Dec. 8, 1931. M. C. BURR 1,835,011

ELECTRICAL CONTACT ELEMENT AND PROCESS OF MAKING SAME

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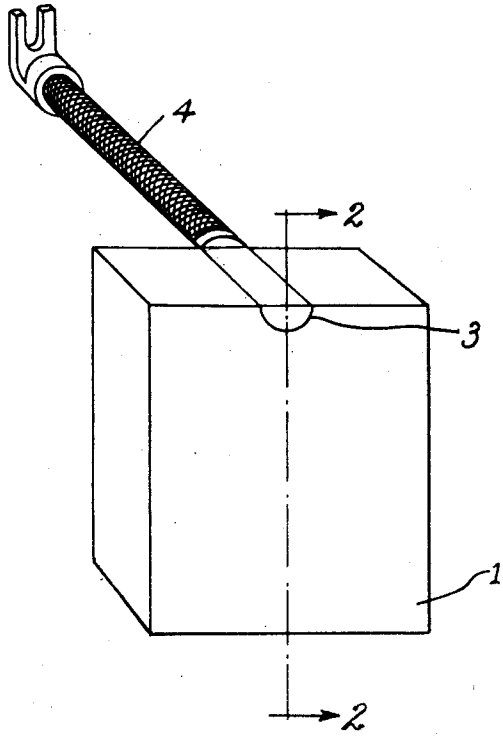


Fig. 1.

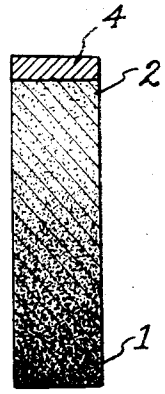


Fig. 2.

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UNITED STATES PATENT OFFICE

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ELECTRICAL CONTACT ELEMENT AND PROCESS OF MAKING SAME

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My invention relates to electrical contacts and particularly to carbon brushes for electric motors.

In the composition of brushes for electric motors and other similar uses it has been customary, in the past, to use carbon powder, such as powdered coke, and graphite mixed with some bituminous binder such as coal tar pitch. The mixture of desired percentages of the various ingredients have been pressed in a mold and then baked. In order to provide a suitable contact portion for the attachment of an electric wire to the brush, it has further been suggested that the surrounding surfaces about the orifice through which the contact lug is to be attached be plated or coated with copper. A connection thus made will avoid resistance losses and heating up at the point of contact.

The plating of the brushes as above suggested has been expensive and has not resulted in obtaining the best results, and it is the object of my invention to provide a process which will in some instances make the plating of the portion of the brush to which the wire is to be attached unnecessary, and in other instances make a portion which may be much more readily coated or plated if this operation is still thought to be necessary.

It is specifically my object to make a brush which will have the portion thereof to be exposed to the commutator of substantially the same ingredients as have formerly been used, and to integrally mold and bake with this composition, a portion to which the wire will be attached which will have as part of its composition a substantial amount of a powdered metal such as copper or aluminum, which will thus greatly increase its conductivity and cut down losses due to resistance and heating up at the juncture of the wire and the brush.

It is further my object to make a brush as above suggested, which is so formed that there will be no line of weakness at the juncture of the materials composing the respective parts of the brush and so that the whole brush will be a substantially integral formation.

In carrying out my invention there is a wide range of proportions and ingredients which may be used in the making of the brush.

As a specific example of one method, I take fifty percent of powdered petroleum coke, ten percent of natural graphite and forty percent of coal tar pitch. These ingredients I mix in a heated mixer, heated sufficiently so that the pitch will melt. The entire mass is thoroughly worked up and then allowed to cool and agglomerate in lumps. It is then pulverized. I then take a batch of fifty percent of finely powdered copper and mix it with twenty five percent of graphite and twenty five percent of coal tar pitch and mix the ingredients independently in another heated mixer. This mixture is then allowed to cool and it is then finely ground up.

Into a mold having a cavity shaped according to the brush which is my desire to make, I deposit in one portion the first mixture above noted consisting of the carbon and pitch, and into another portion of the cavity I deposit the second named mixture containing the metal powder. I may provide a wall in the mold subdividing the two mixtures. I then remove the subdividing wall and apply pressure to the mold. Ordinarily the molding will be accomplished in a hydraulic press. After removal from the press I bake the molded product and the integral formation above noted is formed, which does not have a weakened cleavage line at the juncture line of the two different ingredients.

It should be understood that the inventive principle involved consists, in its broader aspects, in the provision of an integrally formed brush piece having variable resistance in the component parts. While I have, in the example cited above, specified particular ingredients there is a wide scope of ingredients and percentages with which the invention may be practiced. In the example cited the portion of the brush containing the metal powder will have a toughened surface which ordinarily will avoid the necessity of metal supporting plates or holders.

For example, in the manufacture of the armature engaging end of the brush I may use lampblack, artificial graphite and various

bituminous tars and pitches or other carbonaceous binders. The percentages may also be varied.

In the contact end of the brush I may use from fifteen to eighty percent of powdered copper or aluminum or other suitable powdered metallic conductors. Further, the percentages of carbon composition and bituminous or carbonaceous binders may also be varied to meet particular conditions.

In the drawings:

Figure 1 is a perspective view of one type of commutator brush.

Figure 2 is a section along the lines 2—2 in Figure 1.

The brush has the commutator contacting portion 1 composed of the powdered coke, graphite and coal tar pitch. The conductor contacting end 2 is composed of finely divided copper, graphite and coal tar pitch. The block is integrally molded in a mold which forms a groove 3 at the contacting end for the reception of a contact wire 4 which is soldered within the recess in the brush.

Other sizes, shapes and forms of brushes may, of course, be molded to suit the particular requirements of the use to which they are to be put.

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

1. A commutator brush having one end composed of carbon and a carbonaceous binder, and the other composed of carbon, a carbonaceous binder and metal powder.

2. An integrally molded commutator brush having a commutator contacting end of relatively high resistance and having a carbonaceous composition, and a conductor contacting end having a relatively low resistance and having in its composition a portion of finely divided metal.

3. An integrally molded commutator brush having a commutator contacting end formed of carbon and a carbonaceous binder and a conductor contacting end of relatively lower resistance having a composition comprising carbon, a carbonaceous binder and finely divided copper.

4. An integrally molded commutator brush having the commutator contacting portion thereof of relatively high resistance, and having a carbonaceous composition, and a conductor contacting portion having a relatively low resistance and having in its composition a portion of finely divided metal.

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