

J. A. LELAND.  
 RATCHET BRACE.  
 APPLICATION FILED NOV. 10, 1908.

935,266.

Patented Sept. 28, 1909.

Fig. 1.

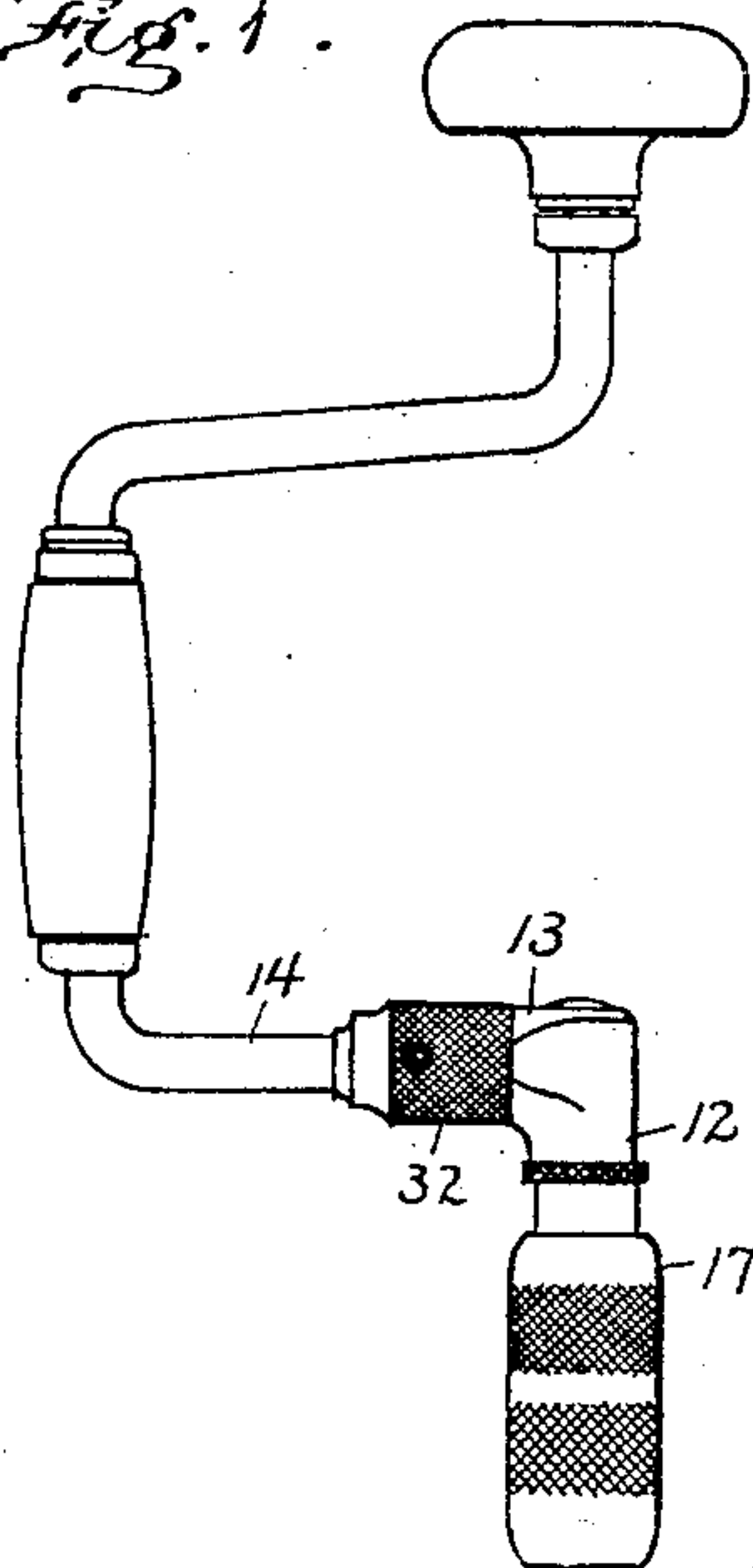


Fig. 2.

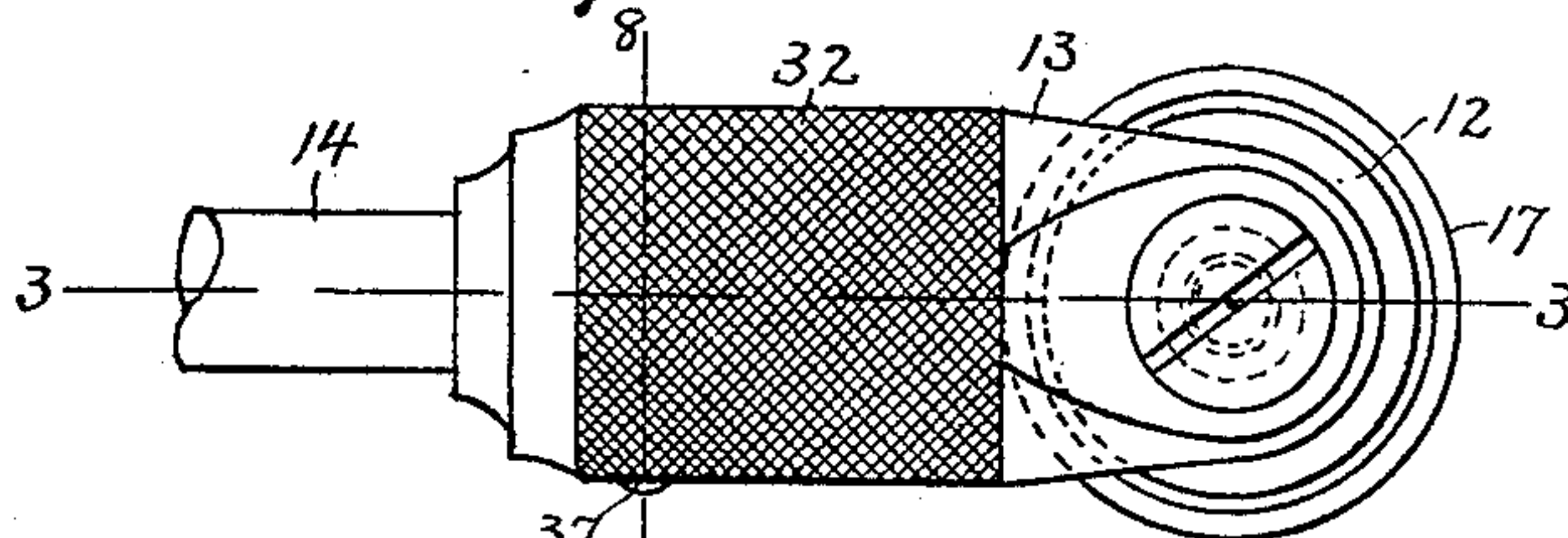


Fig. 3.

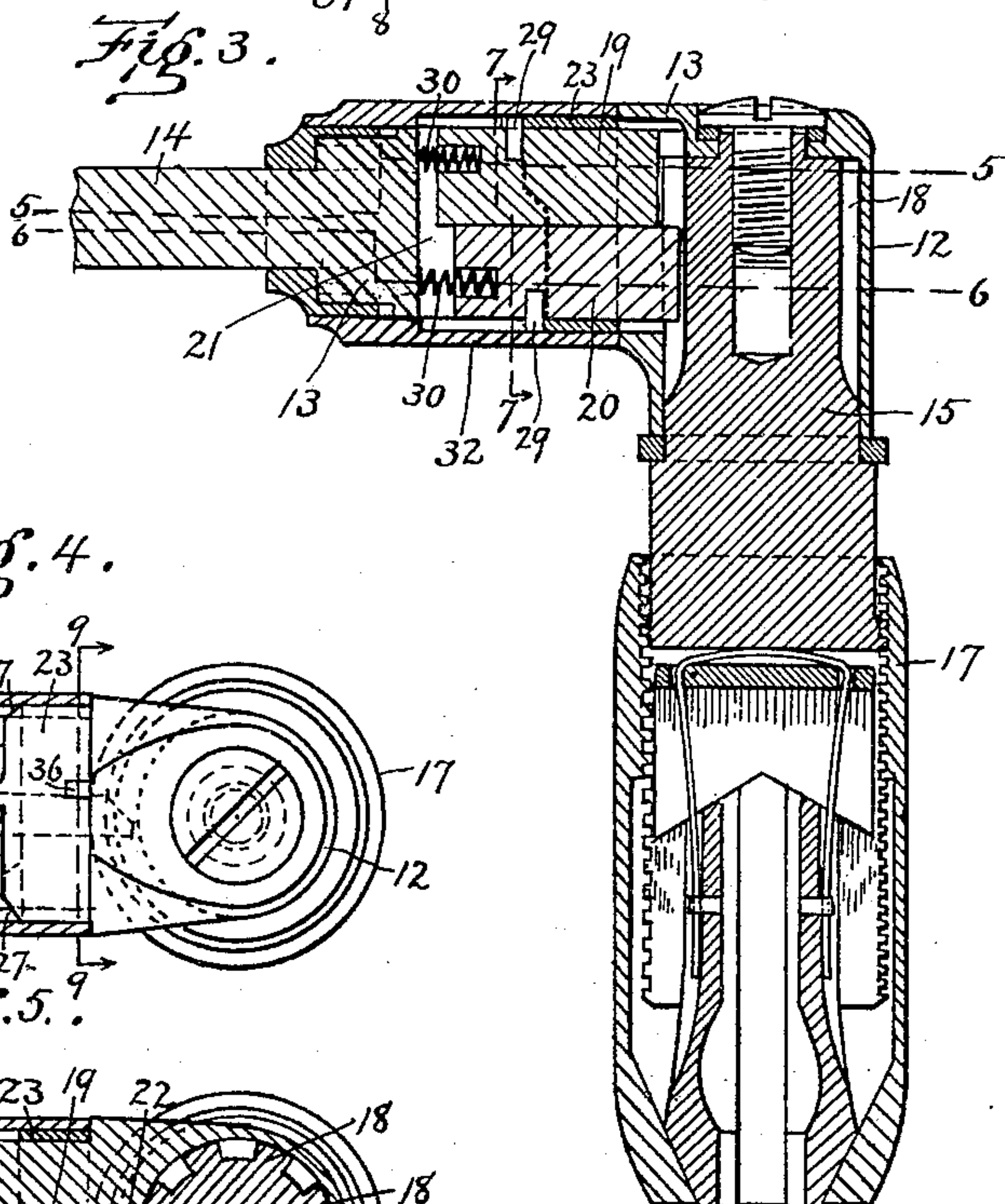


Fig. 4.

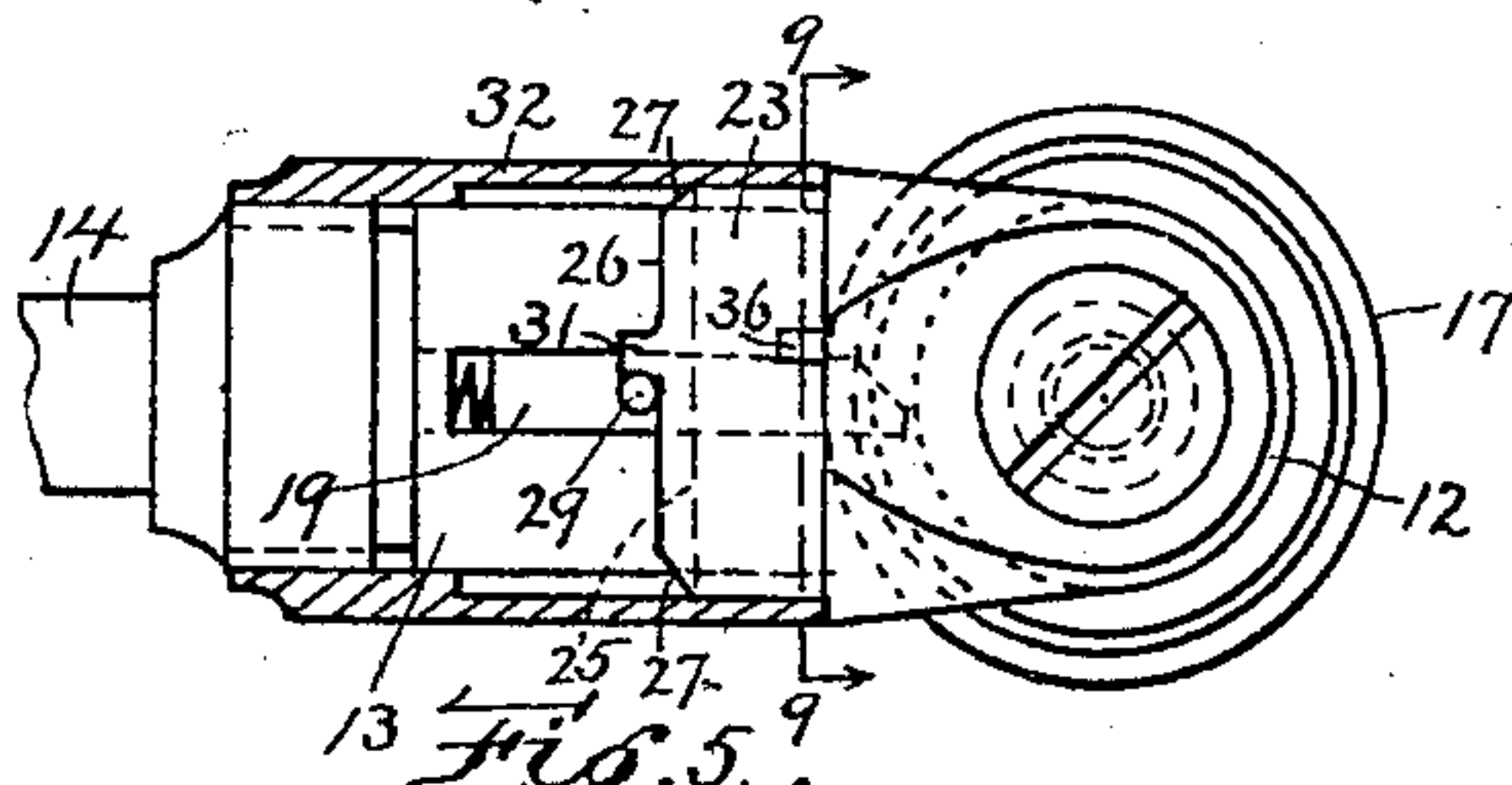


Fig. 5.

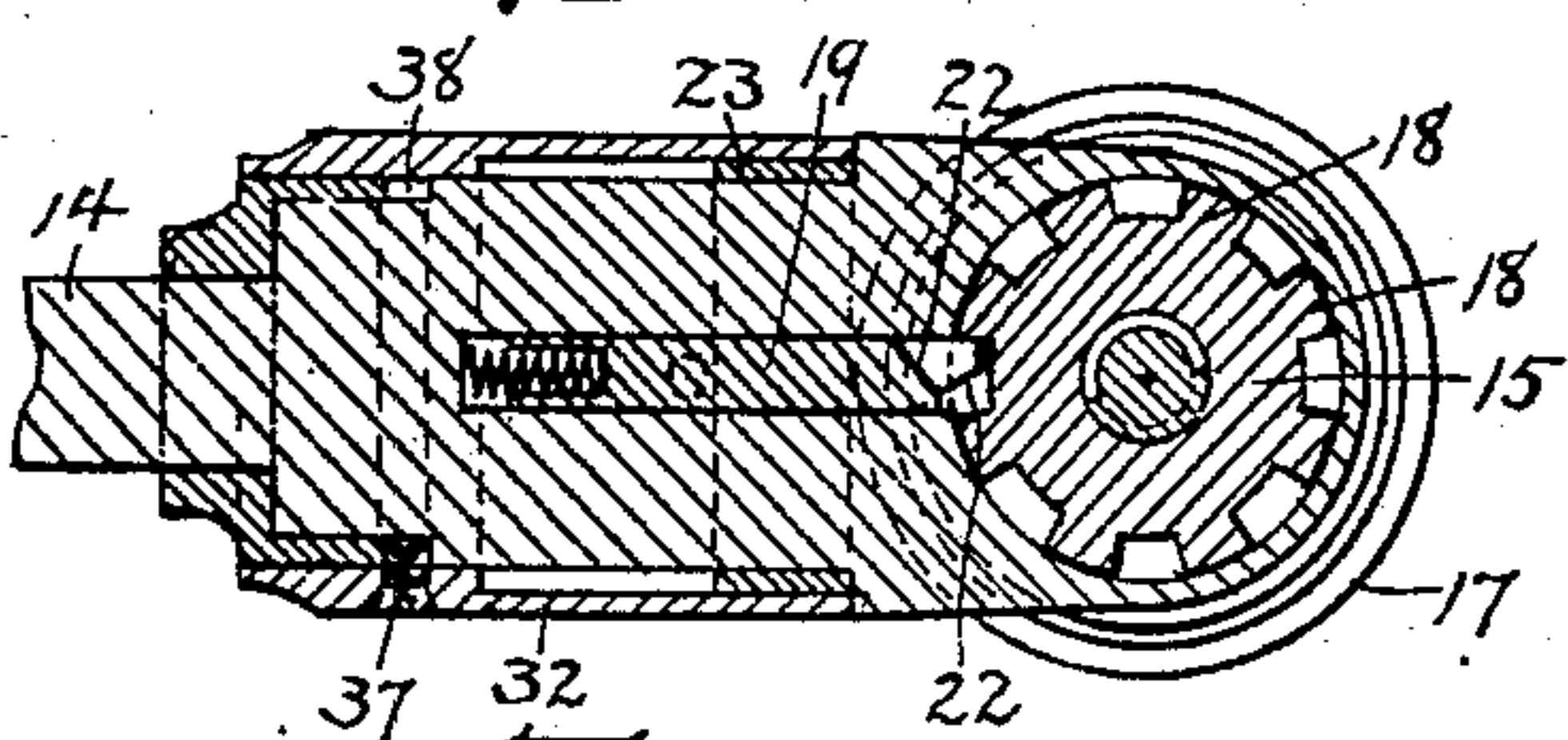


Fig. 6.

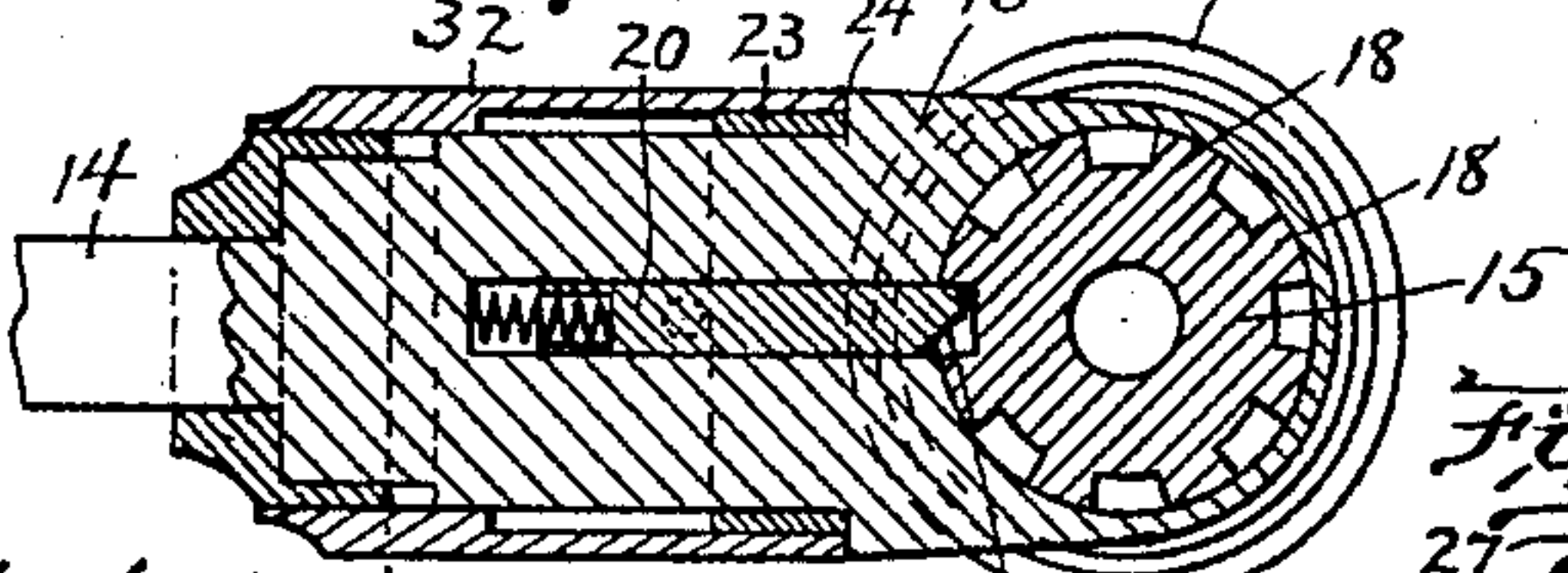


Fig. 8.

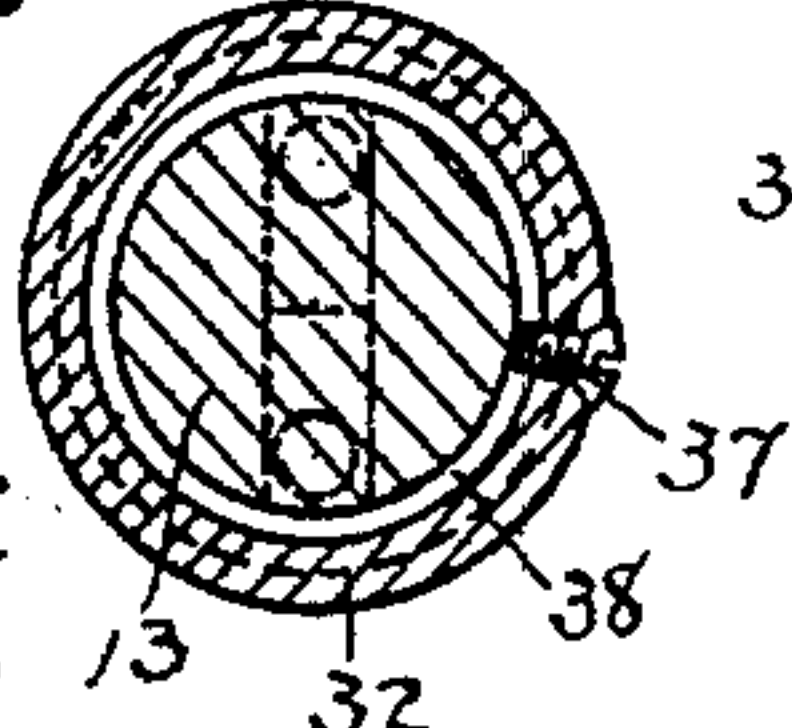


Fig. 9.

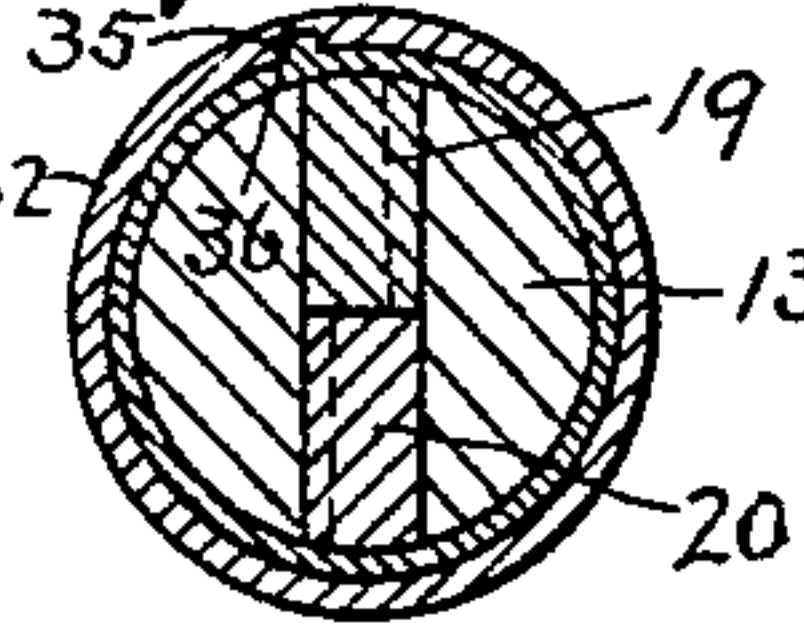


Fig. 10.

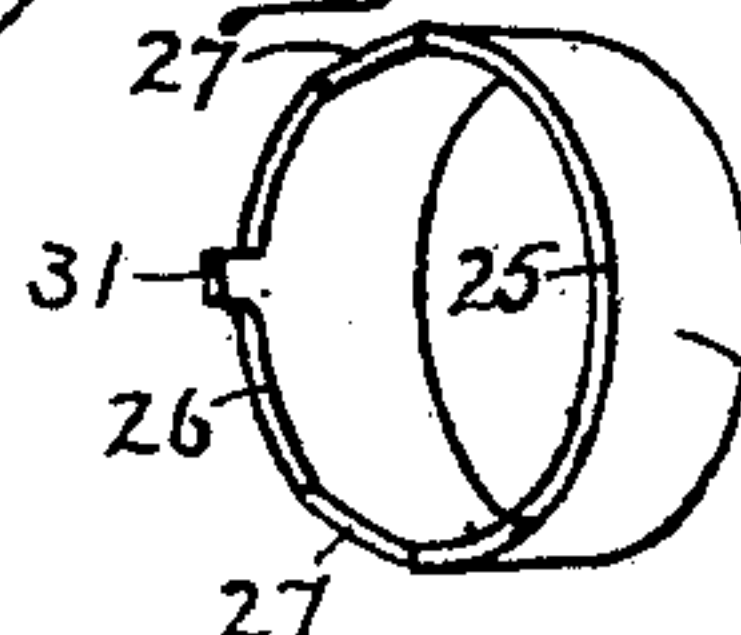
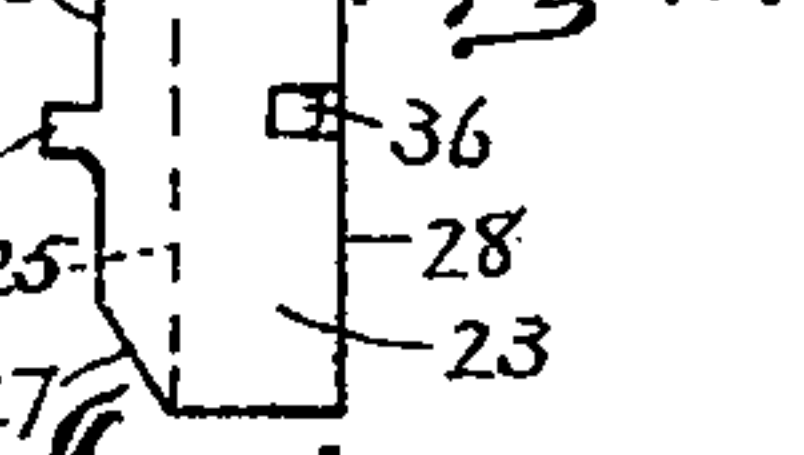


Fig. 11.



Witnesses.  
 P. H. Pezzetti  
 F. R. Rouletone

Inventor.  
 J. A. Leland  
 by [Signature] Attorney



# UNITED STATES PATENT OFFICE.

JOHN A. LELAND, OF MONTAGUE, MASSACHUSETTS, ASSIGNOR TO MILLERS FALLS COMPANY, OF MILLERS FALLS, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## RATCHET-BRACE.

935,266.

Specification of Letters Patent.

Patented Sept. 28, 1909.

Application filed November 10, 1908. Serial No. 461,870.

*To all whom it may concern:*

Be it known that I, JOHN A. LELAND, of Montague, in the county of Franklin and State of Massachusetts, have invented certain new and useful Improvements in Ratchet-Braces, of which the following is a specification.

This invention relates to a ratchet brace for operating bits, drills, etc., and comprises an angular head, one arm of which is provided with a chuck adapted to hold the operating tool, while the other end is provided with a cranked handle or brace whereby the chuck may be rotated.

The invention has for its object to provide simple and efficient means for causing the rotation of the chuck in either direction so that after the operating tool has been driven into the work, its rotation may be reversed to withdraw it from the work.

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 a ratchet brace embodying my invention. Fig. 2 represents an elevation of the inner end of the angular head, and of the chuck carried thereby. Fig. 3 represents a section on line 3—3 of Fig. 2. Fig. 4 represents a view similar to Fig. 2, showing the operating sleeve, hereinafter referred to, in section. Fig. 5 represents a section on line 5—5 of Fig. 3. Fig. 6 represents a section on line 6—6 of Fig. 3. Fig. 7 represents a section on line 7—7 of Fig. 3, and an elevation of parts at the right of said line. Fig. 8 represents a section on line 8—8 of Fig. 2. Fig. 9 represents a section on line 9—9 of Fig. 4. Fig. 10 represents a perspective view, and Fig. 11 a side elevation of the cam-edge collar referred to.

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

In the drawings, 12 and 13 represent the outer and inner arms of the angular head of my improved ratchet brace. The inner arm 13 is provided with the usual cranked handle or brace 14, while in the outer arm is journaled the shank 15 of a chuck 17 adapted to grasp a bit or other tool. The said shank and the chuck carried thereby are rotatable in the arm 12, as hereinafter described. The chuck may be of any suitable construction,

and is here shown as embodying the construction set forth in my application for patent of the United States filed June 23, 1908, Serial No. 439,943.

The shank 15 is provided with longitudinal ratchet teeth 18, which are preferably formed in cross section as shown in Figs. 5 and 6, each tooth being double-acting, so that it is adapted to cooperate with either of the pawls, hereinafter described, in causing the rotation of the shank and chuck.

The inner arm 13 is provided with two pawls 19 and 20, which are longitudinally movable in a slot 21 in said arm, the outer end of each pawl being adapted to engage the ratcheted shank 15. The pawls are adapted to act in opposite directions, each pawl having a beveled face 22 forming the back of its acting end, the beveled face of one pawl being at the opposite side from the beveled face of the other pawl, as illustrated in Fig. 5, so that one pawl is adapted to rotate the shank 15 in one direction, and the other pawl in the opposite direction when the arm 13 carrying said pawls is revolved by the revolution of the cranked handle or brace in the ordinary operation of the device.

In the manufacture of the angular head, the slot 21 is cast or cored in the arm 13 and requires no machining or labor of any kind to enable said slot to properly receive the pawls 19 and 20. In the other arm 12 of the angular head the opening for the shank 15 is preferably bored and reamed, this being done in an automatic machine.

The pawls 19 and 20 are made from flat drawn steel cut off to equal lengths and beveled at one end so as to take a bearing on the teeth 18 of the ratchet the full width of the pawls. The construction provides an engaging tooth at the end of each pawl the length of which tooth equals the major diameter of the pawl so that a wide bearing on the ratchet teeth is secured with a minimum of stock in the pawls. No waste of material whatever results from the formation of the pawls other than what may result from beveling.

Owing to the formation of the transverse slot extending entirely across the arm 13 of the angular head, the pawls 19 and 20 can be easily placed in said slot edge to edge and occupy the entire width of said arm 13,



thereby enabling the arm 13 to be made of a diameter not greater than the total length of the beveled ends of the two pawls.

The inner arm 13 is provided with means 5 for simultaneously projecting either pawl into engagement with the ratcheted shank 15, and retracting the other pawl therefrom, so that the shank and chuck may be rotated in one direction by the projection of the pawl 10 20 and the retraction of the pawl 19, and in the opposite direction by the projection of the pawl 19 and the retraction of the pawl 20. The means here shown for simultaneously projecting and retracting the pawls comprise 15 a collar 23 which is rotatable upon the arm 13, one edge 28 of said collar bearing on a shoulder 24 formed on said arm. The opposite edge of the collar is cam-shaped, said edge including an inner portion 25, and outer 20 portion 26, and two intermediate inclined portions 27. The portions 25 and 26 are parallel with the edge 28 of the collar, the portion 25 being nearer the edge 28 than the portion 26. The said cam-shaped edge constitutes a stop against which pins or projec- 25 tions 29 on the pawls are pressed by springs 30. The portions 25 and 26 of the cam-shaped edge are at opposite sides of the center of the collar 23, the arrangement being 30 such that when the projection 29 of one pawl bears against the edge portion 25, the projection of the other pawl bears against the edge portion 26. The edge portion 25 permits the pawl whose projection bears against it to be 35 engaged by the accompanying spring 30 with the ratcheted shank. The edge portion 26, on the other hand, causes the pawl whose projection is engaged with it to be retracted from the ratcheted shank.

40 Means are provided for limiting the rotary movements of the collar 23, the arrangement being such that when the collar is at either end of its rotary movement, one of the pawls is projected, and the other retracted. As 45 here shown, the said means include a stop finger 31 formed on the edge portion 26, and the projections 29 on the pawls 19 and 20, the said stop finger being arrested by one of said projections when the collar reaches one ex- 50 treme of its movement, and by the other projection when the collar reaches the opposite extreme of its movement. Provision is thus made for arresting the rotation of the collar in either direction when one of the pawls is 55 projected and the other retracted.

It will be seen by reference to Fig. 3 that the projected pawl is held by its spring 30 in yielding engagement with the ratcheted shank 15, so that the pawl is adapted to slip 60 on the ratchet teeth when the arm 13 is swung backwardly or revolved with reference to the projected pawl.

32 represents an operating sleeve which is rotatable upon the arm 13, and surrounds the 65 collar 23, said sleeve being externally milled

to facilitate its rotation by the operator. The sleeve 32 and collar 23 are provided with complementary coupling members, shown in Fig. 9 as a slot 35 in the inner surface of the sleeve 32, and a stud 36 on the exterior of the 70 collar 23. The sleeve 32 is provided with a screw or stud 37 which enters a peripheral groove 38 in the arm 13, and prevents endwise movement of the sleeve upon said arm.

The described implement is operated by 75 first engaging one of the pawls with the ratcheted shank 15, the other pawl being retracted, and then swinging the arm 13 in one direction, or if desired, the arm 13 may be oscillated, the projected pawl slipping back- 80 wardly on the ratchet teeth during the backward movements of the arm.

After the tool carried by the chuck has performed its work, the adjustments of the pawls may be reversed, and the pawl which 85 was before retracted, engaged with the shank, and caused to impart a backward rotation to the chuck.

It will be seen that the mechanism carried by the angular head for imparting rotation 90 in either direction to the chuck, is simple and durable in construction, and that the parts composing it are adapted to be readily assembled and disconnected.

I claim:

95 1. A ratchet brace comprising an angular head the inner arm of which is formed with a flat-sided slot, a chuck carrier having a ratchet-toothed shank journaled in the outer arm of the head, two oppositely-acting flat- 100 sided pawls mounted edge to edge in the slot of the inner arm of the head, each pawl extending from the center line of the slot to the periphery of the said inner arm, and means carried by the inner arm for simulta- 105 neously projecting either pawl into engagement with the shank and retracting the other pawl therefrom, the projected pawl being held in yielding engagement with the shank. 110

2. A ratchet brace comprising an angular head, the inner arm of which is formed with a flat-sided slot, a chuck carrier having a ratchet-toothed shank journaled in the outer 115 arm of the head, two oppositely-acting flat-sided pawls mounted edge to edge in the slot of the inner arm of the head, and provided with projections on their outer edges, each pawl extending from the center line of the slot of the periphery of the said inner arm, 120 a collar rotatable on the inner arm and having a cam-shaped edge, and springs which press said projections against the cam-shaped edge of the collar, said edge being formed to simultaneously retract either pawl, 125 and permit the projection of the other pawl by its spring into engagement with the shank.

3. A ratchet brace comprising an angular head the inner arm of which is formed with a flat-sided slot, a chuck carrier having a 130



5 ratchet-toothed shank journaled in the outer  
arm of the head, two oppositely-acting flat  
sided pawls mounted edge to edge in the slot  
of the inner arm of the head, and provided  
10 with projections on their outer edges, each  
pawl extending from the center line of the  
slot to the periphery of the said inner arm,  
a collar rotatable on the inner arm and hav-  
ing a cam-shaped edge, and springs which  
15 press said projections against the cam-  
shaped edge of the collar, said edge having a  
stop finger adapted to coöperate with the  
said projections in limiting the rotation of  
the collar.

15 4. A ratchet brace comprising an angular  
head, the inner arm of which is formed with  
a flat-sided slot, a chuck carrier having a  
ratchet-toothed shank journaled in the outer  
arm of the head, two oppositely-acting flat-

sided pawls mounted edge to edge in the slot 20  
of the inner arm of the head, and provided  
with projections on their outer edges, each  
pawl extending from the center line of the  
slot of the periphery of the said inner arm,  
a collar rotatable on the inner arm and hav- 25  
ing a cam-shaped edge, springs which press  
said projections against the cam-shaped edge  
of the collar, and an external operating  
sleeve rotatable on the inner arm, said sleeve  
and collar having complemental coupling 30  
members whereby rotary movements may be  
imparted from the sleeve to the collar.

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

JOHN A. LELAND.

Witnesses:

K. E. NICHOLS,

LIZZIE B. STRACHAN.