein insulating cover means extends from each of said plates in overlying relation to said contact means to limit flashover between said contact means and said switch blade after separation thereof and adjacent energized or grounded metallic parts.

20. The circuit interrupter according to claim 9 wherein said heat resistant spacer means includes a pair of inserts in each plate projecting from the surface thereof into recesses in the other plate in the absence of said switch blade.

21. The circuit interrupter according to claim 20 wherein:
a beveled section on one of said plates provides a transition for said switch blade between said portions of said surfaces such that the second-mentioned portions of said surfaces engage first at a location remote from said stationary contact as said switch blade rotates toward open position;
insulating cover means extends from each of said plates in overlying relation to said contact means to limit flashover between said contact means and said switch blade after separation thereof and adjacent energized or grounded metallic parts;
said contact means includes:
a main contact member; and
an auxiliary contact member; and
means mount said main and auxiliary contact members in relation to said switch blade such that the distal portion thereof engages said auxiliary contact member and another portion of said switch blade nearer its axis of rotation engages said main contact member; and
said main and auxiliary contact members being bifurcated with arcing tips at the ends of the furcations biased toward each other for receiving said switch blade therebetween.

22. A circuit interrupter comprising:
stationary and movable contact;
an arc extinguishing structure for said contacts including relatively movable plates capable of evolving an arc extinguishing medium when subjected to an arc drawn on separation of said contacts; and
an expansible insulating seal in said arc extinguishing structure to confine and direct the flow of arc products.

23. The circuit interrupter according to claim 22 wherein insulating covers overlie said contacts to prevent flashover between said contacts after separation thereof and adjacent energized or grounded metallic parts.

24. A circuit interrupter comprising:
a switch blade;
contact means;
means mounting said switch blade and said contact means for relative movement into and out of mutual contact engagement at one end of said switch blade;
a stationary plate and a relatively movable plate of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc mounted on said contact means for receiving said switch blade between said plates;
said switch blade being relatively movable across the juxtaposed surfaces of said plates and across said contacts means,
an auxiliary stationary plate mounted on said contact means and having an arcuate extension in overlying spaced relation to said movable plate; and
insulating means interposed between said movable plate and said arcuate extension to seal off the space therebetween.

25. The circuit interrupter according to claim 24 wherein grooves are provided along the overlying edges between said auxiliary and movable plates to contain the sealing member.

26. The circuit interrupter according to claim 24 wherein the auxiliary plate member is located outside of and paralleling the relatively movable plate.

PO-1050
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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,549,840 Dated December 22, 1970

Inventor(s) Robert H. Harner

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 16 for "construct" read--constrict--.
Column 2, line 3 for "struction" read--striction--.
Column 4, line 34 for "along" read--alone--.
Column 6, delete lines 30, 31, 32 and 33.
Column 8, line 37 for "contact" read--contacts--.

Signed and sealed this 23rd day of March 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents