(No Model.) 2 Sheets—Sheet 1.

C. H. RHOOD.

FILTERING DEVICE.

No. 597,222. Patented Jan. 11, 1898.

Fig. 1.

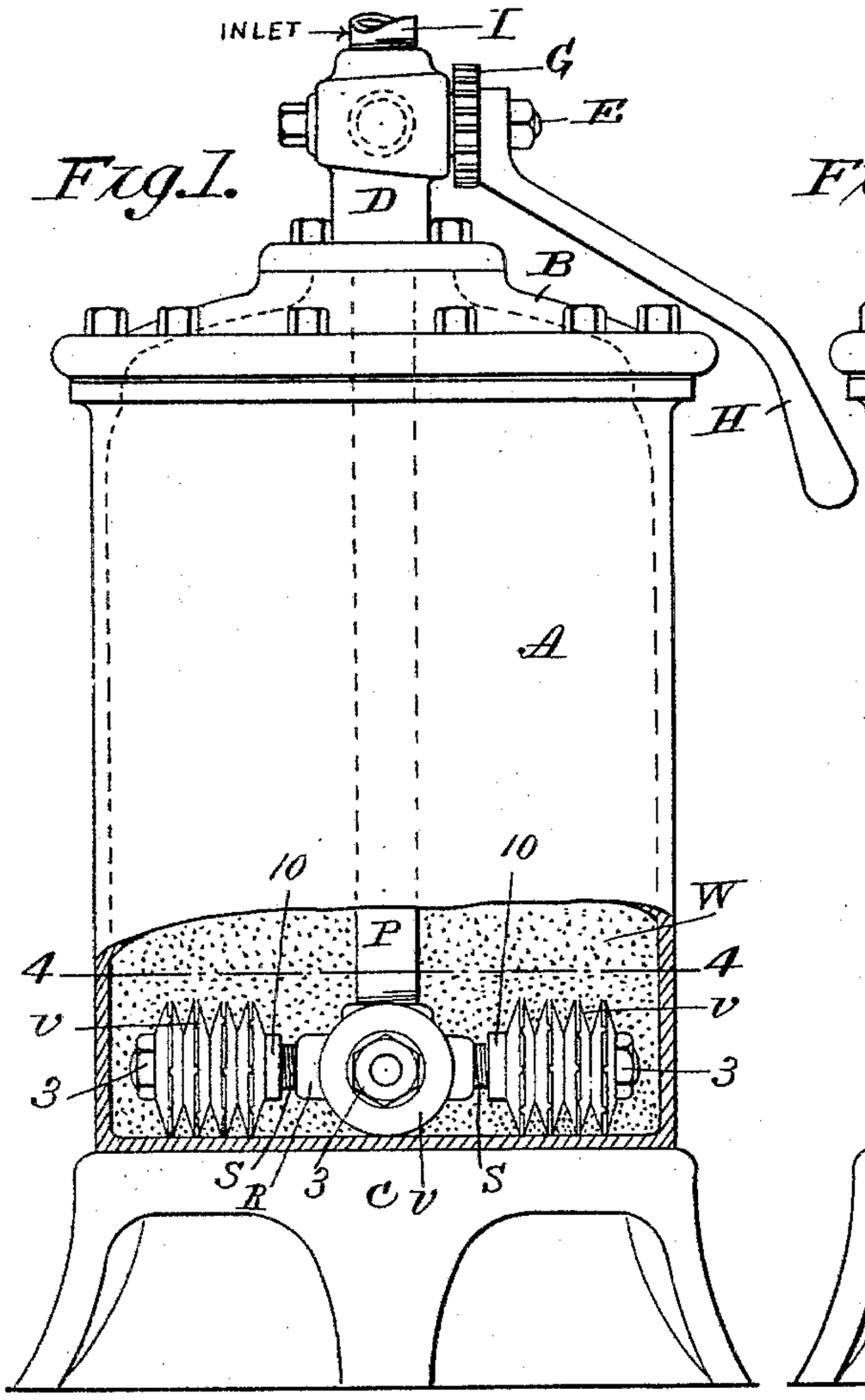


Fig. 2.

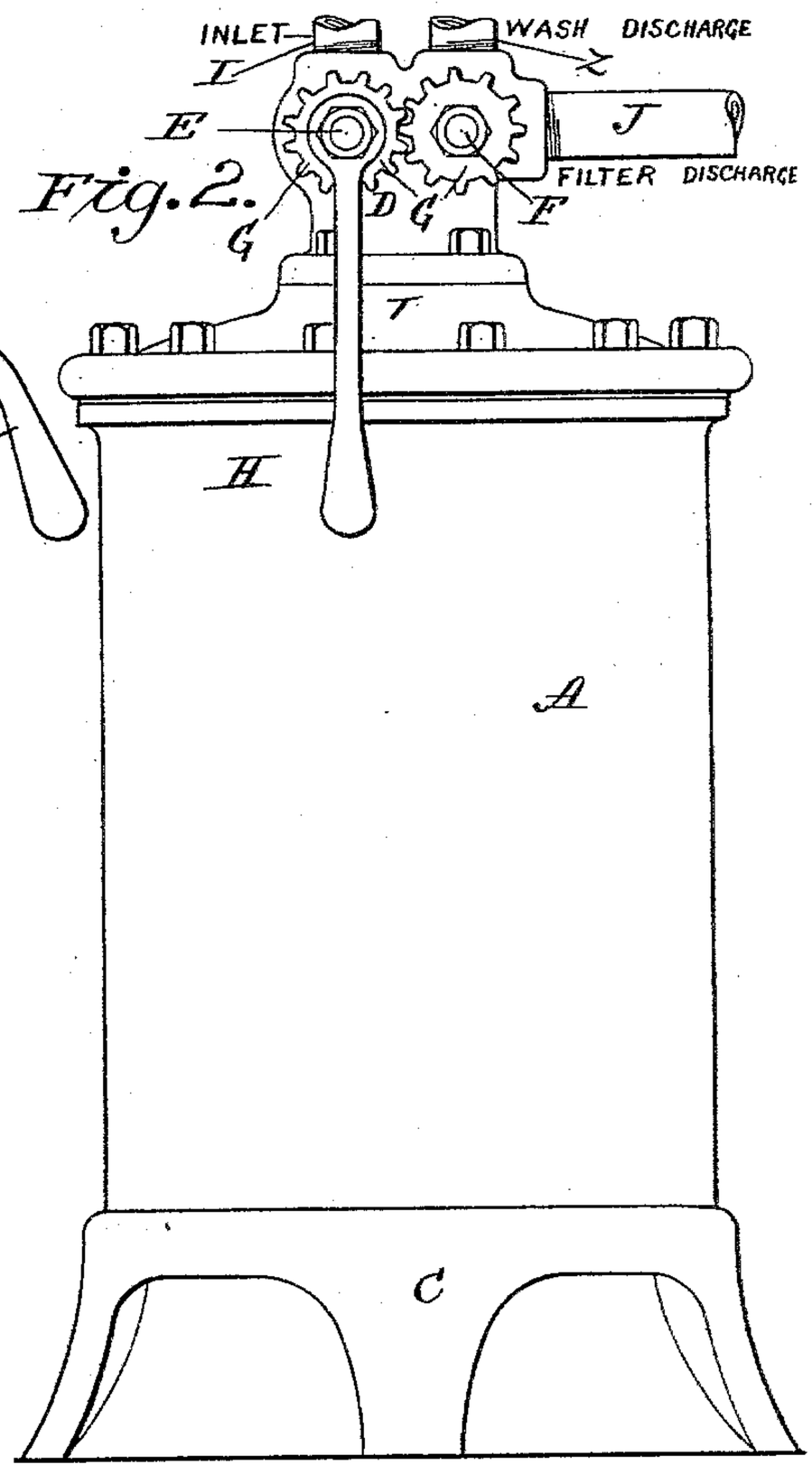


Fig. 3.

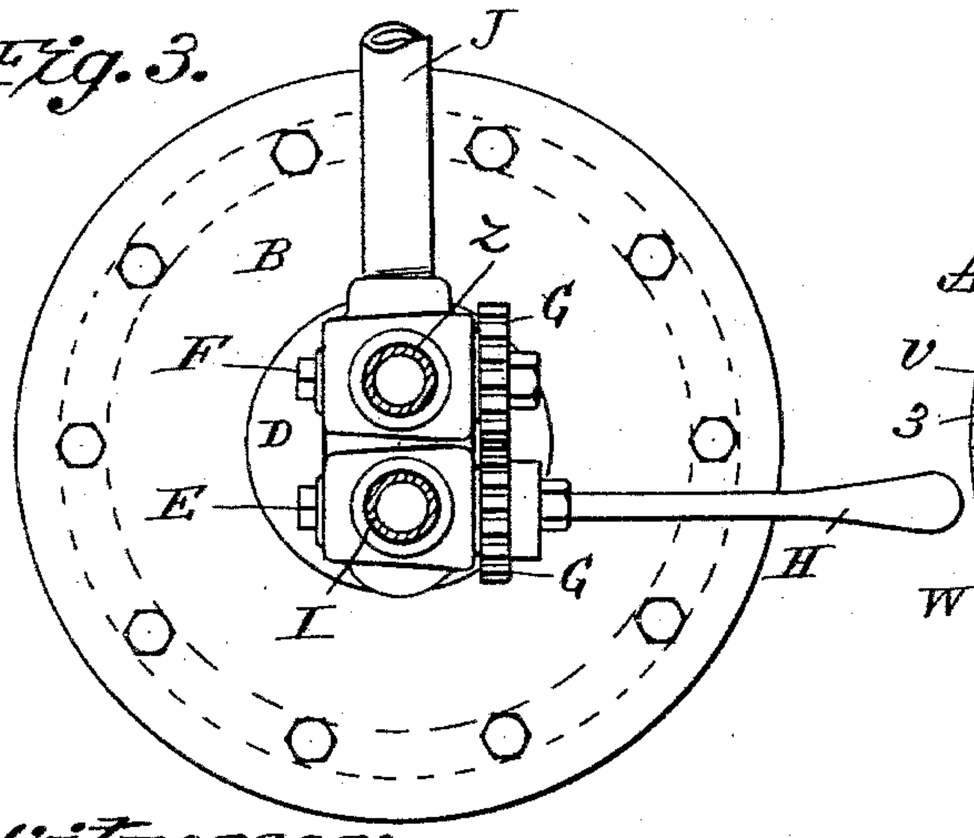
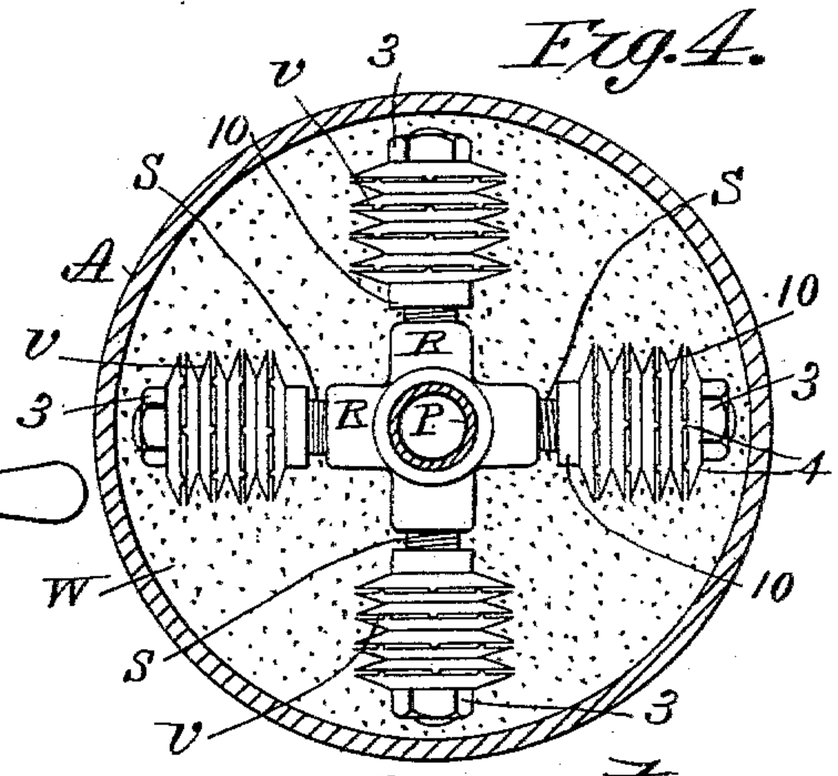


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

C. H. RHOOD.

FILTERING DEVICE.

No. 597,222. Patented Jan. 11, 1898.

Fig. 5.

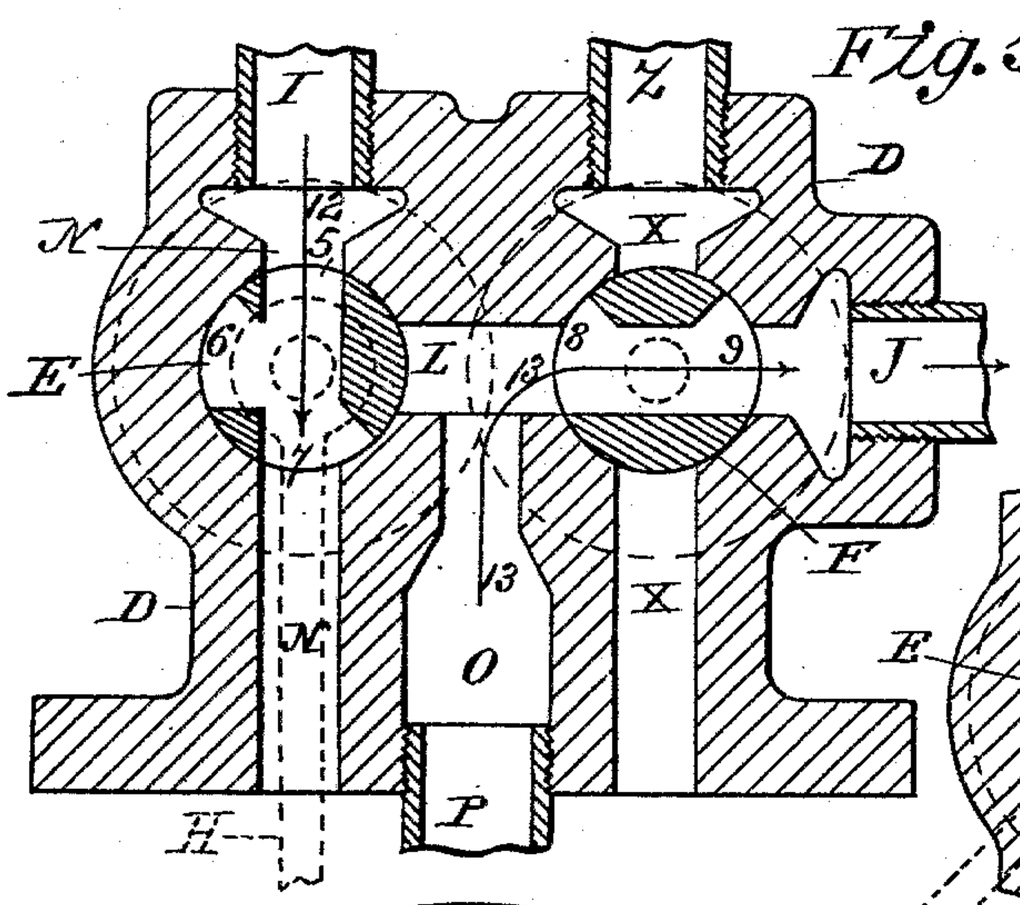


Fig. 8.

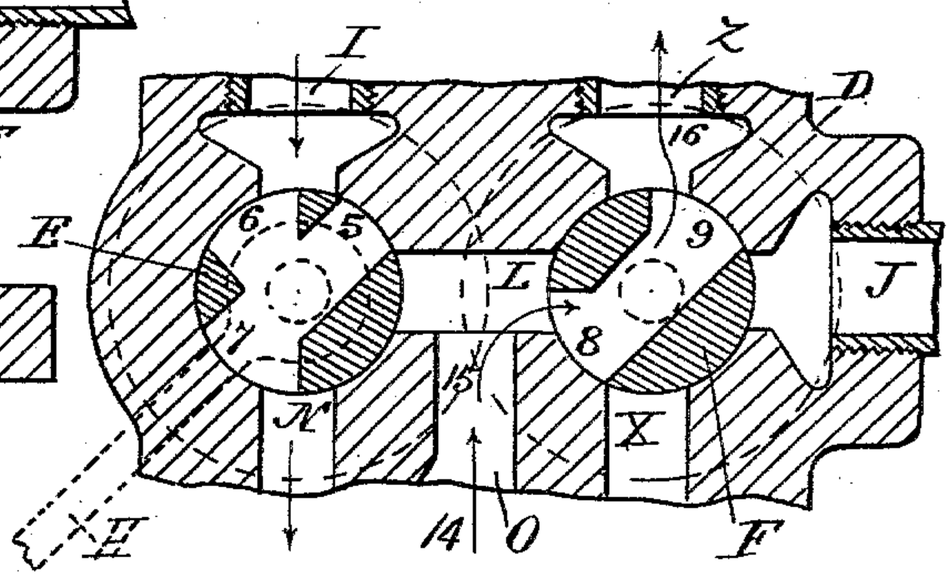


Fig. 6.

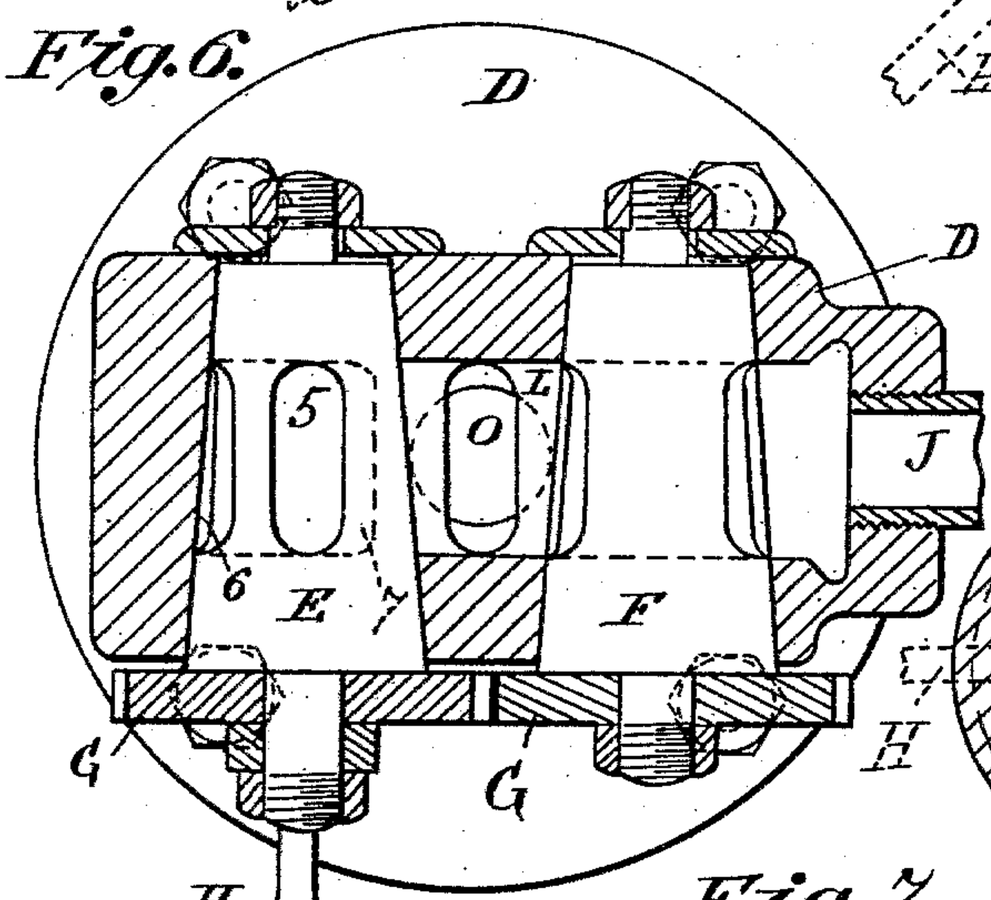


Fig. 9.

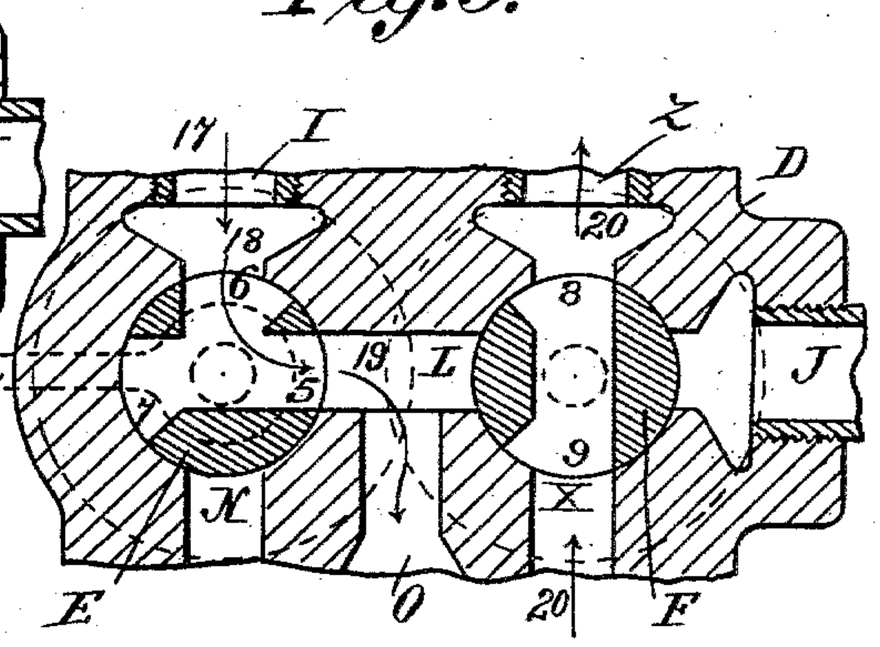
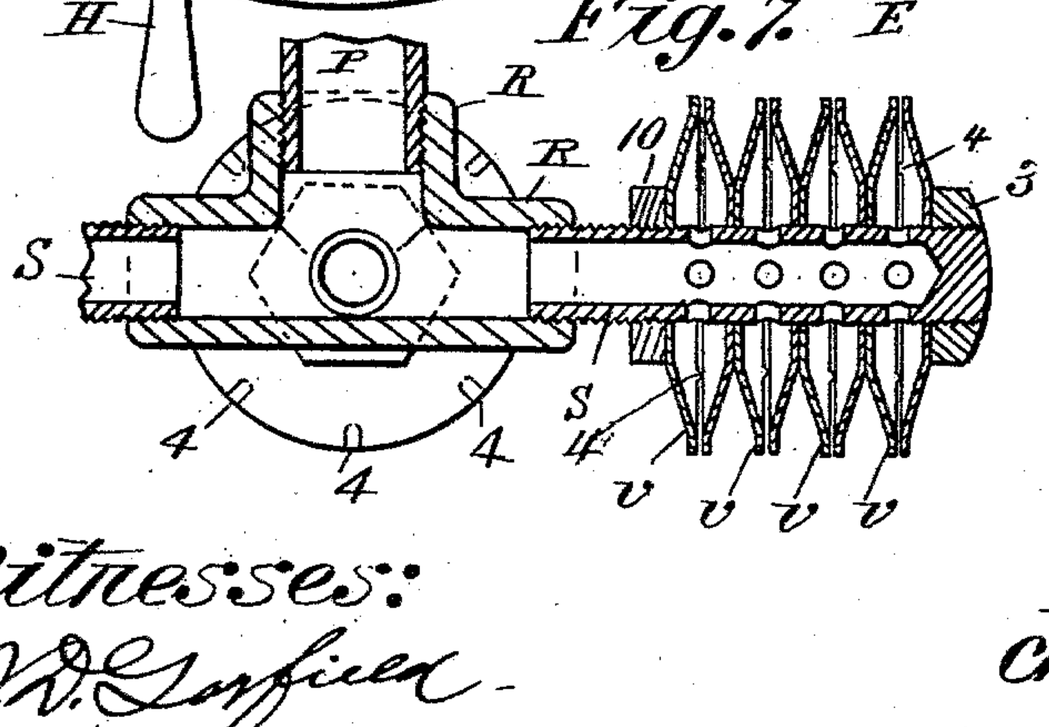


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHARLES H. RHOOD, OF NORTHAMPTON, MASSACHUSETTS.

FILTERING DEVICE.

SPECIFICATION forming part of Letters Patent No. 597,222, dated January 11, 1898.

Application filed September 18, 1897. Serial No. 652,166. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. RHOOD, a citizen of the United States, residing at Northampton, (Florence,) in the county of Hampshire and State of Massachusetts, have invented new and useful Improvements in Filtering Devices, of which the following is a specification.

This invention relates to filtering devices for the purification of water, the object being to provide an improved apparatus of this class in respect to convenience of manipulation for directing the flow of water for filtering, for washing sediment and foul matter from the filtering elements, and for washing unfiltered water from said elements subsequent to washing out said sediment; and the invention consists in various details of construction and arrangement of parts, all as hereinafter set forth, and more particularly pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a side elevation of a filtering device embodying my improvements, a portion of the case thereof being shown broken away to disclose certain features of internal construction. Fig. 2 is a front elevation, and Fig. 3 is a top plan view, showing certain water-conduits in section. Fig. 4 is a transverse section on line 4 4, Fig. 1. Fig. 5 is a vertical sectional view of the double-barrel cock-body of the device and of the plugs therein, showing the latter in certain relative positions, below described, and portions of water-conducting pipes connected to said body. Fig. 6 is a plan view of the head of said case and a horizontal section of said cock-body thereon, illustrating the plugs of the cocks in their relative positions in said body. Fig. 7 is a sectional view of parts of the filtering elements hereinafter described. Figs. 8 and 9 are similar views to that of Fig. 5 in respect to the portion of the cock-body containing the plug-barrels, but showing the cock-plugs in positions different from those shown in said Fig. 5, as and for the purposes below described.

In the drawings, A indcates the filter-case, preferably of cylindrical form. B is the head of said case, suitably bolted to the upper end thereof, as shown. C is the stand or support on which said case rests.

D indicates a cock-body cast from suitable metal and provided with two plug-barrels side by side, as shown, in which are suitably fitted and secured two cock-plugs E and F, as shown, for simultaneous revoluble movements, as below described, whereby the flow of water in various directions is effected through said head. Each of said cock-plugs E and F has a spur-gear G fixed thereon, and said gears are of like diameters and interengage, as shown, to the end that said revoluble movements of said plugs shall be substantially the same in degree. An operating handle-lever H is secured to the end of one of said plugs, as shown. Said plug E is made with three ports 5, 6, and 7 of variable areas of opening on the surface of the plug, all communicating with a common central chamber therein, as shown. Said plug F is made with two ports 8 and 9, as in common practice, excepting that said ports have a greater area in cross-section at the surface of the plug than at the center thereof. The areas of the ports of said plugs at the surface of the latter, arranged as described, provide, in conjunction with the described means for rotating said plugs simultaneously, means for effecting the flow of water, as below described, through the parallel water-passages N and X and the right-angularly-arranged water-passages L and O of said cock-body D, as indicated by the arrows in Figs. 5, 8, and 9. It is obvious that said plug-ports may, in a plug of relatively large diameter, be continued of the same conducting capacity from side to side of the cock-plug, if desired; but it is preferable for economical reasons that said ports be constructed as shown and as adapted to a plug of moderate diameter. A series of intercommunicating water-passages comprising an outlet-passage O for filtered water and a discharge-passage X for foul or rinsing water are formed in said cock-body D, and a passage N therein is formed beneath said cock-plug E, through which water to be filtered flows into said case A. An inlet-pipe I above the cock-plug E constitutes the water-supply pipe for the filter, and a pipe J, connected to one side of said plug F, serves to conduct filtered water from the filter. A pipe Z above said last-named cock-plug serves for conveying water from the filter which has been used for washing de-

posits from the filtering elements, as below described. A pipe P, having a connection with said outlet-passage O in the cock-body D, extends downwardly from the latter, as shown in Fig. 1, nearly to the bottom of said case A, and has a four-way T connection R, secured thereon, as shown, and into each outlet of said connection is screwed a pipe S, having perforations through its sides, as shown. The outer ends of said pipes S are closed and outwardly screw-threaded, and each has a nut 3 thereon and a collar 10 screwed thereon. On each of said perforated pipes S is placed a group of filtering-boxes *v* between said collar 10 and nut 3, and each of said boxes is hollow and communicates with one or more of the said perforations in the pipe on which it is placed. Said boxes *v* are constructed as follows and consist of two concavo-convex metal plates, each having a narrow flat border and a central portion substantially in a plane with said border, to the end that said boxes *v* may be applied side by side on a common water-conductor, as said hollow pipe S. The inner side of said flat border of each metal plate has projections 4 thrown up thereon by indenting the outer opposite side of the border. (See Fig. 7.) Said projections are in practice inconsiderable and only sufficient to maintain such a separation of the two borders of said filtering-boxes as will barely permit water to flow therebetween, to the end that no fine particles of matter that may be carried in the water shall be allowed to pass into said filtering-boxes and thence into the filtered water.

The above-described filtering-boxes are shown and claimed in my application for a patent filed August 7, 1897, Serial No. 647,493.

The said filter-case A is nearly filled with suitable sand or fine emery or similar granulated filtering element W, in which said filtering-boxes *v* are embedded, as shown, and, as below described, all the water which passes through the filter must first percolate said granulated element and then pass through the said narrow spaces between the borders of said filtering-boxes, and thence flow upwardly through the pipe P into the said cock-body D, and thence outwardly for use, as below described.

The operation of the within-described filtering devices for the purposes set forth above is as follows, viz: With the said cock-plugs E and F turned by the handle-lever H to bring the ports 5, 7, 8, and 9 to the positions illustrated in Fig. 5 water to be filtered entering the filter by the inlet-pipe I flows through the ports 5 and 7 of the cock-plug E and thence into the case A, upon the top of the granulated filtering element W, through which it percolates, and thence passes slowly through the slightly-separated borders of the filtering-boxes *v* and through the perforations in the sides of the pipes S, into the latter, and the water then flows into the four-way T connection R, and thence upwardly through the pipe P, into the outlet-passage O in the cock-body D, and then it follows the course indicated by the arrow 13, passing into the horizontal passage L and through the ports 8 and 9 of the cock-plug F, and finally off through the outlet-pipe J to any suitable receptacle for filtered water. It will be noted that while water flows, as above described, communication between the water-passage X and the pipe Z is entirely cut off by the cock-plug F.

When from long use or from the flowing of foul water through the filter the filtering elements become charged with sediment or objectionable deposits and the proper action thereof is prevented, said deposits are washed out from the filter by seizing the handle-lever H and moving it to the left about to the horizontal position indicated in Fig. 9 by dotted lines at the left of said figure. Said movement of the handle-lever causes said cock-plugs to be rotated so as to bring the cock-plug E into such position that the part of said passage N below said plug in the cock-body D is closed and the ports 6 and 5 of said last-named plug are brought to register with the upper end of said passage N and with the horizontal passage L and the upper end of said outlet-passage O, whereby washing-out water may flow freely from the inlet-pipe I through the pipe P into the filtering-boxes *v*, and thence upwardly through the said granulated filtering element W, carrying with it the said deposit of objectionable matter. It will be noted that when said cock-plug E was last turned, as shown in Fig. 9, the cock-plug F was also turned, bringing its ports 8 and 9 to register with the passage X in the cock-body D and cutting off said horizontal passage, thus making a free water-passage from the top part of the interior of the filter-case A outwardly through the pipe Z, through which said washing-out or dirty water may flow off through the pipe Z until the interior of the filter shall be thoroughly cleansed. However, there remains after said "washing out" more or less unfiltered water in the filtering elements, which should not be allowed to mingle with heretofore-filtered water that shall have passed off through the pipe J, and therefore said cock-plugs, by again moving said handle H, and this time to the position indicated by dotted lines to the left of Fig. 8, are turned to positions shown in the latter-named figure, whereby water to be filtered is permitted to enter the filter through portions of the ports 6 and 7 of the cock-plug E, passing, as described relative to Fig. 5, through the passage N in said cock-body into the filter-case A, and thence through the filtering elements above described; but the escaping water for the moment is caused to flow from said outlet-passage O through a portion of said horizontal passage L, and thence through the ports of the cock-plug F, which now cuts off the water flow from escaping, through the pipe J, into and off through said pipe Z; but after a momentary flow of

water in this direction said handle-lever H is returned to the above-described position relative to Fig. 5, thereby changing the direction of the flow of filtered water from said pipe Z to the aforesaid pipe J, which constitutes the regular outlet for filtered water.

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

1. A filtering device comprising a case, filtering elements contained in said case, a cock-body mounted on said case having two plug-barrels in said head, several intercommunicating water-passages in said head through which water may flow toward and from said barrels and into and out from said head and through said head into and out from said case and said filtering elements therein, combined with two simultaneously-revoluble cock-plugs in said barrels, having ports registering with certain of said water-passages, connections for admitting water through said head to and from said case, and means for operating said plugs whereby water is permitted to flow, alternately, into and out of said case for filtration, for washing and cleansing the filtering elements, for ejecting unfiltered water therefrom, and for reinstating the flow of filtered water, substantially as set forth.

2. A filtering device comprising a case, a cock-body mounted on said case having two parallel water-passages extending between the under and upper sides thereof, a third water-passage forming communication between one side of said body and said parallel passages, and a fourth water-passage forming communication between the under side of said body and said third passage, two plug-barrels in said head, each in water communication with said four passages, a granulated filtering element contained in said case, several hollow filtering-boxes embedded in said granulated element receiving water through openings in their borders, conducting-pipes supporting said boxes receiving and conveying water therefrom to said fourth water-passage in said head, combined with two simultaneously-revoluble plugs in said barrels having ports registering with said parallel and third water-passages, means for operating said plugs, and connections for admitting water through said head to said case, whereby the same is permitted to flow alternately into and out of said case for filtration, for washing and cleansing the filtering elements, for ejecting unfiltered water therefrom, and for reinstating the flow of filtered water, substantially as set forth.

3. A filtering device comprising a case, a cock-body mounted on said case having two parallel water-passages extending between the under and upper sides thereof, a third water-passage forming communication between one side of said body and said parallel passages, and a fourth water-passage forming communication between the under side of said body and said third passage, two plug-barrels in said head, each in water communication with said four passages, a granulated filtering element contained in said case, several hollow filtering-boxes embedded in said granulated element receiving water through openings in their borders, conducting-pipes supporting said boxes receiving and conveying water therefrom to said fourth water-passage in said head, combined with two cock-plugs in said barrels having ports registering with said parallel and third water-passages, interengaging spur-gears on said plugs, whereby the simultaneous revoluble movement of said plugs is effected, means for turning said plugs, and connections for admitting water through said head to said case, whereby the same is permitted to flow alternately into and out of said case for filtration, for washing and cleansing the said filtering elements for ejecting unfiltered water therefrom, and for reinstating the flow of filtered water, substantially as set forth.

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