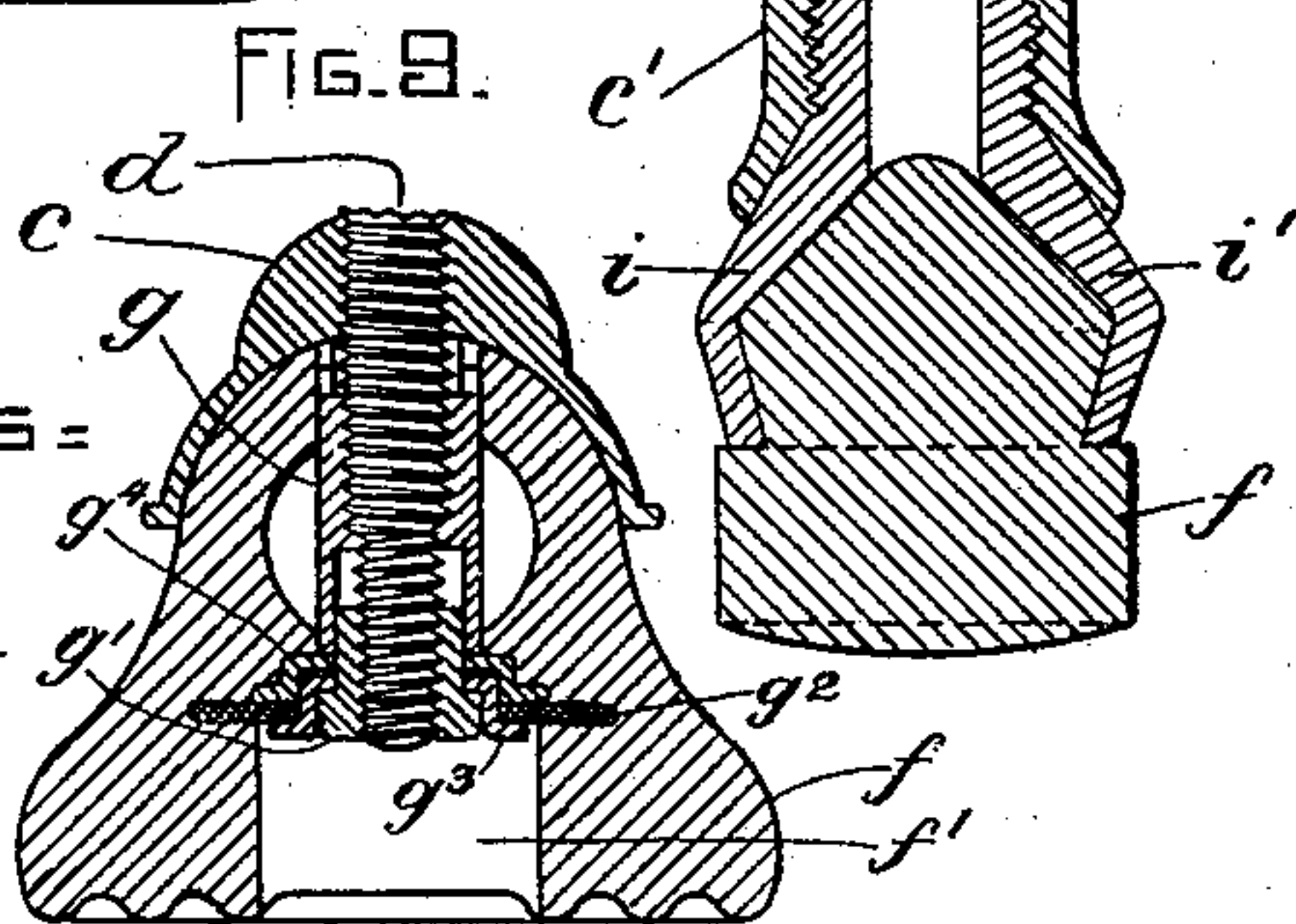
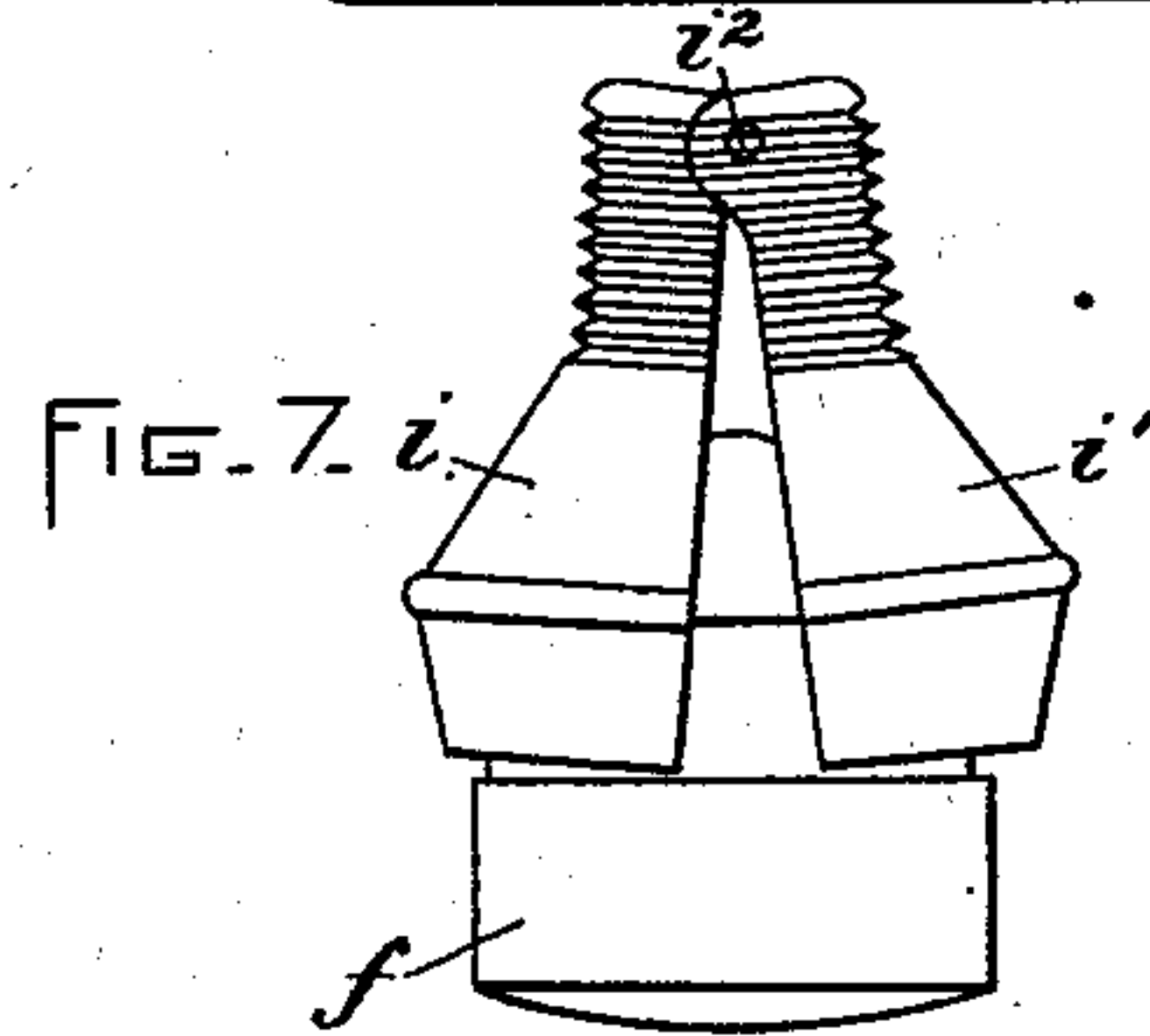
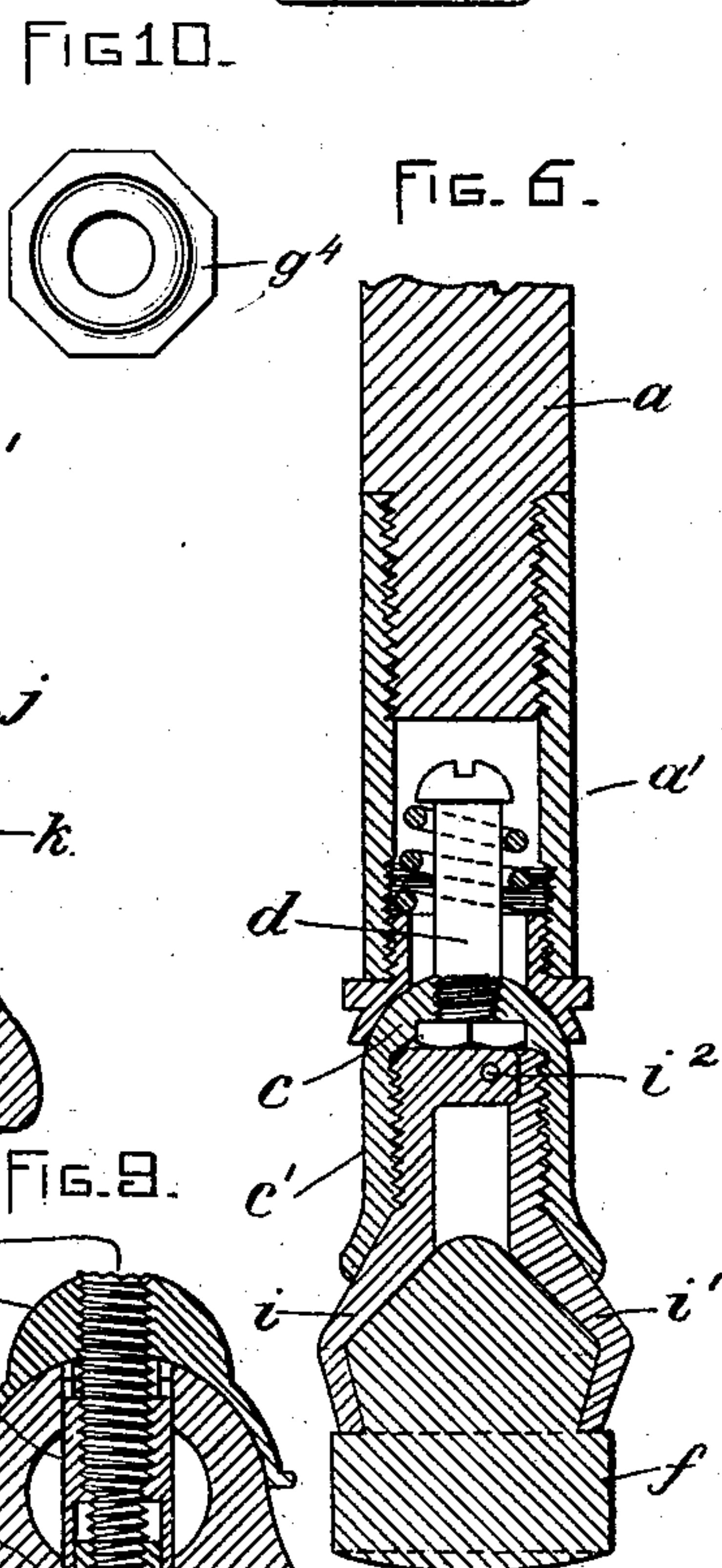
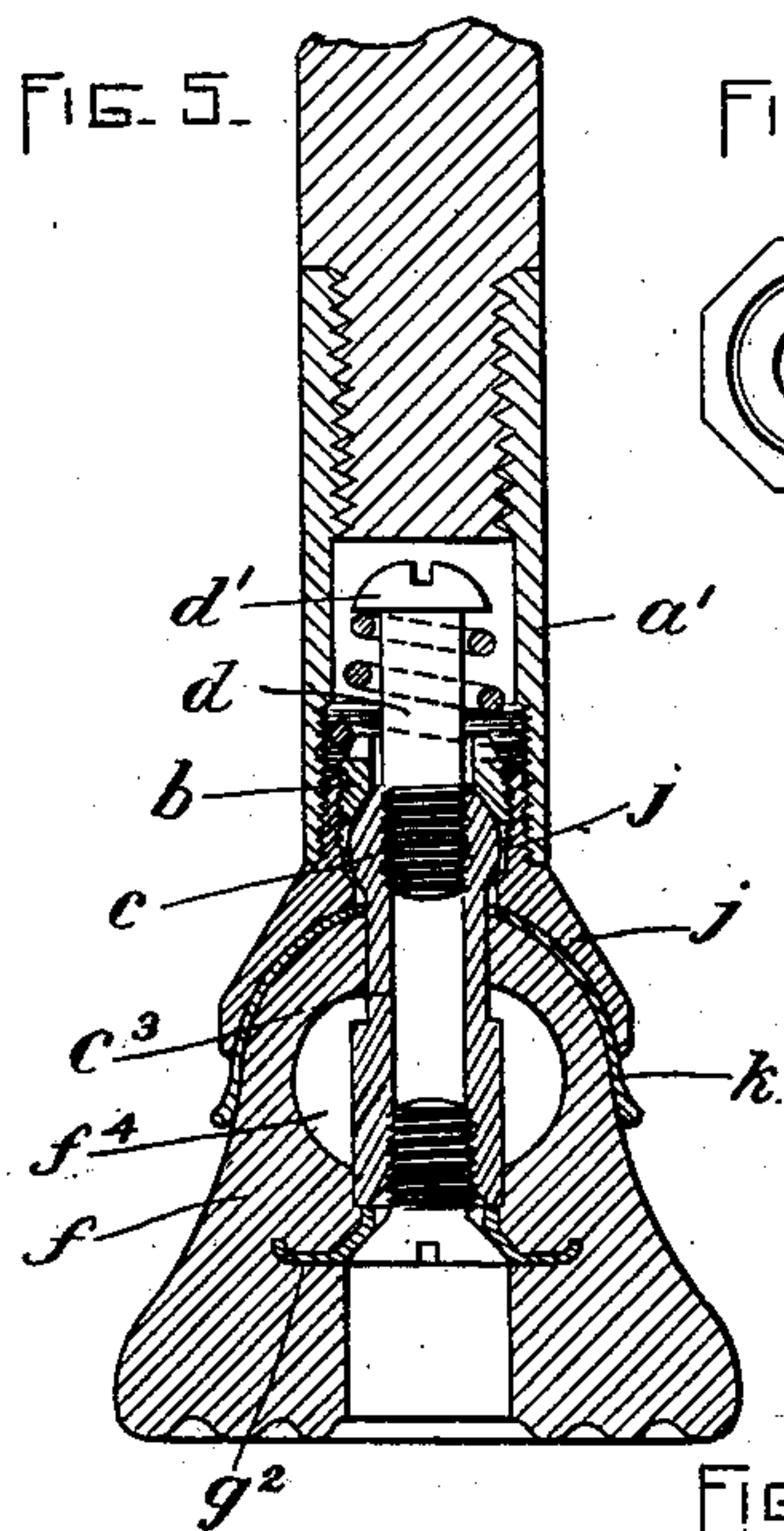
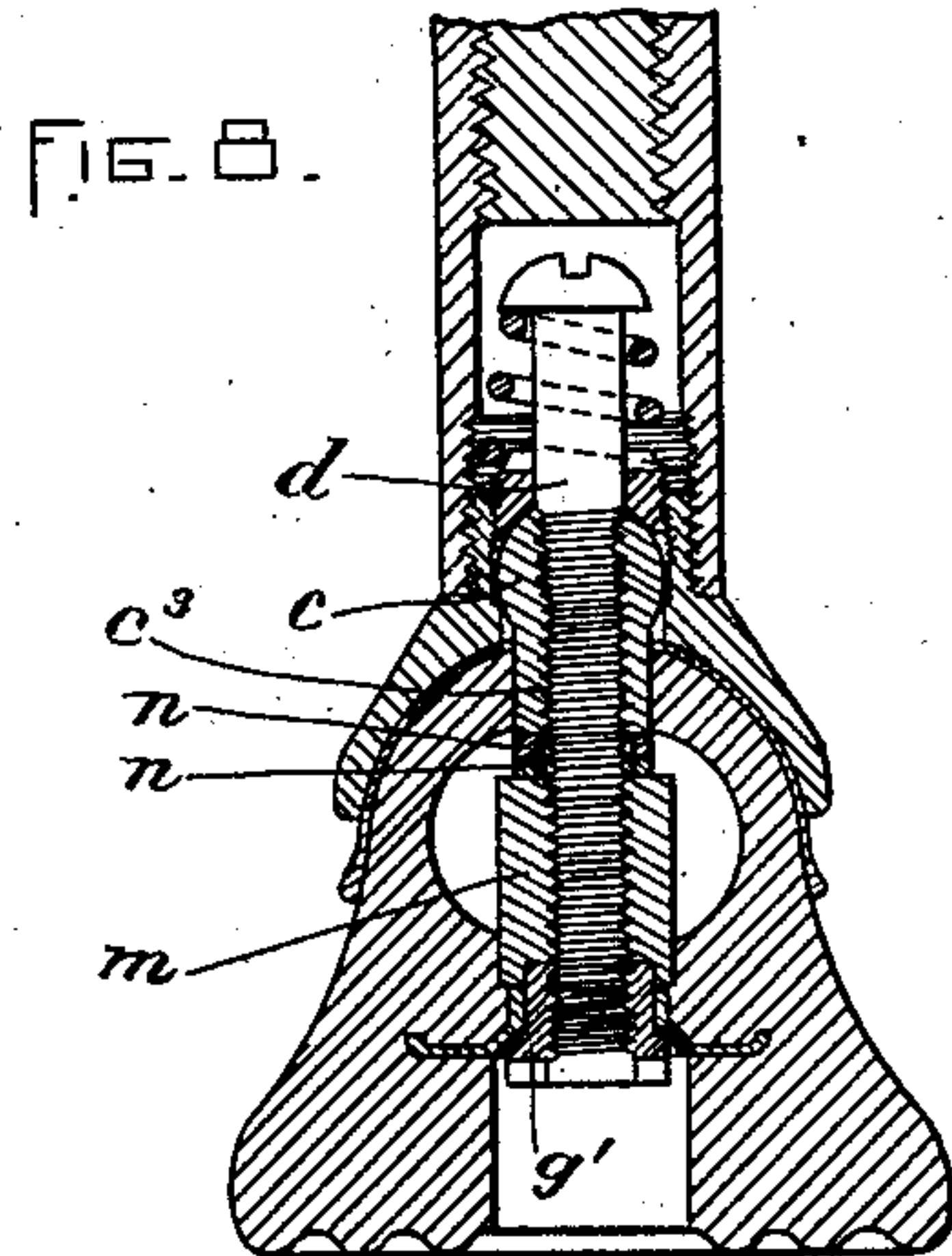
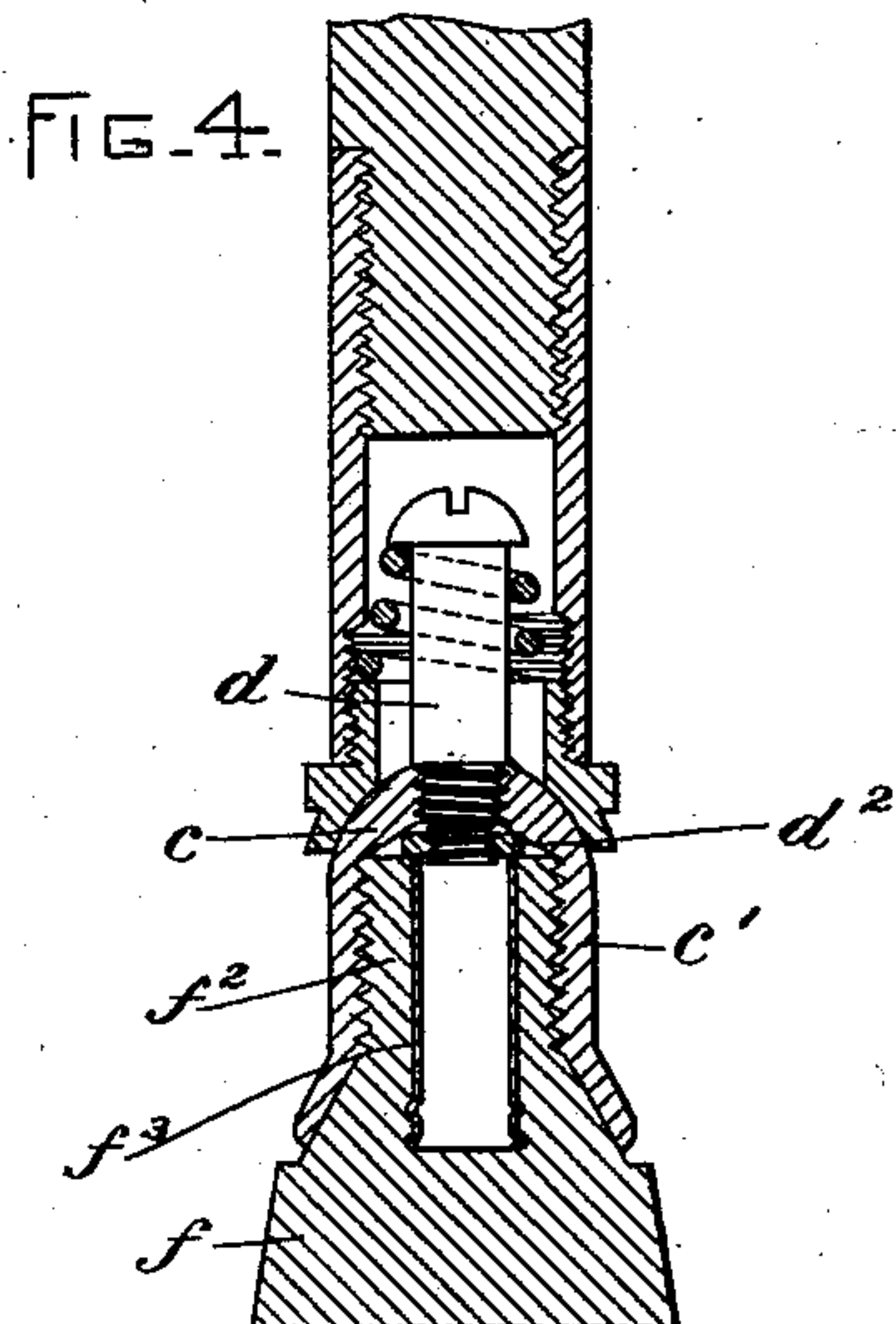
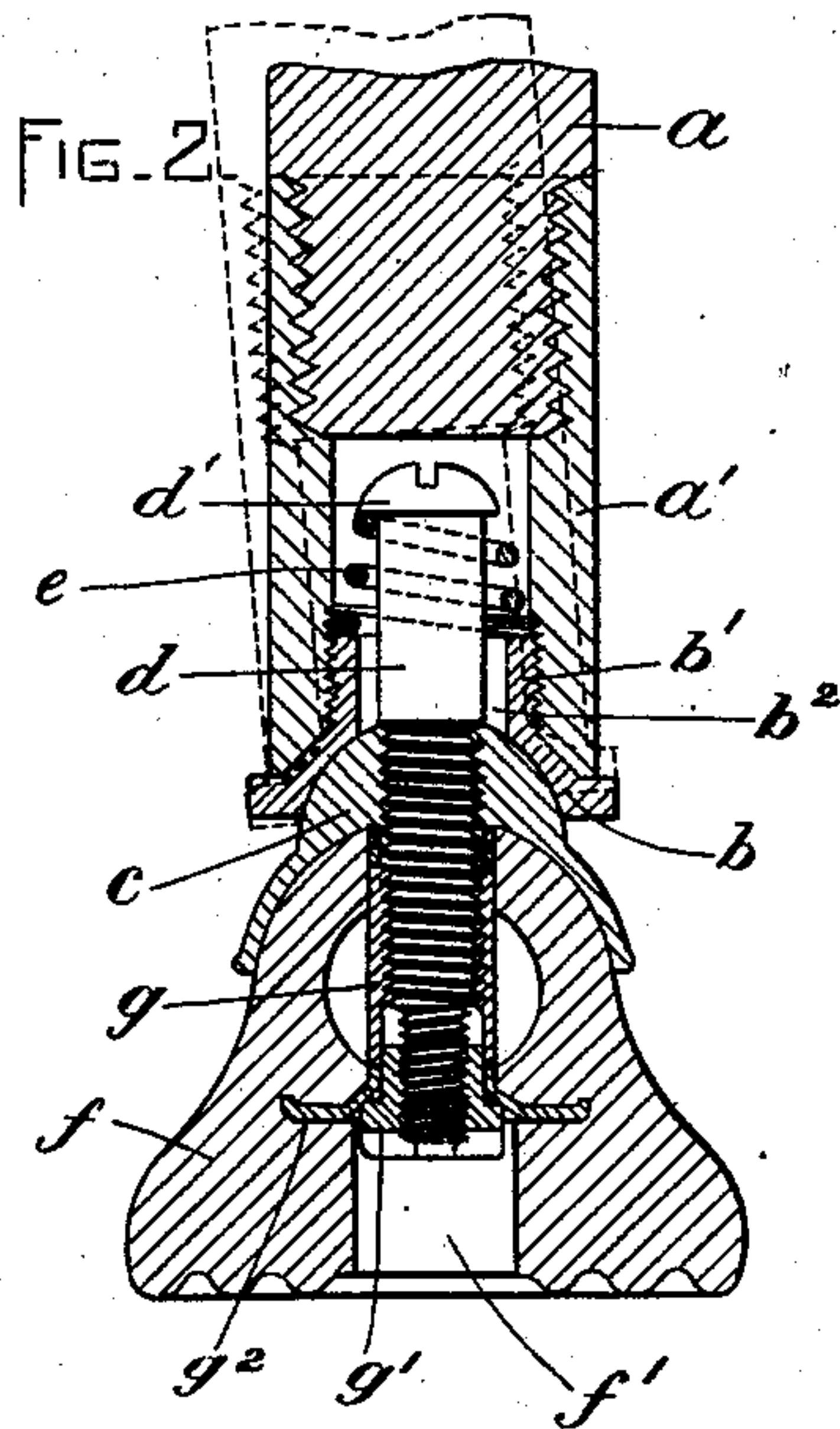
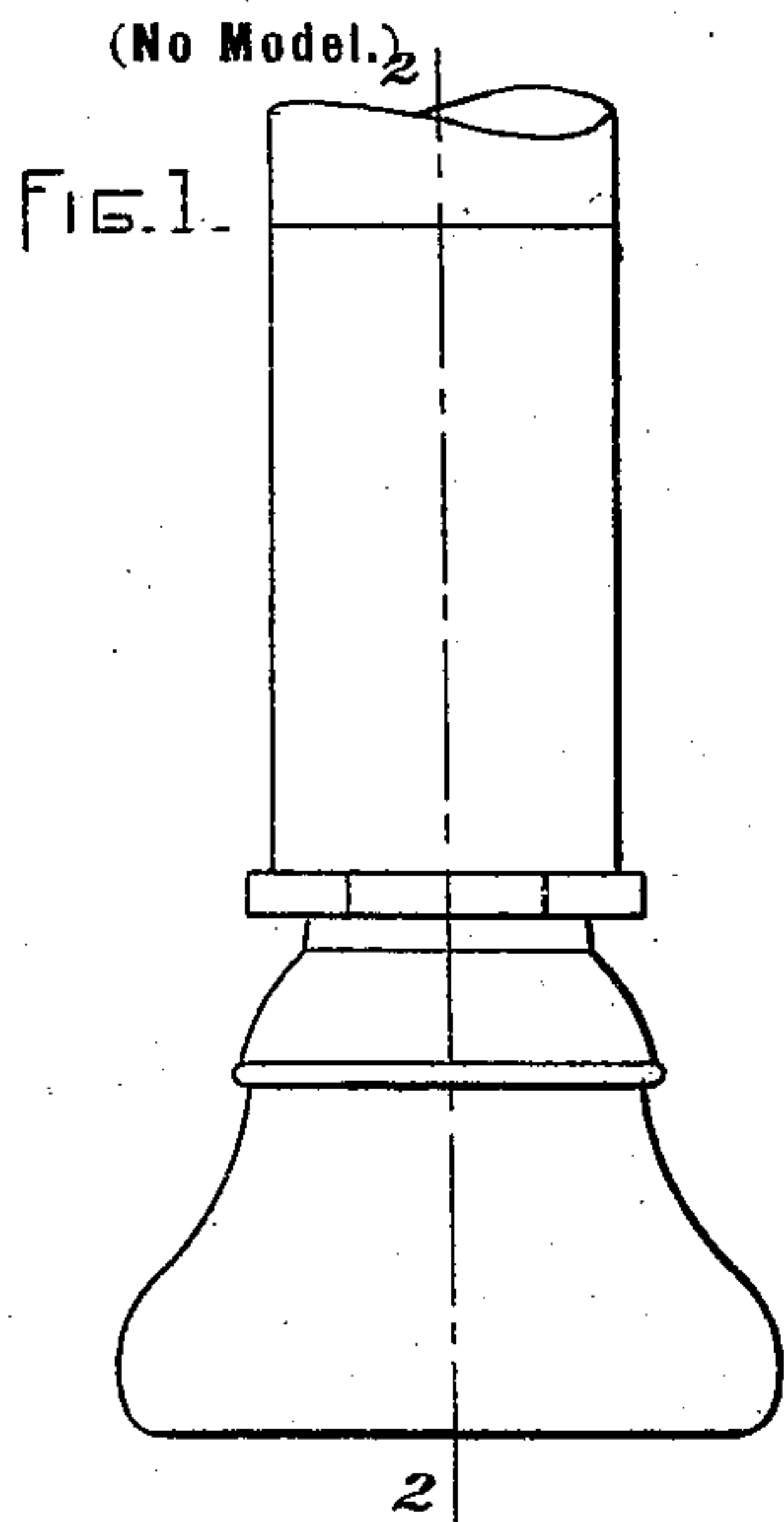


No. 710,074.

Patented Sept. 30, 1902.

P. W. PRATT.  
CRUTCH, CANE, &c.

(Application filed Feb. 27, 1902.)



WITNESSES:

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# UNITED STATES PATENT OFFICE.

PHILIP W. PRATT, OF BOSTON, MASSACHUSETTS.

## CRUTCH, CANE, &c.

SPECIFICATION forming part of Letters Patent No. 710,074, dated September 30, 1902.

Application filed February 27, 1902. Serial No. 95,916. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP W. PRATT, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Crutches, Canes, &c., of which the following is a specification.

This invention relates chiefly to a crutch having an elastic frictional tread-piece jointed to the lower portion of the crutch stick or body, so that the said stick or body can be inclined at various angles relatively to the plane of the surface on which it bears, the tread-piece at the same time remaining parallel with said surface and having a suitably-extended bearing thereon.

The invention has for its object to provide improved means for connecting a crutch stick or body with an elastic tread-piece in order to permit an oscillatory motion of one part relatively to the other.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of the lower portion of a crutch stick or body and an elastic tread-piece connected therewith. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents an edge view of the foot shown in Fig. 2 embedded in the elastic tread-piece. Figs. 4 and 5 represent sectional views of different embodiments of my invention. Fig. 6 represents a sectional view of another embodiment of the invention. Fig. 7 represents a side elevation of the hinged tread-piece-engaging clamp shown in Fig. 6. Fig. 8 represents a sectional view of another embodiment of the invention. Fig. 9 represents a sectional view showing a modification. Fig. 10 represents a plan view of one of the parts shown in Fig. 9.

The same reference characters indicate the same parts in all the figures.

Referring for the present to Figs. 2 and 4, *a* represents the lower portion of a crutch stick or body, and *a'* represents a ferrule attached to the body *a*.

*b* represents an annular socket member affixed to the ferrule *a*, said socket member being formed internally as a zone or section of a hollow sphere and having an upwardly-

projecting externally-threaded flange *b'*, which is engaged with an internal thread in the ferrule *a'* and surrounds an opening *b<sup>2</sup>*, which opening is surrounded by the annular socket member *b*.

*c* represents a complementary member, which for convenience I term a "ball" member, the same presenting a zone or segment of a sphere which is adapted to oscillate in the socket member *b*.

*d* represents a stud which is affixed rigidly to the ball member *c* and projects upwardly therefrom through the opening *b<sup>2</sup>*, said stud being provided with a head *d'* at its upper end.

*e* represents a spring which is interposed between the head *d'* and an abutment within the ferrule *a'*, said abutment being in this case the upper end of the flange *b'*. The spring exerts a constant upward pressure on the stud *d* and through the latter holds the ball member *c* with a yielding pressure against the socket member *b*. The stud *d* is enough smaller than the opening *b<sup>2</sup>* and the interior of the ferrule *a'* to permit the stud to oscillate laterally or to permit the ferrule and crutch-body *a* to oscillate laterally on the ball member *c*, so that the crutch-body can be inclined relatively to the tread-piece hereinafter described, as indicated by dotted lines in Fig. 2.

*f* represents an elastic or frictional tread-piece which is affixed to the ball member *c* and has a bottom surface suitably formed to constitute the tread of the crutch.

It will be seen that the above-described ball-and-socket members, one affixed to the tread-piece and the other to the crutch-body, and the means for holding said members in yielding engagement and for permitting an oscillatory movement of the crutch-body relatively to the tread-piece, enables the tread-piece to maintain a square and firm bearing on the pavement, floor, or other surface on which it bears regardless of the inclination of the crutch-body. The crutch-body can therefore swing in the various directions required by the movements of the user without requiring a corresponding swinging or tilting of the tread-piece.

The details of construction of a crutch or cane embodying the invention above de-



scribed may be variously modified. In Figs. 2 and 4 I show the stud  $d$  provided with a screw-threaded extension, which is engaged with an internal thread formed in the ball member  $c$ , the stud and ball member being thus rigidly connected. In Fig. 4 the threaded extension of the stud  $d$  terminates just below the under surface of the ball member and is of only sufficient length to receive a nut  $d^2$ , which bears against the under surface of the ball member. In Fig. 2 I show the tread-piece  $f$  affixed to the ball member by means of an internally-threaded shank  $g$ , which is embedded in the upper portion of the tread-piece and bears at its upper end on the under side of the ball member  $c$ . A nut  $g'$ , engaged with a reduced threaded extension at the lower end of the stud  $d$ , holds the shank  $g$  against the ball member  $c$ . A circular foot-piece  $g^2$  is preferably held by the nut  $g'$  against the lower end of the shank  $g$ , said shank and footpiece being both embedded in the unvulcanized composition of which the tread-piece is made and secured therein by the process of vulcanization. The tread-piece is provided with a central opening  $f'$ , through which access can be had to the nut  $g'$ , the latter having a slotted lower portion to engage a screw-driver or other tool. The removal of the nut  $g'$  enables the tread-piece to be disconnected from the stud extension by unscrewing it therefrom.

In Fig. 4 I show the tread-piece  $f$  secured to the ball member  $c$  by means of an externally-screw-threaded stem  $f^2$ , formed on and integral with the tread-piece, and an internally-threaded downwardly-projecting flange  $c'$ , formed on the ball member  $c$ . To support the screw-thread on the stem  $f^2$  and prevent it from yielding too freely, I insert a metallic stiffening-tube  $f^3$  in the stem  $f^2$ . The construction shown in Fig. 6 is practically like that shown in Figs. 2 and 4 so far as the engagement of the stud  $d$  with the ball member  $c$  is concerned, and the ball member is provided with an internally-threaded flange  $c'$ , substantially as shown in Fig. 4. In this modification, however, the tread-piece  $f$  is connected with the ball member by means of an intermediate clamp composed of two parts  $i$   $i'$ , hinged together at  $i^2$ . The lower portions of said members are formed as jaws, adapted to encircle a shouldered portion of the tread-piece  $f$ , their upper portions being externally threaded and collectively forming a shank adapted to engage the internal thread of the flange  $c'$ .

In Fig. 5 I show the socket member  $b$  entirely contained within the ferrule  $a'$  and screwed directly into an internally-threaded sleeve  $j'$ , formed on a flange  $j$ , which is affixed to the ferrule  $a'$ . The ball member  $c$  is formed on the upper end of a tubular shank  $c^3$ , which projects downwardly and is engaged with the tread-piece  $f$  in the same manner that the shank  $g$  (shown in Fig. 2) is en-

gaged. The under side of the flange  $j$  is concave and receives a concavo-convex washer  $k$ , which fits the under side of the flange  $j$  and the upper end of the tread-piece  $f$ . The elasticity of the tread-piece enables the crutch-body to oscillate upon the tread-piece, any inclination of the crutch-body from a vertical position causing one side of the flange  $j$  to move inwardly and compress the corresponding side of the upper portion of the tread-piece. The upper portion of the tread-piece is made suitably yielding by the formation of a cavity  $f^4$ , which surrounds the lower portion of the tubular shank  $c^3$  and reduces the thickness of the portion of the tread-piece which is pressed upon by the flange  $j$  when the crutch-body is inclined. In Fig. 8 I show a construction which is substantially similar to that shown in Fig. 5, excepting in the following particulars, namely: The threaded extension of the stud  $d$  is carried down below the tubular shank formed on the ball member  $c$  and engaged with a nut  $g'$ , substantially such as is shown in Fig. 2, the nut confining a sleeve  $m$  and one or more washers  $n$ , said sleeve and washers constituting an extension of the tubular shank  $c^3$ , formed on the ball member  $c$ .

The footpiece  $g^2$ , embedded in the body of the tread-piece  $f$  and secured to the shank  $d$ , provides a strong and durable connection between the said tread-piece and shank. The said footpiece shown in Figs. 2, 3, 5, and 8 is composed of metal, while the footpiece shown in Fig. 9 is an annulus or washer of canvas or other strong flexible material clamped at its inner edge between two shouldered collars  $g^3$   $g^4$ , which are held by the nut  $g'$ . The flexibility of the footpiece shown in Fig. 9 materially increases the elasticity of the tread-piece  $f$ .

I claim—

1. A crutch or cane comprising a body having a rigid annular socket member at its lower portion, a ball member fitted to oscillate in said socket member, a stud affixed rigidly to the ball member and projecting therefrom through the opening of the socket member and movable laterally therein, a spring engaged with said stud and with a fixed abutment within said body, said spring and stud holding the ball member yieldingly against the socket member and permitting one member to oscillate on the other, and an elastic tread secured to the ball member.

2. A crutch or cane comprising a body having a rigid annular socket member at its lower portion, a ball member fitted to oscillate in said socket member, a stud affixed rigidly to the ball member and projecting therefrom through the opening of the socket member and movable laterally therein, a spring engaged with said stud and with a fixed abutment within said body, said spring and stud holding the ball member yieldingly against the socket member and permitting one member to oscil-



late on the other, an elastic tread, and means for detachably securing the said tread to the ball member.

3. A crutch or cane comprising a body having a rigid annular socket member at its lower portion, a ball member fitted to oscillate in said socket member, a stud affixed rigidly to the ball member and projecting therefrom through the opening of the socket member and movable laterally therein, a spring engaged with said stud and with a fixed abutment within said body, said spring and stud holding the ball member yieldingly against the socket member and permitting one member to oscillate on the other, a shank attached to and extending downwardly from the ball member, and an elastic tread attached to said shank.

4. A crutch or cane comprising a body having a rigid annular socket member at its lower portion, a ball member fitted to oscillate in said socket member, a stud affixed rigidly to the ball member and projecting therefrom through the opening of the socket member and movable laterally therein, a spring engaged with said stud and with a fixed abutment within said body, said spring and stud holding the ball member yieldingly against the socket member and permitting one member to oscillate on the other, a shank attached to and extending downwardly from the ball

member and provided with a footpiece at its lower portion, and an elastic tread attached to said shank and footpiece.

5. A crutch or cane comprising a body having a rigid annular socket member at its lower portion, a ball member fitted to oscillate in said socket member, a stud affixed rigidly to the ball member and projecting therefrom through the opening of the socket member and movable laterally therein, said stud having a threaded extension projecting downwardly through and below the ball member, a spring engaged with said stud and with a fixed abutment within said body, said spring and stud holding the ball member yieldingly against the socket member and permitting one member to oscillate on the other, a tubular shank engaging said threaded extension, and an elastic tread attached to said shank.

6. An elastic tread-piece provided with a rigid attaching member embedded in the tread-piece, and a flexible footpiece secured to the inner end of said attaching member and having its marginal portion embedded in the tread-piece.

In testimony whereof I have affixed my signature in presence of two witnesses.

PHILIP W. PRATT.

Witnesses:

C. F. BROWN,  
E. BATCHELDER.