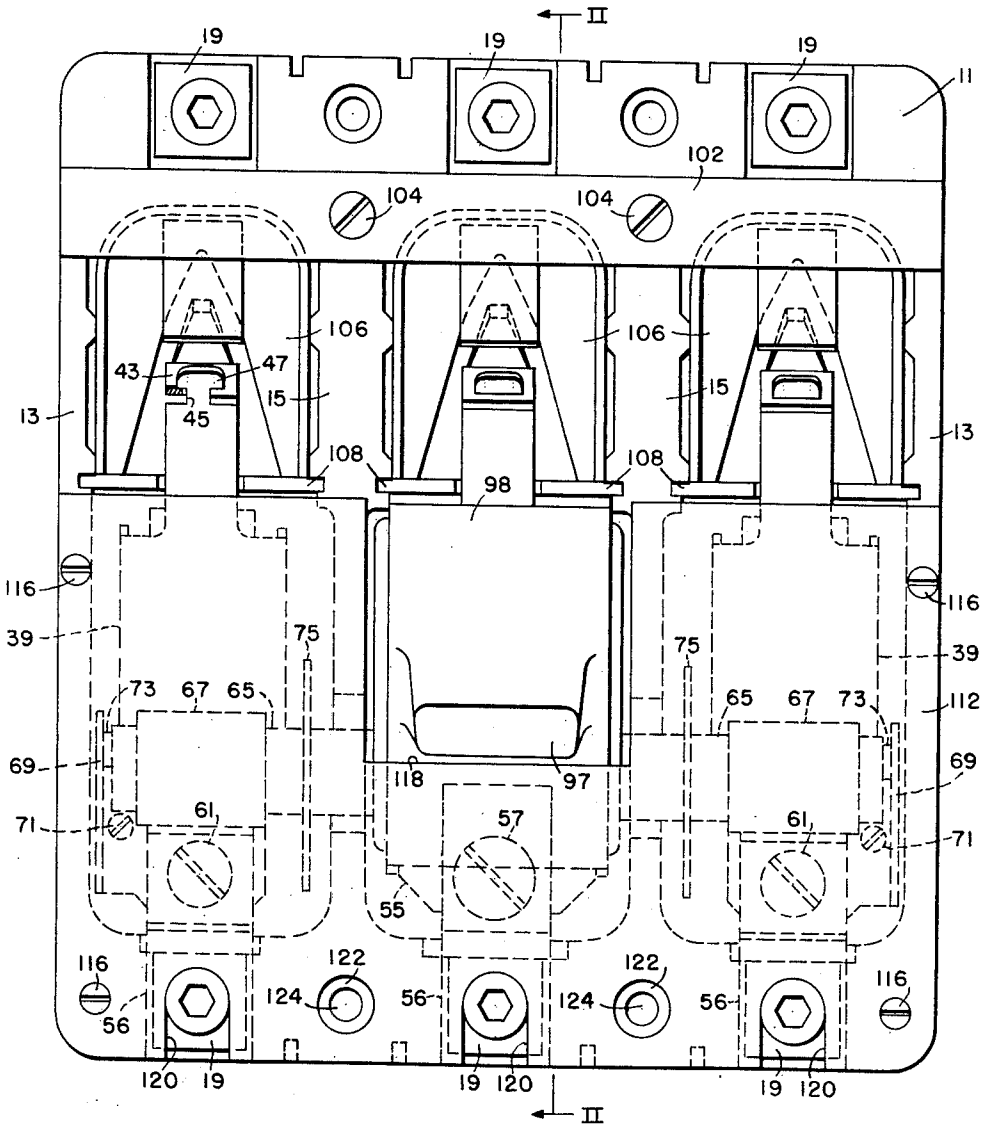
Feb. 25, 1958 C. L. JONES 2,824,934

VISIBLE-BLADE ARC-EXTINGUISHING DISCONNECTING SWITCH

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Fig. 1.



WITNESSES

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VISIBLE-BLADE ARC-EXTINGUISHING DISCONNECTING SWITCH

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Fig. 2.

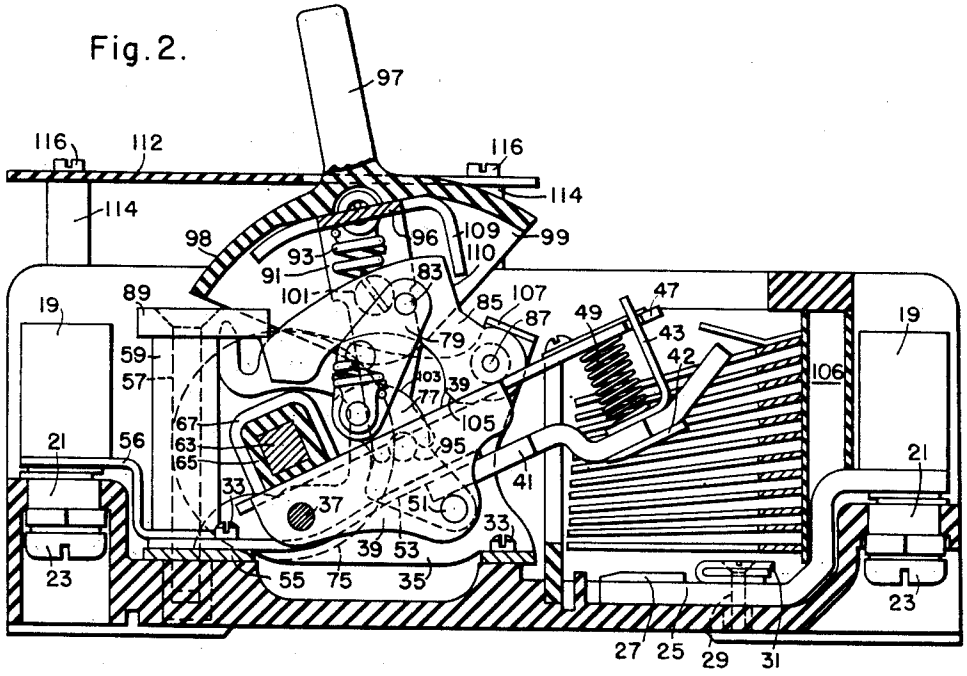
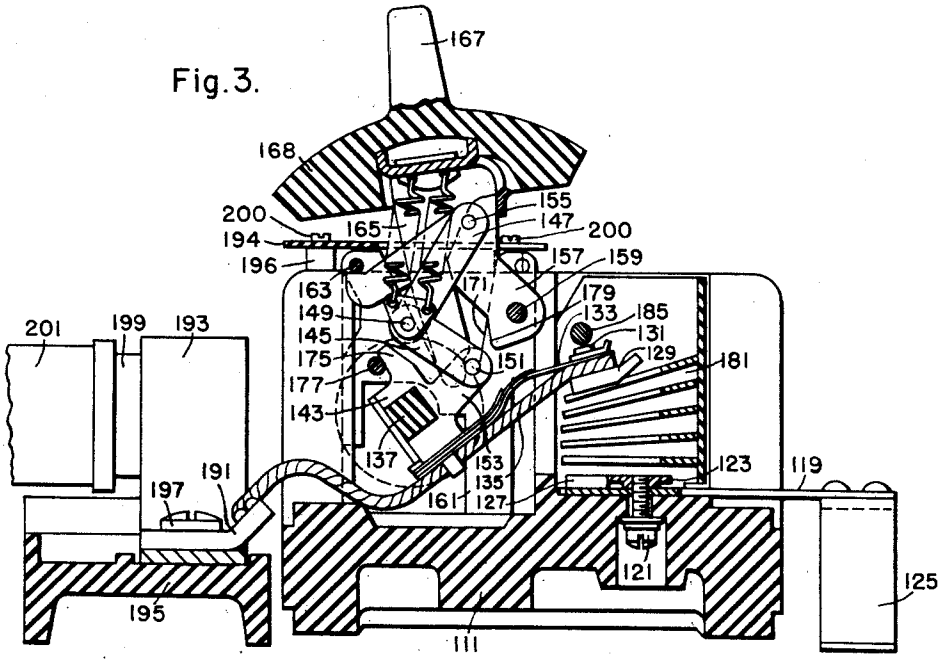


Fig. 3.



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VISIBLE-BLADE ARC-EXTINGUISHING DISCONNECTING SWITCH

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Fig. 4.

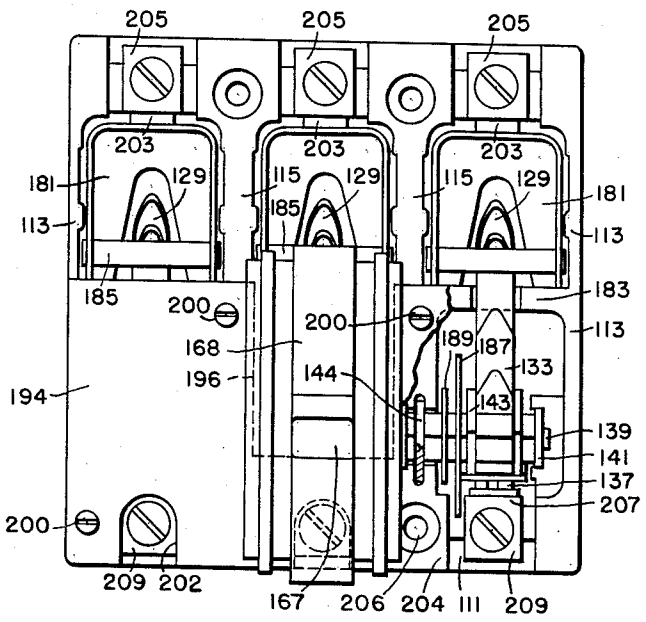
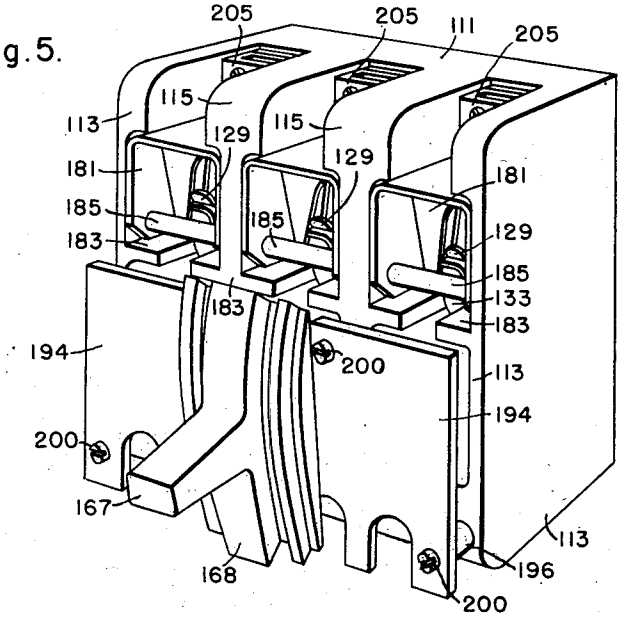


Fig. 5.



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2,824,934

VISIBLE-BLADE ARC-EXTINGUISHING DISCONNECTING SWITCH

Charles L. Jones, Beaver, Pa., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application December 9, 1954, Serial No. 474,164

13 Claims. (Cl. 200—144)

This invention relates to front-operated switches and more particularly to visible-blade arc-extinguishing disconnecting switches.

This application is a continuation-in-part of now abandoned application Serial No. 305,334, filed August 20, 1952, by C. L. Jones and assigned to the assignee of this application.

An object of the invention is to provide an improved front-operated arc-extinguishing switch in which the movable contact is visible in the open position of the switch.

Another object of the invention is to provide a front-operated visible-blade disconnecting switch in which a solid current path is provided by a flexible conductor having one end brazed to the arm which carries the moving contact and the other end brazed to a terminal of the switch.

A further object of the invention is to provide a front-operated visible blade disconnect switch that is small, compact and yet has a high current-interrupting capacity.

Another object of the invention is to provide a front-operated disconnect switch having barriers forming spaces in which the poles of the switch are mounted, the switch having arc extinguishing means and cross barriers in the spaces at the arc extinguishing means.

Another object of the invention is to provide a front-operated disconnect switch according to the preceding paragraph in which the operating mechanism is disposed in the center space.

Another object of the invention is to provide an improved front-operated arc-extinguishing switch in which the movable contact is visible in the open position of the switch and having a cover on a portion of the front of said switch so as not to obscure the movable contact.

Another object of the invention is to provide a front-operated disconnect switch having barriers forming spaces in which the poles of the switch are mounted, the switch having arc-extinguishing means in said spaces at one end and a cover mounted on said barriers and substantially covering said spaces except at the arc-extinguishing means.

A further object of the invention is to provide an arc-extinguishing disconnecting switch having butt contacts that are not enclosed by the switch housing in order to give a visible break.

Another object of the invention is to provide an arc-extinguishing disconnecting switch having butt contacts in which there are no sliding or rotating current carrying joints, a flexible conductor having one end brazed to the arm having the contact brazed thereon and the other end brazed to a terminal to provide a solid current path.

The invention both as to structure and operation, together with additional objects and advantages thereof, will be best understood from the following detailed description of several embodiments thereof, when read in conjunction with the accompanying drawings.

In said drawings:

Figure 1 is a top plan view of a switch embodying the principles of the invention.

Fig. 2 is an elevational sectional view taken substantially along line II—II of Fig. 1 and looking in the direction of the arrows.

Fig. 3 is an elevational sectional view of a switch of a somewhat different type.

Fig. 4 is a top plan view of a switch similar to the switch shown in Fig. 3.

Fig. 5 is a perspective view of the switch shown in Fig. 4.

Referring to Fig. 1 of the drawings, the three-pole switch comprises a base **11** of molded insulating material having outer barriers **13** and inner barriers **15** molded integral therewith. The outer barriers **13** and inner barriers **15** extend the length of the base **11** and between them form three closely-spaced recesses or compartments **17** which also extend the length of the base. The ends of the recesses **17** are open and have terminals **19** mounted therein on the base **11**. The terminals **19** are secured to metal inserts **21** which are loosely mounted in the end base portions by means of screws **23**. Disposed at the right-hand end (Fig. 2) of each of the recesses 17 is an angular conducting strap **25** having its outer end secured between the terminal **19** and the insert **21** by means of the screw **23**. At its inner end the strap **25** has brazed thereto a stationary butt contact **27** and the strap **25** is secured to the base **11** by means of screws **29** which also serve to mount an arc runner **31** on the strap **25** adjacent the contact **27**.

Mounted in the center recess or compartment and secured to the base by means of screws **33** is a U-shaped frame **35** which supports the operating mechanism of the switch. Pivotally mounted on the frame **35** by means of a pivot **37** supported in the side members of the frame is a channel-shaped switch member **39** upon which is mounted the moving contact structure. The moving contact structure comprises a contact bar **41** to which is brazed the moving butt contact **42**. Also secured to the contact bar or arm **41** on the side opposite the contact **42** is an angle bracket **43** the upper portion of which has an opening **45** (see Fig. 1) therein through which extends the reduced free end **47** of the switch member **39**. A coil spring **49** compressed between the switch member **39** and the portion of the bracket **43** which is secured to the contact bar **41** provides contact pressure in the closed position of the switch. In the open position of the switch the spring **49** biases the upper end of the opening **45** in the bracket **43** against the switch member and biases the left-hand end of the contact bar **41** against a rod **51** carried in the side portions of the channel-shaped switch member **39**.

One end of a flexible conductor **53** is brazed to one end of the contact arm or bar **41** and the other end of the flexible conductor is mounted on one of the yoke portions **55** of the frame **35**. Also mounted on the yoke **55** in good electrical contact with the flexible conductor **53** in one end is an angular conducting strap **56** having its other end connected to the terminal **19** at the adjacent end of the switch. The flexible conductor **53** and the strap **56** are secured together and to the base **11** by means of a screw **57** and post **59**. The purpose of the post **59**, which is provided in the center pole only of the switch, will be described later. In the outer poles of the switch (Fig. 1) the flexible conductors **53** and the conducting straps **56** are secured together and to the base by means of screws **61**.

A metal tie bar **63** encased in an insulating tube **65** is clamped to the channel-shaped switch member **39** by means of a clamp **67**. The tie bar extends across all three poles of the switch and the switch members **39** (Fig. 1) for the outer two poles are similarly clamped thereto for unitary movement to open and closed positions. Brackets **69** (Fig. 1) disposed in the outer com-

partments adjacent the outer barriers 13 of the base 11 are secured by means of screws 71 to the base and have pivot pins 73 mounted thereon. The pivot pins 73 extend inwardly from the outer barriers 13 and pivotally support the switch members 39 for the outer poles.

In order to provide a greater creepage path and to reduce the danger of flash-over between the poles, insulating creepage discs 75 are mounted on the tie bar in the two outer poles adjacent the inner barriers 15.

The operating mechanism for operating the switch members to open and close the contacts for all of the poles of the switch is supported between the side members of the U-shaped frame 35 in the center compartment comprising the recess between the inner barriers 15. The barriers 15 extending the length of the base have a height of depth almost as great at the operating mechanism. The operating mechanism comprises a pair of toggle links 77 and 79 pivotally connected together by means of a knee pivot pin 81. The toggle link 77 is pivotally connected to the center pole switch member 39 by means of the pin 51 and the toggle link 79 is pivotally supported at a fixed point at its upper end by means of a pin 83 on a fixed toggle support member 85. The toggle support member 85 is mounted at one end on a pin 87 supported in the frame members 35 and is supported at the other end by means of a block 89 mounted on top of the previously described post 59 and rigidly secured thereto by the screw 57.

The toggle 77—79 is operated to effect opening and closing movement of the contacts by means of a U-shaped operating lever 91 and overcenter spring 93 (only one being shown). The legs of the operating lever 91 (only one of which is shown) are pivotally mounted on pins 95 in the side members of the frame 35. The overcenter springs 93 are connected under tension between the knee pivot pin 81 of the toggle 77—79 and the bight 96 of the U-shaped operating lever 91. An insulating operating handle 97 has side portions 99 which are attached by means of screws 101 to the legs of the operating lever 91.

The switch is shown in Fig. 2 in the open position in which the toggle 77—79 is in the collapsed position with the line of action of the overcenter springs 93 to the left of the pivot pin 83 which supports the toggle link 79 on the toggle support member 85. In the open position the switch member 39 for the center pole rests against the pin 87 on which one end of the toggle support member is mounted. In order to close the contacts the handle 97 together with operating lever 91 is moved clockwise about the pivot 95 from the position in which it is shown in Fig. 2. This movement of the operating lever carries the line of action of the spring 93 overcenter to the right (Fig. 2) of the pivot 83 whereupon the force of the overcenter springs 93 straightens the toggle 77—79 and moves the switch members 39 for all of the poles to closed position to close the contacts with a snap action.

In the closed position of the switch the toggle 77—79 is overset thus locking the switch members 39 in the closed position against magnetic blow-off action in response to short-circuit currents. The overset position of the toggle 77—79 is determined by engagement of an arcuate surface 103 on the toggle link 77 with a projection 105 on the toggle support member 85 adjacent the pin 87. The movement of the operating lever 91 to the closed position is limited by engagement thereof with inwardly formed ears 107 (only one being shown) on the frame 35.

The switch is opened by counterclockwise movement of the handle back to the position in which it is shown in Fig. 2. This moves the line of action of the overcenter springs 93 across to the left of the pivot 83 whereupon the force of the springs 93 causes collapse of the toggle 77—79 and simultaneous opening movement of the switch members 39 to open the contacts with a snap action. Opening movement of the operating lever 91 is limited by engagement of a projection 109 on the bight 96 thereof with a shoulder 110 on the toggle support members 85.

Arc extinguishers 106 (Figs. 1 and 2) are provided to extinguish the arc drawn by the separating contacts and are held in place by an insulating bar 102 secured to base 11 by means of screws 104. The arc extinguishers are of the spaced-plate type and comprise generally a stack of slotted plates of magnetic material which are insulated from each other and which are positioned adjacent the path of movement of the moving contact. Following the initiation of an arc incident to the separation of the contacts, the presence of the plates produces a magnetic reaction which causes the arc to move in a direction toward the slots. This movement results in the breaking up of the arc into a plurality of serially connected short arcs as soon as the single arc reaches the ends of the slots, and then causes the extinguishment of the several small arcs. The barriers 15 have a height greater than the stacks of slotted plates to isolate them.

Slotted cross barriers 108 (Figs. 1 and 2) are provided adjacent the arc extinguisher 106 to aid in preventing the hot gases in the arc extinguishers from flowing toward the operating mechanism. The cross barriers 108 are made of insulating material and are inserted in slots molded in the barriers 13 and 15.

In order to prevent accidental contact with the live parts of the switch such as the terminals 19, the clamps 67 for the outer poles, etc., a cover 112 (Figs. 1 and 2) formed from a flat piece of sheet insulating material is provided. The cover 112 is mounted on the side walls 13 of the base 11 by means of spacers 114 and screws 116. The cover 112 covers the lower portion (Fig. 1) of the base from the lower ends of the arc extinguishers 106 or the cross barriers 108 and has an opening 118 therein for accommodating the handle 97. The handle portion 97 is of insulating material and has an extended base portion 98 also of insulation material which extends under the slot or opening 118 and substantially closes it in both the open and closed positions of the switch to protect against accidental contact with live parts of the switch. The cover 112 also has openings 120 and 122 providing access respectively to the terminals 19 at the bottom of the switch and mounting holes 124. As seen in Figs. 1 and 2, the moving contacts are clearly visible with the cover 112 in place.

Referring now to Figs. 3, 4 and 5 of the drawings, there is illustrated a somewhat different form of disconnecting switch for lower currents. The switch (Fig. 3) comprises a base 111 of one piece molded insulating material having outer barriers 113 and inner barriers 115 molded integral therewith. The barriers 113 and 115 between them form three recesses or compartments 117 (Fig. 4) extending the length of the base. The switch mechanism shown in Figs. 3, 4 and 5 is the same, hence, the same parts will be given the same reference characters in these figures. Fig. 3 differs from Figs. 4 and 5 only in that it illustrates a different way of connecting the disconnect switch in an electric circuit. In Fig. 3 the line ends of the several poles of the switch are provided with plug-in type connectors and the load ends are connected directly to terminals or fuse jaws, whereas in Figs. 4 and 5 terminals are provided at each end of the switch in each of the compartments.

Referring to Fig. 3, there is mounted in each of the compartments at the right hand end a conductor strap 119 which is rigidly secured to the base 111 by means of a screw 121 which also secures an arc runner 123 to the conductor strap. A plug-in connector 125 is rigidly mounted on the outer end of the conductor strap 119 and a stationary butt contact 127 is brazed to the inner end of the strap. A cooperating movable butt contact 129 is rigidly mounted by means of a rivet 131 on the free end of a resilient switch arm 133 with one end of a flexible conductor 135 between the contact 129

and the switch arm **133**, the parts being brazed for good electrical contact. The resilient switch arms **133** for the three poles of the switch are arranged for simultaneous operation by means of a pivoted insulating tie bar **137**. The tie bar **137** has pivot pins **139** (Fig. 4) in the ends thereof which extend through openings in bearing bracket **141** mounted on the base **111** adjacent the outer barriers **113** to pivotally support the tie bar **137**. Each of the switch arms **133** is mounted on a bracket **143** rigidly secured to the tie bar **137**. After the tie bar **137** and switch arm assembly are assembled in the base **111**, small barrier members **144** (Fig. 4) are inserted in the openings in which the tie bar was inserted to close these openings.

The tie bar **137** is operated to close and open the contacts by means of a toggle mechanism comprising a pair of toggle links **145** and **147** pivotally connected together by a knee pivot pin **149**. The toggle link **145** is pivotally connected by means of a pivot pin **151** to an arm **153** on the bracket **143** of the center pole and the toggle link **147** is pivoted by means of a pin **155** to a fixed support member **157**. The support member **157** is mounted at one end on a pin **159** supported in a pair of spaced frame members **161** (only one being shown) and restrained at the other end by a pin **163** also supported in the frame member **161**. A U-shaped operating lever **165** having an insulating handle **167** mounted on the bight portion **169** thereof, is pivotally supported in U-shaped recesses **171** in the frame members **161**. Overcenter springs **173** are connected under tension between the bight **169** of the operating lever **165** and the knee pivot pin **149** of the toggle **145—147**.

In the open position of the switch, as shown in Fig. 3, the overcenter springs **173** bias the tie bar **137** counterclockwise to the position shown in which a projection **175** on the bracket **143** for the center pole rests against a stop stud **177** in the frame members **161** which limits the opening movement of the tie bar **137** and the switch arms **133**.

The switch is operated to close the contacts by clockwise movement of the handle **167** from the position shown in Fig. 3. This moves the line of action of the springs **173** over across to the right of the pivot **155** whereupon the force exerted by the overcenter springs extends th etoggle **145—147** to an overset pinion in which the knee pivot pin **149** is in engagement with a projection **179** on the support member **157**. The action of extending the toggle **145—147** rotates the tie bar **137** and simultaneously moves all of the switch arms to closed position to close the contacts with a snap action.

The contacts are opened by reverse movement of the handle **167**, that is, counterclockwise back to the position shown in Fig. 3. This action carries the overcenter springs **173** across to the left of the pivot **155** and the springs then cause collapse of the toggle **145—147** and opening movement of switch arms to open the contacts with a snap action.

The arc drawn when the contacts open is drawn into an arc extinguisher **181** where it is broken up into a plurality of short arcs and extinguished in the manner previously described. The arc extinguisher **181** is similar to the arc extinguisher **106** shown in Fig. 2 except that it is smaller and has fewer slotted plates. The arc extinguishers **181**, there being one for each pole of the switch, are held in place by the screws **121** and the arc runners **123**, the latter being a part of the arc extinguisher.

As more clearly shown in Figs. 4 and 5 cross barriers **183** are molded integral with the base **111** adjacent the arc extinguisher **181**. These cross barriers are slotted to accommodate the switch arms **133**.

Supported in the sides of the arc extinguishers **181** are rods **185** the purpose of which is to stop the opening movement of the resilient switch arms **133**. It is to be noted that the barriers **115** have a height greater than the length of the gap between the separated contacts to prevent arc-over between phases.

Creepage discs **187** and **189** of insulating material are mounted on the tie bar **137** in the outer compartments adjacent the inner barriers **115** to increase the creepage distance between the poles of the switch.

As shown in Fig. 3, the left end of the flexible conductor **135** is brazed to a terminal **191** which, together with a fuse clamp **193**, is secured to a separate fuse base **195** by means of a screw **197**. The contact blade **199** at one end of a fuse **201** is inserted in the clamp **193**. While the fuse **201** is shown broken away it will be understood that the contact blade at the other end thereof may be similarly mounted to connect the fuse **201** in the electrical circuit in series relation with the disconnect switch. By brazing the flexible conductor **135** to the contact member **129** and directly to the separate fuse clamp **193** which is spaced from the base of the disconnect switch a direct solid current path is provided.

A cover **194** (Figs. 3, 4 and 5) is provided for the switch illustrated in these figures. The cover **194** is similar to the cover **112** shown in Figs. 1 and 2 and is formed from a flat sheet of insulating material. However, the cover **194** extends under the entire insulated handle **167** instead of having only the outer end of the handle projecting through the slot in the cover as in Figs. 1 and 2. The cover **194** extends from the lower edges of the arc extinguisher **181** to the lower edge of the base **111** and is provided with an opening **196** for the operating handle mechanism of the switch. The extended base portions **168** of insulation substantially covers the opening **196** in all positions of the handle to guard against contact with live parts of the switch mechanism. The cover **194** is mounted on the base **111** of the switch by means of spacers **198** and screws **200**. Along its lower edge the cover **194** is provided with slots **202** and **204** which provide access respectively to the terminals **209** and a mounting hole **206** in the base **111**. It will be seen from Figs. 4 and 5 that when this cover **194** is in place, protection against accidental contact with the operating mechanism and other live parts of the switch is provided and, at the same time, the moving contacts are clearly visible at least in the open position of the switch.

Fig. 4 illustrates a top plan view with the cover **194** partly broken away showing the operating mechanism and the arc extinguishers shown in Fig. 3 and also shows a different means for connecting the disconnect switch in an electrical circuit. As seen in Fig. 4 the conductor straps **119** and the plug-in connectors **125** of Fig. 3 are replaced by shorter conductor straps **203** on which are secured terminals **205** and both are secured to the base **111** by means of screws (not shown). The flexible conductors **135**, as seen near the bottom of Fig. 4, are brazed to terminal members **207** and these members, together with terminals **209** are rigidly secured to the base **111** by means of screws (not shown).

The invention provides a front-operated, visible-blade, arc-extinguishing disconnecting switch of compact arrangement and high current-interrupting capacity. The operating mechanism is in the center space of three spaces provided by insulating barriers and cross barriers are provided in each space at the arc extinguishers. The switch has no rotating or sliding current carrying joints, a solid current path being provided by brazing one end of a flexible conductor to a terminal and the other end to the arm on which the moving butt contact is brazed. Another advantage of the switch is the provision of butt contacts, the moving contact being visible in the open position to give a visible break. The snap-acting operating mechanism has an overset toggle which in the closed position of the switch locks the contacts closed against being blown open by short circuit currents. Also there is provided an inexpensive cover for protection against accidental contact with live parts of the switch adjacent

the handle without interference with the visibility of the moving contacts.

Having described the invention in accordance with the provisions of the patent statutes, it is to be understood that various changes and modifications may be made therein without departing from some of the essential features of the invention.

I claim as my invention:

1. A switch for controlling an electric circuit comprising a base of one piece molded insulating material, barriers molded integral with said base forming separate compartments, stationary and movable butt contacts in each of said compartments, a movable switch arm in each compartment having the movable butt contact thereon, said compartments being open at the top at least adjacent said contacts so that said contacts are visible from the front of the switch at least in the open position thereof, an arc extinguisher in each compartment, a cross barrier in each compartment adjacent the arc extinguisher, operating mechanism for said switch arms disposed in one of said compartments comprising an overset toggle having one end mounted on a fixed support and adapted to lock said switch arms closed against fault currents, a terminal at one end of said base, and a flexible conductor brazed at one end to said terminal and at the other end to said movable contact forming a solid current path.

2. A three-pole switch for controlling an electric circuit comprising a base of molded insulating material, barriers molded integral with said base forming three recesses therebetween, a pair of stationary and movable butt contacts disposed in each of said recesses, a pivoted switch arm in each of said recesses, said movable butt contacts being brazed on said switch arms, an arc extinguisher in each of said recesses for extinguishing the arc drawn by said pairs of contacts, the top portions of said recesses being fully open at least adjacent said arc extinguishers so that said movable contacts are visible at least in the open position thereof from the front of the switch, cross barriers in said recesses at said arc extinguishers, a compact snap-acting mechanism disposed in the center recess comprising a pair of toggle links one of which is mounted on a fixed support and operable to open and close said contacts with a snap action, said mechanism being non-responsive to abnormal currents to open said contacts, terminals in said recesses at the ends of said base, a flexible conductor in each of said recesses, said flexible conductors being brazed at one end to said switch arms and at the other end to the terminals at one end of said base thereby forming solid current paths.

3. A switch for controlling an electric circuit comprising a base of molded insulating material, barriers molded intergral with said base and forming between them recesses extending the length of said base, a terminal mounted on one end of said base in each of said recesses, said terminals extending beyond said base and having plug-in connections mounted on the outer ends thereof, stationary butt contacts on the inner ends of said terminals, a movable switch arm in each of said recesses each having a movable butt contact brazed thereon for cooperating with said stationary butt contacts to open and close the circuit, arc extinguishing means in each of said recesses, said recesses being fully open across the top adjacent said arc extinguishers so that said movable contacts are visible from the front of the switch, cross barriers in said recesses at said arc extinguishing means, a compact operating mechanism disposed in one of said recesses for simultaneously operating all of said switch arms to open and close said contacts, a separate terminal support member spaced from the other end of said base and having terminals mounted thereon, flexible conductors in said recesses having one end brazed to the switch arms having the movable contacts brazed thereto, and the other ends of said flexible conductors being brazed to the terminals on said separate terminal support member thereby forming solid current paths.

4. A switch for controlling an electric circuit comprising a base of insulating material, insulating barriers on said base forming separate compartments, stationary and movable butt contacts in each of said compartments, a movable switch arm in each compartment having the movable butt contact thereon, an arc extinguisher in each compartment, each of said compartments being open at the top so that said movable contacts and said arc extinguishers are visible from the front of the switch, a cross barrier in each compartment adjacent said arc extinguisher, an operating mechanism disposed in the center compartment comprising an overset toggle having one end mounted on a fixed support and adapted to lock said switch arms closed against excessive currents in the closed position thereof, said insulating barriers being substantially as high as said operating mechanism, an operating handle on said mechanism disposed just above said barriers, a terminal at the end of said base adjacent said operating mechanism, and a flexible conductor brazed at one end to said terminal and at the other end to said movable contact forming a solid current path.

5. A switch for controlling an electric circuit comprising a base of insulating material, insulating barriers on said base forming separate compartments, stationary and movable butt contacts in each of said compartments, a movable switch arm in each compartment having the movable butt contact thereon, each of said compartments being open at the top adjacent said arc extinguisher so that said movable contacts are visible at least in the open position thereof from the front of the switch, an arc extinguisher in each compartment, a cross barrier in each compartment adjacent said arc extinguisher, an operating mechanism disposed in the center compartment comprising an overset toggle having one end mounted on a fixed support and adapted to lock said contacts closed against excessive currents in the closed position thereof, said insulating barriers extending above said base a distance greater than the distance the contacts separate, an operating handle on said mechanism disposed just above said barriers, a terminal at the end of said base adjacent said operating mechanism, and a flexible conductor brazed at one end to said terminal and at the other end to said movable contact forming a solid current path.

6. A switch for controlling an electric circuit comprising a base of insulating material, insulating barriers on said base forming separate compartments, stationary and movable butt contacts in each of said compartments, a movable switch arm in each compartment having the movable butt contact thereon, said compartments being open at the top so that said contacts are visible at least in the open position thereof from the front of the switch, an arc extinguisher in each compartment, a cross barrier in each compartment adjacent said arc extinguisher, an operating mechanism disposed in the center compartment comprising an overset toggle having one end mounted on a fixed support and adapted to lock said movable switch arms closed against excessive currents in the closed position thereof, said insulating barriers being higher than said arc extinguisher, an operating handle on said mechanism disposed just above said barriers, a terminal at the end of said base adjacent said operating mechanism, and a flexible conductor brazed at one end to said terminal and at the other end to said movable contact forming a solid current path.

7. A switch for controlling an electric circuit comprising a base of insulating material, insulating barriers extending the length of said base forming separate compartments, said compartments extending the length of said base and being open at the top and at both ends, stationary and movable butt contacts in each of said compartments adjacent one end thereof, a terminal on said base in one of the open ends of each of said compart-

ments having a connection with said stationary butt contact, a movable switch arm in each of said compartments having the movable butt contact thereon, said switch arm being visible in the open position thereof from the front of the switch, an arc extinguisher in each compartment, said insulating barriers extending at least as high as said arc extinguishers, a compact operating mechanism disposed in the center compartment comprising an overset toggle adapted to lock said movable switch arms closed against abnormal currents, said toggle having one end mounted on a fixed support, a second terminal on said base in the other end of each of said compartments, and a flexible conductor in each compartment having one end brazed to the movable butt contact and the other end brazed to the second terminal to form a solid current path.

8. A switch for controlling an electric circuit comprising a base of one piece molded insulating material, barriers molded integral with said base forming separate compartments, said compartments being open at the top, stationary and movable butt contacts in each of said compartments, a movable switch arm in each compartment having the movable butt contacts thereon, an arc extinguisher in each compartment adjacent one end thereof, a cover plate mounted on said barriers over said compartments at least from said arc extinguishers to the opposite end of said base, said compartments being open over said contacts so that said contacts are visible from the front of said switch at least in the open position thereof, operating mechanism for said switch arms disposed in one of said compartments, said barriers being substantially as high as said operating mechanism, a terminal at one end of said base, and a flexible conductor brazed at one end to said terminal and at the other end to said movable contact forming a solid current path.

9. A three-pole switch for controlling an electric circuit comprising a base of molded insulating material, barriers molded integral with said base forming recesses therebetween, a pair of stationary and movable butt contacts disposed in each of said recesses, a pivoted switch arm in each of said recesses, said movable butt contacts being brazed on said switch arms, a handle member projecting beyond said barriers for operating said movable butt contacts, an arc extinguisher in each of said recesses at one end thereof for extinguishing the arc drawn by said contacts, said barriers extending at least as high as said arc extinguishers, a cover of sheet insulating material mounted on said barriers and covering said recesses beside said handle member, the portions of said recesses at said contacts being open so that said movable contacts are visible at least in the open position thereof from the front of said switch, a snap-acting mechanism disposed in the center recess and operable by said handle member to open and close said contacts with a snap action, terminals in said recesses at the ends of said base, a flexible conductor in each of said recesses, said flexible conductors being brazed at one end to said switch arms, and at the other end to said terminals at one end of said base thereby forming solid current paths.

10. A switch for controlling an electric circuit comprising a base of one piece molded insulating material, insulating barriers on said base forming compartments, stationary and movable butt contacts in each of said compartments, a movable switch arm in each compartment having the movable butt contact thereon, an operating mechanism for said switch arms disposed in the center compartment comprising an overset toggle adapted to lock said switch arms closed against fault currents, said barriers extending above said base a distance greater than said contacts separate, and a cover of a flat sheet insulating material mounted on said barriers and covering the portions of said compartments beside the operating mechanism and leaving exposed the movable contacts so that they are visible from the front of the switch at least in the open position of said switch arms.

11. A switch for controlling an electric circuit comprising a base of one piece molded insulating material, insulating barriers on said base forming separate compartments, stationary and movable butt contacts in each of said compartments, a movable switch arm in each compartment having the movable butt contact thereon, an operating mechanism for said switch arms disposed in the center compartment comprising a handle for moving said switch arms and an overset toggle adapted to lock said switch arms closed against fault currents, an arc extinguisher in each compartment, said barriers extending at least as high as said arc extinguishers, and a cover formed from a flat sheet of insulating material mounted on said barriers and covering the portions of said compartments below said arc extinguishers so that the movable contacts are visible from the front of the switch at least in the open position of said switch arms, said cover having an opening therein through which said handle of the operating mechanism extends and said handle having a base portion of insulating material at said opening.

12. A switch for controlling an electric circuit comprising a base of one piece molded insulating material, insulating barriers on said base forming separate compartments, stationary and movable butt contacts in each of said compartments, a movable switch arm in each compartment having the movable butt contact thereon, operating mechanism for said switch arms disposed in one of said compartments comprising an overset toggle adapted to lock said switch arms closed against fault currents, said barriers being substantially as high as said operating mechanism, an arc extinguisher in each compartment, a cover formed from a flat piece of insulating material mounted on said barriers and covering the portion of said base below said arc extinguishers and leaving said movable butt contacts visible from the front of the switch at least in the open position, terminals at one end of said base, a flexible conductor in each of said compartments, said flexible conductors being brazed at one end to said switch arms and at the other end to said terminals, and said cover having openings therein providing access to said terminals from the front of said switch.

13. A switch for controlling an electric circuit comprising a base of insulating material, insulating barriers on said base forming separate compartments, stationary and movable butt contacts in each of said compartments, a movable switch arm in each compartment having the movable butt contact thereon, a cover formed from a flat piece of insulating material mounted on but spaced from said barriers and covering the lower portion of said base, said compartments being open above said cover so that said contacts are visible from the front of said switch at least in the open position thereof, an arc extinguisher in each of said compartments, and a cross barrier in each of said compartments adjacent said arc extinguishers.

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