

J. N. HARDY.

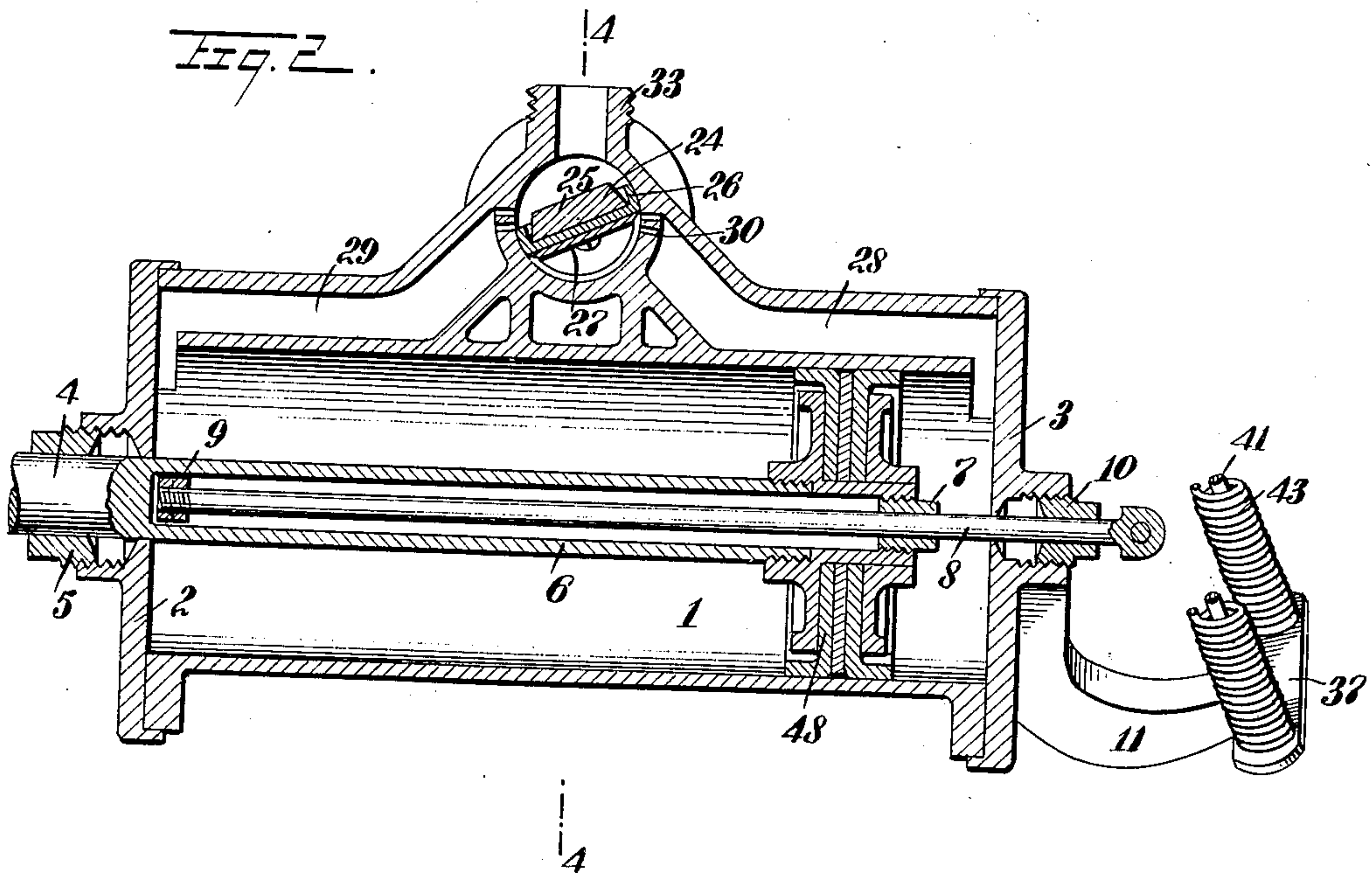
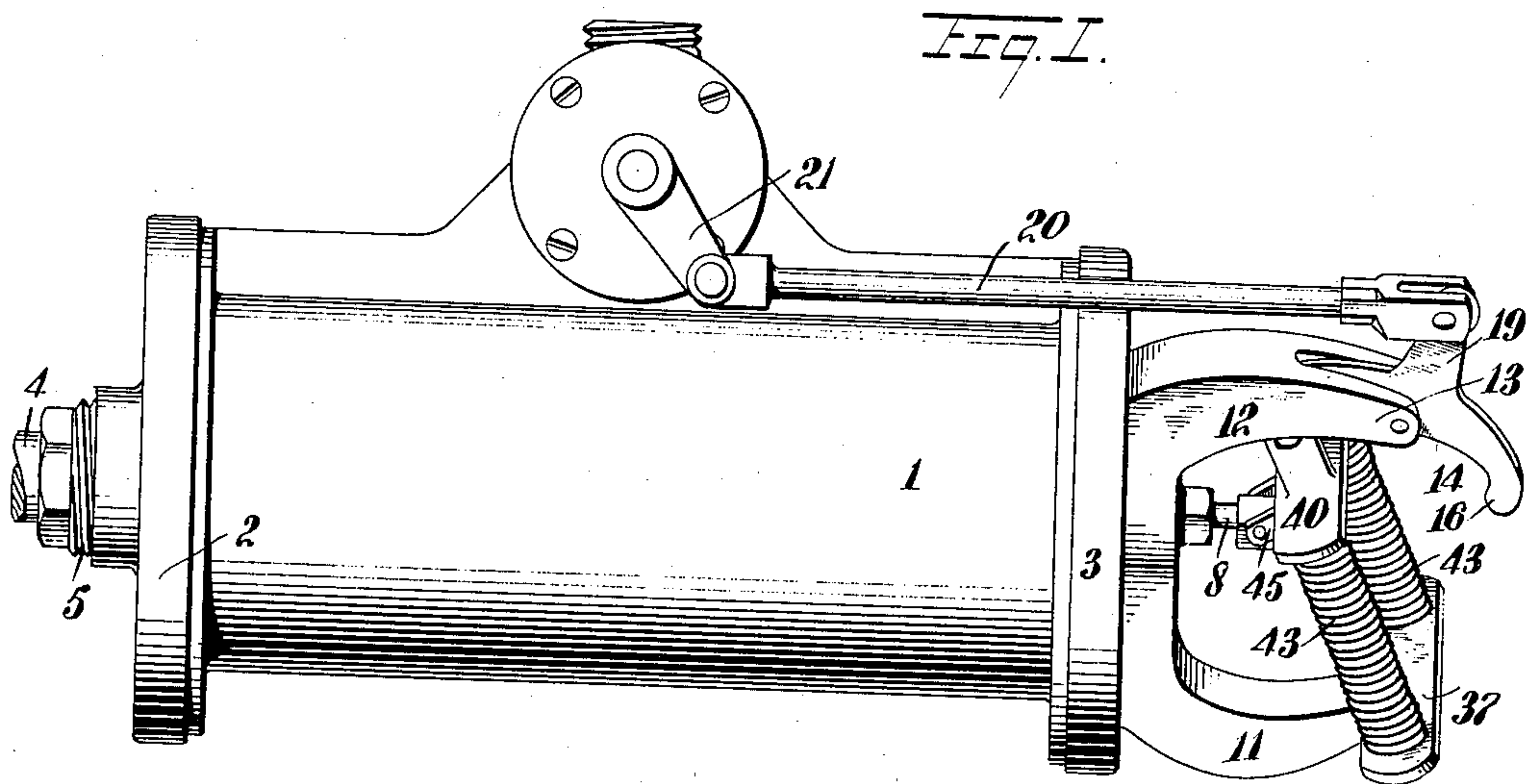
WATER MOTOR.

APPLICATION FILED JULY 27, 1909.

958,492.

Patented May 17, 1910.

2 SHEETS—SHEET 1.



WITNESSES

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Fig. 3.

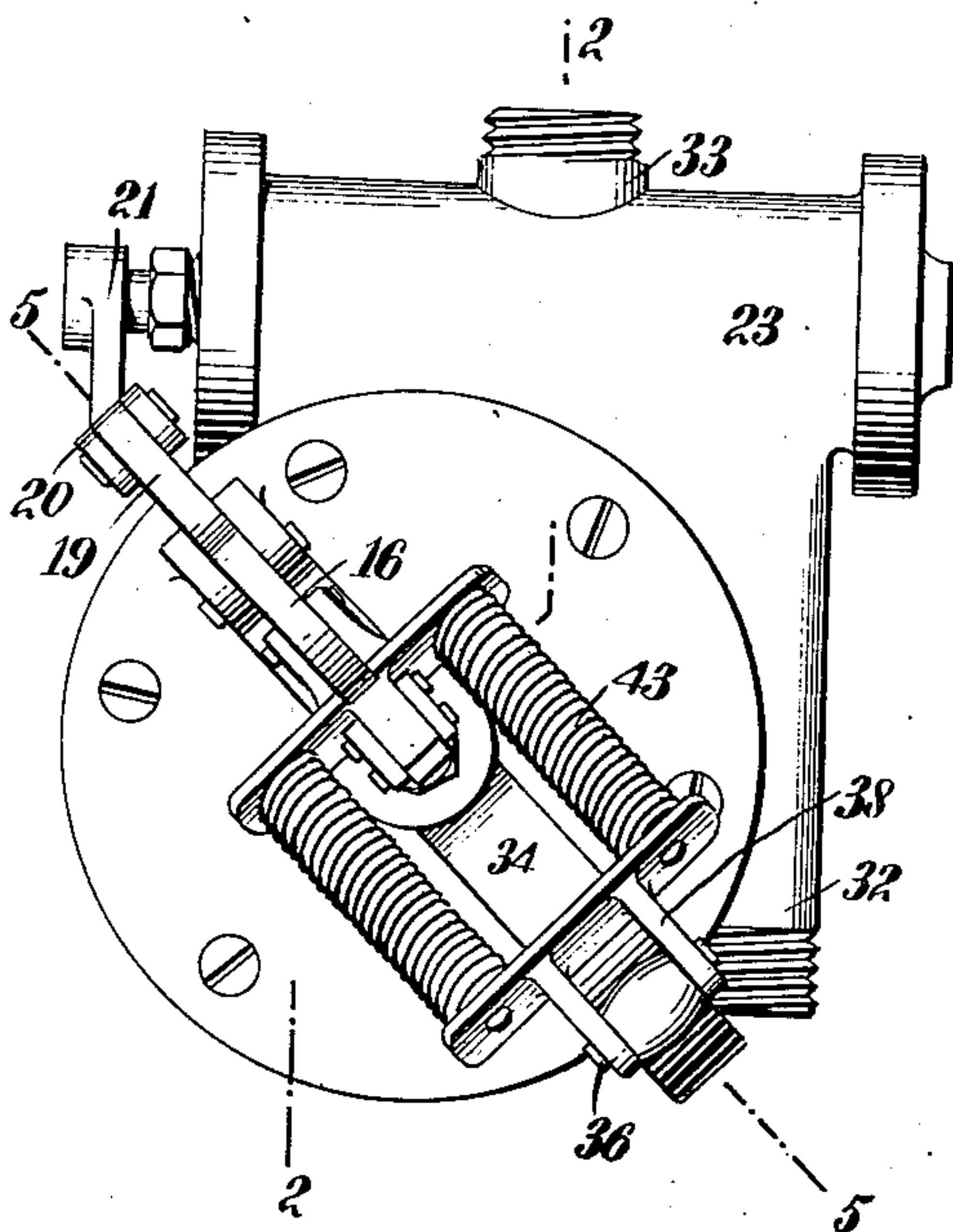


Fig. 4.

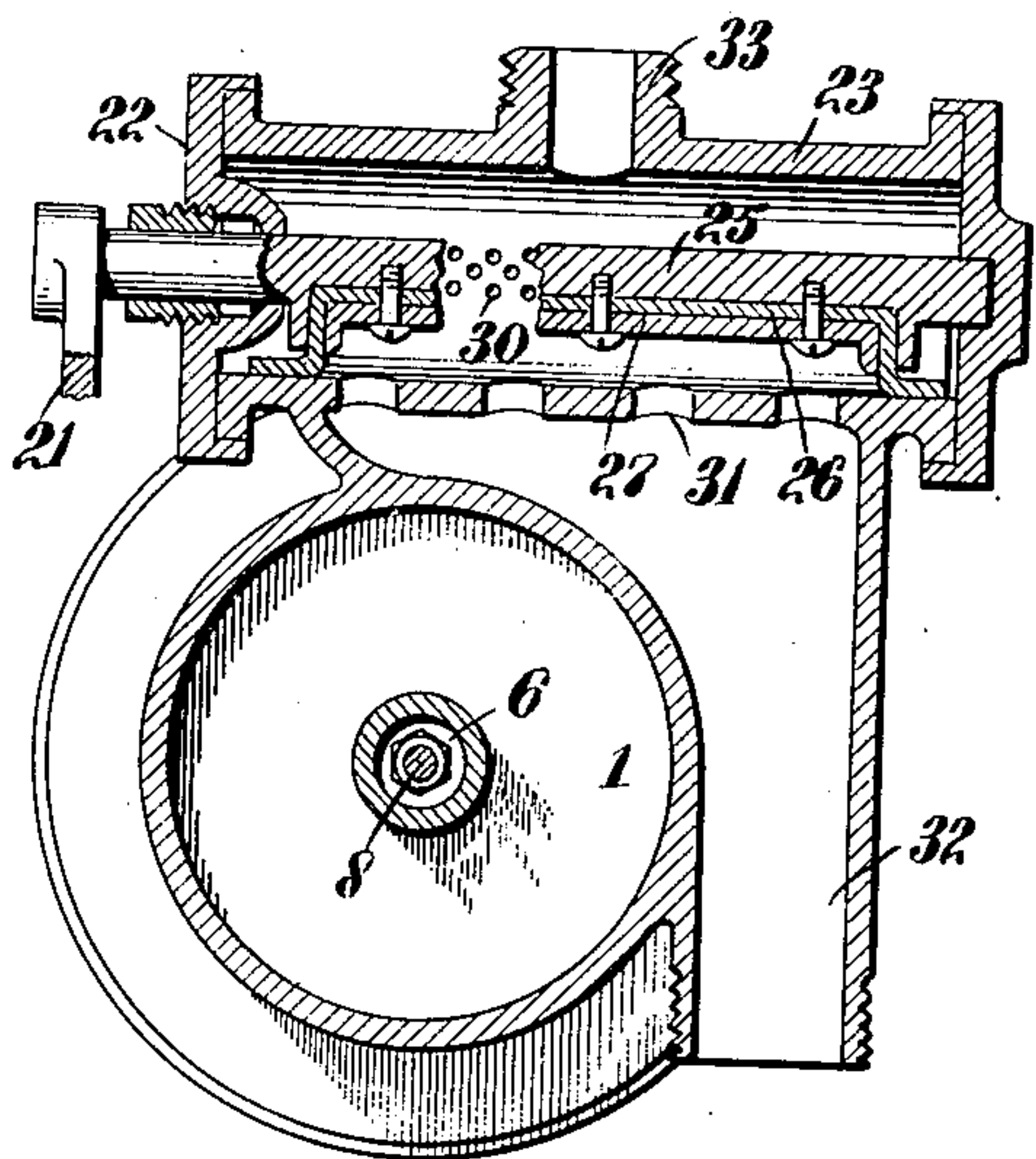


Fig. 5.

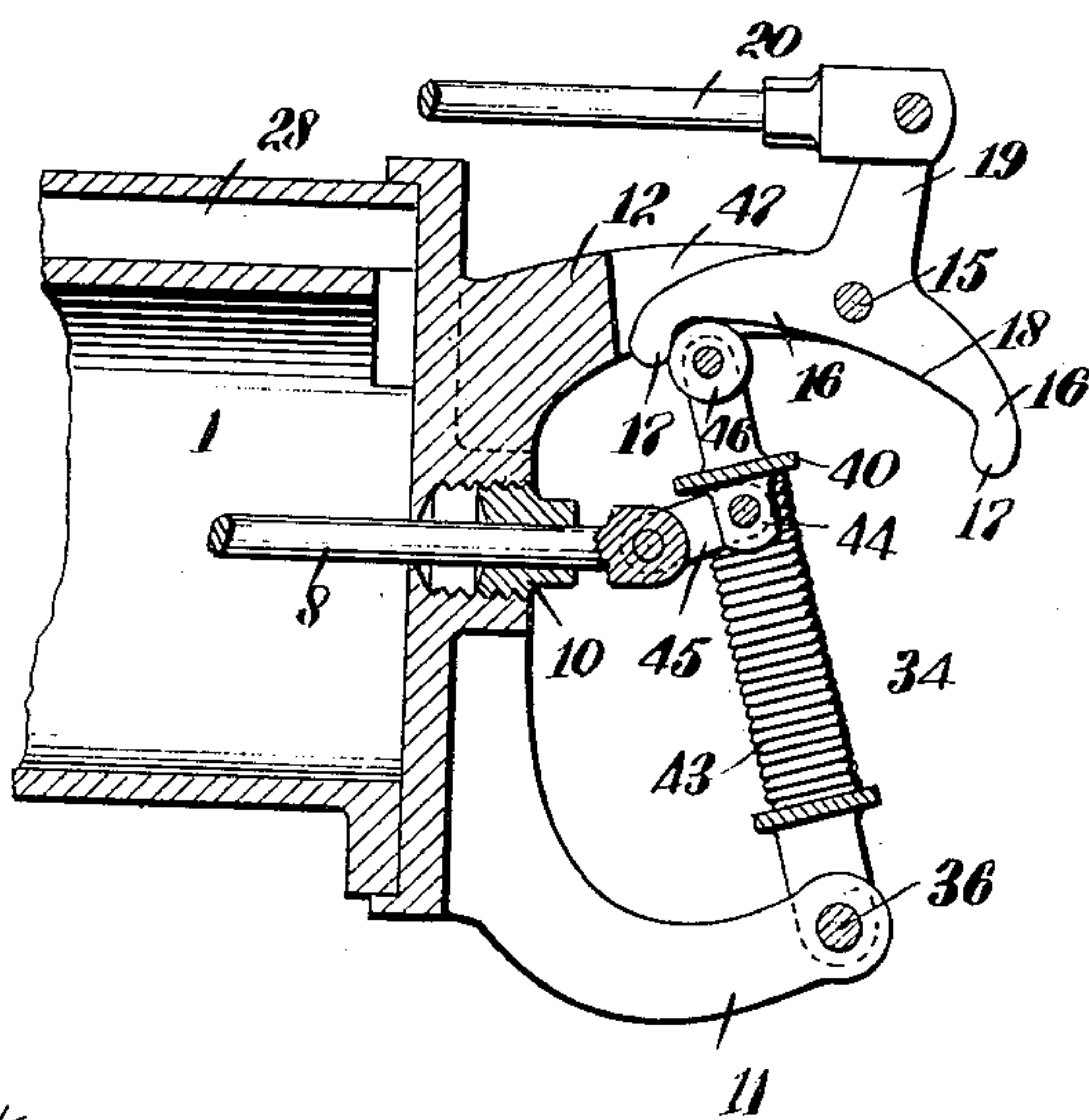
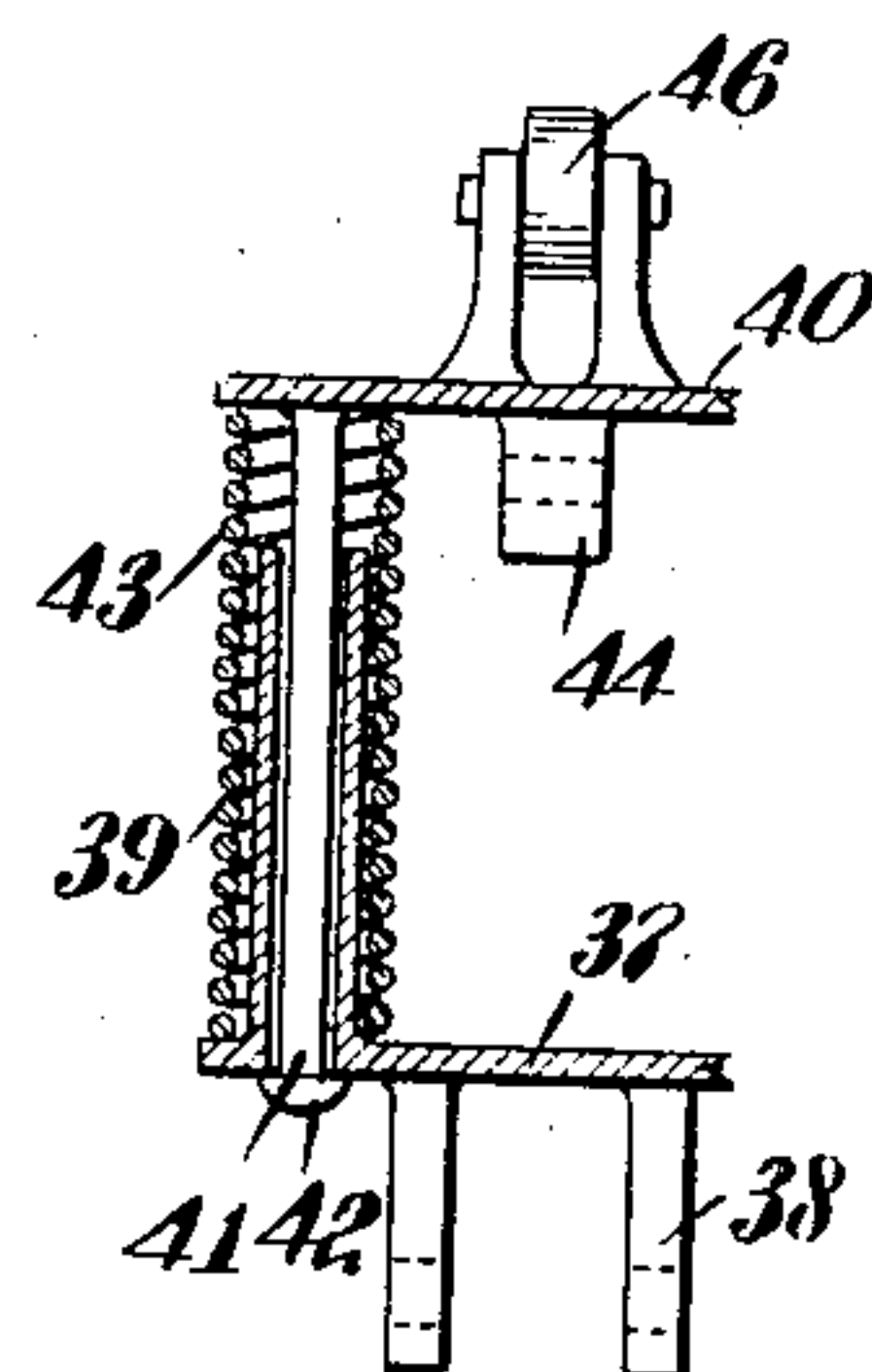


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN NATHAN HARDY, OF COLUMBUS, OHIO.

WATER-MOTOR.

958,492.

Specification of Letters Patent.

Patented May 17, 1910.

Application filed July 27, 1909. Serial No. 509,773.

To all whom it may concern:

Be it known that I, JOHN N. HARDY, a citizen of the United States, and a resident of Columbus, in the county of Franklin and State of Ohio, have invented a new and Improved Water-Motor, of which the following is a full, clear, and exact description.

This invention relates to hydraulic motors, and particularly to the type which embodies a cylinder and a reciprocating piston.

The object of the invention is to produce a motor of this class which is simple in construction, having improved means for reversing the position of the valve at the end of each stroke of the piston so that the motor will operate continuously and automatically.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the motor, a portion of the piston rod being broken away; Fig. 2 is a vertical central section through the cylinder, certain parts being broken away and shown in elevation, this view is a section on the line 2—2 of Fig. 3; Fig. 3 is an end elevation illustrating the particular means for operating the valve; Fig. 4 is a vertical section taken on the line 4—4 of Fig. 2; Fig. 5 is a section taken on the line 5—5 of Fig. 3, and further illustrating the means for controlling the valve from the piston; and Fig. 6 is a section showing details of the valve mechanism.

Referring more particularly to the parts, 1 represents the pump cylinder which is provided with heads 2 and 3, as shown. Through the head 2 the piston rod 4 of the pump passes, a suitable stuffing box 5 being arranged at this point. The inner portion of the piston rod is tubular so that it presents a bore 6, and the end of this bore is closed by a plug 7 which operates as a guide for the valve rod 8. This valve rod extends co-axially in the bore 6, and its inner extremity is provided with a pair of check nuts 9, as shown.

The head 3 is provided with a stuffing box 10 through which the valve rod 8 extends, as indicated. On its outer side the head 3 is formed with an extension or arm 11.

This extension is disposed toward the lower edge of the head and opposite to this extension or arm, a bifurcated arm 12 is provided. Between the forks 13 of the arm 12, a rocker 14 is mounted so as to rock upon a pin 15. This rocker is in the form of a rudimentary Y in an inverted position, and presents two oppositely projecting arms 16, the ends of which are turned up so as to form stops or toes 17. The lower edges of these arms merge into each other so as to form a continuous edge 18. On its upper side the rocker is formed with an upwardly projecting arm 19 which is pivotally attached to a valve link 20. This valve link 20 extends longitudinally of the cylinder and is attached to a valve lever 21. The valve lever 21 extends through the head 22 of the valve chest 23. Within the valve chest a valve 24 is provided, which is in the form of a diametrically disposed plate 25, having a suitable packing 26 held in position by a keeper plate 27. The cylinder is provided with passages or ports 28 and 29, which lead from the valve chest to the ends of the cylinder, as shown in Fig. 2, and these passages communicate with the interior of the valve chest through perforations or valve ports 30. On the under side of the valve chest, as shown in Fig. 4, exhaust ports 31 are provided which communicate with an outlet nipple 32.

When the valve is in the position shown in Fig. 2, water passes into the motor through the inlet nipple 33 which communicates with the valve chest, and from the upper side of the valve chest the water passes through the perforations 30 at the left side and along the passage 29 to the left-hand end of the cylinder. At this time the passage 28 is in communication with the lower part of the valve chest through the perforations 30 at the right side thereof, and through the valve chest the water may escape to the outlet nipple 32.

In the extremity of the arm 11, a rocker frame 34 is mounted to swing on a pivot pin 36. This rocker frame comprises a lower cross head 37 having ears 38 through which the pin passes. This cross head 37 has tubular guide bars 39, which project upwardly. An upper cross head 40 is provided which has downwardly extending stems 41 which lie in the tubular guides 39. The lower ends of these stems 41 are riveted over so as to form heads 42 which limit the upward movement of the cross head 40, that is, these

heads limit the outward movement of the cross heads relative to each other. On the tubular guides 39 helical springs 43 are provided which tend to force the upper cross head upwardly. On the under side of the cross head 40, an ear 44 is provided, and this ear is connected by links 45 with the extremity of the valve rod 8, as indicated most clearly in Fig. 5. On the outer or upper side of the cross head 40, a roller 46 is mounted, and this roller is adapted to engage the edge 18 of the rocker 14. The roller is sufficiently narrow to pass into a slot 47 which is formed between the forks 13 of the arm 12.

In the operation of the pump, when the water enters the left-hand end of the cylinder, as viewed in Fig. 2, it will force the piston 48 which is carried on the piston rod, toward the right end of the cylinder. When the piston is nearly at the end of its stroke in this direction, the end of the bore 6 will strike the nuts 9 at the inner end of the valve rod 8. This outward movement of the valve rod will force the rocker frame 34 outwardly. In this movement the roller 46 runs along the edge 18, compressing the springs 43. As soon as the roller passes the pivot pin 15 of the rocker, it acts upon the outer arm 16 of the rocker, forcing the rocker to its opposite position. This movement of the rocker throws the valve lever 21 over to its opposite position through the medium of the link 20. This position of the valve will admit water through the cylinder as viewed in Fig. 2, the exhaust taking place at the opposite end. The valve will remain in this position until the piston has traveled to a point near the left end of the cylinder, at which time the plug 7 will strike the adjacent check nut 9 and pull the valve rod 8 in the direction in which the piston is moving; this will move the rocker frame back to the position in which it is shown in Fig. 5, and reverse the valve again. From this arrangement it will be seen that the valve will reverse automatically at the end of each travel of the piston and the valve will maintain its position through the operation of the springs 43 until the end of each stroke.

Having thus described my invention, I claim as new and desire to secure by Letters Patent,—

1. A device of the character specified, comprising a cylinder, a piston movable therein, a piston rod connected with the piston and having a recess in the end adjacent the piston, a valve controlling the admission of the motive fluid to and from the cylinder, oppositely extending arms connected with the end of the cylinder, a three armed rocker pivoted on one arm, a link connecting one of the arms with the valve, a frame pivoted by one end to the other arm, said frame comprising a plurality of sections, springs normally pressing the sections away from each other, a roller on the section remote from the arm to which the frame is pivoted, said roller engaging the rocker, and moving between the free arms thereof, said arms having each a stop for engagement by the roller, and a rod pivoted to the frame and extending into the bore of the piston rod, and provided with stops for engagement by the piston rod for the purpose specified.

2. In a water motor, a valve for controlling the admission of the motive fluid, and means for operating the valve, said means comprising oppositely arranged arms extending from the motor, a three armed rocker pivoted on one arm, a link connecting one of the arms with the valve, a frame pivoted by one end to the other arm, said frame comprising a plurality of sections, springs normally pressing the sections away from each other, a roller on the outer section of the frame, said roller engaging the rocker and moving between the free arms thereof, each of said arms having a stop for engagement by the roller a rod pivoted to the frame, and having a lost motion connection with a reciprocating part of the motor for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN NATHAN HARDY.

Witnesses:

P. H. HOFFHINES,
WM. IAMS.