E. S. FARSON.

WATER-FILTER.

No. 169,631. Patented Nov. 9, 1875.

Fig. 1.

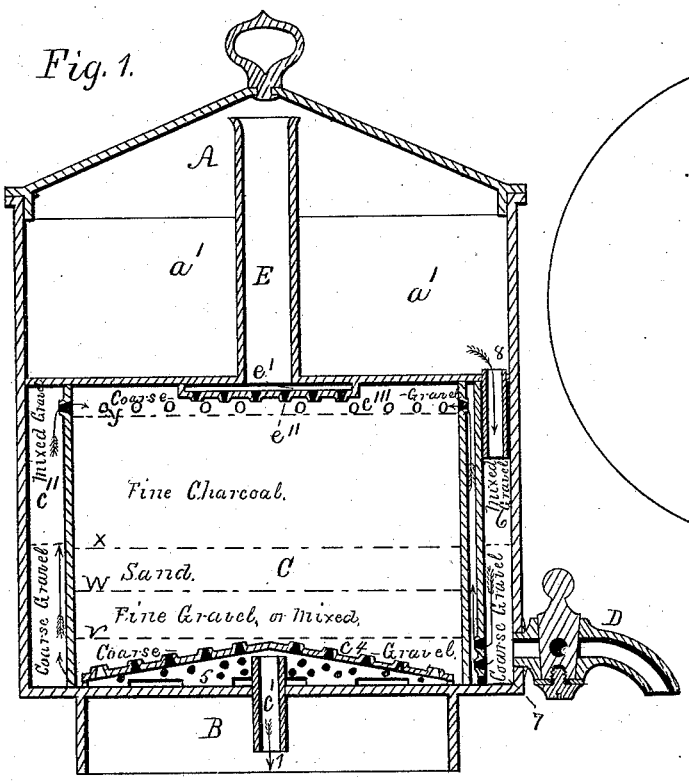


Fig. 2.

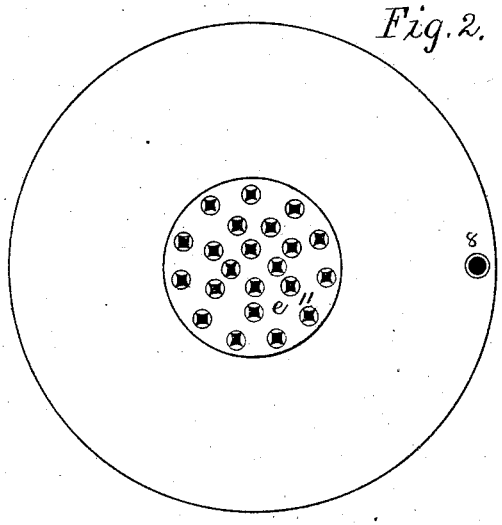
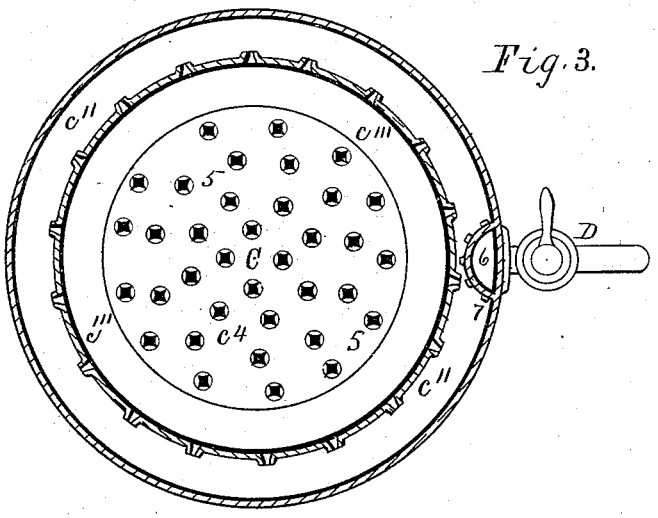


Fig. 3.



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ENOCH S. FARSON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN WATER-FILTERS.

Specification forming part of Letters Patent No. **169,631**, dated November 9, 1875; application filed April 26, 1875.

To all whom it may concern:

Be it known that I, ENOCH S. FARSON, of the city of Philadelphia, in the State of Pennsylvania, have invented an Improvement in Water-Filters, of which the following is a specification:

The object of my invention is twofold—first, to render the operation of a water-filter more reliable and perfect in its operation as such, and, second, to afford increased facility for cleansing the same daily, or as occasion may at any time render desirable; and these important and very desirable results I effect by means of the construction and arrangement hereinafter described, with reference to the accompanying drawing, in which—

Figure 1 is a vertical diametrical section of the improved filter, ready for being placed upon any water-cooler, or other receptacle for the water which may be passing through said filter. Fig. 2 is a plan view of the under side of the bottom plate of the receptacle into which the water to be filtered is placed. Fig. 3 is a horizontal section, showing the interior of that portion of Fig. 1 which is below an imaginary line cutting the respective centers of the series of small holes which are below the bottom plate of the receptacle into which the water to be filtered is placed.

The filter is made of a cylindrical form, by preference, and has a conical slip-cover, A, which fits loosely over the receptacle a' for the water to be filtered, and a flange, B, at its bottom, which is intended to fit loosely into the mouth of an ordinary water-cooler, (not shown,) or into any suitable receiver of the water which may be passing from the filtering-chamber C through the discharge-tube c' into said receiver, as indicated by the arrow 1 in Fig. 1. The chamber C is divided, by a vertical partition, into the central portion C and an annular surrounding portion, c'', and the said two portions communicate with each other through the series of small holes c''', which are punched outward from C. (See Fig. 3.) The bottom of chamber C has a concavo-convex plate, c^4, fixed concentrically upon it, so as to allow open spaces and perforations, 5 5, for the passage of the filtered water into the space immediately below the plate c^4. The perforations 5 5 are punched from the concave or under side of c^4, so as to give upturned edges on the convex side, as indicated in Fig. 3, for the purpose of better preventing the passage of tough or fibrous matter through the said perforations, or choking them, so as to prevent the passage of the water. The outlet-tube c^1 for the filtered water extends upward through the bottom of C to within a short distance of the under side of plate c^4, and is soldered water-tight to the bottom plate of C, and consequently the filtered water must rise in the space around the tube c' before it can pass through the latter to the receiver, (not shown,) thus preventing any sediment which possibly might, by long use of the filter, become deposited on the bottom of C around the upward-projecting part of said tube. A channel, b, of nearly a semicircular transverse section, is soldered in a water-tight manner fast to the inner side of the wall of the filter, and also to the bottom plate of the same, (see Figs. 1 and 3,) and communicates with the annular space c'' through a series of small holes, 7, near the bottom of C, and its open upper end communicates with the chamber a' through a tube, 8, which projects downward into it, and also upward a little above the bottom of a'. (See Figs. 1 and 2.) The lower end of the channel communicates with a stop-cock, D, which is kept closed during the operation of filtering, and opened only during the operation of cleansing the filter, as will be explained. The bottom of the filter is soldered in a water-tight manner entirely around its connection with the outer wall thereof, and also entirely around its connection with the bottom edge of the partition which separates the annular space c'' from the central space or chamber C, in order that water may be effectually prevented from passing either to the other of said spaces C c'', except through the ring of holes c''' in the upper part of the partition which separates the two said chambers. A large tube, E, which is open at both ends, is soldered water-tight in a corresponding hole through the center of the bottom of chamber a', so as to extend perpendicularly upward above the top edge of said chamber nearly into contact with the highest part of the conical lid A, and so as to cause the lower

end of said tube E to communicate with a shallow space, e', which is produced between the bottom of a' and a flanged and perforated plate or disk, e'', soldered fast to the under side of the said bottom of a', substantially as indicated in Fig. 1.

The object of the elevated tube E, arranged as described, is twofold—first, to afford the pressure of a column of water in the same during the operation of washing or cleansing the filter, and, second, to allow the air to escape as the water to be filtered first rises in c'', as will be described.

In proceeding to pack the filtering materials and to permanently inclose the same, I withdraw the bottom of chamber a', with its fixed attachments E, e'', and 8, and then pack into the central chamber C sufficient coarse gravel to just cover, by a horizontal layer of the same, the perforated plate c^4, as indicated by the dotted line v; and upon this layer I pack a layer of finer, or of coarse and fine gravel mixed, up to the dotted line w, and upon this a layer of sand up to the dotted line x; then upon this a layer of ground charcoal up to the dotted line y, packing the charcoal down firmly; and then, upon the charcoal layer, I pack a layer of coarse gravel up to the top edge of the partition which separates C from c''. I now pack into the annular space c'' a sufficient quantity of coarse gravel to half fill it, and then fill the said space with finer or mixed gravel. I now replace the bottom plate of the chamber a', with its attachments E, e'', and 8, and hold the same firmly down upon the partition which is between C c'', and also upon the gravel, and carefully solder or bolt the said bottom plate fast to the surrounding wall of the filter, in such a manner as to make the whole circle of the connecting parts perfectly secure. The filter, being thus completed for use, as described, may be inserted in the mouth of an ordinary water-cooler, so as to rest upon its bottom, with its pipe c' projecting down into the said water cooler, or into whatever receiver of the filtered water may be desirable or convenient.

The water to be filtered is filled into the chamber a', and from this it will gradually pass down through the tube 8 into the channel b; thence horizontally through the series of small holes 7 in the lower part of the latter into the lower portion of the annular chamber c'', spreading around through the lower stratum of coarse gravel, and upward through the finer or mixed stratum of gravel above; thence through the horizontal series or ring of holes c''' into the top layer of the coarse gravel in C, (driving the air out through E,) and thence through the thick stratum of charcoal and the succeeding layers of sand, and of fine and coarse gravel, successively, to the perforated plate c^4; thence through the perforations into the shallow space below them, from which it will overflow the tube c', and enter the receiver in a perfectly clear and bright condition, or free from any obscuring impurities, the air in the filtering-chambers escaping in the meantime out through the large tube E to the open air, as before stated.

In the cleansing or washing out the remnants of the water, or its sediment retained by the gravel strata, the lid A is to be lifted off and the stop-cock D opened. Then water is to be poured into the tube E continuously, so as to keep it full and afford the pressure of a column equal to the height of said tube, as near as may be, and consequently the said water will continue to pass rapidly down through the perforated plate e'', and, spreading over the top surface of the charcoal layer, pass horizontally through the top layer of coarse gravel to and through the ring of holes c''' into the gravel-packed annular chamber c'', and down through the gravel therein, and thence along on an annular bottom of the chamber to and through the holes 7, and across the lower end of the channel 6, and, finally, out through the open cock D, and thus in a minute or two washing out all the sediment which may have been left by the filtered water in the receiver.

The operation of cleansing or washing out the sediment or other impurities left during a day's filtering of water should be performed every morning just before putting the filter in operation for purifying water, and then the cock closed, the water to be filtered poured into the chamber a', the lid placed upon the latter, and the filter placed in position upon the receiver or water-cooler to operate.

It will be readily understood without further explanation that by means of my said improvement in filters, operated as described, the most turbid or feculent and offensively-smelling water, as well as such water as may contain the least perceptible of either of such objectionable qualities, will be entirely removed and a brilliantly-clear water be obtained; and, moreover, it will be seen that the arrangement of the pressure-pipe E and outlet-cock D in relation to the course for the washing-water will serve the purpose intended with facility and perfection, and that a removal of the old and substitution of new packing materials will not be required until after several years of constant use of the filter, as described.

I claim as my invention—

1. The combination, in a water-filter, substantially as described, of the water receptacle or chamber a' and its tube 8, with the channel 6, having the series of small holes 7, the annular chamber c'', and central chamber C, packed with filtering materials, and communicating with each other through the series of small holes c''' at their upper ends, the perforated plate c^4, and the outlet-tube c', the said parts being arranged to operate in the manner and for the purposes hereinbefore set forth.

2. The combination, in a water-filter, substantially as described, of the tube E and per-

forated disk e'', with the opening in the bottom of the chamber a', and the space e' between said bottom and said disk e'', the layer of gravel between the said bottom of a' and the charcoal layer, upon which said gravel layer rests, the perforations c''', the annular chamber c'', packed with gravel, as described, the series of holes 7 in the lower part of the channel 6, and the outlet-cock D, the said parts being arranged to operate together substantially in the manner and for the purpose hereinbefore set forth and described.

3. The arrangement of the upper surface of the layer of charcoal in chamber C, substantially in the same horizontal plane with the lower edges of the perforations c''', as indicated by the dotted line y in Fig. 1, for the purpose of causing the wash-water coming from the tube E to pass horizontally to and through the said perforations c''' to the annular chamber c'', substantially as and for the purpose hereinbefore described.

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Witnesses:

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