

No. 855,026.

PATENTED MAY 28, 1907.

W. S. STAPLEY.

TIRE PUMP.

APPLICATION FILED DEC. 20, 1905.

2 SHEETS—SHEET 1.

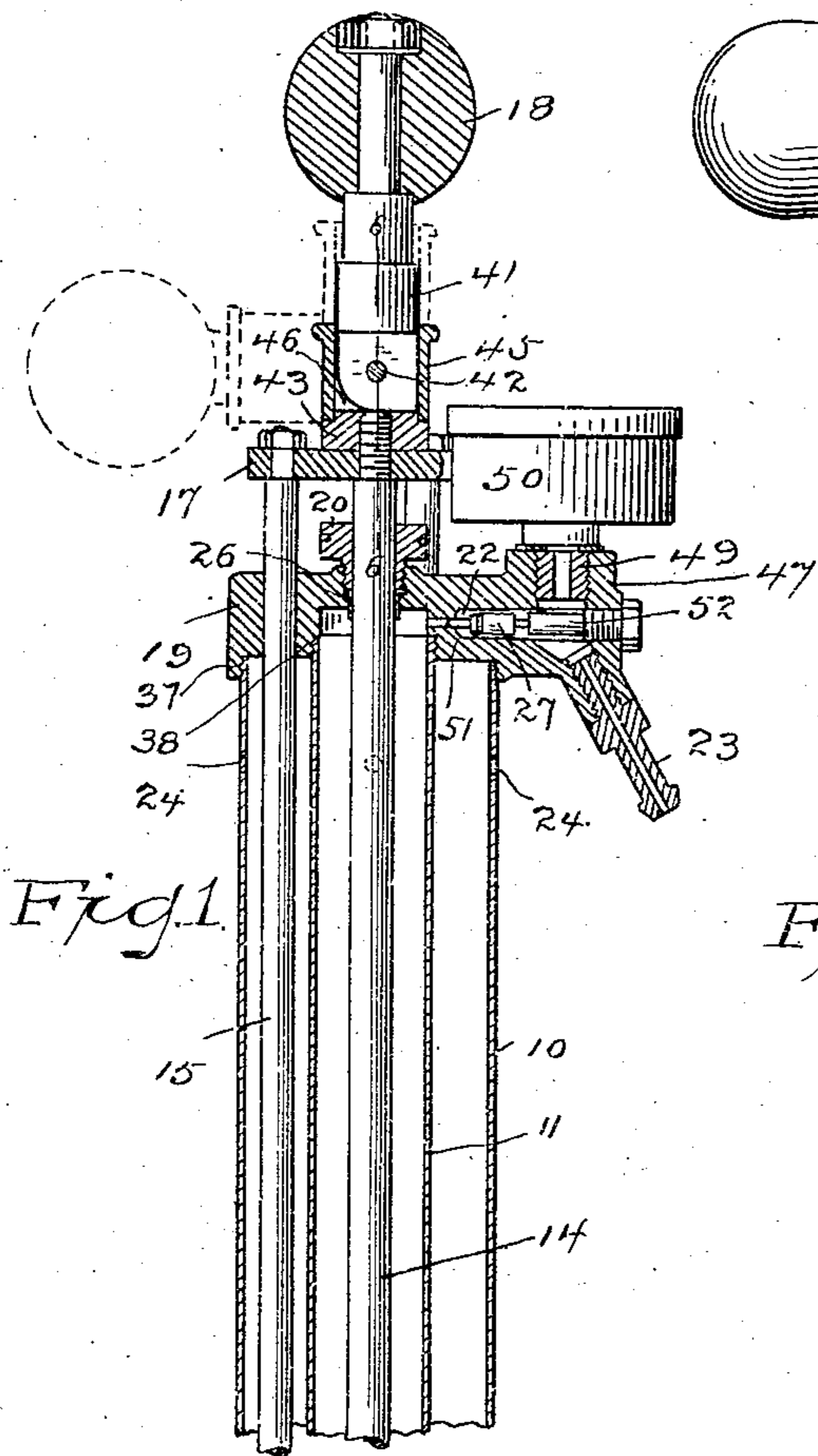


Fig. 1.

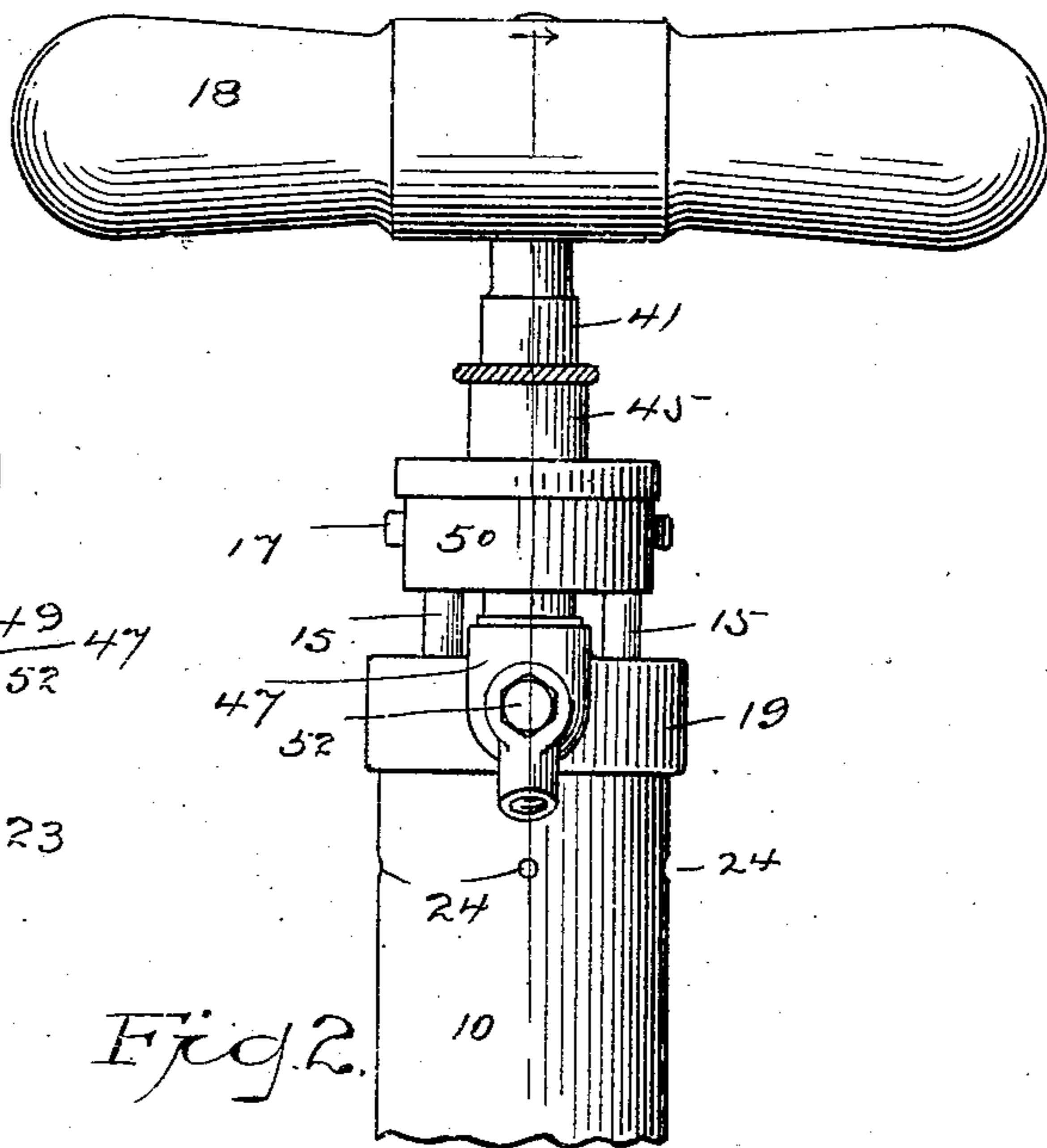


Fig. 2.

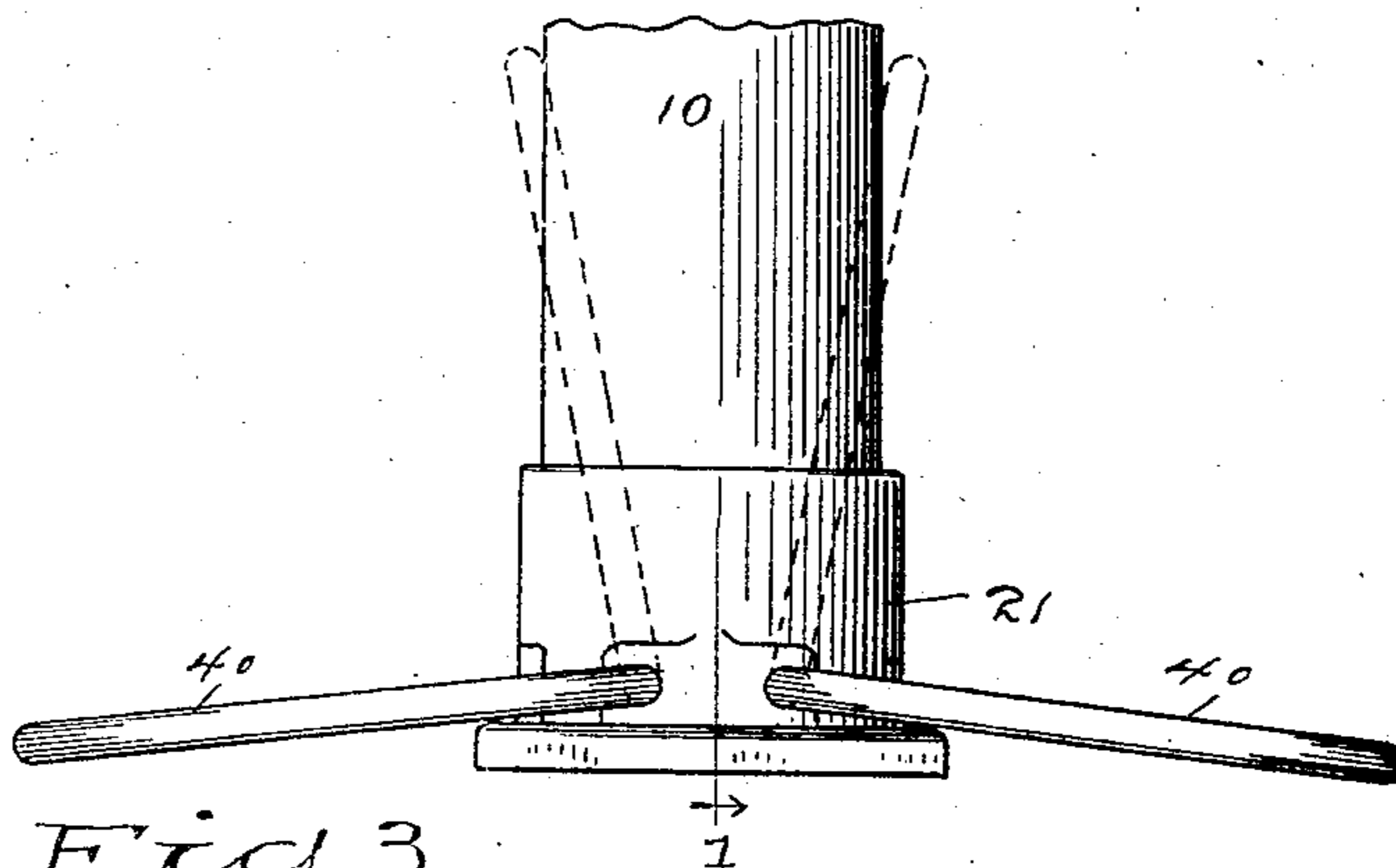
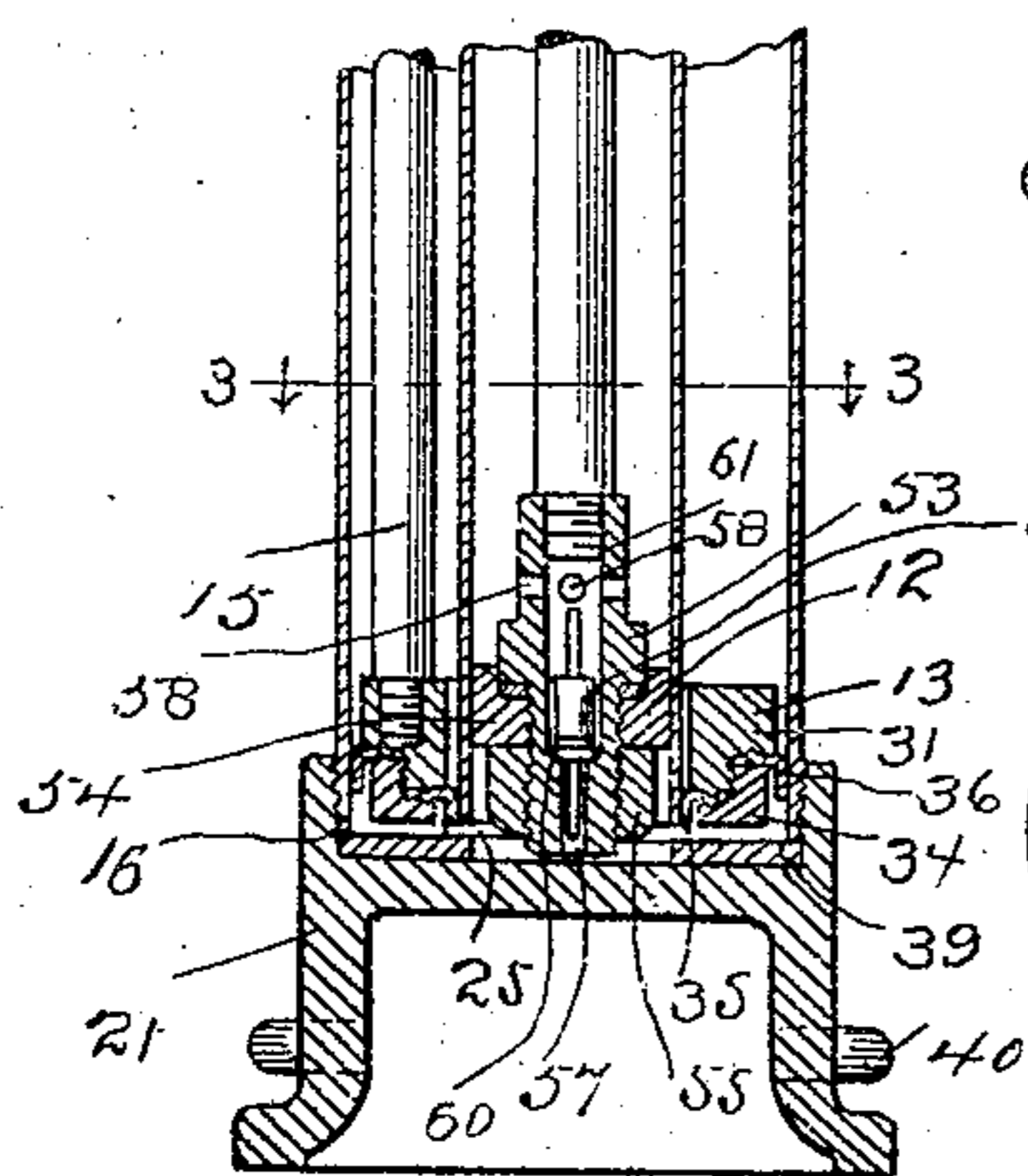
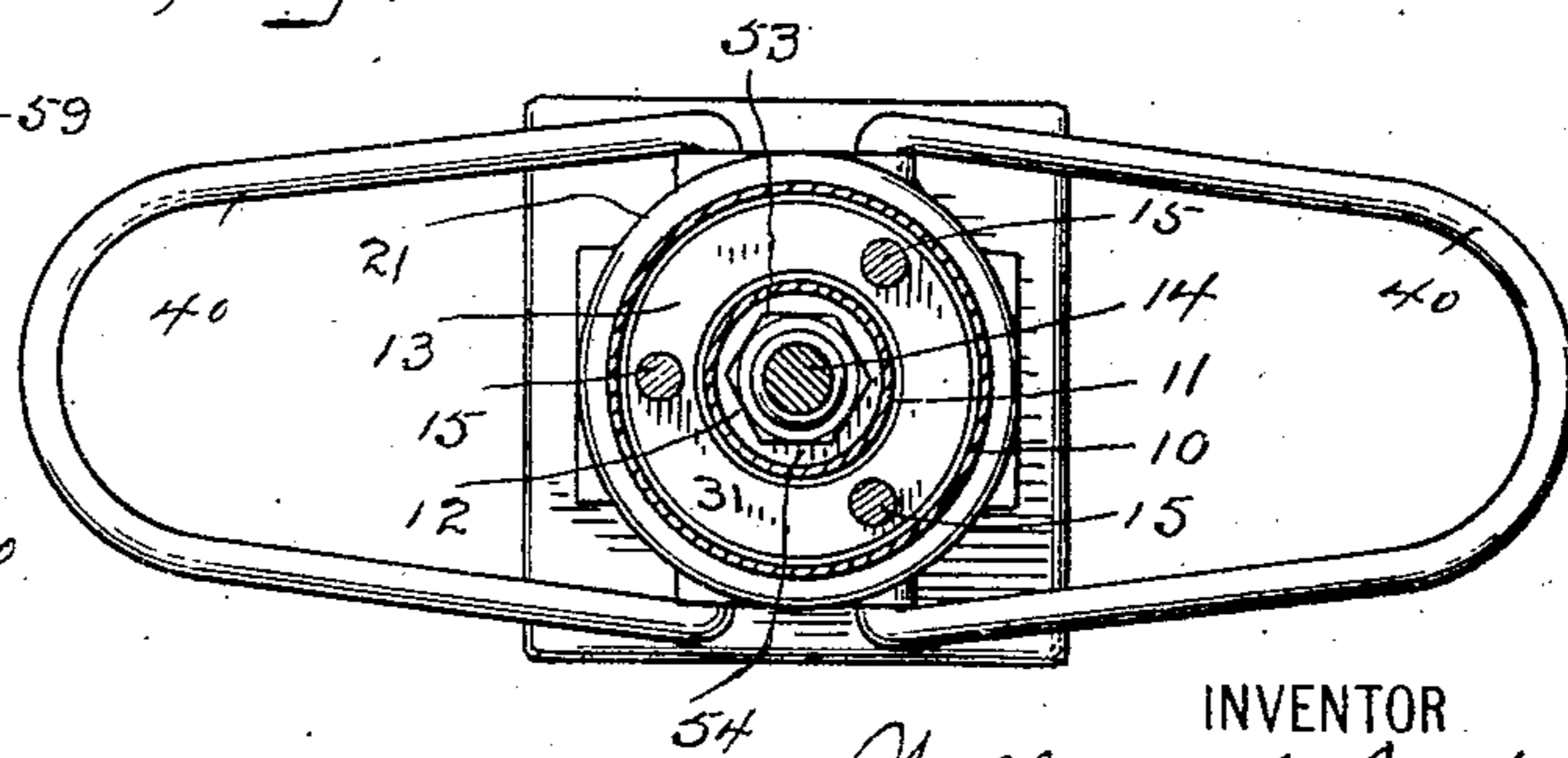


Fig. 3.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 4.

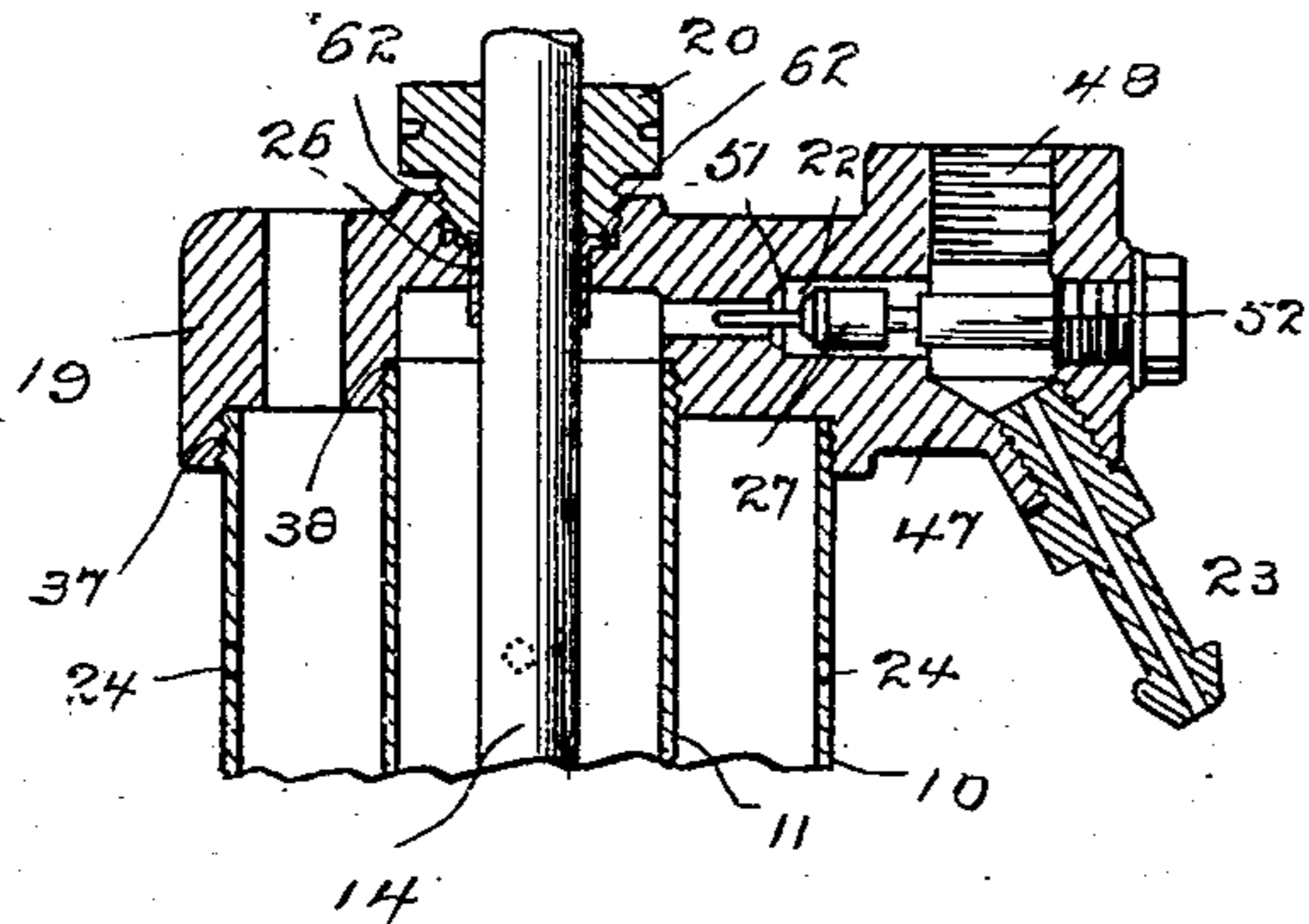


Fig. 6.

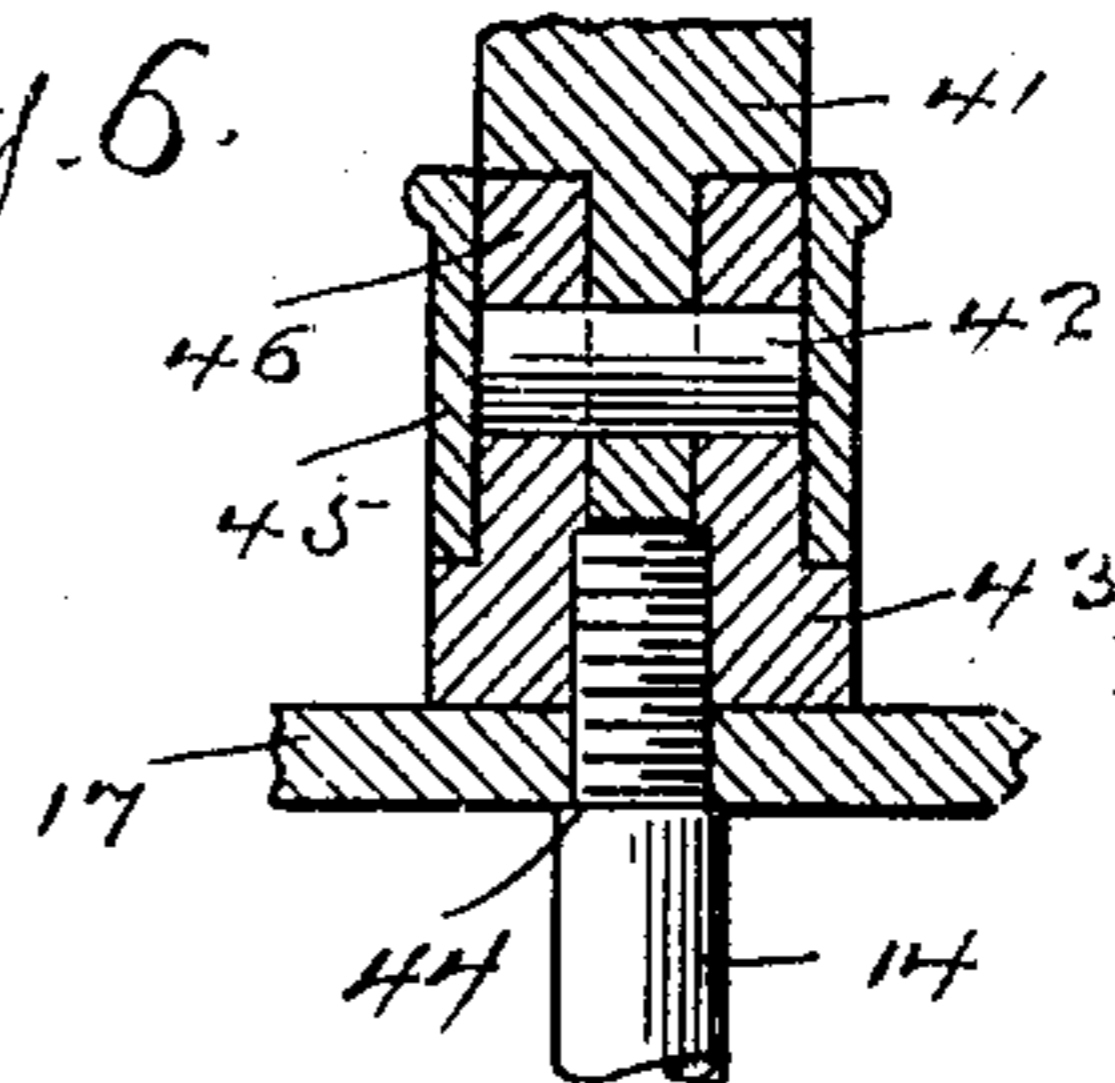


Fig. 7.

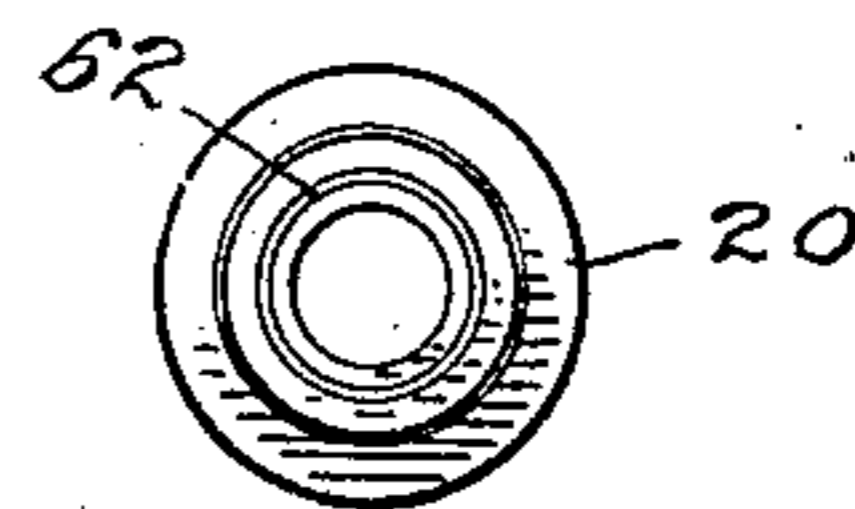


Fig. 5.

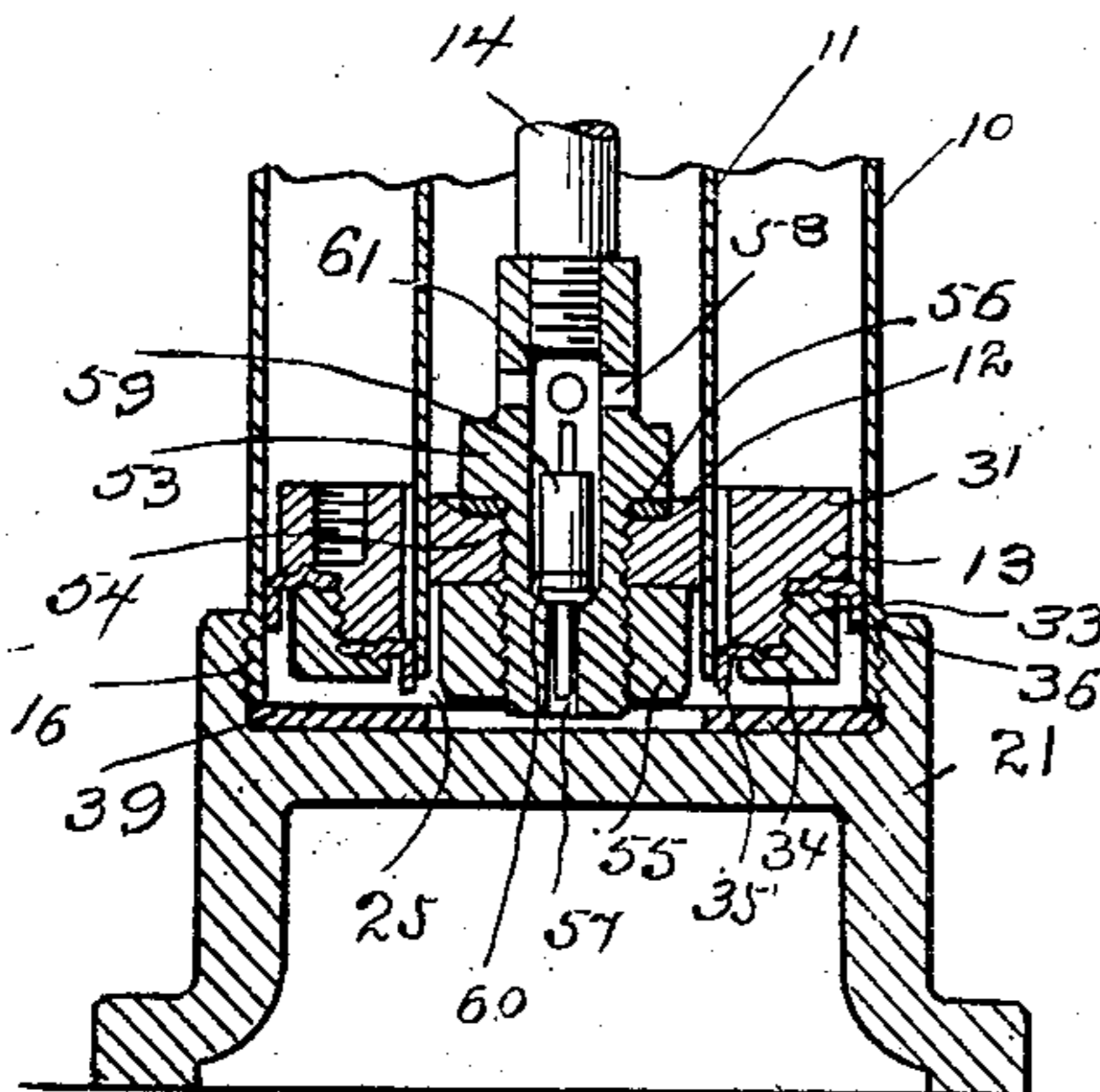


Fig. 8.

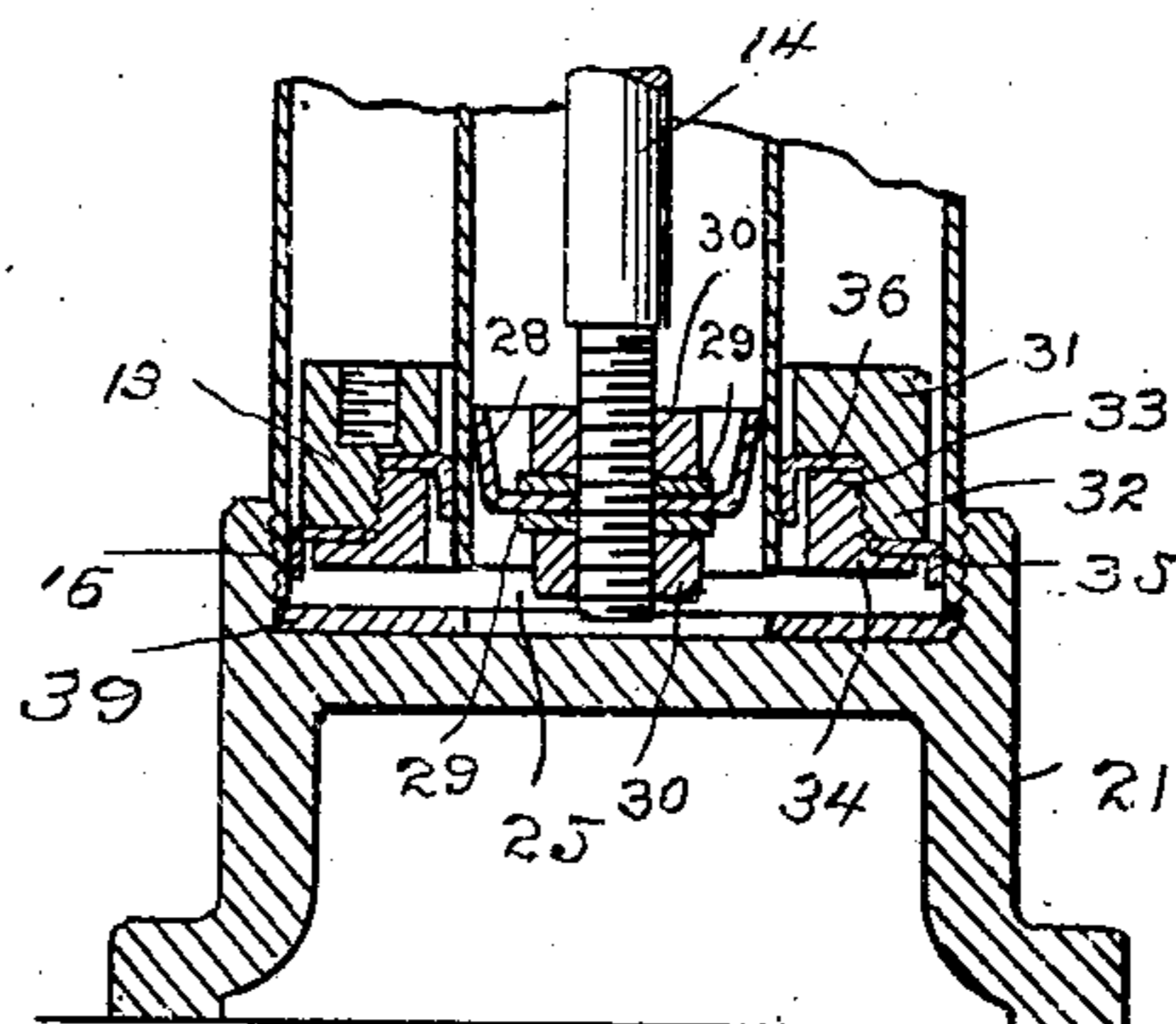
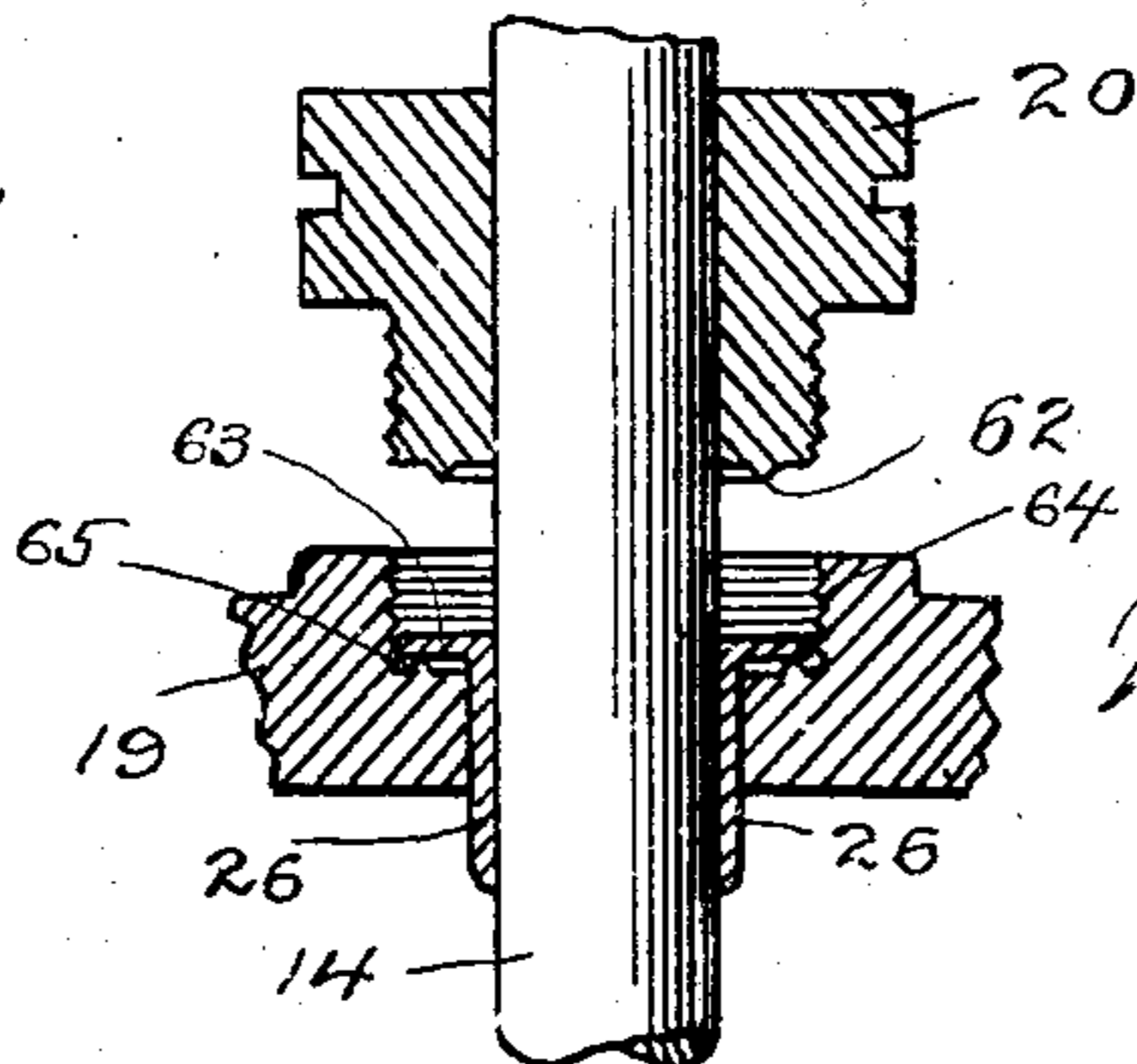


Fig. 9.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM S. STAPLEY, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE
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TIRE-PUMP.

No. 855,026.

Specification of Letters Patent.

Patented May 2, 1907.

Application filed December 20, 1905. Serial No. 292,585.

To all whom it may concern:

Be it known that I, WILLIAM S. STAPLEY, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented a new and useful Tire-Pump, of which the following is a specification.

This invention has for its object to produce a simple, durable and very powerful double-acting pump which shall be adapted for general use as for clearing gas and drainage pipes, for inflating the tires of bicycles, buggies, &c. and especially adapted for inflating the heavy tires of motor vehicles, and which may be folded into small compass so that it shall require but little room relatively and may be carried about conveniently, and my invention consists in certain constructions and in certain parts, improvements and combinations which will be hereinafter described and then pointed out in the claims hereunto appended.

In the accompanying drawings forming a part of this specification, Figure 1 is a vertical section of my novel pump complete, the folding position of the handle being indicated by dotted lines; Fig. 2 an elevation from a point of view at right angles to the point of view in Fig. 1, the folding position of the foot rests being shown in dotted lines; Fig. 3 a transverse section showing the base and foot rests in plan; Fig. 4 a detail section on an enlarged scale of the upper end of the tubes and the cap and illustrating the construction and operation of the eduction valve; Fig. 5 a similar section of the lower end of the tube and the base showing the construction of the pistons and the piston valve; Fig. 6 a detail sectional view illustrating the construction of the folding handle; Fig. 7 an inverted plan view of the packing nut; Fig. 8 a sectional view corresponding with Fig. 5 and illustrating a modified form of inner piston; and Fig. 9 is an enlarged detail sectional view of the inner piston rod packing with the nut detached.

My novel pump comprises an outer tube 10 and an inner tube 11 placed concentrically, an inner piston 12 in the inner tube and a ring-shaped outer piston 13 in the outer tube and surrounding the inner tube. These pistons move together but operate alternately.

The inner piston is carried by an inner piston rod 14 and the outer piston is carried by a plurality of outer piston rods 15, in the present instance three, which reciprocate in the outer tube.

17 indicates a plate to which both the inner and outer piston rods are rigidly secured.

At the upper end of the tubes is a cap 19 which is provided with threaded sockets 37 and 38 which are engaged by corresponding threads upon the tubes. The inner and outer piston rods pass through this cap. No packings are required for the outer piston rods for the reason that the air supply enters at the upper end of the outer tube, air holes being shown for that purpose, but it is wholly immaterial if air enters around the outer piston rods. At the center of the cap is a packing of novel construction for the inner piston rod. This packing consists of a leather tube 26 through which the inner piston rod passes and which is provided with a flange 63 which lies in a threaded socket 64 in the cap. At the base of the socket is an upwardly projecting V-shaped circular rib 65.

20 denotes a nut which engages the threaded socket and is provided at its lower end with a downwardly projecting V-shaped circular rib 62 of unequal diameter with rib 65, in the present instance of smaller diameter. When the nut is turned down to place, the rib upon the nut engages the flange of the packing, clamps it tightly between ribs 62 and 65 and also compresses the packing about the inner piston rod, thus providing an easily adjusted packing and making it impossible for air to escape. The packing may be renewed at any time by simply removing the nut and placing a new flanged leather tube upon the piston rod.

21 denotes a base which may be of any ordinary or preferred design or configuration and is provided with a threaded socket 16 which is engaged by a corresponding screw thread at the lower end of the outer tube, the extreme end of said tube being turned against a packing washer 39 which is preferably metallic.

40 denotes foot rests which are preferably made of heavy wire and are pivotally secured to the base so that when not in use they may be turned upward against the outer tube as

indicated by dotted lines in Fig. 2, so as to be wholly out of the way and greatly lessen the space required for carrying the pump.

18 denotes a handle having a shank 41 which is pivoted as at 42 to a block 43 which in turn is rigidly secured to plate 17.

In the present instance the upper end of inner piston rod 14 is provided with a shoulder 44 against which the plate rests and the threaded end of said rod passes through the plate and engages the block, as clearly shown in Figs. 1 and 6, thus rigidly securing the plate, block and rod together. Both the block and shank 41 are shown as cylindrical.

45 denotes a sleeve which slides over the shank and block as clearly shown in Fig. 1. When the sleeve is in its operative or full line position, that is moved down into engagement with the block, its action is to lock the shank in alignment with the block and inner piston rod. When said sleeve is raised out of engagement with the block, in the present instance out of engagement with a central hub 46 upon the block, the shank carrying the handle with it may be folded over at right angles to its normal position, thus materially shortening the space required for the pump in transportation.

Air passes from the pump through an eduction passage 22, in cap 19 and in a hub 47 formed integral with the cap, which opens inwardly into the inner tube only and opens externally into a nozzle 23 which is preferably projected downward so as to lessen the space occupied by the pump in transportation.

48 denotes a threaded opening in hub 47 which is adapted to receive the threaded shank 49 of a pressure gage 50 which may or may not be used as preferred. When the pressure gage is not used, opening 48 is closed by a cap, not shown. The object of the pressure gage is to indicate the air pressure in a tire.

Within passage 22 is a slide valve 27 which prevents back pressure of air into the inner tube under any conditions. The forward end of valve 27 engages a seat 51 in the passage and the rear end thereof is adapted to engage a stop screw 52 to limit its backward movement and permit outgoing air to pass freely through the eduction passage.

Air enters the pump through openings 24 near the upper end of the outer tube. The outer tube communicates freely with the inner tube by a passage 25 at the bottom, the inner tube being shown in the drawings as suspended from the cap and wholly disconnected from the base. The pistons may be of any ordinary or preferred construction, it being of course required that on the operative stroke they carry the air before them, and on the inoperative stroke they collapse sufficiently to permit air to pass freely. The inner piston, as shown in Fig. 5, consists of a

head 53 which is secured to the lower end of inner piston rod 14 and carries a ring 54 which is held in place against a shoulder 56 on the head by a nut 55 and closely engages the inner tube. Within head 53 is an air passage 57 which opens into the inner tube below the ring and is provided above the ring with openings 58 also leading into the inner tube. Within passage 57 is a slide valve 59 which engages a valve seat 60 and the rear end of which is adapted to engage a suitable stop 61, in the present instance the lower end of the inner piston rod, to limit its backward movement.

It will be obvious from Fig. 5 that when the inner piston is moving upward, the valve will engage the seat and prevent back passage of air, and when the piston is moving downward the valve will be raised from its seat and will permit air from the outer tube to enter passage 57 and pass into the inner tube through openings 58. The outer piston, which is ring-shaped and incloses the inner tube engaging both the inner and outer tubes, consists of an upper ring 31 which is engaged by outer piston rods 15 and is provided with a threaded flange 32 which is engaged by a threaded flange 33 on a lower ring 34.

35 denotes a flexible ring-shaped washer which engages the outer wall of the inner tube and whose upper edge is turned inward and is clamped between the upper and lower rings.

36 denotes a similar flexible ring-shaped washer which engages the inner wall of the outer tube and whose upper edge is turned inward and is likewise clamped between the upper and lower rings. In practice these washers engage the outer wall of the inner tube and the inner wall of the outer tube respectively when the piston is moved downward and carry air before the piston, but when the piston is moved upward the washers collapse and permit air to pass freely.

In the form shown in Fig. 8, the construction of the outer piston is substantially the same as in Fig. 5. The inner piston however in this form consists simply of a cup-shaped flexible washer 28 which collapses so as to permit air to pass freely when the piston is moved downward and engages the wall of the inner tube carrying air before it when the piston is moved upward. This washer lies between plates 29 and is secured to piston rod 14 by nuts 30 which are tightened up against the plates.

The operation is as follows: The upward movement of the pistons is the operative stroke of the inner piston and the inoperative stroke of the outer piston, and the downward movement is the operative stroke of the outer piston and the inoperative stroke of the inner piston. Starting with the parts in the position shown in Figs. 1, 5 and 8, as the inner piston moves upward the

air before it will be forced through eduction passage 22 and out through the nozzle, the pressure in a tire connected with the nozzle being indicated by the pressure gage if used.

5 During this stroke, air will pass the outer piston freely. During the downward stroke of the pistons air will enter the outer tube through openings 24 above the outer piston and the air before the outer piston will be forced through passage 25 into the inner tube and will pass the inner piston freely and out through eduction passage 22. It follows therefore that whether the inner piston is moving upward or downward, air will be forced outward from the inner tube through eduction passage 22, the outward movement of the air being caused during the upward movement by the inner piston and during the downward movement by the outer piston:

Having thus described my invention I claim:

1. A pump comprising an inner tube and an outer tube concentrically placed and communicating with each other at the bottom, a cap having an eduction passage leading from the inner tube and pistons in said tubes which move together but operate alternately, whereby during the downward stroke air will be forced from the outer tube into the inner tube and out past the inner piston, and during the upward stroke air will be forced out by the inner piston and incoming air will pass the outer piston and enter the inner tube behind the inner piston.

2. In a pump, the combination with inner and outer tubes concentrically placed and a cap having an eduction passage leading from the inner tube, of an inner piston provided with a valve whereby the piston is made operative during the upward stroke and air is permitted to pass during the downward stroke and a piston in the outer tube consisting of rings threaded to engage each other and flexible washers clamped between said rings and engaging the inner and outer tubes respectively whereby said piston is made operative during the downward stroke and air is permitted to pass during the upward stroke.

3. A pump consisting of inner and outer tubes concentrically placed and rigidly secured in fixed relative positions and opening into each other at one end, a piston in the inner tube and a piston in the outer tube consisting of rings threaded to engage each other and flexible washers clamped between said rings and engaging the inner wall of the outer tube and the outer wall of the inner tube respectively.

4. A pump consisting of inner and outer tubes concentrically placed and opening into each other at one end, a piston in the inner tube and a piston in the outer tube consisting of rings threaded to engage each other

and flexible washers clamped between said rings and engaging the inner wall of the outer tube and the outer wall of the inner tube respectively.

5. In a pump, the combination with inner and outer tubes concentrically placed and communicating at the bottom, of a cap to which said tubes are secured and which is provided on one side with a hub, said cap and hub being provided with an eduction passage communicating with the inner tube, pistons in said tubes which act alternately to force air from the inner tube through said passage and a valve in said passage which prevents back pressure in the inner tube.

6. In a pump, the combination with inner and outer tubes concentrically placed and communicating at the bottom, of a cap to which said tubes are secured and which is provided on one side with a hub, said cap and hub being provided with an eduction passage communicating with the inner tube, pistons in said tubes which act alternately to force air from the inner tube through said passage, a valve in said passage which prevents back pressure in the inner tube and a pressure gage communicating with the eduction passage outside the valve whereby the pressure is indicated.

7. In a pump, the combination with inner and outer tubes concentrically placed and communicating at the bottom, of a cap to which said tubes are secured and which is provided on one side with a hub, said cap and hub being provided with an eduction passage communicating with the inner tube, pistons in said tubes which act alternately to force air from the inner tube through said passage, a nozzle communicating with said passage, a valve in said passage which prevents back pressure and a stop screw which limits the backward movement of the valve when air is being forced from the inner tube through the passage.

8. In a pump, the combination with inner and outer tubes concentrically placed and communicating at the bottom, of a cap to which said tubes are secured, inner and outer piston rods passing through said cap, a flanged tubular packing in said cap through which the inner piston passes and a nut engaging the cap and having on its underside a V-shaped rib which engages the flange of the packing to retain it in place.

9. In a pump, the combination with a piston rod and a plate to which it is secured, of a block secured to the plate and having a central hub, a permanently connected handle having a shank pivoted to the hub and a sleeve on the shank adapted to engage the hub to lock the handle and shank in operative position and when moved upward on the shank out of engagement with the hub permitting the handle and shank to fold outward

laterally whereby the longitudinal space required for the pump in transportation is shortened.

10. In a pump, the combination with an
5 inner tube and an outer tube concentrically placed and pistons in said tubes connected to work simultaneously, of a cap to which both tubes are connected, a base to which the
10 outer tube is connected and oppositely swinging foot-rests hinged to the base and adapted to swing upward against the outer tube to reduce the space required for the pump in transportation.

11. In a pump, the combination with in-
15 ner and outer tubes concentrically placed and inner and outer pistons and piston rods, of a cap through which the piston rods pass and which is provided with a central threaded socket having a circular rib projecting from
20 its base, a flanged leather packing in said

socket and surrounding the inner piston rod, and a nut engaging the socket and having at its lower end a circular rib of unequal diameter with the rib in the socket, said nut when turned to place clamping the flange of
25 the packing between the ribs and compressing the packing against the piston rod.

12. In a pump, the combination with an inner tube and an outer tube concentrically placed, and pistons in said tubes connected
30 to work simultaneously, of a cap to which the upper ends of both tubes are connected, and a base to which the outer tube is connected.

In testimony whereof I affix my signature, 35
in presence of two witnesses.

WILLIAM S. STAPLEY.

Witnesses:

ANKER S. LYHNE,

ARTHUR H. MOORE.