

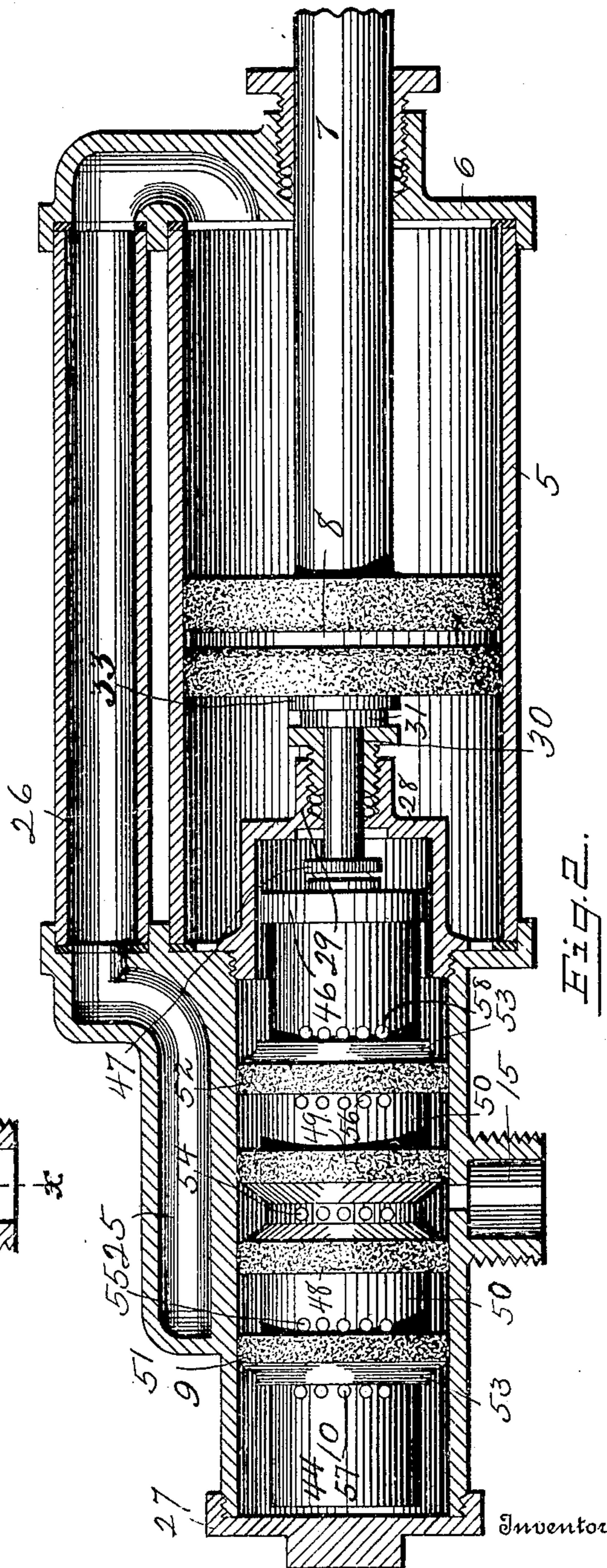
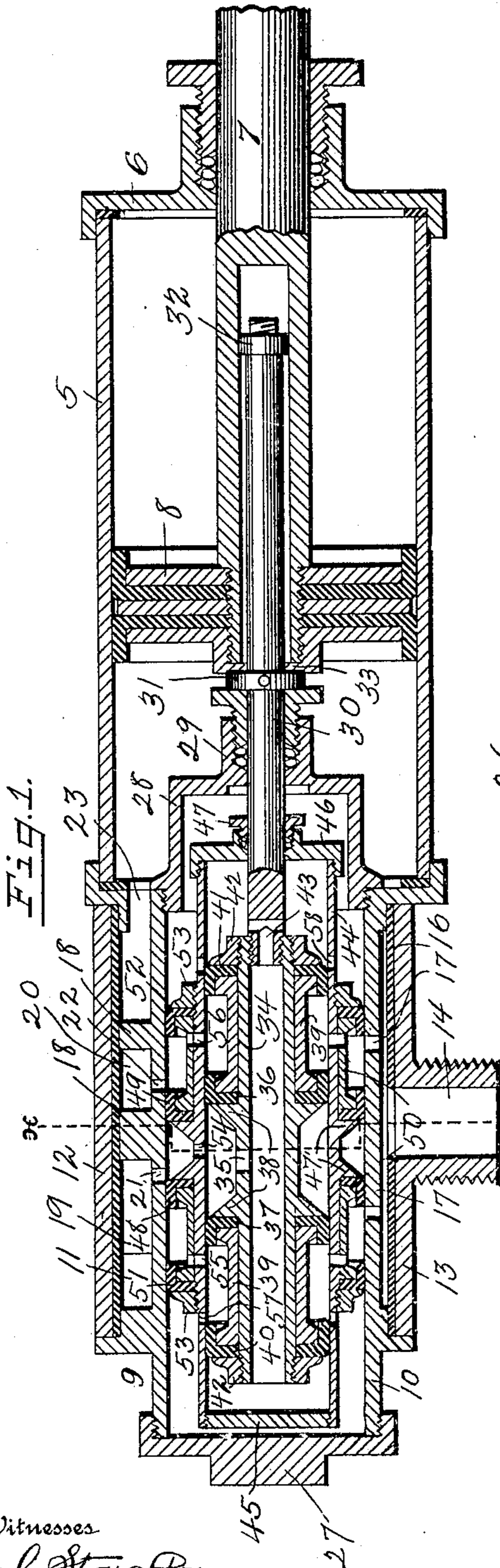
L. C. LEWIS.
WATER MOTOR.

APPLICATION FILED AUG. 12, 1908.

927,560.

Patented July 13, 1909.

2 SHEETS—SHEET 1.



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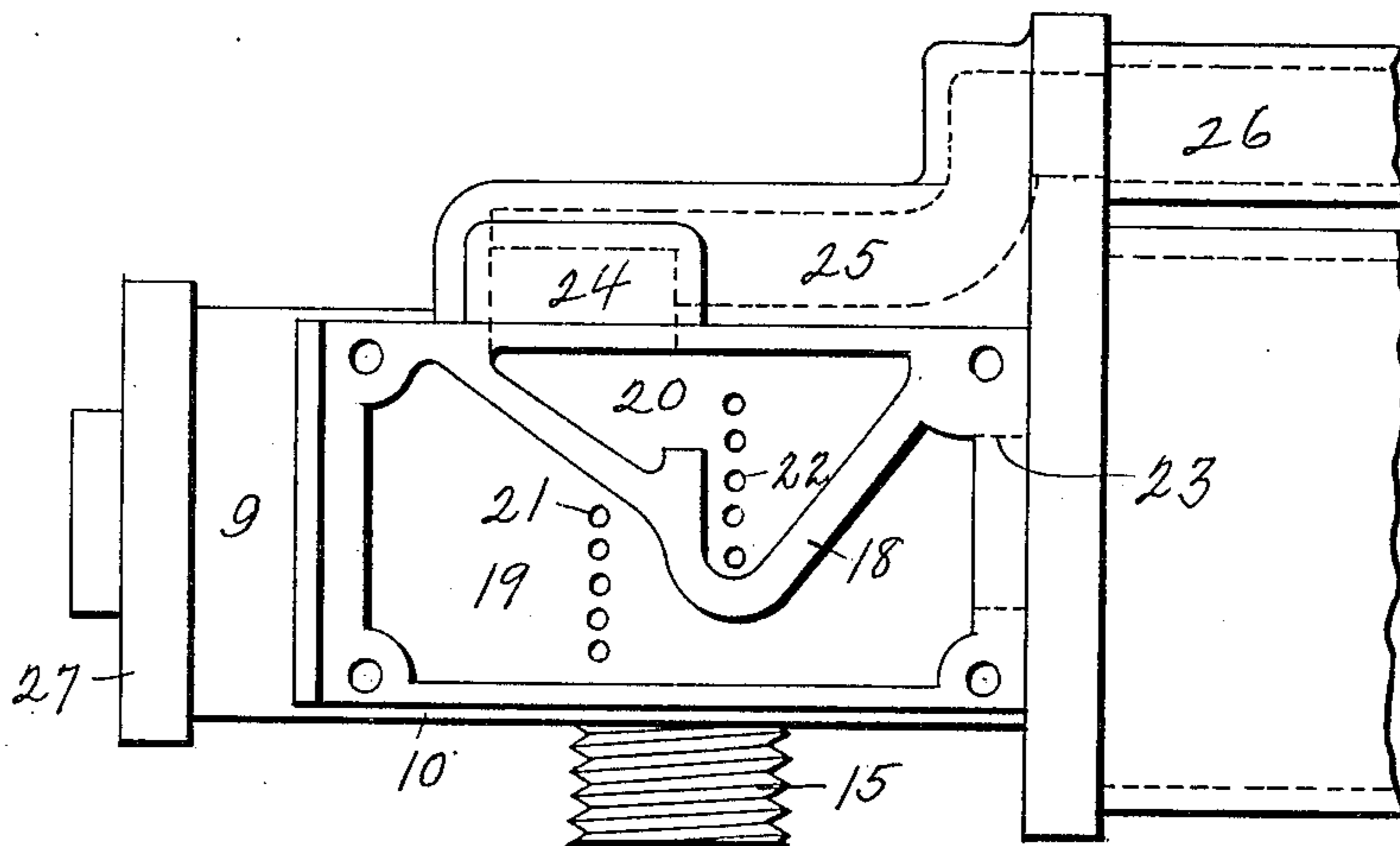


Fig. 3.

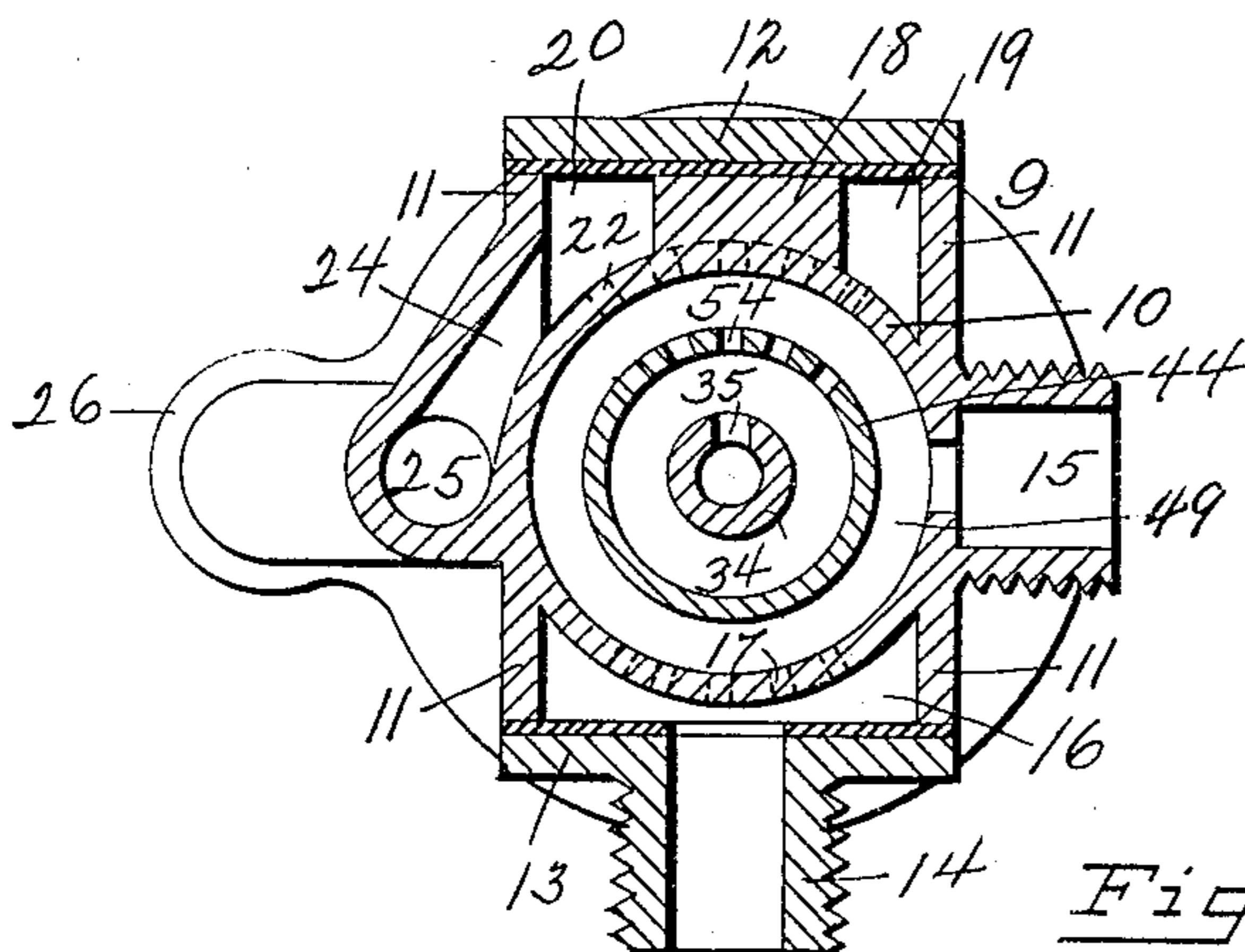


Fig. 4.

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UNITED STATES PATENT OFFICE.

LEWIS C. LEWIS, OF COLUMBUS, OHIO, ASSIGNOR TO GEORGE H. MARTING, OF COLUMBUS, OHIO.

WATER-MOTOR.

No. 927,560.

Specification of Letters Patent.

Patented July 13, 1909.

Application filed August 12, 1908. Serial No. 448,122.

To all whom it may concern:

Be it known that I, LEWIS C. LEWIS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Water-Motors, of which the following is a specification.

My invention relates to water motors, and has for its object the provision of a device of this character constructed in such manner that it may be produced at a low cost and will yield a high degree of efficiency.

A further object of the invention is the provision of means for water cushioning the working parts of the motor to thereby render the device substantially noiseless in operation.

The motor forming the subject matter of the present invention comprises particularly a cylinder, a reciprocatory piston, a valve casing, a fluid operated valve located within said valve casing, and a mechanically actuated valve located within the fluid operated valve and entirely inclosed thereby, the movement of the mechanically actuated valve serving to admit water to the valve casing for the operation of the fluid actuated valve.

Further objects and advantages of the invention will be set forth in the detailed description which now follows.

In the accompanying drawings: Figure 1 is a longitudinal vertical section of a motor constructed in accordance with the invention, Fig. 2 is a horizontal section thereof, Fig. 3 is a plan view with the top of the valve casing removed, and, Fig. 4 is a transverse vertical section upon line $x-x$ of Fig. 1.

Like numerals designate corresponding parts in all of the figures of the drawings.

Referring to the drawings, the numeral 5 designates a cylinder, one end of which is closed by a cap 6. This cap is provided with a packing box of the usual and well known construction, through which a partially hollow piston rod 7 passes. This piston rod is connected to a piston 8 mounted to reciprocate within the cylinder 5. A valve casing 9 is located at the opposite end of the cylinder from the packing box and comprises a cen-

tral cylindrical portion 10, side walls 11, a top plate 12 and a bottom plate 13. An inlet nipple 14 carried by the plate 13 is preferably threaded for the reception of pipe or hose couplings. An exhaust nipple 15 leads from the valve casing and is threaded in a like manner. A chamber 16 is formed between the cylindrical portion 10 and the bottom plate 13 and it is to this chamber that water passes from the nipple 14. Ports 17 lead from the chamber 16 to the interior of the cylindrical portion of the valve casing. A rib 18 divides that portion of the valve casing above the cylindrical portion into two chambers 19 and 20. Ports 21 lead from the chamber 19 to the interior of the valve casing, while ports 22 lead from chamber 20 to the interior of the valve casing. The chamber 19 is in communication through a port 23 with the left-hand end of the cylinder 5, while the chamber 20 is in communication through ports 24 and 25 and by-pass 26 with the right-hand end of the cylinder.

A cap 27 closes the left-hand end of the cylindrical portion of the valve casing and a cap 28 closes the right-hand end thereof, said latter cap carrying a packing box 29 through which a rod 30 passes. This rod carries a collar 31 which limits its movement toward the left in Fig. 1. One end of this rod projects into the hollow piston rod and carries a nut 32 which is slightly larger in diameter than the body of said rod. The piston has a flange 33 through which the rod 30 passes, said flange being adapted to engage the collar 32 as the piston moves toward the right in Fig. 1 to shift said rod and the parts carried thereby, as will be hereinafter described. The inner end of the rod is threaded into a tubular valve 34. This valve has a central port 35 formed in the wall thereof and carries outstanding flanges 36 and 37 are clamped between these flanges and sleeves 39. Cup leathers 40 and 41 are clamped between these sleeves and nuts 42. The left-hand end of the tubular valve is open and at the right-hand end a port 43 is formed in the end of the rod 30. This structure forms the mechanically actuated valve hereinbefore referred to and is located within

a tube 44, the ends of which are closed by caps 45 and 46. A packing box 47 is carried by the cap 46 and forms a fluid tight joint about the rod 30. The sleeve 44 carries out-
 5 standing flanges 47'. Cup leathers 48 and 49 are clamped between these flanges and the sleeve 50. Cup leathers 51 and 52 are clamped against these sleeves by nuts 53 which are threaded upon the sleeve 44.
 10 Ports 54 are formed in the sleeve 44 between the cup leathers 48 and 49. Ports 55 are formed in the sleeve 44 between the cup leathers 48 and 51, while ports 56 are formed in the sleeve between the cup leathers 49
 15 and 52.

The operation of the device is as follows: With the parts in the position illustrated in Fig. 1, water from the inlet nipple 14 will flow through the right-hand port 17 to the
 20 interior of the valve casing and between the cup leathers 49 and 52. Passing through ports 22, chamber 20, ports 24 and 25 and by-pass 26 to the right-hand end of the cylinder, the piston having been shown at the
 25 completion of its stroke toward the left. During this movement of the piston toward the left, the water in the left-hand end of the cylinder was exhausted through ports 23, chamber 19 and ports 21 to the interior of
 30 the valve casing and into the space between the cup leathers 48 and 49. By referring to Fig. 2, it will be seen that this space is always in communication with the exhaust
 35 nipple 15. During the movement of the piston to the left, the mechanically actuated valve was shifted to the left by the contact of the piston with the collar 31. Water will
 40 now flow through the left-hand port 17, ports 55 and ports 57 to the left-hand end of the valve casing and will exert sufficient pressure against the fluid operated valve to force it to
 45 the right until the gland of the packing box 47 contacts with the cap 28. This will bring ports 21 into communication with the space
 50 between the cup leathers 48 and 51 and will bring the ports 22 into communication with the exhaust space between the cup leathers
 48 and 49. Water flowing through the left-hand ports 17 will now pass around between
 55 the cup leathers 48 and 51 and out of ports 21 into chamber 19, thence through port 23 to the left-hand end of cylinder 5, driving the piston toward the right. At the same
 60 time the water in the right-hand end of the piston will be exhausted through by-pass 26, ports 25 and 24, chamber 20 and ports 22 to the exhaust space between the cup leathers 48 and 49 and thence through the exhaust
 nipple 15. During the movement of the fluid actuated valve toward the right, the
 water in the right-hand end of the valve casing is exhausted through ports 58, 43, 35 and
 54. During the movement of the fluid actuated valve toward the left, water in the left-

hand end of the valve casing, would be exhausted through ports 57 which would at this time lie to the left of cup leather 40 by reason of the bodily shifting of the mechanically actuated valve, and through tube 44 and port 35. This exhaust water effectually cushions the fluid operated valve and renders the operation of the device substantially noiseless.

From the foregoing description, it will be seen that simple and efficient means are herein provided for accomplishing the objects of the invention, but while the elements shown and described are well adapted to serve the purposes for which they are intended, it is to be understood that the invention is not limited to the exact construction set forth, but includes within its purview such changes as may be made within the scope of the appended claims.

What I claim, is:

1. A device of the character described comprising a cylinder, a piston mounted in said cylinder, a valve casing mounted upon one end of the cylinder and comprising a central cylindrical portion, a pair of chambers outside of said cylindrical portion one of which is in communication with one end of the cylinder and the other of which is in communication with the other end of the cylinder, a mechanically actuated valve comprising a tube open throughout its length and having a pair of integral outstanding shoulders formed thereon, a pair of cup leathers abutting said shoulders, sleeves the inner ends of which abut said leathers, cup leathers abutting the outer ends of said sleeves, nuts threaded upon the opposite ends of said tube and abutting said last named cup leathers to thereby bind all of said parts together, a tube in which said mechanically actuated valve is slidably disposed, means for closing both ends of the last-named tube, four circumferentially disposed packing members carried by the last-named tube, the space between the two central packing members forming an exhaust space, a rod connected to the mechanically actuated valve and projecting into the cylinder and means carried by the piston for engaging said valve.
2. A device of the character described, comprising a cylinder, a piston mounted in said cylinder, a valve casing comprising a central cylindrical portion, a pair of chambers outside of said cylindrical portion, one of which is in communication with one end of the cylinder and the other of which is in communication with the other end of the cylinder, a mechanically actuated valve comprising a tube open throughout its length, four circumferentially disposed packing members carried by said tube, the space between the two central members forming an exhaust space, a tube in which said me-

chanically actuated valve is slidably disposed, means for closing both ends of the last named tube, four circumferentially disposed packing members carried by the last named
5 tube, the space between the two central packing members forming an exhaust space, a rod connected to the mechanically actuated valve and projecting into the cylinder, and

means carried by the piston for engaging said valve. 10

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

LEWIS C. LEWIS.

Witnesses:

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FRANK G. CAMPBELL.