No. 684,473. Patented Oct. 15, 1901.

D. SVENSON.

DIRECT PRESSURE PUMP.

(Application filed Nov. 30, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

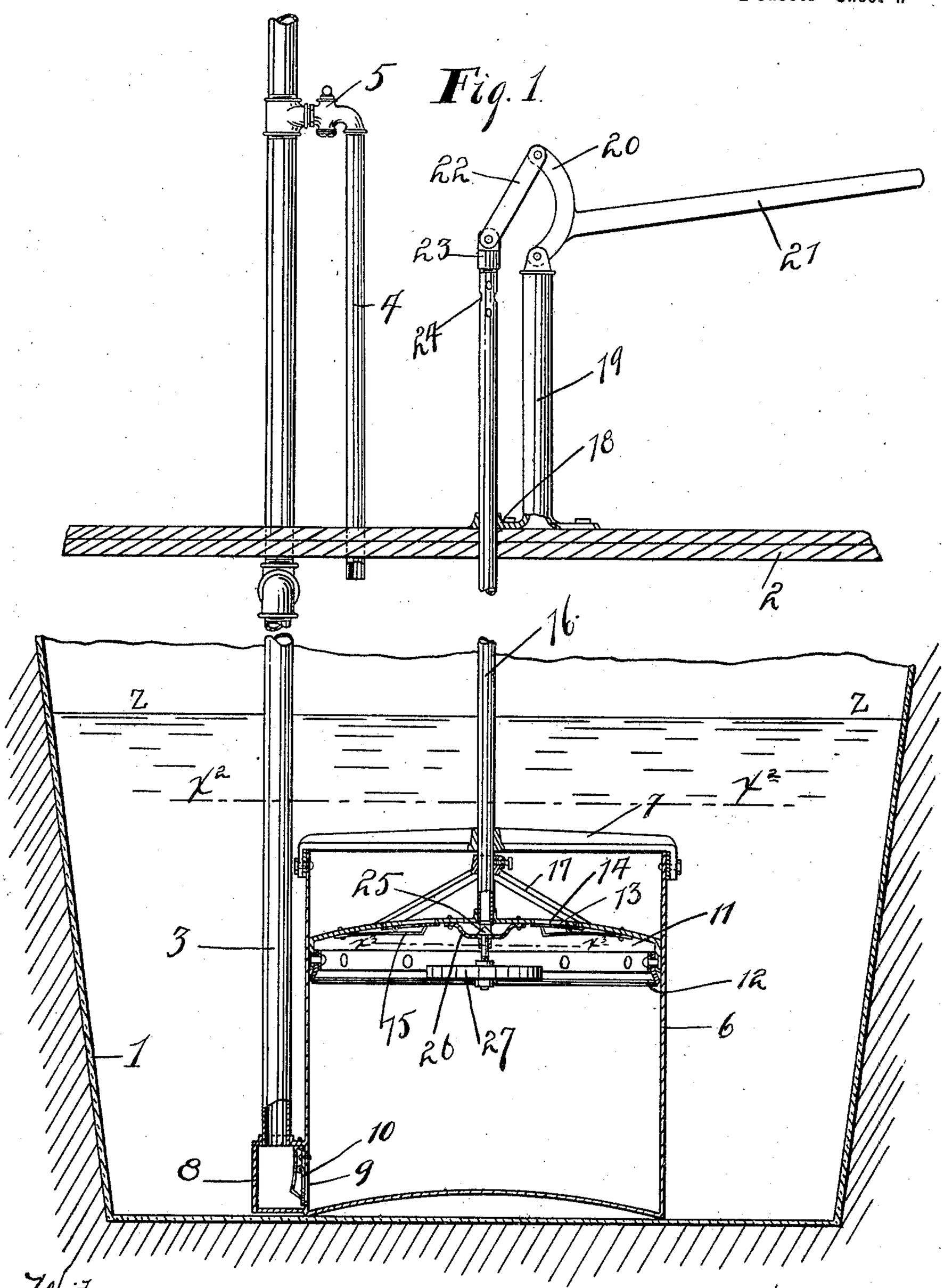

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Fig. 2.

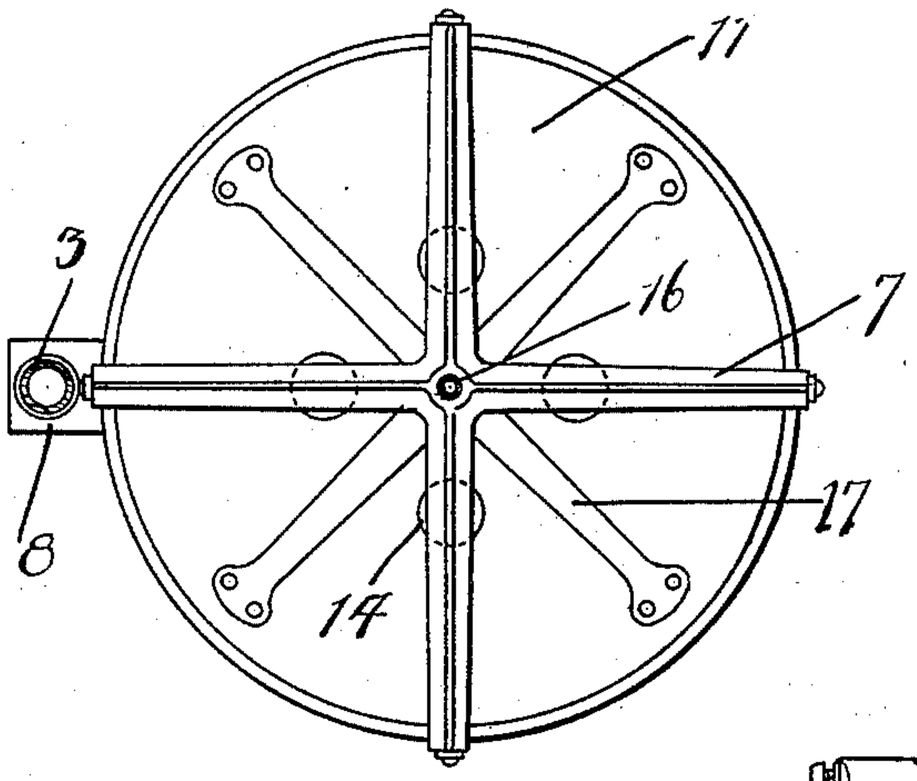


Fig. 3.

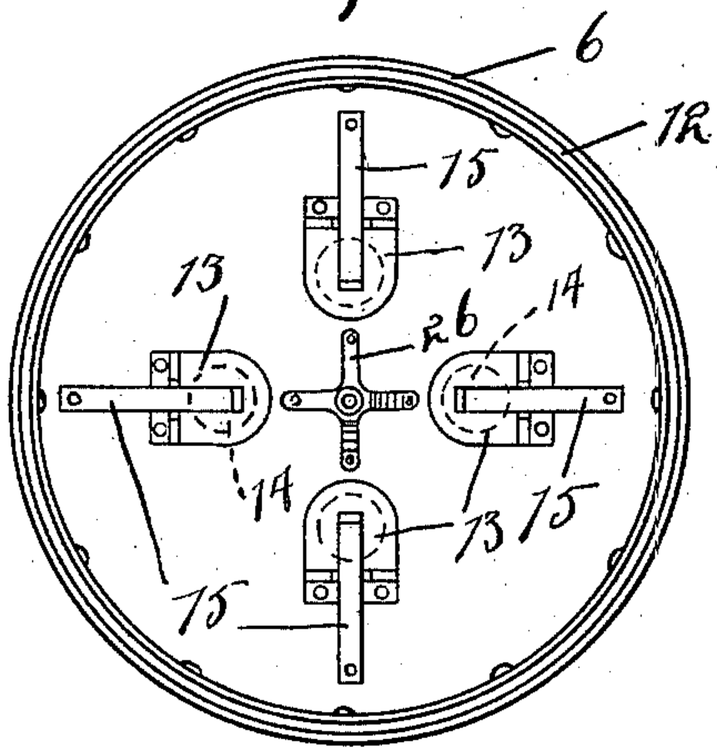
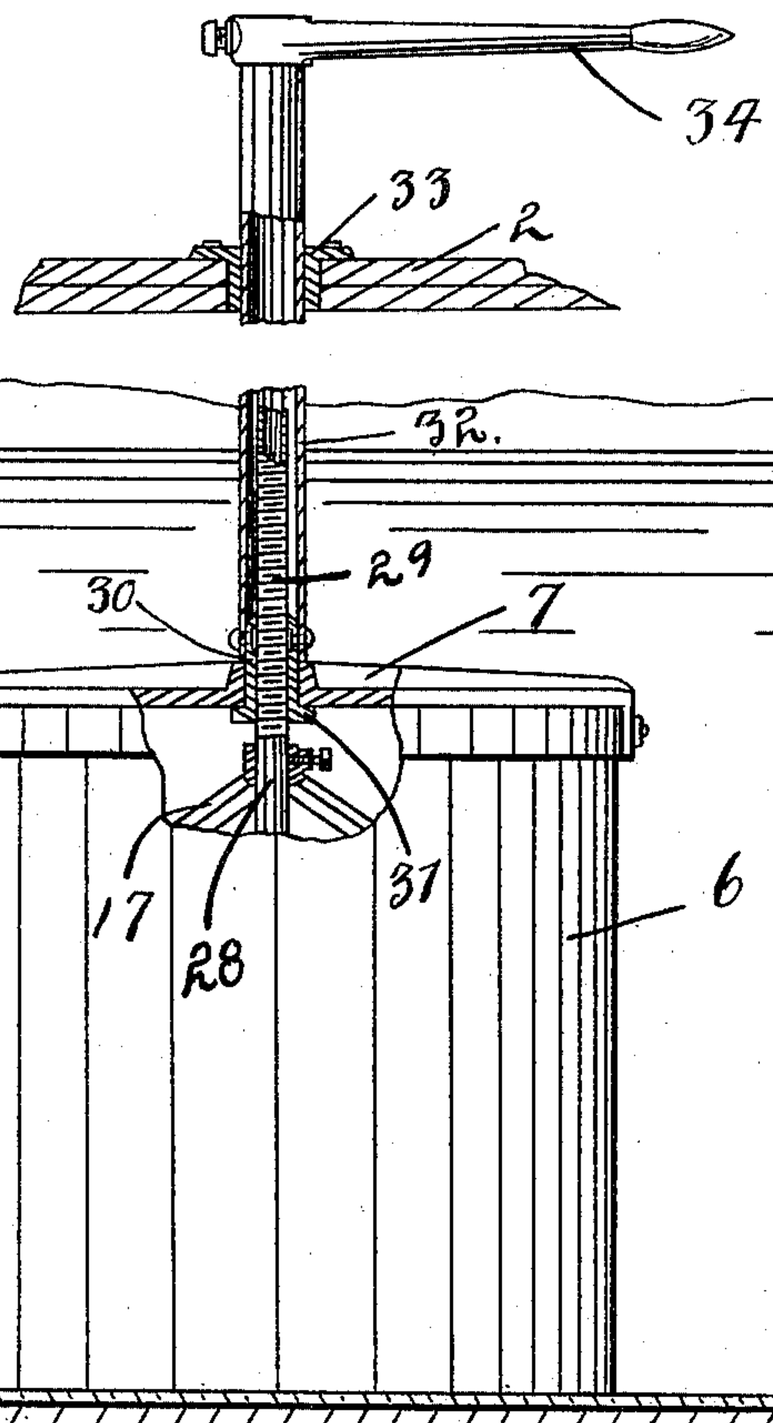


Fig. 4.



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UNITED STATES PATENT OFFICE.

DANIEL SVENSON, OF TWIN VALLEY, MINNESOTA.

DIRECT-PRESSURE PUMP.

SPECIFICATION forming part of Letters Patent No. 684,473, dated October 15, 1901.

Application filed November 30, 1900. Serial No. 38,129. (No model.)

To all whom it may concern:

Be it known that I, DANIEL SVENSON, a citizen of the United States, residing at Twin Valley, in the county of Norman and State of Minnesota, have invented certain new and useful Improvements in Direct-Pressure Pumps; 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 present invention has for its object to provide an improved direct-pressure pump, and is especially intended for use for pumping water from cisterns, wells, and other sources of water-supply to elevated tanks located within or adjacent to houses, barns, &c.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claim.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a view principally in section, but with some parts shown in full, illustrating my invention as applied to pump or elevate water from a cistern. Fig. 2 is a horizontal section on the line x^2 x^2 of Fig. 1. Fig. 3 is a horizontal section on the line x^3 x^3 of Fig. 1 looking upward; and Fig. 4 is a view corresponding somewhat to Fig. 1, but illustrating a modified construction of the device for actuating the pump.

The numeral 1 indicates a cistern containing water approximately to the level indicated at *z*, although the altitude of the water may of course vary to any extent as long as it remains above the cylinder and the piston of the pump.

The numeral 2 indicates the floor of a building, and the numeral 3 indicates a vertical pipe which extends from the bottom of the cistern upward to an elevated tank, (not shown,) which we may assume to be located in the upper portion of a building. This pipe 3 is shown as provided with a draining-pipe 4, which is normally closed by a valve 5.

The numeral 6 indicates a large cylinder provided at its upper end, as shown, with a spider-like bracket 7. At its lower end the cylinder 6 opens directly into a valve-box 8 through a passage 9. This passage 9 is normally closed by a check-valve 10, which permits the outflow of the water from the same, but prevents a return flow. The valve-box 8 opens directly into the lower end of the water-pipe 3. A piston 11, afforded by a large head having a cylindrical flange, works within the large cylinder 6. To form a tight joint between the piston and the cylinder under the downstroke of the former, a flexible annular packing-strip 12 is preferably applied to the flange of said piston. The piston is provided with a plurality of check-valves 13, which normally close the passages 14, but are adapted to open up under the upward movement of the piston to permit water to flow under the action of gravity into the cylinder 6 through said perforation. As shown, the check-valves 14 are subject to light springs 15. A hollow pump-rod, afforded by a pipe 16, opens axially through the piston 11 and is rigidly secured thereto by a spider-bracket 17. The said pump-rod 16 works freely through the hub portion of the bracket 7, which, as previously noted, is secured to the upper open end of the cylinder 6. Further, as shown, the pump-rod 16 extends upward through the floor 2 and is afforded a bearing by a part 18 of the standard 19, secured on the said floor 2. In this illustration the head or arm 20 of a pump-handle 21 is pivoted to the upper end of the standard 19 at one end and is connected at its free end by a link 22 to a cap 23, secured on the upper end of the said hollow pump-rod 16. At some suitable point, which is always above the level of the water *z*, the pump-rod 16 is perforated, as shown at 24, to afford air-passages to the interior of said pump-rod and through the same to the interior of the cylinder 6.

A check-valve 25, the stem of which is loosely mounted in a small bracket 26, secured on the under surface of the piston 11, is adapted to open and close the lower end of the hollow pump-rod or air-inlet pipe 16. A float 27 is secured to the depending end of the stem of the check-valve 25.

The operation of the pump above described will be substantially as follows: By means of the pump-handle 21 it is of course evident that the piston 11 may be reciprocated upward

and downward within the cylinder 6. It is also evident that when water within the cylinder 6 reaches the altitude of the float 27 it will raise the said float and cause the check-valve 25 to close the lower end of the hollow piston-rod 16, so that neither air nor water can escape through the said pump-rod. Hence under the downstroke of the piston the water from the cylinder finds its only escape through the opening 9, and hence is forced upward through the distribution-pipe 3 and delivered to the elevated tank. (Not shown.) Under the upward movement of the piston the valves 13 open up to permit the water from the cistern to run, under the action of gravity, into the cylinder 6 through the ports or passages 14. Also under this upward movement of the piston the check-valve 25 is permitted to open, so that air is free to flow into the cylinder 6 below the piston and above the water therein contained. This inflow of air permits the piston to be raised with very much less resistance than would be offered if an air-vent of some kind were not provided. This is especially true when the piston is moved upward rapidly. However, when the piston reaches its extreme uppermost position water will continue to flow through the ports 14 into the cylinder, and the air which is displaced thereby finds a ready escape upward through the hollow pump-rod 16 until the water in the said cylinder reaches the altitude of the float 27, whereupon the said float will be raised by the rising column of water and will cause the check-valve 25 to close the lower end of the said pump-rod 16. The pump is then in proper condition for the pumping action under the downstroke of the piston.

Fig. 4 illustrates a modified construction of the piston-actuating device, which, while much slower in its action than the device illustrated in Fig. 1, is correspondingly more powerful. This device is intended for use where a very large cylinder and piston are employed or where the water is to be forced to a very great height. This modified device comprises a short pipe 28, which is substituted for the so-called "pump-rod" 16 of the previously-described construction. This pipe 28 is provided with screw-threads 29, on which a nut or threaded sleeve 30 works. The nut 30 is loosely mounted in the hub of the bracket 7 and is provided with a flange 31, which engages below said bracket 7 to resist the upward thrust thereon. The pipe 28 terminates at such altitude that its open upper end will always be above the level of the water *z*. To the upper end of the nut or threaded sleeve 30 the lower end of a pipe 32 is rigidly secured. This pipe 32 surrounds the pipe 28, extends upward through a suitable bearing 33 in the floor 2, and is provided at its upper end with an operating-lever 34. With this construction it is evident that the piston 11 may be raised and lowered by rotating the pipe 32, its lever 34, and nut 30. Otherwise than as above described the construction illustrated in Fig. 4 may be the same as that illustrated in Figs. 1 to 3, inclusive.

It will of course be understood that the device above described is capable of many modifications not herein specifically indicated and is capable of use for a very large range of work. The cylinder and piston of the pump may of course be located in any body of water, such as a river or lake.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

The combination of a cylinder and piston located below the level of the water or liquid to be elevated, which piston operates to elevate the water under its compression-stroke, one or more valved inlet-passages opening into said cylinder through said piston from below the level of the water in which it is submerged, an air-inlet passage opening into said cylinder, through said piston from above the said liquid, and a check-valve controlling said air-inlet passage, and provided with a float by means of which it is closed when the liquid in said cylinder approaches said piston within a predetermined limit, substantially as described.

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

DANIEL SVENSON.

Witnesses:
MABEL M. MCGRORY,
F. D. MERCHANT.