

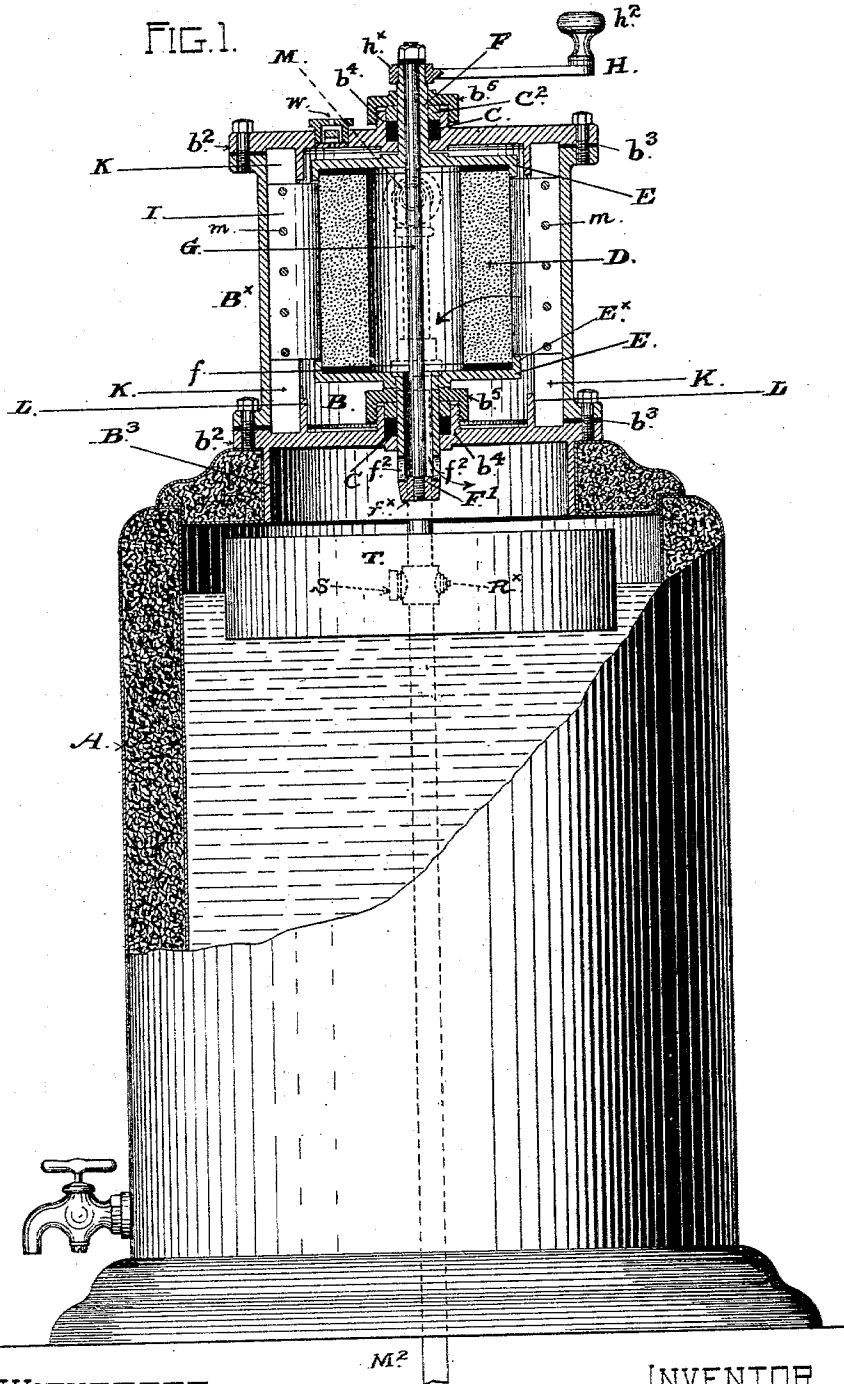
(No Model.)

2 Sheets—Sheet 1.

W. B. FARWELL. WATER FILTER.

No. 556,725.

Patented Mar. 17, 1896.



WITNESSES

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INVENTOR

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FIG. 2.

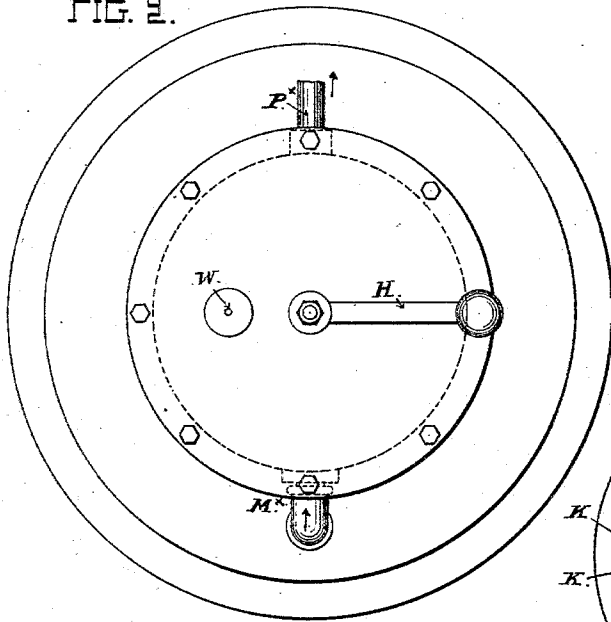


FIG. 3.

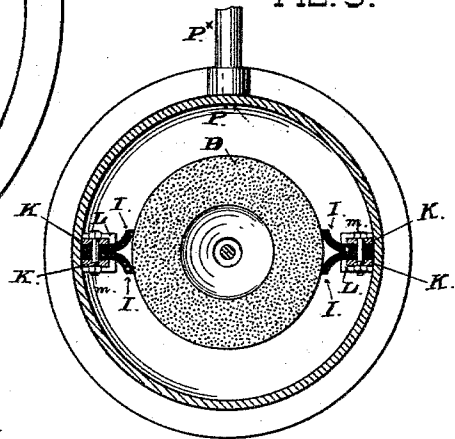


FIG. 4.

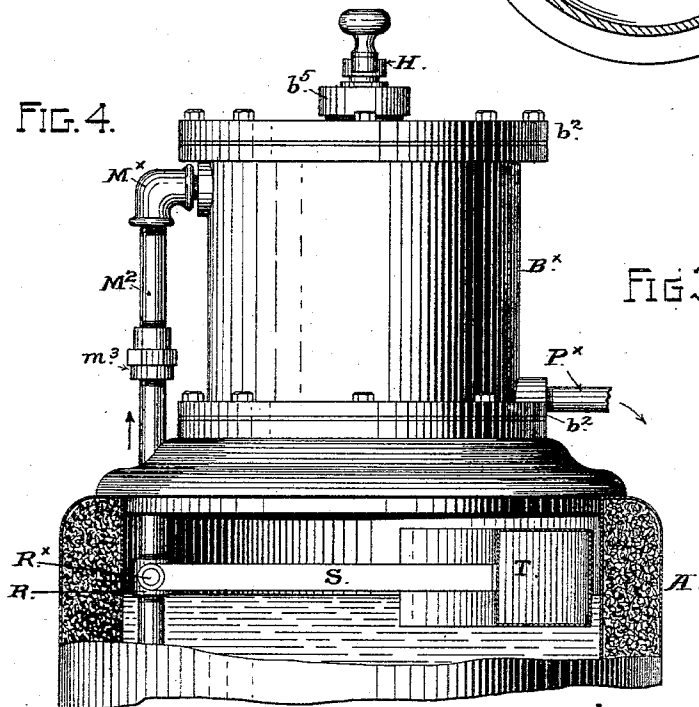
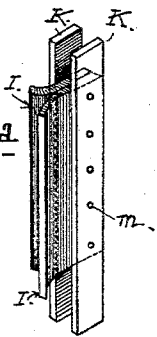


FIG. 3^a



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UNITED STATES PATENT OFFICE.

WILLARD B. FARWELL, OF SAN FRANCISCO, CALIFORNIA.

WATER-FILTER.

SPECIFICATION forming part of Letters Patent No. 556,725, dated March 17, 1896.

Application filed February 13, 1894. Serial No. 500,040. (No model.)

To all whom it may concern:

Be it known that I, WILLARD B. FARWELL, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Water-Filters, of which the following is a specification.

This invention relates to certain improvements in water-filters of the kind or description which employ for a filtering medium tubes or hollow cylinders made of natural stone possessing filtering qualities or formed of artificial compositions resembling stone; and my invention consists in certain novel constructions and combinations of parts, as hereinafter fully described and set forth in the claims, reference being had to the accompanying drawings, forming a part of this specification.

In the said drawings, Figure 1 represents in side elevation a complete filtering apparatus constructed according to my invention and comprising a tank or receptacle for the filtered water, a filtering-chamber having a filtering-diaphragm in the form of a hollow cylinder, a scraper or scrubber and means for rotating or moving the cylinder in contact with the said scraper from the outside of the filtering-chamber, and an automatic regulator controlling the supply of unfiltered water to the filtering-chamber in proportion to the consumption of the filtered water. The upper part of the water-receptacle and the filtering-chamber are shown in longitudinal section. Fig. 2 is a top view of the water-receptacle and the filtering-chamber upon it. Fig. 3 is a horizontal section of the filtering-chamber taken in a plane about midway between the top and the bottom of the chamber. Fig. 3^a is a perspective view of one of the scrapers removed from the filtering-chamber. Fig. 4 is an outside view in front elevation of the filtering-chamber in the top of a water-receptacle, the upper part of the receptacle being broken away to expose the parts of the water-supply regulator inside.

A indicates a water tank or receptacle with double walls filled with a non-conducting substance. The receptacle here represented is the ordinary portable water-cooler in which water for drinking purposes is kept during warm weather. As commonly constructed, it

is formed of sheet metal with filled walls; but such coolers are also constructed of earthenware, pottery, stone, and similar hard substances and material. Ordinarily the top is closed by a lid or cover removable for purposes of filling the cooler and for introducing ice. A faucet or draw-off cock is usually fixed in the lower part for filling drinking utensils from the receptacle. In some cases, however, these water-receptacles are set up and connected to a supply-pipe, and are also connected by a service-pipe with a draw-off faucet located at a distance from the receptacle, in which case they are of a more permanent character. These improvements are applicable as well to such fixed or permanent receptacles for holding and supplying filtered water as to portable water-receptacles, and they are as readily combined for operation with one character or description of receptacle as with the other.

B is a cylindrical chamber formed of a flanged cylindrical body B^x and two circular flanged heads $b^2 b^3$, united by bolts and nuts, as shown in the drawings, with packing b^3 between the joints. The lower one of the heads has a cylindrical standing rim on the outside that forms on the bottom a neck or projecting portion B^3 of about the same diameter as the body B^x . In the center of each head is a circular opening with a surrounding neck or rim b^4 , screw-threaded and fitted with a threaded cap b^5 , in which there is a central opening of the same size as the opening in the head. A packing C, of rubber or other suitable substance, and a metal washer C^2 for a follower are set within the rims b^4 to form a stuffing-box around the opening in each head.

D represents a filtering tube or cylinder of stone, or of composition resembling stone, having the required filtering properties and set within the chamber before mentioned. Its outer surface is surrounded by the unfiltered water, while the hollow space within it is sealed or perfectly closed to the surrounding water in the chamber. The ends of the cylinder are formed by circular metal heads E E, each head having a flanged rim E^x fitting upon and closely against the end of the cylinder, and a packing-ring f interposed in-

side the rim between the end of the cylinder and the head. These parts are drawn tightly together by a long bolt or threaded rod G.

In the center of each head on the outside is a long tubular axle or journal portion in line with the axis of the cylinder, the one, F, on the top of the upper head being made of proper length to extend through the stuffing-box to the outside and set above the cap, and the bottom axle, F', somewhat larger in diameter than the other one, F, having a tubular passage of greater diameter than the bore or passage through the top axle. This lower axle, F', is of suitable length to extend through the stuffing-box on the lower head and into the space inclosed by the standing rim on the bottom, but its bottom end is closed, as shown at f^x , Fig. 1, and in the sides above the closed end before mentioned are outlet-apertures f^2 , located at such point that when the axle is set through the bottom of the filtering-chamber these apertures will be outside the filtering-chamber. The rod G, threaded at both ends, is set through the two heads E E' through the hollow space within the cylinder. Its threaded lower end is screwed into a socket in the solid end of the axle F', and by a nut fitted on its threaded top end above the axle F the heads E E' are drawn up tightly against the ends of the cylinder.

The rod G before mentioned fills the tubular passage through the upper axle, but a passage from the interior space of the cylinder is afforded around the rod by the increased diameter of the lower axle. From the space within the cylinder to the outside of the chamber surrounding the cylinder an outlet for the filtered water is thus provided through the axle F' and the apertures f^2 .

The filtering-cylinder so mounted is revolved in the filtering-chamber on the axles F F' by means of a handle H fixed on the upper axle outside the head. The end of the axle is finished square to fit a square eye or opening in one end h^x of the handle, and a knob h^2 for the hand is fixed on the opposite end. The cylinder mounted in this manner is rotatable in the chamber, and when turned by the handle H the whole exterior surface is brought in contact with a stationary scraper or scrubber I in the filtering-chamber fixed in suitable stationary position in contact with the surface of the cylinder.

The scrapers or devices which I have used for this purpose are constructed of blades or strips of flexible material I—such as sheet-rubber—clamped between stiff metal bars K K and fixed by screws m taking through one bar and into the other. The construction which I prefer to follow in making this scraper is clearly shown in Figs. 3 and 3^a. Stiff sheet-rubber is good material to use for the strips I. They should project beyond the clamps K sufficiently to bend and lie against the surface of the cylinder D, as shown in Fig. 3, and in length they should correspond

with the length of the cylinder D between the heads. When set up in this manner against the cylinder it will be noticed that the corner or angle along one edge of the strip lies closely against the surface of the cylinder, thereby forming a scraping edge, while the elastic or flexible character of the bent strip has the effect to hold this edge at all times up to its work. Usually I arrange two such strips in a pair between two clamps K K and secure them by the screws m , the strips being of such width that when set up against the cylinder they will bend outwardly and hold a curved shape in opposite directions to each other, so that in whatever direction the cylinder is rotated there will always be a scraping edge presented against the face of the cylinder in the most favorable working position. When more than one of these scrapers is placed in the filtering-chamber against the surface of the cylinder they are set at equal distances apart around the circumference of the cylinder. Ordinarily I arrange two of these strips at points diametrically opposite to each other, as shown in Figs. 1 and 3. This number for a single cylinder may be increased, however, as circumstances may be found to require.

The ends of the clamps K K sit into sockets L L, formed on the inner faces of the two heads b^2 b^2 , as shown in Figs. 1 and 3, by casting parallel lugs on the inner face of the head. By removing the top head the scrapers can be taken out to renew or replace them.

M is an inlet in the side of the filtering-chamber with a suitable coupling M^x for a supply-pipe M^2 , and P is an outlet on the opposite side, to which is connected a waste-pipe P^x . The pipes connected to these two openings should have stop-cocks for controlling the admission of the water to the filtering-chamber and for emptying the chamber at will.

W is an air-vent for the escape of air from the filtering-chamber. It is provided with a check-valve suitably arranged to close the aperture when the chamber is filled with water and to drop and uncover the aperture when the waste-outlet is opened, in order to admit the atmospheric pressure from the outside.

The filtering apparatus thus constructed is mounted for operation upon a receptacle to receive and hold the filtered water for consumption or distribution, the standing rim or neck B^3 on the bottom of the filtering-chamber being set into an opening in the top of the receptacle. This is a much better construction than to make the body of the filtering-chamber integral with the receptacle, as it allows the filtering apparatus proper to be removed at pleasure for convenience of making repairs, and in addition thereto it enables the filter to be applied to any size or style of receptacle.

In an apparatus for supplying filtered drinking-water, and especially where the same is required to supply considerable quantities of water for constant consumption, it is very important to control and regulate the supply

of unfiltered water to the filtering-chamber in quantity according to the consumption of the filtered water from the receptacle. To such end and purpose I place at some convenient point on the supply-pipe a stop-cock or valve with a rotary plug of ordinary construction and then connect to the stem of that valve one end of a lever S carrying on the opposite end a float T, which is located inside the filtered-water receptacle, these parts being so arranged that the variations in the level of the water in such receptacle will raise and lower the float and thus operate the valve in the supply-pipe. At the highest level the float-bearing end of the lever will be raised and the valve will be closed, while as the lever drops the valve will be turned and the water allowed to flow into the filtering-chamber.

Figs. 1 and 4 of the drawings illustrate the manner in which this automatic regulation of the water supply before mentioned can be carried out without complicated mechanism.

In order to cool the inflowing water the supply-pipe M² is carried directly through the bottom of the filtered-water receptacle upward and out at the top, where connection is made with the filtering-chamber by a coupling M³ and an elbow M^x. In this pipe within the filtered-water receptacle is placed a cock or valve R of ordinary construction having a rotary plug R^x, to the stem of which is fixed the lever S. This last-mentioned part is set in such relation to the highest level of the body of water in the filtered-water receptacle that when the same is full the lever stands about horizontal and the valve is closed, while in the angular position assumed by the lever at a lower level of the water the valve is opened and the water flows through the pipe M² into the filtering-chamber.

This construction of apparatus not only insures a constant supply of filtered water without special care or attention to regulate the supply, but it tends to secure the best results in the operation of the filtering-chamber. It dispenses with the necessity also of maintaining water-tight joints between the filter proper and the receptacle for the filtered water.

The operation of cleaning the filtering-diaphragm is performed by turning the crank H on the top of the chamber several times and opening the waste-pipe P^x. In this way the surface of the diaphragm can be thoroughly cleaned and the foul matter washed out of the filtering-chamber at frequent intervals during the day without interrupting the operation of filtering.

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

1. The combination, with the hollow filtering-cylinder having heads mounted for rotative movement within a surrounding filtering-chamber and having a passage and outlet through one head to the outside of said chamber, and sockets on the inner faces of said heads at diametrically-opposite points, of the stationary clamps formed in pairs and insertible at their extremities in and removable from said sockets and the two flexible scraping-blades held at their outer edges between said clamps and having square scraping inner edges extending beyond the said plates for contact with the surface of the filtering-cylinder for the entire length of the same, the said flexible blades being in breadth greater than the space between the surface of the cylinder and the stationary clamps, whereby the said blades are kept in working contact with the surface of the cylinder, as set forth.

2. The herein-described filtering apparatus comprising the filtering-chamber B, hollow, rotatable cylinder D, having heads with axle portions extending through water-tight axle-boxes in the heads of the filtering-chamber, an outlet-passage through the lower axle from the interior hollow space of the cylinder, a handle on the end of the upper axle outside for rotating the cylinder, a stationary scraping device adapted by the rotation of the cylinder to remove from the surface of the cylinder the filtered matter collected on the surface, a filtered-water receptacle beneath said filtering-chamber, an unfiltered-water-supply pipe extending through the interior of said receptacle and coupled to an inlet in the filtering-chamber, a cock in said pipe to control the flow of water into the filtering-chamber, a float in the said water-receptacle and a lever connecting said cock with the float to move the same by the perpendicular movements of the float, and a waste-outlet from the lower part of the filtering-chamber provided with a cock to open and close the same, constructed for operation, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

WILLARD B. FARWELL. [L. S.]

Witnesses:

EDWARD E. OSBORN,
C. W. M. SMITH.