

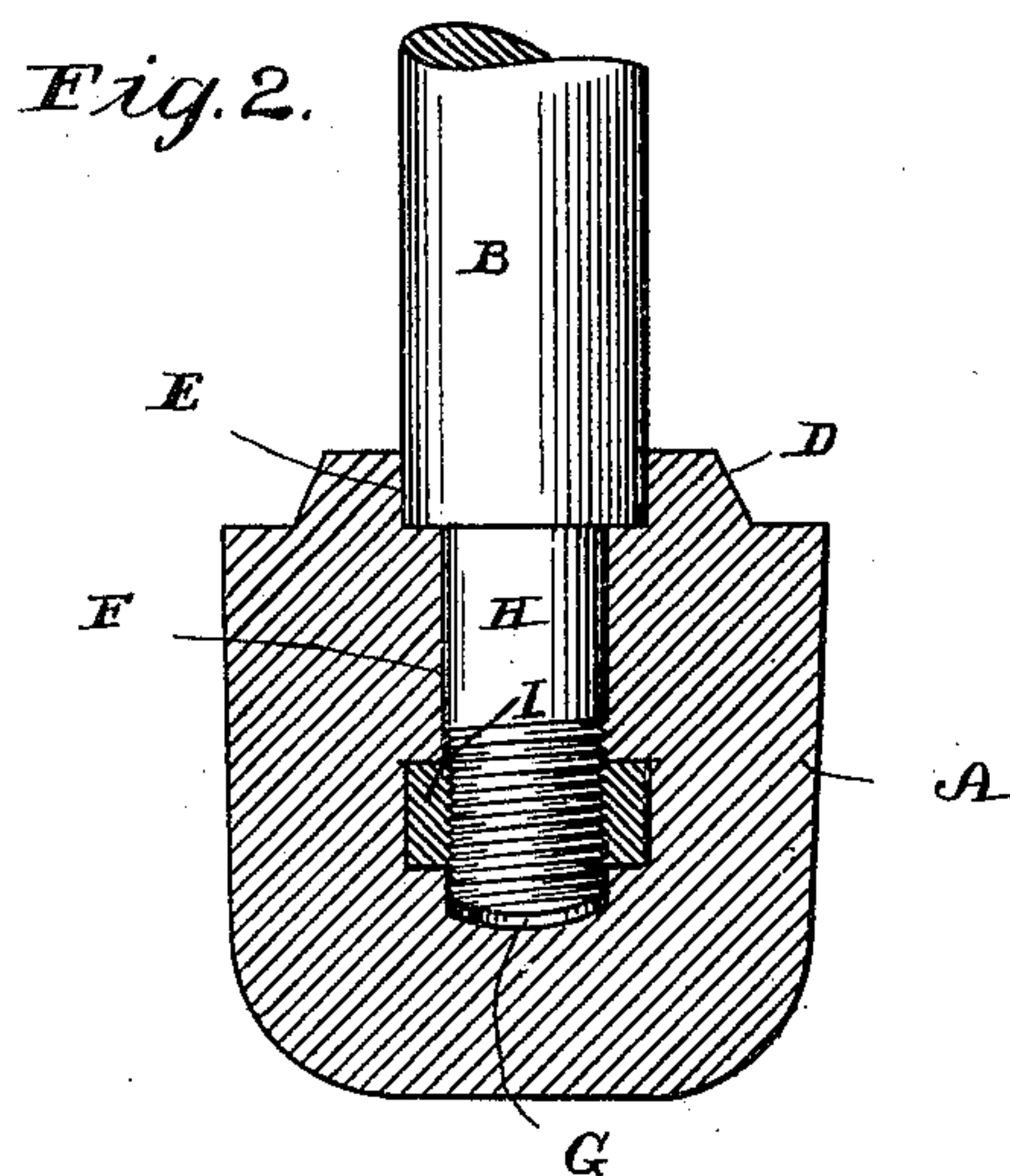
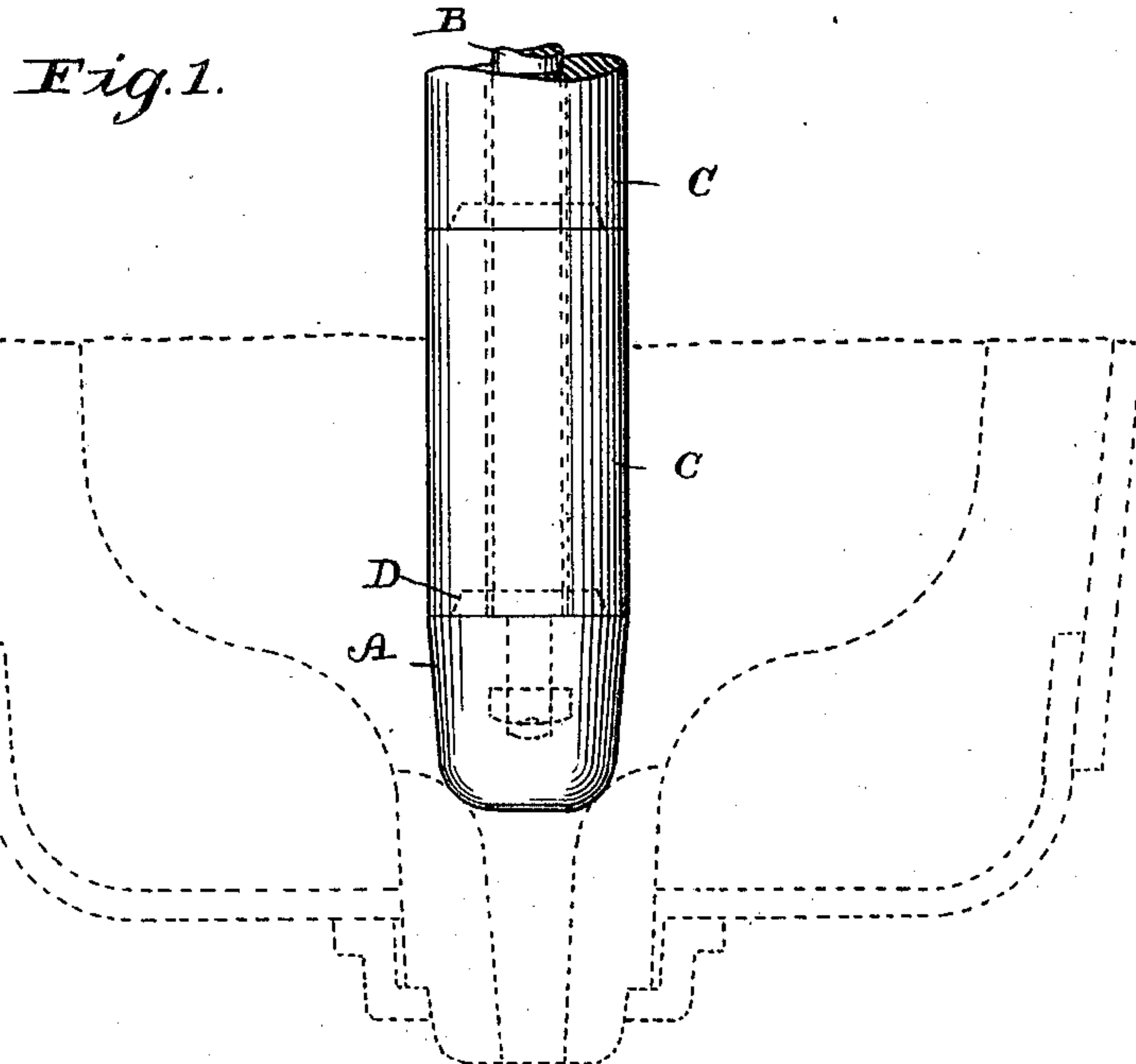
No. 685,735.

Patented Nov. 5, 1901.

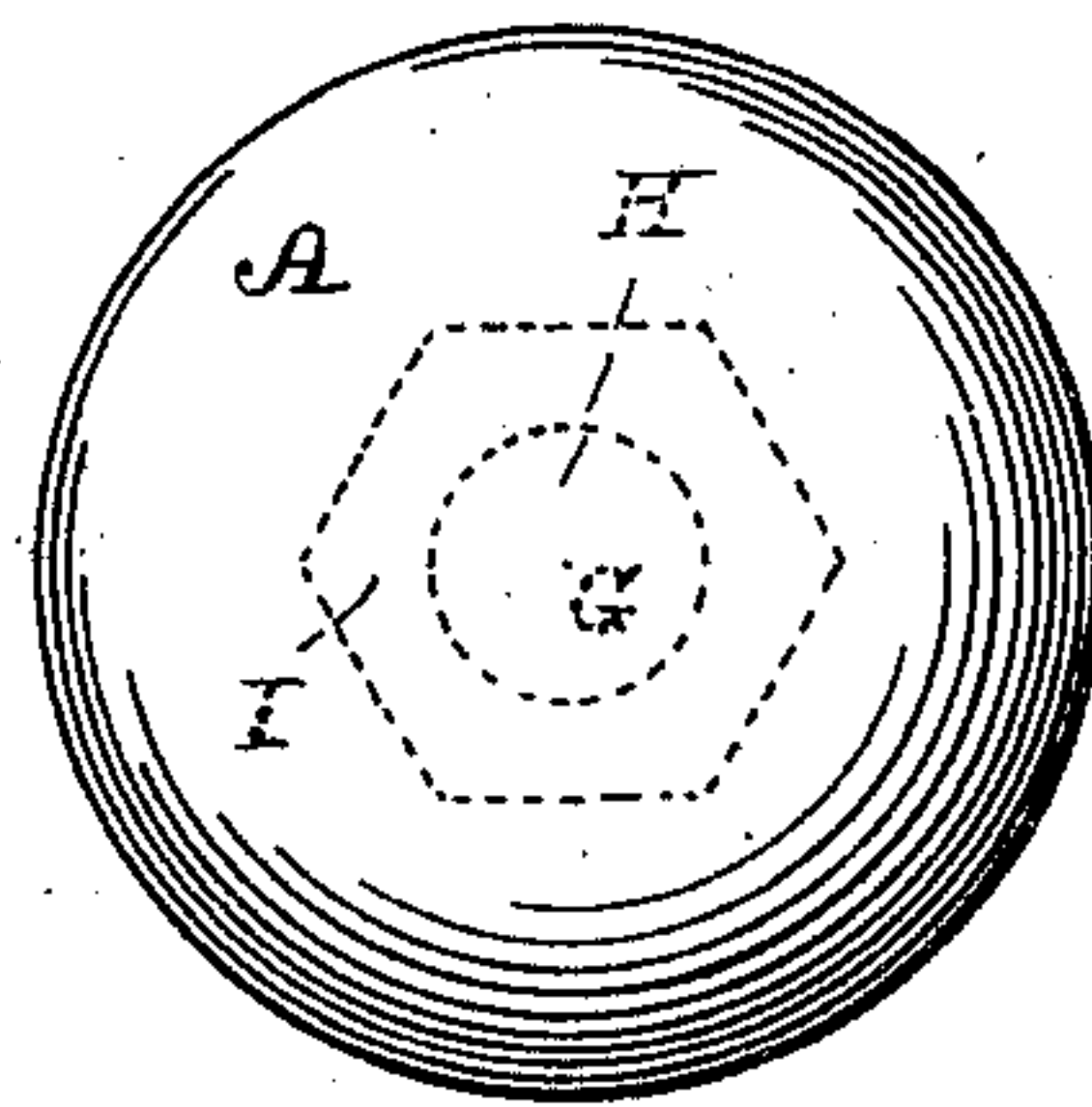
J. H. ALLENDORFER.  
STOPPER FOR LADLES.

(Application filed Oct. 30, 1900.)

(No Model.)



*Fig. 3.*



Witnesses

C. M. Newman  
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Inventor

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# UNITED STATES PATENT OFFICE.

JOHN H. ALLENDORFER, OF WESTMONT, PENNSYLVANIA.

## STOPPER FOR LADLES.

SPECIFICATION forming part of Letters Patent No. 685,735, dated November 5, 1901.

Application filed October 30, 1900. Serial No. 34,970. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. ALLENDORFER, a resident of the borough of Westmont, in the county of Cambria and State of Pennsylvania, (my post-office address being Johnstown, Pennsylvania,) have invented certain new and useful Improvements in Stoppers for Ladles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the art of founding Bessemer steel, open-hearth steel, and other metals it has been customary to employ ladles provided with a pouring-nozzle of refractory material located in the bottom thereof, said nozzle being closed and opened by means of a refractory stopper secured to a stopper-rod passing downward through the molten metal.

It is the object of my invention to provide a stopper of improved form and construction which may be cheaply manufactured, easily and simply applied to the purposes intended, solid and strong in all its parts, and so arranged as to provide adequate protection to the stopper-rod upon which it is secured; and to accomplish these purposes my invention consists of certain details of construction, as will hereinafter more fully appear.

The ordinary stopper as heretofore used has been secured to the stopper-rod by means of a key-bolt, and for the purpose of introducing said bolt into the stopper a hole has to be provided in the bottom thereof, which is afterward plugged with refractory material. The results of this latter construction are that the plug may become loose or broken in use, thus permitting the molten metal to have access to the key-bolt or the stopper-rod, with the result of heating or burning them in such a way as to cause a failure of this small but important piece of apparatus, and for these reasons a stopper constructed in the old style can only be used for one, or at least two or three heats.

By means of my improved construction, whereby the bottom of the stopper is made solid and the entire stopper is firmly secured to the stopper-rod, thoroughly inclosing and protecting it, I have been able to make six and more heats from each stopper without any

difficulty or danger and in many instances have made twelve heats in actual practice.

My improved stopper consists of a plug of refractory material having a nut embedded therein, into which the threaded end of the stopper-rod may be inserted and screwed fast.

The use of a metallic nut in my improved stopper provides a large bearing-surface between the metal portions and the softer refractory material of the stopper for securing the same to the stopper-rod, thus adding to the strength and rigidity of the construction, which heretofore has not been provided for in prior apparatus of this kind. In addition to this the form of stopper-rod which I use is such that both the body of the rod and the reduced end of the same may be of large diameters to provide for the stresses incident to their use, and these large sections also add to the life of the construction as a whole, for the reason that they are not so easily affected by the heat of the molten metal which surrounds them as is the case with rods and connections of smaller sizes.

My improved stopper may also be provided with a recess in its upper portion into which the main body or shoulder of the stopper-rod is inserted, whereby the entire lower end of said rod is protected from the destructive influences of the heat and molten metal.

Having thus given a general description of the objects and nature of my invention, I will now, in order to make these more clear, refer to the annexed sheet of drawings, which form part of this specification and in which like letters refer to like parts.

Figure 1 is a vertical cross-section of a ladle shown in dotted lines with my improved stopper and stopper-rod in position. Fig. 2 is a central vertical section of my improved stopper, showing a stopper-rod provided with a threaded screw end inserted therein. Fig. 3 is a bottom plan view of my improved stopper.

In the different figures, A is a stopper composed of refractory material; B, the upper and larger portion of the stopper-rod.

C C are the usual stopper-rod sleeves, composed of refractory material.

D is a projection or shoulder on the upper portion of the stopper to form a joint or seal in connection with the stopper-rod sleeves C C.

E is a circular recess in the top of the stop-



per, into which the end of the body portion of the stopper-rod B is inserted.

F is a circular opening in the stopper, into which the smaller threaded end H of the stopper-rod is inserted. G is the lower end of said opening, of sufficient depth to provide the necessary clearance for the small end of the stopper-rod H, and I is a threaded metallic nut secured within the stopper A.

10 In the process of manufacturing stoppers the refractory material composing the portion A may be placed around the nut I, which is firmly held within the mold in the correct position by means of a mandrel or other apparatus, after which the stopper is withdrawn from the mold and baked, with the nut inclosed.

I am familiar with the fact that stoppers have been made provided with tapered screw-threads formed in the body of the refractory material, and I therefore do not claim such construction broadly; but

20 What I do claim, and desire to secure by United States Letters Patent, is—

25 1. A stopper composed of refractory material provided with a threaded metallic nut

secured therein, said stopper being also provided with a hole communicating with the threaded opening of the nut aforesaid, said hole having an enlarged recess at its upper end, in combination with a stopper-rod provided with a body portion and a reduced end adapted to screw into said nut and fitting in the recess and hole aforesaid.

2. A stopper composed of refractory material provided with a threaded metallic nut secured therein and an opening in said refractory material communicating with the threaded opening of the nut aforesaid, said opening having an enlarged recess at its upper end, a shoulder formed on the upper portion of said stopper, in combination with a stopper-rod screwed and fitted within said nut and opening, and a sleeve adapted to fit over and form a joint with said shoulder.

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

JOHN H. ALLENDORFER.

Witnesses:

CYRUS C. HUBBARD,  
H. S. ZIMMERMAN.