

(No Model.)

2 Sheets—Sheet 1.

E. A. BRASHEAR.
FILTER.

No. 579,039.

Patented Mar. 16, 1897.

Fig. 3.

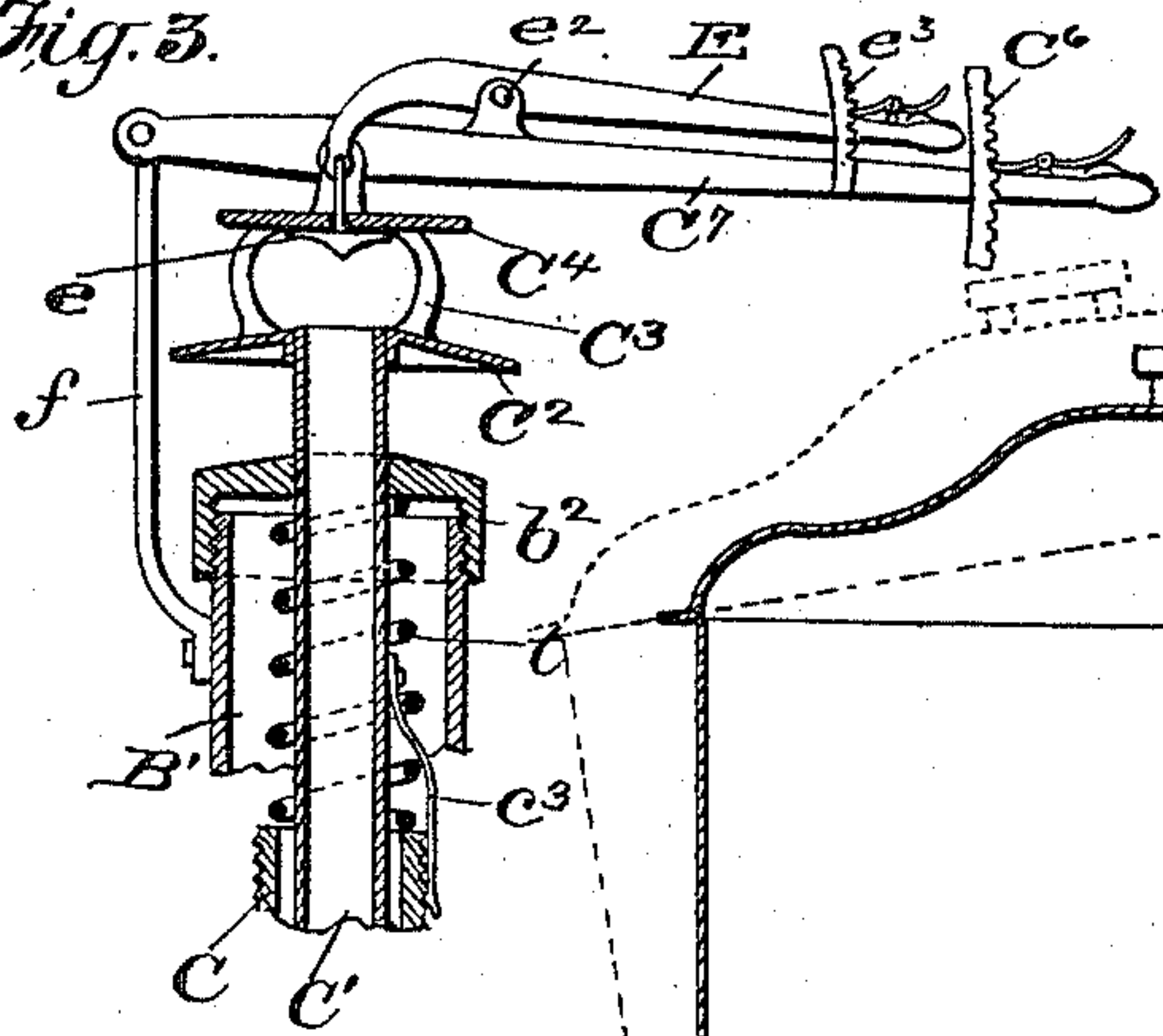
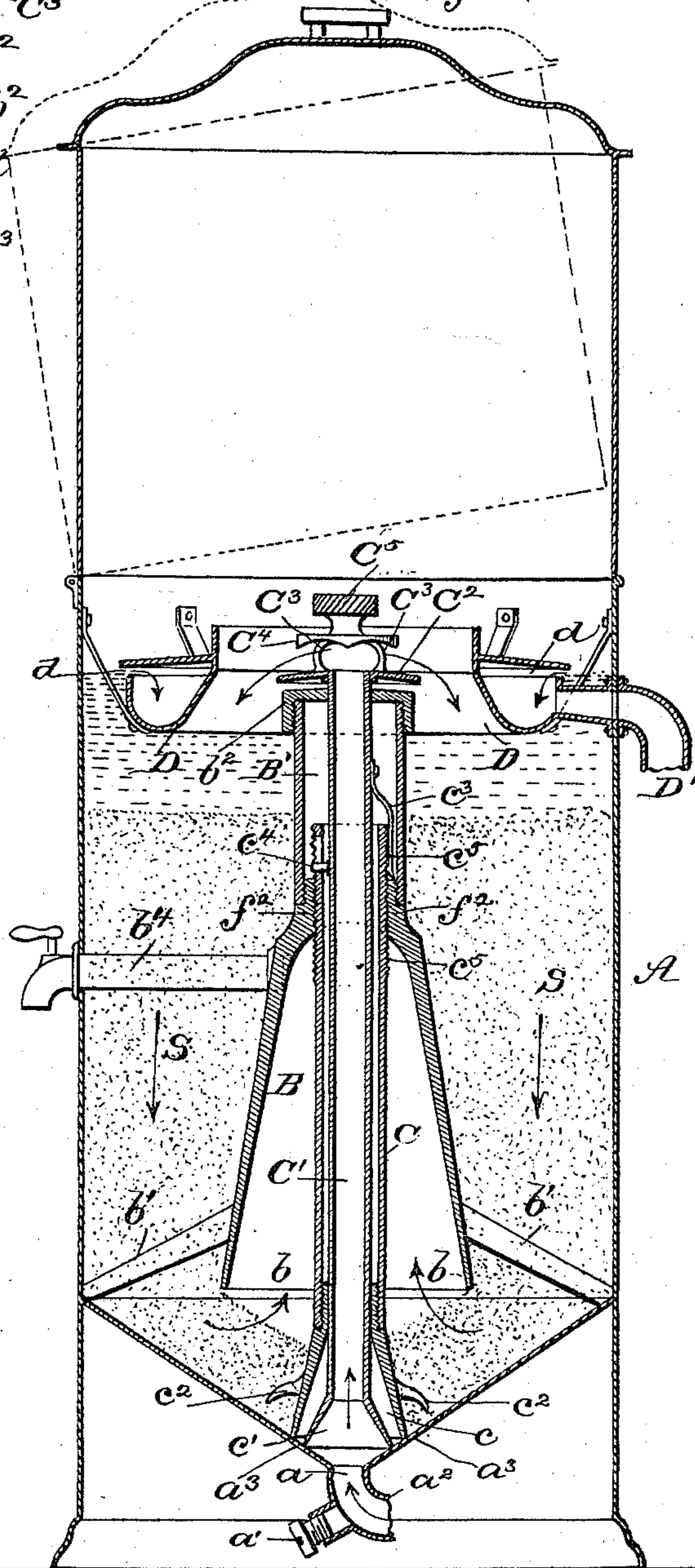


Fig. 1.



WITNESSES:

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(No Model.)

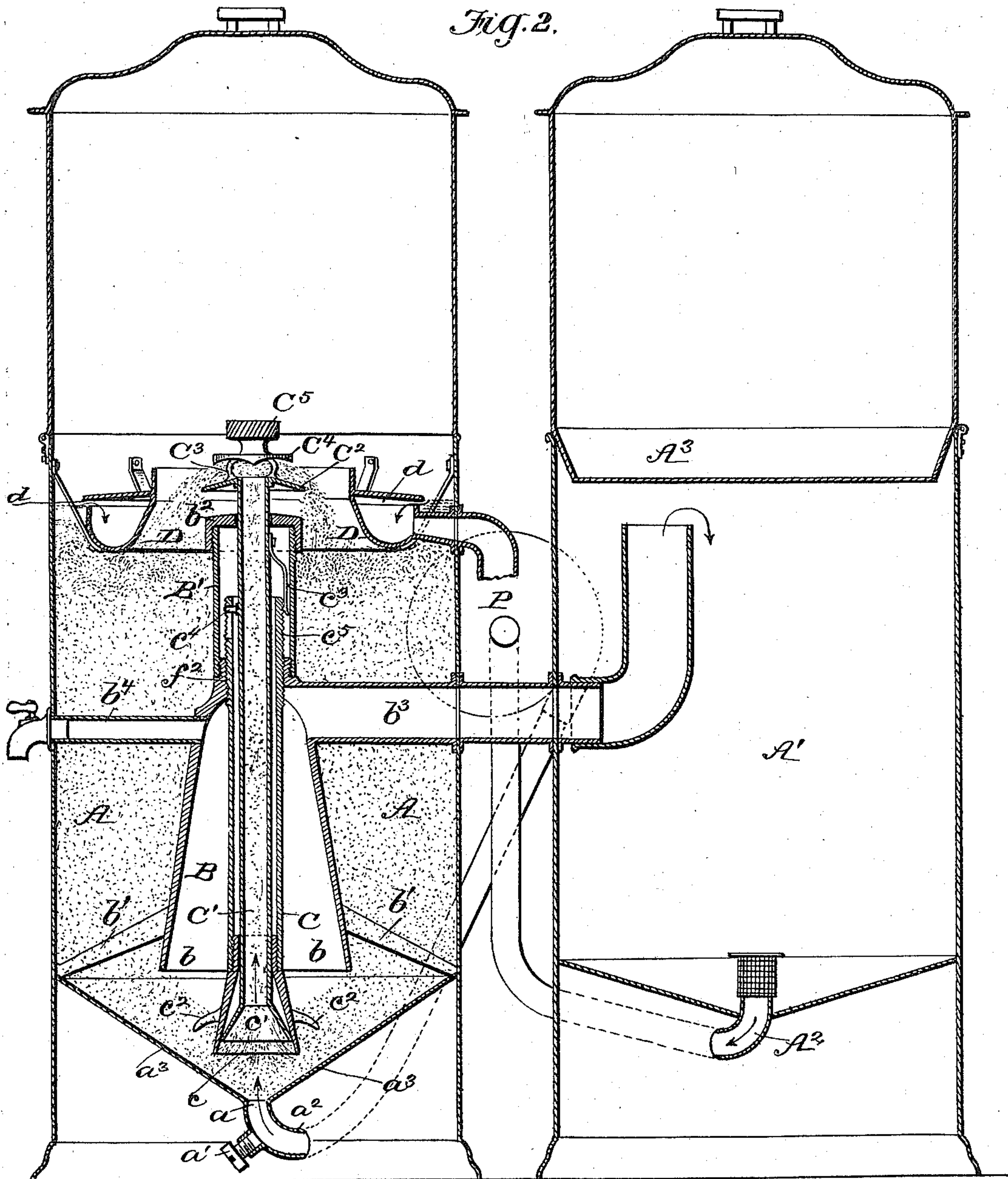
2 Sheets—Sheet 2.

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Fig. 2.



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UNITED STATES PATENT OFFICE.

EDON ARUEL BRASHEAR, OF WESTERN PORT, MARYLAND, ASSIGNOR OF
ONE-HALF TO CHARLES B. KARN, OF SAME PLACE.

FILTER.

SPECIFICATION forming part of Letters Patent No. 579,039, dated March 16, 1897.

Application filed November 28, 1896. Serial No. 613,836. (No model.)

To all whom it may concern:

Be it known that I, EDON ARUEL BRASHEAR, of Western Port, in the county of Allegany and State of Maryland, have invented a new and useful Improvement in Filters, of which the following is a specification.

The object of my invention is to provide an improved filter to be used either for family purposes or for operations on a larger scale.

It belongs to that class of filters in which sand is employed as the filtering medium and in which the sand may be agitated and cleansed from time to time by the power of the water which is admitted to the filter under pressure.

It consists in the novel and peculiar construction and arrangement of parts whereby the currents of water are controlled and the sand cleaned and effective filtration provided in a very simple and practical manner, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a central vertical section of the filter in its simplest form as constructed and arranged for family use, the parts of the filter and the sand being shown in the position that they occupy when filtering. Fig. 2 is a similar view of the filter as adapted for large families, hotels, or for power-filtering on a larger scale, the parts of the filter and the sand being shown in the positions which they occupy when the sand is being cleaned of its accumulated impurities. Fig. 3 is an enlarged detail showing means for working the central tubes in the larger power-filters.

In the drawings, A represents the outer casing, of any suitable shape and material. This will generally be constructed in the form of an ordinary water-cooler with a cylindrical body and circular base, but the bottom of the filtering-chamber is conical and tapers downwardly to a central inlet a . This communicates with the water-service pipes of the house or with a force-pump or other source of water-supply under pressure through the pipe a^2 , a detachable plug a' being inserted in the bend of the pipe a^2 for the purpose of cleaning away sand or impurities which may settle at this point in the inlet-pipe.

Centrally within the outer casing there is fixed the filtered-water chamber B. This is

of conical shape, and on top is provided with a detachable surmounting cylinder B', screwed thereto and having detachable cap b^2 at the top, while the open lower end b of the chamber B is sustained in fixed position within the case by legs $b' b'$. Centrally within this chamber B there are two concentric tubes C C', both of which are vertically adjustable, and which are also independently movable in relation to each other. These tubes have flared and open lower ends c and c' , which are adapted to receive the unfiltered water or the commingled water and sand in cleaning the filter, and the vertical motion of these tubes causes their lower ends to act as a sand cut-off or compound valve with the bottom of the filtering-chamber, the outer and flared end c of tube C fitting, when in its lowest position, tightly against the conical bottom of the filtering-chamber and having points or spurs c^2 to stir the sand.

The inner tube C' at its upper end passes through the cylinder B' and its cap b^2 and opens through and is surmounted by a cap C², and on this are mounted legs C³, sustaining a deflector-disk C⁴ directly above the open upper end of the central tube C. This disk has on its under side a conical peak extending downwardly concentrically above the open end of the tube C' for the purpose of uniformly deflecting the rising current of water into an outwardly-flowing sheet of water all around the tube, and said deflector-disk has also a milled knob or handle C⁵, by which it may be lifted and also turned about its vertical axis. The inner tube C' slides vertically within the outer tube C and cylinder B', but rotates with tube C through a connection formed by a headed pin c^4 , fixed to the inner tube and extending through a vertical slot in the outer tube, and a spring c^3 on the inner tube bears against the outer tube and holds the two to whatever vertical adjustment is given them in relation to each other. The vertical adjustment of the outer tube is effected by an external screw-thread c^5 , formed on its upper end, which screw-thread meshes with an internal screw-thread on the flange f^2 on the top of the filtered-water chamber B.

On a level with the upper part of the tube C' and surrounding the same there is a cir-

cular ring-shaped trough D, whose inner wall is inclined and in whose outer edge, near the top and extending all the way around it, there is left an opening d on a level with the water-line, into which the scum and light impurities pass and are conducted away by the trough D and its discharge-pipe D' in cleaning the sand.

The operation of this filter as thus described is as follows: The space within the filter between the outer casing A and inner chamber B is filled with sand of the requisite fineness nearly up to the trough D. The tubes C and C' being now in their lowest positions, with their flared lower ends c and c' resting on the bottom a^3 , unfiltered water under pressure is admitted through the inlet a . This water passes up through the tube C' and striking the deflector-disk C⁴ at the top is directed downward upon the body of quiescent sand S and percolating through it downwardly deposits its impurities therein, and rising through the lower end b of the central chamber remains there in a clear and filtered condition, either to be drawn off through pipe b^4 , extending to a faucet on the outside of the filter, or passes through another pipe b^3 , Fig. 2, to a larger reservoir, as will be described hereinafter.

When the filter has become foul or clogged with deposited impurities, the cover of the outer case is removed and the knob C⁵ is pulled up and then rotated. When the knob C⁵ is pulled up, the tube C' rises within C and is held to this adjustment by the spring c^3 pressing against the outer tube, and when the inner tube and knob are rotated the pin c^4 causes the outer tube to turn also, and the screw-thread c^5 at the upper end of the outer tube causes both the tubes to slowly rise in the conical chamber B and open a space between the sand-chamber and inner side of tube C', as shown in Fig. 2. The water now entering at a under pressure gradually carries the sand up the central tube, and when it strikes the deflector-disk C⁴ at the top it is again deposited in the sand-space on the top of the slowly-descending column of sand. This continues until all the sand has several times made a complete circuit and been thoroughly washed. As it undergoes this washing process, the impurities, which are of a lighter character, rise as a scum to the top of the water in the sand-space, and overflowing through the opening d into the water-trough D pass off through the same to the discharge-pipe D'. As soon as the sand is thoroughly cleaned the tubes C and C' are forced downwardly again and are screwed to a tight bearing against the bottom a^3 , thus cutting off the sand from the central tube C', and the sand then becomes a quiescent and solid filtering-column again. The object in having the two tubes C C' is to progressively and tightly close this sand-valve, the outer bell c of the outer tube serving to hold the sand back while the inner one c' is finding a

tight bearing against the bottom a^3 , so that if any particles of sand are caught between the outer bell c and the bottom a^3 the continued inflow of water will keep clean the bearing-surface for the inner bell c' and the latter can be forced down to a tight fit. The spurs c^2 simply stir and distribute the sand as it passes into the central tube.

When filtering water on a larger scale, a larger reservoir, as A', for instance, in Fig. 2, may be connected to the filter and water may be drawn from the bottom of this reservoir through its outlet A² and to any suitable force-pump P, and thence be delivered to the inlet a of the filter, while the purified water passes out through the pipe b^3 into the reservoir A'. In this way the contents of the reservoir may be repeatedly passed through the filter. For hotel and family uses the reservoir of the filter may be provided with a hinged ice-pan A³ on the top.

When the filters are made large and the operation of the tubes C and C' is awkward or attended with the exercise of considerable power, I provide a lever mechanism for working the tubes, as shown in Fig. 3. In this case the two tubes C and C' have a slip connection through a coiled spring t , which permits one tube to move first and the other to follow. Both tubes are lifted and operated directly by a lever C⁷, which is fulcrumed to a stationary standard f , and at the other end is provided with a notched locking-bar C⁶. A supplemental lever E is fulcrumed at e^2 to the lever C⁵, and its outer end is attached to a vertically-adjustable deflector e , which is arranged beneath the disk C⁴ and may be raised or lowered to turn the currents outwardly sooner or later. This lever E is fixed in its adjustments by a notched locking-bar e^3 .

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

1. A sand-filter having a central inlet at its bottom, and a central filtered-water chamber opening at its bottom into the sand-space around it, and a vertically-adjustable concentric tube arranged when in its lowest position to cut off the sand and admit only water through it, and when raised serving to admit both water and sand to the interior of said tube substantially as and for the purpose described.

2. A sand-filter having a central inlet at its bottom, and a central filtered-water chamber opening at its bottom into the sand-space around it, and two vertically-adjustable concentric tubes forming an upward passage-way for water and sand, both of said tubes being opened at their lower ends and forming a compound valve with the bottom of the filter to cut off the sand by their successive action, and form a tight joint substantially as and for the purpose described.

3. A sand-filter having a central upwardly-opening passage-way for sand and water, and a ring-shaped waste-trough surrounding the

same and having an opening to receive the overflow of the scum and light impurities substantially as and for the purpose described.

4. A sand-filter comprising a case having a central inlet at its bottom, a central filtered-water chamber opening at its bottom into the sand-space around it, two vertically-adjustable concentric tubes forming at their lower ends a compound valve or progressive cut-off for the sand, and means for giving a successive adjustment to said tubes substantially as shown and described.

5. A sand-filter comprising a case having a central inlet at its bottom, a central filtered-water chamber opening at its bottom into the sand-space around it, a central tube for the upward passage-way of water and sand, and a ring-shaped discharge-trough for impurities arranged about the upper end thereof substantially as and for the purpose described.

6. The combination in a sand-filter of the outer case having conical bottom a^3 , and inlet a of the concentric tubes $C C'$ having bell-shaped or flared lower ends $c c'$ said tubes being made vertically adjustable substantially as and for the purpose described.

7. The combination in a sand-filter, of the

outer case having conical bottom with a central inlet, and a vertically-adjustable tube forming a water passage-way and a sand cut-off substantially as described.

8. The combination in a sand-filter, of the outer case having a conical bottom with a central inlet, a horizontal inlet-pipe a^2 with a detachable plug a' in its end, and a central and vertically-adjustable tube forming a water passage-way and a sand cut-off substantially as described.

9. The combination with the outer and inner chambers A and B of a filter; of two concentric vertically-adjustable tubes $C C'$ forming a compound valve at their lower ends, and having with each other a slot-and-pin connection c^4 , and spring c^3 , the outer tube being screw-threaded and held in the top of the inner chamber B, and the inner tube being provided with a current-deflector and operating-handle substantially as and for the purpose described.

EDON ARUEL BRASHEAR.

Witnesses:

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J. B. SHUPE.