

No. 679,454.

Patented July 30, 1901.

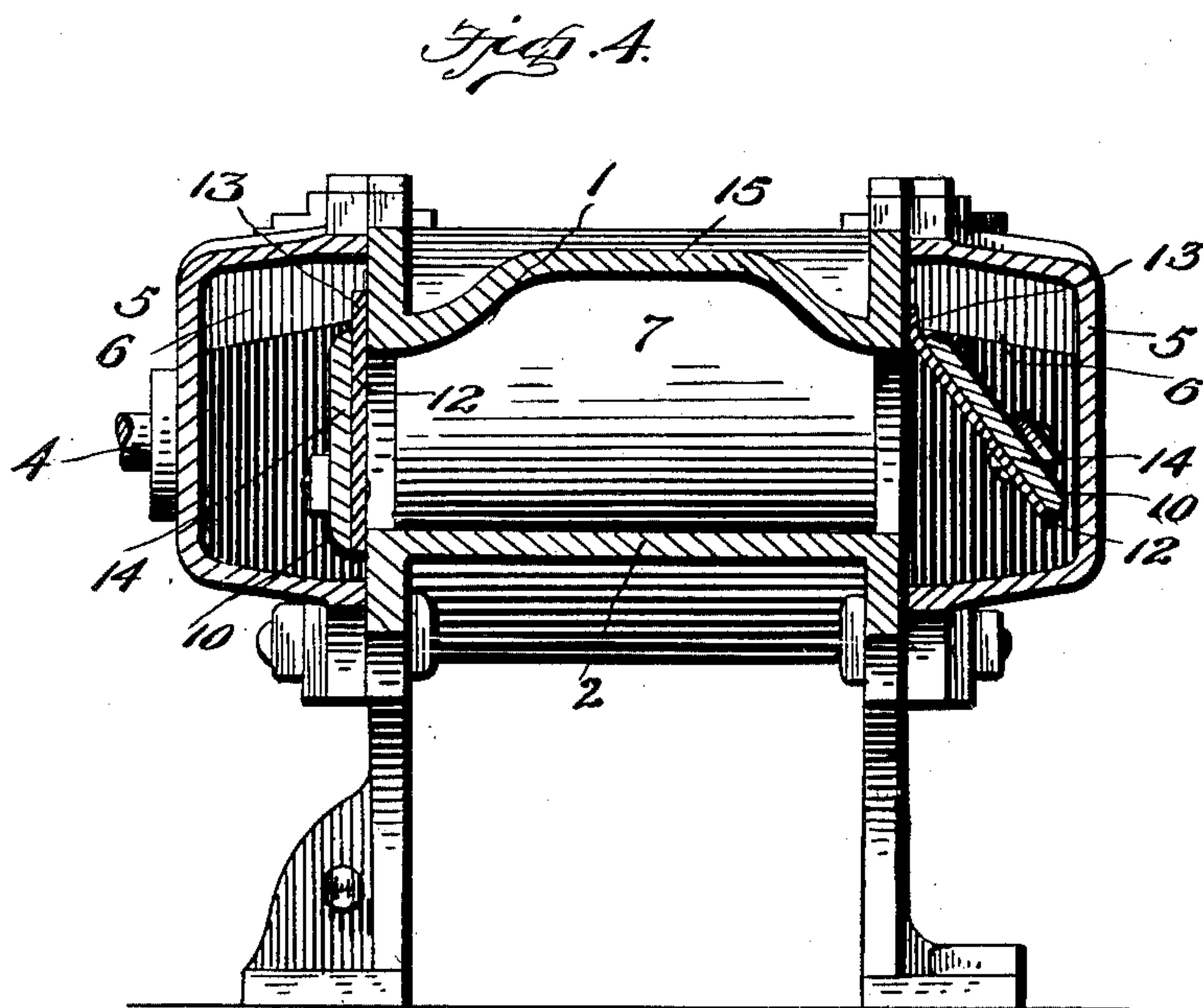
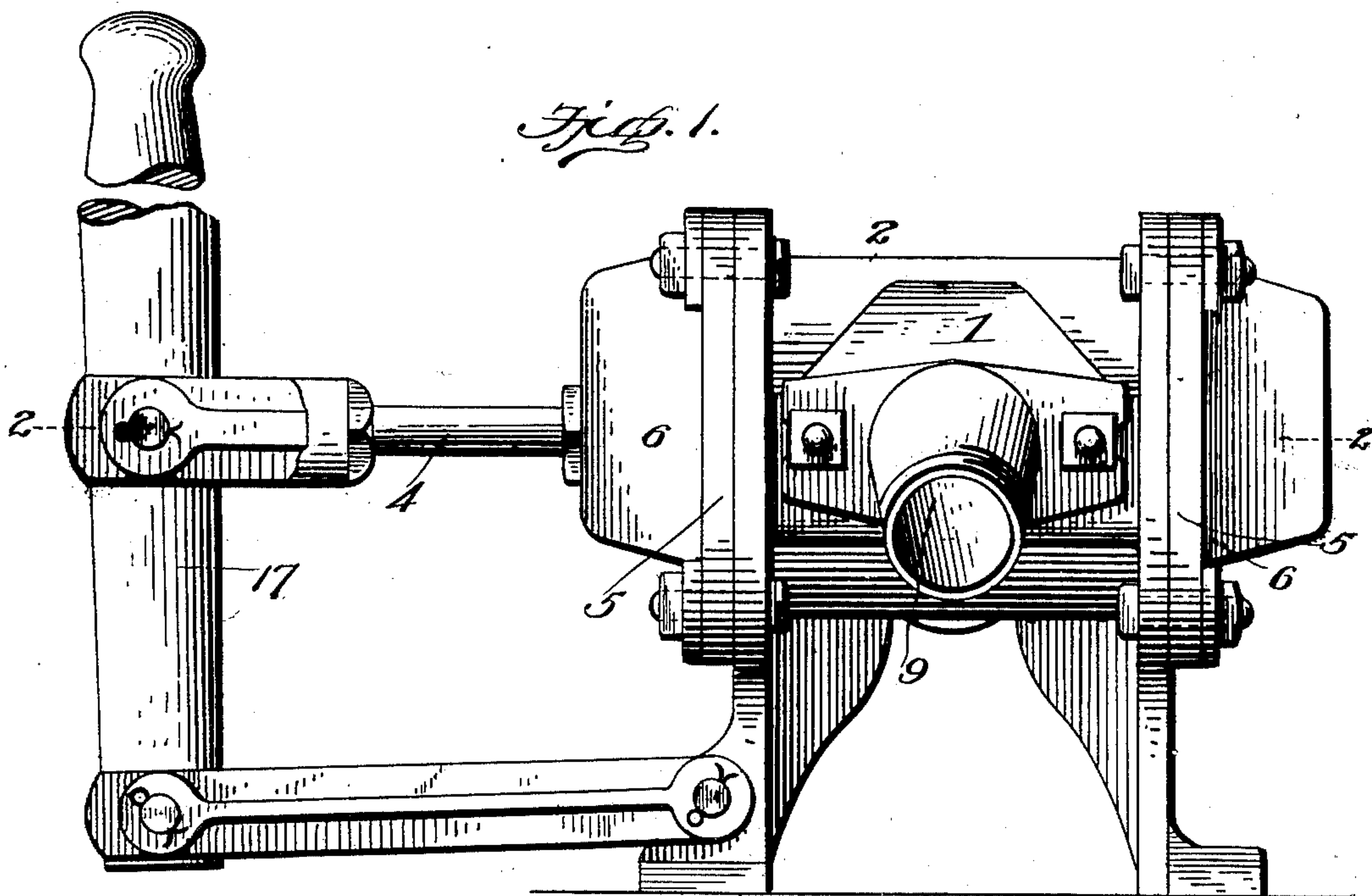
G. F. CONNER.

PUMP.

(Application filed Apr. 1, 1901.)

(No. Model.)

3 Sheets—Sheet 1.



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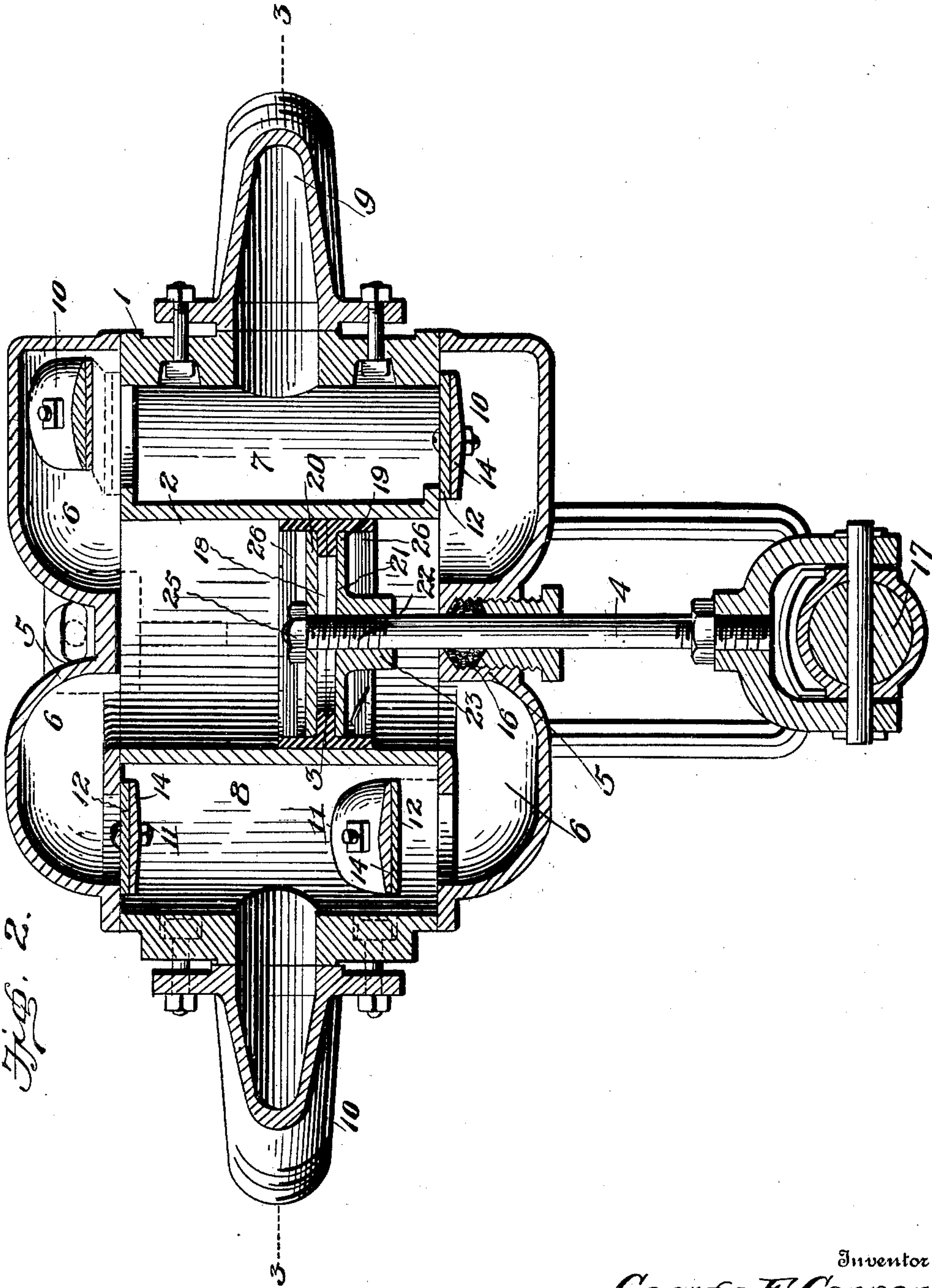


Fig. 2.

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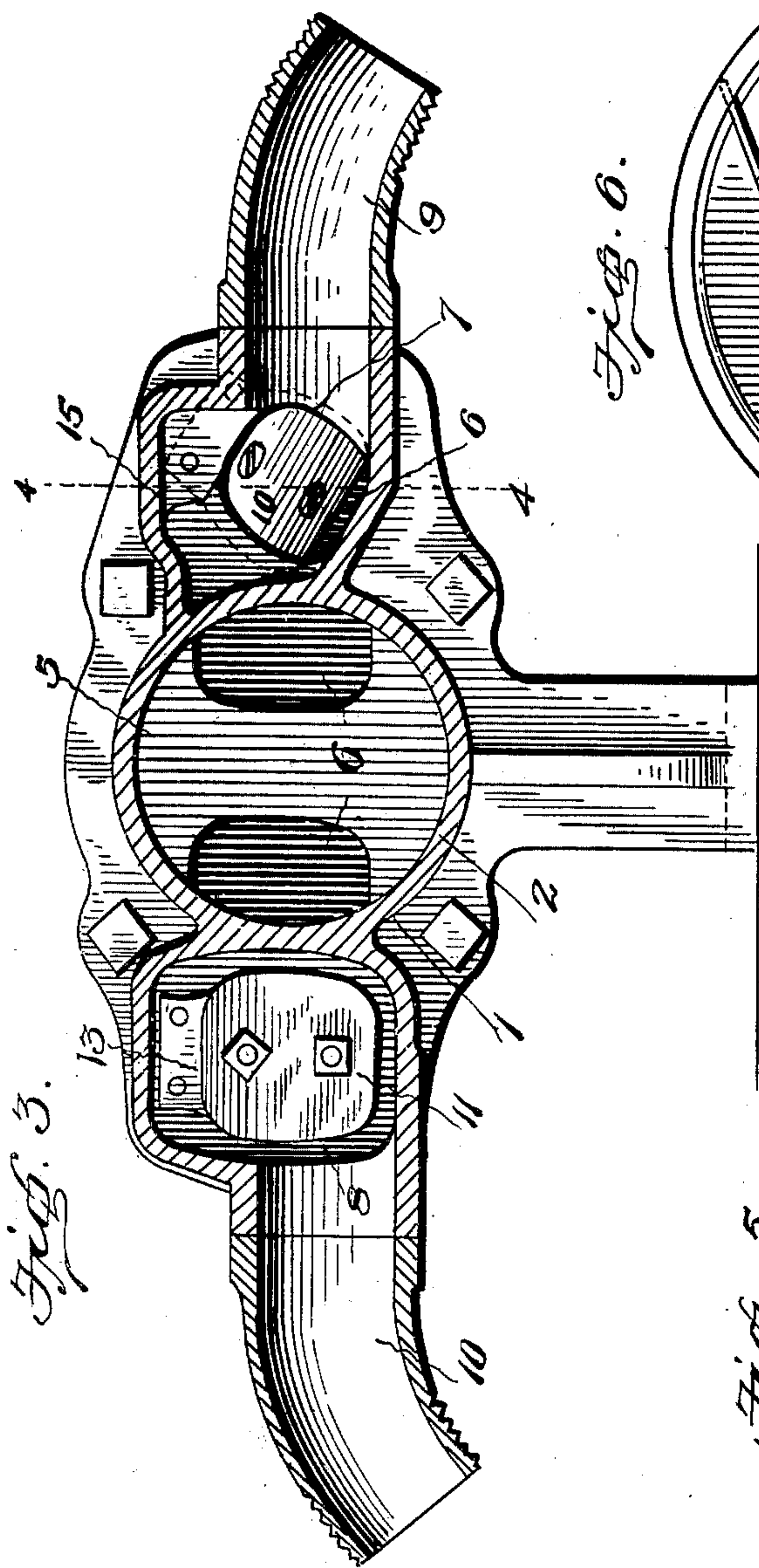
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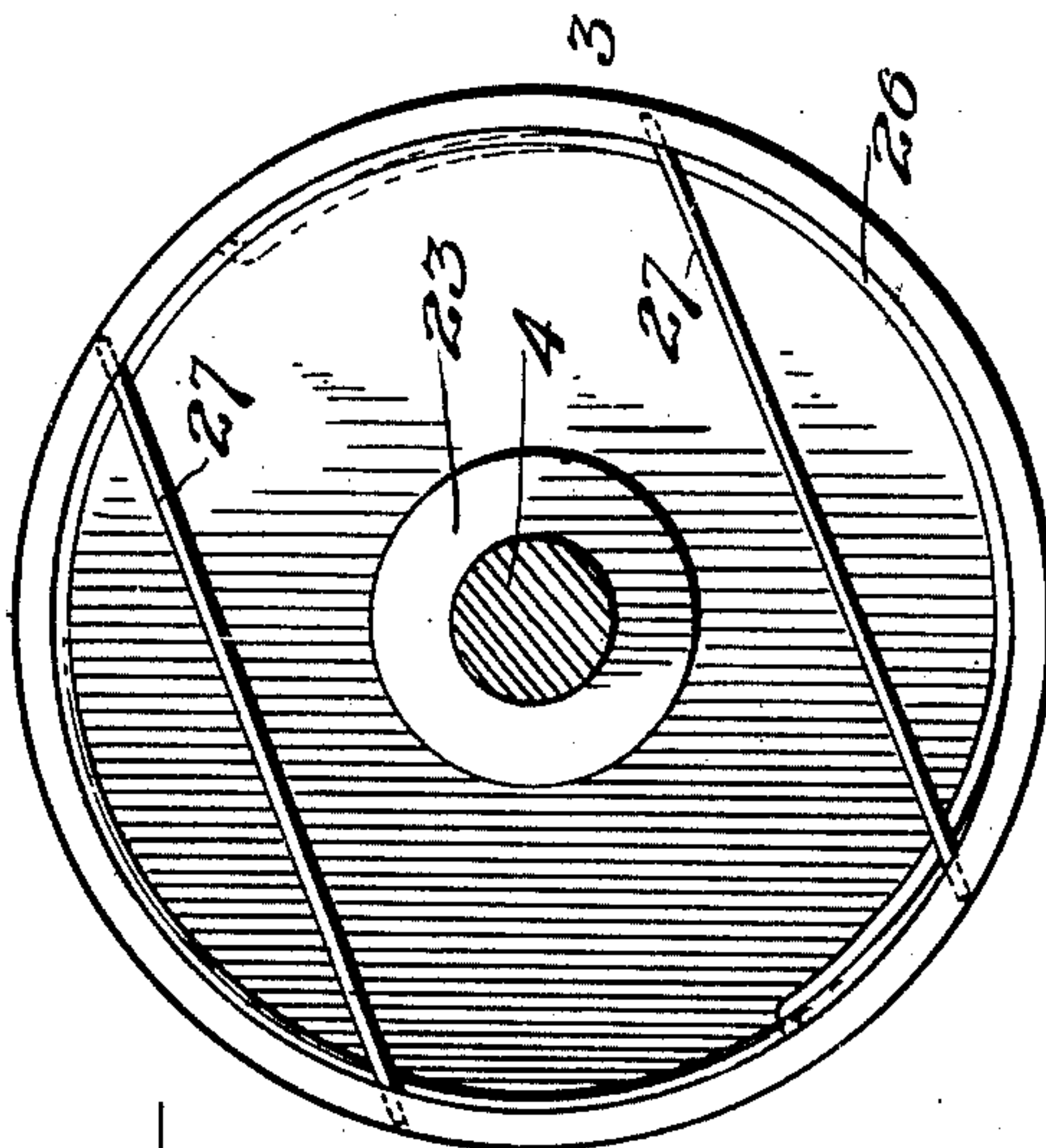
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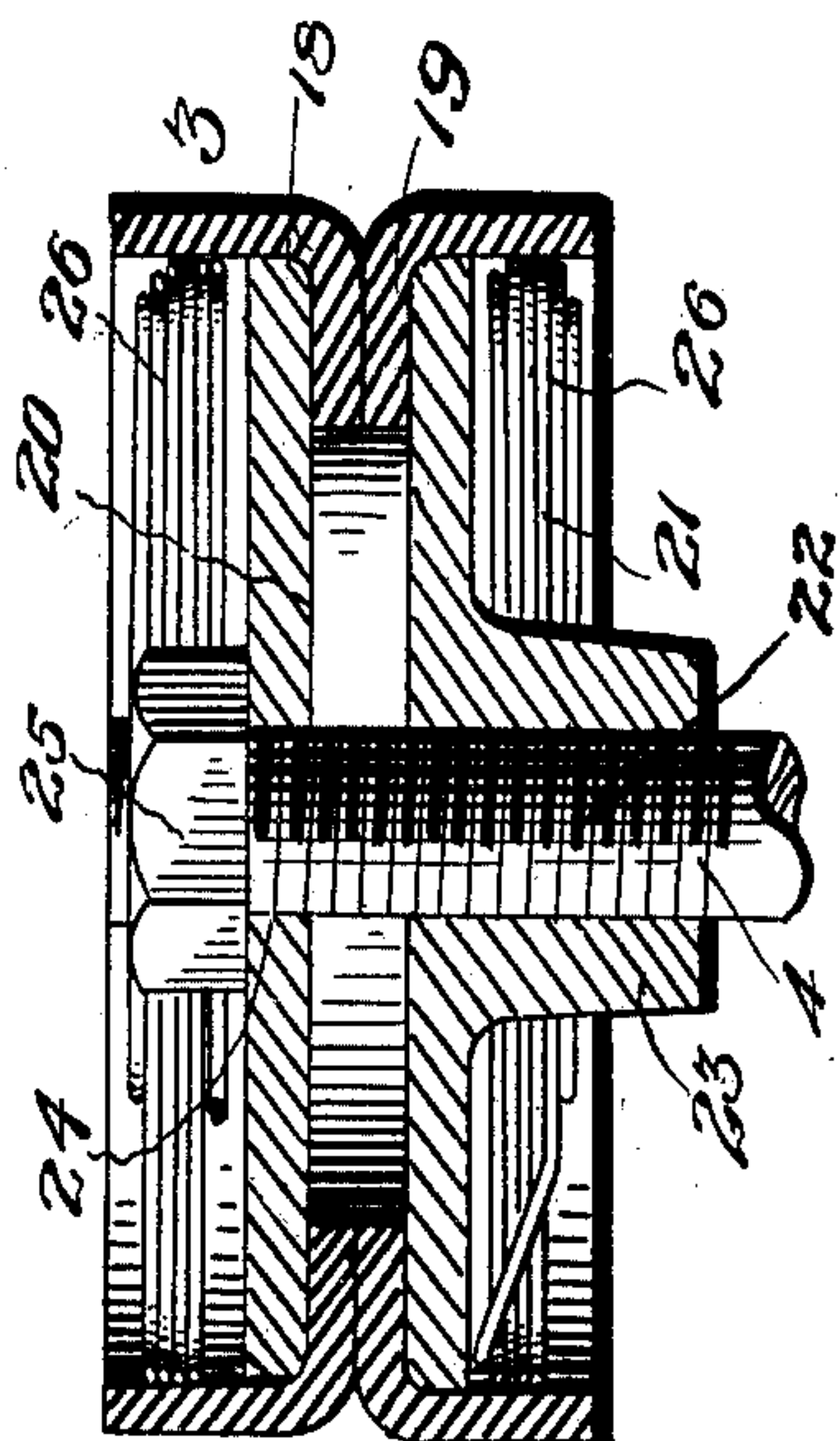
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*Fig. 6.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

GEORGE F. CONNER, OF PORT HURON, MICHIGAN.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 679,454, dated July 30, 1901.

Application filed April 1, 1901. Serial No. 53,912. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE F. CONNER, a citizen of the United States, residing at Port Huron, in the county of St. Clair and State of Michigan, have invented certain new and useful Improvements in Pumps; and I do 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.

This invention relates to improvements in tank-pumps; and its object is to generally simplify and improve the construction and increase the practical efficiency of such pumps.

To this end the invention consists in certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a pump constructed in accordance with my invention. Fig. 2 is a horizontal section of the same on the line 2 2 of Fig. 1. Fig. 3 is a vertical transverse section of the pump on the line 3 3 of Fig. 2. Fig. 4 is a vertical longitudinal section through the pump on the line 4 4 of Fig. 3. Fig. 5 is a sectional view of the pump-piston, and Fig. 6 is an end elevation thereof.

Referring now more particularly to the drawings, the numeral 1 represents the body or casing of the pump, which is horizontally disposed and incloses a centrally-arranged cylinder or piston-chamber 2, in which the piston 3 operates. The body or casing is closed at each end by a head 5, forming valve-chambers 6, which are in communication with water inlet and discharge passages 7 and 8, extending horizontally on opposite sides of the cylinder 2 and corresponding in length to said cylinder. The suction and discharge pipes 9 and 10 are located on opposite sides of the casing 1 and communicate, respectively, with the said inlet-passage 7 and discharge-passage 8. By thus locating the suction and discharge pipes and passages upon opposite sides of the piston cylinder or chamber provision is made for the more convenient attachment of the water supply and discharge connections thereto and for the easier and smoother operation of the pump, as the arrangement of the parts stated and the pro-

longation of the inlet and discharge passages to a length corresponding to the length of said piston cylinder insure a much freer and smoother flow of the water through the pump.

In the valve-chambers 6 are disposed the inlet-valves 10', which open outwardly into said chambers, and in the outlet-passage 8 are disposed the outlet-valves 11, which open inwardly from the corresponding valve-chambers. These valves are fastened to the casing 1 and heads 5, so that they hang perpendicular over the ports at each end of the casing. Each valve consists of a leather disk 12, riveted to the head at 13 and having a metallic backing 14 suitably secured thereto for the purpose of making the leather disk rigid and stiff. These valves hang in a perpendicular position, and the inlet-valves swing out, while the outlet-valves swing in. As shown clearly in Figs. 2 and 4, the inlet or suction valves 10' seat against the ends of the casing 1 and cylinder 2, while the outlet-valves 11 seat against the inner faces of the heads 5. The surfaces against which these valves seat are disposed perpendicularly and on a true plane at each end of the pump, thereby bringing them at right angles to the plane of the casing and cylinder. By mounting the valves in this manner and constructing the seats as stated the valves are adapted to swing with much less resistance and with less power than when made to lift in a perpendicular position, and small particles are less liable to lodge under the valve when working in this position. This construction also avoids the use of valve-seats arranged at an angle, which are objectionable in that they are expensive of construction, liable to retard the flow of any sediment which may be drawn in with the water, and thus tend to cause choking up of the pump, and because of the fact that the gravitative resistance opposed to the swinging of the valve renders the pump less easy and efficient in operation than where my improved construction is employed. With my construction also the ends of the pump-casing and the heads can be planed true and made absolutely accurate, which insures a better and smoother operation of the valves and at the same time tends to prevent clogging of the valves. When the plunger 3 is traveling in one direction, two of the valves



are open and two are closed. When the plunger is traveling in the opposite direction, the valves are reversed, so that those that were open are closed and those that were closed are open. As shown in Fig. 2, when the piston makes its inward stroke the inlet-valve at the outer end of the pump-cylinder and the outlet-valve at the inner end of said cylinder open to allow the water drawn in through the suction-pipe to enter the cylinder and to allow that which has been taken in before by the outward stroke of the piston to discharge through the outlet-passage 8 and discharge-pipe 10. When the piston moves on its outward stroke, the other valves open to allow water drawn in from the suction-pipe to pass behind the piston and to permit the water which has been taken in before upon the back stroke of the piston to pass outward through the outlet-valve controlling the outer end of the passage 8 to discharge through the said pipe 10.

In order to increase the practical efficiency and smoothness of the operation of the pump, the walls of the inlet and outlet passages 7 and 8 are enlarged intermediate of their ends, as shown at 15, to form an air-chamber between each set of inlet-ports and between each set of discharge-ports, which air-chambers are adapted to form cushions against the liquid being pumped, and thus to prevent gushing and cause the liquid to flow in a smooth stream. It has heretofore been customary to employ air-chambers independent of and mounted upon the cylinder, thus disposing them at some distance from the water-passages. By my construction the air-chambers are arranged directly in the water-passages, which is advantageous in that a freer and smoother flow of the water is secured than if the air-chambers were disposed farther away from the valves, whereby the efficiency and ease of operation of the pump are materially increased.

The piston 3 has its stem 4 working in a stuffing-box 16 in one of the heads 5 and connected on the exterior to an operating-lever 17. The said piston comprises in its construction a pair of leather disks 18 and 19, having their inner or meeting edges intumed and clamped between a pair of metallic heads or disks 20 and 21 and their outer or free ends extending at right angles in a reverse direction to form bearing-surfaces which traverse the inner wall of the cylinder 2. The metallic heads or disks 20 and 21 may be secured to the piston-rod 4 in any preferred manner, but preferably by threading the inner end of said rod, as shown at 22, to project through a threaded boss 23 on the head 21 and through an opening 24 in the head 20, a nut 25 being applied to the extremity of said threaded portion to hold the said head 20 in position thereon. By tightening up this nut or adjusting the piston-rod the disks 18 and 19 may be clamped as tightly as desired, and by loosening up said parts said

disks 18 and 19 may be readily removed when worn for the substitution of new disks. To maintain the two bearing-surfaces of the disks 18 and 19 in engagement with the wall of the cylinder, a spiral spring 26 is disposed within the interior of each of said disks and constitutes expanding coils extending spirally around the piston to cause the leather disks to stand out and fill the bore of the cylinder to obviate all liability of leakage. Each coil-spring is kept in position by means of two retaining-wires 27, inserted at their ends in the disks 18 and 19 and extending across the faces of the disks, as clearly shown in Figs. 5 and 6. By this construction a simple and efficient form of piston-head is provided, wherein the parts are mounted so as to secure the best results in preventing leakage and may be readily and conveniently removed for repairs or for the substitution of new parts.

From the foregoing description, taken in connection with the accompanying drawings, the construction and mode of operation of the invention will be readily understood, and it will be seen that the invention provides a pump which embodies desirable advantages in point of simplicity, durability, the readiness with which the parts are adapted to be applied and removed for inspection or repairs, and ease of operation and manipulation as a result of the construction and arrangement of the parts in such manner as to secure a smooth and even flow of water.

While the preferred embodiment of the invention is as herein disclosed, it will of course be understood that changes in the form, proportion, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

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

1. In a double-acting pump, the combination of a casing having a cylinder arranged longitudinally and centrally therein, inlet and discharge passages on opposite sides of and extending parallel with said cylinder, air-chambers formed intermediate the ends of said passages by enlargements of the walls of the passages, the air-chambers being thus formed on the interior of the casing, and inlet and discharge pipes communicating with the passages, substantially as described.

2. In a double-acting pump, the combination of a horizontal casing having a cylinder centrally disposed therein, inlet and discharge passages on opposite sides of and extending parallel with and of the same length as said cylinder, suction and discharge pipes upon opposite sides of the casing and in communication, respectively, with said inlet and outlet passages, the walls of said inlet and outlet passages being enlarged intermediate their ends to form air-chambers independent of said pipes and located upon the interior of the casing, and the said suction and discharge



5 pipes connecting with the casing below said enlargements, valve-chambers at the ends of the casing, and valves controlling the flow of water to and from the inlet and discharge passages and valve-chambers and mounted to hang perpendicularly, the valve-seats being arranged substantially at right angles to the bore of the cylinder, substantially as described.

10 3. In a double-acting pump, the combination of a horizontal body or casing provided with a central horizontal cylinder, inlet and discharge passages on opposite sides of, and extending parallel with, and of the same  
15 length as, said cylinder, the walls of said passages being enlarged intermediate their ends to form air-chambers which are thus located wholly upon the interior of the casing and formed by the walls thereof, removable heads  
20 closing the ends of the cylinder and passages and forming valve-chambers, the outer faces of the end walls of the cylinder and inlet-passage and the inner faces of the end walls of the cylinder and heads at the ends of the out-  
25 let-passage being planed off to true vertical surfaces forming valve-seats, suction and discharge pipes mounted upon the sides of the cylinder and in communication, respectively,

with the said inlet and discharge passages at a point below the air-chamber enlargements 30 thereof, inlet-valves hung perpendicularly in the valve-chambers and opening outwardly into said chambers and adapted to seat against the said outer faces of the end walls of the cylinder and inlet-passage to control 35 the flow of water from the inlet-passage to the valve-chambers, outlet-valves mounted to hang perpendicularly in the outlet-passage and adapted to seat against the said inner faces of the heads of the casing and end walls 40 of the cylinder and to swing inwardly to control the flow of water from the valve-chambers to the suction-pipe, each valve consisting of a metallic backing and a flexible disk secured thereto and having a hinged connec- 45 tion with the cylinder-heads, a piston in said cylinder, and means for operating the piston, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing wit- 50 nesses.

GEORGE F. CONNER.

Witnesses:

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H. B. HOYT.