No. 607,778. Patented July 19, 1898.

# A. J. TYLER.

## DOMESTIC WATER SERVICE.

(Application filed Feb. 27, 1895.)

(No Model.)

Fig. 1.

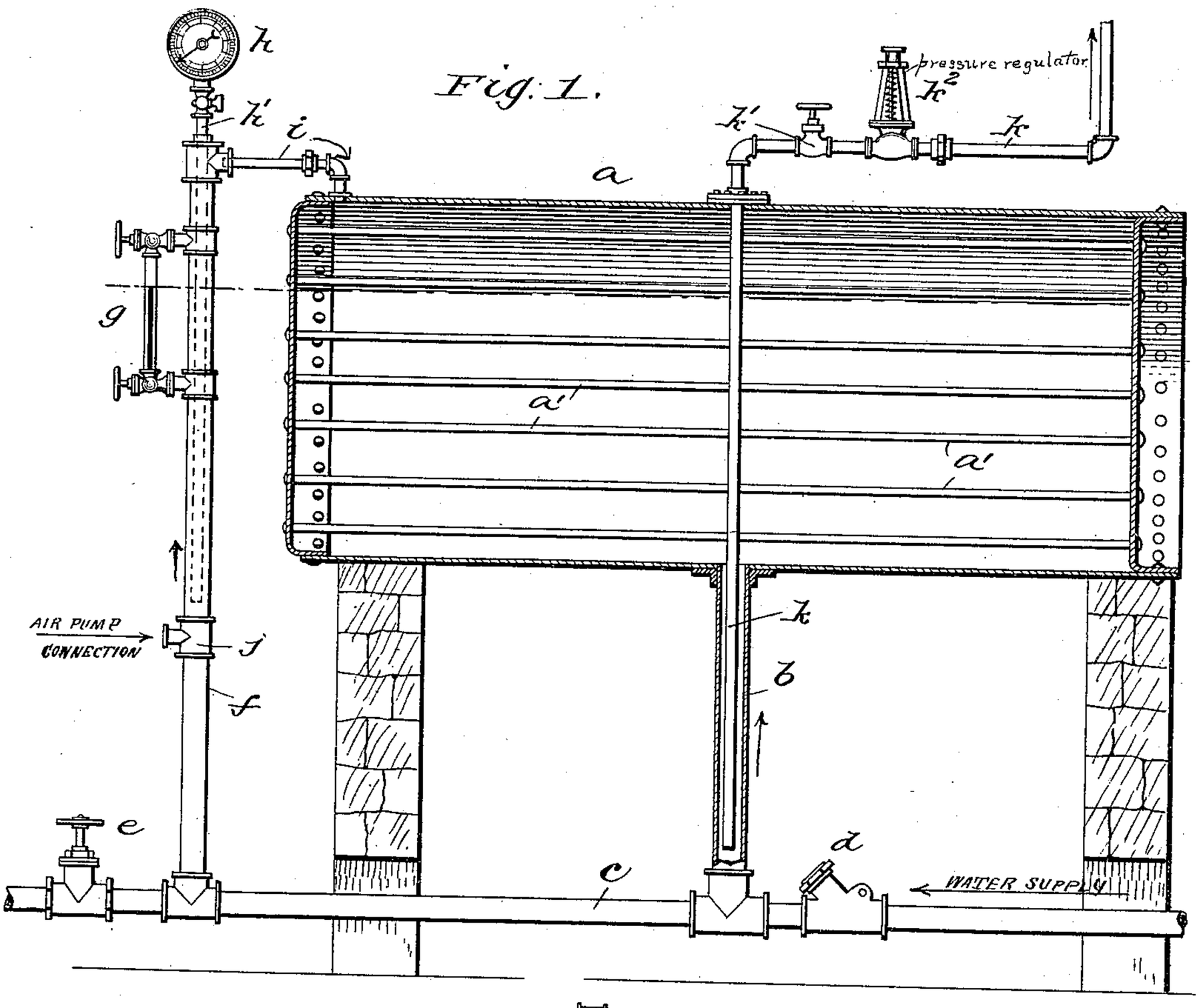
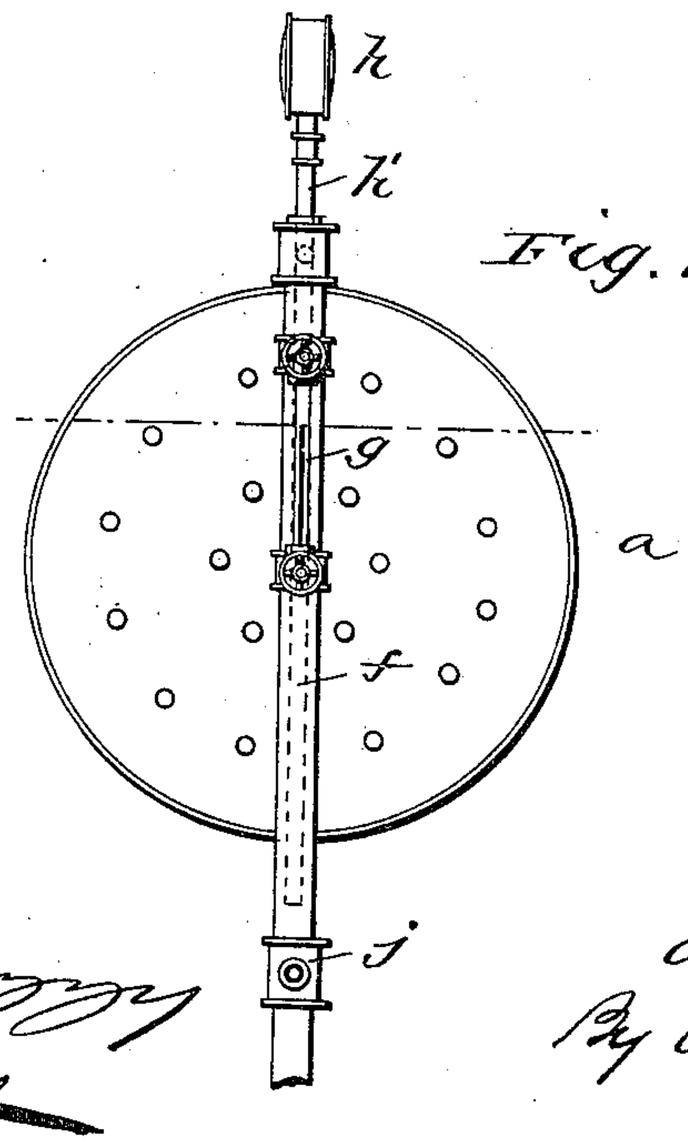



Fig. 2.




WITNESSES

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## DOMESTIC WATER-SERVICE.

SPECIFICATION forming part of Letters Patent No. 607,778, dated July 19, 1898.

Application filed February 27, 1895. Serial No. 539,904. (No model.)

*To all whom it may concern:*

Be it known that I, AARON J. TYLER, a citizen of the United States, residing at Passaic, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Domestic Water-Service, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention is designed to provide a simple apparatus especially adapted to be placed in the cellar of a dwelling or other building and which will (through the medium of compressed air) keep up a constant supply of water under an equable pressure throughout the service-pipe in the building irrespective of the pressure in the supply-main and the reservoir, as more fully hereinafter set forth.

In the drawings, Figure 1 is a vertical sectional view of my improved apparatus, showing the same in its preferred form; and Fig. 2 is an end elevation thereof.

Referring to the drawings by letters, *a* is the reservoir, which is shown arranged horizontally, but which may be supported vertically, if desired, said reservoir being sufficiently strong to withstand the desired pressure and being braced horizontally by means of a series of stay-rods *a'*, extending from end to end thereof. Communicating with the bottom of the tank is an inlet-pipe *b*, which is connected at its lower end to the supply-pipe *c*, which leads to any suitable water-supply, this pipe *c* being provided with a check-valve *d* to prevent the pressure in the tank from being communicated to the water-supply and at the same time to permit the water to be pumped from the supply into the tank. The supply-pipe *c* continues on beyond the inlet-pipe and may connect with another similar tank or tanks, and it is provided with a stop-cock *e*. Between the stop-cock *e* and the inlet-pipe *b* a vertical pipe *f* connects to the pipe *c* and extends to a point above the tank. A water-gage *g* is attached to this pipe to indicate the level of the water in the tank, the water in the tank being in communication with the gage through the pipes *b* and *f* and the intermediate part of the supply-pipe. A pressure-gage *h* is supported over the upper end of pipe *f* by means of a pipe *h'*, which extends down through the upper closed end of pipe *f* and terminates at or below the level of the bottom of the tank for a purpose hereinafter described. A short pipe *i* connects the upper end of the pipe *f* with the upper part of the tank. The air may be pumped into the tank through the pipes *f i*, the pipe *f* being provided with a coupling *j* for connection to the air-pump, or the air-pump may be connected to the tank in any other suitable manner.

The service-pipe *k* extends down through the tank and into the inlet-pipe *b* to a considerable distance, its lower end being of course open. This pipe *k* is provided with a stop-cock *k'* to shut off the pressure from the pipes in the building. In this pipe *k* beyond the stop-cock is a pressure-regulator $k^2$ of any suitable construction, which serves to regulate the pressure and keep it uniform throughout the building irrespective of the pressure in the tank.

In charging the tank ready for operation I have found it necessary to first charge it with air to a degree about equal in pounds pressure to one-half the distance in feet to which the water needs to be raised. For instance, where the water is to be raised one hundred feet the air in the tank is primarily raised to about fifty pounds to the inch. When the pressure is raised sufficiently in that way, the water is pumped into the tank, which serves to further compress the confined air in the upper part of the tank. This method of filling the tank is preferred, since if the water were pumped into the tank with the air therein simply under atmospheric pressure the tank would have to be pumped almost entirely full before sufficient compression could be obtained to give the desired force to the water, and the compressive force would soon practically expend itself and render a further pumping of water necessary. After the desired pressure is obtained, as shown by the pressure-gage, the stop-cock *k'* is opened and the apparatus is ready for use. An essential advantage lies in the use of an automatic pressure-regulator, which prevents the heavy pressure in the tank from being communicated to the service-pipes in the building, such pipes not being, as a rule, adapted to withstand the heavy pressure under which the water in the tank is usually maintained. By this pressure-regulator the pressure in the service-pipes is maintained at

a uniform degree, irrespective of the variable pressure in the tank. Another essential advantage lies in depending the inlet end of the service-pipe into the inlet-pipe, whereby the inlet-pipe forms a sort of water chamber or seal surrounding the service-pipe for a considerable portion of its length, the object of which is to permit practically all the water in the tank to be used without allowing any of the compressed air to escape through the service-pipe. It has been found in practice that when the outlet-pipe is terminated at or near the bottom of the tank the air begins to force itself down through the body of water and into the outlet-pipe as soon as the level of the water comes within a foot or so (according to the pressure) of the bottom of the tank, so that by thus extending the outlet-pipe a considerable distance below the bottom of the tank and surrounding it by a water-chamber the full capacity of the tank is utilized, thereby making it possible to use a much smaller tank.

Another very essential feature lies in the peculiar manner in which the pressure-gage is connected to the apparatus. It will be observed that when the water is pumped into the apparatus the air will be compressed in the tube *h'*; but after the apparatus is in use a short time the air confined in the tube will have been gradually absorbed by the water or have leaked out through the gage or stop-cock therein, and the water will press directly on the gage, the whole pipe *h'* being filled with water. It will therefore be seen that no air can escape from the tank through the gage unless it passes out through pipe *i* and down pipe *f* and then up through pipe *h'*, which will be a practical impossibility so long as there is a quantity of water in the tank. The pipe *h'* need not extend down below the tank, since in practice the water is not permitted to be entirely run off from the tank, but need only extend down below the water-level in the tank.

It will thus be seen that in my apparatus there is no way for the air to escape except by absorption through the water, which will render it unnecessary to recharge the tank with compressed air, except at long intervals, it being simply necessary to pump occasionally sufficient water into the tank to keep up the pressure. It will also be observed that the water will be entirely free from all contamination, as it is drawn directly from the well or other supply and supplied almost directly to the service-pipes; but in case sediment should collect in the bottom of the tank it may be readily removed by simply opening the cock *e* wide and permitting the pressure to blow off the contents of the tank or so much as is necessary to remove the sediment.

Having thus fully described my invention, what I claim is—

1. In compressed-air water-service, the combination of a tank, means for compressing the air therein, a service-pipe depending through the tank and extending below the bottom thereof, an automatic pressure-regulator in the service-pipe beyond the tank, a water-chamber connected to the tank and surrounding the portion of the service-pipe below the tank, and a supply-pipe, substantially as described.

2. In a compressed-air water-service, the combination of a tank, a service-pipe entering the tank and having its lower end open and depending below the tank for a considerable distance, a water-chamber connected to the tank and surrounding the portion of the service-pipe below the tank, and means for compressing the air and water therein, substantially as described.

3. The combination of a tank, a supply-pipe, an inlet-pipe *b* connecting the supply-pipe to the bottom of the tank, a service-pipe entering the tank and depending into the inlet-pipe, and means for compressing air therein, substantially as described.

4. The combination of a tank, a supply-pipe connected thereto, a service-pipe connected to the tank, a vertical branch pipe connected to the supply-pipe, a tube *h'* and a pressure-gage connected to said tube *h'*, said tube *h'* extending down through said branch pipe to a point below the level of the water in the tank substantially as described.

5. In a compressed-air water-service apparatus, the combination of a closed tank, a supply-pipe provided with a check-valve, an inlet-pipe connecting the supply-pipe to the bottom of the tank, a service-pipe depending into the inlet-pipe and provided with a stop-cock and pressure-regulator, a branch pipe *f* connected to the supply-pipe and having its upper end in communication with the upper part of the tank, a water-gage, a tube *h'* and a pressure-gage connected to the tube *h'*, said tube *h'* extending down through the pipe *f* to a point below the water-level, substantially as described.

6. The combination of a tank, a supply-pipe connected thereto, a service-pipe connected to the water-space of the tank, a pipe *f* having its lower end in communication with the water-space of the tank and its upper end closed, a pipe connecting said pipe *f* with the air-space of the tank, a tube *h'* depending through said pipe *f* to a point below the water-level, and a pressure-gage on the upper end of said tube *h'*, substantially as described.

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

AARON J. TYLER.

Witnesses:
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CHAS. A. MUZZY.