Feb. 2, 1943. H. KORNDÖRFER 2,310,093

ELECTRIC CIRCUIT BREAKER

Filed July 10, 1941

Fig. 1.

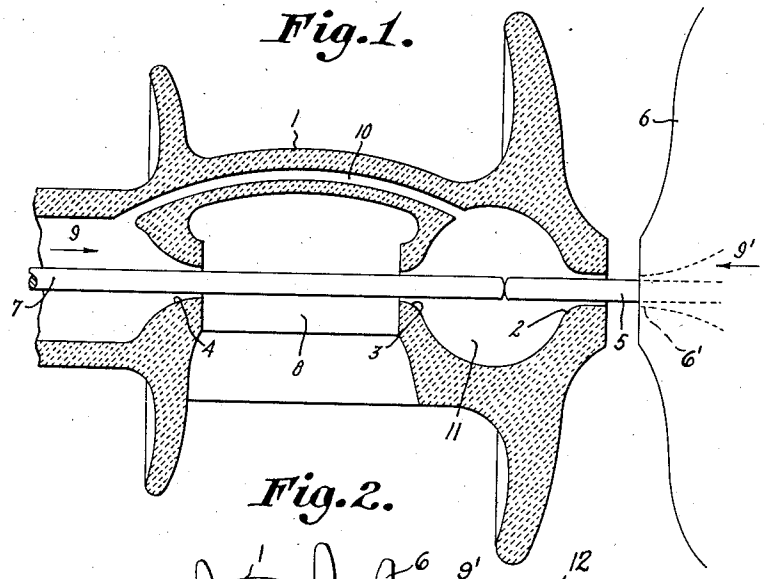
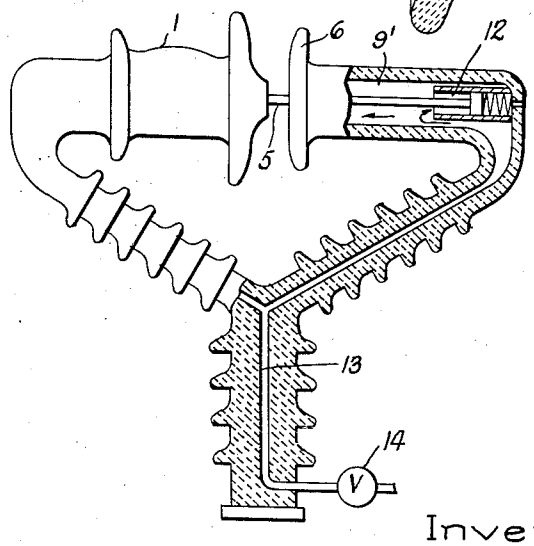


Fig. 2.



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ELECTRIC CIRCUIT BREAKER

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In Germany July 1, 1940

5 Claims. (Cl. 200—143)

My invention relates to an electric circuit breaker and more particularly to an electric circuit breaker of the fluid-blast type wherein a blast of fluid, such as air, is utilized as the interrupting medium.

Circuit breakers have been constructed heretofore in which an arc is drawn between two interrupting heads so as to expose the arc to blasts of fluid from two different points. Such an arrangement is disclosed in Fig. 2, for example, of United States Letters Patent 2,084,885, granted June 22, 1937, upon an application of Joseph Biermanns, and assigned to the same assignee as the present application. It has also been suggested to provide an electric circuit breaker with a plurality of interrupting heads which could be mounted at the ends of a forked insulator in which case again the arc is exposed to blasts from a plurality of points.

It is an object of my invention to provide an electric circuit breaker in which the arc drawn therein is exposed to several blasts of fluid from different points and which requires fewer interrupting heads than was required in heretofore known arrangements.

It is another object of my invention to provide a new and improved interrupting head for an electric circuit breaker.

Further objects and advantages of my invention will become apparent as the following description proceeds and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of my invention, reference may be had to the accompanying drawing in which Fig. 1 is a schematic diagram partly in section of the interrupting heads of an electric circuit breaker embodying my invention, and Fig. 2 is a schematic diagram partly in section of an electric circuit breaker employing the interrupting heads of Fig. 1.

In order to permit a saving of supporting insulators or supporting arms, I have provided an interrupting head 1 which, as will be described in greater detail hereinafter, is constructed so as to provide a plurality of separate fluid blasts for aiding in extinguishing the arc drawn therein. This interrupting head 1 is constructed of an insulating material and provided with a plurality of coaxially arranged nozzles 2, 3, and 4, which are spaced from one another. Arranged within and normally closing the coaxially arranged nozzles 2, 3, and 4 are the relatively movable conducting members or rod contacts 5 and 7 which, when the circuit breaker is closed as is indicated in Fig. 1 of the drawing, are in engagement with one another to carry the current flowing through the circuit breaker. At least one of the rod contacts 5 or 7 must be movable in order to produce the relative separation therebetween for circuit-interrupting purposes.

In the specific arrangement disclosed in the drawing, however, both of the rod contacts 5 and 7 are movable, similar to the arrangement disclosed in Fig. 2 of the above-mentioned Biermanns patent. To this end, movable rod contact 5 is mounted within an interrupting head 6 which may be similar to interrupting head 1 in certain respects. Interrupting head 6 is mounted in axial alignment with interrupting head 1 so that proper engagement of rod contacts 5 and 7 will result. Relative movement of contact rods 5 and 7 may be obtained by any suitable means, well known to those skilled in the art, and, in view of the fact that a source of fluid for arc-extinguishing purposes is required, preferably such movement may best be obtained by an arrangement such as that disclosed in the above-mentioned Biermanns patent utilizing the fluid under pressure for causing such relative movement. Accordingly, in Fig. 2, a fluid motor 12 is provided for moving rod contact 5 and a similar arrangement may also be provided for causing movement of rod contact 7.

The nozzle or orifice 2 of interrupting head 1 is controlled by rod contact 5 of interrupting head 6 while the nozzle or orifices 3 and 4 are controlled by rod contact 7. The nozzle or orifices 3 and 4 discharge in opposite directions into the opening 8 in interrupting head 1 while the nozzle 2 discharges into the space between interrupting heads 1 and 6.

As shown in Fig. 2, fluid under pressure from a source not shown is supplied to interrupting heads 1 and 6 through a branched conduit 13 and control valve 14 and this fluid under pressure enters the interrupting head 1 at 9 so as to be available at the nozzle or orifice 4. In order that this fluid may also be supplied to the orifices 2 and 3, a channel 10 is provided in interrupting head 1 which connects the source of fluid under pressure with the chamber 11 from which the orifices 2 and 3 lead to the exterior of interrupting head 1. The fluid under pressure from branched conduit 13 for interrupting head 6 enters the passageway 9' thereof and is available at the orifice 6'. The flow of fluid in both interrupting heads 1 and 6 is indicated by the arrows on the drawing.

It will be observed that actually four nozzles are provided for the arc drawn between rod contacts 5 and 7, namely, 2, 3, 4, and 6'. Upon relative separation of contact rods 5 and 7 due to simultaneous retraction of both contacts in response to a supply of fluid under pressure in passageways 9 and 9' from branched conduit 13, the arc drawn between the contacts will be subjected to simultaneous blasts of fluid from orifices 2 and 3 as the contact rods 5 and 7 are withdrawn therefrom. Subsequently, the orifice 6' will come into play as rod contact 5 is withdrawn therefrom and thereafter nozzle or orifice 4 becomes effective as rod contact 7 is retracted still farther. By this arrangement, the arc drawn between rod contacts 5 and 7 is subjected to four separate arc-extinguishing blasts, two of which occur simultaneously as orifices 2 and 3 are opened and the other two occur successively thereafter. Furthermore, at the most, only two supporting insulators are required to obtain such an arrangement with a considerable saving in both space and cost and, as shown in Fig. 2, the interrupting heads 1 and 6 are preferably mounted on a single forked insulator to obtain a still further saving in both cost and space.

Although, when my invention is actually embodied in a circuit breaker, a disconnecting switch for insulating purposes would be required as well as certain refinements; since they form no part of the present invention, they have been omitted both from the description and drawing in order to simplify the disclosure.

It should be understood that my invention is not limited to the specific details of construction and arrangement herein illustrated and that changes and modifications may occur to one skilled in the art without departing from the spirit and scope of my invention and I aim in the appended claims to cover all such changes and modifications.

I claim:

1. In an electric circuit breaker of the fluid-blast type comprising a pair of relatively movable contacts separable to draw an arc therebetween, an interrupting head for said contacts, means including a plurality of orifices in said interrupting head so constructed and arranged as to be rendered effective simultaneously to emit a plurality of simultaneous blasts of fluid to engage said arc at spaced points thereon to extinguish the same, and an additional orifice subsequently rendered effective to emit an additional blast of fluid for engaging said arc.

2. In an electric circuit breaker of the fluid-blast type comprising a pair of relatively movable contacts separable to draw an arc therebetween, a pair of interrupting heads for said contacts, a plurality of orifices in one of said interrupting heads, means for causing movement of one of said contacts to render certain of said orifices effective to permit a blast of fluid to engage said arc for extinguishing purposes, and means associated with said other interrupting head and including said other contact for controlling the operation of another of said plurality of orifices.

3. In an electric circuit interrupter of the fluid-blast type comprising a pair of relatively movable contacts separable to draw an arc therebetween, a pair of interrupting heads for said contacts, a chamber in one of said interrupting heads, a plurality of orifices connected with said chamber, means for causing movement of one of said contacts to render one of said orifices effective to permit a blast of fluid to engage said arc for extinguishing purposes, and means associated with said other interrupting head and including said other contact for controlling the operation of another of said orifices connected with said chamber.

4. In an electric circuit breaker of the fluid-blast type comprising a pair of relatively movable contacts separable to draw an arc therebetween, a pair of interrupting heads for said contacts, a plurality of coaxially arranged orifices in one of said interrupting heads, means for causing movement of one of said contacts to render certain of said orifices effective to permit a blast of fluid to engage said arc for extinguishing purposes, and means associated with said other interrupting head and including said other contact for controlling the operation of another of said plurality of orifices.

5. In an electric circuit breaker of the fluid-blast type comprising a pair of relatively movable contacts separable to draw an arc therebetween, a pair of interrupting heads for said contacts, means for supplying fluid under pressure to said interrupting heads, a plurality of coaxially arranged orifices in one of said interrupting heads, means including said fluid under pressure for producing relative movement of said contacts to render at least two of said orifices simultaneously effective to produce a blast of fluid adjacent said arc at spaced points thereon for extinguishing the same.

HUBERT KORNDÖRFER.