

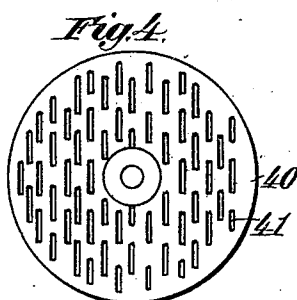
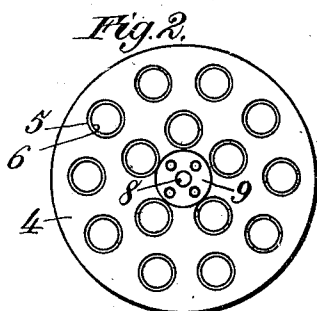
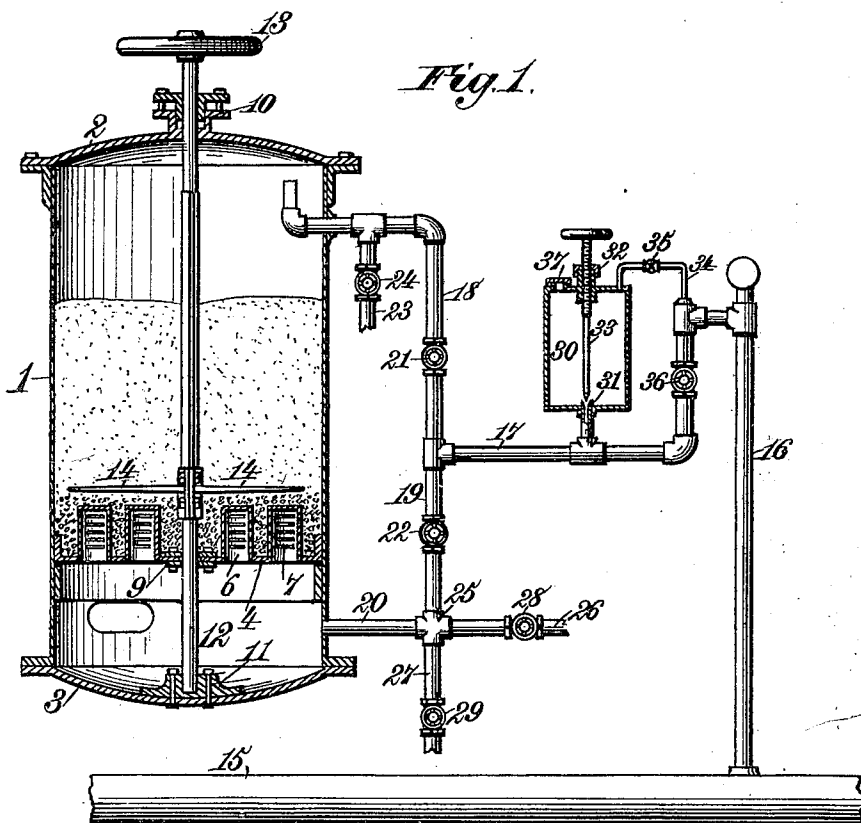
No. 632,091.

Patented Aug. 29, 1899.

F. BOMMARIUS.
FILTER.

(Application filed Apr. 1, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

FREDERICK BOMMARIUS, OF NEW ORLEANS, LOUISIANA, ASSIGNOR TO
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FILTER.

SPECIFICATION forming part of Letters Patent No. 632,091, dated August 29, 1899.

Application filed April 1, 1899. Serial No. 711,398. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK BOMMARIUS, a citizen of the United States, residing at New Orleans, parish of Orleans, State of Louisiana, have invented certain new and useful Improvements in Filters, of which the following is a specification.

This invention relates to filters; and it has for its object to provide a filter of improved construction in which impure water may be thoroughly filtered and the filtering medium readily cleansed from time to time and the foreign substances and impurities precipitated and discharged from the filter.

A further object of the invention is to improve and simplify the construction and render more efficient the operation of the class of filters referred to.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a view in vertical section of my improved filtering apparatus. Fig. 2 is a detail plan view of the perforated diaphragm arranged in the bottom portion of the filter-casing. Fig. 3 is a similar view of the stirrer-arm. Figs. 4 and 5 are detail views of a modification.

Referring to the drawings, the numeral 1 indicates the filter-casing, preferably comprising a cylindrical sheet-metal vessel flanged at its opposite ends and having attached thereto the top and bottom heads 2 and 3. A flanged head or diaphragm 4 is disposed transversely in the casing 1 at a suitable distance above the bottom head 3 and is secured in place, preferably, by riveting its flanged head to the wall of the casing and calking or otherwise suitably packing it to prevent the passage of filtering material about its edge. As shown most clearly in Fig. 2 of the drawings, the diaphragm 4 is provided with a number of perforations 5, and in each of said perforations is fitted one end of a short tube 6, which is closed at its opposite end, and intermediate its ends is provided with a number of narrow

slits 7, formed transversely through the vertical walls of the tubes. The tubes 6 may be screwed or expanded in the perforated diaphragm in manner similar to securing boiler-tubes in place. A vertical perforation 8 is formed in the diaphragm, and secured to the opposite sides of the latter about said perforation are bearing or bushing plates 9.

In the upper head 2 of the casing is arranged a stuffing-box 10, and to the lower head 3 is riveted a step-bearing 11. Passing through the stuffing-box 10 and stepped at its lower end in the bearing 11 is a shaft 12, provided at its upper outer end with a hand-wheel 13. The upper and lower portions of the shaft 12 are round, as clearly indicated, to form an easy bearing for the shaft in the stuffing-box 10 and bearing-plates 9, and between said round portions is preferably square or angular in cross-section. Fixed on the shaft 12 immediately above the upper ends of the slitted tubes 6 is a perforated stirrer-arm formed in two half-sections 14, the adjacent ends of the sections being flanged and provided with V-shaped recesses, as most clearly shown in Fig. 3. The flanged and recessed ends of the two sections of the stirrer-arm are bolted about the squared portion of the shaft 12, thus tightly fixing said arm on the shaft in an obvious manner.

The numeral 15 indicates a water-main and 16 a service-pipe, hydrant, or the like connected therewith. Leading from the pipe 16 is a water-feed pipe 17, connected at its opposite end to a branch pipe 18 19, one branch 18 of which enters the upper portion of the filter-casing and the other branch 19 is connected with the lower portion of the said casing by a pipe connection 20. Valves 21 and 22 are respectively arranged in the branches 18 and 19, and a waste-pipe 23 is connected to the upper end of the branch 18 and is provided with a valve 24. A four-way coupling 25 connects the branch 19 to the connecting-pipe 20, and also connects said pipes with an outlet or draw-off pipe 26 and a waste-pipe 27, respectively provided with valves 28 and 29.

Supported on the feed-pipe 17 is a chemical-receiving vessel 30, comprising a vertical cylindrical closed vessel provided at its bot-

tom with a conical valve-seat 31, that is in communication with the feed-pipe 17, as shown. Through a gland 32, formed in the top of the vessel 30, is screwed a threaded needle-valve stem 33, that is adapted to seat in the valve-seat 31. A small by-pass pipe 34 leads from the upper end of the vessel 30 to the water-supply pipe and is provided with a valve 35, while in the feed-pipe 17 at a point between the points at which the chemical-receiving vessel is connected thereto is arranged a valve 36.

In practice coarse filtering material—such as gravel, for example—will be first placed in the casing over the diaphragm 4 and slitted tubes 6, and this will be surmounted by finer filtering material—as sand, for example—to a suitable height. A quantity of any chemical material suitable for purifying the water and precipitating the impurities—such as alum, for example—is placed in the vessel 30, and for this purpose I preferably form an opening in the top of the vessel normally kept closed by a cap or cover 37.

Constructed as above described the operation of my apparatus is as follows: To place the filter in position for use in filtering and purifying water, partly open valve 36, open wide the valves 21 and 28, and finally open the valve 35 and very slightly raise the valve 33. All the other valves should remain closed. Water will now pass through the feed-pipe 17, branch pipe 18 into the upper part of the filter, down through the filtering material and slitted tubes into the bottom of the casing, and finally out through the outlet-pipe 26. A portion of the supply, however, passes by way of the small by-pass 34 into the vessel 30 and forces a small quantity of alum into the feed-pipe 17, where it immediately mixes with the feed-water and passes with the latter to the filter-bed, thus purifying the water and precipitating foreign substances.

When it becomes necessary to wash out the filter, close the valves 21 and 28 and open the valves 22 and 24. The course of the water through the filter will now be reversed—that is to say, it will pass from pipe 17 down branch pipe 19 and by connecting-pipe 20 into the bottom of the filter, thence up through the slitted tubes and filter-bed and out through the waste-pipe 23, washing out and discharging all impurities. During this operation the hand-wheel 13 should be turned, so as to rotate the stirrer-arm 14 and disintegrate and loosen up the filter-bed, whereby the impurities and foreign substances are liberated and permitted to be carried off by the wash of the water. After the filter-bed has been thoroughly washed out and the filter again been placed in condition for filtering the valve 28 should at first be closed and the valve 29 opened and this condition maintained until the water discharged by the waste-pipe is perfectly clear, when the valve 29 should again be closed and the valve 28 opened, restoring the apparatus to its normal position.

In Figs. 4 and 5 of the drawings I have shown a modified construction of parts designed to be substituted for the diaphragm 4 and slitted tubes 6, before described. As shown in the said figures of the drawings, two perforated heads 38 and 39 are secured in the lower portion of the casing 1, and arranged between said heads is a circular disk 40, of thin sheet brass, provided with a number of narrow slits 41. As before stated, such an arrangement may be substituted for the diaphragm 4 and tubes 6, the construction and operation of the filter in all other respects remaining the same.

Having described my invention, what I claim is—

1. In a filter, the combination with the filter-casing having an inlet and an outlet, of a perforated diaphragm fitted in the casing, horizontally-slitted tubes each open at its lower end and closed at its upper end, the lower open ends of said tubes being fitted in the perforations in the diaphragm, a filter-bed arranged above the diaphragm, a bearing in the diaphragm, a stuffing-box in the upper head of the casing, a step-bearing in the lower head, a vertical shaft passing through said stuffing-box and bearing and stepped in the step-bearing, a perforated stirrer-arm fixed on the shaft above the slitted tubes, and a hand-wheel fixed on the shaft outside the casing, substantially as described.

2. In a filter, the combination with the filter-casing having an inlet and outlet, of a diaphragm fitted in the casing and provided with narrow slitted water-passages, a filter-bed above the diaphragm, a vertical shaft journaled in the casing, a hand-wheel fixed on the shaft outside the casing, and a stirrer-arm fixed on the shaft above the diaphragm said stirrer-arm being formed in two half-sections flanged and angularly recessed at their adjacent ends, said flanged ends being bolted upon an angular portion of the shaft, substantially as described.

3. The combination with the filter casing and bed, of an inlet and outlet pipe, a water-feed pipe connected with the inlet-pipe and with a pressure-supply pipe, a chemical-containing vessel provided at its bottom with a conical valve-seat communicating with the water-feed pipe, a contracted and valved by-pass pipe connecting the upper part of said vessel with the water-feed pipe, a threaded needle-valve fitted in a bushing in the top of the chemical-containing vessel and arranged to seat in the conical valve-seat, and a hand-wheel fixed on the outer end of the needle-valve, substantially as described.

4. The combination with the filter casing and bed, of a water-feed pipe leading from a pressure-supply pipe, a chemical-containing vessel in valved communication at its bottom with the water-feed pipe, a contracted and valved by-pass pipe connecting the upper part of said vessel with the pressure-supply

pipe, valved branch pipes leading from the
water-feed pipe to the opposite ends of the
filter-casing, valved waste-pipes leading from
each of the branch pipes, and an outlet-pipe
5 leading from one of them, substantially as
described.

In testimony whereof I have hereunto set

my hand in presence of two subscribing wit-
nesses.

FREDERICK BOMMARIUS.

Witnesses:

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FELIX J. PUIG.