

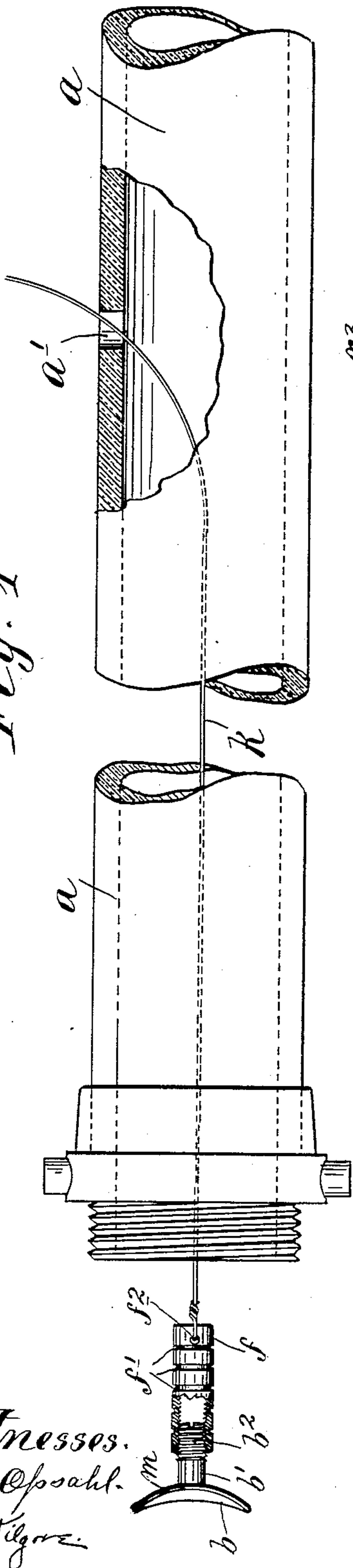
E. F. FELSING & J. A. ANDERSEN.

PUNCTURE PLUG.

APPLICATION FILED OCT. 11, 1902.

NO MODEL.

Fig. 1



Witnesses.
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Fig. 2.

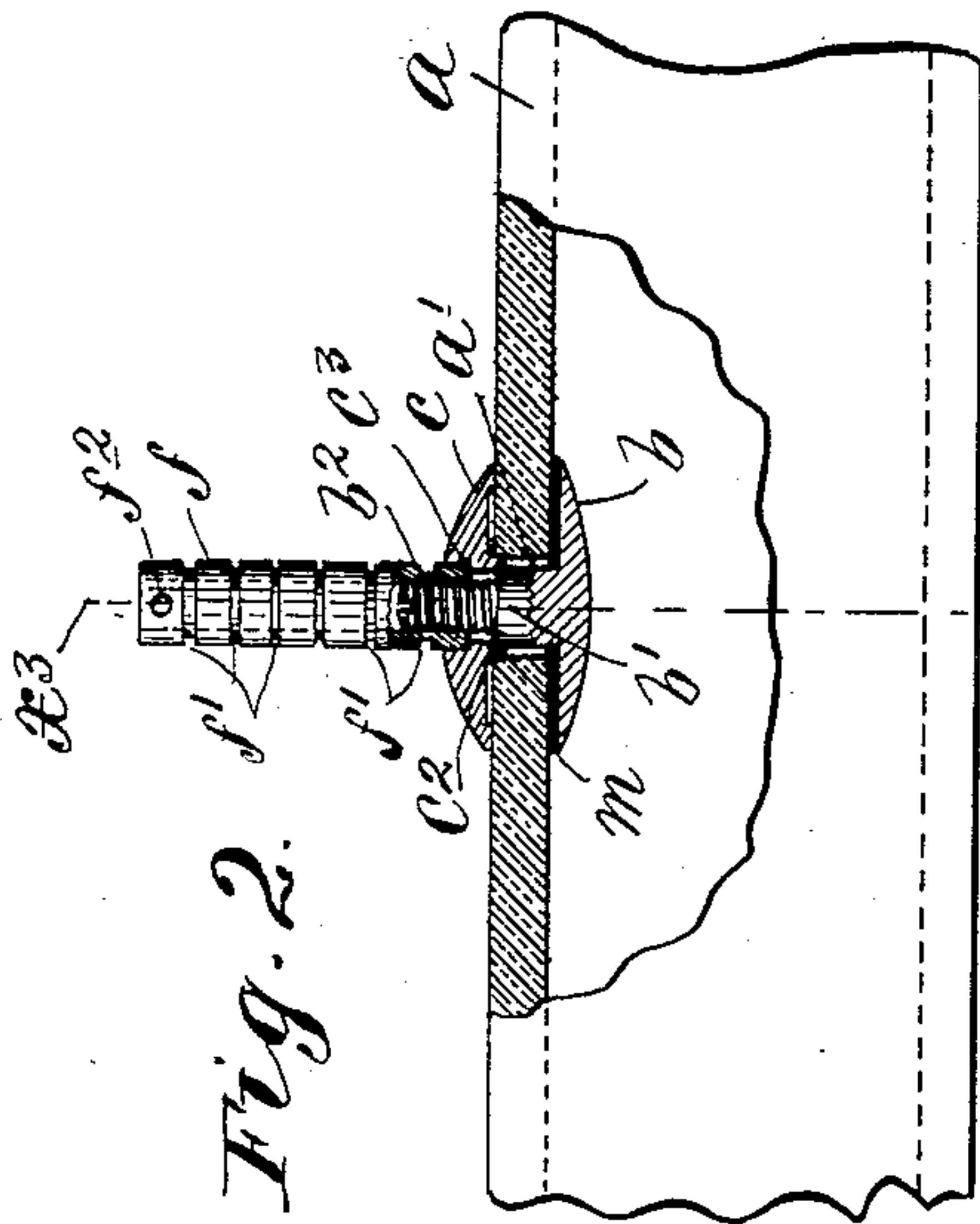


Fig. 3.

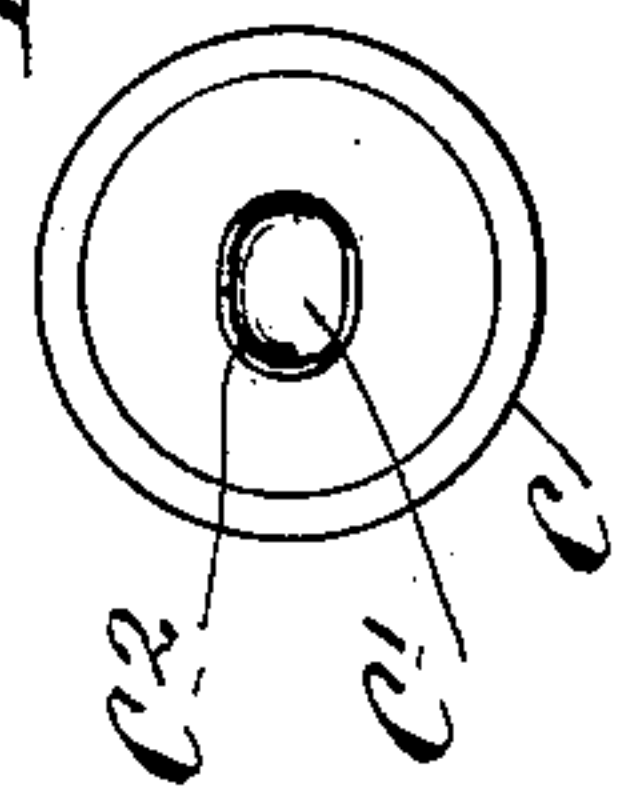


Fig. 4.

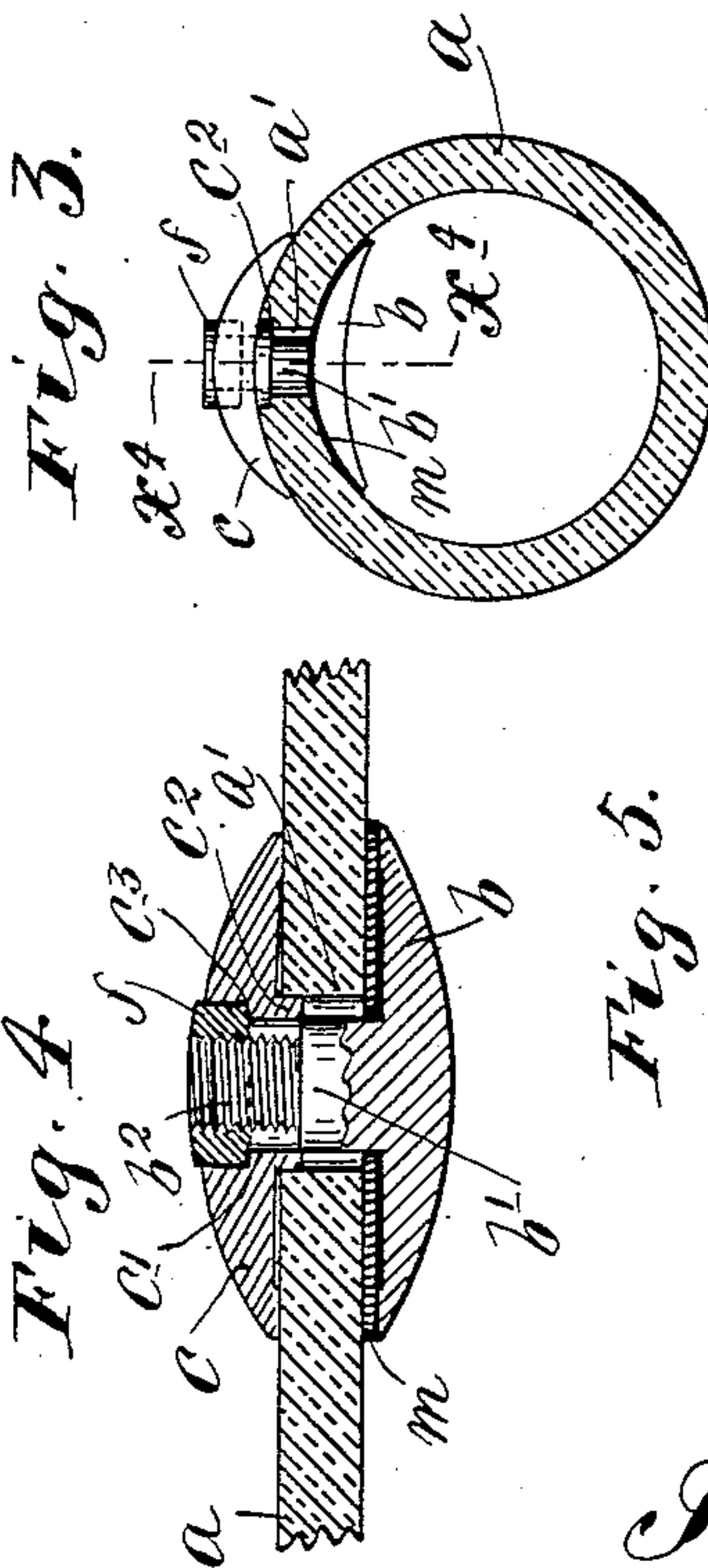


Fig. 5.

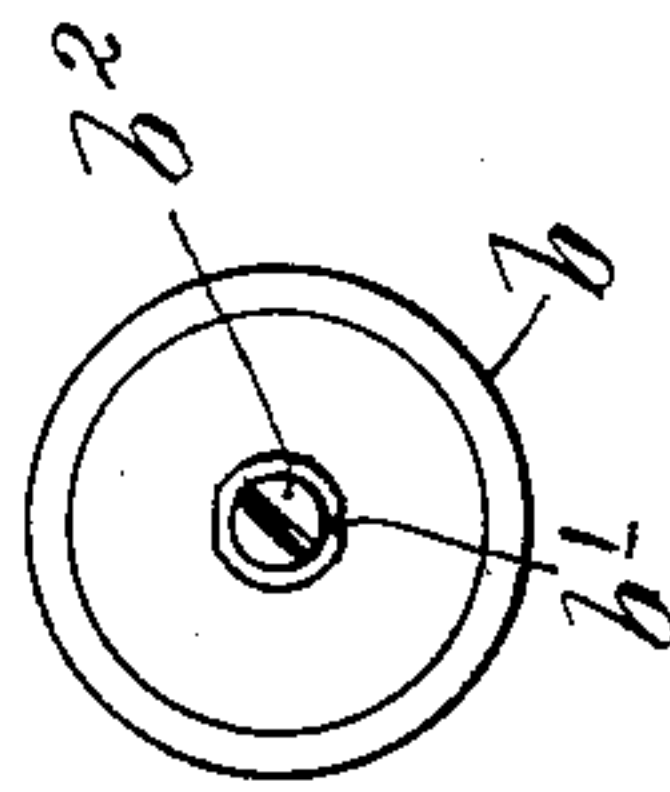
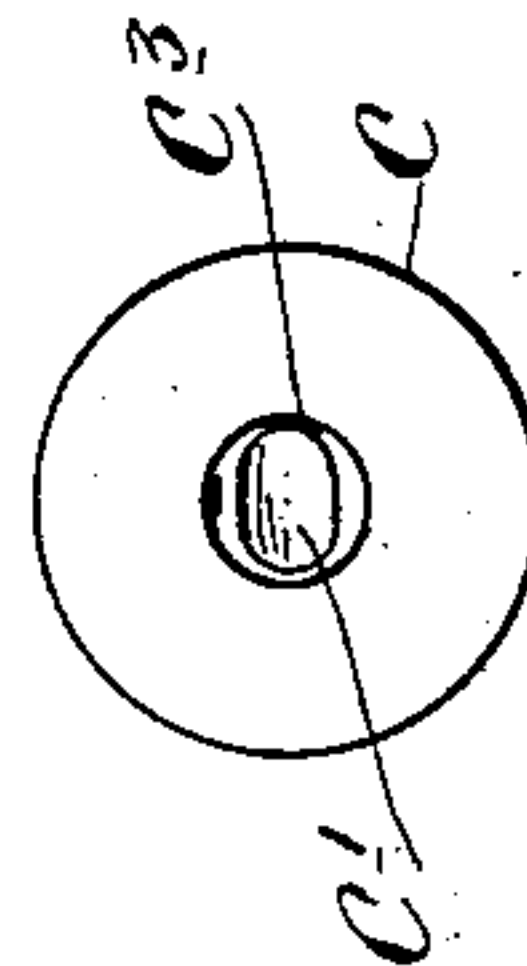


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDWARD F. FELSING AND JOHN A. ANDERSEN, OF MINNEAPOLIS,
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PUNCTURE-PLUG.

SPECIFICATION forming part of Letters Patent No. 735,078, dated August 4, 1903.

Application filed October 11, 1902. Serial No. 126,875. (No model.)

To all whom it may concern:

Be it known that we, EDWARD F. FELSING and JOHN A. ANDERSEN, citizens of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Puncture-Plugs; and we 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.

Our invention has for its object to provide an improved puncture-plug especially adapted for closing punctures in fire-hose; and to this end it consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The horses of the fire departments are necessarily kept sharply shod, and as they often pass over a hose at a fire the hose-sections are very frequently punctured by their sharp calks. It has previously been the common practice when a hose-section has been punctured to cut the same in two at the puncture and apply a hose-coupling. These hose-couplings are, however, expensive, and, furthermore, they add much weight to the hose. If the puncture should be within, say, ten feet of the end of the hose-section, these ten feet of hose would under the prevailing practice be cut off and thrown away. As this hose is worth approximately one dollar per foot the great waste under the above practice is obvious.

Prior puncture-plugs, many of which have been found more or less efficient for curing punctures in bicycle-tires, have not been found serviceable for closing punctures made in fire-hose. The said prior devices have been found inefficient for the above purpose chiefly for the reasons, first, that fire-hose when in use is subjected to a very high pressure, and, second, such hose in view of the great strength which it must have has very little or no elasticity, so that a puncture device inserted through a puncture from the outside of the hose will not sufficiently overlap with that portion of the hose which surrounds the said puncture.

By our invention we provide a device or

puncture-plug which by means of a wire or similar device is adapted to be drawn through the end of the hose and then inserted into the puncture from the inner side thereof or from the interior of the hose.

The device is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a plan view with some parts broken away and others sectioned, showing a section of hose and illustrating the manner in which our improved puncture-closing device or plug is applied to a puncture thereof. Fig. 2 is a similar view to Fig. 1, but illustrates a later step in the manipulation of applying the plug. Fig. 3 is a view, partly in transverse section, on the line $x^3 x^3$ of Fig. 2, but with parts of the puncture-plug shown in full. Fig. 4 is an enlarged view, in longitudinal section, on the line $x^4 x^4$ of Fig. 3, some parts being broken away. Fig. 5 is a plan view looking at the stem end of the inner clamping-head of the puncture-plug. Fig. 6 is a plan view of the outer clamping-head of the puncture-plug, and Fig. 7 is a bottom plan view of the head shown in Fig. 6.

The character a indicates a section of fire-hose which, as shown, is punctured at a' .

The character b indicates the inner member, and the character c the outer member, of a pair of clamping-heads which are bent cylindrical, the former to fit the interior surface and the latter to fit the exterior surface of the hose, as best shown in Fig. 3. The inner clamping-head b is formed with a flattened shank or stud b' , the end of which is further reduced and threaded, as shown at b^2 . The outer clamping-head c is provided with a central and slightly-elongated perforation c' , which quite closely fits the flattened stud or stem b' and is thereby held against rotation with respect to the head b ; otherwise stated, the cooperating clamping-heads b and c can be put together only when their cylindrical clamping-surfaces are parallel, as is necessary to properly apply the same to the surface of the hose. On its clamping-face the head c is provided with an annular flange c^2 , which follows the edge of the perforation c' and when the plug is applied is adapted to

telescope into the puncture a' . In the outer face of the head c the perforation c' is enlarged to form a countersunk nut-seat c^3 .

The character f indicates a sleeve provided
 5 with internal screw-threads which fit the screw-threaded end of the stem or stud b' . This sleeve f on account of the purpose which it serves we term a "sleeve-nut." It is of such diameter that it may be drawn through the
 10 puncture a' and will fit within the seat c^3 of the clamping-head c . It may here be stated that the puncture a' is assumed to be cut to a standard size by a suitable tool provided for that purpose, but not shown. As the
 15 sleeve-nut f is adapted to be cut into short sections, each section affording a nut, it is partially sectioned or severed by annular grooves f' . At its extreme outer end it is provided with a perforation or eye f^2 , through
 20 which may be passed one end of a wire k . As shown, a pliable washer m , of rubber or other suitable material, is placed between the clamping-head b and the inner surface of the hose.
 25 The manner of applying the puncture device is as follows: The nut-sleeve f is screwed onto the stem of the head b , and one end of the wire is attached to the outer end of said sleeve-nut after first having been run inward
 30 through the puncture a' and out through the end of the hose. Then by means of said wire the attached members of the puncture-plug may be drawn into the hose and the said sleeve-nut and threaded stem may be drawn
 35 outward through the puncture. The sleeve-nut f is then removed from the threaded stem of the plug b , and the outer clamping-head c is applied in working position, and then the said sleeve-nut is again applied to
 40 the threaded stem of the said clamping-head b . By means of a suitable tool—for instance, by rod or pin passed through the eye or perforation f^2 —the sleeve-nut may be tightly screwed into its seat in the head c , and the
 45 clamping-heads b and c may thereby be very tightly drawn or clamped onto the hose. After the clamping-heads are applied as just described the sleeve-nut f , together with that portion of the screw-threaded stem b^2 which
 50 projects beyond the head c , are sawed off close to the outer face of the said head c , as shown in Fig. 3. Then by the use of a file or hammer the sawed portions of the sleeve c and stem b^2 may be rounded, as shown in
 55 Fig. 4. It will thus be seen that the section of the sleeve-nut which is left in the seat c^3 constitutes a nut which is countersunk into the head c .

It will be noted that the outer end of the
 60 screw-threaded stem b^2 is slitted, so that a

screw-driver may be applied thereto to remove the severed end thereof from the severed main section of the sleeve-nut, thus enabling the said sleeve-nut to be used over and over until the last section thereof has
 65 been utilized.

The importance of providing the clamping-heads with cylindrical clamping-surfaces which fit one the interior and the other the exterior surface of the hose will be readily
 70 appreciated. In actual practice we have found that the clamping-head thus formed is more efficient than flat clamping-heads, for the reason that the latter force the hose into an unnatural form, which not only tends to
 75 cut the hose, but also distributes the clamping strains of the puncture device unevenly.

What we claim, and desire to secure by Letters Patent of the United States, is as follows:

1. A puncture-plug comprising a pair of
 80 clamping-heads the one having a screw-threaded stem and the other having a central stem-passage expanded at its outer portion to afford a surrounding countersunk nut-seat, and a sleeve-nut working with screw-thread-
 85 ed engagement in said stem and fitting in the countersunk nut-seat, and which sleeve-nut projects beyond the outer extremity of said countersunk nut-seat and is adapted to be cut off flush with the outer surface of the outer
 90 clamping-head, substantially as described.

2. A puncture-plug comprising a pair of clamping-heads having cylindrical clamping-surfaces, one fitting in the interior and the other the exterior of the hose, one of said
 95 clamping-heads having a stem which works through a seat in the other head and by its engagement therewith holds the said heads against rotation with respect to each other and with their cylindrical surfaces concentric, substantially as described. 100

3. A puncture-plug comprising the clamping-head b with flattened shank b' and screw-threaded stem b^2 , of the clamping-head c perforated at c' to fit said shank c and provided
 105 with the countersunk nut-seat c^3 , which heads b and c have cylindrical clamping-surfaces, and the sleeve-nut f working on said stem b^2 and fitting in said seat c^3 , and which parts b^2 and f are adapted to be cut off flush with the
 110 outer face of said head c , substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

EDWARD F. FELSING.
 JOHN A. ANDERSEN.

Witnesses:

ELIZABETH H. KELIHER,
 F. D. MERCHANT.