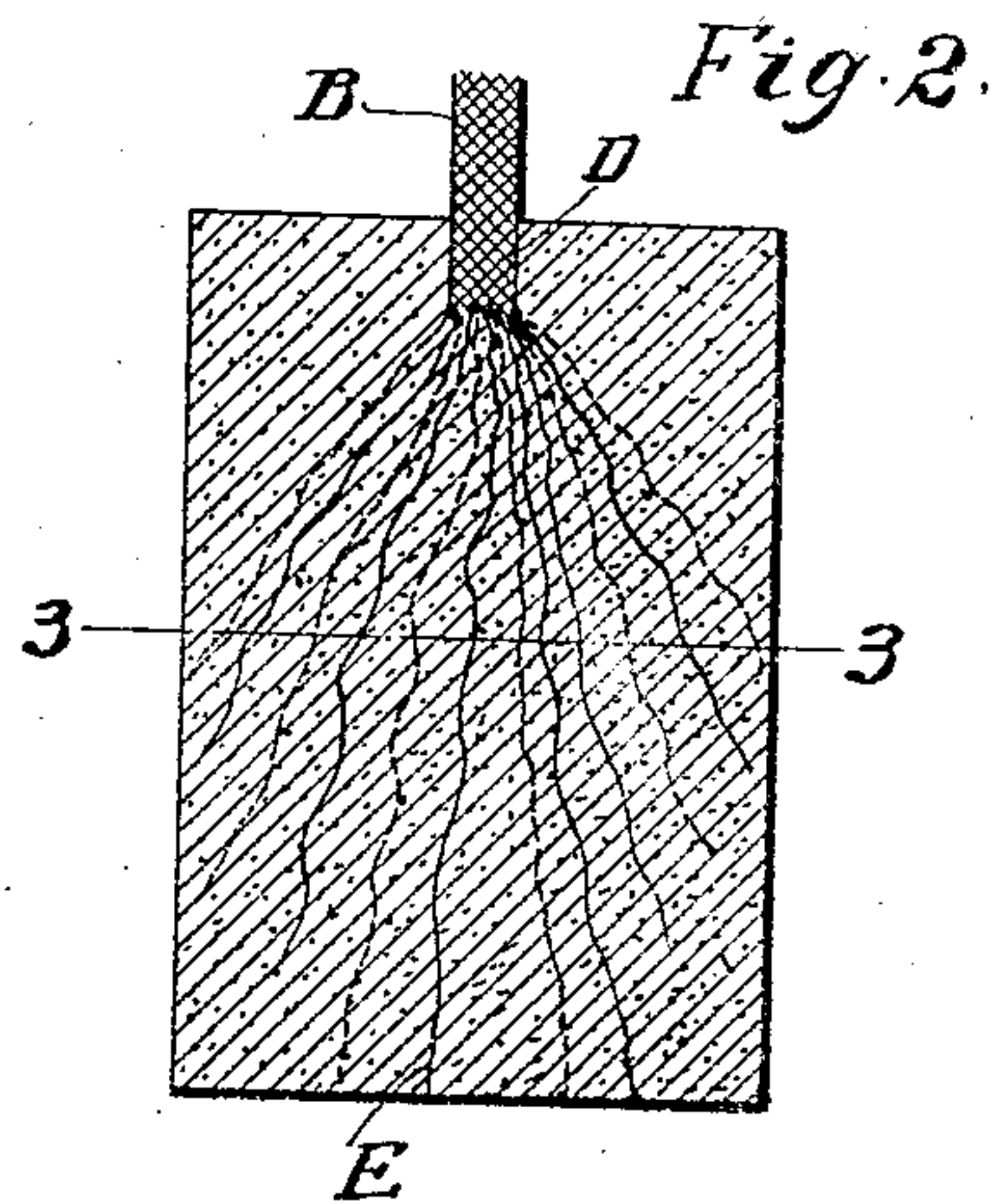
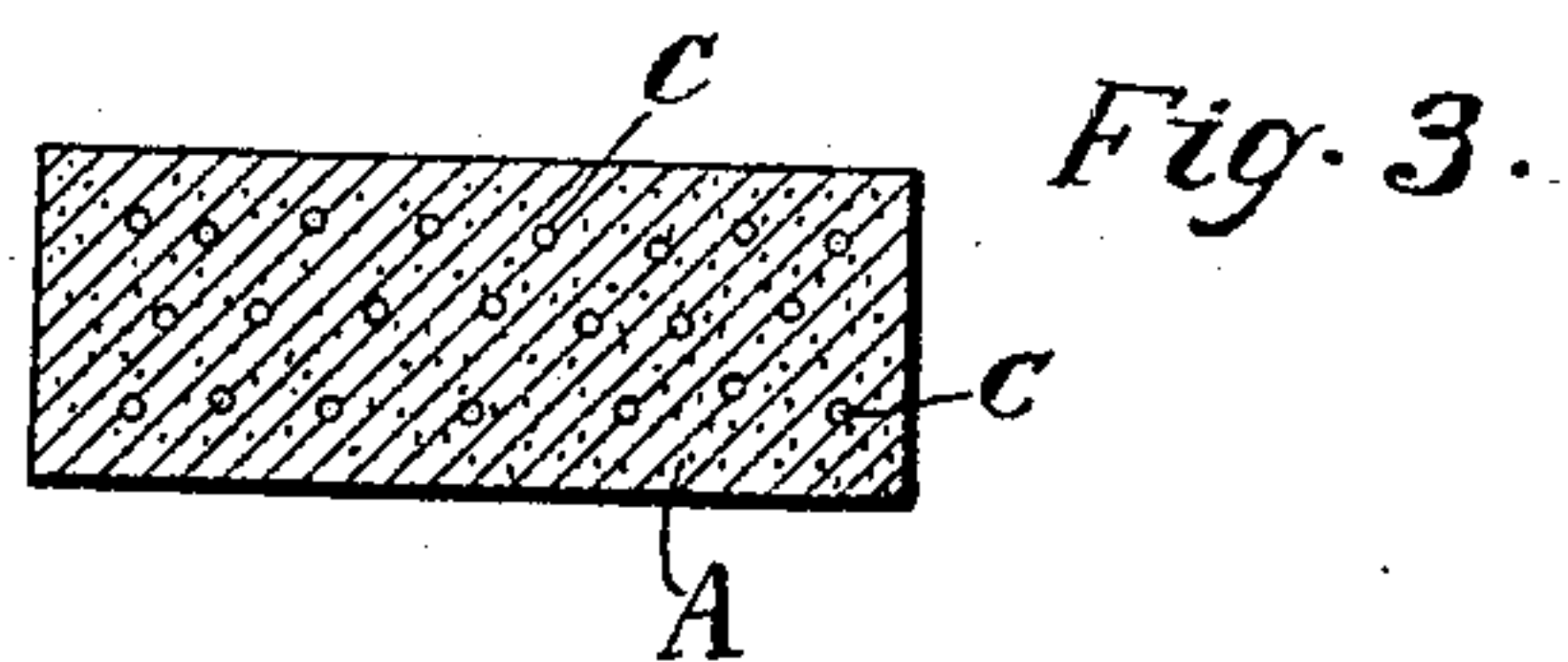
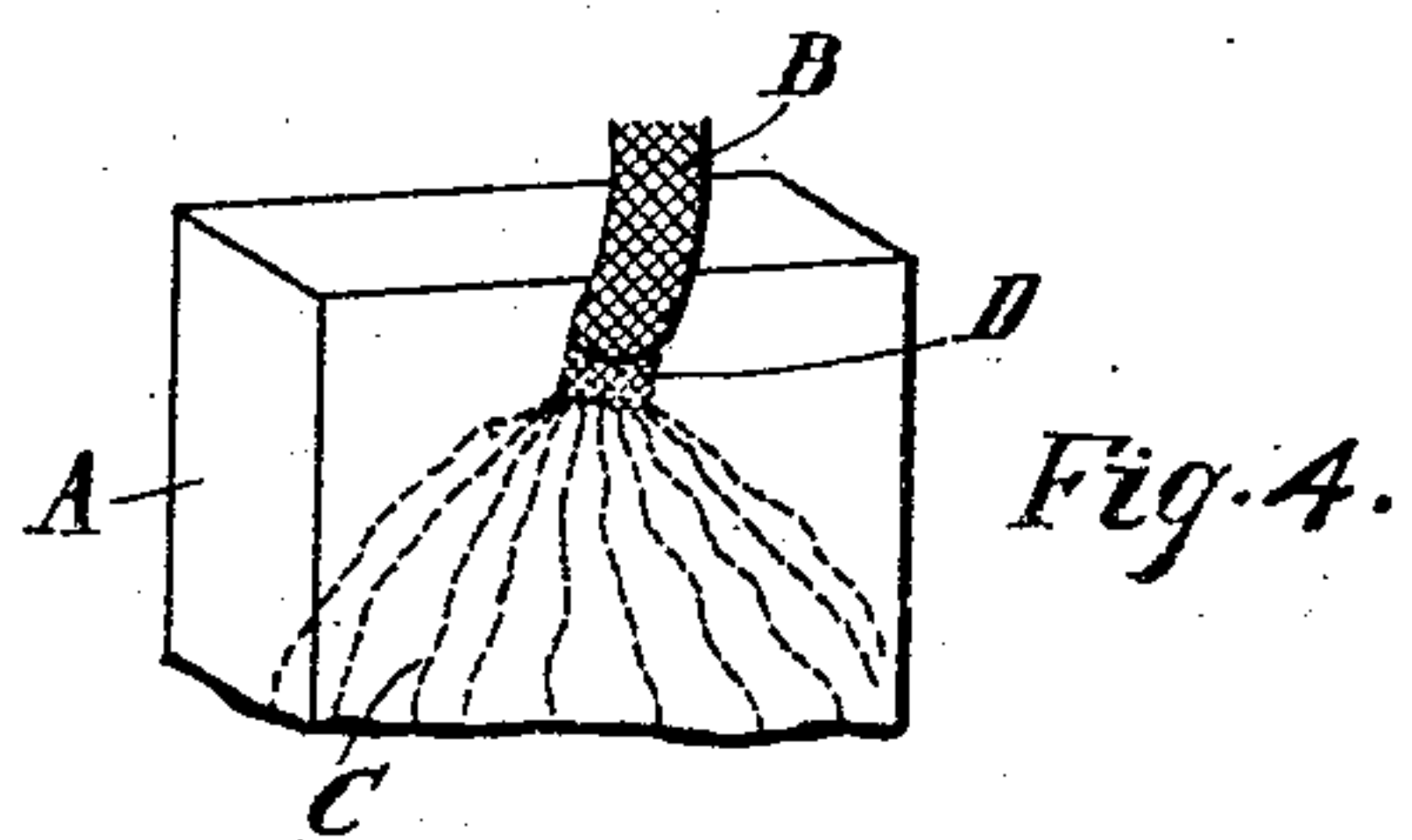
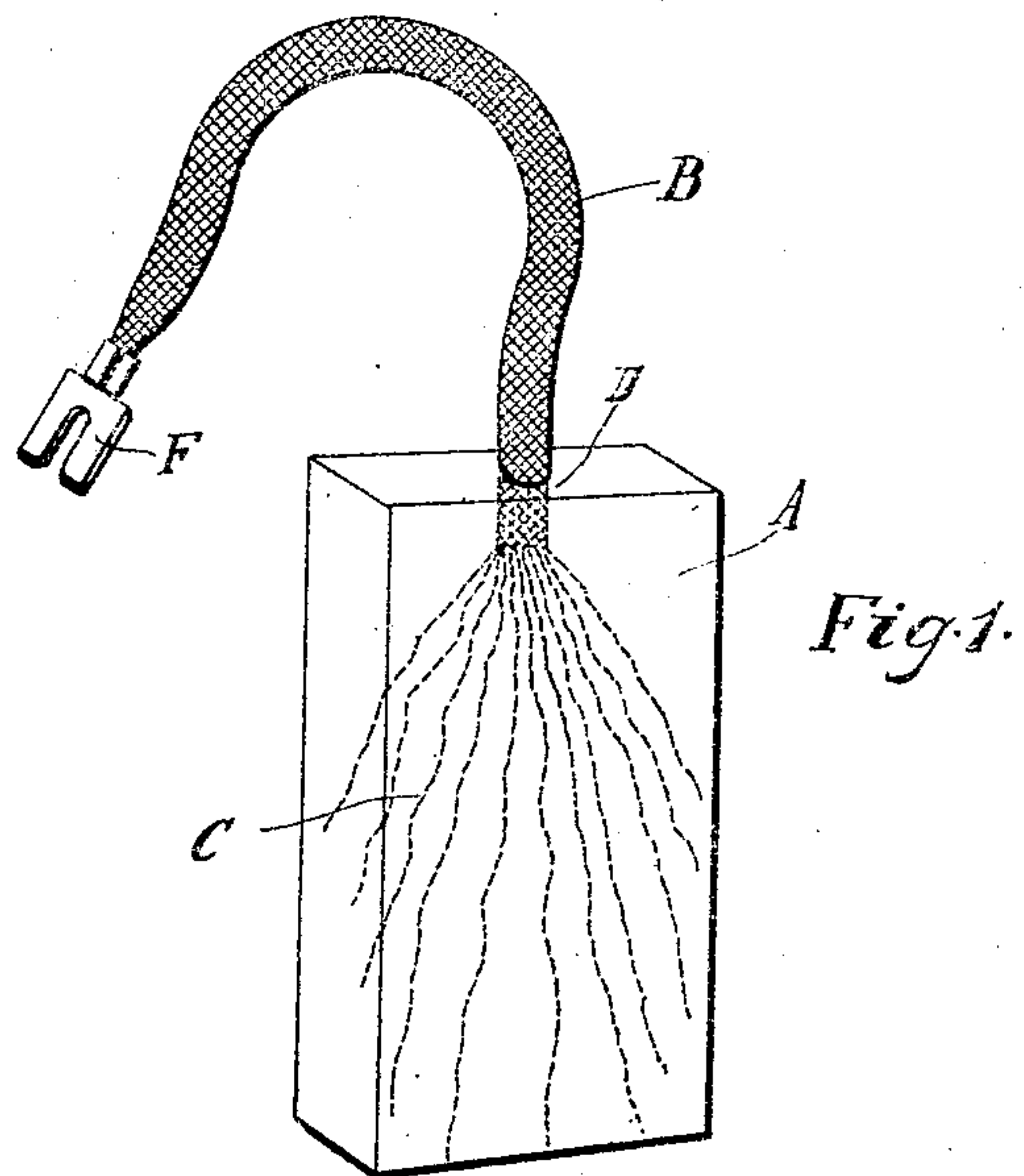


969,796.

E. T. MUG.
BRUSH FOR DYNAMO ELECTRIC MACHINES.
APPLICATION FILED SEPT. 19, 1904.

Patented Sept. 13, 1910.



Witnesses:

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UNITED STATES PATENT OFFICE.

EDWARD T. MUG, OF NORWOOD, OHIO, ASSIGNOR TO THE BULLOCK ELECTRIC MANUFACTURING COMPANY, A CORPORATION OF OHIO.

BRUSH FOR DYNAMO-ELECTRIC MACHINES.

969,796.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed September 19, 1904. Serial No. 225,064.

To all whom it may concern:

Be it known that I, EDWARD T. MUG, citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Brushes for Dynamo-Electric Machines, of which the following is a full, clear, and exact specification.

My present invention relates to brushes for dynamo-electric machines and to the method of connecting conductors made of flexible material to carbon brushes.

Heretofore great difficulty has been experienced in effecting a good electrical and mechanical connection between the high resistance carbon brush ordinarily employed in dynamo-electric machines and the low resistance braided flexible conductor or "pig tail" connected thereto. The flexible conductor has been connected to the carbon brush in a great many ways, for instance, by soldering it directly to the copper plated surface of the brush, by soldering it in a slot formed in the brush, by fastening it to a bolt placed in a transverse hole drilled through said brush, by clamping and soldering it to a metallic clip, which is then in turn soldered to the copper plating of the brush, etc. Soldered connections are objectionable on account of the liability of the solder melting and the connection between the conductor and brush becoming loosened, if not entirely separated, if the brush should become overheated when carrying an excessive amount of current. The other methods above enumerated are objectionable in that they require a multiplicity of parts which are expensive to construct and assemble.

The object of my invention is to improve the method of attaching to the carbon brush the flexible braided wire conductor or cable commonly employed to carry the current transmitted to or from said brush, so as to enable said brush to carry without undue heating the full current transmitted thereto or therefrom.

The invention aims to reduce the cost of the brush and attached "pig tail," and to produce a reliable article of manufacture which will not be subjected to the objections which have been raised against the older forms of brushes. To this end I form the brush so that one end of the flexible con-

ductor, or "pig tail" is embedded in the body of the brush and is preferably flared out so as to bring the individual wires composing the conductor into intimate contact with the material of which the carbon brush is made. The method of connecting the flexible conductor to the brush which I prefer to employ is to embed one end of said conductor in the material of which the brush is made when said material is in a plastic, semi-plastic, or pulverulent condition, and then mold the brush into the desired shape.

In the accompanying drawing, which illustrates the preferred embodiment of my invention, Figure 1 is a perspective view of a carbon brush with the flexible "pig tail" attached thereto in accordance with my invention, the said "pig tail" entering the brush through an opening in its upper end; Fig. 2 is a vertical sectional view of the brush shown in Fig. 1; Fig. 3 is a section on the line 3--3 of Fig. 2; and Fig. 4 is a perspective view of a modified form of my invention illustrating the flexible lead or "pig tail" entering the carbon brush through an opening in its side.

Referring now to Figs. 1, 2, and 3, A represents the block of carbon forming the brush proper. Embedded in the material of which said carbon block is made, preferably when said material is in a plastic, semi-plastic, or pulverulent condition in a mold is the flared end of a flexible braided wire conductor or "pig tail" B, the separate strands of said flared end being indicated in dotted lines Fig. 2 at C. A bundle of unbraided wires may be used if so desired. It will be noted by reference to Figs. 1 and 2 that the end of the flexible conductor B which is embedded in the carbon block enters said block an appreciable distance before it is unraveled or flared out. This is indicated clearly at D. As shown in Fig. 3 the strands of the flared end of the flexible conductor are spread out through the material comprising the brush body as much as possible, so as to obtain intimate electrical and mechanical contact between all parts of the brush and said flexible conductor. If desired all of the strands of the flared end of the flexible conductor may pass completely through the brush as shown at E, Fig. 2, but I prefer to have only part of said strands pass completely therethrough

and have the remaining strands spread out and come to an end at varying distances from the bottom of the brush.

In the modification illustrated in Fig. 4 instead of bringing the flexible conductor B out through an opening in the top of the brush, I pass the same through an opening in the side of the brush, as it often happens that such a brush is employed in a brush holder, which has a spring finger bearing on the top surface of the brush, and by bringing the flexible connection out through the side of the brush all interference with such finger is obviated. The flexible lead B is preferably provided with a terminal clip at its opposite end, said clip being indicated in Fig. 1 by F.

Such a brush as just described may be employed to carry much heavier currents than the ordinary carbon brush with the "pig tail" soldered, or otherwise fastened thereto, and it will be readily seen that a very intimate connection, electrically and mechanically speaking, is made between the parts of the carbon brush and the flexible conductor.

It is seen that in a brush constructed according to my invention no hole or channel need be drilled into or through the brush for the reception of holding screws or solder. In fact, the four sides of the brush are entirely uninterrupted or unbroken except in the modification shown in Fig. 4, in which the flexible conductor emerges from the brush at the side near the top.

Although I have illustrated the preferred embodiment of my invention, I do not care to be limited thereto, as various changes may be made without departing from the spirit and scope of my invention, and I aim in the appended claims to cover all such changes.

Having thus described my invention, what I claim as new and desire to cover by Letters Patent is:—

1. A carbon brush, and a flexible conductor composed of a plurality of strands having the strands at one end separated one from another and embedded in said brush.
2. A carbon brush, and a flexible conductor composed of a plurality of wires, one

end of said conductor being flared and embedded in said brush.

3. A carbon brush, and a flexible braided wire conductor having one end unraveled and embedded in said brush.

4. A carbon brush, and a flexible braided wire conductor having one end unraveled and embedded in said brush said conductor entering said brush an appreciable distance in its braided condition.

5. A carbon brush, and a flexible conductor composed of a plurality of wires in a compact bundle, one end of said conductor being spread out through the body of said carbon brush.

6. A carbon brush, and a flexible conductor composed of a plurality of wires in a compact bundle, one end of said conductor being spread out through the body of said carbon brush, said conductor entering said carbon brush an appreciable distance in its compact form.

7. The method of connecting a flexible conductor with a carbon brush which consists in embedding the flared or unraveled end of said conductor in the material of which the brush is made when said material is in a plastic, semi-plastic or pulverulent condition, and then molding the brush into the desired shape.

8. A carbon brush, a flexible conductor composed of a plurality of wires in a compact bundle, one end of said conductor being spread out through the body of said brush, said brush having unbroken or uninterrupted sides.

9. The method of connecting a flexible conductor to a carbon brush, which consists in embedding the separated strands of the unraveled end of said conductor in the material of which the brush is made while said material is in a plastic, semi-plastic, or pulverulent condition, molding the brush into the desired shape, and permitting the brush to solidify.

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

EDWARD T. MUG.

Witnesses:

B. A. BEHREND,
FRED J. KINSEY.