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ELECTRICAL CONTACT BRUSH

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1

This invention relates to electrical contact brushes.

During commutation, electrical contact brushes must carry two currents—the useful current to or from an outside circuit and the circulating currents between segments of the commutator. Difficulties arise if the circulating currents become too large, and it is desirable to control them. In flowing from segment, to segment, the circulating currents encounter the contact resistance between brush and commutator and the resistance of the brush itself. Both these resistances are also in the path of the useful current, so that it is undesirable to attempt to control the circulating currents by increasing the resistances unduly, and a compromise must be effected. It is known that the best results follow when contact resistance is kept quite low, but without diminishing brush resistance below certain recognized minima.

The object of this invention is to provide an electrical contact brush which has been treated so as to reduce the contact resistance between the brush and the commutator without appreciably increasing the conductivity of the body of the brush.

To accomplish the object of the invention a carbon or graphite brush is impregnated with silver in an amount not more than 10 percent by weight of the conducting material. It has been found that such small amounts of silver in the brush do not appreciably increase the conductivity of the brush but do lower the contact resistance. For most purposes a brush containing from 0.5 to 5 percent by weight of silver will be satisfactory.

In a specific embodiment of the invention, an electrical contact brush was placed in an airtight vessel from which the air was evacuated. The brush was allowed to stand for about thirty minutes in the evacuated vessel after which time a ten percent solution of silver nitrate in water was introduced into the vessel in an amount sufficient to cover the brush. Pressure in the vessel was then raised to approximately 85 pound per square inch and maintained at this level for about thirty minutes. The brush was then air dried, and finally baked at a temperature of around 600° C. During the baking process the silver nitrate decomposed leaving small particles of silver distributed throughout the brush.

A brush which had been treated as described above had a composition by weight of 0.82 percent silver. This composition can be varied by changing the time of treatment, the concentration of silver nitrate solution and the pressures

2

to which the brush is subjected. Brushes containing the preferred amount of silver can be made by other means within the scope of this invention. For example, the silver can be added to the carbon or graphite before the latter is molded into brushes. The process described is merely illustrative of one that can be adopted.

Brushes made according to the method of impregnation described above have a higher concentration of silver near the surface of the brush than in the inner portions. This can cause a marked effect on the conductivity of the brush if the total amount of silver in the brush approaches the upper limits of the invention. The difficulty can be remedied by removing the outer portions of the brush since the composition of all but the extreme outer portions is substantially homogeneous.

Brushes within the scope of this invention can be made using any of the grades of carbon and graphite usually used in the manufacture of brushes, including those of an abrasive nature. The term "carbon," as used in the appended claims, includes all such compositions. The brush itself may be solid or laminated according to the requirements of particular commutation problems.

A brush made according to this invention has a contact resistance which remains practically constant despite changes in the temperature of the commutator.

I claim:

1. An electrical contact brush comprising carbon and not more than 10 percent by weight finely divided silver, said silver being distributed uniformly throughout said brush.

2. An electrical contact brush comprising carbon and 0.5 percent to 5 percent by weight finely divided silver, said silver being distributed uniformly throughout said brush.

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