No. 701,363. Patented June 3, 1902.

R. D. LAUGHLIN.

PROCESS OF MAKING ELECTRIC BRUSHES.

(Application filed Dec. 30, 1901.)

(No Model.)

Fig. 1.

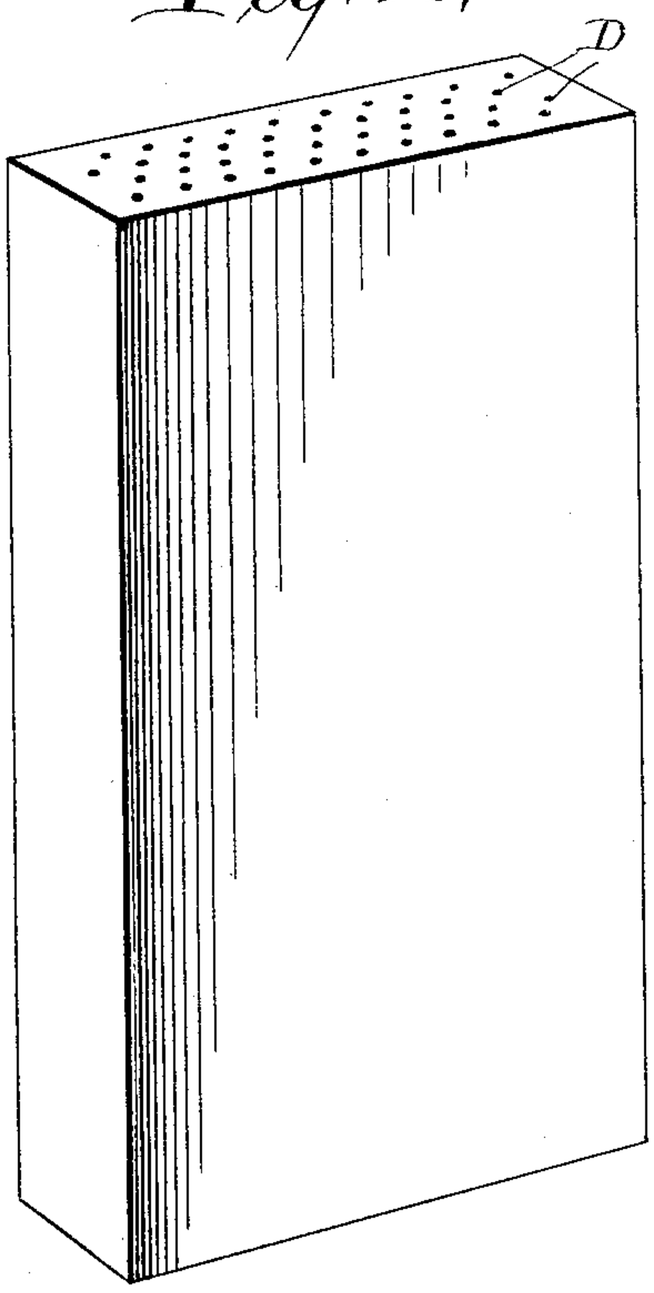


Fig. 2.

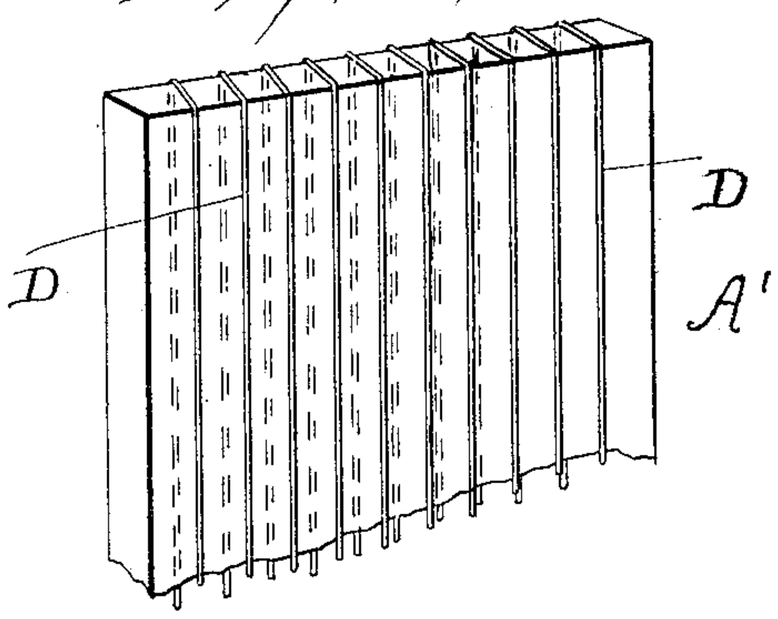


Fig. 3.

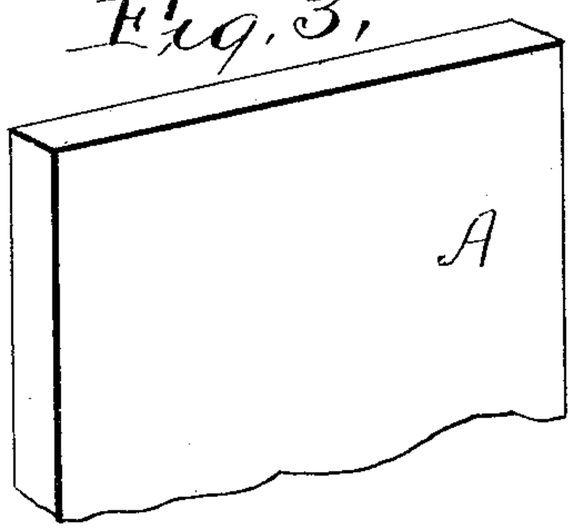


Fig. 4.

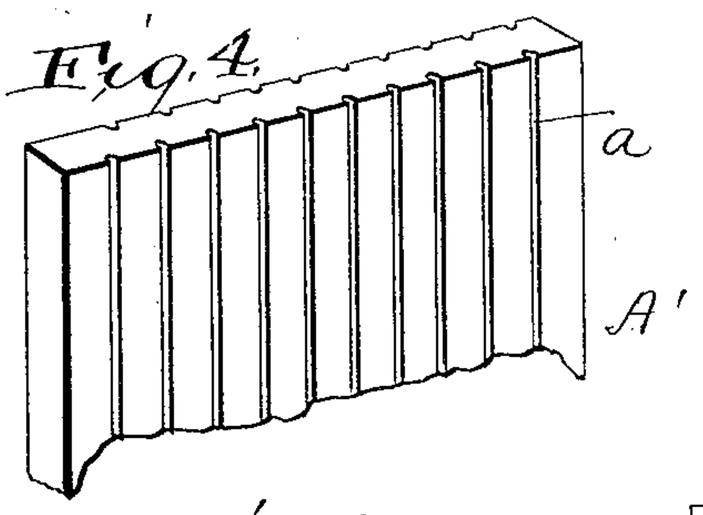


Fig. 5.

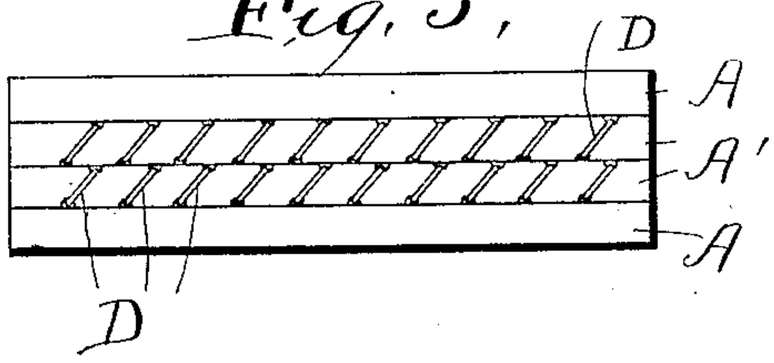


Fig. 7.

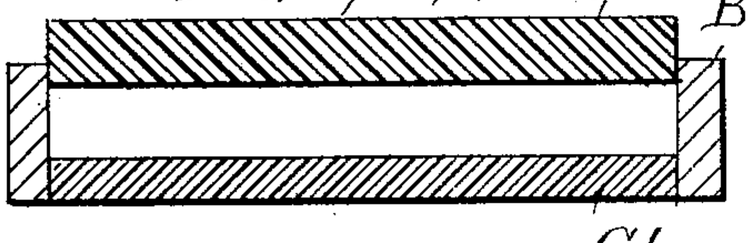
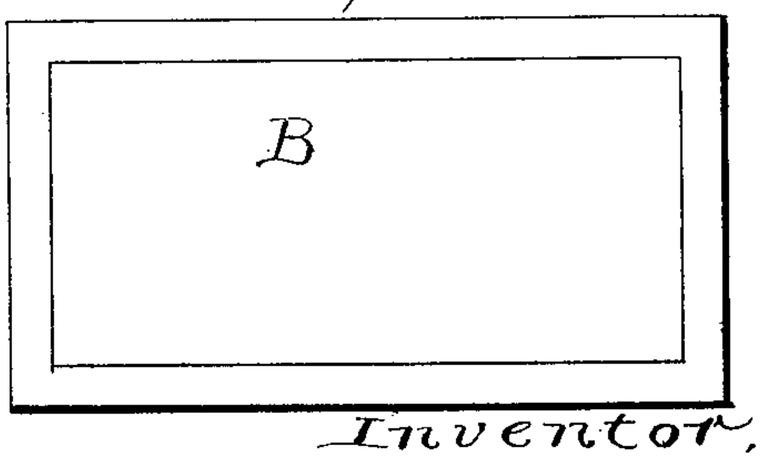


Fig. 6.



Witnesses.
E. B. Gilchrist
H. M. Wise.

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Robert D. Laughlin,
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UNITED STATES PATENT OFFICE.

ROBERT D. LAUGHLIN, OF RAVENNA, OHIO, ASSIGNOR TO NATIONAL CARBON COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF NEW JERSEY.

PROCESS OF MAKING ELECTRIC BRUSHES.

SPECIFICATION forming part of Letters Patent No. 701,363, dated June 3, 1902.

Application filed December 30, 1901. Serial No. 87,674. (No model.)

To all whom it may concern:

Be it known that I, ROBERT D. LAUGHLIN, a citizen of the United States, residing at Ravenna, in the county of Portage and State of Ohio, have invented certain new and useful Improvements in Processes of Making Electric Brushes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The invention relates to electric brushes made of carbon and metallic wire, which brushes are especially adapted for use with electric dynamos, electric motors, electric contacts and circuit-breakers, and other electrical appliances. The object is to cheaply produce an exceedingly efficient electric brush of the character specified which is not liable to become warped or cramped during the manufacture thereof, especially during the baking thereof.

The invention consists of an electric brush composed of a mass of baked carbon in which are embedded a plurality of separated wires running longitudinally only through the brush; and it also consists in the process hereinafter described for the construction of such brushes.

In the drawings, Figure 1 is a perspective view of one of the completed brushes. Fig. 2 is a perspective view of one of the wire-wound green-carbon plates used in the manufacture of said brushes. Fig. 3 is a perspective view of one of the green-carbon plates, such as is used for the two outer layers of carbon in constructing the brushes and which are preferably used intermediate of the plates shown in Fig. 2. Fig. 4 is a perspective view of a slightly-modified form of one of the plates on which the wire is wound. Fig. 5 is an end view of a brush in which the plates shown in Fig. 4 are used before the plates are compressed together. Fig. 6 is a plan view, and Fig. 7 a sectional view, of a box-mold in which the several constituent parts of the plate are pressed together.

Referring to the parts by letters, A represents a plate of green carbon, which is preferably formed by forcing plastic carbon through suitable dies, thereby forming ribbons of the required thickness and width, which ribbons are subsequently cut to the desired length. This method of producing the plates is a well-known method of producing similar plates and is not a part of the present invention. The plates may be produced otherwise, if desired. On some of these plates—as, for example, the plate A′ (shown in Fig. 2)—copper wire D of the desired gage is wound spirally but longitudinally of the plates, substantially as shown. To make the brushes, the plates A (shown in Fig. 3) and the wire-wound plates A′ (shown in Fig. 2) are alternately laid together, the outermost plates on both sides of the pile being without wires, and the pile is placed in a mold-frame B, into which pressure-plates C C′ are fitted. Suitable pressure is applied to these plates to unite the carbon plates A and A′ into a homogeneous mass of carbon, in which these longitudinal wires are embedded. This being accomplished, the brushes are then baked in the usual ovens, and thereby completed. Before they are used, however, the ends are preferably ground off, thereby removing the wire loops at the ends of the brushes, which connect the respective longitudinal strands of the wire.

Instead of making the brushes in precisely the manner above described green-carbon plates substantially like those shown in Fig. 4 may be used, these plates having longitudinal grooves *a* on their sides to receive the wire, whose diameter should be less than the depth of said grooves. The wire is wound spirally upon these grooved plates, the wires being drawn into the grooves, and a plurality of plates with the wire so wound upon them are piled (shown in Fig. 5) between two plain plates A. The brush so made up in its green state is placed in the mold and submitted to pressure until the carbon becomes a homogeneous mass, and the resultant structure is baked, as before explained.

Having described my invention, I claim—

The herein-described process of making electric brushes which consists in winding

wire spirally and longitudinally upon plates of green carbon, in placing one or more of these plates, so wound, between other green-carbon plates not so wound, in compressing this composite plate so as to unite the carbon of the several plates into a homogeneous mass, and in finally baking the resultant structure.

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

ROBERT D. LAUGHLIN.

Witnesses:
H. L. BEATTY,
AMOS N. BARRON.