E. T. MUG.

BRUSH FOR DYNAMO ELECTRIC MACHINES

APPLICATION FILED NOV. 17, 1905.

908,483. Patented Jan. 5, 1909.

Fig. 2.

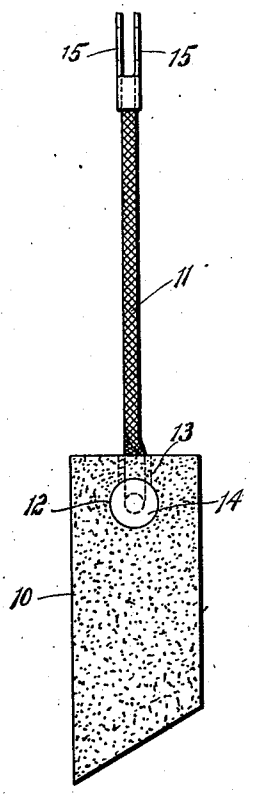
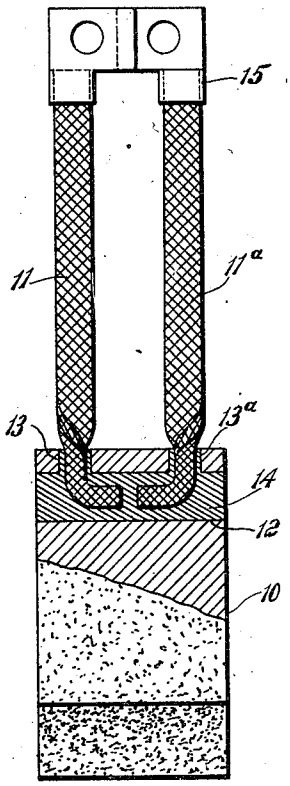


Fig. 1.



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EDWARD T. MUG, OF NORWOOD, OHIO, ASSIGNOR TO THE BULLOCK ELECTRIC MANUFACTURING COMPANY, A CORPORATION OF OHIO.

BRUSH FOR DYNAMO-ELECTRIC MACHINES.

No. 908,433. Specification of Letters Patent. Patented Jan. 5, 1909.

Application filed November 17, 1905. Serial No. 287,833.

To all whom it may concern:

Be it known that I, EDWARD T. MUG, citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Brushes for Dynamo-Electric Machines, of which the following is a full, clear, and exact specification.

My invention relates to brushes for dynamo-electric machines, and more particularly to the connections between the brushes and flexible leads or conductors.

Heretofore, great difficulty has been experienced in effecting a good electric and mechanical connection between the high resistance brush ordinarily employed in dynamo-electric machines and the low resistance, braided flexible conductor or "pig tail" connected thereto. The flexible conductor has been connected to the carbon brush in a great many ways, for instance, by soldering it directly to the copper plated surface of the brush; by soldering it in a slot formed in the brush; by fastening it to a bolt placed in a transverse hole drilled through the brush; by clamping and soldering it to a metallic clip which is then in turn soldered to the copper plating of the brush, etc. Soldered connections are objectionable on account of the liability of the very thin copper coating becoming oxidized by the heat of soldering and the connection between the conductor and the brush being thereby loosened, even entirely destroyed. The other methods above enumerated are objectionable for the reason that they require a multiplicity of parts which are expensive to construct and assemble.

The object of my invention is to provide an improved connection between the carbon brush and the flexible braided wire conductor or cable, commonly employed to carry the current transmitted to or from the brush, so that the brush can carry without undue heating, the full current transmitted thereto and therefrom.

With this end in view I provide the brush with a channel, in which the flexible conductor is inserted, the latter being held in place by a fusible metal which surrounds the end of the conductor and fills the unoccupied space in the channel, whereby a good connection electrically and mechanically is obtained.

More specifically considered my invention consists of a brush having a transverse channel and one or more openings extending from the top of the brush into the channel and into the body of the brush if desired, a flexible conductor extending through each of the openings into the channel, and a fusible metal filling the unoccupied space in the channel and openings and holding the conductors in place.

My invention still further consists in the details of construction and combinations of elements described in the specification and set forth in the appended claims.

I will now explain my improved connection, and also the steps of the process of the formations of the same by reference to the accompanying drawings in which—

Figure 1 is an elevation of a brush provided with my invention, parts being broken away for the sake of clearness; and Fig. 2 is a side view of the same.

Referring now to the figures of the drawing, I have shown at 10, a carbon brush as ordinarily used in dynamo-electric machines. The carbon brush is provided at 11 and 11^a with two flexible braided wire conductors or "pig tails" attached to the brush by my improved connection. The brush is provided near its top with a transverse channel or perforation 12 extending from side to side of the brush, and also with the two openings or channels 13 and 13^a which are arranged at right angles to the channel 12 and extend from the top of the brush to the channel. The perforations or channels 12, 13, and 13^a may be formed in the brush during the process of its manufacture or may be afterwards drilled. If desired, the channels or openings 13 and 13^a may extend beyond the transverse channel 12, into the body of the brush.

Preferably flat, woven wire, flexible conductors, or pig tails, 11 and 11^a are employed. The lower ends of these conductors are turned or rounded as shown and extend from the top of the brush through the channels or openings 13 and 13^a into the channel 12. The free ends of the conductors which extend into the channel 12 are preferably bent by a suitable tool in the direction of the channel, and preferably toward each other, as shown. I have shown two channels leading from the top of the brush to the transverse channel 12, and I have shown two conductors 11 and 11^a with their ends inserted

therein, but I wish to be understood that I am not to be confined to the use of this specific number of conductors shown. I may use a single conductor or I may use more than two. I prefer however, to employ two conductors in the manner shown, for the reason that for the same current carrying capacity, much more flexible "pig tails" can be employed than if a single large "pig tail" or conductor is employed.

After the ends of the conductors are inserted in place in the brush, a fusible metal or alloy 14, such as Babbitt, or type metal, is run into the channel 12, until the unoccupied space in all the openings is entirely filled and the ends of the conductors are completely surrounded by the metal. It is seen that when the metal 14 is cooled and hardened that a connection is formed between the brush and the conductor or conductors which is most effective, both electrically and mechanically. It will be impossible for the conductors to become loose accidentally. If desired, a fusible anchoring metal or alloy 14 may be employed which will expand on solidifying to more completely fill the space in the brush. The channels 13 and 13ª may extend beyond the transverse channel 12 into the body of the brush as far as desired. In this case the fusible metal would provide a better path for the current than the carbon and therefore the resistance and consequent heating would be reduced and life of the brush prolonged.

The ends of the conductors are provided with connection clips 15 made of flexible punched material by means of which the conductors may be connected to a brush holder or any other stationary member.

I do not wish to be confined to the details shown, I have shown a preferred embodiment of my invention, but various changes may be made without departing from the spirit and scope of my invention and I aim in the appended claims to cover all such changes and modifications.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A carbon brush having a transverse channel, and a channel or opening extending from the transverse channel to the top of the brush, a fusible metal filling said channels, and a conductor embedded in said metal.

2. A carbon brush having a transverse channel extending through the same, and an opening leading from said channel to the top of the brush, a conductor extending through said opening into the channel, and a fusible metal entirely surrounding the end of the conductor and anchoring the latter in place.

3. A carbon brush having a transverse channel extending from one side to the other, and a second channel extending from the transverse channel to the top of the brush, said channels being substantially at right angles to each other, a conductor extending from the top of the brush through said last named channel and having its end bent at substantially right angles into the transverse channel, and a metal-filling in said transverse channel, the end of the conductor being embedded therein.

4. A carbon brush having a transverse channel extending from one side to the other, an opening or channel leading from the top of the brush to the transverse channel, a conductor extending through said opening into the transverse channel, and a metal or alloy filling said transverse channel and surrounding the end of said conductor, said metal or alloy consisting of a substance which expands on solidifying.

5. A carbon brush having a transverse channel extending therethrough, a plurality of holes or openings extending from the top of the brush to said channel, a flexible conductor extending through each of said openings into the channel, and a fusible metal in said channel completely surrounding and anchoring the conductors in place.

6. A brush having a transverse channel extending therethrough, a plurality of openings or channels leading from the top of the brush to the transverse channel, a conductor extending through each of said openings into the transverse channel, and a fusible metal surrounding the conductors and completely filling the unoccupied space in the channels and openings.

In testimony whereof I affix my signature, in the presence of two witnesses.

EDWARD T. M[illegible]

Witnesses:
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ARTHUR F. KWIS.