D. R. TRIPPLEHORN.

COMPRESSED AIR MOTOR FOR PUMPS.

APPLICATION FILED JAN. 17, 1908.

955,296.

Patented Apr. 19, 1910.

2 SHEETS—SHEET 1.

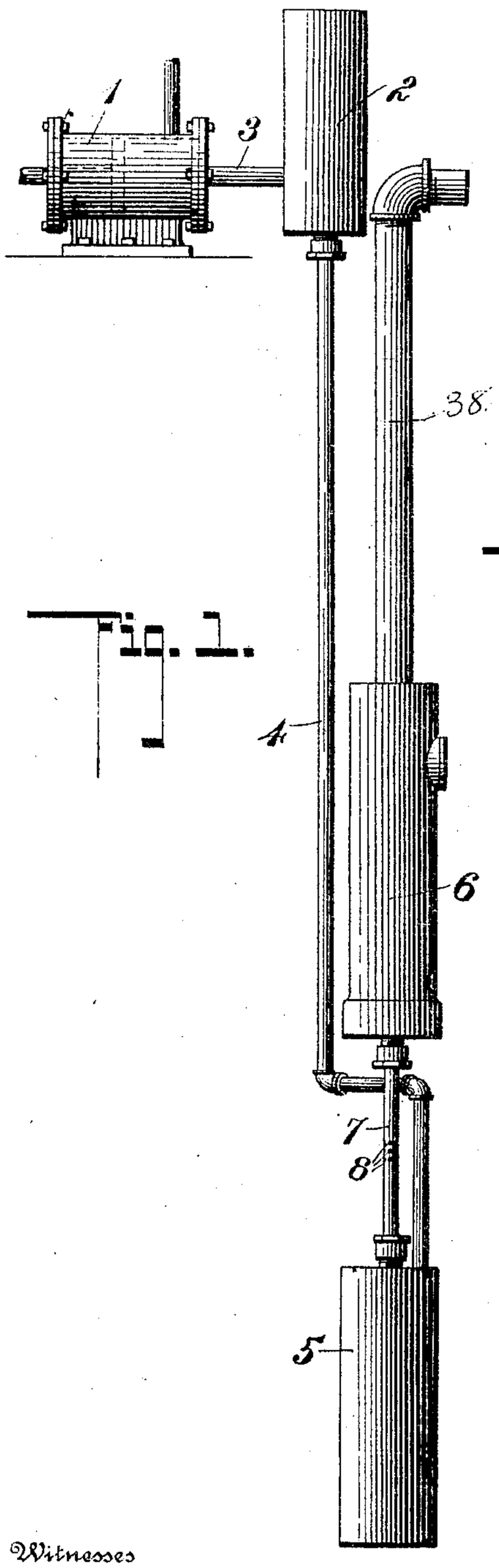

Fig. 1.

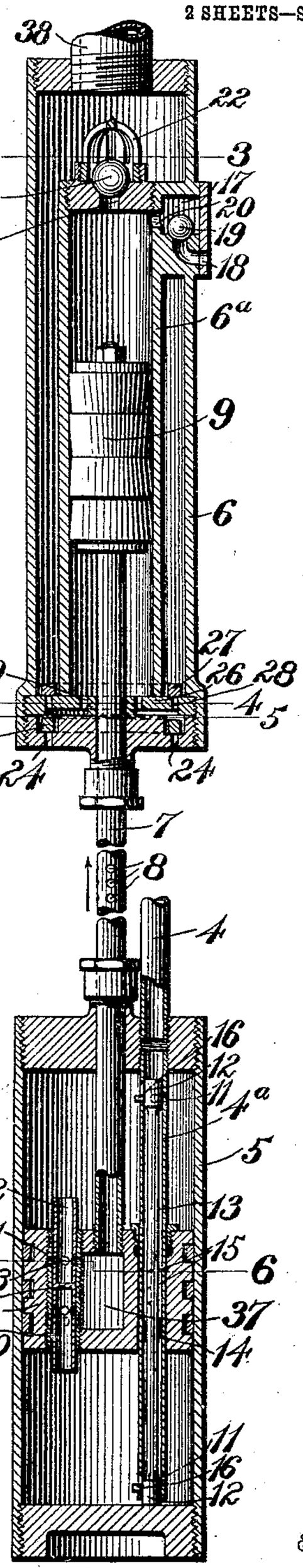

Fig. 2.

Witnesses

Philip H. Burch

E. B. McBath

Inventor

By D. R. Tripplehorn

O'Meara & Brock Attorneys

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Fig. 3.

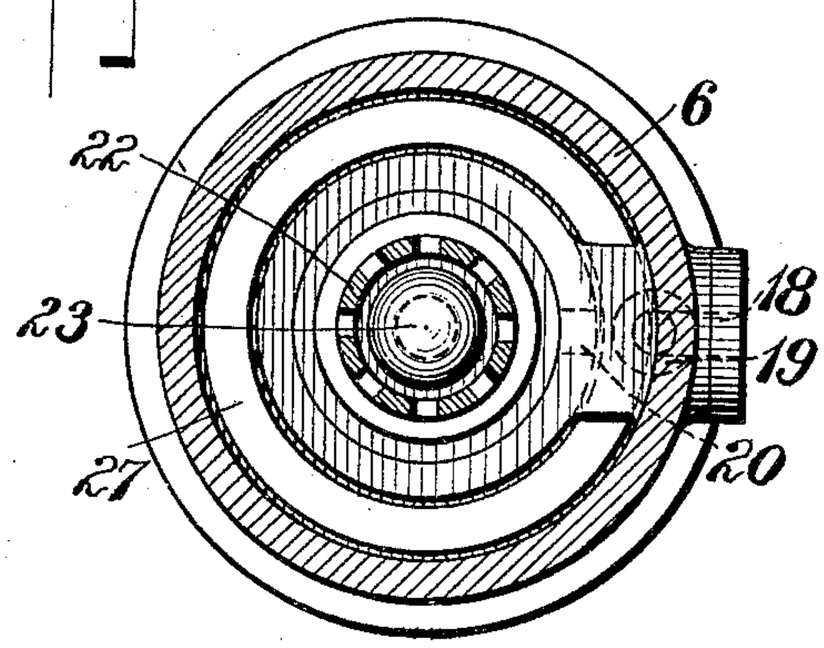


Fig. 4.

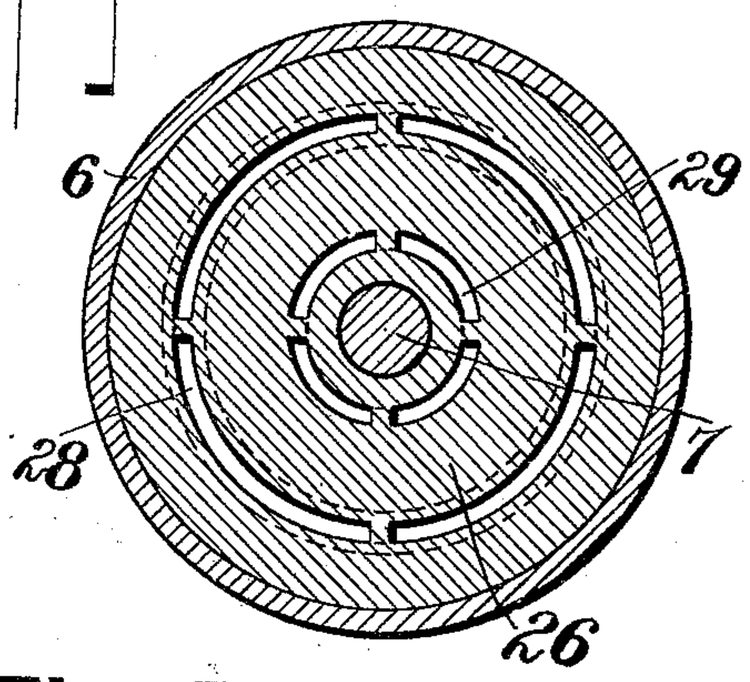


Fig. 5.

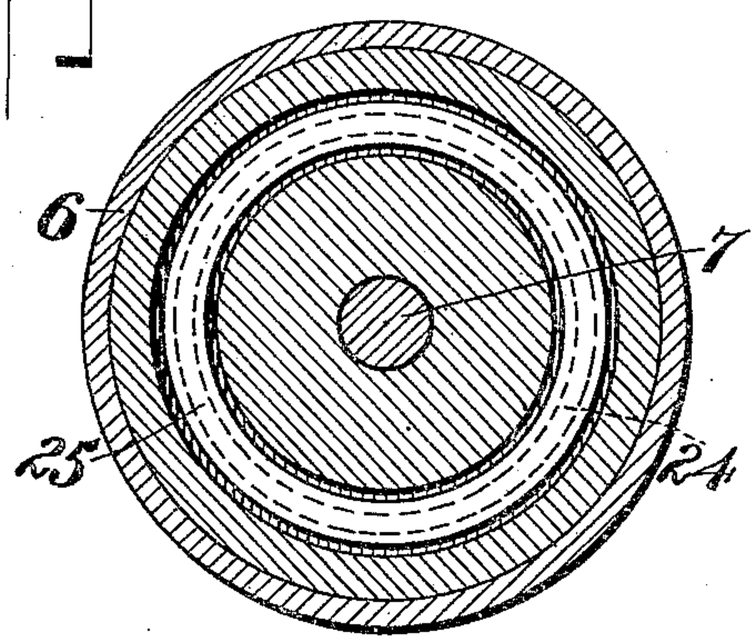


Fig. 6.

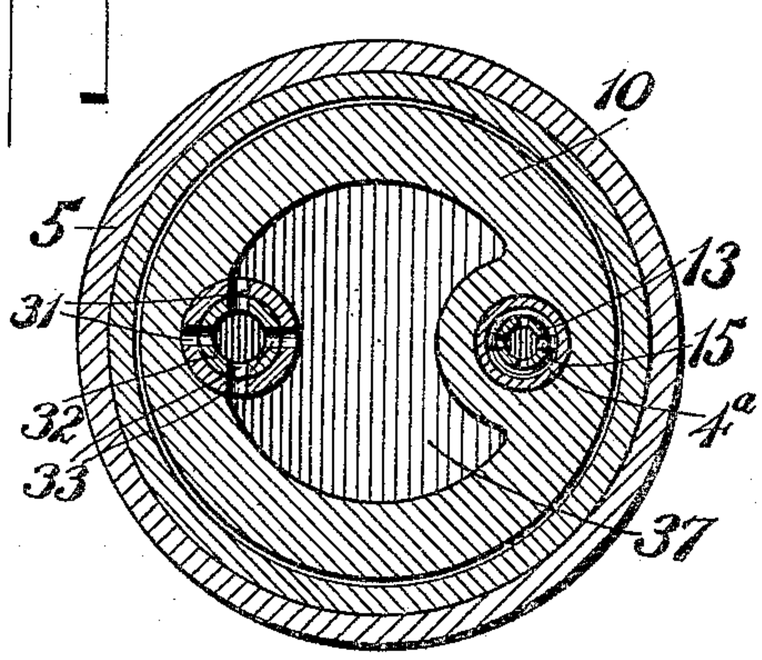


Fig. 7.

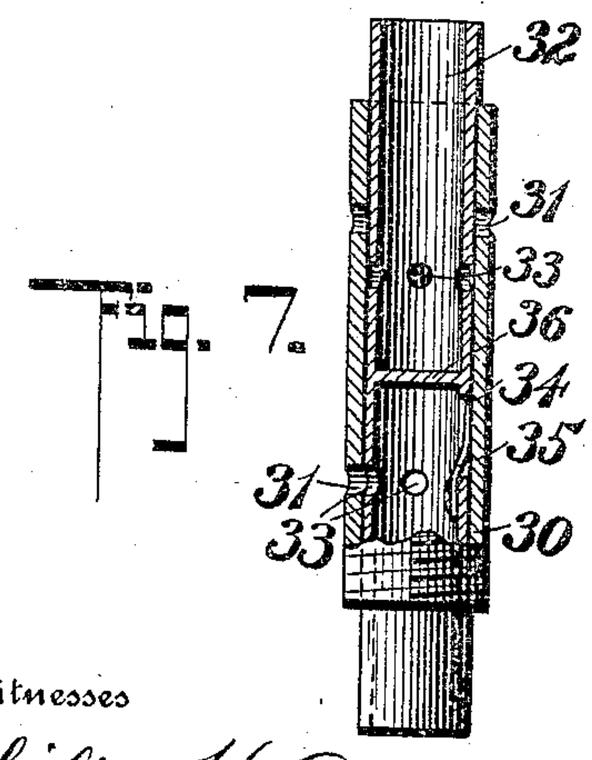
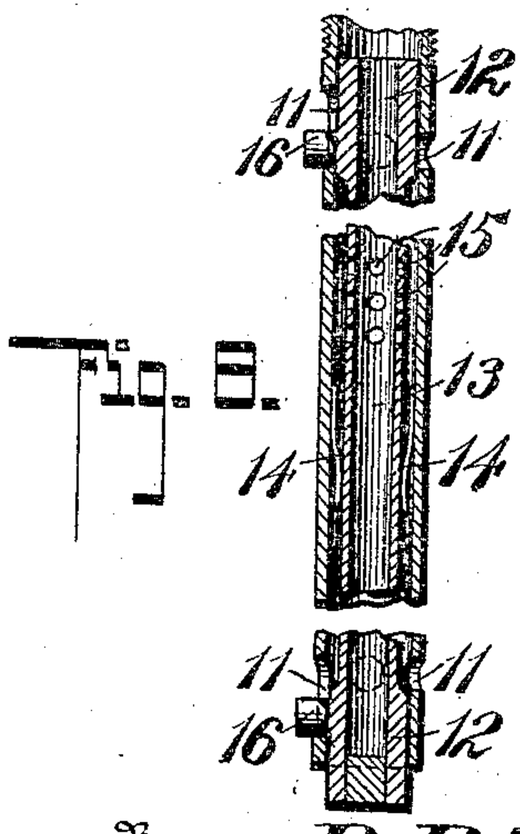


Fig. 8.



Witnesses

Philip H. Burch

E. B. McGrath.

Inventor

D. R. Tripplehorn

By Howard Brock

Attorneys

UNITED STATES PATENT OFFICE.

DAVID R. TRIPPLEHORN, OF FINDLAY, OHIO.

COMPRESSED-AIR MOTOR FOR PUMPS.

955,296. Specification of Letters Patent. Patented Apr. 19, 1910.

Application filed January 17, 1908. Serial No. 411,320.

To all whom it may concern:

Be it known that I, DAVID R. TRIPPLEHORN, a citizen of the United States, residing at Findlay, in the county of Hancock and State of Ohio, have invented a new and useful Improvement in Compressed-Air Motors for Pumps, of which the following is a specification.

This invention relates to a double acting pump intended to be operated by compressed air.

The invention consists of the novel features of construction hereinafter described, pointed out in the claim and shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the complete device. Fig. 2 is a longitudinal section through the pump and working barrel, parts being shown in side elevation. Figs. 3, 4, 5 and 6 are sections on their respective lines on Fig. 2. Fig. 7 is an enlarged longitudinal sectional view showing a cylindrical valve and valve sleeve. Fig. 8 is a detail sectional view through portions of a compressed air pipe showing valves having valve stem therein, said valves and stem being also in section.

In constructing the device I employ any suitable means for compressing air such as a pump 1 which compresses air in a reservoir 2 supplying air to the reservoir by a pipe 3. From this reservoir leads downwardly a compressed air pipe 4 which enters the upper portion of a vertically arranged cylinder 5 forming a portion of the air pump for lifting water and above which is arranged a working barrel 6, within which is a cylinder 6^a, and the two cylinders are connected by a common piston rod 7 perforated as shown at 8 between the cylinders, and carrying at its upper end a plunger 9 which works in the cylinder 6^a of the working barrel, and at its lower end the piston rod 7 is connected to a piston 10 which works in the cylinder 5.

For convenience of manufacturing and assembling the compressed air pipe 4 is formed in sections the last section 4^a being arranged within the cylinder 5 and extending substantially the entire length of the cylinder, communicating with the next adjacent section through the cylinder head, shown in Fig. 2. The section 4^a is provided adjacent its ends with ports 11 and sliding piston valves 12 are adapted to close the said ports. These piston valves are hollow and are connected by a common hollow stem 13. The valves are held against the contraction of gravity by means of springs 14 arranged within the pipe section 4^a and pressing upon the hollow stem 13. These springs act as friction brakes and prevent fall of the valves to their lowest position by gravity. The stem 13 is provided with a series of perforations 15 midway the two valves 12. Pipe section 4^a passes through the piston 10 which slides upon said pipe section. The piston valves 12 are each provided with a piston pin 16 and one of the ports 11 adjacent each valve is lengthened and forms a guide slot in which one of the pins works. These pins are engaged alternately by the piston 10 upon its upward and downward strokes, and as the two piston valves have a common stem movement of one gives the corresponding movement to the other, as will hereafter appear.

The working barrel 6 is provided with a small valve chamber 17 into which leads an inward port 18 and a ball valve 19 is placed in the chamber 17 and serves as a check valve, admitting water from the well into the chamber 17 and thence through an inlet port 20 into the cylinder 6^a. The upper end of the cylinder 6^a is closed by a suitable threaded plug in which is formed an outlet 21 and upon which is mounted a valve cage 22 in which works a ball valve 23 serving as a check valve to prevent reëntrance of water into the cylinders 6^a through the port 21. The lower end of the working barrel 6 is also provided with inlet ports 24, and an annular valve 25 rests upon the upper face of the cylinder head and when seated covers the inlet ports 24. A false head 26 is arranged above but spaced from the annular valve 25 and forms a cylinder head for the cylinder 6^a and also forms a seat for a second annular valve 27, which I will term a ring valve to distinguish from the annular valve 25. The ring valve encircles the cylinder 6^a and closes ports 28 formed in the false head 26. This false head is also provided with ports 29 which give communication between the lower portion of the cylinder 6^a and the compartment formed between the true and the false heads above mentioned, and in which compartment the annular valve 25 works. A short threaded pipe 30 is threaded into the piston 10 and is of the same length as the thickness of the piston and is provided with exhaust ports

31 adjacent its ends. An exhaust valve 32 in the form of a sliding pipe section fits within the pipe 30 and is provided with two sets of ports 33, each set being adapted to register with one of the series of exhaust openings 31. The pipe valve 32 is also cut out as shown at 34 and carries a spring 35 the free end portion of which rests in the cut out portion 34 and bears against the inner face of the pipe 30, thus holding the valve 32 in its adjusted position. This valve is divided into two parts by a solid transverse partition 36 arranged midway its ends. The piston 10 is cored out to form a chamber 37 into which the exhaust ports 31 open. By forming these exhaust ports in annular rings about the pipe 30 two or more of them will always open into the chamber 37 regardless of the number of rotations given the pipe in threading it into the piston. A water supply pipe 38 leads from the upper end of the working barrel 6 and discharges the water at the desired point.

The operation of the device is as follows:—Compressed air entering the pipe 4 will pass into the pipe 4ª and with the parts in the position in Fig. 2 will pass through the upper piston valves 12 and through the stem 13 and will then pass through the lower ports 11 from the under side of the piston 10. The sliding pipe valve 32 being in such a position that it closes the lower series of exhaust ports 31 the compressed air will act upon the piston 10 forcing the same upwardly, and also forcing the plunger 9 in the same direction. As the piston 10 approaches the limit of its up stroke the upper end of the pipe valve 32 will strike the upper end of the cylinder 5 and the piston 10 will engage the pin 16 upon the upper piston valve 12. A slight additional upward movement of the piston brings the lower series of ports 33 of the pipe valve 32 into registry with the exhaust ports 31, permitting the air in the cylinder to exhaust through the chamber 37, piston rods 7 and perforations 8. At the same time the pin 16 will be lifted bringing the upper series of ports 11 into communication with the perforations 15 in the pipe section 4ª, and lifting the lower piston valve so that it will cover the lower ports 11, thus cutting them off from communication with the said ports or openings 15. The air will then enter the upper portion of the cylinder through the upper series of ports 11 and downward movement of the cylinders 10 will commence. In the cylinder 6 the upward movement of the plunger 9 will lift the annular valve 25 and draw in water through the ports 24 and 29. Upon the downward movement of the plunger 9 this water will be forced back through the ports 29 and up through the ports 28 lifting the ring valve 27 and filling the cylinder 6. Also upon the downward movement water will be drawn into the cylinder 6ª through the ports 18 and 20, and upon the second up stroke of the plunger 9 will be forced into the cylinder 6 through the port 21. It will be obvious therefore that a double acting pump is provided forcing water out through the pipe 38 upon both the up and down stroke of the plunger.

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

A motor of the kind described, comprising a cylinder, a hollow piston therein, a hollow piston rod communicating with said piston, a pipe section passing transversely through said piston and provided with exhaust passages communicating with the interior of the piston, a tubular valve open at the ends and slidably held in said pipe, said valve being divided into two non-communicating end portions, each of said portions having an exhaust port adapted by movement of the valve to be brought into communication with one of the passages in the pipe, and an air pipe arranged parallel to and upon one side of the piston rod, said air pipe passing loosely through the piston and extending from one end of the cylinder to the other, and means carried by said air pipe adjacent opposite ends of the cylinder, for regulating admission of air under pressure to the cylinder, said means being operated by engagement with the piston.

DAVID R. TRIPPLEHORN.

Witnesses:
MARTIN MALEY,
VIRA V. STOCKTON.