No. 873,906. PATENTED DEC. 17, 1907.

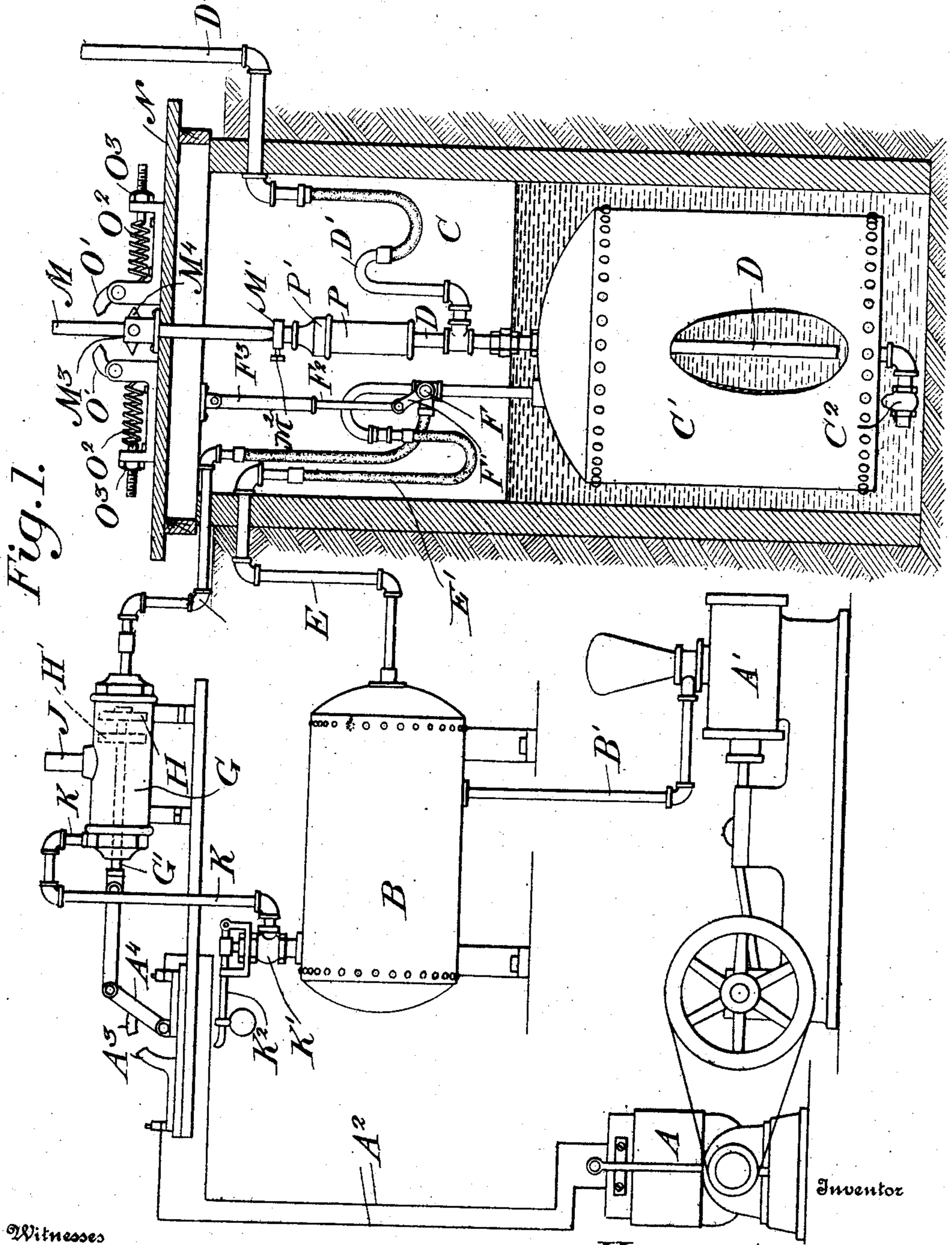
H. C. SILLETT.

AUTOMATIC WATER SUPPLY SYSTEM.

APPLICATION FILED DEC. 31, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

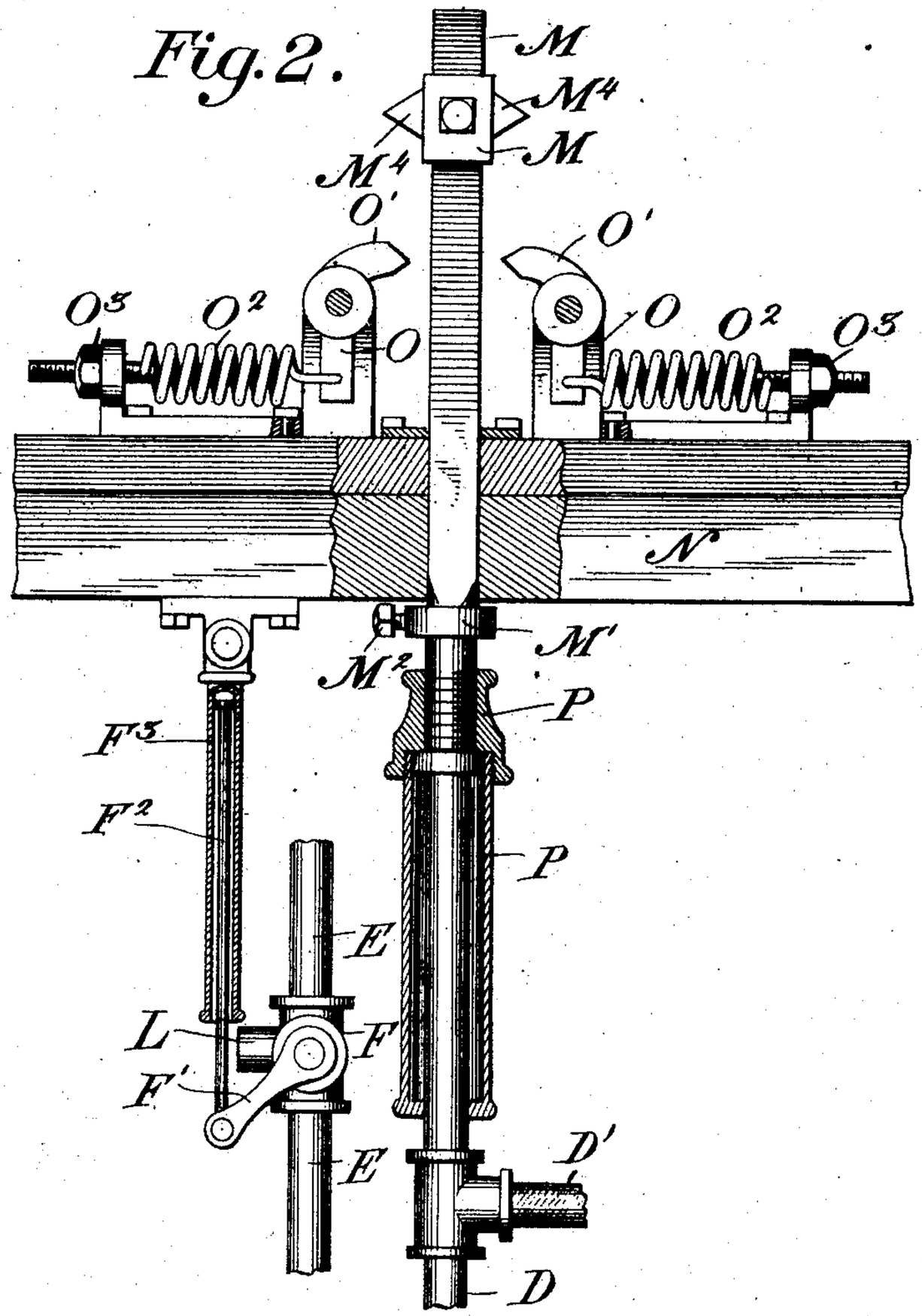
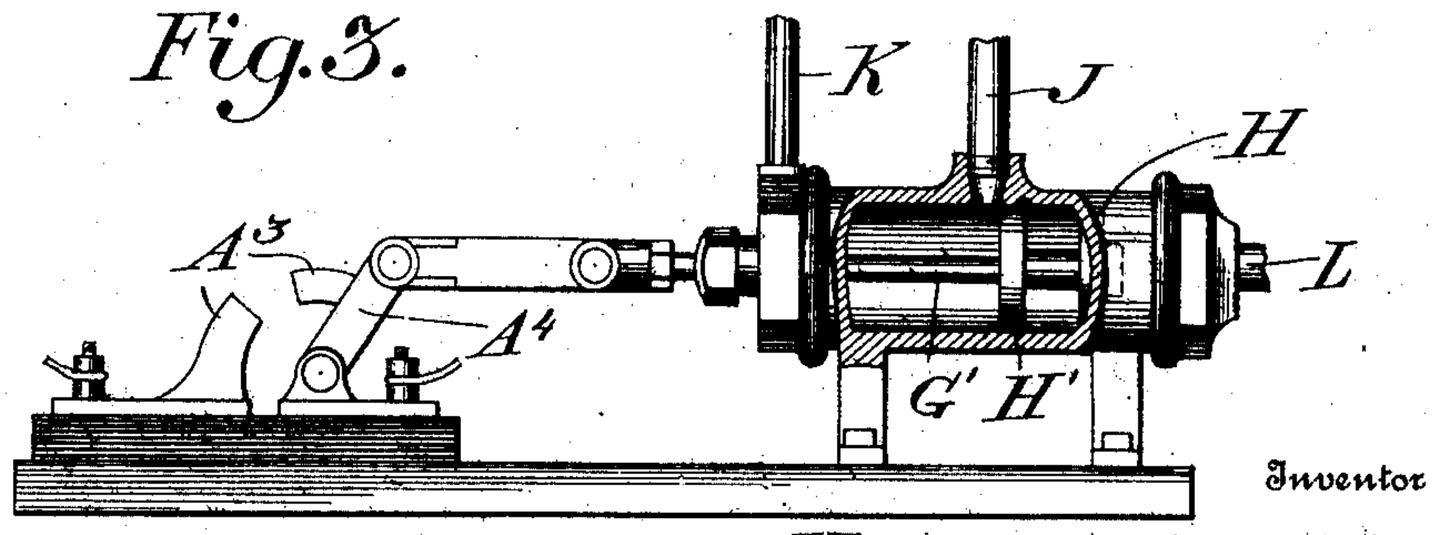


Fig. 3.



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AUTOMATIC WATER-SUPPLY SYSTEM.

No. 873,906. Specification of Letters Patent. Patented Dec. 17, 1907.

Application filed December 31, 1906. Serial No. 350,161.

To all whom it may concern:

Be it known that I, HARRY C. SILLETT, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented a new and useful Improvement in an Automatic Water-Supply System, of which the following is a specification.

This invention relates to a water supply system designed for pumping water from wells, cisterns and the like and the object of the invention is a supply system in which the discharge of water by means of compressed air is carried on at regular intervals, the compressing of the air and the regulation of its delivery to a buoyant submerged tank being effected automatically.

The invention consists of a buoyant tank, said tank sinking by gravity and filling with water as it sinks, a flexible discharge pipe, an air reservoir, means for compressing air and storing same in said reservoir, means for automatically stopping the compression of air when the reservoir is full and of placing the reservoir in communication with the tank, thereby forcing the water from the tank and permitting the same to rise by reason of the buoyancy of the air forced into the tank, and means operated by the rising of the tank for utilizing the compressed air within the tank for again starting the pump, and refilling the reservoir as the tank again sinks.

In the drawings forming a part of this specification:—Figure 1 is a diagrammatic view of my complete apparatus, a cistern being shown in vertical section and a tank being broken away upon one side. Fig. 2 is an enlarged detail view partly in section showing certain details of construction mounted upon the cistern curbing or platform. Fig. 3 is a side elevation, partly in section, illustrating an electric switch and a compressed air cylinder provided with means operating said switch.

In these drawings A represents an electrical motor for driving an air pump A′. The motor A is connected by means of suitable electrical wires A² with a segmental switch A³ the switch segment being broken as shown in Figs. 1 and 3.

It will be understood here that any form of electrical motor may be employed to drive the pump A′ and any form of pump may also be used, and where it is not convenient to install an electrical motor a gas or gasolene engine may be substituted therefor, as the motor A and pump A′ are of the ordinary construction and are not claimed by me, as a part of my invention.

In constructing my system I employ also an air reservoir B which is connected by a suitable pipe B′ with the pump A′. Within a cistern or well C, I place a tank C′ which is air tight and the bottom of the tank carries a suitable check valve C² which admits water to the tank and prevents escape of water through the bottom of the tank. A vertically arranged pipe D extends through the top of the tank C′ and downwardly into the tank to a point adjacent the bottom and is opened at its lower end. The pipe D at a point above the tank is connected by suitable couplings to a flexible discharge pipe D′ which connects to a pipe D² which conveys the water discharge from the tank C′ to the place of use.

A suitable air pipe E, provided with flexible portions E′ conveys air from the reservoir B to the top of the tank C′. This pipe is provided with a valve F which has a rotatable valve stem F′ and this stem is connected to a plunger rod F² which works in a cylinder F³ pivotally suspended within the upper portion of the stem. I also provide upon any suitable platform a cylinder G in which works a piston rod G′ carrying two pistons H and H′ secured thereupon and spaced apart.

The cylinder G is provided intermediate its ends with an exhaust pipe J and is connected at one end by a pipe K, to the air reservoir B, said pipe connecting to the reservoir through a safety valve K′ operated by any suitable governor K². The other end of the cylinder G is connected by a pipe L, which leads into the pipe E through the valve F. To the upper end of the pipe D is secured a bar M, which carries a desirable collar M′ locked in its adjusted position by means of a set screw M². The bar M works through the platform or cover N of the well or cistern and above said platform carries a sleeve M³, which is provided with lateral V-shaped projections M⁴. Upon opposite sides of the bar M the platform carries castings O, upon which are pivoted resistant dogs O′. The amount of resistance offered by the dogs O′ to the passage of the sleeve M³ with its projecting points between them is regulated by springs O² provided with tension nuts O³.

The operation of the device is as follows:—The tank being submerged and the reservoir

B being filled with compressed air, the said air will travel through the pipe E and its flexible portions E′ and discharge into the tank C′ forcing the water therein upwardly through the pipes D, D′ and D². As the air escapes from the tank C′ the increased buoyancy of the tank will cause it to rise, and the rising of the tank will be checked, temporarily by engagement of the projections M⁴ with the dogs O′. As the amount of air in the tank C′ increases and the amount of water diminishes the dogs O′ will be forced apart and the projections M⁴ will pass between them and the rising movement of the tank continued. This movement will carry the plunger F² upwardly within the cylinder F³ and as the plunger arrives at or adjacent its highest point, the valve stem F′ to which the lower end of the plunger F² is pivoted will be moved and as the parts shift from the position shown in Fig. 1 to that shown in Fig. 2 the supply of air to the tank C′ from the reservoir B through the pipe E will be cut off, and the tank C′ will be placed into communication with the cylinder G through the pipe L. The compressed air in the tank will escape through the pipe L into the cylinder and bearing upon the piston H thus forcing the same forward and forcing forward also the piston rod G′ until the piston H has cleared the exhaust pipe J, after which the air will be exhausted through said pipe. This movement of the piston rod G′ will swing the switch bar A⁴ to which it is pivoted which bar will slide upon the switch segment A³ and bridge the broken place in said segment, thus completing a circuit and setting the motor A in operation.

The motor A will drive the pump A′ and will refill the reservoir B. When the tank B is filled to the desired pressure the governor K² will operate to open the valve K′ and compressed air will escape through the pipe K in the cylinder G and will bear upon the piston H′ and force the same rearwardly until it has cleared the exhaust pipe J as shown in Fig. 3. This movement will throw the switch bar A⁴ into the position also shown at A³ so that it will no longer bridge the broken place in the segment A³ and the motor will stop. The stoppage of the motor will stop the pump A′ and as soon as the pressure in the cylinder B comes within the desired limit the governor K² will close the valve K′. In the meantime the tank C′ having been emptied of water by the air pressure and having been relieved of this air pressure through the pipe L, and the exhaust pipe J, will have returned to its normal position, and in so doing the valve F will be again rotated to place the cylinder C′ which has again filled with water through the check valve C², into communication with the reservoir B and the operation above described will be repeated.

While the bar M may be connected to the discharge pipe D in any suitable manner, I prefer to connect the bar to the pipe as shown in Fig. 2. In this construction the bar M carries at its lower end a sleeve P secured to the lower end of the bar, which lower end is cylindrical and threaded by a nut P′.

The upper end of the rigid portion of the discharge pipe D connected directly to the tank C′, works in this sleeve P, and when it reaches the upper end of the sleeve lifts the same, also lifting the bar M. It is of course obvious that the end portion of the pipe operating in the sleeve P is closed, the water discharging through the flexible section D′.

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

1. A device of the kind described comprising a buoyant submerged tank, an air reservoir in communication with said tank, a discharge pipe carried by the tank, a pump supplying compressed air to the reservoir, and means operated by the rising of the tank for starting the pump.

2. A system of water distribution comprising a submerged buoyant tank, a reservoir of compressed air having communication with said tank, a discharge pipe carried by the tank, means set in operation by compressed air for starting the pump, said means being controlled by the rise of the tank, and means operable by an overcharge of air in the reservoir for stopping the pump.

3. A water discharge system for cisterns and wells, comprising a tank submerged in said cistern or well and receiving water therefrom, means for forcing compressed air into the said tank, a discharge pipe conveying water therefrom, the tank rising as air is admitted and water discharged, means for cutting off a supply of compressed air from the tank when the tank has risen to a predetermined point, an air pump, a source of power driving the pump, means for starting and stopping said source of power, and means for conveying the air delivered to the tank to the starting means above referred to.

4. A system of the kind described the combination with a submerged buoyant tank, an air reservoir, an air pump connected thereto, an air pipe leading from the reservoir to the tank, a valve placed therein, a motor for driving the air pump, a cylinder having a double piston working therein, a valve controlled pipe leading from the air reservoir to said cylinder and admitting air to the cylinder when the pressure in the reservoir has reached a predetermined limit, an air pipe leading from an end of said cylinder and communicating with the air pipe leading from the reservoir to the tank through the valve in the said air pipe, the valve operating to close one pipe when the other is open, the cylinder above mentioned being provided with

an exhaust opening midway the two air pipes leading thereto, an electrical switch in the motor circuit, and a piston rod connected to the double pistons and operating the said switch, the switch being closed by pressure of air from the tank.

5. In a device of the kind described comprising a buoyant submerged tank, an air reservoir, an air pump connected to said reservoir, a motor operating said pump, a normally open electric switch in the motor circuit, means for conveying compressed air from the reservoir to the tank, means for cutting off communication between the reservoir and the tank as the tank rises, and means for closing electric switch and starting the motor by pressure of air escaping from the tank after communication has been cut off between the reservoir and the tank.

6. In a device of the kind described a buoyant submerged tank, a discharge pipe carried thereby, a portion of the said pipe being flexible, a bar mounted upon the non-flexible portion of said discharge pipe said bar extending upwardly through a cover for a cistern or well, a sleeve carried by said bar having V-shaped projections, pivoted spring held dogs arranged upon the opposite sides of the bar and in the path of the projections, a pipe admitting air to the tank, a valve having a valve stem arranged in said pipe, a cylinder, and a plunger working in said cylinder and pivotally connected at its outer end to the valve stem, said plunger being moved in the cylinder by the rising of the tank and the air pipe, as and for the purpose set forth.

7. In a water distributing system of the kind described, a buoyant submerged tank, a discharge pipe carried by the tank, said discharge pipe having a flexible portion, a pipe admitting compressed air to said tank, said pipe having a flexible portion, a bar carried by the rigid portion of the discharge pipe, the lower portion of said bar carrying a sleeve in which the upper portion of the discharge pipe works, V-shaped projecting points carried by the bar, and spring controlled resisting dogs arranged upon opposite sides of the bar and in the path of said points, as and for the purpose set forth.

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Witnesses:
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