(No Model.)

P. ABBOTT.

FILTER.

No. 250,868. Patented Dec. 13, 1881.

Fig. 1.

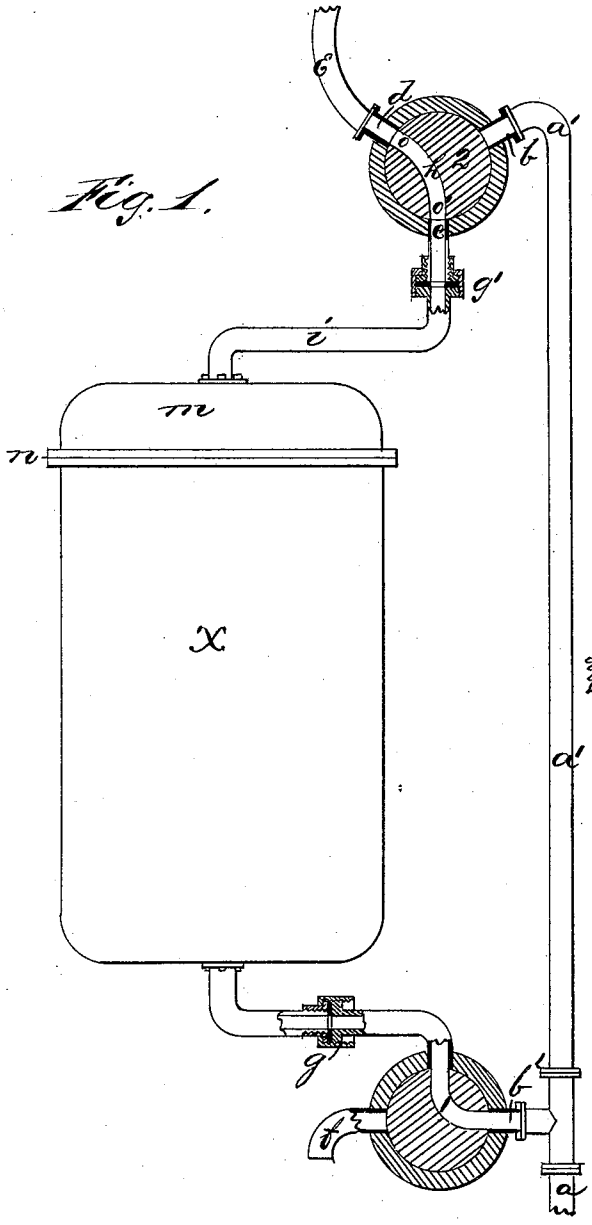
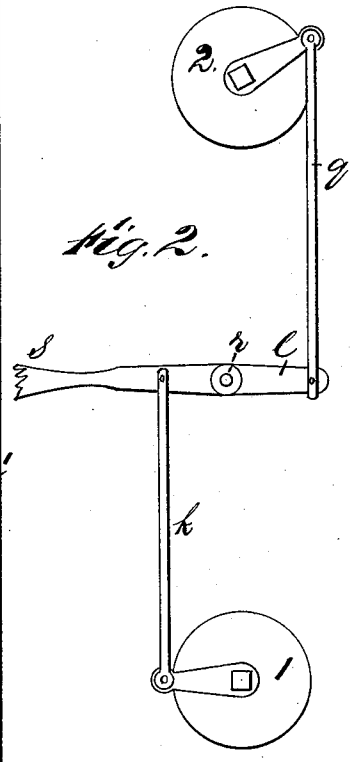


Fig. 2.



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UNITED STATES PATENT OFFICE.

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FILTER.

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Application filed September 2, 1881. (No model.)

To all whom it may concern:

Be it known that I, PHILLIPS ABBOTT, of the city of Brooklyn, State of New York, have made a new and useful Improvement in Filters and Piping for the Same; and I do hereby declare that the following, taken in connection with the drawings hereof, is a full, clear, and exact description thereof.

My invention consists in so combining the filter with two cocks that the water from the service-pipe may be directed through the filter to the house-pipe, or in a reverse direction through the filter to a waste-pipe, or directly to the house-pipe without passing through the filter.

Figure 1 is an elevation of filter, pipings, and cocks, the latter being shown in section. Fig. 2 is an elevation showing the plugs of the cocks connected by levers and rods.

The cock 1 is a two-way cock, and may be made as shown in the drawings, or as a spigot-cock, and it is so adjusted to the pipes *b' f* and the coupling *g* that when turned as shown in the drawings water will enter it from pipe *b'* and be turned upward through the coupling *g* into the filter *x;* and also, when desired, this cock 1 may be turned quarter round, so that the water coming from the direction of pipe *b'* will be cut off from passing it, and when in this position the water coming from the direction of the filter will enter it through the coupling *g*, and will be turned by the cock into the waste-pipe *f*.

The cock 2, I prefer to construct as shown in the drawings, (in Fig. 1 of which all but the body of the filter is shown in section,) and its barrel is provided with three ports or exit and entrance tubes, which are marked, respectively, *b*, *c*, and *d*. These tubes are so cast in the barrel of the cock that their centers on the inside of the barrel are exactly equidistant from each other and in the same plane. The plug of this cock has through it a hole, *h*, of the same diameter as the bore of the tubes *b*, *c*, and *d*, and this hole is made in the plug so that the distance apart of the centers thereof at each end of the hole shall be exactly the same distance as that between the centers of any two of the holes in the tubes *b*, *c*, and *d* on the inside of the barrel. Thus it will be seen that this plug can be turned in its seat in the barrel of the cock so that the centers of the two ends of the hole through it shall exactly coincide with the centers of some two of the tubes *b*, *c*, and *d*. The hole *h* through the plug I make, by preference, curved, as seen in the drawings, although it may be straight. It may also be made as a groove or channel cut in the periphery of the plug.

g and *g'* are two couplings, by preference such as are used to connect water-backs with ranges; but any water-tight coupling which can be made or broken at pleasure will do very well. The coupling *g* connects the cock 1 with the filter at the lower end, and the coupling *g'* connects the cock 2 with the filter at the upper end. When the water is to be filtered the cock 1 is turned as shown in the drawings, so that it will receive water coming from pipe *b'*, and the plug of the cock 2 is turned so that the end of the hole in it marked *o'* shall coincide with the hole in the tube *c*, and the end of the hole in the plug marked *o* will then coincide with the hole in the tube *d*. The water will now enter at pipe *a*, pass through pipe *b'*, (for it cannot pass the cock 2 through pipe *a'* and the tube *b*, for cock 2 is now so turned as to shut it off,) thence through the cock 1 and through the coupling *g* to the filter *x*, up through the filter, being purified in its passage, and thence out through the coupling *g'*, thence through the hole *h* in the plug of the cock 2 into tube *d*, thence into pipe E, which is the house-pipe.

The filter *x* may be of any suitable construction; but the ordinary diaphragm-filter is preferred, and it is to be charged in any known manner.

When the water is to be reversed for cleansing the filter, the cock 1 is turned quarter around, so as to cut off water coming to it from pipe *b'*, and cock 2 is turned one-third around, so that the end of the hole through its plug marked *o'* shall coincide with tube *b*, and the end marked *o* with tube *c*. The water will then enter at *a*, as before. It cannot pass cock 1, and therefore rises through pipe *a'*, enters the cock 2 through tube *b*, thence through the hole in the plug *h*, and is turned downward into the tube *c*, thence through the coupling *g'* into and through the filter *x*, and thence through the coupling *g* to cock 1, which, as now turned, deflects the water into the waste-pipe *f*, carrying the impurities with it.

When the filter, for any reason, cannot be used the water is shut off from it and allowed to by-pass it to the house as follows: The cock 1 is turned as it is when the reverse flow is

used—*i. e.*, so that it will cut off water coming to it from pipe *b'*—and the plug of cock 2 is turned so that the end of the hole through it marked *o* will coincide with the tube *b*, and the end marked *o'* will coincide with the tube *d*. The water will now enter at *a*. It cannot pass cock 1, and will therefore rise through pipe *a'* to tube *b*, through it and the hole in the plug of cock 1 to tube *d*, through it and into the house-pipe E, and thus to the house. While the water has this flow the filter can be bodily removed for repairs or recharging by simply unscrewing the couplings *g* and *g'* in the well-known manner; and as it is frequently desired to open the filter without bodily removing it, I cast the head *m* thereof separate from the filter and with a flange on it, (marked *n*,) by which it is fastened to a corresponding flange on the filter by ordinary flange-bolts. Thus when the coupling *g'* is unscrewed the flange-bolts may be also unscrewed and this head taken off; and that the piping and cock 2 may not interfere with free access to the filter when the head is removed, I locate the coupling *g'* some little distance away from a vertical line through the center of the filter and in the short pipe *i*.

I do not limit myself to the precise construction of the cocks 1 and 2, as they may be made in other ways and still accomplish the same result.

The hole through the plug of cock 2 may be made to move in quarter revolution, and the hole in the plug of cock 1 in third revolution, the particular degree of movement given to the plug being not at all essential in either case; but the ports in the barrel of the cock must conform to the hole in their plugs respectively.

In order that both cocks may be easily and quickly turned, so that the flow may be reversed, I connect the cocks 1 and 2 with certain rods and a lever, (shown in Fig. 2, in which *k* is a rod, which is connected with the end of the plug-handle of cock 1, and extends from it to the cross-lever *l*, to which lever it is pivoted some distance from the end thereof.) The rod *q* is, in the same way, connected with the end of the plug-handle of cock 2, and extends from it to the cross-lever *l*, and is pivoted to it at the end thereof. The cross-lever *l* is pivoted to some fixed support by a pin or bolt, *r*, which passes through it at a point between the two points of attachment of the rods *k* and *q*. The end of the lever *l* is extended, and made into a handle, *s*, which being taken hold of and moved upward or downward, will, in a manner already well known and practiced in door-bolt operating devices, and by the agency of the pivoted cross-lever *l* and the two connecting-rods *k* and *q*, turn both of the plugs of the cocks 1 and 2, thus operating them both at once, and thus, by one movement of the lever *l*, change the course of the water from the direct filtered flow to the reverse flow for cleansing.

It will be apparent to any one skilled in this art, and is hardly needful to state, that the distances at which the rods respectively shall be away from the pivot *r* of the cross-lever *l*, and the position and length of the handles of the cock-plugs, respectively, will be determined by the degree of rotation needful to be given to each of the cock-plugs, for the plug of cock 2 makes but one-third of a complete revolution to reverse the water, while the plug of cock 1 makes a quarter-revolution; but this is a matter of mechanical calculation to be determined by the machinist; also, both of the rods *k* and *q* may be attached to the cross-lever on the same side of the pivot *r* and on either side of it, or they may be combined in a single rod, with different lengths to the plug-handles, extending from one cock to the other, with a slot in the lever; but in these two last cases the plug-handle of one of the cocks should be shifted over to the other side. That end of the rod *q* which is attached to the end of the plug-handle of cock 1 should be so attached to it that it can be readily detached, so that the cock 2 will be entirely disconnected from the rod, so that it may be turned freely for effecting the direct flow to the house around the filter, as hereinbefore set forth.

There should be stops provided, against which the lever *l* shall bring up when the cocks have sufficiently turned in either direction. These stops are well known, and may be placed anywhere the most convenient.

The rod connecting the two cocks may be a single one, without any separate lever, and made to extend from the handle of one of the cocks to the handle of the other, and both of the cocks will then be turned by force applied to the handle of either cock. In this arrangement the handle of the cock 1 should be provided with stops, as was the lever above named, to limit the movement of the handles, and the rod must be attached to the handles of these cocks at such distance from the axes of the plugs thereof respectively as to secure the needful amount of rotation for them respectively. The rod should be so connected with the handle of cock 2 in any well-known way that it may be readily disconnected to allow free movement of this cock for by-passing the water to the house—as, for instance, the rod may be bifurcated and a spring-pin put through holes in the bifurcated ends and through the handle of this cock.

Having thus described my invention, I claim—

The combination, substantially as before set forth, of the supply-pipe, the filter, the house-pipe, a cock adapted to connect the supply-pipe with one end of the filter or the latter with a waste-pipe, and a second cock adapted to connect the other end of the filter with the house-pipe or the supply-pipe with this other end of the filter or the supply-pipe with the house-pipe.

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