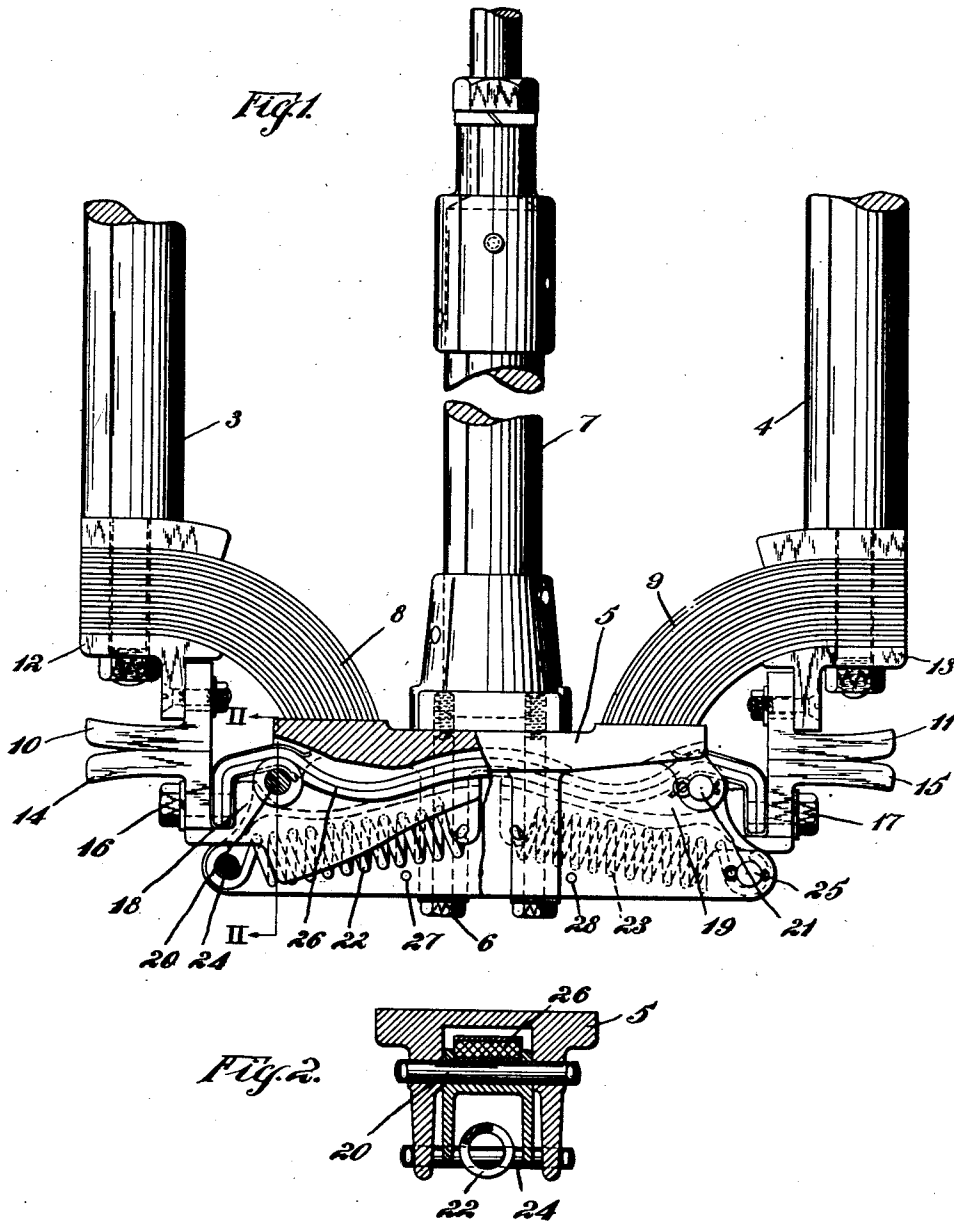


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CIRCUIT BREAKER.
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1,395,327.

Patented Nov. 1, 1921.



WITNESSES:

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CIRCUIT-BREAKER.

1,395,327.

Specification of Letters Patent.

Patented Nov. 1, 1921.

Application filed October 18, 1920. Serial No. 417,561.

To all whom it may concern:

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

My invention relates to electric circuit breakers and particularly to those used in opening and closing high-voltage lines, which employ, in addition to the brush contacting members, arcing tips to prevent arcing between the brush contacts.

My invention has for its object, the provision of mechanical means for securing a more effective contacting engagement of the brushes and the arcing tips with their contacting members, and means whereby the magnetic forces which are present in mechanism of this kind are utilized to secure a more effective engagement between the various contact surfaces.

Circuit breakers are usually constructed in such manner that the path of the electric current therethrough is of substantially U-shape, and the magnetic forces set up in that portion of the circuit exercises an expansive force which tends to distort the switch parts and break the circuit.

In my device the magnetic forces are utilized to secure a still firmer engagement between the contact members of the switch.

Another objection to the ordinary type of circuit breaker resides in the fact that its arcing tips, which are usually of the spring-held plunger type, are apt to bind in their guideways, under the action of the magnetic forces, with the result that the tips will not function properly to relieve the brush contacting surfaces of their tendency to arc. This objection I overcome by pivoting the arcing tips, and using springs—assisted by the magnetic forces—to maintain them in engagement with the stationary contact members until the brush members have moved a sufficient distance to preclude arcing.

One means for utilizing my invention is illustrated in the accompanying drawings wherein—

Figure 1 is a view, partially in side ele-

vation and partially in section, of a circuit breaker built in accordance with my invention, and Fig. 2 is a sectional view taken along the line II—II of Fig. 1.

The circuit breaker is employed, in the usual manner, for opening and closing the electric circuit between a pair of conductors 3 and 4 by means of a movable contact member 5 secured by bolts 6 to a lifting rod 7 that is raised and lowered to move the contact member 5 into and out of engagement with a pair of stationary brush members 8 and 9 which are flexible and angularly disposed with respect to the movable contact member, so that, when the movable contact member is brought into tight engagement with them, a wiping action occurs, which action serves to keep the contacting faces cleared of foreign matter and effects a more intimate engagement.

To prevent arcing between the contact member 5 and brushes 8 and 9 during the opening and closing of the circuit breaker, I provide a pair of arcing tips 10 and 11 that are secured to the terminals 12 and 13, and another pair of arcing tips 14 and 15 that are secured to brackets 18 and 19 by bolts 16 and 17. The brackets 18 and 19 are pivoted at 20 and 21 to the movable contact member 5.

The movable arcing tips 14 and 15 are normally maintained in engagement with the stationary arcing tips 10 and 11 by the tension of springs 22 and 23, which have their inner ends secured to the inner ends of the brackets 18 and 19 and their outer ends to pins 24 and 25, respectively.

When the lifting rod 7 is lowered to break contact between the member 5 and the brushes 8 and 9, the arcing tips 14 and 15, by reason of the tension exerted by the springs, are maintained in engagement with arcing tips 10 and 11. By this means, the current is conducted, through arcing tips 14, flexible shunt member 26 and arcing tip 15, to the conductor 4, thus avoiding any arcing between brushes 8 and 9 and contact member 5, and the engagement between the contact tips is maintained until the brushes are far enough removed from the contact member 5 to avoid any danger of arcing. Stop members 27 and 28 are provided to

limit the downward movement of the brackets 18 and 19.

The electric current, passing downwardly along conductor 3, across the contacting members 8, 5 and 9 and upwardly along conductor 4, as indicated by the arrows, sets up opposing magnetic forces in the zone between the conductors 3 and 4 which exert a repulsive action and tend to distort, or spread apart, the contacting members. But, because the movable contact member 5 is positively held in position by the rod 7, this magnetic stress acts to press the brushes 8 and 9 more firmly into engagement with the contact member 5.

The magnetic forces also exert a repellant effect on the arcing tips 14 and 15, tending to force them out of engagement with the tips 10 and 11. To overcome this tendency of the tips to break contact and to assist the springs 22 and 23 in maintaining an effective engagement between the arcing tips, I provide the flexible shunt member 26 which crosses the inner ends of the brackets 18 and 19. The magnetic force that is directed against the flexible shunt member is more powerful than that which is imposed upon the relatively small area of the movable arcing tips, and, consequently, the shunt member exerts a force on the inner ends of the brackets 18 and 19 that overcomes the repellant forces directed against the movable arcing tips and assists the springs 22 and 23 in maintaining the arcing tips 14 and 15 in engagement with the stationary tips 10 and 11, respectively.

It will be seen from the foregoing that I provide means whereby the magnetic forces present in constructions of this kind are utilized to secure a more effective operation of the switch parts, instead of these forces being permitted to exercise their usual tendency of rendering action of the switch less effective.

Various changes in the way of detail and general arrangement might be made in the construction without departing from the spirit of the invention as set forth in the claims.

I claim as my invention:

1. In a circuit breaker, the combination of a movable contact member, a pair of yieldingly mounted stationary contact members, a pair of arcing tips, a pair of supports for the arcing tips, carried by the movable contact member and movable with respect thereto, and means whereby the magnetic stresses set up by the passage of current through the circuit breaker are directed against the said supports to maintain the arcing tips in advanced position.

2. In a circuit breaker, the combination of a plurality of relatively movable main contact members, a pair of movable arcing tips

mounted on one of the main contact members, a movable conducting member in engagement with the arcing tips and actuated by the magnetic forces set up by the passage of current through the circuit breaker to maintain the arcing tips in advanced position.

3. In a circuit breaker, the combination of a movable contact member, a pair of stationary contact members, a pair of arcing tips carried by the movable contact member and movable with respect thereto, and means whereby the magnetic stresses set up by the passage of current through the circuit breaker are directed against the arcing tips to maintain them in advanced position.

4. In a circuit breaker, the combination of a plurality of relatively movable main contact members, a movable arcing tip, a flexible shunt member connected to said arcing tip and so arranged that the magnetic forces which are set up by the passage of current through the circuit breaker cause the shunt member to maintain the arcing tip in advanced position.

5. In a circuit breaker, the combination of a pair of stationary contact members, a movable contact member, a pair of pivotally mounted arcing tips carried by the movable contact member, and a flexible shunt member in position to be subjected to the magnetic stresses set up by the passage of current through the circuit breaker and so connected to the arcing tips as to maintain them in advanced position by reason of said magnetic stresses.

6. In a circuit breaker, the combination of a pair of yieldingly mounted stationary contact members, a pair of stationary arcing tips, a movable contact member, a pair of movable arcing tips, and a flexible conducting member adapted, when subjected to magnetic stresses to maintain the movable arcing tips in engagement with the stationary arcing tips.

7. In a circuit breaker, the combination of a pair of stationary contact brushes, a movable contact member, a pair of stationary arcing tips, a pair of pivoted arcing tips carried by the movable contact member, springs normally maintaining the pivoted tips in contact with the stationary tips and a shunt member arranged to transmit magnetic strains to the pivoted tips and assist the springs in maintaining the pivoted tips in advanced position.

8. In combination, a circuit breaker, a movable contact member, a pair of stationary contacting brushes angularly disposed with respect to the movable contact member, a pair of stationary arcing tips, a pair of movable arcing tips carried by the movable contact member, a pair of pivoted supports for the movable arcing tips, and springs for

normally maintaining the movable arcing tips in advanced position.

9. In combination, in a circuit breaker, main contact members movable with respect to each other, a pair of stationary arcing tips, a pair of pivotally mounted arcing tips, and a shunt member engaging the free ends

of the pivoted arcing tips and so arranged as to bear against the arcing tips when acted upon by repellant magnetic strains.

In testimony whereof I have hereunto subscribed my name this 6th day of October, 1920.

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CHRISTIAN AALBORG.