

Dec. 16, 1924.

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C. AALBORG

CIRCUIT INTERRUPTER

Filed July 10, 1918

2 Sheets-Sheet 1

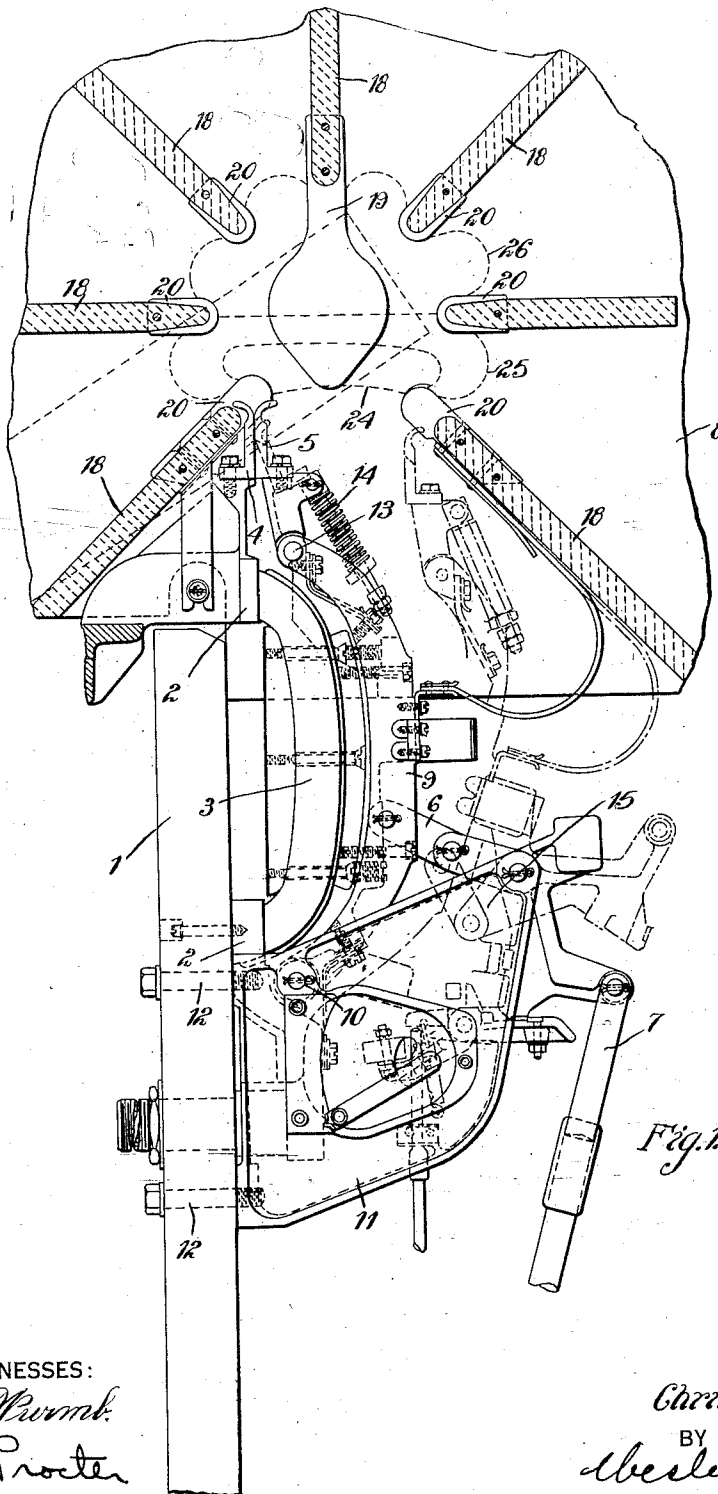


Fig. 1

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J. A. Procter

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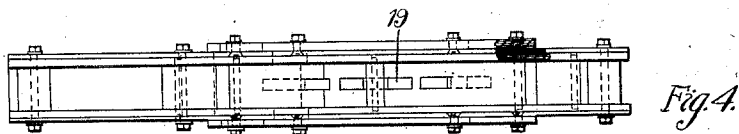
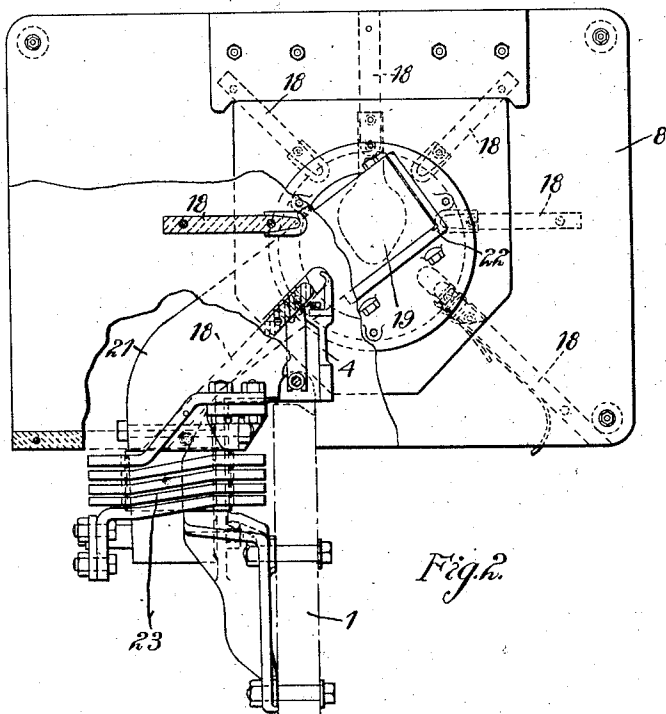
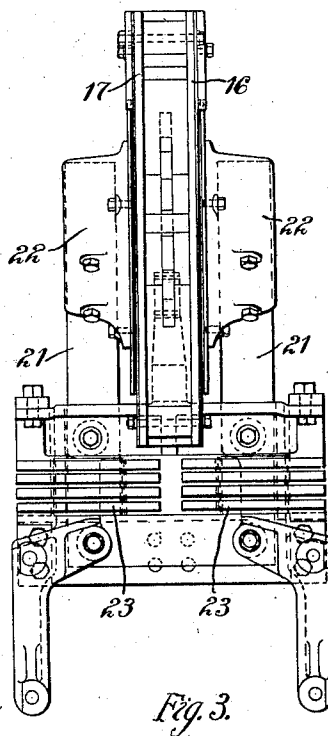
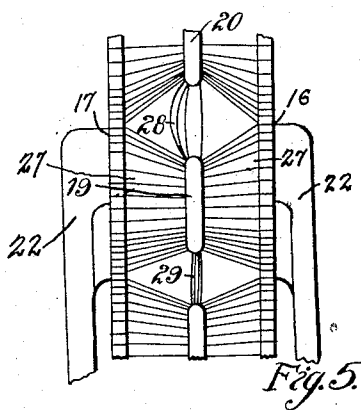
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CIRCUIT INTERRUPTER

Filed July 10, 1918

2 Sheets-Sheet 2



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHRISTIAN AALBORG, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

CIRCUIT INTERRUPTER.

Application filed July 10, 1918. Serial No. 244,261.

To all whom it may concern:

Be it known that I, CHRISTIAN AALBORG, a citizen of the United States, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Circuit Interrupters, of which the following is a specification.

My invention relates to circuit-interrupters and particularly to arc-blow-out devices therefor.

One object of my invention is to provide arc-extinguishing devices for circuit-interrupters having barriers therein that are positioned to conform to the shape of the arcs that are drawn when the interrupters are opened.

Another object of my invention is to provide an arc-blow-out device for a circuit-interrupter that shall have means for removing the arc from the contact members to prevent deterioration of the same.

Another object of my invention is to provide an arc-blow-out device that shall have means for so centering the arc between the walls of the device as to prevent injury thereto.

A further object of my invention is to provide a device of the above-indicated character that shall be inexpensive to construct and effective in its operation.

In practicing my invention, I provide a circuit-interrupter having main and auxiliary contact members. An arc chute, comprising two side walls, is disposed around the auxiliary contact members, and radially extending barriers are disposed between the walls of the arc chute. The barriers are so placed that the arc is permitted to assume its natural shape, that is, they extend downwardly from the contact members as well as upwardly and outwardly therefrom. A magnetizable member is attached to one of the barriers and extends to the central part of the device for the purpose of co-operating with other magnetizable members that are disposed at an inner central portion of the other barriers to remove the arc from the contact members. A blow-out coil is arranged to direct magnetic lines of force normal to the central magnetizable member and

co-operates with the magnetizable members to hold the arc in a central position with respect to the side walls of the device to thereby prevent injury to the same.

In the accompanying drawings, Figure 1 is a side view, partially in section and partially in elevation, of a circuit-interrupter embodying my invention; Fig. 2 is a side view, partially in section and partially in elevation, of a blow-out coil and the arc chute shown in Fig. 1; Fig. 3 is a front elevational view of the device shown in Fig. 2; Fig. 4 is a top plan view of the arc chute shown in Fig. 2, and Fig. 5 is a diagrammatic view of the arc chute illustrating the direction of the arc therein.

A circuit-interrupter is mounted on a panel board 1 and comprises, in general, main stationary contact members 2, a main movable bridging member 3, an auxiliary stationary contact member 4, a movable auxiliary contact member 5, a toggle mechanism 6, an operating device 7 and an arc-extinguishing device 8.

The bridging contact member 3 is mounted on an arm 9 that is pivoted at a point 10 to a frame 11 that is secured by bolts 12 to the panel 1. The auxiliary contact member 5 is pivotally mounted at a point 13 on the arm 9 and is yieldingly held in a predetermined position by a spring 14. The toggle mechanism 6 is connected between the arm 9 and a point 15 on the arm 11, and the operating device 7 is connected to one leg of the toggle mechanism 6 for the purpose of setting the same and thus forcing the contact members into engagement.

The arc-extinguishing device 8 comprises two side walls 16 and 17 of soapstone, asbestos or other suitable insulating material and a plurality of insulating barriers 18 that are disposed between the walls 16 and 17 and radiate from a central portion in all directions therefrom. That is, two of the barriers 18 extend downwardly and thus assume a position corresponding to the natural shape of an arc that is drawn when the contact members 4 and 5 are separated. A magnetizable member 19 of substantially heart-shape is secured to the downwardly extending barrier 18 at the center of its inner

edge and, similarly, magnetizable members 20 are secured to the other barriers 18 at the central portion of the inner edges thereof.

A magnetizable member 21, having two poles 22 which are energized by coils 23 that are connected in series with the main contact members 2 and 3, is mounted on the rear of the panel 1 and extends to such position that the poles 22 are so disposed, in relation to the inner ends of the barriers 18, that magnetic lines of force therefrom will pass through the magnetizable members 19 and 20.

When the latching device of the circuit-interrupter is moved to such position as to permit the toggle mechanism 6 to collapse, the arm 9 will be moved in a clockwise direction to permit the bridging contact member 3 to be disengaged from the stationary contact members 2. After the bridging member 3 has moved a predetermined distance, the auxiliary contact member 5 will be disengaged from the stationary contact member 4 and thus an arc will be drawn which, when the contact member 5 reaches its final position, will pass from the magnetizable members 20 on the barriers adjacent the contact members through the member 19, as shown by the broken line 24 in Fig. 1 of the drawings. The members 19 and 20 are so disposed that they receive the arc from the contact members 4 and 5 and thus prevent deterioration of the same. The lowermost barriers 18 extend downwardly in order that the arc, which normally assumes the position shown by the broken lines 25, may be permitted to be dissipated in a normal direction. Of course, since the blow-out coils 23 tend to deflect the arc, the same will advance to the position shown by the dotted lines 26 and will thus be broken up into a plurality of series-connected arcs, the total counter electromotive force of which permits the same to be dissipated with a minimum disturbance.

In Fig. 5 of the drawings, the lines 27 represent the direction of the magnetic lines of force from one pole 22 of the magnet 21 to the other pole of the same. That is, the lines of force will converge toward the magnetizable members 19 and 20 and thus the arc 28 that would normally be distorted if the magnetizable members 19 and 20 are not provided, will be so neutralized that the arc will assume the position shown by the lines 29. That is, the resultant force caused by concentrating the magnetic lines of force in the members 19 and 20 will cause the arc to be centralized between the side walls 16 and 17 and thus prevent the same from being deflected toward the one or the other of the side walls and, consequently, the life of the device will be materially increased.

It will be understood from the foregoing that the members 19 and 20 need not necessarily be of magnetizable material if it is only

desired to remove the arc from the contact members but, if it is desired to centralize the arc between the walls 16 and 17, these members must necessarily be of magnetizable material. It has been found that, by disposing the barriers 18 in such positions that they permit the arc to assume its natural position in all directions around the contact member, the extinguishing of the arc is achieved with relatively less violence, and the operation of the device is materially improved.

My invention is not limited to the type of circuit-interrupter nor to the specific arc-extinguishing device illustrated, as various modifications may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim as my invention:

1. An arc-blow-out device for a circuit-interrupter comprising side walls, radial barriers disposed between the walls, and magnetic means disposed at the center of the device and on the barriers for directing the arc away from the walls.

2. In a circuit-interrupter, the combination with contact members, of an arc-chute comprising insulated side walls, radial arc-splitting means extending from the contact members in all directions, and magnetic means disposed adjacent the contact members and on the arc-splitting means for removing the arc from the contact members and for directing the same away from the side walls.

3. In a circuit-interrupter, the combination with contact members, of an arc-chute comprising insulated side walls, radial arc-splitting means extending from the contact members in all directions, and means disposed adjacent the contact members and at the center of the inner end of each arc-splitting means for removing the arc from the contact members.

4. An arc-blow-out device comprising two insulated side walls, insulated barriers radiating from a central portion of the device in all directions for splitting the arc, a magnetizable member disposed adjacent the inner ends of the barriers in the central portion of the device, and electro-magnetic means for deflecting the arc.

5. An arc-blow-out device comprising two insulated side walls, insulated barriers radiating from a central portion of the device, a magnetizable member mounted at the center of one barrier and extending into the central portion of the device, and means for directing magnetic lines of force in a direction normal to the face of the magnetizable member.

6. An arc-blow-out device comprising two insulated side walls, insulated barriers disposed between the walls and radiating in all directions from a central portion of the device, a magnetizable member mounted on one of the barriers and extending into the cen-

tral portion of the device, magnetizable members disposed at the center of the inner ends of the barriers in a plane with the magnetizable member, and electromagnetic means for forcing the arc outwardly.

7. An arc-blow-out device comprising two insulated side walls, insulated barriers disposed between the walls and radiating in all

directions from a central portion of the device, and a magnetizable member mounted on one of the barriers and extending into the central portion of the device.

In testimony whereof, I have hereunto subscribed my name this 26th day of June, 1913.

CHRISTIAN AALBORG.