

H. S. MILLER.  
BRUSH FOR DYNAMO ELECTRIC MACHINES.  
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Patented Nov. 2, 1909.

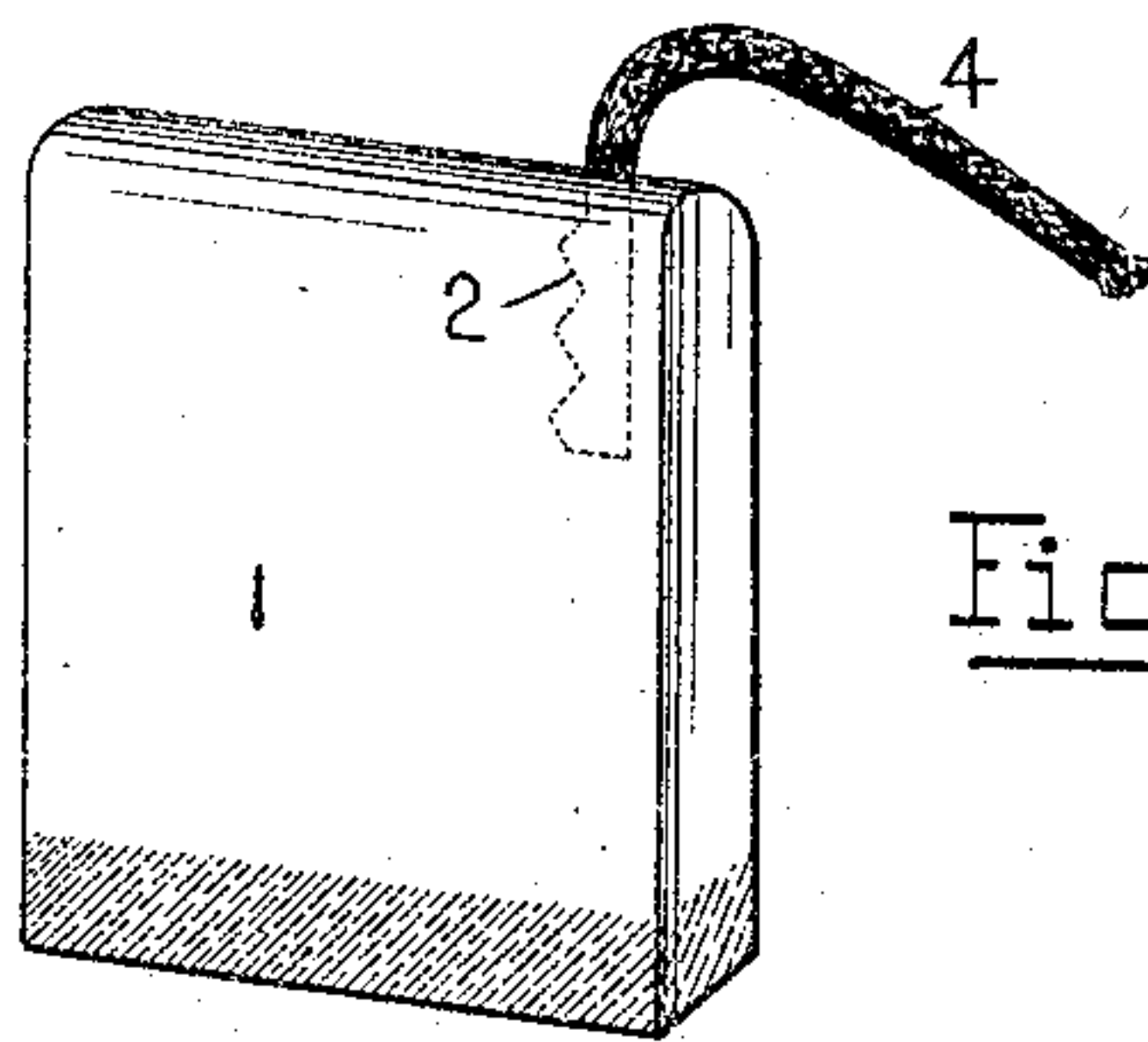


Fig. 1.

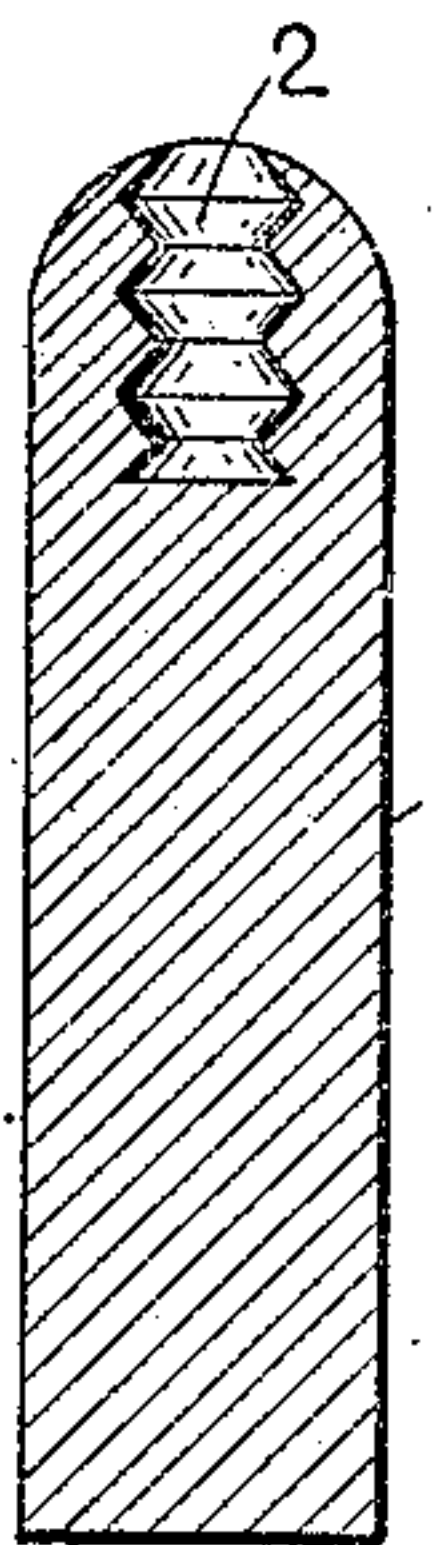


Fig. 2.

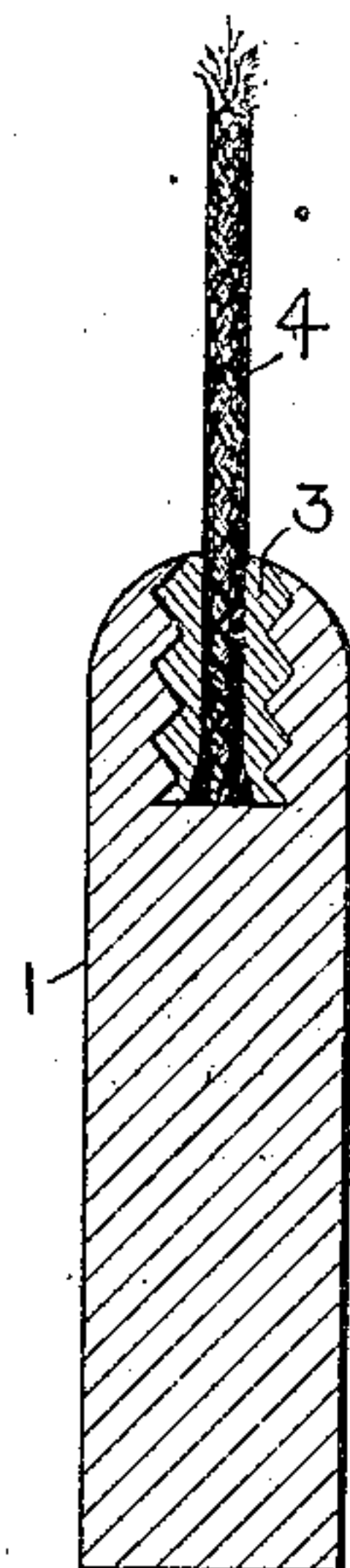


Fig. 3.

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# UNITED STATES PATENT OFFICE.

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BRUSH FOR DYNAMO-ELECTRIC MACHINES.

938,604.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed April 22, 1907. Serial No. 369,452.

*To all whom it may concern:*

Be it known that I, HERBERT S. MILLER, a citizen of the United States, and resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Brushes for Dynamo-Electric Machines, of which the following is a specification.

This invention relates to an improvement in that class of brushes for electric motors and generators comprising a carbon block and a flexible conducting lead forming a connection between such block and a stationary part of the machine connected with one of its terminals; and the invention has for its object to provide a simple and effective means of attachment of the lead to the carbon block whereby a secure anchorage for the lead is afforded as well as an efficient electrical connection between such parts.

In accordance with the present invention, I have provided in the carbon block an undercut aperture or recess into which is introduced a filling of molten or otherwise softened material such as metal or other conducting substances, into which is introduced and embedded one end of the flexible conducting lead, the same having been preferably tinned at its extremity to insure the adherence of the filling thereto. By this means I am enabled to mechanically lock the end of the lead within the carbon block and to insure a large contact surface between the surrounding walls of the recess and the filling so as to produce an efficient electrical connection between the parts thus attached.

The invention will be understood by reference to the annexed drawings, in which—

Figure 1 is a perspective view of a brush embodying the present improvement; Fig. 2 is a transverse section of the carbon block with the lead cavity or recess formed therein in readiness to receive the end of the lead and the surrounding filling; and Fig. 3 is a transverse section of the carbon block similar to Fig. 2, but representing the lead and the surrounding filling within its cavity or recess.

The carbon block 1 is shown provided in its upper edge with a recess or cavity 2 of fluted form, so as to produce a connected series of annular undercut portions somewhat resembling a screw-thread in cross-section. In practice, this form of recess may be readily made by employment of a drill having a

series of contractions in its operative or cutting end portion, which is first fed inwardly in a straight line and is then shifted laterally in respect of the carbon block to form a series of lateral indentations as shown in the drawings. The form of recess represented in Fig. 2 is made by laterally shifting the drill in opposite directions, while that represented in Fig. 1, having one straight side and one serrated side is formed by feeding the drill longitudinally to form a straight cylindrical hole and then laterally in one direction only to form the angular undercut side of the recess.

The side walls of the recess 2 require no coating with metal, as in certain other constructions, but the block is preferably heated preparatory to applying the molten or softened filling 3, which preferably consists of type-metal which has practically no shrinkage and therefore maintains a close mechanical contact with the side walls of the recess when cooled. It is evident, however, that other conducting substances may be employed instead.

The molten or softened filling having been introduced into the cavity or recess 2, one end of the conducting lead 4 is introduced into such filling and the latter is allowed to harden by cooling or otherwise, depending upon the character of the conducting filling substance selected. When a metal alloy such as type-metal is used, the lower extremity of the lead, which is herein represented as consisting of the usual woven wire cord, is preferably tinned to insure a perfect electrical union between the lead and the filling, and is flared at the end, as represented in Fig. 3, to an area within that of the cavity 2 so that it is mechanically locked within the filling 3 which is in turn locked within the cavity 2.

It is evidently immaterial what form of cavity or recess be provided in the carbon block, so long as it is undercut or is provided with a contraction below its mouth so as to form a detaining or locking shoulder for the filling in which the end of the lead is embedded; and it is also evidently not material to the present improvement what conducting substance be used for the filling, so long as it is adapted to be softened or melted to conform closely with the walls of its cavity or recess without a tendency to split the block or to contract out of contact



with the same to impair the electrical connection between the brush-block and the lead, but I prefer to use type-metal because of the facility with which it may be melted, 5 its capability of entering all angles or irregularities in the cavity to which it is applied and therefore mechanically clinging to the walls of the same, and of its conducting quality adapting it to form an efficient 10 intermediate connection between the end of the lead and the brush-block. Another important characteristic of type-metal of which I avail myself in connection with the present improvement is that of its slight expansion upon cooling, which causes it to 15 mechanically adhere very closely to the walls of the cavity, any excess of the filling due to such expansion being readily accommodated by the compression of the conducting 20 lead embedded therein.

In lieu of or in addition to the tinning of the lead, its extremity may be slightly expanded within the conducting filling in which it is embedded, so as to mechanically 25 lock it in position, as indicated in the accompanying drawings.

Having thus set forth the invention what I claim herein is:—

1. In combination, a carbon brush formed 30 with a recess or cavity having one or more lateral indentations and closed upon all sides excepting one in which is provided an open-

ing for the conducting lead, a filling of conducting material within said recess and entering said lateral indentation or indentation, 35 and a flexible conducting lead having one end embedded in said filling and thereby mechanically locked within said recess.

2. In combination, a carbon brush formed with an undercut recess or cavity closed at 40 the bottom and sides and open at the top to receive a conducting lead, a filling contained in said recess composed of a metal which expands upon cooling, and a flexible conducting lead having one end embedded in 45 said filling and thereby mechanically locked within said recess.

3. In combination, a carbon brush formed with an undercut recess or cavity closed at 50 the bottom and sides and open at the top to receive a conducting lead, a filling of conducting material within said recess, and a flexible conducting lead having one end expanded to an area less than that of the recess 55 or cavity and embedded in said filling and thereby mechanically locked both within said recess or cavity and its contained filling.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HERBERT S. MILLER.

Witnesses:

HENRY J. MILLER,

HENRY A. KORNEMANN.