No. 640,399. Patented Jan. 2, 1900.

W. MILLER.

PUMP.

(Application filed Mar. 28, 1896.)

(No Model.)

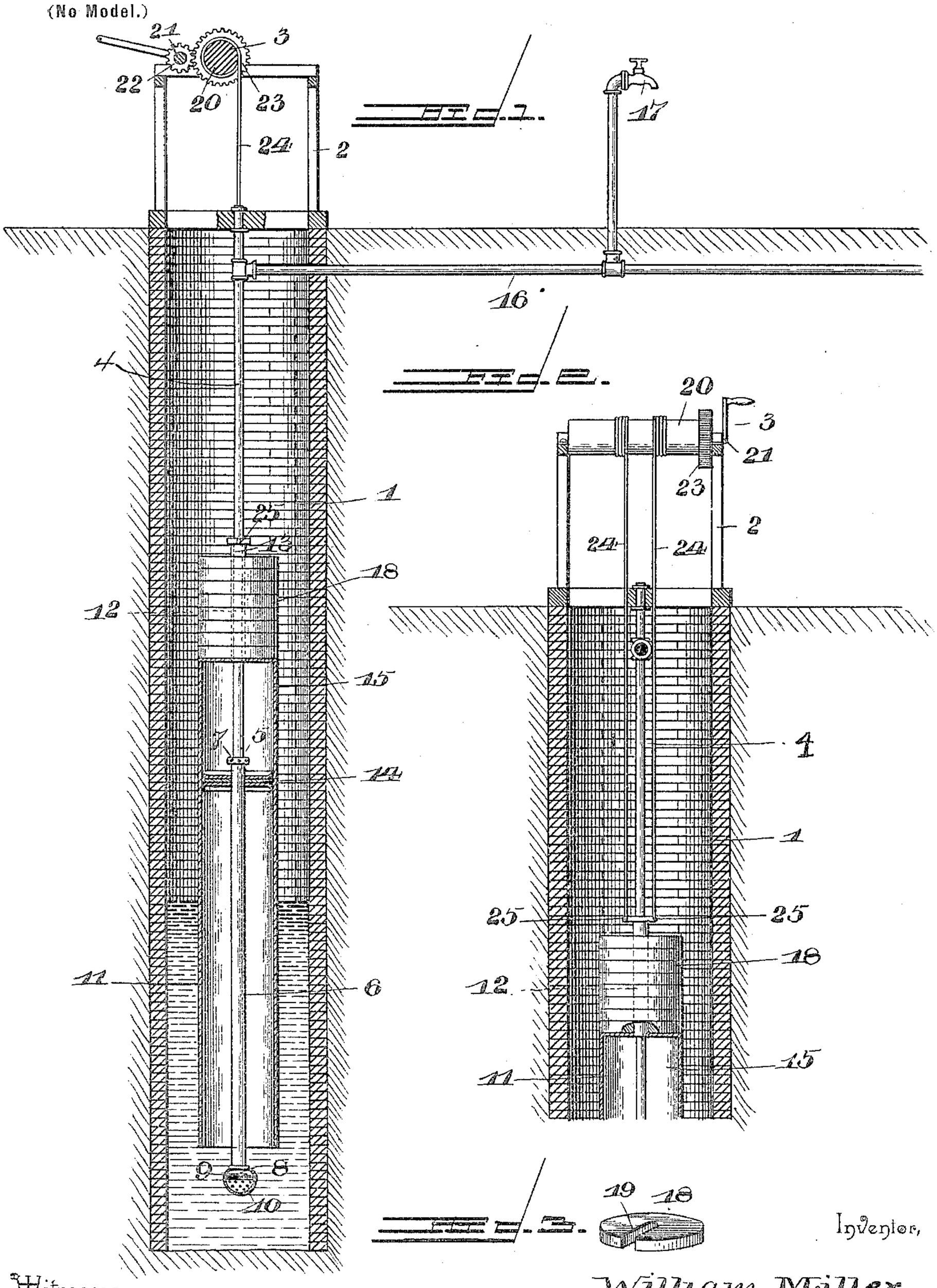

FIG. 1.

FIG. 2.

FIG. 3.

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WILLIAM MILLER, OF THOMASVILLE, GEORGIA.

PUMP.

SPECIFICATION forming part of Letters Patent No. 640,399, dated January 2, 1900.

Application filed March 28, 1896. Serial No. 585,268. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MILLER, a citizen of the United States, residing at Thomasville, in the county of Thomas and State of Georgia, have invented a new and useful Pump, of which the following is a specification.

My invention relates to pumps, and particularly to a device for elevating and storing water in a suitable receptacle within a well, from which it is subsequently discharged, as required, by means of a constant pressure without further manipulation of the apparatus.

In my improved water-elevating apparatus I employ a single fixed conductor, which, in connection with a peculiar form of valveless coupling, serves the dual purpose of a feed-pipe to a reservoir-chamber and as a discharge-pipe to a distributing pipe system; and the elements of my system are arranged for operation to require a single foot-valve at the receiving extremity of the fixed conductor which is immersed in the well. The working elements of the system combine extreme simplicity, require but a few parts, and are readily adjustable to vary the pressure in the discharge length of the conductor.

Prior to my invention it has been proposed to employ a reciprocating cylinder in connection with various forms of pipes and valves to effect the elevation and discharge of water from a well to a distributing system; but so far as I am aware a water-elevating system has not been devised in which alined sections of piping forming a fixed conductor have been united by a coupling which is provided between the meeting ends of the pipes with radial ports that open into a reservoir-chamber in the upper part of a reciprocating cylinder, one length or pipe of the conductor being immersed in the well and adapted to convey water to the coupling for discharge by the ports thereof into the reservoir-chamber of the cylinder, while the other length or pipe of the conductor is arranged to receive water through the ports in the coupling from the reservoir-chamber of the cylinder and convey the water so received to the distributing-pipes. The single coupling is thus made to serve a two-fold purpose in uniting the lengths or pipes of the conductor and as a means for communication of the conductor with the reservoir-chamber of the cylinder, such ports serving both as inlets and outlets for the water to and from the reservoir-chamber. The only valve used in my elevating system is the foot-valve at the lower extremity of the pipe or conductor, and this valve is arranged to open automatically when the cylinder is raised to permit water to flow by the atmospheric pressure on the column of water in the well through the conductor into the reservoir-chamber of the cylinder; but when the cylinder is permitted to descend (which is weighted to insure its descent) this foot-valve is closed by the column of water in the fixed conductor, and thus permit the water to flow under the pressure of the cylinder-head from the reservoir-chamber through the ports in the coupling and the upper length of the conductor to the distributing-pipe.

In the drawings, Figure 1 is a vertical central section of a pump constructed in accordance with my invention. Fig. 2 is a vertical section of a portion of the apparatus, taken at right angles to the plane of Fig. 1. Fig. 3 is a detail view of one of the removable weight-sections.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a well, above which is erected a suitable supporting-frame 2, upon which operating mechanism 3 is mounted, and within the well is arranged a vertical discharge-pipe 4, connected at its lower extremity by means of a coupling 5 with an inlet or suction pipe 6, the suction-pipe being preferably larger in diameter than the discharge-pipe, and the coupling 5 having a lateral port or ports 7. The inlet or suction pipe is also provided at its lower extremity with an inlet-valve 8, arranged in a suitable casing 9, having its lower side perforated to form a strainer, as shown at 10.

Arranged concentric with the fixed conductor, which constitutes the inlet and discharge pipes, is an axially-movable cylinder 11, having a closed upper end and an open lower end and provided at its upper end with a tubular guide 12 of an interior cross-sectional

area equal, approximately, with the exterior cross-sectional area of the pipe 4 and terminating at its upper end in a stuffing-box 13. Fixed to the axial conductor below and preferably contiguous to the lateral ports 7 is a stationary piston or plunger 14, provided with suitable packing-cups and fitting snugly within the cylinder 11. When the cylinder is elevated to increase the storage chamber or receptacle 15, which constitutes that portion of the cylinder above the plane of the piston 14, water is drawn into the inlet or suction pipe 6 and is admitted to said storage chamber or receptacle through the ports 7, the valve 8 being opened by inward pressure of the liquid. When the cylinder has reached the desired elevation and the required volume of water or other liquid has been stored in the chamber or receptacle 15, the release of said cylinder will allow the weight thereof to be supported by the contents of said chamber or receptacle.

The suction-pipe 6 is of larger internal diametrical extent than the discharge-pipe 4, thereby admitting of the water passing freely into the storage-chamber 15 when elevating the cylinder, and resulting in the work of recharging the exhaust-cylinder being more easily and quickly performed. Moreover, the difference in diameter of the two alining pipes provides a shoulder which serves to limit the downward movement of the cylinder. The ported coupling is located at the juncture of the two pipes and constitutes a stop, against which the upper closed end of the cylinder strikes when lowered to the required or predetermined distance.

Arranged in communication with the discharge-pipe 4 is a distributing or service pipe 16, tapped at suitable intervals by faucets 17 or equivalent valved outlets, and when one of said valved outlets is opened to reduce the pressure in the distributing-pipe water or other liquid will be forced from the storage chamber or receptacle through the outlet and distributing pipes by reason of the downward pressure of the cylinder. Hence by constructing the cylinder of suitable capacity sufficient water may be stored therein to supply an establishment for a day or more, whereby a single operation of the pump is sufficient to raise the water necessary for subsequent use through an extended period of time without exposing the water to heat and dust, which constitutes the objectionable feature of exposed or elevated reservoirs.

The weight of the cylinder must be regulated in accordance with the height to which the water must be elevated and the number of valved outlets which are in communication therewith, and in order to provide for such variation as may be necessary in this respect I employ a weight 18, consisting of a plurality of weight-sections which are independently removable, as indicated in detail in Fig. 3, said weight-sections being provided with radial slots 19 to fit the axial tubular guide 12, which rises from the upper extremity of the cylinder. The weight is thus supported by the upper end of the cylinder and is applied directly thereto without interfering with the operation of any other elements of the apparatus.

Various forms of elevating devices may be used in connection with the above-described construction, that illustrated in the drawings consisting of a windlass comprising a drum 20, a crank-shaft 21, a pinion 22 on the crank-shaft meshing with a gear 23 of larger diameter on the drum, and a flexible connection between the cylinder and the drum. This flexible connection preferably consists of a cable or chain 24, arranged in duplicate, with the lower extremities of its members attached to eyes 25 upon the upper extremity of the tubular guide 12.

From the above description it will be seen that the advantages derived from employing a movable gravitating cylinder and a fixed piston are that a single straight length of pipe may be employed for the conductor to serve as a means for conveying water to the storage chamber or receptacle and from the receptacle to the distributing-pipes; that said conductor may be employed as the sole means for supporting the piston; that the liquid is elevated a uniform distance by gravity, inasmuch as it enters the upper portion of the conductor at the upper side of the piston, whether the storage chamber or receptacle of the cylinder is full or nearly exhausted, and that the heavier of the two members necessary for forming the pump—namely, a cylinder and a piston—is employed as the gravitating member, whereby it is necessary to apply less auxiliary weight thereto.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

In a pump, the combination with a cylinder having an open lower end and a closed upper end, and having a central perforation in its upper end, of a sleeve fixed to the upper end of the cylinder concentric therewith and communicating with the perforation, a stuffing-box upon the sleeve, a discharge-pipe passed through the stuffing-box and into the cylinder and upon which the cylinder is adapted for reciprocation, an inlet-pipe of greater diameter than the discharge-pipe and attached to the lower end of the latter, the upper end of the inlet-pipe being adapted to limit the downward movement of the cylinder, valves in the pipes at their point of connection, a solid piston fixed to the inlet-pipe below the valves and snugly fitting the cylinder, a wind-

lass, rods fixed to the windlass and attached to the sleeve, and a plurality of weights disposed upon the upper end of the cylinder and inclosing the sleeve, whereby the cylinder may be raised to admit water thereto and will drop of its own weight to force the water through the discharge-pipe.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM MILLER.

Witnesses:
J. W. REID,
J. H. SPENCE.