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EXTINGUISHING DEVICE FOR ELECTRICAL ARCS COMPRISING  
A PLURALITY OF INSULATING PLATES  
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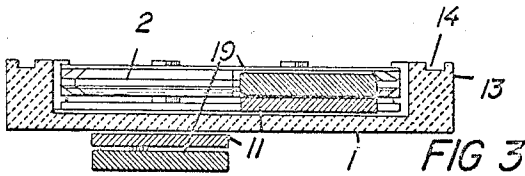


FIG 3

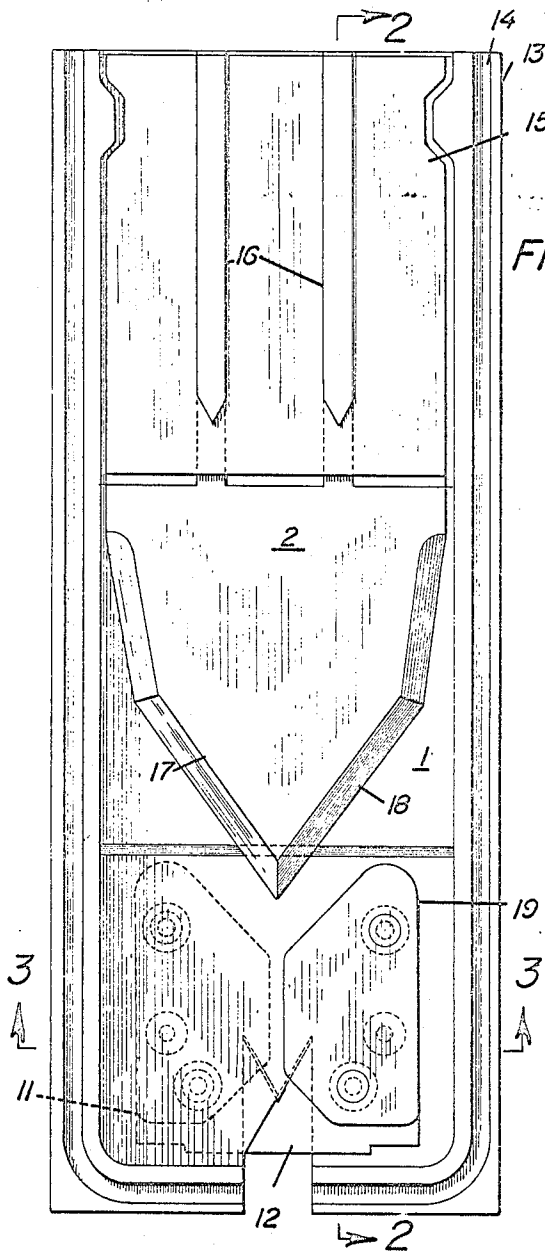


FIG 1

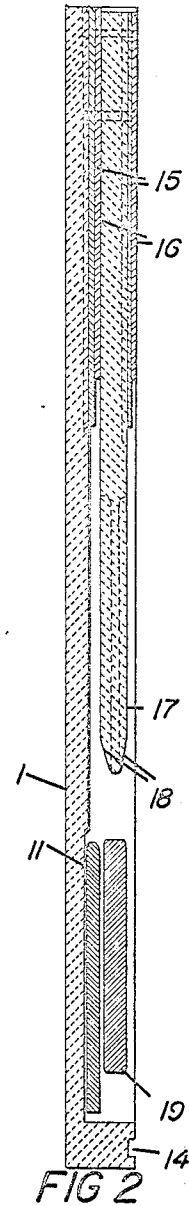


FIG 2

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## EXTINGUISHING DEVICE FOR ELECTRICAL ARCS COMPRISING A PLURALITY OF INSULATING PLATES

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Claims priority, application France, July 1, 1960, 4,264  
6 Claims. (Cl. 200-144)

This invention relates to extinguishing devices for electrical arcs drawn between separable contact members located in an arc formation chamber of an electrical circuit breaker, and more particularly to extinguishing devices of this type having an arc extinguishing chamber which comprises a set of at least two parallel plates of insulating material spaced apart from one another and disposed transversely of the direction of separation of the contacts or the initial direction of the arc.

The spaced parallel plates of insulating material define narrow arc separating or extinguishing chambers and are provided with conductive members which are generally V or U-shaped and whose legs or wings embrace or straddle the individual insulating plates. Conductive members of this general type and configuration are disclosed in my U.S. Patent No. 2,707,739. The web portion of the V or U-shaped conductive member straddles the side or edge of an insulating plate while the legs or wings of the conductive member extend along the faces of the insulating plates in a substantially parallel arrangement. The opposed parallel wings of each conductive member are slightly offset or diverging relative to each other. Conductive members or paths are thus provided on the faces of the insulating plates which attract and conduct the arc drawn between the insulating plates in such a manner as to turn the arc to form expanding curved or looped configurations within the narrow spaces between the insulating plates. The initial arc in contact with the conductive members is thus subdivided into a number of partial arcs which enter the extinguishing chambers where they are extended and developed into loops of substantially oblong form. The partial arcs are effectively cooled upon coming in contact with the adjacent parallel plates of insulating material and are thereby extinguished.

In this general type of arc extinguishing apparatus it is advantageous to conduct the initial arc or arc portions between the narrow spaces of the extinguishing chambers by means of a magnetic field generated by the arc loops which are developed by the arc proper as is customary in this type of arc extinguishing arrangement.

It has been found that the conductive members which are connected in the conventional arrangement at the lower part of the insulating support plates are not thick enough and that the cooling surface of the support plates is not sufficiently large to take care of very strong current intensities.

In another embodiment of this type of arc extinguishing devices the initial arc has been extended in the various arc extinguishing chambers by deflecting it by means of intermediate refractory partition walls provided with slots or notches. In this other arrangement the initial arc is thereby distributed throughout several laminar spaces between the partition walls and the insulating support plates.

It has now been found that if intermediate plates are used which do not have any slots or notches but whose lower parts are preferably shaped to terminate in a point it is possible to obtain the subdivision of the initial arc into two or more arcs travelling in electrically parallel paths between two conductive members. These subdivided arcs are distributed between the various

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laminar spaces provided in the arc extinguishing assembly.

The arrangement according to the invention makes possible the use of conductive members of substantial thickness or the legs of the conductive members may be provided with auxiliary conductive portions in order that they present a greater force to strong currents. These auxiliary conductive portions may be made a part of the conductive member or may be mounted thereon. In case they are mounted on the conductive members it may be advantageous to leave a space between the auxiliary conductive portions and the legs of the conductive members.

According to a modification the intermediate panels may be provided with openings which allow the pressure on the two sides of the intermediate panel to be equalized.

It is therefore an object of this invention to provide improved means for cooling the initial arc produced in the arc extinguishing operation.

It is an other object of the invention to provide an arc extinguishing device having a wider space between adjacent insulating plates to accommodate conductive members of greater thickness.

It is further an object of this invention to provide intermediate wall means between adjacent insulating support panels whose lower extremity is formed to produce an improved subdivision of the initial arcs.

These and other objects and features of the invention will become apparent upon reading the specific description of the invention in connection with the accompanying drawing which forms part of the specification and which illustrates by way of example only an embodiment of the invention. In the drawing:

FIG. 1 is a front view in elevation of an arc extinguishing device according to the invention.

FIG. 2 shows a cross-section along line 2-2 of FIG. 1.

FIG. 3 shows a cross-section along line 3-3 of FIG. 1.

Referring now particularly to the figures of the drawing, reference numeral 1 designates the support plate for the conductive member and numeral 2 designates the partition wall or intermediate panel which is located in the space defined by plate 1. The arc extinguishing device consists of a stack of a number of sub-assemblies. A conductive member 12 embraces or straddles the lower edge of plate 1. The support plate has a peripheral wall 13 provided with a groove 14 in which a sealing member 30 is located.

The space defined by plate 1 accommodates a partition wall or intermediate panel 2 of a refractory material mounted in this space in any suitable manner. Flame arrestors 15 are mounted at the top between the insulating support plate 1 and intermediate panel 2. Vertical ribs or spacer members 16 are connected to the flame arrestors.

The spacing between the intermediate panels and support plates is obtained by suitably placed spacing members.

In this lower part the intermediate panels 2 terminate in a point 17 which may be a sharp or a rounded point and the point and its converging edges are provided with chamfered portions 18 which facilitate the penetration of the partial arcs into the laminar spaces between the panels. The conductive members 11 are provided with conductive reinforcing portions 19 which in the embodiment shown in the drawing are riveted to the conductive members in such a manner that a small space or interstice is left between the reinforcing portions and the legs of the conductive members.

What is claimed is:

1. A device for extinguishing an arc drawn between separable contact members, comprising a plurality of insulating support plates mounted transversely of the

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direction of separation of said contact members and defining an arc extinguishing chamber, two successive insulating support plates defining a divisional chamber, two conductive means in each divisional chamber, each conductive means being associated with one of the successive insulating support plates defining the divisional chamber and disposed at the lower portion thereof, said two conductive means extending in the upward direction and spaced a distance apart from each other, and an intermediate insulating panel extending substantially throughout the width of said chamber and having front and rear walls spaced from and parallel to said support plates mounted in said divisional chamber above said conductive means, said intermediate panel having a progressively varying length along its width defining a pointed lower extremity directed downwards.

2. A device for extinguishing an arc drawn between separable contact members, comprising a plurality of insulating support plates mounted transversely of the direction of separation of said contact members and defining an arc extinguishing chamber, two successive insulating support plates defining a divisional chamber, two conductive means in each divisional chamber, each conductive means being respectively associated with one of the successive insulating support plates defining the divisional chamber and disposed at the lower portion thereof, both conductive means diverging outwardly one relative to the other in the upward direction and at a distance apart from each other, and an intermediate insulating panel extending substantially throughout the width of said chamber mounted parallel to and spaced from said support plates in said divisional chamber above said conductive means, said intermediate panel having converging

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lower side portions terminating in a pointed lower extremity extending between said diverging wing portions.

3. A device according to claim 1 in which the front and rear edges of said pointed lower extremity are chamfered.

4. A device according to claim 1 wherein auxiliary conductive means are connected to said conductive means to provide a larger combined cross-section.

5. A device according to claim 4 wherein said auxiliary conductive means are mounted on said conductive means in spaced parallel relation.

6. A device according to claim 1 wherein said conductive means occupy substantially the entire space between two adjacent support plates below said pointed intermediate panel.

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