

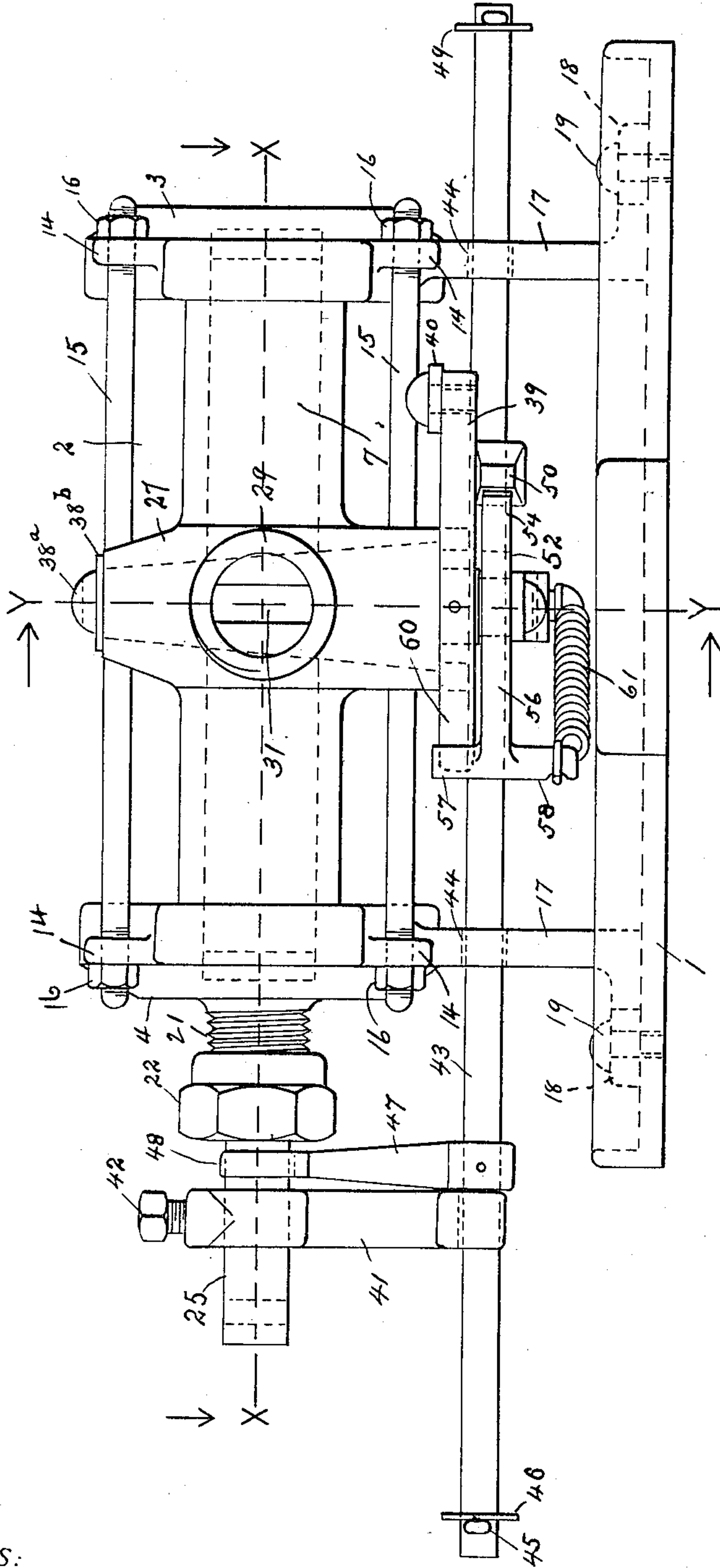
No. 837,252.

PATENTED NOV. 27, 1906.

J. H. ROSE.  
HYDRAULIC MOTOR.  
APPLICATION FILED JULY 26, 1905.

3 SHEETS—SHEET 1.

FIG. 1.



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3 SHEETS—SHEET 2.

FIG. 2.

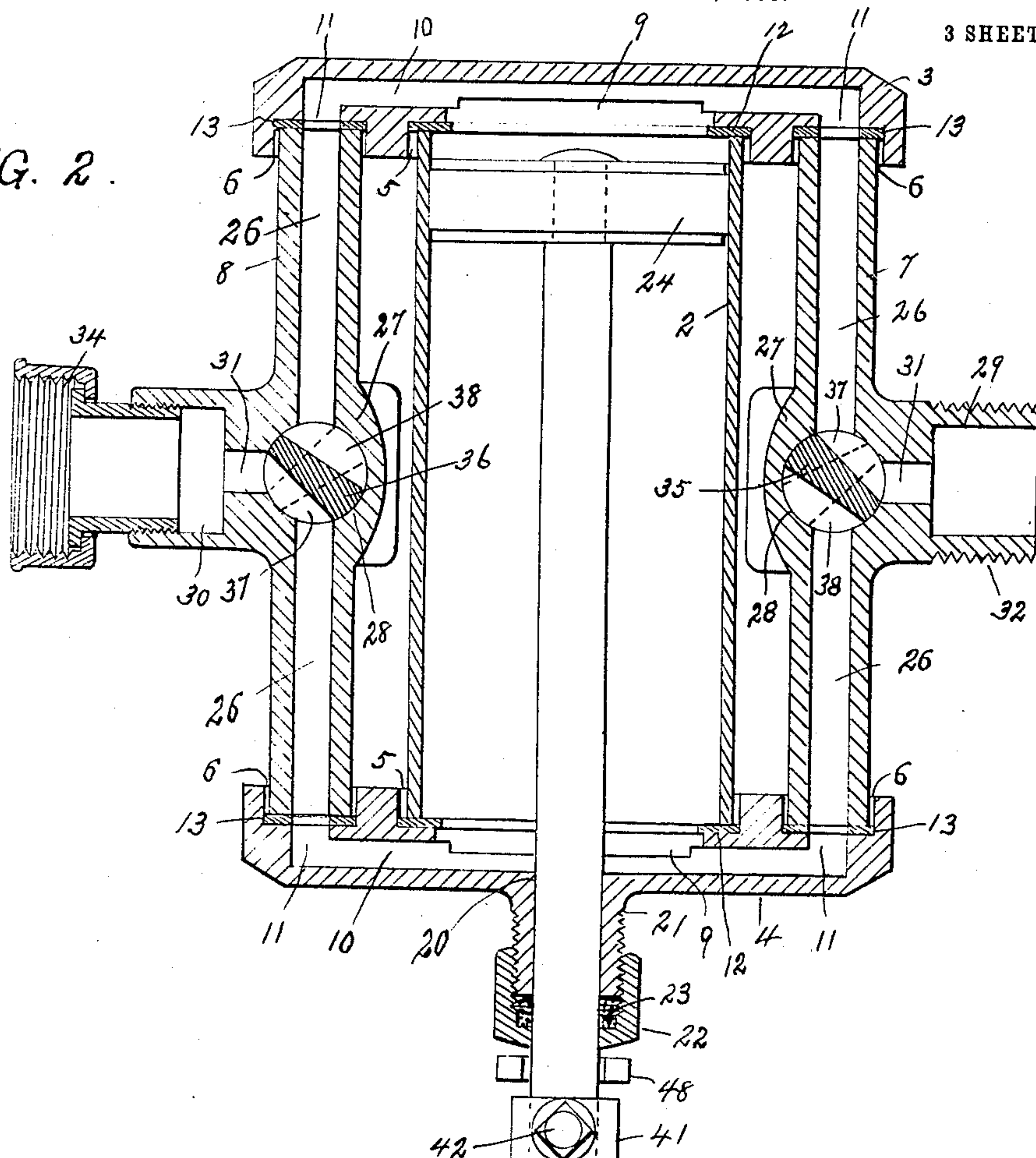
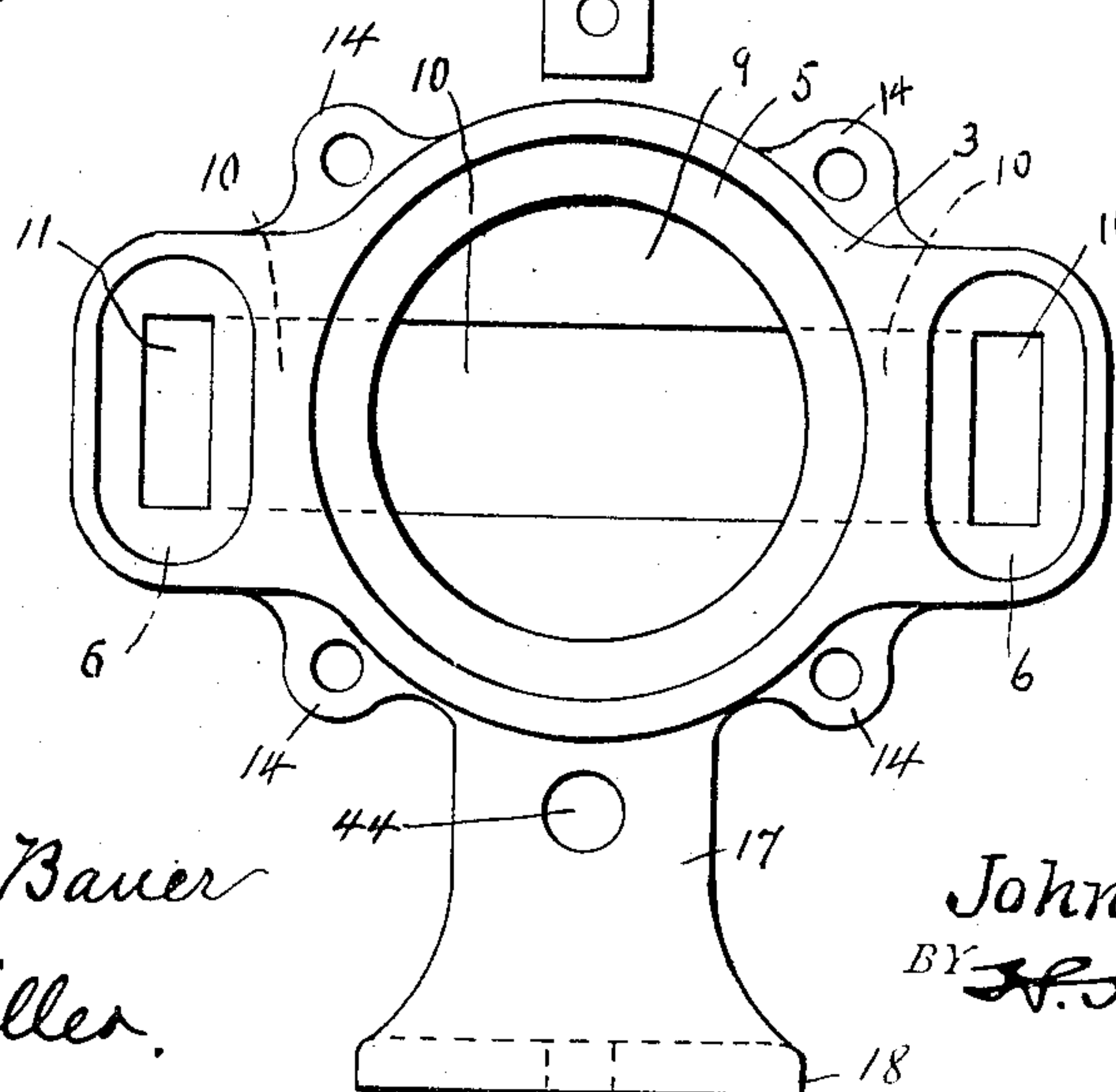


FIG. 5.



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3 SHEETS—SHEET 3

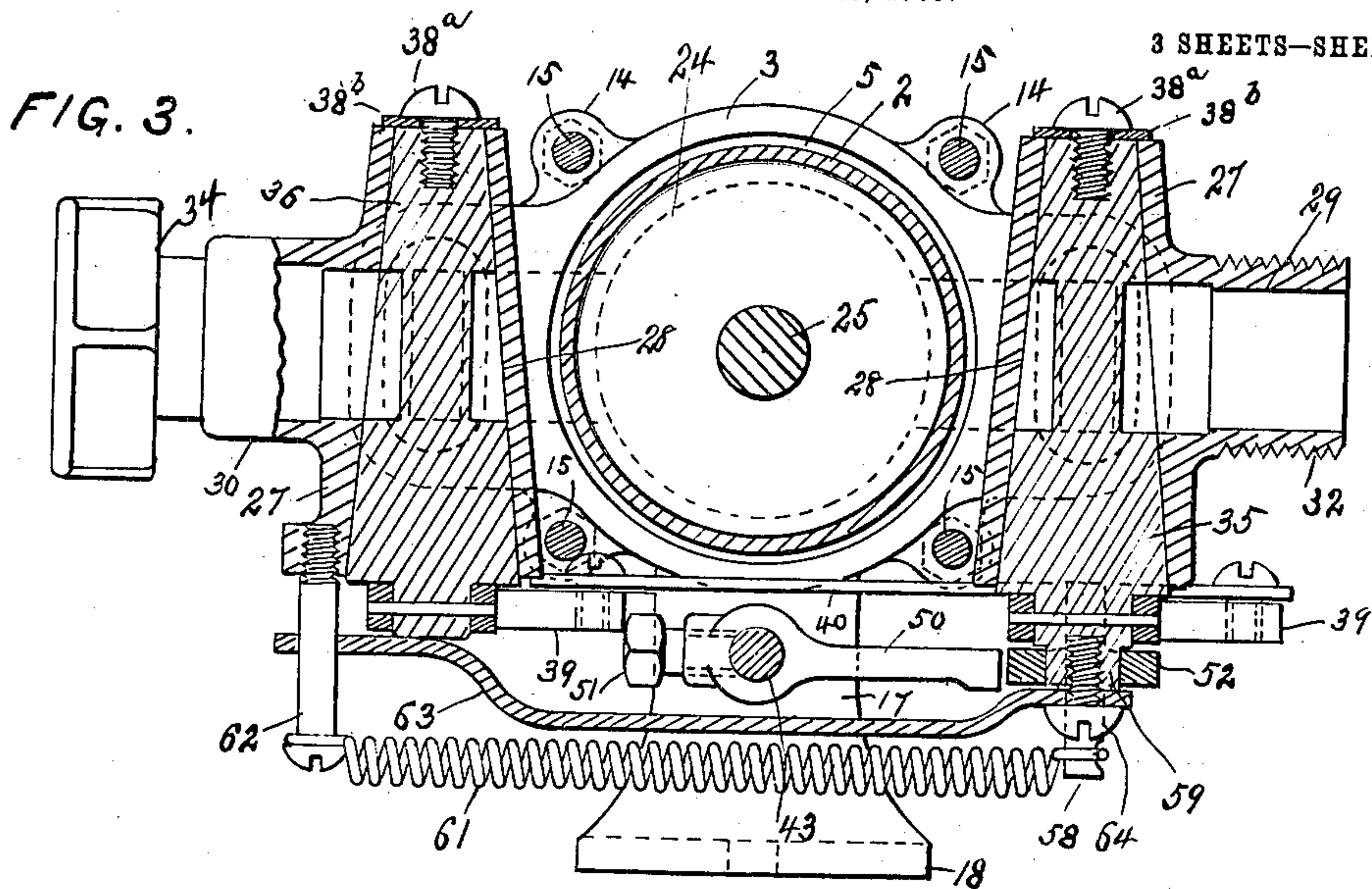
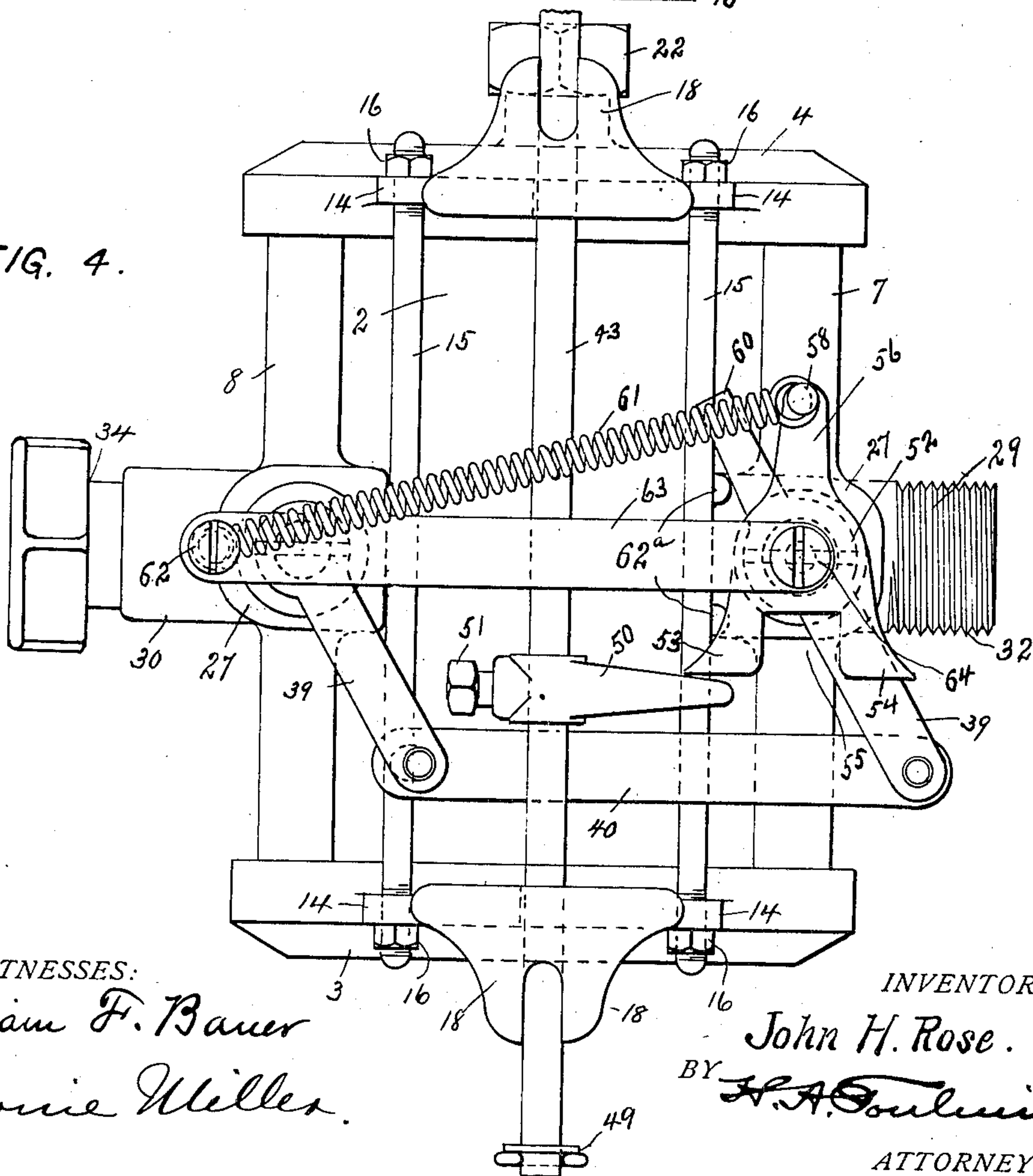


FIG. 4.



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# UNITED STATES PATENT OFFICE.

JOHN H. ROSE, OF DAYTON, OHIO.

## HYDRAULIC MOTOR.

No. 837,252.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed July 26, 1905. Serial No. 271,276.

*To all whom it may concern:*

Be it known that I, JOHN H. ROSE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Hydraulic Motors, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to hydraulic motors, and has for its object to provide a simple, efficient, and inexpensive reciprocating water-motor of the single-cylinder double-acting type, the same being designed primarily for use as a small motor for domestic use and being capable of ready application in various situations, owing to the fact that its organization is such that its pressure and exhaust connections may be reversed.

To these and other ends my invention consists in certain novel features which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a motor embodying my invention in one form. Fig. 2 is a sectional view of the same, taken on the line  $xx$  of Fig. 1 and looking in the direction of the arrows. Fig. 3 is a transverse sectional view taken on the line  $yy$  of Fig. 1 and looking in the direction of the arrows. Fig. 4 is an inverted plan view of the motor with the drip-base omitted, and Fig. 5 is a view of the inner face of one of the end members of the frame, detached.

In the said drawings the motor is shown in Fig. 1 as mounted upon the usual drip-base 1, although this base may be dispensed with. The motor proper comprises a cylinder 2, preferably in the form of a plain piece of cylindric tubing of brass or the like. This cylinder is supported in a frame comprising end pieces and side pieces in the form of castings, preferably of brass, which may be readily constructed and connected without any special fitting of the parts. The end members of the frame are indicated by the reference-numerals 3 and 4, and one of them, the end member 3, is shown in detail in Fig. 5 of the drawings. Each end member of the frame comprises a body portion having a seat 5 for the corresponding end of the cylinder and lateral seats 6 to receive the ends of the side members 7 and 8 of the frame. The central portion of each end member thus constitutes a cylinder-head and is provided with

a central chamber 9 in free communication with the corresponding end of the cylinder, said central chamber being connected by a transverse passage 10 with openings or ports 11 in the seats or recesses 6, which receive the ends of the side members of the frame. The seat 5 is provided with a gasket or packing-washer 12, fitting between it and the corresponding end of the cylinder 2, and the seats 6 are provided with similar gaskets or packing-washers 13, fitting between said seats and the ends of the side frame members 7 and 8.

Each of the end frame members 3 and 4 is provided with apertured lugs 14, through which pass longitudinal connecting-bolts or threaded rods 15, provided on their outer ends with nuts 16. By means of these nuts and bolts the two end frame members may be drawn toward each other, so as to firmly grip between them the cylinder and side frame members, and thus hold the cylinder and frame rigidly and firmly together, the gaskets or packing-washers making watertight joints between the parts and doing away with the necessity of any special fitting or machining of the castings or threading of the cylinder ends. Each of the end frame members is provided with a supporting-leg 17, terminating in a slotted foot 18, by means of which the motor may be secured to the base 1 or any other suitable support through the medium of screws 19. The two end members of the frame are similar in construction, except that the end member 3 is closed, while the end member 4 has an aperture 20 for the passage of the piston-rod, and a guide sleeve or nipple 21 for said piston-rod extending outwardly from the opening 20 and threaded externally to receive a cap 22, carrying a packing 23, and thus constituting a stuffing-box for the piston-rod. The piston is indicated at 24, and the piston-rod at 25. Each of the side frame members is in the form of a bar having a passage 26 extending longitudinally therethrough and having a central valve-casing 27, the valve-chamber 28 of which lies midway of the passage 26 and in communication with both portions thereof. A pipe or conduit 29 communicates with the valve-chamber 28 of the frame member 7, and a pipe or conduit 30 communicates with the valve-chamber 28 of the frame member 8, these pipes or conduits being in the form of sleeves or nipples cast in one piece with the frame members and communicating with the



valve-chambers through ports 31. These sleeves or nipples constitute the receiving and exhaust connections of the motor, and either of them may act in either capacity, although for convenience of explanation I have indicated the part 29 as the supply-conduit and the part 30 as the discharge or exhaust conduit. They may be identical in construction; but in the present instance I have shown the sleeve or nipple 29 as being externally threaded, as indicated at 32, while the sleeve or nipple 30 is internally threaded to receive a union or coupling 34. Similar valves 35 and 36 are located, respectively, in the valve-casings of the frame members 7 and 8, and these valves may be three-way valves of any approved construction. In the present instance I have shown them as tapering plug-valves having ports 37 and 38, by means of which the port 31 may be placed in connection with either branch of the passage 26, according to which of the two positions of the valves are assumed, said positions being indicated, respectively, in full and dotted lines of Fig. 2 of the drawings. They are shown as held in position and adjusted to take up wear by means of screws 38<sup>a</sup> and washers 38<sup>b</sup> at their upper ends. In the case now assumed, in which the supply of water under pressure enters at 29, 35 is the inlet-valve, and 36 is the exhaust-valve. These valves are caused to move in unison by reason of arms 39, rigidly secured to their lower ends and connected by a link 40, pivoted to the ends of said arms. The simultaneous movement of the two valves to proper relative positions with relation to each other is thus assured.

The valve-shifting mechanism comprises a tappet-arm 41, secured by a set-screw 42 on the projecting end of the piston-rod 25. This arm extends downward and embraces or straddles a valve-rod 43, adapted to slide in guide-apertures 44 in the leg-pieces 17 of the frame end members 3 and 4. This rod has abutments against which the arm 41 strikes as it approaches the limit of its movement in each direction, so as to shift the valve-rod. These abutments are of any suitable construction, and in the present instance I have shown the outer abutment as composed of a split key 45 and washer 46, while the inner abutment is composed of an arm 47, secured to the rod 43 at one end and having its other end formed into a yoke 48, which embraces the piston-rod 25, and thus prevents the valve-rod 43 from turning. The arm 47 by its contact with the cap 22 limits the motion of the valve-rod in one direction, its motion in the other direction being limited by a stop 49, shown as composed of a split pin and washer.

The valve-rod carries a tappet-finger 50 adjustably secured thereon by means of a set-screw 51. With this tappet-finger there co-

operates a valve-shifting lever 52, having contact-pieces 53 and 54, adapted to be alternately engaged by the finger 50, a recess 55 being formed between the contact-pieces to receive the end of the finger 50 as the lever 52 passes its central position. The lever 52 is provided with a projecting arm 56, having pins 57 and 58 extending therefrom in opposite directions. The lever 52 is pivotally mounted on a bearing 59, formed on the lower end of the valve 35, and the pin 57 is arranged to engage in one direction with the arm 39 of said valve and in the other direction with an arm 60, which forms an extension of the arm 39 in the opposite direction. The pin 58 has connected to it one end of a spring 61, the other end of which is connected to a fixed part on the opposite side of the motor—as, for instance, a pin or post 62, mounted in the valve-casing 27 of the valve 36. This connection of the spring is transversely opposite to the pivotal support of the lever 52, so that as soon as said lever has been moved beyond a central position in either direction, said central position being that in which the pins 58 and 62 and the pivotal support 59 of the lever are in alinement, the lever will be thrown fully over to that side toward which it is moving. By reason of this construction the valve-rod and finger 50 are only required to move the lever 52 to a point slightly beyond its central position, whereupon the spring 61 will complete the movement and will almost instantaneously move both valves over into free open position, such position being the opposite of that formerly assumed by them. Stops 61<sup>a</sup> limit the movements of the lever 52.

63 indicates a bridge-bar or strut connecting the side members centrally at their lower portions, one end thereof being mounted on the pin or stud 62, while the other end is mounted on a screw-bolt 64, which is threaded into the lower end of the valve 35.

From the foregoing detailed description of the construction of the motor its general mode of operation will be readily understood. With the parts in the position shown water entering through the part 29 will pass through the conduits formed in the side and end frame members and enter the cylinder at the end to the right of Fig. 2, forcing the piston outward until the arm 41 thereof comes into contact with the abutment on the valve-rod formed by the washer 46 and pin 45. The valve-rod will then move in the same direction along with the piston and piston-rod, its arm 50 being in engagement with the contact-piece 53 of the lever 52, and said lever will be turned upon its pivotal support until slightly past its central position, in which position of the parts the arm 50 extends into the recess 55. The spring 61 then quickly throws the lever 52 over into its other or opposite position, and the engage-



ment of the pin 57 with the arm 39 shifts both valves at the same time. Prior to this reversal of the parts the water on the other side of the piston has been passing out through the  
 5 ports formed in the other end member and side member of the frame through the valve 36 and through the conduit 30. Upon the reversal of the valves in the manner just described a reversal of the direction of flow of  
 10 the water occurs and the piston moves back to its original position. Toward the end of the stroke in this direction the arm 41 comes into contact with the arm 47, whereupon the arm 50 by its contact with the contact-pieces  
 15 54 of the lever 52 carries said lever backward to and past its central position, when the spring 61 throws said lever back to the position shown in Fig. 4, and the contact of the pin 57 with the arm 60 will again shift  
 20 the valves.

It will be noticed that the arrangement of the parts is such that the valves remain stationary until the closing portion of the movement of the lever 52 in each direction,  
 25 the shifting of the valves occurring quickly during the last portion of said movement when either the arm 39 or the arm 60 is struck by the pin 57. Thus the valves are shifted almost instantaneously at each end of  
 30 the stroke, and the only work which the piston has to do in effecting this shifting is the movement of the lever 52 through a little more than half of its range of motion against the resistance of the spring 61, which spring  
 35 accomplishes the shifting by the impact or blow of the pin 58 after it is moved through a considerable arc without any resistance whatsoever, so that its momentum is correspondingly great and any resistance of the  
 40 valves is thus readily overcome.

It will be understood that the piston-rod is adapted to be coupled to any mechanism which it is desired to operate, such as an ice-cream freezer, washing-machine, or any  
 45 other device capable of being operated by a reciprocating motion. The motor may be readily mounted in any desired position, either horizontal or vertical, and the supply of water under pressure may be connected to  
 50 either side, the exhaust being discharged from the opposite side. Suitable pipes or hose may be connected to the supply and exhaust connections, as may be desired.

It will be seen that the structure is exceedingly simple, the frame being composed of  
 55 four parts, through which the water-passages are formed, two of these parts having the cylinder-heads formed therewith and the other two having the valve-casings formed therewith, said valves being located on opposite sides of the central portion of the cylinder, so as to be readily accessible. The cylinder is a plain section of cylindrical tubing, unthreaded and otherwise unfinished, and  
 60 the castings of which the frame is composed

have no machine-fitted joints, the gaskets and connecting-bolts effecting a water-tight junction between the frame members and the cylinder, and the tension of the bolts which draw the end members together being  
 70 resisted by the rigid castings forming the side members, which latter serve not only as conduits for the water, but also as struts or compression members to cooperate with the tension members, which are the bolts or  
 75 threaded rods.

I do not wish to be understood as limiting myself to the precise details of construction hereinbefore described, and shown in the accompanying drawings, as it is obvious that  
 80 these details may be modified without departing from the principle of my invention.

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

1. In a water-motor of the character described, a cylinder consisting of an open-ended tube, in combination with a supporting-frame comprising end and side members and means for connecting the same, the end  
 90 members forming the cylinder-heads, the side members having valve-casings, and inlet and exhaust valves located in the casings of the respective side members, and passages extending through both the side and end  
 95 members and connecting both cylinder ends with both of the valves, substantially as described.

2. In a water-motor of the character described, the combination, with a cylinder  
 100 consisting of an open-ended tube, of a supporting-frame therefor comprising end and side pieces having intercommunicating water-passages, the end pieces having seats for the ends of the cylinder and side members  
 105 provided with packing-gaskets, the side members comprising water connections and valve-casings with controlling-valves therein, and tension-bolts connecting the end members to draw them toward each other,  
 110 substantially as described.

3. In a water-motor of the character described, a cylinder consisting of an open-ended tube, in combination with a supporting-frame comprising side and end members,  
 115 each end member having a central portion forming a cylinder-head and having a packed seat for the cylinder end, and lateral portions having packed seats for the ends of the side members, each end member having a water-  
 120 passage formed therein with openings or ports at the ends of the cylinder and side members, each side member having a longitudinal opening therethrough from end to end, a central valve-casing and valve, and  
 125 a water connection, and tension-bolts for drawing the end members toward each other and against the ends of the cylinder and side members, substantially as described.

4. In a water-motor of the character de- 130



scribed, the combination, with a cylinder  
and piston, of two rotatory three-way valves  
located on opposite sides of the cylinder, con-  
nected with both ends thereof, and having  
5 supply and exhaust connections, said valves  
having arms and a connecting-link to cause  
them to operate in unison, one of said valves  
having a second arm extending in the oppo-  
site direction from the first-mentioned arm,  
10 a shifting lever pivotally mounted concen-  
trically with said last-mentioned valve and  
provided with contact-pieces and an inter-  
vening recess on one side of its pivot and a  
projection on the other side of its pivot  
15 adapted to engage the valve-arms at the  
limits of its stroke, a shifting rod provided  
with a tappet-arm to alternately engage the  
contact-surfaces of the shifting lever, a pro-

jection on the piston-rod to engage and move  
the shifting rod at the ends of the piston- 20  
stroke, and a spring acting on the shifting  
lever to resist the first part of its movement  
and to accelerate or cause the last part of its  
movement, after said shifting lever has  
passed the center of its movement, to cause 25  
the said lever to strike one or the other of the  
valve-arms with the momentum due to the  
unresisted action of the spring toward the  
end of the stroke of the shifting lever, sub-  
stantially as described. 30

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

JOHN H. ROSE.

Witnesses:

ALBERT KERN,  
LUCIUS C. COOK.