

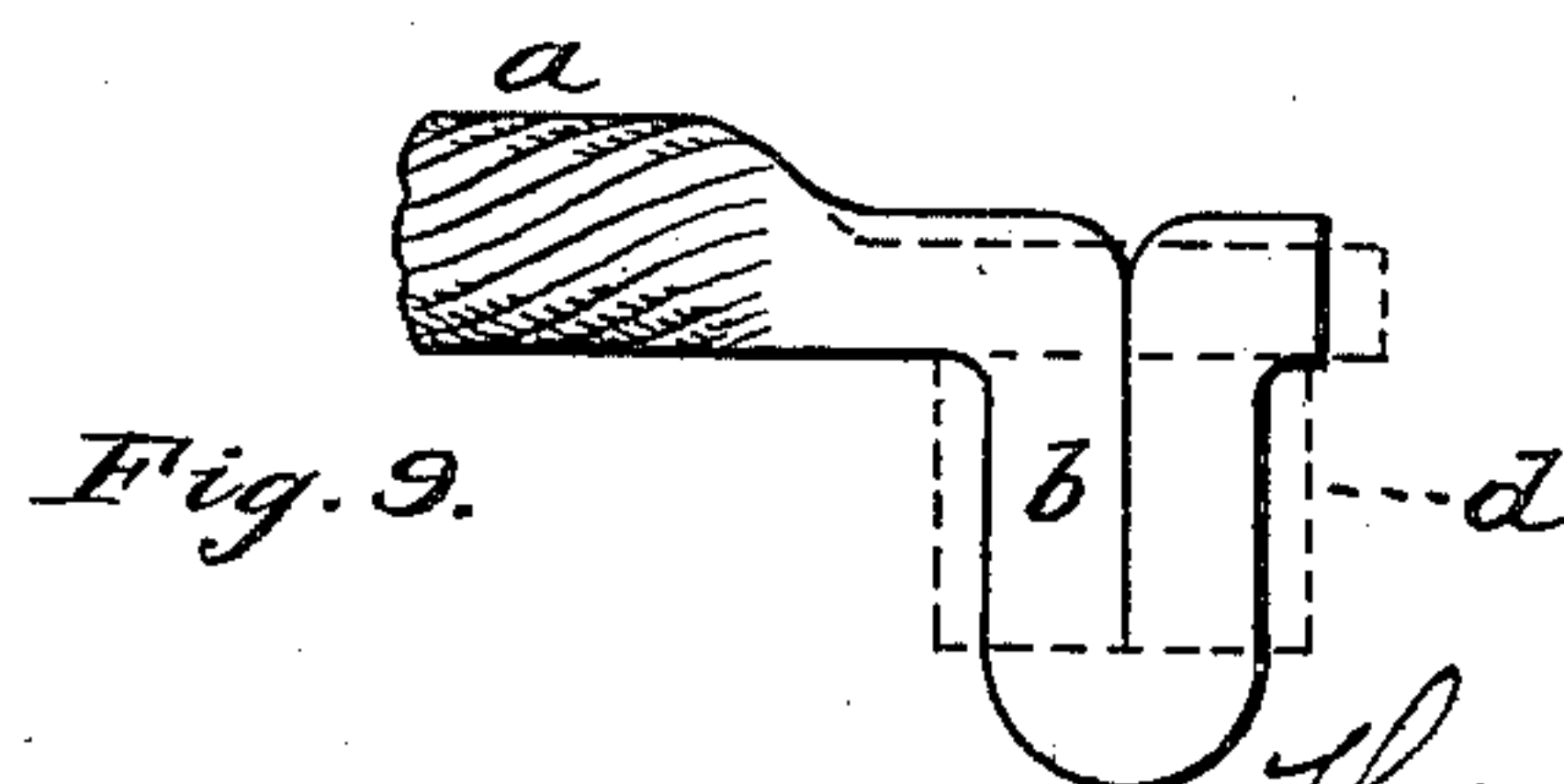
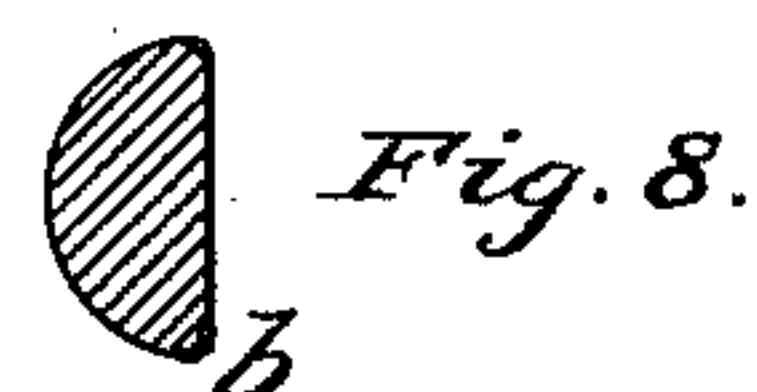
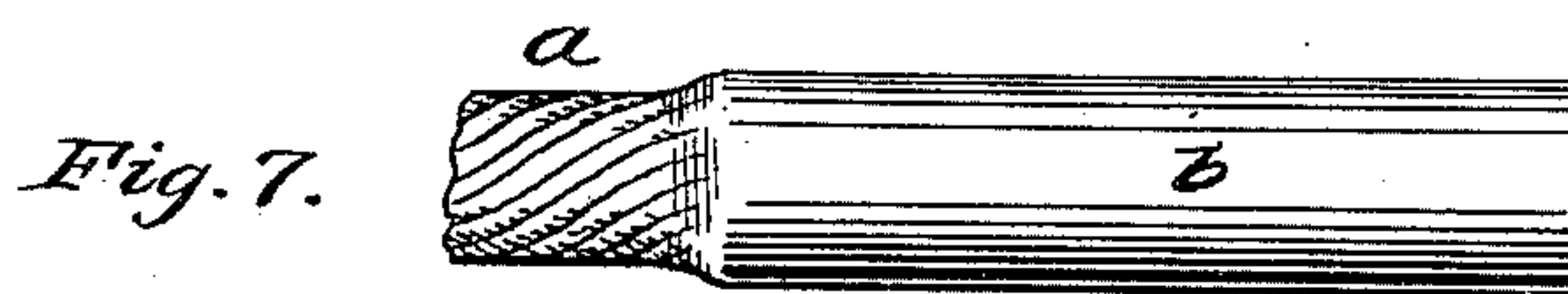
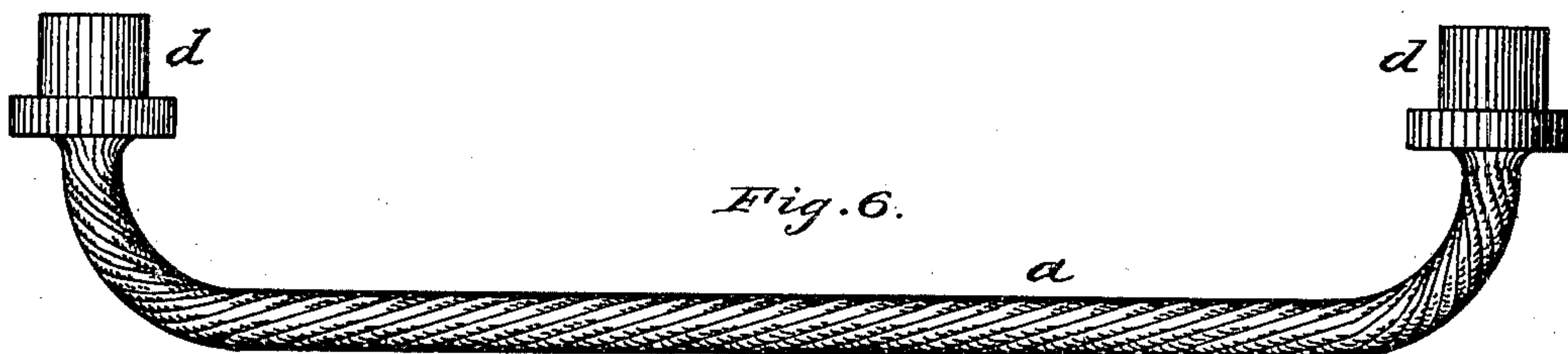
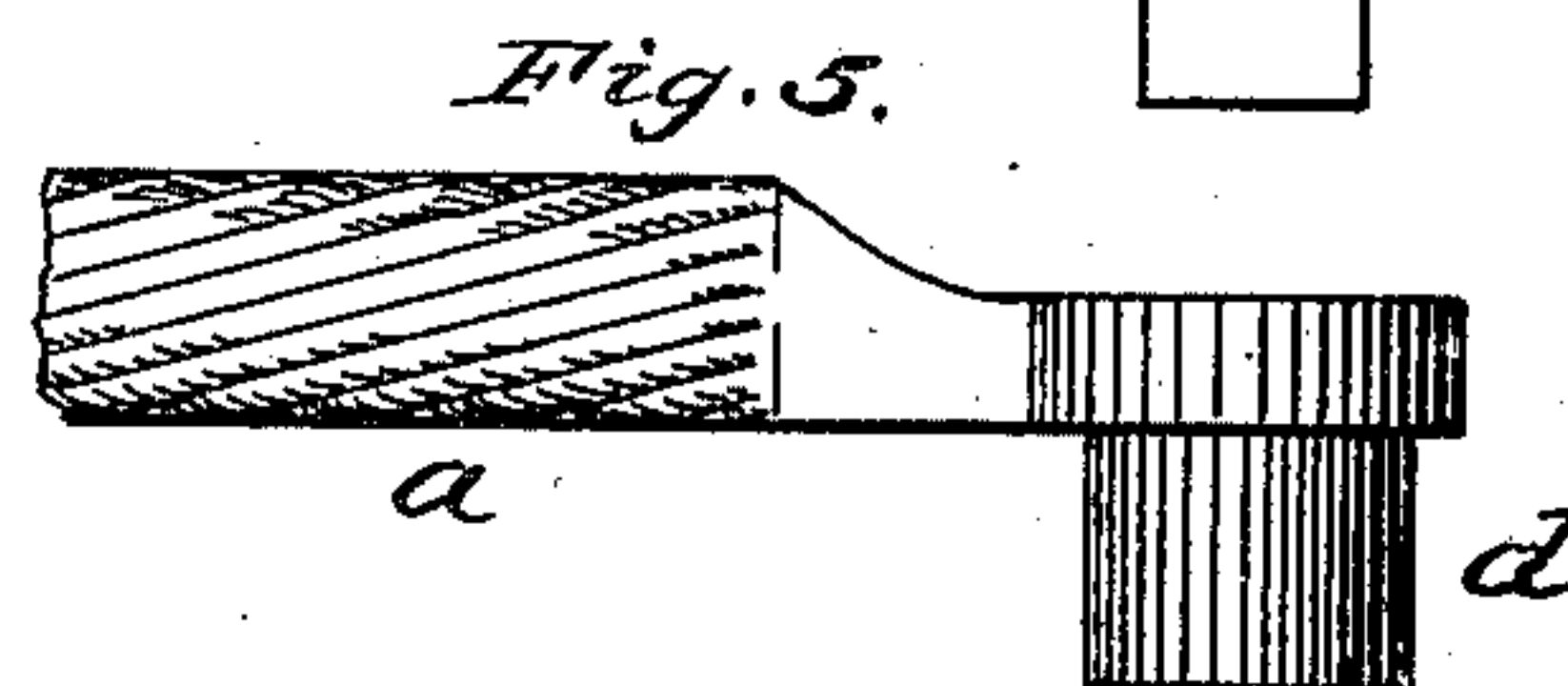
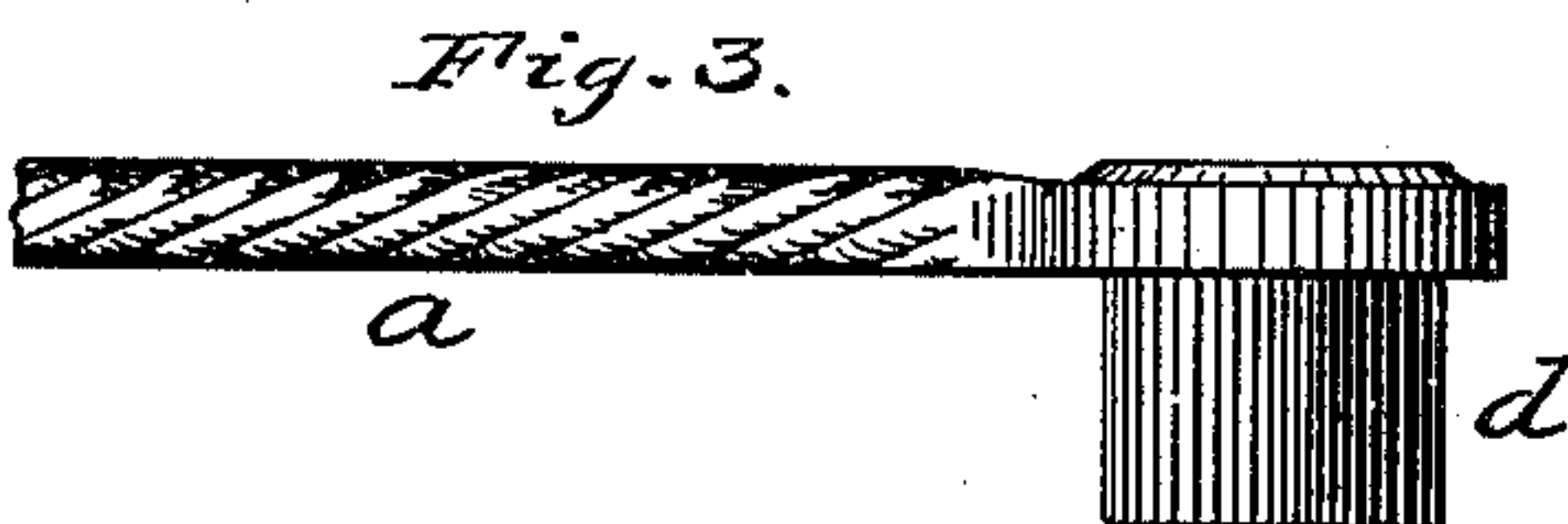
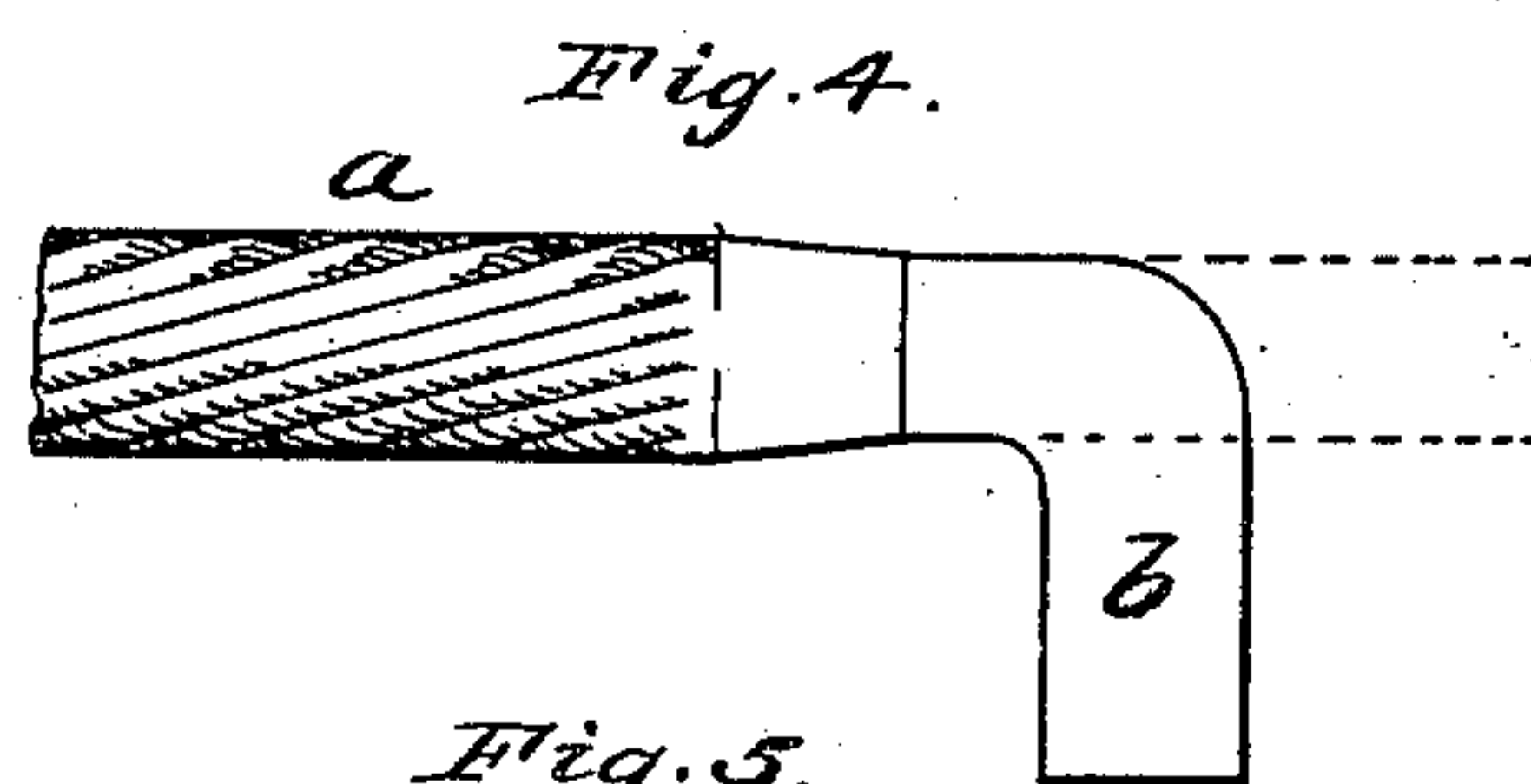
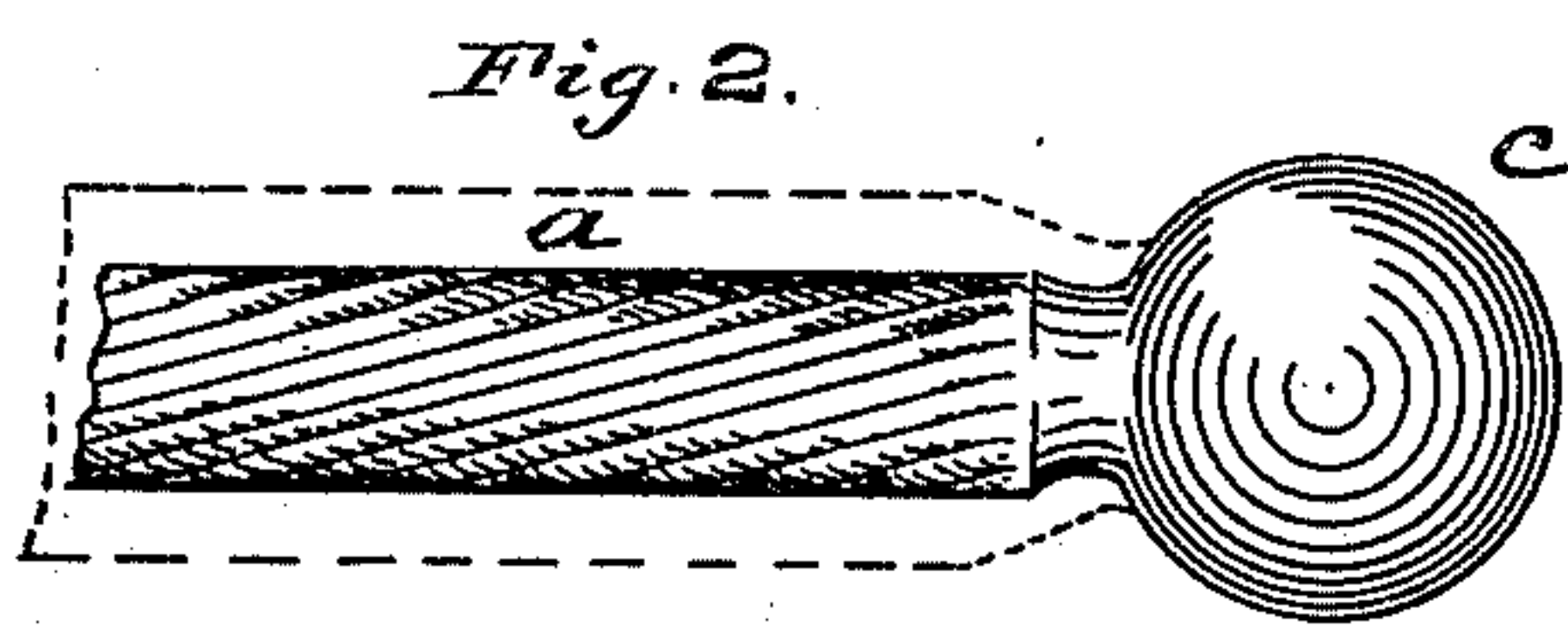
No. 672,387.

Patented Apr. 16, 1901.

T. J. MCTIGHE.  
ELECTRICAL CONNECTOR.

(Application filed Feb. 6, 1901.)

(No Model.)



Witnesses  
*James O'Neil*  
*George J. M.*

*T. J. McTighe* Inventor  
By *his* Attorneys. *Cornell Bros*



# UNITED STATES PATENT OFFICE.

THOMAS J. MCTIGHE, OF NEW YORK, N. Y.

## ELECTRICAL CONNECTOR.

SPECIFICATION forming part of Letters Patent No. 672,387, dated April 16, 1901.

Application filed February 6, 1901. Serial No. 46,231. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS J. MCTIGHE, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electrical Connectors, of which the following is a specification.

This invention relates to electrical connectors, such as rail-bonds, brush-connectors for dynamos, and the like; and it consists in flexible electrical conductors of cable or similar form having solid terminals formed up from the cable itself, substantially as hereinafter fully described, and set forth in the claims. By "flexible" electrical conductors I mean such as have a body or intermediate part made up of a number of wires of any desired section, such that the body is transversely flexible or pliable. For proper attachment to rails and other objects it is usual to have enlarged heads or terminals on the end or ends of such body. Heretofore these terminals have been attached by soldering, brazing, casting, or welding a separate and distinct body of metal onto the flexible cable or similar structure, in such cases requiring the use of molds and the expensive methods of the foundry and machine-shop. I propose to dispense with all such complications and their attendant costly labor and form the terminals directly on and out of the body itself, thus producing a connector whose terminals are absolutely integral with the body and are made of the identical metal of which the body is composed.

In the drawings which form part of this specification, Figures 1, 2, and 3 are corresponding views of a cable end in three stages of manufacture. Figs. 4 and 5, taken in connection with Fig. 1, show a modification in the detail of manufacture. Fig. 6 shows a complete rail-bond of an ordinary type with integral terminals. Fig. 7 is a modified blank formed on the cable end. Fig. 8 is a transverse section of the same, and Fig. 9 shows in full lines the doubled-up blank and in dotted lines the terminal as finished from same.

In carrying my invention into effect I proceed in either of several modified ways. I

take the flexible body *a*, Fig. 1, which is preferably a stranded copper cable, heat its end to a suitable temperature, and give it a quick pressure between suitably-shaped swaging-dies. When properly done and a good flux used, the result is that the part operated on is consolidated and welded into a homogeneous mass, as at *b*, where the metal of each wire or strand is present in the mass, but its identity is lost. The solid part *b* is then upset into an enlargement *c*, of ball or other form, after which the ball is shaped in dies to form the stud or terminal *d*, which may be of any desired form or design. When the flexible body is intended for use as a rail-bond, it may, if desired, be flattened, as shown in Figs. 2 and 3. The upsetting and final shaping are best done at a good red heat.

Instead of upsetting to form the enlargement *c* I may simply bend the solid blank *b*, as shown in Fig. 4, and then shape in dies to produce the finished form of Fig. 5, having the stud or terminal *d*, as shown, or I may consolidate the cable end, as in Figs. 7 and 8, into a flattened and preferably semicircular section, and after folding this on itself with the flat faces adjacent, as in Fig. 9, reheat and swage to form the terminal *d*, as shown in dotted lines, this last operation also welding the adjacent faces of the folded portion.

In some cases the solid terminal may be formed on the cable by simply upsetting and consolidating the latter at one heat and one pressure. I prefer, however, to use two heats and two pressures, one to produce a solid blank end on the cable or other flexible conductor and the other to do the final shaping. Other modifications may be adopted without departing from the spirit of my invention, so long as the result is the production of a terminal integral with and made out of the body of the cable itself. In some cases it may be found advisable to bind the free ends of the cable with a wire or thin sleeve prior to the heating and welding to prevent any undesirable spreading of the ends of the cable wires or members, which would be likely to cause waste.

For the swaging or welding and shaping I may use any suitable machine—such as a fly-

press, a "bulldozer," or any other suitable apparatus—in connection with dies adapted to the work, as hereinbefore described.

I claim as my invention and desire to secure  
5 by Letters Patent—

1. An electrical conductor composed of a number of strands of wire having their adjacent ends welded into a homogeneous mass constituting a terminal.
- 10 2. An electrical conductor composed of a number of strands of wire and having one or more solid homogeneous ends or terminals formed out of the strands themselves.
- 15 3. An electrical conductor composed of a number of strands of wire and having its end or ends upset and consolidated by welding into an enlarged terminal or terminals homogeneous with said wires.

4. A rail-bond consisting of a flexible body having solid terminals welded up and formed 20 out of its ends.

5. A rail-bond consisting of a number of separate members forming the body portion, having their ends welded together and shaped into solid terminals. 25

6. A rail-bond consisting of a flexible wire cable having its ends welded into homogeneous masses forming terminals for attachment.

Signed at New York, in the county of New 30 York and State of New York, this 5th day of January, A. D. 1901.

THOMAS J. MCTIGHE.

Witnesses:

FREDERICK K. FITCH,  
THOS. J. MCTIGHE, Jr.