

W. MILLS.

CARBON BRUSH AND PROCESS OF MAKING SAME.

(Application filed Nov. 5, 1901.)

(No Model.)

Fig. 1,

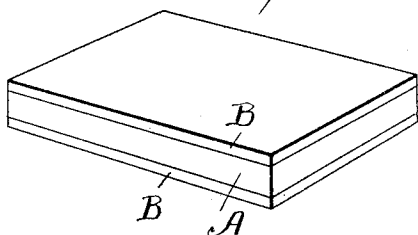


Fig. 2,

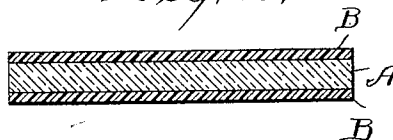


Fig. 3,

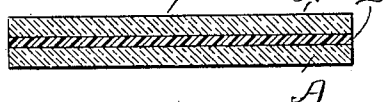


Fig. 5,

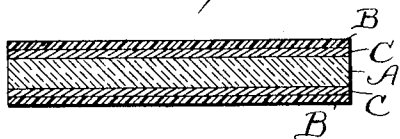


Fig. 4,

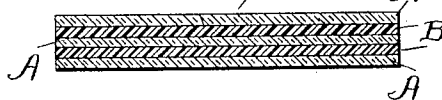


Fig. 6,

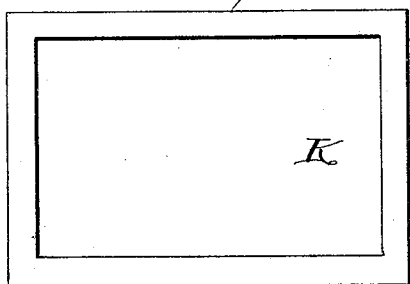
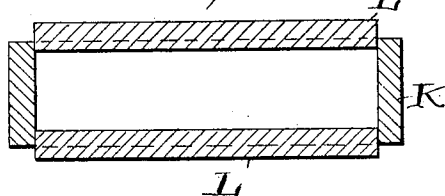


Fig. 7,



Witnesses:
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UNITED STATES - PATENT - OFFICE.

WILLIAM MILLS, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO EASTERN CARBON WORKS, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

CARBON BRUSH AND PROCESS OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 701,369, dated June 3, 1902.

Application filed November 5, 1901. Serial No. 81,244. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MILLS, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Carbon Brushes and the Process of Making the Same, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to brushes for electric generators and motors, controllers, and various electrical appliances where electrical contact between relatively movable surfaces is required and includes not only the article, but the process of making it.

My brush has a portion of high conductivity and another portion of relatively low conductivity, the effect being that the breaking of the circuit or the forming of the difference in potential at the brush and its cooperating surface—as a commutator, for example—occurs at a high point of resistance, resulting in less sparking and in a corresponding reduction of heat in the brush, the commutator, and the brush-holder. My brush allows the active or usual current to pass through the high conductor portion, while the resistance portions take care of the Foucault or eddy currents.

My invention includes, broadly, a new article of manufacture, comprising a carbon brush having a portion of relatively high conductivity and a portion of relatively low conductivity in the more particular formation thereof, as hereinafter described, and in the process of making such brushes.

In making my brush, I take stone, ground mica, sand, clay, or other suitable non-conductor and grind it to an impalpable powder, then mix it with a certain percentage of graphite and carbon and add enough binder—as pitch or molasses, for example—to hold the parts together and obtain the proportion I desire of resistance. The amount of resistance of the composition is governed by the proportions of non-conducting material and conducting material employed. The

greater the amount of stone, clay, &c., the higher is the resistance, while the greater the amount of carbon, graphite, pitch, &c., the lower the resistance. Having made my resistance mixture, I place layers of it and ordinary relatively high conductive material, as carbon, in a suitable mold, each layer being leveled with a gage to insure its proper thickness. I then subject the whole to a high pressure, causing the layers to firmly adhere. This pressure may be very conveniently supplied by a hydraulic press. The arrangement and relative position of the layers are varied according to the uses to which the brush is adapted to be put. The drawings illustrate several arrangements.

Figure 1 is a perspective view of one of the brushes made in a common shape for commutator-work, and Figs. 2 to 5 are cross-sections of various arrangements of the brush layers. Figs. 6 and 7 represent a mold which may be employed to make the brush, Fig. 6 being a plan of the mold-frame, and Fig. 7 a vertical section of the frame and its accompanying plates.

In the drawings, A represents the layer of high conductivity, and B the layer of relatively high resistance. In Figs. 1 and 2 it will be seen that the high-conductivity layer is intermediate and the high-resistance layers are on the outside. Fig. 3 is the reverse of this. In Fig. 4 there are five layers alternately. In this view the layers are all of the same thickness, while in the preceding views the thickness varies. Fig. 5 shows a central thick layer A of high conductivity and on opposite sides of this a comparatively thin layer of less conductivity C and outside of these on the two side layers of the lowest conductivity B.

The above-described arrangements are deemed sufficient to illustrate the nature of my brush and are not intended as enumerations of all its modifications.

In forming the brush the materials composing the different layers are put within the frame K, the plates L placed on opposite sides thereof, and the mold is then put in a

hydraulic press, forcing the plates L L toward each other and compressing the layers to cause them to firmly adhere.

I claim—

- 5 1. The process of making electric brushes, consisting of placing in a mold alternate layers of relatively high and low resistance and submitting them to a pressure capable of causing them to firmly adhere.
- 10 2. The process of making an electric brush, consisting of making a resistance composition by mixing a substance similar to ground stone, mica, clay, &c., with carbon, and putting a layer of this material and a layer of
- 15 relatively high conductivity in a mold and subjecting the same to pressure.
3. The process of making a carbon brush, consisting of making a high-resistance composition of material similar to ground stone, mica, &c., and carbon, and a suitable plastic
- 20 binder; and alternating this composition and carbon in layers; and in subjecting the whole to a high pressure.

4. A carbon brush composed of a layer of carbon and a layer of a mixture of carbon 25 and non-conductor.

5. A carbon brush composed of a layer of high-conductivity material and a layer of relatively low conductivity material, which latter comprises a mixture of carbon and a substance similar to ground stone, mica, clay, &c. 30

6. A carbon brush consisting of alternate layers of varied resistance, the high-resistance layers being of carbon and the low resistance of a mixture of carbon and material 35 similar to ground stone, mica, &c.

7. A carbon brush consisting of layers of different resistance pressed into intimate contact with each other.

In testimony whereof I hereunto affix my 40 signature in the presence of two witnesses.

WILLIAM MILLS.

Witnesses:

E. J. WILSON,
GEO. B. ARFKEN.