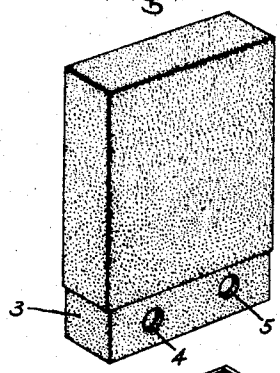
June 28, 1927. 1,633,815

F. C. KELLEY

ELECTRIC TERMINAL

Filed Sept. 14, 1925

Fig. 1.



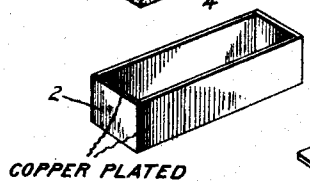


Fig. 2.

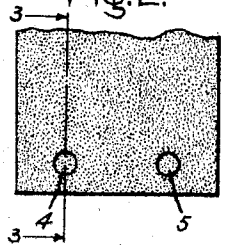


Fig. 3.

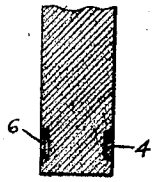


Fig. 4.

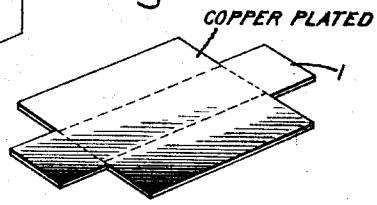


Fig. 5.



Fig. 7.

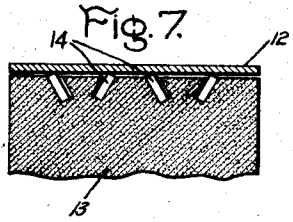


Fig. 6.

Inventor:
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Patented June 28, 1927. 1,633,815

UNITED STATES PATENT OFFICE.

FLOYD C. KELLEY, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC TERMINAL.

Application filed September 14, 1925. Serial No. 56,163.

The present invention comprises a new electric terminal which is particularly adapted for attachment to carbonaceous bodies, such as brushes for dynamo electric machines. This application is a continuation in part of my copending application. Serial No. 728,977, filed July 29, 1924.

It is the object of my invention to provide a terminal construction which is mechanically strong and rugged. When used for devices, such as a furnace electrode, it is capable of withstanding high temperatures without deterioration.

My invention is applicable particularly to the production of electric contacts for brushes which are subjected during service to the wearing action of a spring-pressed contact as in a railway motor. The metal cap upon such a brush is adapted to withstand the wearing action of the contact better than carbon.

The novel features of my invention will be set forth with particularity in the appended claims.

My invention is described hereinafter in detail in connection with the accompanying drawing in which Fig. 1 shows a perspective view of the brush and terminal; Fig. 2 shows a vertical elevation of a modified form of brush; Fig. 3 is a cross-section taken on line 3—3 of Fig. 2; Fig. 4 shows a form of metal blank from which the terminal may be formed; Fig. 5 is a perspective view of one of the metal disks employed to effect the connection between the terminal and brush; Fig. 6 shows the assembled article held in a form ready for introduction to a furnace for the fusion of the binder metal; and Fig. 7 illustrates in section a modification.

In accordance with my invention I have provided a terminal which is constituted by a metal member anchored into firm mechanical and electrical relation with a dynamo electric machine brush or other carbonaceous body, by a metal set from a fused state. The metal member may be united to the brush by lugs of metal set from fusion or by metal lugs inserted in the carbon body and brazed to the metal cap with molten metal.

As shown in Fig. 4, the terminal for a brush, electrode, or other body consisting of carbon, graphite or the like, may be made from a sheet of metal, such as iron, nickel-copper alloy, or the like, by cutting away the corners and bending the sides along the dotted lines to form a cap 2 as shown in Fig. 1. When copper brazing iron caps in a hydrogen furnace, and in the presence of carbon brushes, the iron tends to melt at the same time as the copper, and to produce terminals which are brittle and hard, due to carburization. In order to overcome this drawback, I provide the iron metal terminal with a copper coating. The coating may be applied by electrolysis or any suitable means either to the blank, such as shown in Fig. 4, or to the finished cap, as shown in Fig. 1. The copper coating is then welded to the iron body of the cap by heating in a hydrogen furnace. The cap formed in this manner is not affected by carburization when it is later heated in the hydrogen furnace in the presence of the carbon brush, but remains soft and pliable.

The body of the brush preferably is reduced in section at 3, so that when the cap is slipped upon the reduced section, the sides of the cap will be flush with the sides of the carbon block, although, of course, this is not essential. Depressions 4, 5 are formed in this contacting end and into these depressions, disks of a metal, such as iron (shown in Fig. 5), are inserted. As shown in Figs. 2 and 3, the cavities 4, 5 do not extend through the brush. Preferably they are just large enough to receive the disks and the cavities are formed on opposite sides of the carbon body, the cavity 6 being shown in Fig. 3. When these metal disks 7 have been inserted in the cavities, the cap 2 is slipped over the end 3 of the carbon body. Preferably the end 3 and the cap 2 should make a firm frictional fit.

The article thus assembled is placed in some suitable holder, such as a carbon block, having a longitudinal groove for receiving the assembled article as indicated in Fig. 6. Retaining blocks, 8, 9, then are inserted against the capped end of the brush. Copper in the form of sections of wire 10, or other convenient form, is placed adjacent the capped end, preferably in contact with the cap 2.

When the article thus assembled is heated in hydrogen, or other reducing gas, to the fusion temperature of copper, a slight expansion of the cap 2 occurs, and fused copper fills up the crevices between the cap and the disks and also between the cap and the

carbon body itself. As the temperature falls, the copper first solidifies from fusion and as the cap cools further, that is down from the solidifying temperature of copper about 1085° C. to room temperature, the cap shrinks and takes firm hold of the body.

In accordance with a modification of my invention illustrated by Fig. 7, a terminal 12, consisting of a plate of steel, or other suitable metal, is joined to a body of graphite or carbon 13, by a fused metal such as cast iron. A number of cavities or recesses are made in the carbon brush, or other body (this being shown in part broken away). The cavities preferably extend at an angle to each other as indicated. Plugs of cast iron 14 are placed in these cavities and the plate 12 which consists of a metal of higher melting point such as steel or cold rolled iron, is placed upon the cast iron plugs. The plugs need fit only loosely in the cavities, the spaces between the plugs and the carbon body being somewhat exaggerated. Powdered iron, which may be mixed with carbon is placed between the plate 12 and the carbon body 13. The parts thus assembled are heated to about 1200° C. in hydrogen and allowed to stand for several minutes at this temperature.

It will be observed that the plugs 14 extend somewhat beyond the upper end of the carbon brush 13. Plate 12 is, therefore, kept away from the carbon brush until the plugs 14 melt, and in this manner carburization of the plate 12 takes place only to a limited extent. A firm union is made with the contact plate by the fused metal, and due to angular relation of the metal projecting from the plate and filling the cavities, a firm union is maintained. Suitable conductors (not shown) later may be joined in any convenient way mechanically, or by brazing or welding to the steel plate 12.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. An article of manufacture comprising a body of carbonaceous material and a sheet metal member engaging therewith and being bent to conform with a part of the surface of said body, said sheet metal member being provided with anchors engaging with said carbonaceous body and being joined to said sheet metal member by a layer of copper.

2. A brush for a dynamo electric machine comprising a body of carbonaceous material, a sheet metal cap frictionally engaging with said body and metallic anchors engaging with depressions in said carbonaceous body and joined by a layer of copper to said cap.

3. A terminal for a dynamo electric machine brush having a body of carbonaceous material which comprises a metal cap engaging with one end of said body, metal members engaging with depressions in said body, and a layer of fusion-deposited metal joining said members to said cap and filling the crevice between said cap and carbonaceous body.

4. A carbon brush for a dynamo electric machine having a terminal constituted by a sheet metal cap frictionally engaging with the end of said brush, a plurality of metal discs embedded in depressions in said brush under said cap and a layer of copper binding said discs to said brush and coating the inner surface of said cap.

In witness whereof, I have hereunto set my hand this 11th day of September 1925.

FLOYD C. KELLEY.