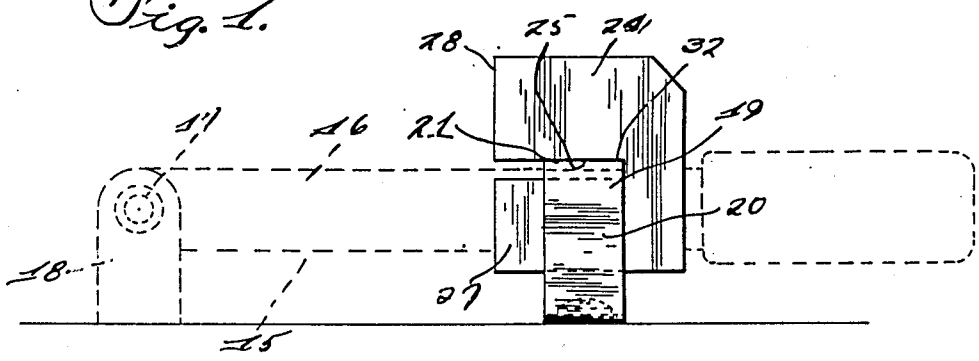
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ARC SUPPRESSOR

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Fig. 1.



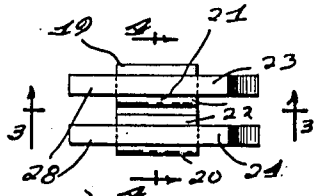


Fig. 2.

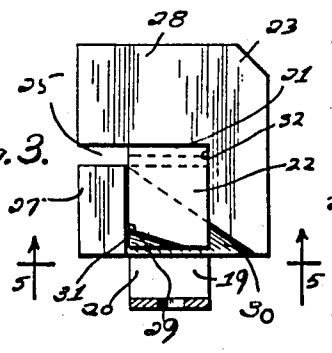


Fig. 3.

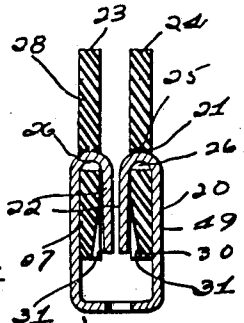


Fig. 4.

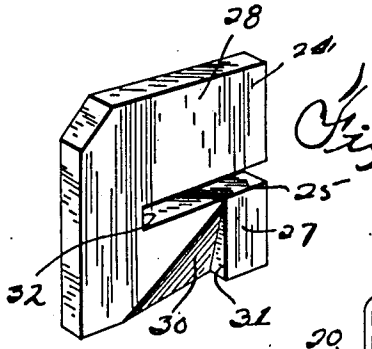


Fig. 6.

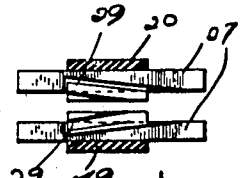


Fig. 5.

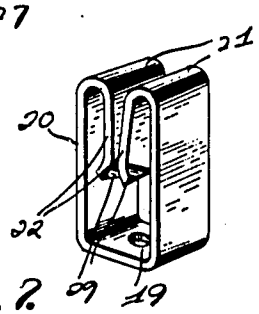


Fig. 7.

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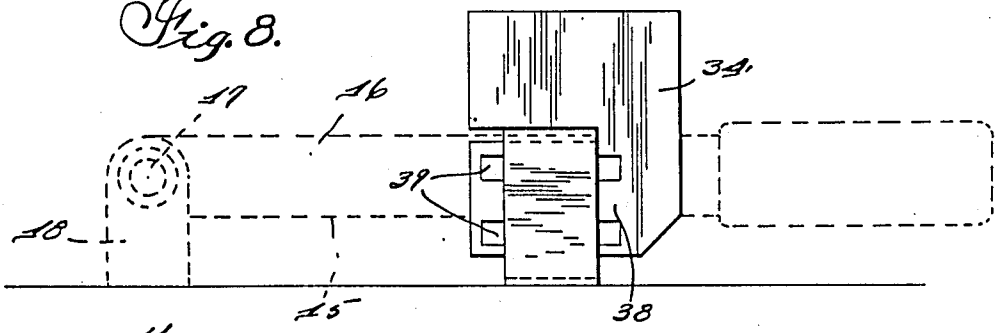
ATTORNEYS

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Fig. 8.



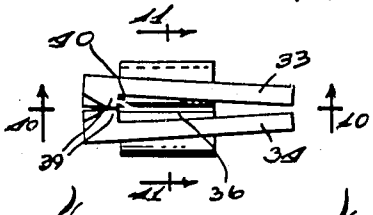


Fig. 9.

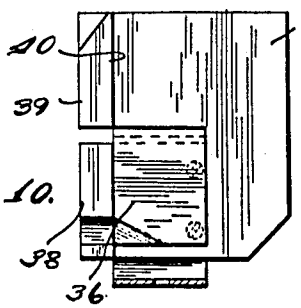


Fig. 10.

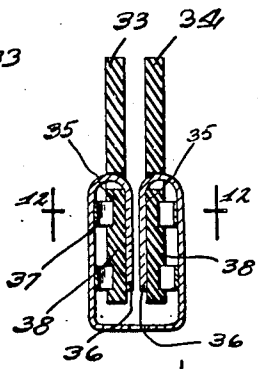


Fig. 11.

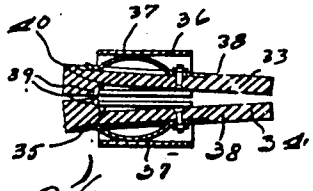
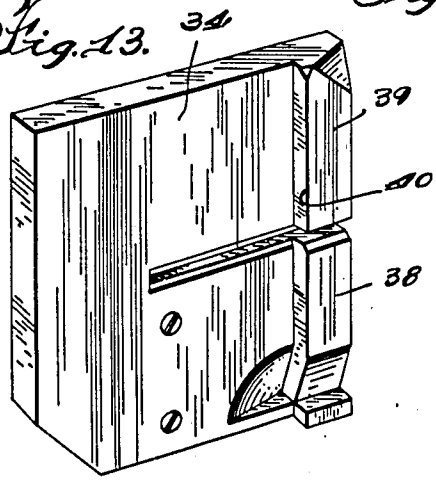


Fig. 12.

Fig. 13.



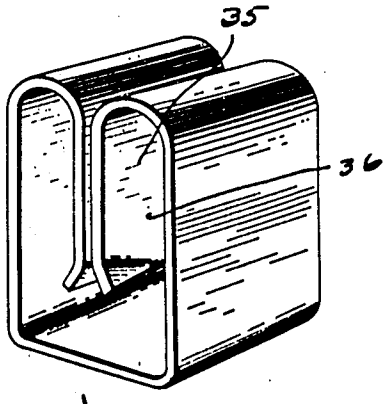


Fig. 14.

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Patented Feb. 21, 1933 1,898,128

UNITED STATES PATENT OFFICE

JOHN G. JACKSON AND WALLACE T. ALLEN, OF DETROIT, MICHIGAN, ASSIGNORS TO SQUARE D COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN

ARC SUPPRESSOR

Application filed October 28, 1929. Serial No. 403,024.

This invention relates generally to apparatus for making and breaking a circuit, and more particularly to means associated with apparatus of the above character for suppressing the arc caused upon breaking the circuit.

The invention, while capable of use in connection with various types of make and break apparatus, finds particular utility when used in connection with throw switches commonly known in the trade as knife switches, and to this end the invention consists in the provision of arc suppressing plates attachable to the opposed knife contacting jaws of the switch and spaced apart sufficiently to receive the knife portions therebetween.

A further advantageous feature of the present invention which contributes materially to the commercial value and acceptability of the invention, resides in the novel and expeditious manner in which the arc suppressing plates may be attached to the conventional jaws of the switch without replacing any of the parts thereof.

The foregoing object may be obtained by various specific constructions, some of which are illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevational view of a switch equipped with arc suppressors constructed in accordance with this invention.

Figure 2 is a plan view of the arc suppressor plates showing the same in assembled relation with the blade contact clip.

Figure 3 is a sectional view taken on the plane indicated by the line 3—3 of Figure 2.

Figure 4 is a sectional view taken on the plane indicated by the line 4—4 of Figure 2.

Figure 5 is also a sectional view taken on the plane indicated by the line 5—5 of Figure 3.

Figure 6 is a perspective view of one of the arc suppressing plates.

Figure 7 is a perspective view of the blade contact clip.

Figure 8 is a view similar to Figure 1 showing a slightly modified form of construction.

Figure 9 is a fragmentary plan view of the construction shown in Figure 8.

Figures 10 and 11 are sectional views taken respectively on the lines 10—10 and 11—11 of Figure 9.

Figure 12 is a sectional view taken on the plane indicated by the line 12—12 of Figure 11.

Figure 13 is a perspective view of one of the arc suppressor plates; and

Figure 14 is a perspective view of the plate contact clip.

Referring now to the specific embodiment of the invention illustrated in Figures 1 to 7 inclusive, the numeral 15 designates a throw switch of any suitable construction comprising a blade 16 having one end thereof pivotally mounted as at 17 to a lug 18 and having a portion intermediate the ends thereof engageable with a contact member 19. As shown in Figure 7, the contact member is substantially U-shaped having laterally spaced legs 20 return bent toward each other as at 21 to form contacting jaws 22 for clamping the switch blade therebetween.

When switches of the above character are used on high voltage lines, it is highly desirable that some means be provided for suppressing the arc caused when disconnecting the blade 16 from the contact jaws. In the present invention, this is accomplished by securing two plates, 23 and 24 to the clip 19 in spaced relation to each other so as to permit the passage of the blade 16 therebetween. The plates project a substantial distance beyond the jaws 22 of the clip so that when disconnecting the blade 16 from the jaws, the arc caused thereby will be confined and suppressed by the adjacent surfaces of the plates 23 and 24. In detail, the plates 23 and 24 are formed intermediate their opposite edges with elongated slots 25 for receiving the return curved portions 21 of the jaws. The arrangement is such as to position the lower portions 27 of the plates intermediate the jaws 21 and the adjacent faces of the legs 20 and to permit the upper portions 28 of the plates to project a substantial distance beyond the upper edges of the jaws.

In order to secure the plates 23 and 24 to the contact member 19 and at the same time insure proper clearance between the plates

for the blade, the end portions of the jaws 22 are flared outwardly as indicated at 29 in Figures 5 and 7 so as to engage within corresponding recesses 30 formed in the plates 23 and 24 adjacent the bottom thereof. The recesses 30 are so fashioned as to form the shoulders 31 engageable with the edges of flared portions 29, thereby restricting movement of the plates relative to the jaws. Thus it will be observed that longitudinal movement of the plates relative to the jaws is restricted in one direction by engagement of the curved portions 21 of the jaws with the rear walls 32 of the slots 26 and in the other direction by the engagement of the flared portions 29 with the shoulders 31 formed on the jaws and plates 23 and 24 respectively. The construction is such, however, that while the plates 23 and 24 are secured to the contact member 19 by the jaws 22, they are permitted of slight angular movements relative to each other and to the clip so as not to bind and impair the operation of the switch.

Referring now to the modified form of construction illustrated in Figures 8 to 14 inclusive, it will be noted that the only material differences between this construction and the one previously described are first, that the arc suppressing plates 33 and 34 in the modified form of construction are normally resiliently maintained in engagement with the inner surfaces 35 of the contacting jaws 36 by means of the leaf spring 37 carried by the lower portions 38 of the plates; and second, that the plates 33 and 34 are provided with inwardly extending portions 39 arranged in juxtaposition to each other so as to provide in effect a separable wall 40 arranged to cut off the path of the arc direct to the blade and thereby snuff the arc before it has a chance to damage the blade.

Thus from the foregoing, it will be apparent that we have provided means for confining and suppressing the arc of a knife switch distinguished by its simplicity of construction and the expeditious manner in which it may be applied to switches as now commercially produced without materially altering or replacing any of the parts thereof.

What we claim as our invention is:

1. A switch having in combination, a movable blade, a contact member having jaws for engaging a portion of the blade, and arc suppressing plates arranged to permit passage of the blade therebetween and having shoulders thereon engageable with portions of said jaws for securing the plates in assembled position upon the contact member.

2. A switch having in combination, a movable blade, a contact member having jaws for engaging a portion of the blade, arc suppressing plates arranged in spaced relation upon the contact member to permit free passage of the blade therebetween and having shoulders, and means for holding said plates in position upon the contact member including portions upon said jaws flared into engagement with the shoulders on the respective plates.

3. A switch having in combination, a pivotally mounted blade, a substantially U-shaped contact member having leg portions return bent toward each other at the outer ends thereof and terminating in laterally spaced portions for reception therebetween of the blade aforesaid, plates arranged in spaced relation to each other having portions interposed between the portions aforesaid and the respective legs of the U-shaped contact member and having other portions arranged in alignment with and in the plane of the first mentioned portions of the plates and extending beyond the first mentioned portions to form arc suppressing surfaces.

4. A switch having in combination, a movable blade, a contact member having jaws for receiving a portion of the blade, and arc suppressing means carried by the contact member and including plates arranged to permit passage of the blade therebetween and having shoulders thereon, and shoulders upon said jaws engageable with the shoulders aforesaid for holding the plates in assembled position upon the contact member.

5. A switch having in combination, a pivotally mounted blade, a contact member having jaws for receiving a portion of the blade, and arc suppressing plates arranged to permit passage of the blade therebetween and having spaced shoulders thereon engageable with spaced portions of the jaws to hold the plates in proper assembled relation upon the contact member.

6. A switch having in combination, a movable blade, a substantially U-shaped contact member having leg portions return bent toward each other at the outer ends thereof and terminating in contact portions for engaging the blade therebetween, plates arranged in spaced relation to each other having portions interposed between the contact portions aforesaid and the respective legs of the U-shaped contact member and having other portions arranged in alignment with and in the plane of the portions aforesaid of the plates to form arc suppressing surfaces, and yieldable means interposed between the legs of the U-shaped contact member and plates for urging portions of the latter into engagement with each other.

7. A switch having in combination, a movable blade, a contact member having jaws for engaging a portion of the blade therebetween, arc suppressing plates carried by said jaws in juxtaposition to each other and yieldable means engaging portions of said contact member and plates for normally urging the latter into engagement with said jaws.

8. A switch having in combination, a movable blade, a substantially U-shaped contact member having leg portions return bent to-

ward each other at the outer ends thereof and terminating in contact jaws for engaging the blade therebetween, plates arranged in spaced relation to each other having portions interposed between the contact portions aforesaid and the respective legs of the U-shaped contact member and having other portions arranged in alignment with and in the plane of the portions aforesaid of the plates to form arc suppressing surfaces, and means associated with the plates and legs of the U-shaped contact member for pressing portions of the plates together and for resisting separation thereof when a blade is received between the jaws.

9. A switch having in combination, a movable blade, a substantially U-shaped contact member having leg portions curved inwardly toward each other and terminating in downwardly extending portions for receiving therebetween a portion of said blade, and arc suppressing plates having slots therein intermediate opposite ends thereof receiving the inwardly curved portions of the contact member whereby portions of said plates extend beyond the contact member and other portions of said plates extend between the legs of the U-shaped contact member and the downwardly extending portions aforesaid.

10. A switch having in combination, a movable blade, a contact member having jaws for receiving a portion of the blade, arc suppressing plates arranged to permit passage of the blade therebetween, cooperating shoulders upon the jaws and plates for engaging each other to hold the plates in assembled position upon the jaws, and yieldable means acting upon said plates to normally hold said shoulders in engagement.

11. A switch having in combination, a movable blade, a contact member having jaws for receiving a portion of the blade and provided with outwardly flared portions, and means for suppressing the arc caused by movement of the blade out of engagement with said jaws, said means including plates formed of insulating material arranged upon opposite sides of the path of travel of the blade and having notched portions for receiving the flared portions aforesaid of the jaws to hold the plates in assembled relation with the jaws.

12. In combination, a substantially U-shaped member having the arms of the U return bent inwardly and providing substantially parallel switch contacts, and substantially flat plates of insulating material having slots intermediate their ends receiving the return bent portions aforesaid, and having the inner end portions thereof between the arms and the inturned portions aforesaid, whereby the outer end portions of the plates will be spaced uniformly apart to function as arc suppressors.

13. In combination, a pair of substantially parallel arc suppressor plates, and a U-shaped member receiving said plates, having portions extending through said plates and having other portions upon the inner sides of said plates constituting switch contacts and cooperating with the sides of the U to maintain uniform spacing between said plates.

14. In an electric switch, a fixed contact element having movable portions, a movable contact element having means for engaging the movable portions of the fixed element, and plates of insulating material forming a constantly open path in the direction of travel of the movable element for the arc created upon movement of said element relative to the fixed element, said plates being mounted directly upon and carried solely by the movable portions of the fixed contact element so as to be movable with such portions relative to each other, and being constructed and arranged in such a way that they will confine and direct the arc in the plane of movement of the movable element.

15. In an electric switch, a fixed contact element having movable portions, a movable contact element having means for engaging the movable portions of the fixed element, and plates of insulating material interlocked with the movable portions of the fixed contact element so as to be movable therewith toward and away from each other, said plates being constructed and arranged to provide a constantly open path in the plane of travel of the movable element for the arc created upon movement of said movable element from the fixed element and tending to confine and direct the arc so as to prevent back and lateral fastening.

16. In an electric switch, a fixed contact element, a movable contact element having means for engaging a part of the fixed element, and means effective upon movement of the movable element relative to the fixed element to provide a path in the plane of travel of said movable element for the arc created and tending to confine and direct the same so as to prevent back and lateral flashing, including means under the control of and carried solely by the fixed contact element aforesaid.

17. In an electric switch, a fixed contact element, a movable contact element having means for engaging a part of the fixed element, and means effective upon movement of the movable element relative to the fixed element to provide a path in the plane of travel of said movable element for the arc created and tending to confine and direct the same so as to prevent back and lateral flashing, including plates of insulating material having means receiving parts of the fixed contact element aforesaid.

18. In an electric switch, a fixed contact element having movable portions, a movable contact element having means engageable with said movable portions, and means effec-

tive upon movement of the movable element relative to the fixed element to provide a path for the arc created and tending to confine and direct the same so as to prevent back and lateral flashing, including plates of insulating material mounted directly upon the movable portions of the fixed element and movable with said portions toward and away from each other so as to vary the width of the path aforesaid, the distance between the movable portions of the fixed element being less than the distance between said plates so that the path aforesaid is always open regardless of the movement of the movable portions of the fixed contact relative to each other.

19. In an electric switch, a fixed contact element, a movable contact element having means for engaging the fixed element, and means carried solely by the fixed element and constructed and arranged to provide a constantly open path in the plane of travel of said movable element for the arc created upon movement of said movable element relative to the fixed element and tending to confine and direct the arc so as to prevent lateral and back flashing.

20. In an electric switch, a movable contact element, a fixed contact element having means for receiving a part of the movable element, and means effective upon movement of the movable element relative to the fixed element to provide a path in the plane of travel of the movable element for the arc created and tending to confine and direct the same so as to prevent back and lateral flashing, including plates of insulating material spaced apart and having means receiving parts of the fixed contact element aforesaid.

21. In an electric switch, a fixed contact having substantially parallel portions provided with inwardly extending open return bent portions having flared portions, and plates of insulating material between and substantially parallel to the parallel portions of the fixed contact, said plates having slots receiving the open return bent portions and having recesses receiving the flared portions aforesaid of said fixed contact.

22. In an electric switch, a fixed contact having substantially parallel portions provided with laterally projecting portions, and arc suppressor plates of insulating material between and connected to said parallel portions and having recesses receiving said laterally projecting portions.

23. In an electric switch, a pair of substantially parallel plates of insulating material having aligned slots and opposed recesses therein, and a fixed contact element having portions within the slots and having portions engaging the recesses so that the portions just mentioned will be held against displacement from said slots.

24. In an electric switch, a pair of substantially parallel plates of insulating material having recesses in opposed faces thereof, and a support for said plates including a fixed contact element having substantially parallel portions upon the inner sides of and connected to said plates, the portions aforesaid of said fixed contact having laterally projecting portions engaging the recesses in the opposed faces of said plates.

In testimony whereof we affix our signatures.

JOHN G. JACKSON.
WALLACE T. ALLEN.

CERTIFICATE OF CORRECTION.

Patent No. 1,898,128. February 21, 1933.

JOHN G. JACKSON, ET AL.

It is hereby certified that error appears in the printed specification of the above numbercd patent requiring correction as follows: Page 3, line 102, claim 15, for "fastening" read flashing; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of February, A. D. 1935.

Leslie Frazer

(Seal) Acting Commissioner of Patents.