July 16, 1946. G. P. CLUTE 2,404,216

ELECTRIC SWITCH

Filed Jan. 11, 1943

Fig. 1.

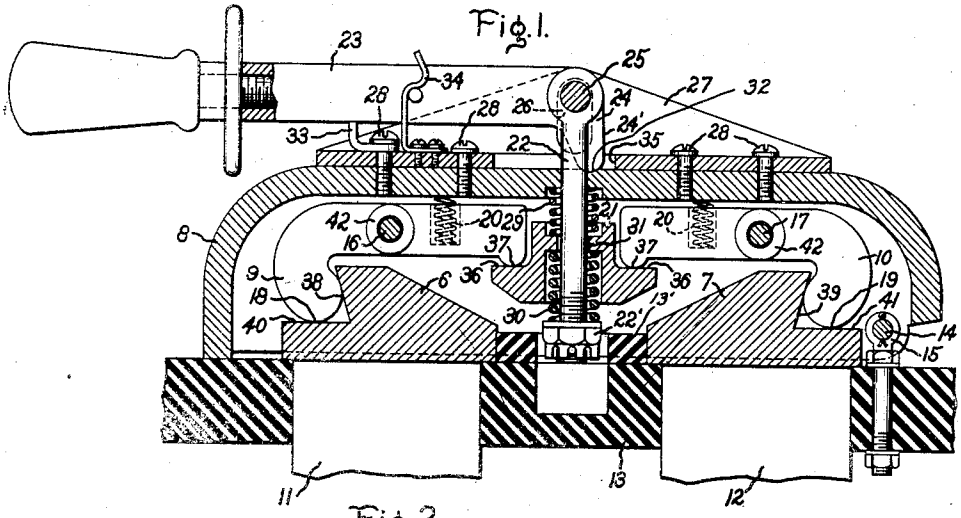


Fig. 2.

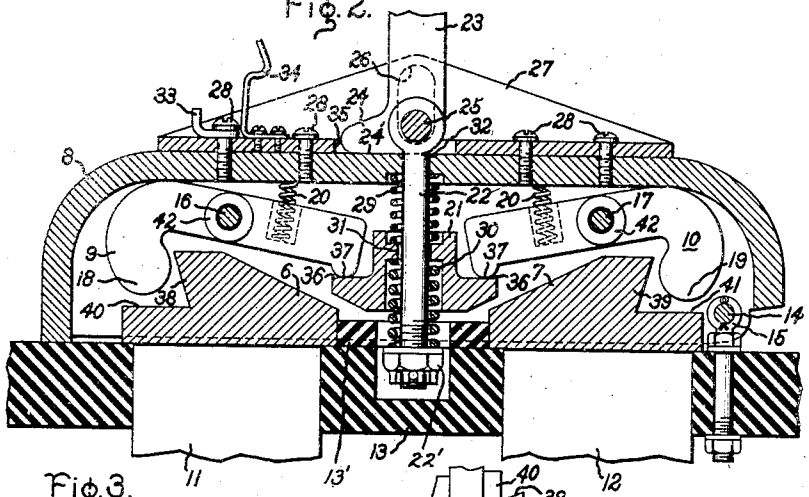


Fig. 3.

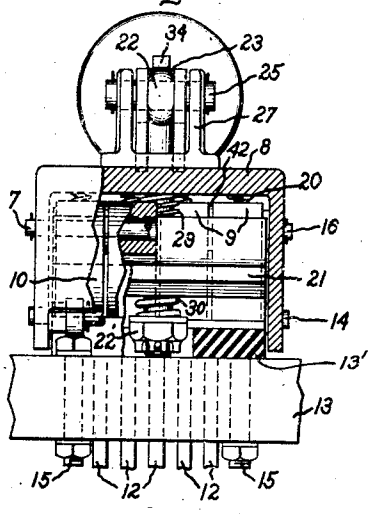
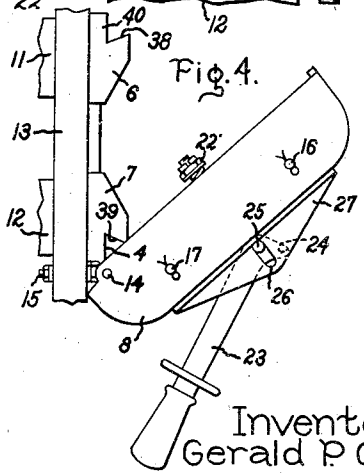


Fig. 4.



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2,404,216

ELECTRIC SWITCH

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Application January 11, 1943, Serial No. 471,925

21 Claims. (Cl. 200—50)

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My invention relates to improvements in electric switches and more particularly to improvements in electric switches having a high current conducting capacity and especially disconnecting switches which carry large currents.

In order to obtain high current conducting capacity in disconnecting switches of the knife blade type, a relatively large number of blades is necessary. The larger the number of blades, the greater the nicety of alignment and contact adjustment required if overheating is to be avoided. Moreover, since relatively high pressure between the sliding contact surfaces is required, the more there are of such surfaces, the more difficult it becomes to operate the switch. In addition, the structure and operation are further involved since it is usually necessary to have some additional or special arrangement not only for providing the required contact pressure but also for holding the switch in the closed position against the magnetic loop expansion effect of high currents. Furthermore, the bulkiness of structure of such knife blade type switches neither lends to their appearance nor invites their application, particularly if switchboard space is limited. Also, all parts of the usual knife blade type of disconnecting switch are exposed to falling objects and to the elements whether the switch is open or closed.

An object of my invention is to provide an improved electric switch having high current conducting capacity. Another object of my invention is to provide an improved electric switch which is relatively easy and simple to operate. Still another object of my invention is to provide an improved electric switch in which the necessary contact pressure and current conducting capacity are readily available and easily maintained without the necessity of refinements in alignment and adjustment. A further object of my invention is to provide an improved electric switch which presents a neat appearance and requires the minimum switch board space for maximum current conducting capacity. Also an object of my invention is to provide an improved electric switch structure which can be assembled in various current conducting capacities with the minimum number of unit parts. A still further object of my invention is to provide an improved electric switch which will not open under the magnetic loop expansion effect of heavy currents. Still another object of my invention is to provide an improved electric switch whose current conducting parts are not exposed to falling objects or the elements, particularly when the switch is in the closed position and substantially so when the switch is in the open position. These and other objects of my invention will hereinafter appear in more detail.

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In accordance with my invention, I provide an improved electric switch having a relatively simple structure which is particularly adapted to the use of high pressure line and point contacts and for carrying large currents. Also in accordance with my invention, I provide an improved electric switch structure which has a single operating member embodying a camming arrangement for opening and closing the switch and helping to maintain the switch in the closed position. Again in accordance with my invention, I provide an improved electric switch whose contact structure embodies a wedging action for helping to obtain the desired contact pressure and also to maintain the switch closed against shocks and jars and the magnetic loop expansion effect of heavy currents. Further in accordance with my invention, I provide an improved high current conducting capacity electric switch which is not only neat in appearance but also requires a relatively small switchboard space for its current conducting capacity and which may also embody as a part of the mechanism a cover or housing for the switch parts.

My invention will be better understood from the following description when considered in connection with the accompanying sheet of drawings, and its scope will be pointed out in the appended claims.

In the accompanying sheet of drawings, Fig. 1 is a longitudinal view, partly in section and partly in elevation, of a switch embodying my invention and shown in the closed position; Fig. 2 is a view similar to Fig. 1 showing the contacts disengaged; Fig. 3 is an end view as seen from the right of Fig. 1 with parts broken away; and Fig. 4 is a side elevation to a smaller scale of a vertical mounting of the switch shown in Fig. 1 with the switch in the full open position.

In the electric switch shown for the purpose of illustrating my invention, two spaced stationary contacts 6 and 7 are arranged to be conductively connected by movable contact means embodying my invention. As shown, this movable contact means comprises a support such as a member 8 which is mounted for movement into switch closable position over the contacts 6 and 7, and two spaced contacts 9 and 10 mounted on the member 8 for movement therewith and relatively thereto into engagement with the contacts 6 and 7, respectively, when the member 8 is in the

switch closable position shown in Fig. 2. The contacts 6 and 7 are mounted on terminals 11 and 12, respectively, which are supported on a base, switchboard or the like 13 of insulating material in any suitable manner, examples of which are well known to the art. In order to provide a covering for the switch parts and particularly the contacts, the member 8 may be in the form of a housing which, as shown, is pivotally supported on a pin 14 adjacent one of the contacts 7, preferably the lower contact, when the switch is vertically mounted, as shown in Fig. 4. The pivot pin 14 may be supported in eye bearing bolts 15 secured to the base 13, as shown.

For movement of the contacts 9 and 10 with and relatively to the housing 8 to complete a conducting path between the contacts 6 and 7, the contacts 9 and 10 are pivotally supported at intermediate points thereof within the housing on pins 16 and 17, respectively. These pins are so positioned that, when the housing 8 is in the circuit closable position shown in Fig. 2, counterclockwise movement of the contact 9 and clockwise movement of the contact 10 will bring the remote ends 18 and 19, respectively, of these contacts into engagement with the stationary contacts 6 and 7, respectively. In order to have the contacts 9 and 10 positioned for these movements and their ends 18 and 19 clear of the contacts 6 and 7 when the housing 8 is moved to and from the switch closable position, the contact 9 is biased for clockwise movement and the contact 10 for counterclockwise movement to the respective positions shown in Fig. 2. For this purpose, biasing springs 20 are provided.

In order to actuate the member or housing 8 to and from the switch closable position and the contacts 9 and 10 to and from the closed circuit position, I provide operating means mounted on the housing and arranged to furnish the necessary mechanical advantage to insure the desired contact pressure. As shown, this operating means comprises an element 21 which is mounted for engagement with the adjacent ends of the contacts 9 and 10 and is adapted to be actuated in one direction to effect engagement of the stationary contacts 6 and 7 by the movable contacts 9 and 10, respectively. For actuating the element 21, it is mounted on a substantially linearly movable support 22 which projects through the housing 8 and is arranged to be actuated by a camming mechanism comprising a handle lever 23 and a suitable cam such as a camming arm 24 rigidly associated therewith. The support 22, the lever 23 and the cam 24 are mounted on a pivot pin 25 which is supported in a slot 26 of a yoke member 27 suitably secured to the housing 8 as by screws 28.

The support 22 is biased to the switch open position by suitable means such as springs 29 and 30 so positioned as to tend to actuate the element 21 away from the housing and yet by means of a separating partition 31 in the element 21 to prevent this element from touching the stationary contacts 6 and 7 when the switch is open while the housing is in the switch closable position. The angular relation of the handle lever 23 and the cam 24 is such that in the switch closed position the direction of the thrust of the springs and the contact load on the support 22 and the pin 25 prevents rotation of the operating lever from the circuit closed position shown in Fig. 1. To accentuate this holding effect, the housing 8 is provided with a receiving notch 32 for the end of the cam 24 as it moves over center

into the holding position. It will be observed that, in the closed position of the switch shown in Fig. 1, the support 22 and the cam 24 form an overset toggle to hold the switch closed. A stop 33 is provided for the handle lever 23 to limit counterclockwise movement of the operating lever. A spring catch 34 may also be provided further to assist in holding the handle lever in the switch closed position. Also as shown, the yoke 27 is provided with a slot 35 in its base to permit movement of the operating cam over the outside face of the housing 8.

Although the movable contacts 9 and 10 may be connected by a flexible conductor, I prefer, in accordance with my invention, to eliminate such an undesirable feature and to rely upon suitable high pressure contact bridging means which is conveniently accomplished by having the element 21 act as a bridging conducting member. For this purpose, it may have plane, silvered contact surfaces 36 which are arranged to engage, for example, silvered cylindrical contact portions 37 on the adjacent ends of the movable contacts 9 and 10. In this way, it is possible to gain the advantages of high pressure line contact. The contact pressure can be varied by changing the position of a retaining nut 22' on the support 22 to vary the compression of the spring 30. The contact portions 37 could be spherical to provide high pressure point contact if desired. To prevent any material wobble of the lower end of the support 22 and its retaining unit 22' and yet permit the necessary linear movement thereof, the base 13 may be recessed as shown and a supplemental insulating spacer 13' provided. Obviously, the shapes of the contact surfaces 36 on the elements 21 and 37 on the contacts 9 and 10 could be reversed. In order to obtain high current conducting capacity, the ends 18 and 19 of the contacts 9 and 10 may be cylindrical and silvered to maintain line pressure contact of the contacts 6 and 7.

As shown, the contacts 6 and 7 have flaring plane faces 38 and 39, respectively, which, in order to prevent opening of the switch by shocks and jars and the magnetic loop expansion effect, are engaged by the contact ends 18 and 19 below the zone of maximum flare in the switch closed position. This provides a wedging contact action or claw-like grip of the contacts to prevent any possible slipping off of the contacts 9 and 10 from the contacts 6 and 7. In order to insure this wedging action and also provide a suitable seating action for the contacts in the closing operation, the contacts 6 and 7 may be notched with the notches opening away from each other with the angle between two corresponding notch faces 38, 39 less than 90°. In this case, the notch faces 40 and 41 provide a bearing or seat for lining up the switch conducting parts and, in addition, give additional line contact engagement.

With this arrangement, it will be observed that the ratio between the length of the handle lever 23 and the length of the operating cam 24 provides a powerful mechanical advantage to insure high pressure between all of the contact faces and, therefore, high current conducting capacity. Moreover, with the structure herein disclosed, current carrying capacity can be varied with a relatively few switch elements by mounting several of the contacts 9 and 10 side by side, as shown more clearly in Fig. 3, rather than using a single solid block of varying widths depending upon the current conducting capacity required. The separate elements not only provide greater flex-

ibility in assembling switches of different current conducting capacities but also reduce the refinements necessary to insure the best line contact engagement. When several contact segments are arranged side by side, as shown in Fig. 3, it is desirable to separate the segments by insulating washers **42** in order to prevent transfer of current from one segment to an adjacent segment by reason of the pulling together of adjacent segments from the forces due to currents traveling in the same direction through two parallel conductors.

Assuming the parts positioned as shown in Fig. 2, then counter clockwise movement of the handle lever **23** moves the bridging contact element **21** to the position shown in Fig. 1. During this movement, the contacts **9** and **10** are turned into engagement with the notches in the contacts **6** and **7**, and the cam **24** goes over center into the pocket **32** in the housing **8** with the parts now positioned as shown in Fig. 1 to maintain the switch closed under any opening effects due to shocks, jars or magnetic loop expansion. To open the switch, the operating lever is turned clockwise to the position shown in Fig. 2. This permits the bridging contacts **21** and the parts associated therewith to move to the open circuit position shown in Fig. 2 under the bias of the springs **20**, **29** and **30**. By pulling outwardly on the handle lever **23**, the housing **8** and parts carried thereby may be moved to the position shown in Fig. 4. To return the housing to the switch closable position, the handle lever may be turned counter clockwise until the edge **24'** on the cam **24** squarely abuts the housing **8**, and then the handle lever acts as a strut to move the housing to the switch closable position with the free end of the housing abutting the base **13**. In this position, the switch can be closed as described.

While I have shown and described my invention in considerable detail, I do not desire to be limited to the exact arrangement shown, but seek to cover in the appended claims all those modifications that fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. An electric switch comprising two spaced stationary contacts and means for conductively connecting said contacts comprising a member supported for movement into switch closable position over the contacts, two spaced contacts pivotally mounted on said member for movement therewith and relatively thereto into engagement with said two stationary contacts respectively when the member is in the switch closable position, and means carried by said member and adapted to be operated to move the remote ends of said pivotally mounted contacts into engagement with said stationary contacts when the member is in the switch closable position.

2. An electric switch comprising two spaced stationary contacts and means for conductively connecting said contacts comprising a member supported for movement into switch closable position over the contacts, two spaced contacts pivotally mounted on said member for movement therewith and relatively thereto into engagement with said two stationary contacts respectively when the member is in the switch closable position, and means carried by said member and adapted to be operated to move the member to and from the switch closable position and to move the remote ends of said pivotally mounted contacts into engagement with said stationary contacts when the member is in the switch closable position.

3. An electric switch comprising two spaced stationary contacts and means for conductively connecting said contacts comprising a member supported for movement into switch closable position over the contacts, two spaced contacts each pivotally mounted at an intermediate point thereof on said member for movement therewith and relatively thereto into engagement with said two stationary contacts respectively when the member is in the switch closable position, means tending to prevent engagement of said stationary contacts by said movable contacts, operating means carried by said member and adapted to be operated to move the member to and from the switch closable position, and means engageable with the adjacent ends of said pivotally mounted contacts and actuatable by said operating means to move the remote ends of said pivotally mounted contacts into engagement with said stationary contacts when the member is in the switch closable position.

4. An electric switch comprising two spaced stationary contacts and means for conductively connecting said contacts comprising a housing pivotally supported adjacent one of said contacts for movement into switch closable position over the contacts, two spaced contacts pivotally mounted within said housing for movement therewith and relatively thereto into engagement with said two stationary contacts respectively when the housing is in the switch closable position, means within said housing tending to prevent engagement of said stationary contacts by said movable contacts, and means carried by said housing and adapted to be operated to move the housing to and from the switch closable position and to move said movable contacts into engagement with said stationary contacts when the housing is in the switch closable position.

5. An electric switch comprising two spaced stationary contacts and means for conductively connecting said contacts comprising a member supported for movement into switch closable position over said stationary contacts, two spaced contacts mounted on said member for movement therewith and relatively thereto into engagement with said two stationary contacts respectively when the member is in the switch closable position, means tending to prevent engagement of said stationary contacts by said movable contacts, and means carried by said member and adapted to be operated to move the member to and from the switch closable position and to move said movable contacts into engagement with said stationary contacts when the member is in the switch closable position comprising a current conducting element movably mounted on said member and engageable with both of said movable contacts and means for maintaining said movable contacts and said element in the switch closed position.

6. An electric switch comprising two spaced stationary contacts and means for conductively connecting said contacts comprising a member supported for movement into switch closable position over said stationary contacts, two spaced contacts mounted on said member for movement therewith and relatively thereto into engagement with said two stationary contacts respectively when the member is in the switch closable position, means tending to prevent engagement of said stationary contacts by said movable contacts,

and an element mounted on said member for movement in one direction to actuate said movable contacts into engagement with said stationary contacts, means biasing said element for movement in the opposite direction, and an actuator pivotally supported on said member and provided with a camming crank movable over said member and operable upon rotation of the actuator in one direction to move said element in the direction to effect the circuit closing operation of said contacts and to maintain the element in the circuit closing position against the bias thereon, said crank being rotatable in the opposite direction to release said contacts for movement to the open circuit position under the bias thereon and to be movable as a unit with said member to effect movement thereof from the circuit closable position.

7. An electric switch comprising two spaced stationary contacts and means for conductively connecting said contacts comprising a housing pivotally supported adjacent one of said contacts for movement into switch closable position over the contacts, two spaced contacts pivotally mounted within said housing for movement therewith and relatively thereto into engagement with said two stationary contacts respectively when the housing is in the switch closable position, means within said housing tending to prevent engagement of said stationary contacts by said movable contacts, a current conducting element movably mounted within the housing and engageable with said contacts and upon movement in one direction to move the contacts into engagement with said stationary contacts when the housing is in the switch closable position, means biasing said element for movement in the opposite direction, an operating lever pivotally supported on the outside of said housing, and a camming crank movable with said operating lever and engageable with said housing, said crank being constructed and arranged to move said element in the direction to effect the circuit closing operation of said contacts upon rotation of the operating lever in one direction and to maintain the element in the circuit closing position against the bias thereon and said operating lever being rotatable in the opposite direction to release said contacts for movement to the open circuit position and movable as a unit with said housing to effect movement thereof from the circuit closable position.

8. An electric switch comprising two spaced stationary flaring contact surfaces and means for conductively connecting said surfaces comprising a member supported for movement into switch closable position over said surfaces, two spaced contacts mounted on said member for movement therewith and relatively thereto into engagement with said two contact surfaces respectively below the zone of maximum flare thereof when the member is in the switch closable position, means tending to prevent movement of said contacts into engagement with the respective contact surfaces, and means carried by said member and adapted to be operated to move the member to and from the switch closable position and to move said contacts into engagement with the respective contact surfaces when the member is in the switch closable position comprising a current conducting element movably supported on said member and engageable with both of said contacts to effect movement thereof.

9. An electric switch comprising two spaced stationary flaring contact surfaces and means for conductively connecting said surfaces comprising a member supported for movement into switch closable position over said surfaces, two spaced contacts mounted on said member for movement therewith and relatively thereto into engagement with said two contact surfaces respectively below the zone of maximum flare thereof when the member is in the switch closable position, means tending to prevent movement of said contacts into engagement with the respective contact surfaces, and means carried by said member and adapted to be operated to move the member to and from the switch closable position and to move said contacts into engagement with the respective contact surfaces when the member is in the switch closable position comprising a current conducting element movably supported on said member and engageable with both of said contacts and means on said member adapted to be operated to actuate said element in a direction to move said contacts into engagement with the respective contact surfaces.

10. An electric switch comprising two spaced stationary flaring contact surfaces and means for conductively connecting said surfaces comprising a member supported for movement into switch closable position over said surfaces, two spaced contacts mounted on said member for movement therewith and relatively thereto into engagement with said two contact surfaces respectively below the zone of maximum flare thereof when the member is in the switch closable position, means tending to prevent movement of said contacts into engagement with the respective contact surfaces, and means carried by said member and adapted to be operated to move the member to and from the switch closable position and to move said contacts into engagement with the respective contact surfaces when the member is in the switch closable position comprising a current conducting element movably supported on said member and engageable with both of said contacts and means on said member adapted to be operated to actuate said element in a direction to move said contacts into engagement with the respective contact surfaces including means for maintaining said element and said contacts in the closed circuit position.

11. An electric switch comprising two spaced stationary flaring contact surfaces and means for conductively connecting said surfaces comprising a member supported for movement into switch closable position over said surfaces, two spaced contacts mounted on said member for movement therewith and relatively thereto into engagement with said two contact surfaces respectively below the zone of maximum flare thereof when the member is in the switch closable position, means tending to prevent movement of said contacts into engagement with the respective contact surfaces, and means for moving said contacts into engagement with the respective contact surfaces when said member is in the switch closable position comprising a current conducting element movably supported on said member and engageable with both of said contacts and means carried by said member and adapted to be operated to actuate said element in a direction to move said contacts into engagement with the respective contact surfaces, means tending to move said element in the opposite direction, and means for preventing movement of said element in said opposite direction

when the contacts are in the closed circuit position.

12. An electric switch comprising two spaced stationary flaring contact surfaces and means for conductively connecting said surfaces comprising a member pivotally supported adjacent one of the surfaces for movement into switch closable position over said surfaces, two spaced contacts each pivotally supported at an intermediate point thereof on said member for movement of their remote ends into engagement with said two contact surfaces respectively below the zone of maximum flare thereof when the member is in the switch closable position, means biasing said contacts for movement in a direction to prevent engagement of their remote ends with the respective contact surfaces, and means adapted to be operated to move the remote ends of said contacts into engagement with the respective contact surfaces when said member is in the switch closable position comprising a current conducting element movably supported on said member and engageable with the adjacent ends of said contacts and means on said member adapted to be operated to actuate said element when said member is in the switch closable position in a direction to move the remote ends of said contacts into engagement with the respective contact surfaces, means biasing said element for movement in the opposite direction, and means for preventing movement of said element in said opposite direction when the element and said contacts are in the closed circuit position.

13. An electric switch comprising two spaced stationary flaring contact surfaces and means for conductively connecting said surfaces comprising a housing pivotally supported adjacent one of the contact surfaces for movement into switch closable position over said surfaces, two spaced contacts each pivotally supported at an intermediate point thereof within said housing for movement of their remote ends into engagement with said two contact surfaces respectively below the zone of maximum flare thereof when the housing is in the switch closable position, means within said housing biasing said contacts for movement in a direction to prevent engagement of the remote ends with the respective contact surfaces, and means on said housing adapted to be operated to move the remote ends of said contacts into engagement with the respective contact surfaces when said housing is in the switch closable position comprising a current conducting element movably supported within said housing and engageable with the adjacent ends of said contacts and means on said housing adapted to be operated to actuate said element when the housing is in the switch closable position in a direction to move the remote ends of said contacts into engagement with the respective contact surfaces.

14. An electric switch comprising two spaced stationary flaring contact surfaces and means for conductively connecting said surfaces comprising a member pivotally supported adjacent one of the contact surfaces for movement into switch closable position over said surfaces, two spaced contacts each pivotally supported at an intermediate point thereof on said member for movement of their remote ends into engagement with said two contact surfaces respectively below the zone of maximum flare thereof when the member is in the switch closable position, means biasing said contacts for movement in a direction to prevent engagement of their remote ends with the respective contact surfaces, and means adapted to be operated to move the remote ends of said contacts into engagement with the respective contact surfaces when said member is in the switch closable position comprising a current conducting element movably supported on said member and engageable with the adjacent ends of said contacts and means on said member adapted to be operated to actuate said element when said member is in the switch closable position in a direction to move the remote ends of said contacts into engagement with the respective contact surfaces including means for maintaining the element and the contacts in the closed circuit position.

15. An electric switch comprising two spaced stationary contacts each provided with an angular notch, the positioning of said contacts being such that the notches open away from each other with the angle between two corresponding notch faces less than 90°, and means for conductively connecting said contacts comprising a member supported for movement into switch closable position over the contacts, two spaced contacts mounted on said member for movement therewith and relatively thereto into wedging engagement with the notches of said stationary contacts respectively when said member is in the switch closable position, and means carried by said member and adapted to be operated to move the member to and from the switch closable position and to move said movable contacts into high pressure engagement with the sides of the notches of said stationary contacts when the member is in the switch closable position.

16. An electric switch comprising two spaced stationary contacts each provided with an angular notch, the positioning of said contacts being such that the notches open away from each other with the angle between two corresponding notch faces less than 90°, and means for conductively connecting said contacts comprising a member pivotally supported adjacent one of said contacts for movement into switch closable position over the contacts, two spaced contacts each pivotally supported at an intermediate point thereof on said member for movement of their remote ends into wedging engagement with the notches of said stationary contacts respectively when said member is in the switch closable position, and means carried by said member and adapted to be operated to move the member to and from the switch closable position and to move said movable contacts into high pressure engagement with the sides of the notches of said stationary contacts when the member is in the switch closable position comprising a current conducting element movably supported on said member and engageable with the adjacent ends of said movable contacts.

17. An electric switch comprising two spaced stationary contacts each provided with an angular notch, the positioning of said contacts being such that the notches open away from each other with the angle between two corresponding notch faces less than 90°, and means for conductively connecting said contacts comprising a member pivotally supported adjacent one of said contacts for movement into switch closable position over the contacts, two spaced contacts each pivotally supported at an intermediate point thereof on said member for movement of their remote ends into wedging engagement with the notches of said stationary contacts respectively when said member is in the switch closable position and means

carried by said member and adapted to be operated to move the member to and from the switch closable position and to move said movable contacts into high pressure engagement with the sides of the notches of said stationary contacts when the member is in the switch closable position comprising a current conducting element movably supported on said member and engageable with the adjacent ends of said movable contacts, means biasing said element for movement in the opposite direction and means for preventing movement of said element in said opposite direction when the contacts are in the closed circuit position.

18. An electric switch comprising two spaced stationary contacts and means for conductively connecting said contacts comprising a support, two spaced contacts pivotally mounted on said support for movement relatively thereto into engagement with said two stationary contacts respectively, and means carried by said support and adapted to be operated to bridge the adjacent ends of said pivotally mounted contacts and thereby to move their remote ends into engagement with said stationary contacts.

19. An electric switch comprising two spaced stationary contacts and means for conductively connecting said contacts comprising a support, two spaced contacts each pivotally mounted at an intermediate point thereof on said support for movement relatively thereto into engagement with said two stationary contacts respectively, means tending to prevent engagement of said stationary contacts by said movable contacts, means movably mounted on said support comprising an element engageable with the adjacent ends of said pivotally mounted contacts, and means adapted to be operated to actuate said element to move the remote ends of said pivotally mounted contacts into engagement with said stationary contacts.

20. An electric switch comprising two spaced stationary flaring contact surfaces and means for conductively connecting said surfaces comprising a support mounted adjacent thereto, two spaced contacts mounted on said support for movement relatively thereto into engagement with said two contact surfaces respectively below the zone of maximum flare thereof, means tending to prevent movement of said contacts into engagement with the respective contact surfaces, and means carried by said support and adapted to be operated to move said contacts into engagement with the respective contact surfaces comprising a current conducting element movably mounted on said support and engageable with both of said contacts.

21. An electric switch comprising two spaced stationary contacts, a member supported for movement into switch closable position over said stationary contacts, two spaced contacts mounted on said member for movement therewith and relatively thereto into engagement with said two stationary contacts respectively when the member is in the switch closable position, means tending to prevent engagement of said stationary contacts by said movable contacts, a support reciprocably mounted on said member, an element positioned on said support for engagement with said movable contacts and movable in one direction of movement of said support to actuate said movable contacts into engagement with said stationary contacts, means biasing said support and said element for movement in the opposite direction, and an actuator pivoted on said support and having an arm movable over said member upon rotation of the actuator in one direction to effect movement of the support in the circuit closing direction, said arm forming with the support an overset toggle to maintain said element in the circuit closing position against the bias thereon.

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