April 14, 1925. 1,533,251

H. H. JOHNSTON

ELECTRIC SWITCH

Filed June 5, 1922

Fig. 1.

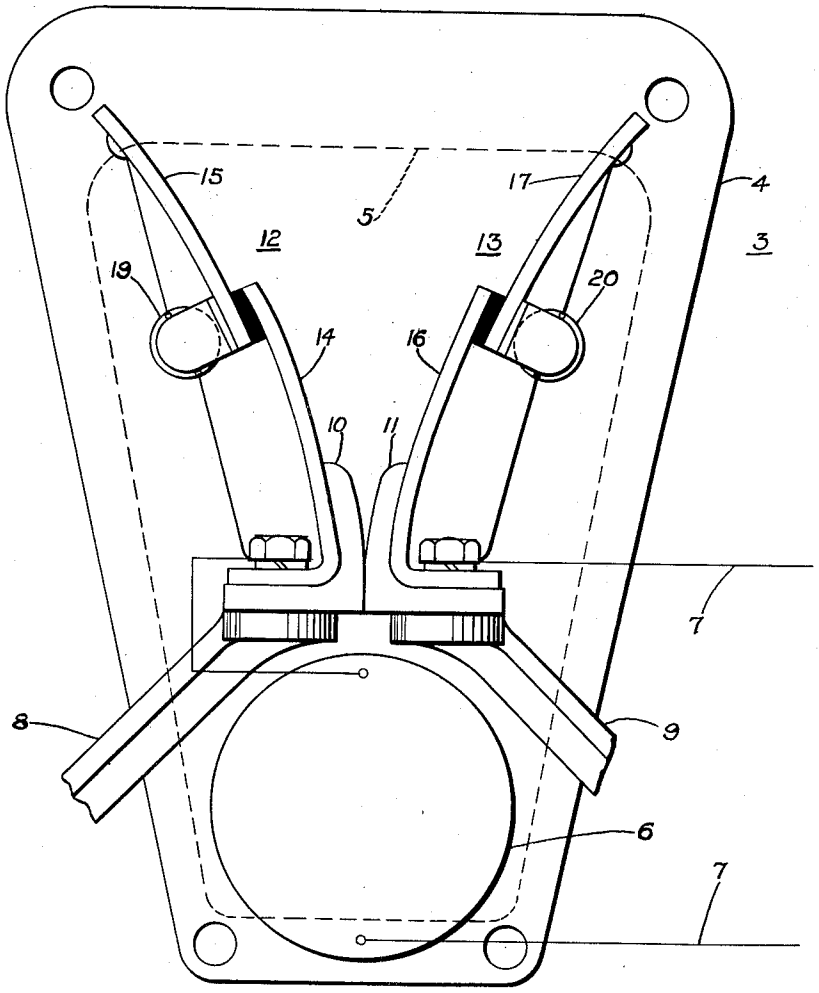
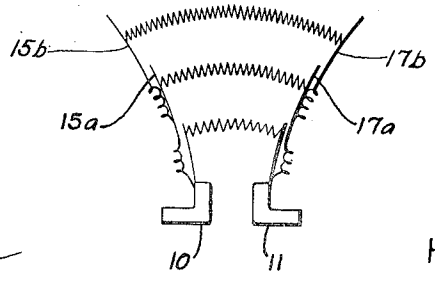


Fig. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HOWARD H. JOHNSTON, OF FOREST HILLS BORO, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

ELECTRIC SWITCH.

Application filed June 5, 1922. Serial No. 566,005.

To all whom it may concern:

Be it known that I, HOWARD H. JOHNSTON, a citizen of the United States, and a resident of Forest Hills Boro, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electric Switches, of which the following is a specification.

My invention relates to electric switches and particularly to means for extinguishing arcs that are formed across a pair of relatively movable contact members.

Relatively movable contact members of a circuit interrupter for controlling circuits of high voltage are usually provided with a pair of arc horns and a blowout coil, for setting up a flux across the zone between the horns, to exercise a blow-out effect upon the arcs that are formed across the horns.

My invention has for its object the provision of auxiliary blowout means that accelerate the movement of the arc when it reaches a point at such distance from the main blowout coil that the rate of movement of the arc tends to decrease.

Still another object of my invention is to provide a simple and effective blowout device of greater efficiency than those heretofore employed.

As shown in the accompanying drawings, Figure 1 is a view, partially in side elevation and partially in section, showing the manner in which my invention may be applied to an electric switch, and

Fig. 2 is a diagrammatic view of a modified form thereof.

The apparatus comprises an arc chute 3 that may be of the usual form and which is provided with insulating barriers 4 and pole pieces 5 that are mounted on the exterior of the barriers 4. One of the barriers and one of the pole pieces are omitted on the drawing for greater clearness of illustration.

A magnetic flux is set up across the pole pieces 5 by a blowout coil 6, in the usual manner, the coil thus being connected in series with the circuit 7. A pair of relatively movable switch members 8 and 9 are provided with contact members 10 and 11, respectively, that are connected in the circuit 7. The contact members 10 and 11 are provided with arc horns 12 and 13, respectively, the horn 12 being provided with a lower section 14, and an upper section 15 that is insulated therefrom, and the horn 13 being provided with a lower portion 16 and an upper portion 17 that is insulated from the lower portion.

An auxiliary blow-out coil 19 is electrically connected to the horn member 15 and the contact member 10 and an auxiliary blowout coil 20 is similarly connected to the horn member 17 and the contact member 11.

Upon the separation of the contact members 10 and 11 and the formation of an arc thereacross, such arc will move upwardly, partially owing to its natural tendency to rise and partially owing to the influence of blow-out coil 6. As the arc rises, it will pass from the horn sections 14 and 16 to the horn sections 15 and 17. At this point, the effectiveness of the repulsive force exerted thereupon by the coil 6 will be considerably reduced. However, when the arc reaches the horn sections 15 and 17, the auxiliary blowout coils 19 and 20 will be introduced into the circuit and will set up a magnetic flux to supplement that of the main coil 6 and thereby cause an acceleration in the movement of the arc upwardly along the horns. It will be clear that this additional blowout force will tend to quickly and effectively complete the extinguishing of the arc.

As indicated in Fig. 2, the horns 12 and 13 may be made in any number of desired sections, such as 15^a—15^b and 17^a—17^b, with a blowout coil interposed between each of two adjacent sections, where it is desired to employ a plurality of auxiliary blowout coils in each horn or when the horns are of considerable length.

In setting forth a preferred embodiment of my invention, I do not limit myself to the employment of magnetic blowout devices, but contemplate also the employment of other forms of auxiliary blowout devices that may either accelerate the movement of an arc or set up additional blowout forces when such arc approaches the limit of effectiveness of a main blowout device.

I claim as my invention:

1. The combination with a pair of relatively movable electrical conductors, of a pair of arc horns, each of which is composed of two sections that are insulated from each other, of blowout means adjacent to the point of formation of arcs across the horns and

auxiliary magnetic blowout coils in series with the upper sections of the said horns.

2. The combination with a pair of arc horns each of which is composed of two sections that are insulated from each other, of blow-out means for initiating the movement of an arc therealong and an auxiliary blow-out coil connected in series with the outermost section, means for introducing an auxiliary blow-out force at a point intermediate the ends of the horns.

3. The combination with a pair of relatively movable contact members, of an arc horn for each of said members, each of which arc horns is composed of sections insulated from each other and with an auxiliary blow-out coil in series with the outer section and with the contact member, such coil being located at a point intermediate the ends of the horn with which it is associated.

4. The combination with a pair of relatively movable contact members of arc horns therefor each of which is composed of two sections that are insulated from one another, a blowout device associated with one of the horns, and means for including the blow-out coil in the circuit of the arc stream when the said stream contacts with an outermost section of an arc horn.

5. The combination with a pair of relatively movable contact members, of a main blow-out coil, a pair of arcing horns one of which is composed of a plurality of sections that are insulated from one another, an auxiliary blow-out coil associated with one of said horns, and means for introducing the auxiliary coil into the circuit when an arc that has been formed across the contact members contacts with an outer section of the sectional arc horn.

In testimony whereof, I have hereunto subscribed my name this 22nd day of May, 1922.

HOWARD H. JOHNSTON.