No. 647,648. Patented Apr. 17, 1900.

J. D. CAPRON.

FILTER.

(Application filed July 12, 1898. Renewed Sept. 15, 1899.)

(No Model.)

Fig. 1.

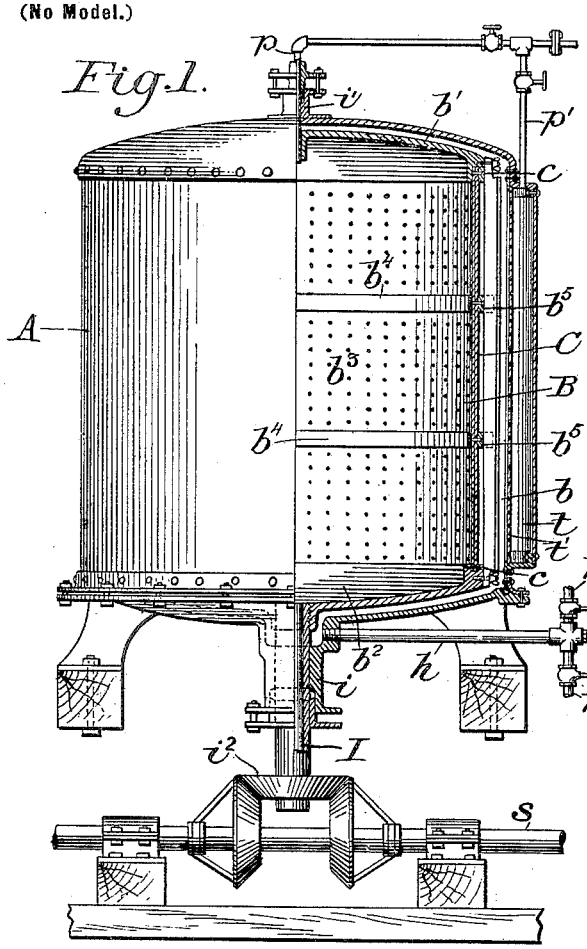


Fig. 6.

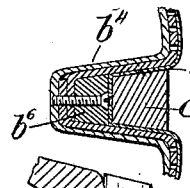


Fig. 4.

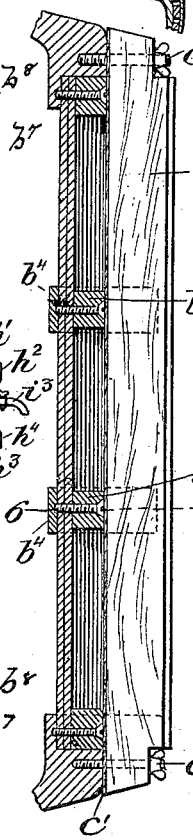


Fig. 5.

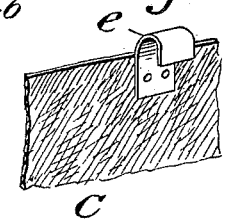


Fig. 2.

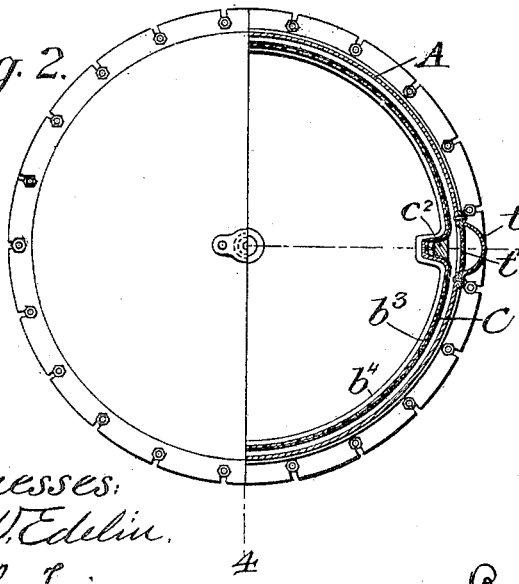
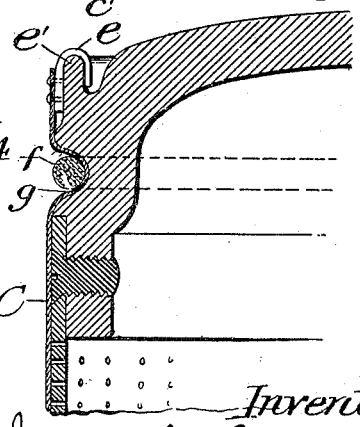


Fig. 3.



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UNITED STATES PATENT OFFICE.

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FILTER.

SPECIFICATION forming part of Letters Patent No. 647,648, dated April 17, 1900.

Application filed July 12, 1898. Renewed September 15, 1899. Serial No. 730,641. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. CAPRON, a citizen of the United States, residing in New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Filters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the invention is to provide a filter for water and other liquids so constructed and arranged that when the accumulation of matter separated out from the liquid becomes a hindrance to the efficient operation of the apparatus its complete removal may be quickly and easily effected without disconnecting any of the mechanical parts of the device and without disturbing the filtering medium, and the medium itself be at the same time thoroughly cleansed and washed with the least possible interruption in the filtering operation and without any loss or waste of the liquid itself.

The best form of the invention at present known to me is represented in the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a side elevation of the apparatus, half in vertical section. Fig. 2 is a plan view of Fig. 1. Fig. 3 is an enlarged sectional detail showing more especially the manner of securing the filtering medium at the top and bottom of the perforated cylinder. Fig. 4 is a section (enlarged) on the line 4 4 of Fig. 2, showing the manner of fastening the vertical edges of the filtering medium lengthwise the cylinder. Fig. 5 is a detail of the top edge of the filtering medium, and Fig. 6 is a section on the line 6 6 of Fig. 4.

Referring to Fig. 1, A denotes a closed metallic cylinder rigidly supported by legs a upon any suitable framework a'. The cylinder is stationary and has within it a revolving cylinder or basket B of perforated or reticulated material. This basket is mounted to revolve within the outer cylinder and fills the interior of the same, leaving only a narrow space b between its periphery and the inner walls of the cylinder A. The interior basket is formed of heads b' and b^2 and a body portion of perforated sheet metal b^3, secured by screws c or otherwise at its top and bottom edges to the respective heads. Reinforcing rings or hoops b^4 are fastened on the inside of the body portion at intermediate points between the heads, and the longitudinal edges of the metal sheet forming the body portion are overlapped and secured by means of screws b^5, passing through block b^6 and entering the sides of the hoops for a short distance. Similar screws b^7 and blocks b^8 are also employed at or near the upper and lower edges of the body portion, with the said screws entering flanges on the heads b' and b^2. The external cylinder is provided at its ends with pipes for the inlet of steam and outlet of the liquid to be filtered, as will be more particularly described later on, and these pipes are secured centrally of and to the heads of the inner basket, so as to form journals for the basket to revolve on or with.

Around the outer periphery of the basket B the filtering medium C is removably secured. This medium is cloth of any suitable character, texture, and thickness. It is wound on the basket from one point on its periphery around to the starting-point, and its meeting edges are secured thereto lengthwise the basket by being clamped in a groove c' by means of a wooden strip c^2, which is laid in the groove over the cloth and firmly fastened therein by thumb-screws c^3 at its ends taking into the heads b' b^2. The manner of thus securing the filtering-cloth around the basket is illustrated in Figs. 4 and 6 on an enlarged scale, and these views, taken in connection with this description, will make the matter clearly understood. The filter-cloth being stretched around the basket, as thus described, it is kept taut lengthwise the same by having hooks or clips e, that are fastened on its opposite edges, catch over a circular lip or flange e', running around the edges of the heads b' b^2, and to still further tighten the cloth lengthwise the basket each head is provided with a groove g, running around it just below (or above, as the case may be) the flange, and a cord f is drawn around in this groove and tied tightly outside the cloth C.

I will now describe the pipes for the inlet and outlet of the liquid to be filtered, as well as those provided for washing and cleaning the filtering-cloth. The base of the external cylinder is tapped for a pipe h, which opens into the narrow space below the head b^2. The liquid to be filtered goes into the filter through this pipe, which it enters by way of the branch h', having a cock h^2. As the liquid enters the filter it completely fills the space between the cylinder and the basket, and being under pressure is forced through the filtering medium C and the reticulated basket B and passes out at the bottom of the latter through a pipe I, which is journaled in a suitable stuffing-box i in the base of the outer cylinder A and is secured rigidly to the head b^2 of the inner basket B. This pipe I not only is the draw-off for the filtered liquid, but constitutes also the shaft by means of which the basket is revolved when it is desired to clean the filter, as will presently be more fully described.

Through a stuffing-box i' in the top of the outer cylinder enters a pipe p for the purpose of carrying steam into the interior of the basket B, and this pipe constitutes the upper journal upon which the inner cylinder rotates while being washed.

As shown in Fig. 1, the combined draw-off pipe and shaft I is extended downwardly and has a gear i^2 (preferably friction) secured to its lower end. A drive-shaft s is supported in suitable bearings below the gear i^2 and has an idle and a drive-gear thereon engaging the gear i^2, so as to rotate the inner basket when desired. This shaft and the gears thereon also form the support for the shaft I and the basket B at its lower end, and in this way the basket is held within the outer cylinder, so as to be free of contact therewith at its sides and ends. Any suitable means may be provided for rotating the shaft s. The lower end of the pipe I is open and may connect with any suitable receptacle or conduit for the filtered liquid.

The pipe h, in addition to the branch h', has a similar branch h^3 with a cock h^4. It also has a faucet i^3, located at a point between the two cocks h^2 and h^4, so that either branch may be in use without the other or the faucet may be used without either branch. The liquid to be filtered, as before explained, enters the filter through the pipes h h', and when it is necessary to clean the filter-cloth the unfiltered liquid that is in the filter is first drained off through the pipes h h^3.

For the purpose of cleaning the filter-cloth the following arrangement is provided in addition to the steam-pipe p already described: At one side the outer cylinder has a small casing t, secured thereto in the manner shown in Figs. 1 and 2, and into the top of this casing a branch p' from the steam-pipe p enters, suitable cocks being arranged in the pipes, so as to permit either or both to be in operation at the same time. The outer wall of that part of the cylinder A that is covered by the casing t is provided with perforations t', and the perforations are obliquely inclined, as shown in Fig. 2, so as to be tangential to the periphery of the basket within. These perforations constitute jets for throwing steam upon the outer surface of the filter-cloth.

Such being the construction of my apparatus the operation is as follows: The liquid to be filtered is carried in and out in the manner already described, at which time the inner basket is stationary. When the accumulation of sediment renders it desirable to clean the filter, the supply of liquid is cut off at the cock h^2, and that which is in the filter unfiltered is drawn off by opening the cock h^4. When this has been done and the cock h^4 closed, the inner basket is revolved and simultaneously therewith steam is admitted into the interior of the same through the pipe p and passes in jets through the perforations in the basket outwardly. At the same time steam is turned into the casing t and issues in force through the inclined jets t' against the surface of the revolving basket, thus subjecting the cloth on both sides to the action of steam under pressure issuing through numerous fine jets. While this is going on, the faucet i^3 is opened and the sediment and condensed water passes out through the pipe h, which is thus made an inlet and outlet for unfiltered liquid and an outlet for the sediment.

Having thus described the invention, what I claim is—

1. The combination of the outer cylinder, the inner perforated cylinder, having the groove g around its end, the filter-cloth, and the cord f for securing the cloth in the groove.

2. The combination of the outer cylinder, the inner perforated cylinder having the heads b', b^2, the lip or flange e' and the filter-cloth having the hooks e.

3. The combination of the outer cylinder, the inner perforated cylinder having the heads b', b^2, the lip or flange e', the groove g, the filter-cloth having the hooks e, and the cord f for tightening the cloth in the groove.

4. The combination of the outer cylinder, the inner perforated cylinder, the pipes h, h', h^3, the cocks h^2, h^4 and the faucet i^3.

5. The combination of the outer cylinder, the inner perforated cylinder, the casing t having the jet-perforations t', and the steam-pipe p'.

6. The combination of the outer cylinder, the inner perforated cylinder, the casing t having the jet-perforations, the steam-pipe p and the branch pipe p'.

7. The combination of the outer cylinder, the inner perforated cylinder, the inlet-pipe h, the outlet-pipe I, the casing t, the steam-pipes p, p', the branches h', h^3 to the pipe h, the faucet i^3, and mechanism for rotating the inner cylinder.

8. In a filter, the combination of an outer closed cylinder, a perforated filtering-cylin-

der inclosed within the same with a space between it and the inner wall of the outer cylinder, said space being adapted to hold liquid under pressure, means for projecting a cleaning agent against the filtering-surface of the inner cylinder, and means for simultaneously revolving said inner cylinder.

9. In a filter, the combination of an outer closed cylinder, an inner cylinder having a perforated filtering-surface, a space between the filtering-cylinder and the inner wall of the outer cylinder, said space being adapted to receive and hold liquid under pressure, a conduit for a cleaning agent running lengthwise the inner cylinder and having orifices for projecting the cleaning agent against the filtering-surface of the same, and means for simultaneously rotating the filtering-cylinder.

10. The combination of the outer cylinder, the inner perforated cylinder having the vertical groove *c'* extending lengthwise the same, the filter-cloth passing around the inner cylinder and secured in said groove by a strip laid in the groove and fastened to the cylinder, and means for securing the upper and lower edges of the cloth to the cylinder-heads.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES D. CAPRON.

Witnesses:
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F. L. MCCALEB.