No. 795,892. PATENTED AUG. 1, 1905.

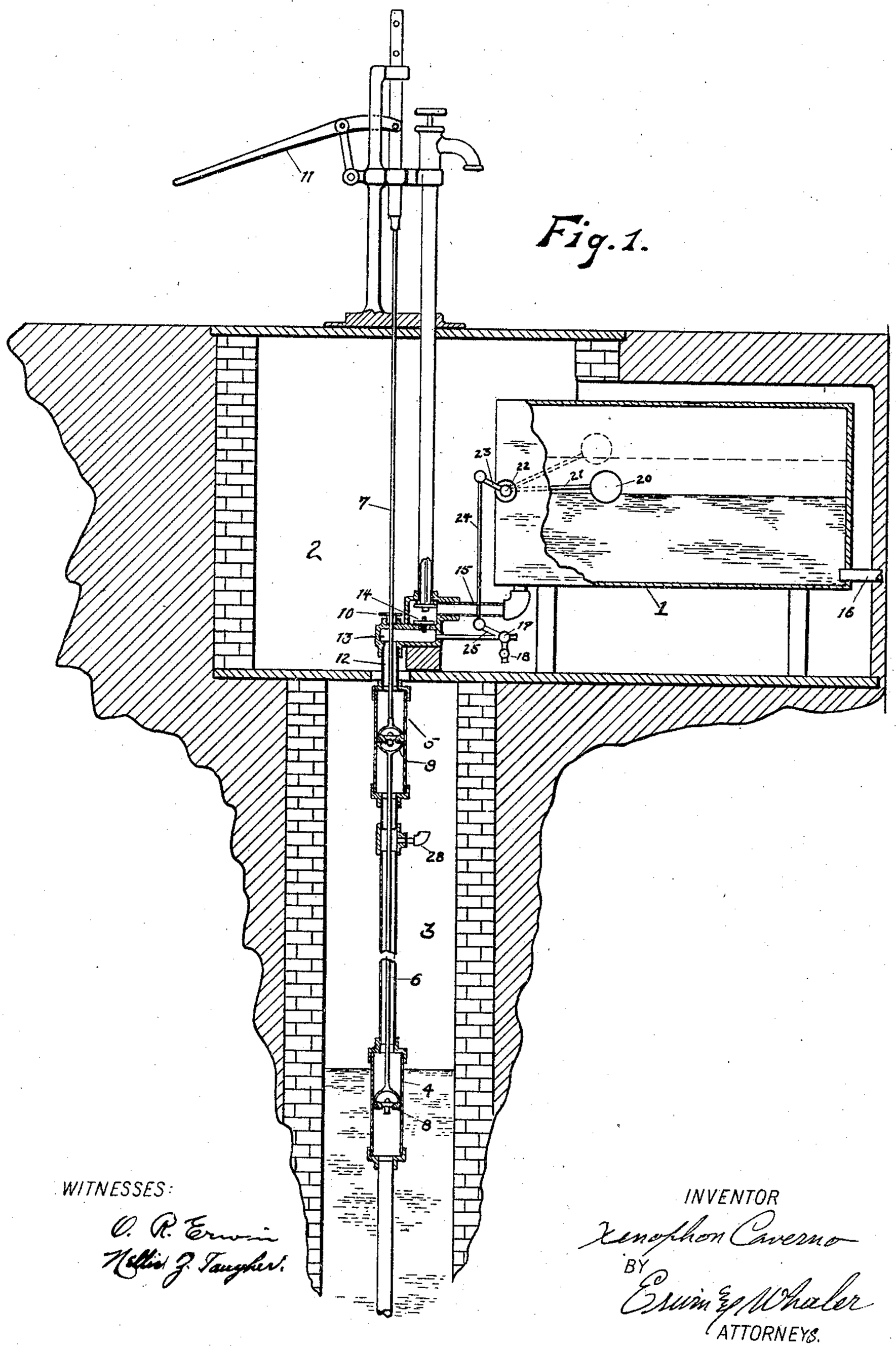
X. CAVERNO.

WATER SUPPLY SYSTEM.

APPLICATION FILED JAN. 20, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

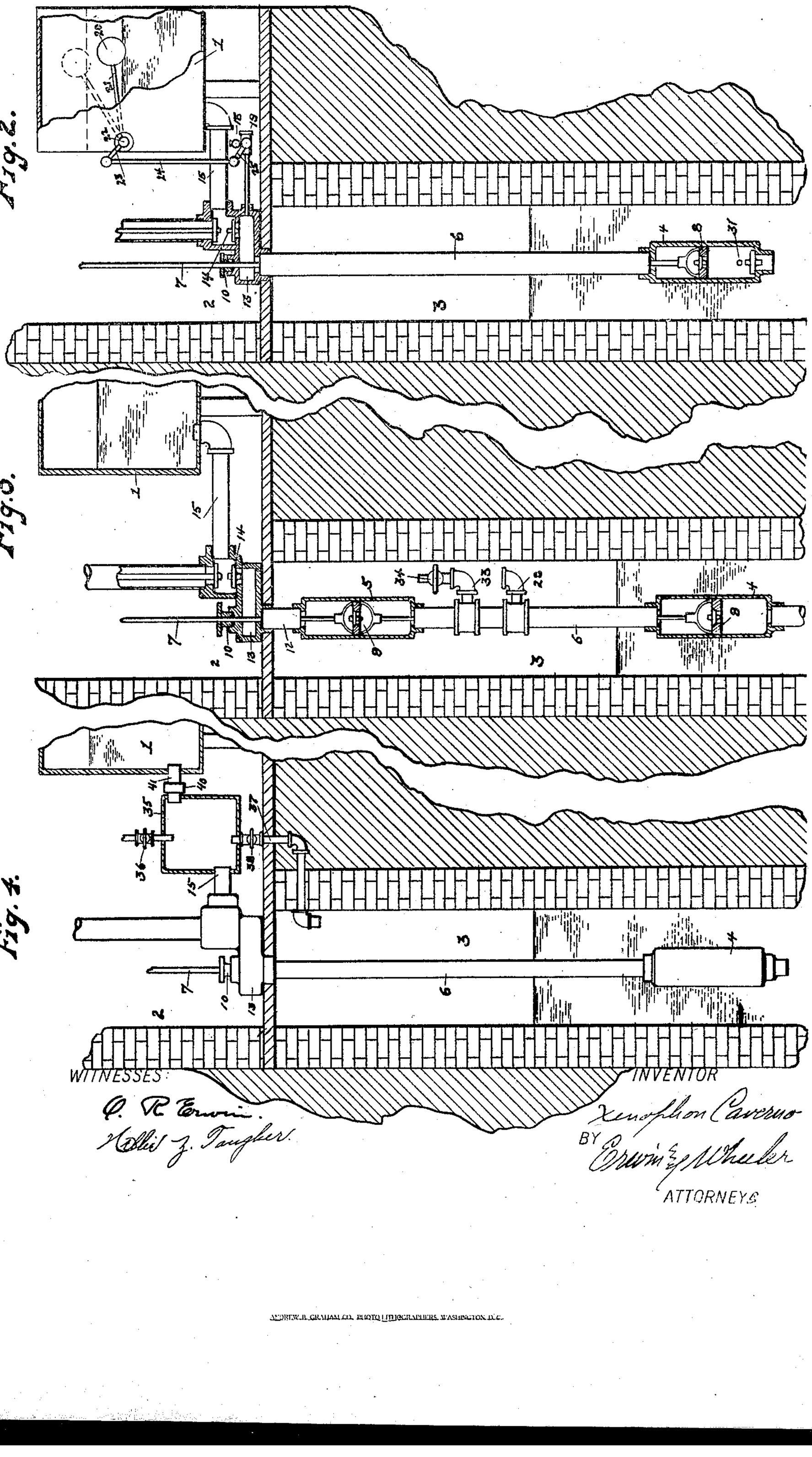

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

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WATER-SUPPLY SYSTEM.

No. 795,892. Specification of Letters Patent. Patented Aug. 1, 1905.

Application filed January 20, 1905. Serial No. 241,931.

To all whom it may concern:

Be it known that I, XENOPHON CAVERNO, a citizen of the United States, residing at Kewanee, county of Henry, and State of Illinois, have invented new and useful Improvements in Water-Supply Systems, of which the following is a specification.

My invention relates to improvements in water-supply systems, with especial reference to that class of systems which include a closed tank in which the water is stored under an air-pressure sufficient to elevate the water to the desired levels in the service-pipe connections.

The object of my invention is to provide means adapted to the requirements of all conditions of water-supply for utilizing the same pumping apparatus to supply either air or water to the storage-tank.

In the following description reference is had to the accompanying drawings, in which—

Figure 1 is an elevation of a water-supply system embodying my invention, showing the well and well-pit walls in section. Figs. 2, 3, and 4 are similar detail views showing modified forms of construction.

Like parts are identified by the same reference characters throughout the several views.

1 is a storage-tank, preferably located in a pit 2 adjacent to a well 3, from which water is drawn and forced into the tank 1. Where the well is deep, two pump-cylinders 4 and 5 are preferably employed, the pump-cylinder 4 being located below the surface of the water in the well and the pump-cylinder 5 being located near the top of the well or, if desired, within the pit 2. The pumps are connected by a pipe 6, and a connecting-rod 7 connects the pistons 8 and 9 of the respective pump-cylinders and extends upwardly through a stuffing-box at 10 to the top of the well, where it is connected with a suitable manually-actuated handle 11 or, if desired, with any other source of power. The water is forced by the pumps through the connecting-pipe 6, upper pump-cylinder, pipe 12, chamber 13, and past the valve 14 into the tank 1 through a pipe 15. The chamber 13 is provided with an air-inlet duct having an inwardly-opening check-valve 18. The admission of air to the chamber 13 through this duct is further controlled by a valve 19, which may be manually actuated or may, if desired, be automatically controlled by means of a float 20 in the tank 1, which is arranged to communicate motion to the valve at 19 through the float-arm 21, rock-shaft 22, arm 23, link 24, and valve-actuating lever 25. The tank 1 is provided with a service-pipe connection at 16 leading to any suitable delivery-points.

It will be observed that the pipe 6 is provided with an opening at 28, preferably located a short distance below the cylinder 5. When the air-controlling valve is open, water will be permitted to escape through the opening at 28 during the downstroke of the pistons and a corresponding volume of air permitted to enter through the air-inlet duct past the valves 18 and 19. On the upstroke of the pistons the valve 18 automatically closes and the air is forced into the tank 1. Where the opening at 28 is not sufficiently large to permit of the water to run out of the cylinder 5, the pumps will supply both air and water to the tank so long as the valve at 19 remains open. When a sufficient supply of air has been furnished to the tank 1 to lower the water-level, the downward motion of the float is communicated to close the valve at 19, whereupon no water will escape through the opening at 28, as the upper pump will draw in by suction all water lifted by the lower pump.

In Fig. 2 I have illustrated a form of construction in which a single pump-cylinder 8 is employed. In this case a water-escape opening is formed in the pump-cylinder at 31 near the lower end of the cylinder, the construction otherwise remaining the same as in Fig. 1.

In Fig. 3 two pump-cylinders are used in the same manner as in Fig. 1 so far as the pumping of the water is concerned; but in this view I have illustrated an air-inlet duct 33 interposed between a water-outlet and the upper pump-cylinder 5. The inlet-duct 33 is provided with a valve at 34, and which may be manually actuated.

Referring to Fig. 4, it will be observed that an auxiliary chamber 35 is interposed between the chamber 13 and the tank 1. This auxiliary chamber is provided with an air-inlet valve at 36, and a drainage-pipe 37 leads downwardly from the bottom of the chamber 35 and discharges into the well, a valve 38 being employed to control the passage of water through the drainage-pipe. A check-valve 40 is also provided between the chamber 35 and the tank 1, so that the escape of water from the tank 1 is prevented. With this construction whenever the supply of air in the tank 1 is found insufficient the valves 36 and

38 are opened, permitting the water to drain from the chamber 35, which becomes filled with air. The pumping apparatus being then started and the valves 36 and 38 closed, it is obvious that the air in chamber 35 will be forced into the tank 1. To render this construction effective, the pipe 15 will of course be connected with the lower portion of chamber 35 and the pipe 41, leading to the tank 1, will be connected with the upper portion of chamber 35.

In each form of construction illustrated it will be observed that the principle of operation is the same in each case—the water column is permitted to drop and a supply of air substituted therefor. This enables me to apply my invention under all circumstances regardless of the size or depth of the well or conditions of water-supply in the well, as the air-supply is not obtained by the suction of the pump-cylinders, and the admission of the air therefore does not depend upon the relative size of the cylinders nor upon the depth at which the cylinders are submerged in the water.

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

1. In a water-supply system, the combination with a closed storage-tank, having water-supply and service-pipe connections; of an air-inlet valve for said water-supply connections; and means for permitting water to escape from said supply connections at a point below the air-inlet valve.

2. In a water-supply system, the combination with a closed storage-tank, having water-supply and service-pipe connections; of means for permitting the water column to drop in said supply connections; and an air-valve arranged for the admission of air to take the place of the water.

3. In a water-supply system, the combination with a closed storage-tank, having water-supply and service-pipe connections; of a pump included in said supply connections, said connections having a water-escape aperture below the piston of said pump, and an air-inlet aperture above the water-escape aperture.

4. In a water-supply system, the combination with a closed storage-tank, having water-supply and service-pipe connections; of a pump included in said supply connections; said supply connections being provided with an aperture for the escape of water lifted by said pump and an air-inlet aperture having a suitable check-valve adapted to prevent the escape of admitted air.

5. In a water-supply system, the combination with a closed storage-tank, having water-supply and service-pipe connections; of a pump included in said supply connections; an air-inlet valve controlling the admission of air to the supply connections; and a water-outlet arranged to permit the escape of water when the same is not being lifted by the pump.

6. In a water-supply system, the combination with a closed storage-tank, having water-supply and service-pipe connections; of a pump included in said supply connections; an air-inlet valve controlling the admission of air to the supply connections; and a water-outlet arranged to permit the escape of water when the same is not being lifted by the pump, together with means, controlled by the water in said tank, for opening and closing said air-inlet.

7. In a water-supply system, the combination of a storage-tank provided with water-supply and service-pipe connections; of a set of pumps included in said supply connections; said connections being provided with an opening for the free escape of water below the upper pump; and means for admitting air above the water-escape opening.

8. In a water-supply system, the combination of a storage-tank provided with water-supply and service-pipe connections; of a set of pumps included in said supply connections; said connections being provided with an opening for the free escape of water below the upper pump; and means for admitting air above the water-escape opening; together with means, controlled by the water-supply of the tank, for regulating such admission of air.

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

XENOPHON CAVERNO.

Witnesses:
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WILLIAM E. GRUED.