

No. 670,082.

Patented Mar. 19, 1901.

J. LEUKART.
HYDRAULIC MOTOR.

(Application filed Apr. 28, 1899.)

(No Model.)

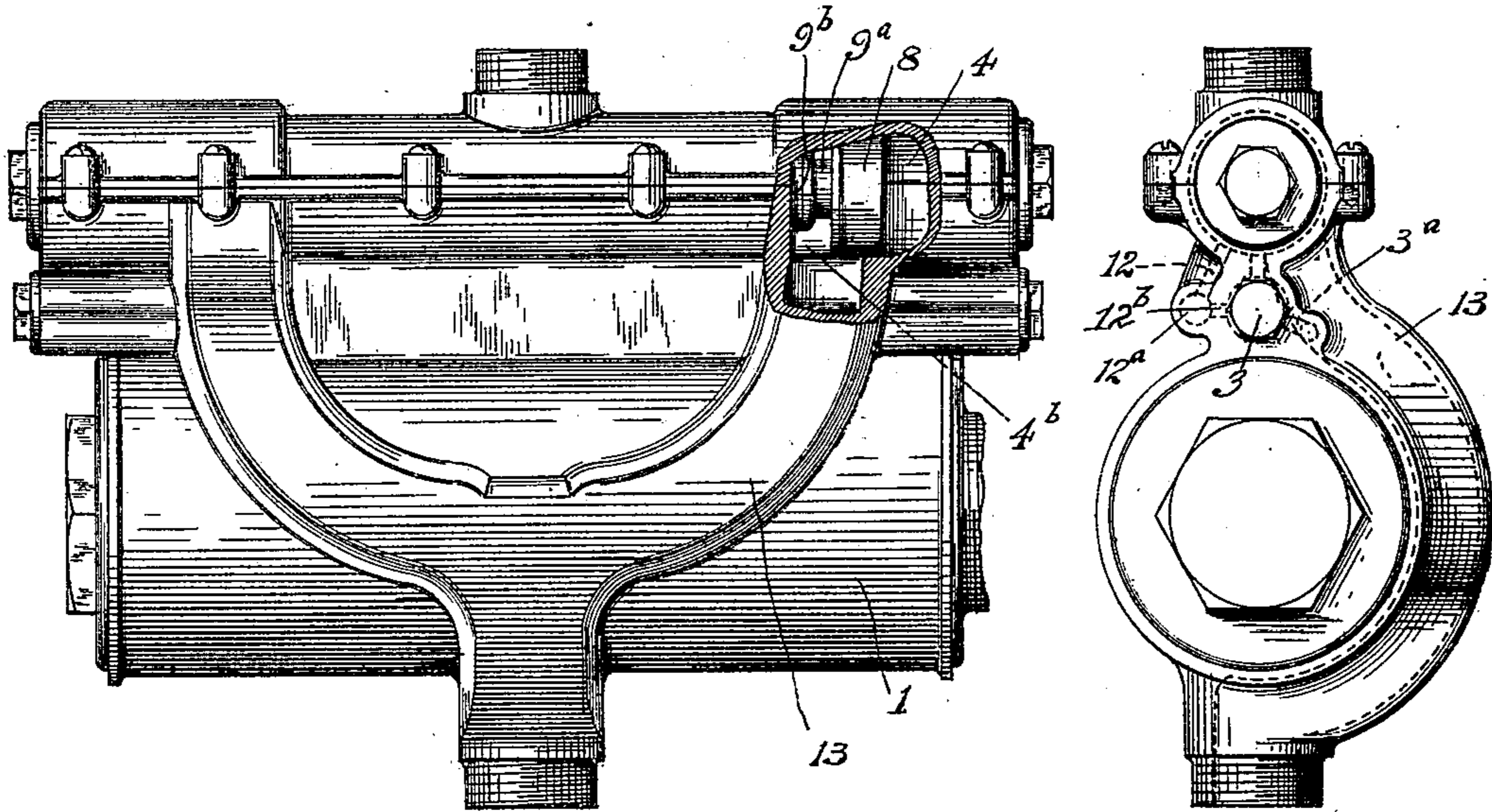


Fig. 1

Fig. 2

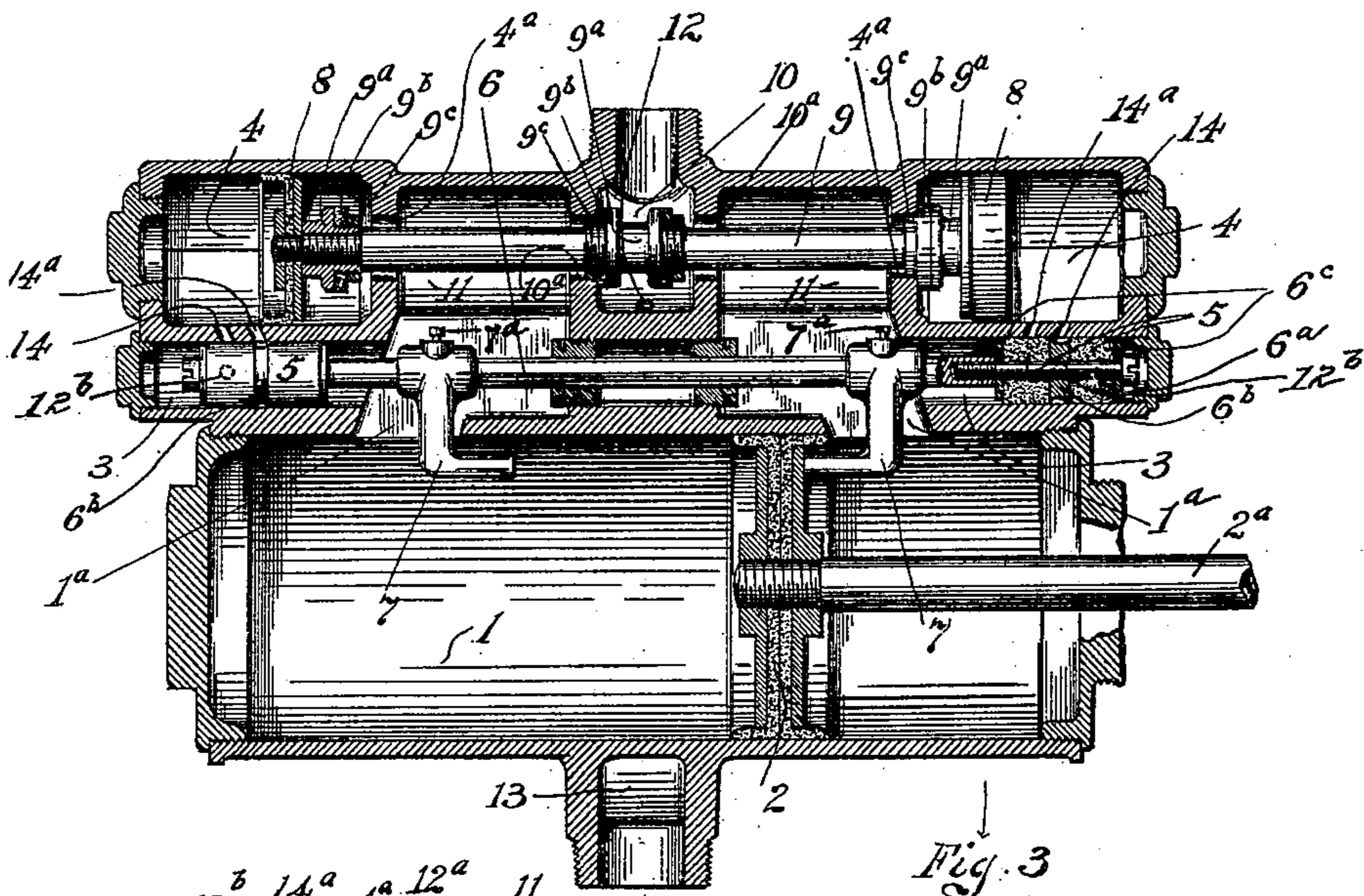


Fig. 3

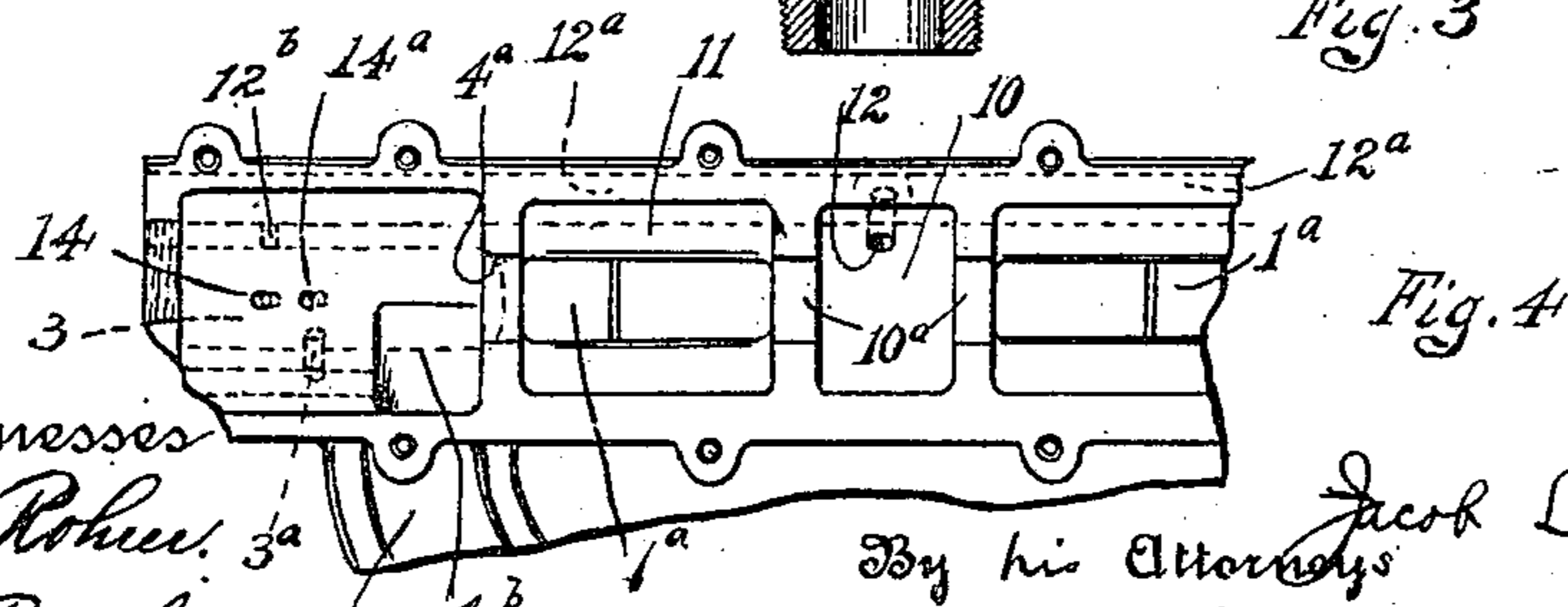


Fig. 4

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JACOB LEUKART, OF COLUMBUS, OHIO.

HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 670,082, dated March 19, 1901.

Application filed April 28, 1899. Serial No. 714,832. (No model.)

To all whom it may concern:

Be it known that I, JACOB LEUKART, 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 Hydraulic Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates more particularly to such motors as are operated by the pressure of a city water-main and designed to work a pump to lift rain-water from cisterns for use in kitchens, bath-rooms, &c. As heretofore furnished such motors have been unreliable in operation, requiring much attention and frequent repairs.

My invention consists of the construction and combination of parts herein described and pointed out in the claim.

In the accompanying drawings, Figure 1 is a view or side elevation, a part of one of the main-valve chambers being broken out to show the location of the exhaust or outlet port. Fig. 2 is a view in elevation of the left-hand end of the motor as seen in Fig. 1. Fig. 3 is a central longitudinal sectional view, some of the interior parts being partially in elevation and some partially in section, the better to show details of construction. Fig. 4 is a top plan view of a fraction of the casing, the upper section being removed.

Like characters of reference in the several views designate corresponding parts.

1 designates the main cylinder of the motor, in which fits and moves a piston 2 and its pump-rod 2^a. Formed at the upper side of this cylinder are auxiliary-valve chambers 3 3 and main-valve chambers 4 4. Fitting to move in the chambers 3 3 are annularly-recessed valves connected by a rod 6. A convenient way of constructing these valves consists in placing on each end of the rod 6 or upon a stem 6^a, threading into the end of the rod, two pieces of packing material 5 5, between which is placed a bobbin-like or circumferentially-channeled metallic disk or ring 6^b, the said disk being held in place by compressing the packing between washers 6^c, abutting against the end of the rod and the head of the stem. Secured to the rod 6 are

lugs 7, that project through ports 1^a in the upper side of the cylinder 1, said lugs being adjustable on the rod by set-screws 7^a and arranged to be struck by the piston 2 to move the auxiliary-valve rod as the piston 2 is reciprocated in its cylinder.

In the chambers 4 4 are pistons 8 8, connected together by a stem or rod 9. The inner wall of each of the chambers 4 4 is made with a port or opening 4^a of smaller diameter than that of the chamber 4, but of larger diameter than the stem or rod 9, and on this stem or rod within the chamber is a shoulder or nut 9^a, upon which is seated a soft ring 9^b and a hard ring 9^c of smaller diameter than the soft ring 9^b; but the hard ring 9^c is of such diameter as to nicely fit and close the port 4^a and practically cut off the flow of water through said port at the proper times, the soft ring supplementing and making certain the shutting off of such flow. The valves are arranged on rod 9 so that one set of ports will always be open when the other is closed, and thereby prevent the liability of an equilibrium being established in the main cylinder and consequent stopping of the motor.

10 designates what might be termed the "induction-chamber," because the water under pressure first enters here. It is made with ports 10^a 10^a, which are opened and closed by valves composed of parts 9^a 9^b 9^c on the rod 9, like those in the chamber 4. The closing of the port 4^a in the left-hand chamber 4 is approximately coincident with the closing of the right-hand port 10^a in the induction-chamber, and the closing of the port 4^a in the right-hand chamber 4 is approximately coincident with the closing of the left-hand port 10^a.

The induction-chamber 10 communicates with the motor-cylinder through chambers 11, which are duly inclosed. The induction-chamber also communicates with the chambers 3 3 through a port 12 and passages 12^a 12^a 12^b 12^b, and the chambers 3 3 communicate with exhaust-passages 13 13 through openings 3^a. Each of the chambers 4 communicates with the exhaust-passages 13 by means of a port 4^b in its side. The main-valve chambers 4 are of larger diameter than the chambers 11, whereby to afford a larger piston-surface to be operated upon by the water.

Connecting the chambers 3 3 and 4 4 are ports 14 14^a and 14 14^b, and when the stem or rod 6 is thrown so that the channeled ring 6^b coincides with a port 14 communication between the induction chamber and chamber 4 is established through one of the passages 12^a and said port 14, and when the stem or rod 6 is thrown in the reverse direction or so that the channeled ring 6^b coincides with the port 14^a communication of the induction-chamber and chamber 4 is cut off and communication established between the chamber 4 and an exhaust-passage 13; but the parts are so constructed and arranged that when one chamber 4 is in communication with the induction-chamber 10 the other chamber 4 is exhausting. Hence the flow or pressure is transferred automatically from one side of the piston 2 to the other, and while the pressure is acting on one side of said piston it is acting on the corresponding side of the piston in a chamber 4. The main cylinder exhausts, through chamber 11, port 4^a, and port 4^b, into exhaust-passage 13. The exhaust-passages 13 are conveniently united at the under side of the motor-cylinder.

In the manufacture of my motor I form the cylinder 1, chambers 3 3, the lower part of the chambers 4 4 and 11 11 and 10, as well as the passages 12 12^a and 13 13, of one piece or casting, the proper opening being bored or turned when necessary, while the upper part or half of the chambers 4 4 and 11 11 and 10 are formed in another casting to be screwed down upon the lower part, as clearly shown. The open ends of the cylinder 1 and chambers 3 3 and 4 4 are closed by screw caps or heads. The rod 6 is passed through bushings secured in the opening below the induction-chamber 10. The soft ring 9^b and the end of the hard ring 9^c may be beveled.

What I claim, and desire to secure by Letters Patent, is—

In a hydraulic motor, the combination with a main cylinder, its piston and piston-rod, of auxiliary-valve chambers separated from one another and provided with valves, a rod connecting said valves, the latter consisting of a

plurality of packing-rings of equal size separated by a grooved or channeled disk or ring, the whole mounted concentrically upon a screw, said screw received in the correspondingly-threaded ends of the auxiliary-valve rod, lugs adjustably and rigidly secured on said rod, ports through which said lugs extend to engage the main piston and thus operate the auxiliary-valve rod, main-valve chambers located in proximity to the auxiliary-valve chambers and provided with a rod and pistons, chambers 11 located adjacent to the main-valve chambers, the latter being of larger diameter than the chambers 11 whereby to afford a larger piston-surface to be operated upon, ports connecting said chambers 11 with the main-valve chambers, valves for closing said ports, said valves secured on the piston-rod, an induction-chamber located between chambers 11, ports connecting the induction-chamber with chambers 11, said piston-rod extending through said induction-chamber and provided with valves thereon for closing said last-named ports, ports affording communication between the induction and auxiliary-valve chambers, an exhaust-passage, exhaust-ports between the auxiliary-valve chambers and said passage, means of communication between the main-valve chambers and said exhaust-passage, ports between said main-valve chambers and the auxiliary-valve chambers affording communication between the induction-chamber and the main-valve chambers by means of said channeled disk and communication between the main cylinder and said exhaust-passages, the whole so arranged that the pressure is automatically transferred from one side of the main piston to the other and simultaneously acting upon the corresponding sides of the main-valve pistons.

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

JACOB LEUKART.

Witnesses:

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