(No Model.) 2 Sheets—Sheet 1.

R. WELLENS.

BEER PUMP.

No. 385,981. Patented July 10, 1888.

FIG. 5.

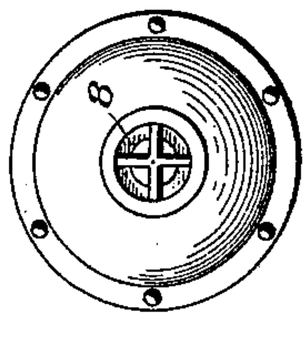


FIG. 6.

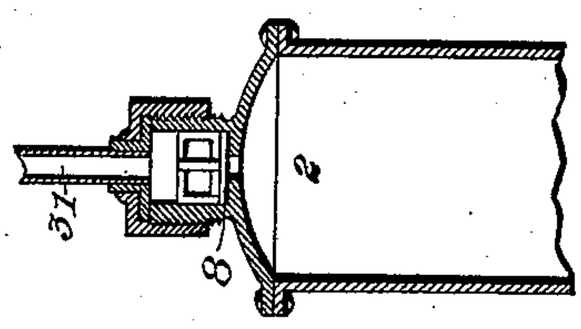


FIG. 2.

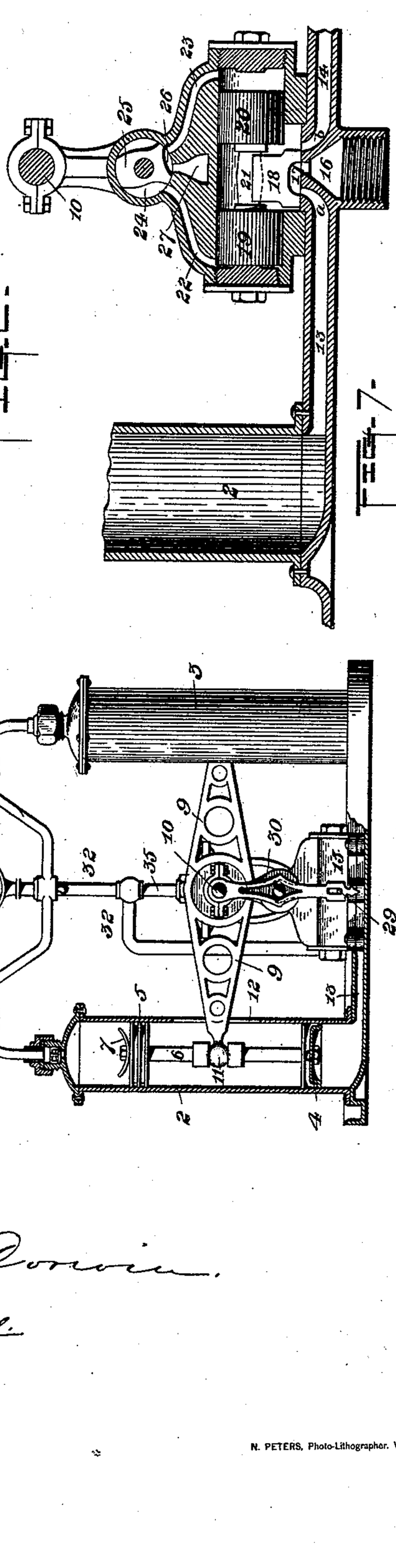


FIG. 3.

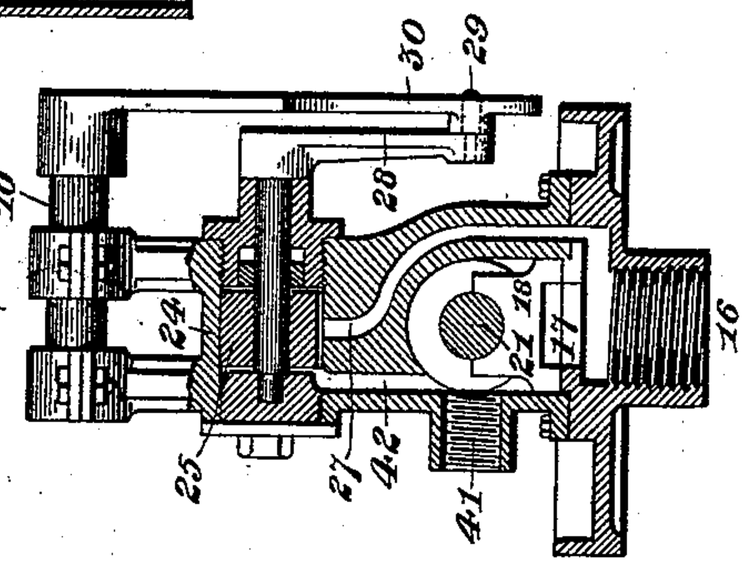


FIG. 7.

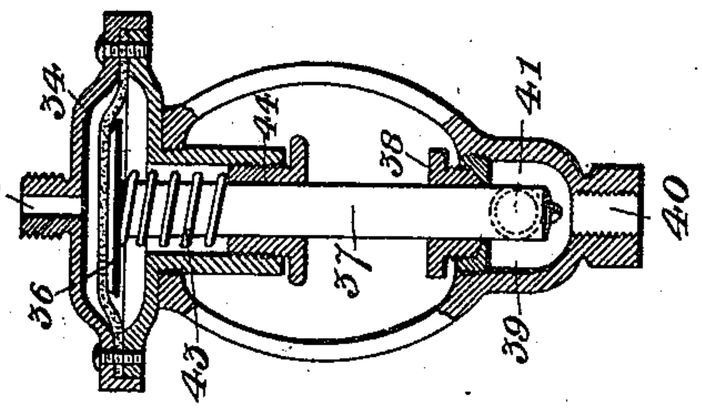


FIG. 1.

FIG. 4.

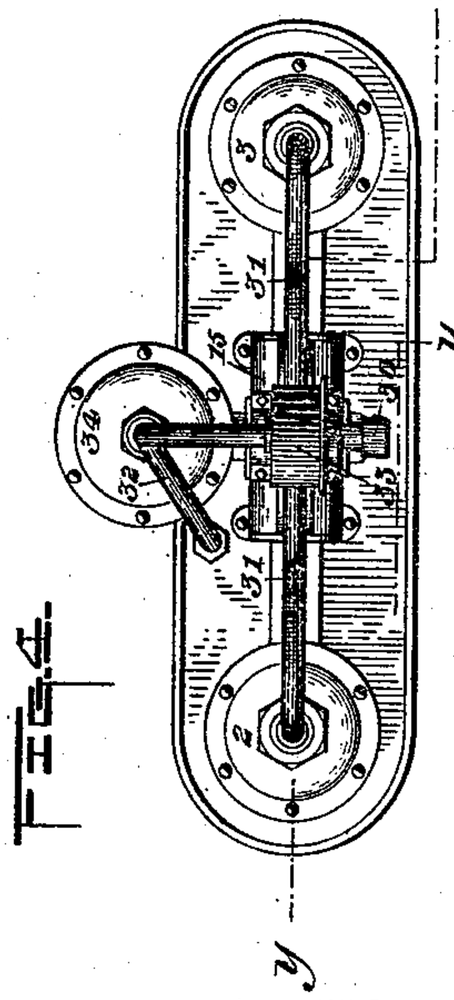
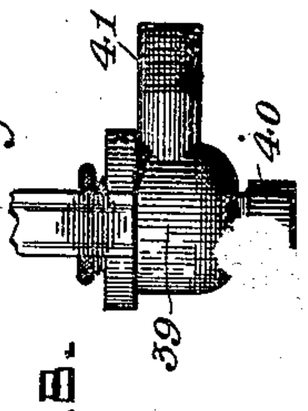


FIG. 8.



WITNESSES.

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(No Model.) 2 Sheets—Sheet 2.

R. WELLENS.

BEER PUMP.

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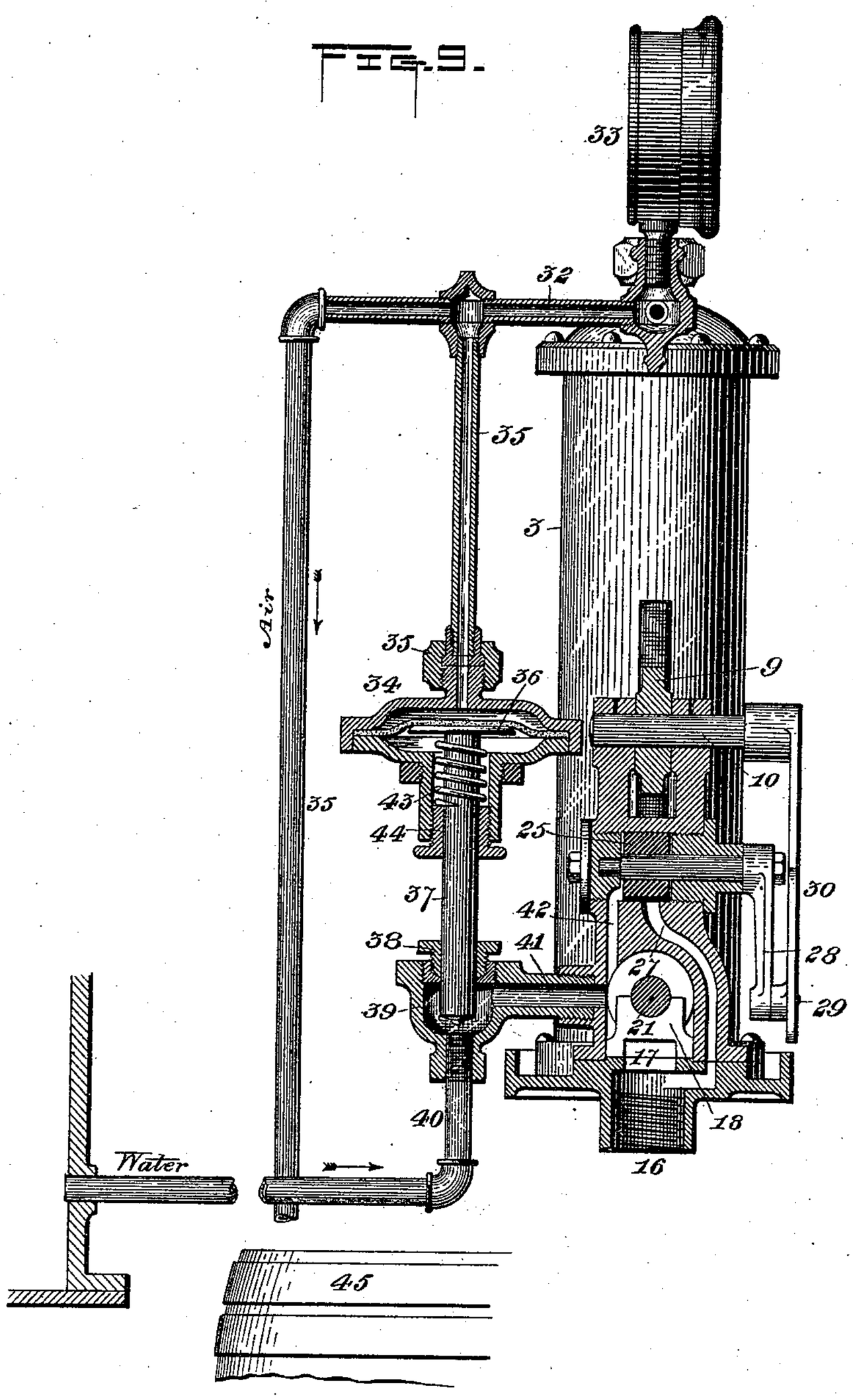
FIG. 9.



WITNESSES.

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INVENTOR.

Robert Wellens

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UNITED STATES PATENT OFFICE.

ROBERT WELLENS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO DUNCAN FERGUSON AND JOSEPH WELLENS, BOTH OF SAME PLACE.

BEER-PUMP.

SPECIFICATION forming part of Letters Patent No. 385,981, dated July 10, 1888.

Application filed March 19, 1888. Serial No. 267,695. (No model.)

To all whom it may concern:

Be it known that I, ROBERT WELLENS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Beer-Pumps; and I do hereby declare the following to be a full, clear, and exact description thereof.

The object of my invention is to provide an improved pump for forcing air into reservoirs for holding beer or other liquids, so as to supply means for discharging the liquid from the reservoir, which pump shall be automatic in its action and shall keep the air-pressure in the reservoir always the same.

My improvements consist, principally, in the mechanism, hereinafter described, by which the water employed to drive the pump is prevented from entering the chamber containing the compressed air and all danger of its entering the reservoir with said air obviated; also in devices by which the pressure of the compressed air in the reservoir is automatically regulated, and, generally, in various details of the apparatus, which I will now describe.

The invention is embodied in apparatus which is shown in the accompanying drawings, wherein—

Figure 1 is a side view of the pump, one of the air cylinders or barrels being in central vertical section on the line *y z* of Fig. 4. Fig. 2 is a vertical longitudinal section on the line *y y* of Fig. 4, showing the valves and the ports through which the water enters to drive the pump. Fig. 3 is a vertical cross-section on the line *x x* of Fig. 2. Fig. 4 is a plan view of the entire pump. Fig. 5 is an enlarged inside plan view of the top of one of the pump-cylinders, showing the check-valve. Fig. 6 is a vertical diametrical section of the upper part of the pump-cylinder and the valve. Fig. 7 is a vertical central section of the regulator and regulating-valve and its connections. Fig. 8 is a side view of the lower part of Fig. 7, showing the adit and exit ports of the regulating-valve. Fig. 9, Sheet 2, is a vertical cross-section of the apparatus on the line *u u* of Fig. 1, showing the connection of the water-supply with the pump and the connection of the air-pumping cylinders with the beer-barrel into which the air is forced.

In Fig. 4 the air-pipe 32 is shown extending at an acute angle to the other parts of the apparatus, and in Fig. 9, for obvious purposes of illustration, I show it at right angles thereto. The position of this pipe in no wise affects its function and is immaterial.

Like symbols of reference indicate like parts in each.

In the drawings, 2 and 3 are the main pumping-cylinders of the pump. The internal construction of each is the same, and is illustrated at the cylinder 2 in Fig. 1.

4 is a piston-head in the cylinder, and 5 is a second piston-head above the head 4. They are connected by a rod or stem, 6. The piston-head 4 is the hydraulic head and is imperforate. The head 5 is the pneumatic piston, and is provided with holes or ports, which are controlled by a flexible flap-valve, 7, mounted on the upper side of the piston-head. This valve is shown in Fig. 1 as being open and uncovering its ports. At the top of the cylinder is a check-valve, 8, which opens upwardly in response to air-pressure from the cylinder below, and shuts downwardly in response to back-pressure. The rods 6 are connected by a pivoted lever or walking-beam, 9, which is centrally fulcrumed at a point, 10, and is pivotally connected with each rod 6 by a ball-joint, 11. This walking-beam passes through vertical slots 12 in the sides of the cylinders. At the bases of the cylinders are passages or ports 13 and 14 for the passage of water to and from the cylinders. The passage 13 leads from the cylinder 2, and the passage 14 from the cylinder 3. These passages extend toward each other and open into a central valve chest or cylinder, 15, through ports *a* and *b*. Between these ports is an exhaust-port, 16.

Within the valve-chest 15 is a slide-valve, 18, which has a connecting-port, 17, adapted to register with the ports *a* and 16, or with *b* and 16, according to the position of the slide-valve. The slide-valve is set between two piston-heads, 19 and 20, which are conected by an intermediate stem or neck, 21. At the ends

of the cylinder 15 are passages 22 and 23, which lead to a chamber, 24, in which is a centrally-pivoted rocking valve, 25, having a notch or passage, 26, wide enough to connect either port 22 or 23 with an exhaust-port, 27, according to the position of the valve. The valve is operated by a lever, 28, keyed to its projecting stem. At the lower end of the lever is a pin, 29, working in a slot at the lower end of a second lever, 30, which is fixed at its upper end to a rotary spindle or shaft, 10, journaled in suitable bearings and keyed to the walking-beam. The lever 30 therefore oscillates with the rocking beam. The exhaust-port 27 extends around to and communicates with the exhaust 16, Fig. 3. At the upper ends of the cylinders 2 and 3 pipes 31 lead to a pipe, 32, which extends to the beer-reservoir 45.

33 is a pressure-gage, which is connected with the pipe 32, and 34 is a regulator-chamber, which is in communication with the pipe 32 through a branch, 35. Inside the chamber 34 is a diaphragm, 36, to the bottom of which is attached a vertical valve stem, 37, which extends down through a stuffing-box, 38, into a chamber, 39, where it controls the adit-port of the water-supply pipe 40, Fig. 7. A passage, 41, leads from the chamber 39 into the cylinder or chamber 15, Figs. 3 and 9, and a branch passage, 42, leads up to the chamber 24.

43 is a coiled spring encircling the stem 37, and bearing at one end on the diaphragm 36 and at the other end on a nut, 44, by screwing which the pressure of the spring on the diaphragm may be regulated.

The operation is as follows: Suppose that the nut 44 is screwed up to such a point that it requires, say, ten pounds pressure on the upper side of the diaphragm 36 to force the valve 37 down to its seat against the pressure of the spring. The communication of the diaphragm-chamber with the beer-reservoir causes the pressure on the latter to be constantly exerted on the diaphragm, and when that pressure exceeds ten pounds the valve 37 will be held to its seat; but when the pressure falls below that point the spring will raise the valve and diaphragm, so as to open the water-passage 40. Suppose the parts to be in the position shown in the drawings. Their action is as follows: The water flows from the pipe 40 through chamber 39, pipe 41, and into the cylinder 15, and a branch stream flowing to the valve-chamber 24 through the passage 42 passes through the passage 22 into the valve-cylinder 15, back of the piston-head 19, and moves the heads 19 and 20 and the interposed slide-valve 18 to the right, so as to uncover the port *a* and to connect the ports *b* and 16, at the same time forcing the water back of the piston 20 through the passage 23 and into the exhaust 27. The water then passes through the pipe 13 into the base of the cylinder 2, and raises the piston-head 4, so as to force air into the reservoir by means of the air-piston 5. The motion of the walking-beam 9 thus caused depresses the piston-heads 4 and 5 in the other cylinder, 3, causing air to pass through the slot 12 and the valve-ports in the head 5 into the upper part of the cylinder, and forcing the water below the piston 4 through the pipe 14 and through the connecting-passage 17 into the exhaust 16. When the piston-head 5 in the cylinder 2 reaches the end of its upstroke, the rotation of the spindle 10 will have (through the levers 30 and 28) reversed the valve 25, so as to connect the passage 22 with the exhaust 27 and to uncover the passage 23. The branch stream of water then flowing through the passage 23 moves the piston-heads 20 and 19 and the slide-valve 18 to the left, so as to connect the ports *a* and 16 and to uncover the port *b*, as shown in Fig. 2. The main stream of water then flows through the passage 14, so as to raise the piston-heads in the cylinder 3 and to pump air from it into the reservoir, while the cylinder 2 exhausts water through the pipe 13. In this way the motion of the pump is kept up, air being pumped from each cylinder alternately until the pressure in the reservoir reaches ten pounds, when the diaphragm 36 will be forced downward, so as to seat the valve 37 and to cut off the supply of water. The pump then necessarily stops until the pressure in the reservoir again falls, when it begins to work again.

The pump is entirely automatic in its action, and is so simple in its construction that it will continue to run for a long time without attention and without need of repair.

It will be noticed that in each of the cylinders 2 and 3 there are two piston-heads, 4 and 5, which are connected by a single piston-rod, but are separated by an intervening space. The lower piston-head is the piston of the hydraulic motive engine, and the upper head forms the piston of the air-pump, and as both are single-acting it is not possible for water to leak past the hydraulic piston-head and to enter the air-compression chamber, because any water which might so leak past the lower piston-head would escape harmlessly from the space intervening between them. This is one of the distinguishing features of my invention, and is of great importance, because it affords all the benefits of a double-acting pump, and yet altogether removes the danger, which has been present in prior pumps of this kind, of the water getting access to the beer and spoiling it.

I claim—

1. As an improvement in beer-pumps, the combination of the hydraulic piston-heads and pneumatic piston-heads situate within suitable cylinders having intervening vents, so as to prevent water escaping from the hydraulic piston from passing the pneumatic piston-head, said piston-heads being connected with each other by piston-rods and a walking-beam, a water-conduit leading to the cylinders back of the hydraulic heads, a valve

controlling the water and connected with the walking-beam, a pneumatic conduit leading from the cylinders above the pneumatic piston-heads to a beer-reservoir, and a valve arranged to admit air above the pneumatic piston-heads on the back-stroke of the same, substantially as and for the purposes specified.

2. In a beer-pump, the combination, with the two cylinders, each containing hydraulic and air piston-heads connected by a rod, of a beam connecting the rods, a hydraulically-operated main valve, which controls the flow of water to the cylinders, and an auxiliary valve, which controls the flow of water to operate the main valve, said auxiliary valve being connected with and operated by the said beam, substantially as and for the purposes specified.

In testimony whereof I have hereunto set my hand this 13th day of March, A. D. 1888.

ROBERT WELLENS.

Witnesses:
W. B. CORWIN,
THOMAS W. BAKEWELL.