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CARBON BRUSH AND METHOD OF MAKING

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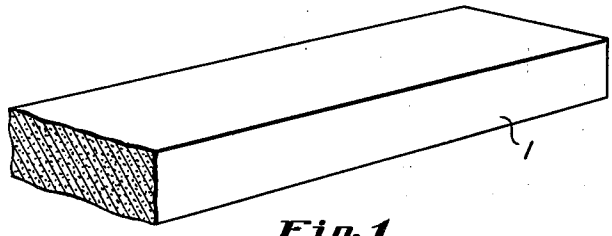

Fig. 1

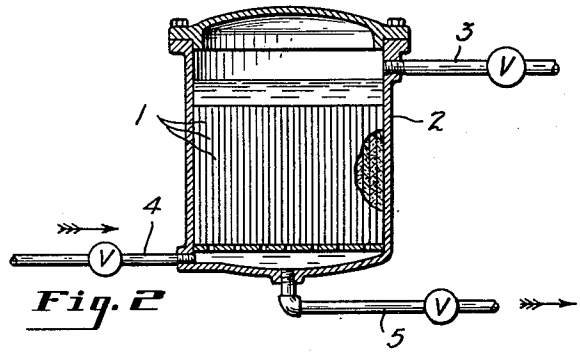

Fig. 2

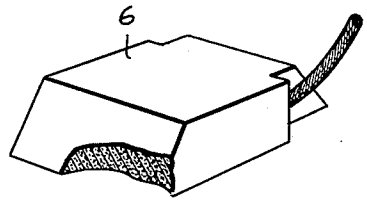

Fig. 3

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CARBON BRUSH AND METHOD OF MAKING

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5 Claims. (Cl. 171—325)

This invention relates to molded brushes for motors or generators and similar electrical contact elements of the type known as carbon brushes, in which the conductive material consists mainly of carbon particles.

Objects of the invention are to increase the strength and durability of such brushes and also to lower the coefficient of friction of the brush so that objectionable chattering of the brushes on commutators is eliminated and the brushes ride more evenly on the rotating surface with which they engage.

In making the brush of the present invention, the finely divided conductive material consisting mainly of fine carbon particles is mixed with a suitable quantity of a resinous binding material preferably pitch or tar which may be coked or carbonized by heat treatment and the mixture is pulverized to a finely divided state. The pulverized mixture is then molded under pressure in the form of blocks suitable for brushes, or may be molded in the form of elongated bars which may be cut to length to form a number of brushes, and after molding, the blocks or bars are baked at a temperature of from 1700° to 1800° F. for a time sufficient to coke or carbonize the binding material, with the result that the bars or blocks are hardened but are porous due to the coking or carbonization of the binder.

If desired the blocks may be further processed by subjecting them to a graphitizing heat which converts the carbon into the form of graphite.

Blocks prepared as above described have heretofore been extensively used as brushes for motors or generators.

The brush of the present invention is, however, subjected to further treatment which increases its strength and durability and which also lowers its coefficient of friction so that the brush will operate more smoothly.

The carbon or graphite blocks formed as above described are placed in a conventional impregnating tank provided with means for applying pressure.

The blocks are placed in the impregnating tank and treated therein with a solution of resinous material which is capable of being hardened upon application of heat. The resinous material preferably used is a resinous material formed by the condensation of a mixture comprising a polyhydric alcohol and a polybasic acid. This group of resins may be termed "glycerophthalate resins". The blocks are thoroughly impregnated with the solution by applying a suitable pressure in the impregnating tank and after impregnation are dried to evaporate the solvent and then baked for from two to three hours in an oven heated from 350° to 700°. This heating polymerizes the resinous material which has been deposited in pores of the block upon evaporation of the solvent and forms a hard resinous coating on the walls of the pores interspersed throughout the body of each block, greatly increasing the strength of the blocks.

The glycerophthalate resin has the additional advantage of reducing the coefficient of friction of the brush, thereby eliminating chattering and insuring smoother operation.

The carbon particles may be in the form of graphite or amorphous carbon, and in the original baking the brushes may be subjected to sufficient heat to graphitize the block.

Referring to the accompanying drawing:

Fig. 1 is a perspective view showing a bar of the material from which the brushes are made;

Fig. 2 is a sectional view showing the tank in which the bars are impregnated;

Fig. 3 is a perspective view showing a completed brush.

Carbon bars 1 such as shown in Fig. 1 are placed in a suitable impregnating tank 2 such as shown in Fig. 2 having a valve controlled vacuum pipe line 3, a valve controlled supply pipe line 4 and a valve controlled drainage pipe line 5. After the tank 2 is charged with carbon bars 1, air is exhausted through the line 3, and solvent with the resinous material in solution is delivered into the tank through the line 5 under suitable pressure, and excess solvent being drained away through the line 5. Brushes such as the brush 6 shown in Fig. 3 are formed from the impregnated carbon bars.

While the method of the present invention is ordinarily practiced in the manufacture of brushes from finely divided materials, it is obvious that the original molding and baking and the subsequent impregnation and baking may be performed at different times and places.

In one aspect thereof, the invention may be considered as a method of treating molded carbon brushes to increase the strength and durability thereof and improve the operating characteristics.

Furthermore, it is to be understood that the particular form of product shown and described, and the particular procedure set forth, are presented for purposes of explanation and illustration and that various modifications of said product and procedure can be made without departing

from my invention as defined in the appended claims.

What I claim is:

1. An electrical contact element comprising a porous block composed of finely divided material consisting mainly of carbon held together by a carbonized binder and having the pores thereof partially filled with a polymerized resinous material.

2. An electrical contact element comprising a porous block composed of finely divided material consisting mainly of carbon held together by a carbonized binder and having the pores thereof partially filled with a polymerized glycero-phthalate resin.

3. The method of making electrical contact elements which consists of forming blocks of the desired shape by mixing finely divided material composed mainly of carbon with a glycero-phthalate resin, molding the mixture and subjecting the molded material to heat sufficient to carbonize the binder, impregnating the blocks so formed with a solution of a resinous binding material, and heating the blocks to polymerize the glycero-phthalate resin.,

4. The method of making electrical contact elements which consists of forming blocks of the desired shape by mixing finely divided material composed mainly of carbon with a resinous binding material, molding the mixture and subjecting the molded material to heat sufficient to carbonize the binder, impregnating the blocks so formed with a solution of a glycero-phthalate resin, and heating the blocks to polymerize the glycero-phthalate resin.

5. The method of treating carbon brushes of the type in which carbon particles are held together by a carbonized binder, which comprises impregnating a brush with a solution of a glycero-phthalate resin, evaporating the solvent and heating the brush to polymerize the glycero-phthalate resin.

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