2 Sheets—Sheet 1.

P. P. EMORY.
Water-Filter.

No. 206,938. **Patented Aug. 13, 1878.**

Fig 1

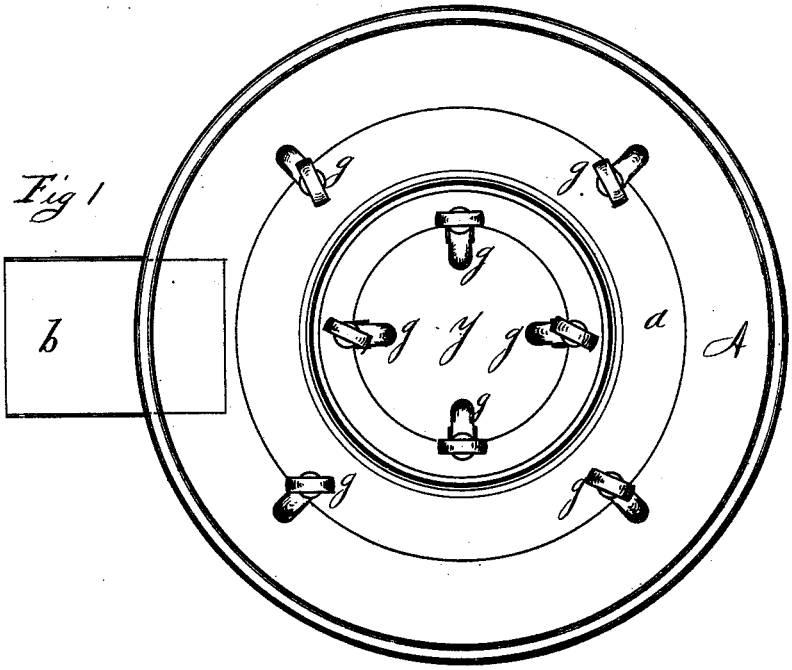

Fig 2

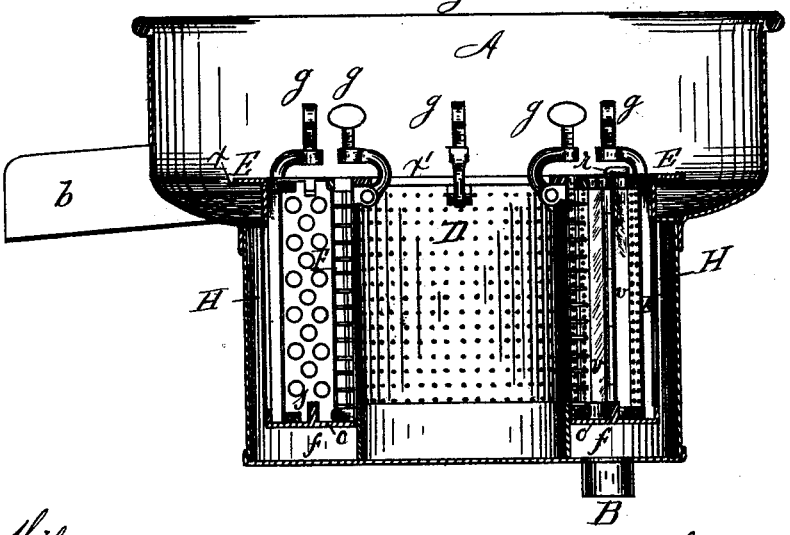

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Fig 3

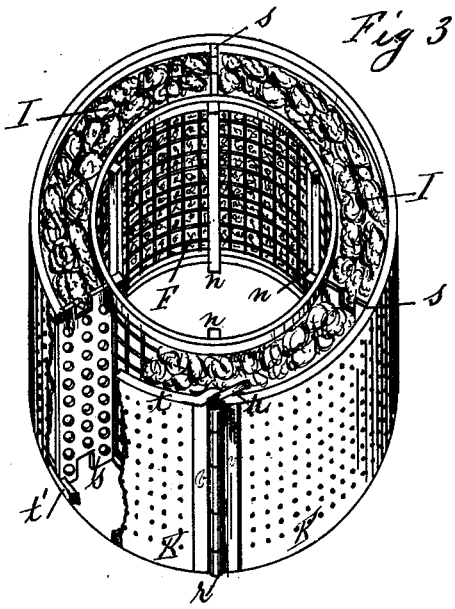

Fig 4

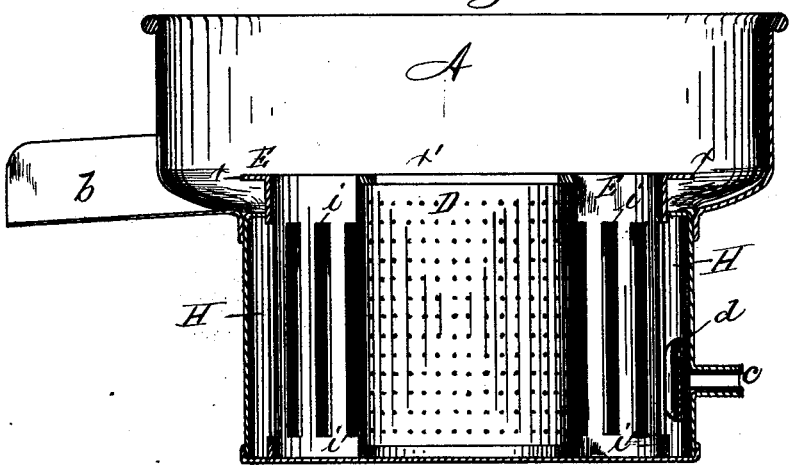

Fig 5

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UNITED STATES PATENT OFFICE.

PASCHAL P. EMORY, OF SPRINGFIELD, MASSACHUSETTS.

IMPROVEMENT IN WATER-FILTERS.

Specification forming part of Letters Patent No. **206,938**, dated August 13, 1878; application filed May 27, 1878.

To all whom it may concern:

Be it known that I, PASCHAL P. EMORY, of Springfield, county of Hampden, and State of Massachusetts, have invented new and useful Improvements in Water-Filters, which improvements are fully set forth in the annexed specification and in the accompanying drawings.

The object of my invention is to provide for paper-makers and other industries requiring a large quantity of clear water a filter which will be effective for the purpose, present a large area of filtering medium, and have its parts so arranged that the latter can, when choked with foreign substances extracted from the water which has passed through it, be easily removed and replaced by one that is clean without the necessity of stopping the supply of water for any considerable length of time.

Referring to the drawings, which consist of two sheets and five figures, Figure 1 is a plan view of my improved filter. Fig. 2 is a vertical section of the same, with the top plate removed. Fig. 3 is a perspective view of my improved sponge-case removed from the filter. Fig. 4 is a vertical section of my filter, with the sponge-case removed, and showing its construction when arranged with a side inlet. Fig. 5 is a rear view of a water-shield for the side inlet.

Various filtering devices for the purposes above set forth have been made, in which sponge and other similar or fibrous material have been used through which to pass the water; but their mode of construction has rendered their use very inconvenient, inasmuch as it has been difficult to clean them when they became filled with sediment from the water, and they did not present such an area of filtering-surface through which to pass the water as was desirable without involving considerable expense in construction; but by the use of my improvements, as hereinafter set forth, the above inconveniences are obviated.

A is the tub. *b* is the spout; *a*, the top plate; B, the bottom inlet; *c*, the side inlet; *d*, the side-inlet shield. *g* are hinged clamps. D is an inner perforated tube fixed to the bottom of tub A, on the top rim of which one of the series of clamps *g* is hung. E is an outer circular case with vertical perforations *i*. *o* is an inner bottom surrounding perforated tube D, leaving a space, *f*, between it and the bottom of tub A.

Sponge-case, Fig. 3, is composed of an inner wire-cloth tube, F, with vertical supports *n*, vertical perforated partitions *s*, upper and lower rims *t t'*, and a perforated flexible metallic outside band, K, united by a hinged joint, *v*, and pin *r*.

H is a water-space between tub A and case E. I, Fig. 3, is a sponge-packing between band K and wire-cloth tube F.

I construct my improved filters with a bottom inlet, B, Fig. 2, and with a side inlet, *c*, Fig. 4.

When constructed as per Fig. 2 the tub is made with the inner bottom, *o*, so as to form the water-space *f* therein, from which the water flows up and around in the space H between the tub A and the circular case E, and thence through the sides of the sponge-case, Fig. 3, into the center *y* of perforated tube D, and thence over the top of plate *a*, and escapes by spout *b*.

When constructed with side inlet, *c*, Fig. 4, the inner bottom, *o*, is dispensed with, the sponge-case, Fig. 3, is made long enough to set down onto the bottom of tub A, and the water admitted at the side into space H finds its way through the filter, as above described.

The shield *d* is secured in space H directly opposite inlet *c*, to direct the ingoing stream of water circularly around in space H, and so prevent an undue deposit of sediment from too violent a contact of the water against the sponge-case opposite said opening *c*.

Circular perforated case E is firmly secured to the bottom of the tub A, and to the side of it, around the line of the height of spout *b*, and has a flanged rim, *x*, around its border. Secured to the under side of rim *x* are hinged screw-clamps *g*, Figs. 1 and 2.

a is a circular plate, fitted to the top of the rim *x*, having a bearing thereon, and on the top of rim *x'* of the perforated inner tube, D. Hinged screw-clamps, like those described as secured to the under side of rim *x*, are also secured to the under side of rim *x'* on tube D, and the

latter is firmly fixed to the bottom of tub A. Plate *a* may be turned or ground to a water-tight fit on the tops of rims *x* and *x'*, or a gasket of suitable material may be interposed between them, to make a tight joint when said plate is screwed down against them by screw-clamps *g*.

Sponge-case, Fig. 3, is composed of the parts already designated; and the vertical perforated partitions *s* are firmly secured by their edges to the outer surface of wire-cloth tube F, to form divided sponge-cells, so as to secure greater compactness in packing the sponges therein, and they act as a support to the rims *t* and *t'*, which are secured to their outer top and bottom corners. K is a flexible porforated metallic band, covering entirely the outside surface of sponge-case, Fig. 3, and is secured around it by bringing its hinged ends *v* together and inserting pin *r* through the hinged parts, and it may be readily removed from the case by withdrawing pin *r*.

My filter is packed and arranged for use in the following manner, viz.: Band K is secured around the sponge-case, the latter being removed from tub A, as heretofore described, and sponges I are solidly packed into the divisions of the case between perforated partitions *s*, and the sides thereof formed by band K and wire-cloth tube F; and I take care to let the sponges bulge out above and below the rims of the sponge-case, so that when plate *a* is screwed down the sponges will be tightly pressed between the latter and the bottom of tub A, and so prevent the water from running freely between them. Thus packed, the sponge-case is placed in the tub A between circular case E and inner perforated tube D. Plate *a* is then placed on top of rims *x x'*. Clamp-screws *g* are swung over so their screws will bear vertically on the top of said plate, and in this position they are screwed firmly down against said plate, making a tight joint between it and rims *x x'*, said plate also bearing tightly against the top surface of the sponge-packing. Thus arranged, the water may be let on, and it will be forced to pass through case E, perforated band K, sponges, wire-cloth tube F, and perforated tube D, to arrive inside of the latter, and flow up over plate *a*, and thence out through spout *b*. Coarse sediment in the water will be arrested on the outer surface of band K, and the fine dirt by sponges I. The wire-cloth tube F acts as a strong barrier to hold the sponge-packing against the inward pressure of the water, and its openings are at the same time so ample that the water-pressure cannot force the sponge so compactly against it as to greatly impede the water-flow, as is often the case if a perforated metal, like band K, be used in the same position. Inner perforated tube D acts as an additional barrier against the passage of any foreign substance that may be brought along by the water.

The sponge-case and the sponges packed therein, having become foul and full of sediment by the passage of much water through it, are changed in the following manner, viz: I keep in reserve one extra sponge-case for each filter in use, ready packed with clean sponges, and ready to be inserted in tub A at a moment's notice whenever a change may be required, and by this means I can, by unscrewing screw-clamps *g* and removing plate *a*, remove the dirty case and its packing bodily from the tub, and insert the clean one in its place in a few moments, thus practically obviating any delay to the work by changing from a dirty to a clean filter. Of course, it is not indispensable that an extra sponge-case be kept in reserve, as above stated; but it greatly facilitates the operation of changing, as set forth.

When the dirty case and packing are removed from the tub A they are taken to a proper place, and pin *r* is withdrawn from band K, said band is removed from the case, and thus all the sponge-packing is freed and falls out of the sections of the case in which it was inclosed, and may be cleaned and repacked therein for further use. The removable band K greatly facilitates the work of cleaning my filter, for the sponges are packed in the case-divisions very tightly, and it would require much time to remove them if the case was made with a fixed exterior wall instead of a removable band, K.

I do not confine myself to the combination of the removable sponge-case, Fig. 3, with the tub A and plate *a*, as constructed and shown; but I can make a superior filter, substantially upon my plan, to be attached to the water-supply pipe of a house or other building, in the cellar thereof or other convenient place, by making an outer case, which would be represented by tub A if its bowl part above case E and its spout were cut off, and by partially closing over the center opening *y* in plate *a*, leaving only a pipe-outlet thereon. In this manner my filter could be connected into the line of the water-supply pipe by inlet B or *c* and by said outlet in plate *a*, and when the filter became foul plate *a* could be removed by unscrewing clamps *g* and putting in a clean sponge-case, as above described. In this way I could furnish a filter for domestic and other purposes that could run a long time without changing and be very convenient to take care of.

What I claim as my invention is—

1. The combination, with tub A, perforated tube D, and plate *a*, of the removable sponge-case, Fig. 3, substantially as and for the purpose set forth.

2. The sponge-case, Fig. 3, constructed with the removable perforated band K, substantially as and for the purpose set forth.

3. The combination, in the sponge-case, Fig. 3, of wire-cloth tube F, perforated divisions *s*, and the flexible perforated removable

band K, substantially as and for the purpose set forth.

4. The combination of the case E, perforated tube D, hinged screw-clamps *g*, and plate *a*, substantially as and for the purpose set forth.

5. In a water-filter, the sponge-case, Fig. 3, constructed and arranged substantially as set forth, whereby the filtering medium packed in sponge-case, Fig. 3, may be, with said sponge-case, inserted in and removed bodily from case or tub A, substantially as set forth.

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Witnesses:
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