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W. M. SCOTT & H. C. CAMPION, Jr.

CIRCUIT BREAKER CONTACT.

APPLICATION FILED JAN. 30, 1906.

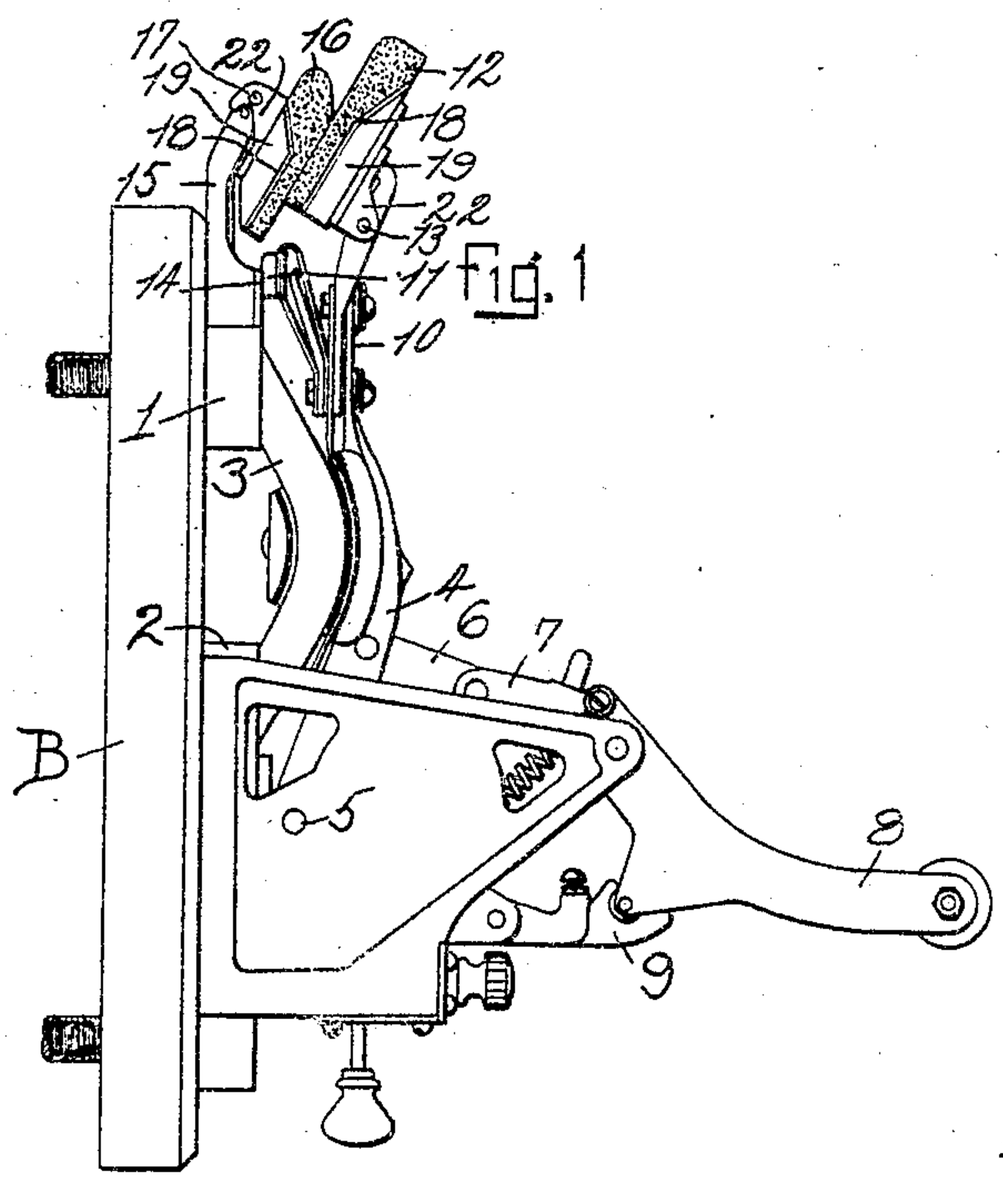


Fig. 1

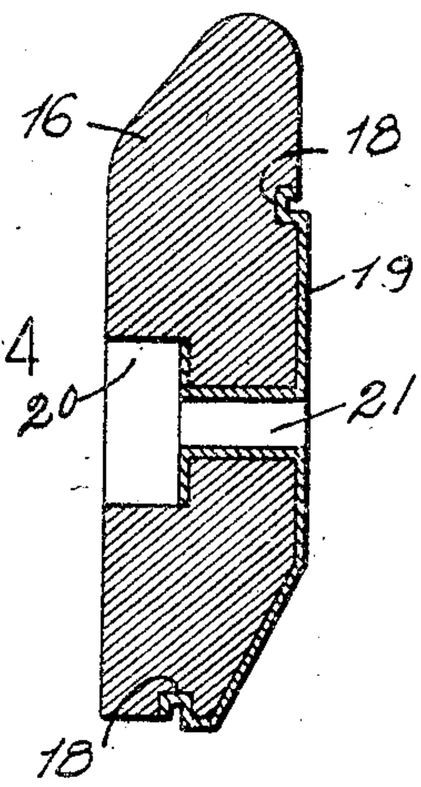


Fig. 4

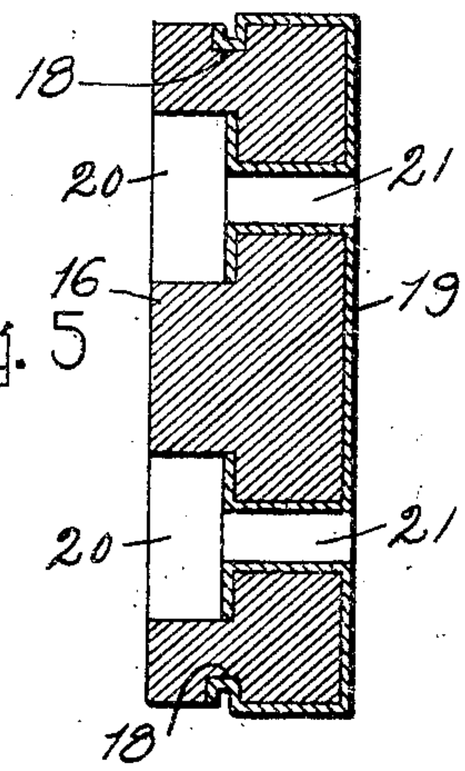


Fig. 5

Fig. 6

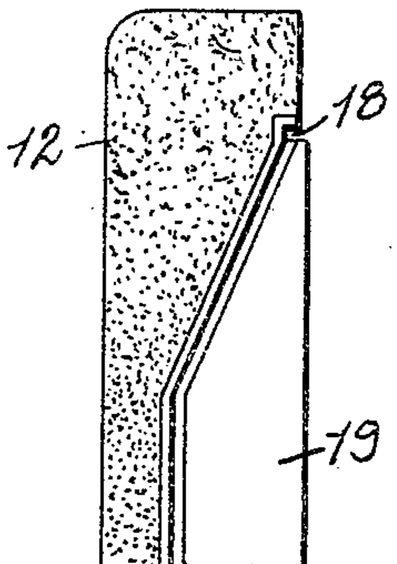


Fig. 2

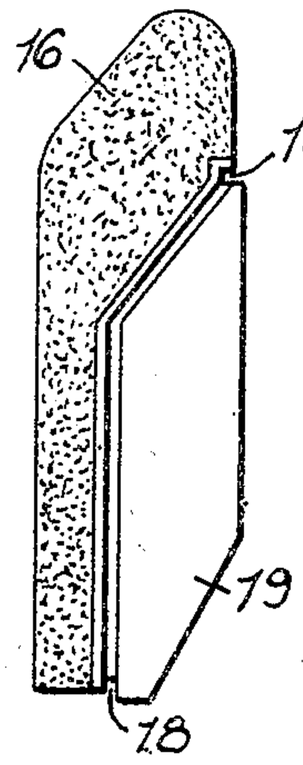
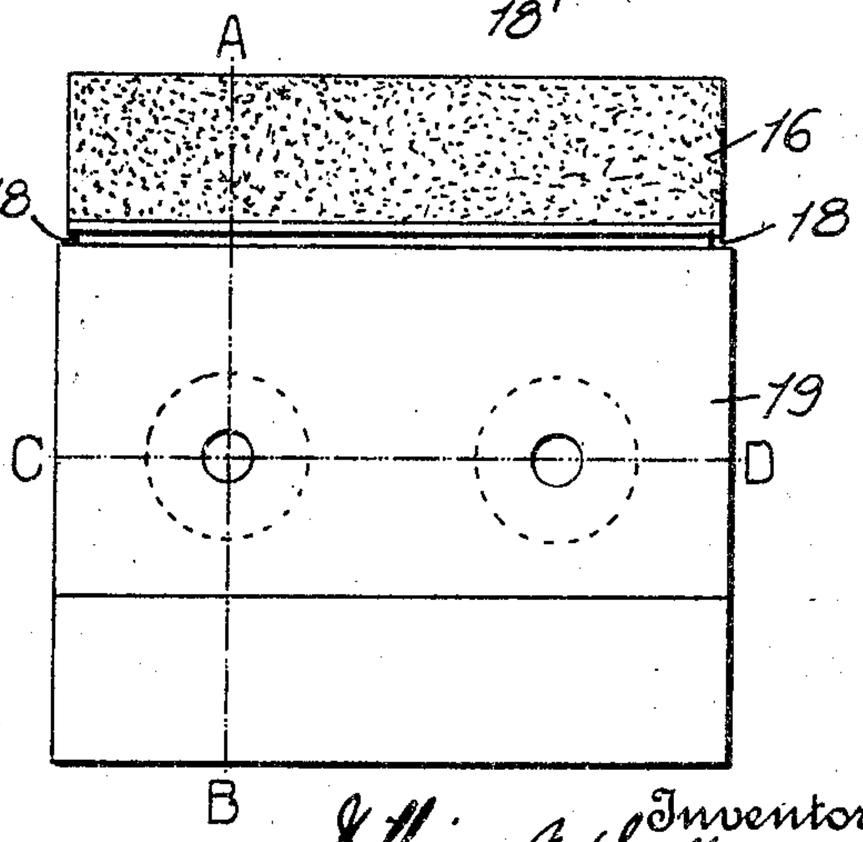


Fig. 3



Witnesses
Chas. W. Herrion
Agnes Reid

Inventors
William M. Scott and
Harry C. Campion Jr.
Cornelius Ecker
their Attorney

UNITED STATES PATENT OFFICE.

WILLIAM M. SCOTT AND HARRY CLIFFORD CAMPION, JR., OF PHILADELPHIA, PENNSYLVANIA; SAID CAMPION ASSIGNOR TO SAID SCOTT.

CIRCUIT-BREAKER CONTACT.

No. 896,764. Specification of Letters Patent. Patented Aug. 25, 1908.

Application filed January 30, 1906. Serial No. 298,611.

To all whom it may concern:

Be it known that we, WILLIAM M. SCOTT and HARRY CLIFFORD CAMPION, Jr., citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Circuit-Breaker Contacts, of which the following is a specification.

Our invention relates to electrical switches, automatic electrical switches, or circuit breakers and more particularly to the supplemental or shunt contacts employed to relieve the main contacts of the detrimental effects of arcing incident to the rupture of a circuit carrying an electrical current, especially when the current is of high voltage or power.

It is the object of our invention to produce a supplemental or shunt contact piece, usually of carbon, which shall be practically non-breakable under usual working conditions. It has been found that the carbon shunt contact pieces commonly employed are subject to breakage either at the time they are being assembled in the switch or circuit breaker, or when in service, and especially in the latter case with regard to the movable carbon which is subjected to considerable inertia effects. To this end we reinforce or strengthen the carbon shunt contact pieces by applying thereto a metal or other coating, electrolytically or otherwise applied, which greatly strengthens the contact pieces and enables them to withstand any mechanical strains they are likely to be subjected to.

For an illustration of our invention reference is to be had to the accompanying drawings, in which:—

Figure 1 is a side elevational view of an automatic circuit breaker employing our reinforced carbon shunt contact pieces. Fig. 2 is an enlarged side elevation of the stationary shunt carbon reinforced according to our invention. Fig. 3 is a front elevational view of the shunt contact piece shown in Fig. 2. Fig. 4 is a vertical sectional view taken on the line A—B in Fig. 3. Fig. 5 is a sectional view taken on the line C—D in Fig. 3. Fig. 6 is an enlarged view showing a side elevation of the movable shunt carbon reinforced according to our invention.

In Fig. 1, B is a base of marble or other suitable insulating material on which are mounted the main copper terminal blocks 1 and 2 adapted to be bridged by the laminated bridging member 3 secured to the arm 4 which is pivoted at 5. The toggle 6, 7 is adapted to cramp the laminated contact member 3 into engagement with the terminal blocks 1 and 2, the operating handle 8 being integral with the toggle link 7. A latch 9 serves to lock the parts in circuit closing position and electro-magnetic tripping means serve to actuate the latch in a manner well understood in this art.

The arm 4 has an upwardly projecting portion 10 to which are mechanically secured but from which are electrically insulated the movable metallic shunt contact piece 11, spring supported, and the movable carbon shunt contact piece 12, the latter pivoted at 13. The metallic shunt contact 11 coöperates with the metallic plate 14 forming a part of the bracket 15 secured and in electrical contact with the upper main terminal block 1. The movable carbon 12 coöperates with the stationary shunt carbon 16 pivoted in the bracket 15 at 17.

As well understood in the art, when the circuit breaker is tripped or opened, the laminated contact member 3, separates from the main contact terminals 1 and 2, thereafter the metal contact 11 separates from the carbon 16, and thereafter the carbon contact 12 separates from the carbon contact 16, and it is at these carbons that the final arcing occurs.

Referring to Figs. 2 to 5 inclusive, a groove 18 is made along the two sides, across the bottom, and across the flat face of the carbon 16, thus forming a continuous channel.

The portion of the surface of the carbon which is to remain exposed, is covered with paraffin or other easily removable insulating material up to the edge of the continuous groove 18. The groove 18 is in effect the boundary or limit of the portion of the carbon which is to remain exposed. The remainder of the carbon is not coated with paraffin. The carbon is then placed in an electro-plating bath, and copper, or any other suitable material, is plated on to it, covering all the parts not treated with paraffin. When the electro-plate coating has reached a suitable thickness, the carbon is removed and the paraffin is removed from its surface thus

leaving an effectively reinforced and strengthened carbon contact. This coating is represented at 19 throughout the drawings.

In Figs. 4 and 5, the circular openings or countersinks 20 accommodate the heads of screws whose shanks extend through the holes 21 and are screw threaded into the pivoted members 22. As shown the metallic reinforcing plate extends over the walls of the holes 21 and over the bottoms of the depressions 20. The coating over the portion of the outer surface of the carbon, and extending as well into the body of the carbon, by covering the surfaces of the holes 21 and the bottoms of the depressions 20, produces a greatly strengthened and materially improved carbon shunt contact piece for electric switches or circuit breakers.

It has been found that carbons reinforced according to our invention withstand great mechanical shocks and strains which heretofore caused breakage of carbon shunt contacts.

We are aware that carbon or graphite commutator brushes have been copper plated for the purpose of securing efficient electrical contact between the brushes and their brush holders, where relative movement generally occurs. We are also aware that arc light carbons have been electro-plated with copper for the purpose of reducing their resistance. We accordingly do not claim plated carbon or graphite, or plated brushes or arc light carbons, but confine our invention to reinforced shunt contact pieces of carbon or like material.

We reinforce our carbons and do not apply a conducting coating over their entire outer surfaces as is customary with dynamo brushes. While our coating increases the conductivity, it is incidental, for in shunt contacts it is not an object to reduce resistance or increase conductivity. It is our object to mechanically reinforce the carbon so that it may successfully withstand the shocks and strains to which it is subjected.

What we claim is:

1. In an electrical switch, a shunt contact piece, a groove in the surface thereof, and a reinforcing electroplate applied to said surface and extending into said groove.

2. In an electrical switch, a carbon shunt contact piece, a groove in the surface thereof dividing said surface into active and non-active portions, and a reinforcing electroplate applied to the inactive portion and extending into said groove.

3. In an electrical switch, a carbon shunt contact piece, an aperture therein to receive fastening means, and a reinforcing coating electro-plated upon the external surface of said piece and upon the wall of said aperture.

4. In an electrical switch, a carbon shunt contact piece, and a reinforcing electro-plate extending into the body and covering a portion of the surface thereof.

5. In an electrical switch, a carbon shunt contact piece, a groove in the surface thereof, and a reinforcing electro-plate applied to said surface and extending to said groove.

6. In an electrical switch, a refractory shunt contact piece having arcing and non-arcing surfaces, a groove dividing the surface of said piece into arcing and non-arcing portions, and a mechanically reinforcing electro-plate coating applied to the non-arcing portion of the surface of said piece, whereby said shunt contact piece resists the strains incident to assembly and switch operation.

7. In an electrical switch, a carbon shunt contact piece, an aperture extending therethrough to receive fastening means, a countersink, and an electro-plate coating applied to a portion of the surface of said contact piece and to the walls of said aperture and countersink.

8. In an electrical switch, a carbon shunt contact piece, a groove in each of a plurality of faces of said piece and dividing the surface of said piece into arcing and non-arcing portions, and a mechanically reinforcing electro-plate applied to the non-arcing portion.

9. In an electrical switch, coöperating shunt carbon pieces adapted to engage each other, a groove on each carbon dividing the surface of the same into engaging and non-engaging portions, and a reinforcing electro-plate on the non-engaging surface of each carbon and extending to said groove.

10. In an electrical switch, a carbon shunt contact piece, an aperture therein adapted to receive fastening means, and a reinforcing electro-plate upon the wall of said aperture.

11. In an electrical switch, a composite shunt contact piece consisting of refractory conducting material and a reinforcing electroplate, said electroplate covering a portion of the external surface of said refractory material and extending into the body thereof.

In testimony whereof we have hereunto affixed our signatures in the presence of the subscribing witnesses.

WILLIAM M. SCOTT.
HARRY CLIFFORD CAMPION, JR.

Witnesses:
JAMES H. BELL,
ALICE S. MARSH.