

(No Model.)

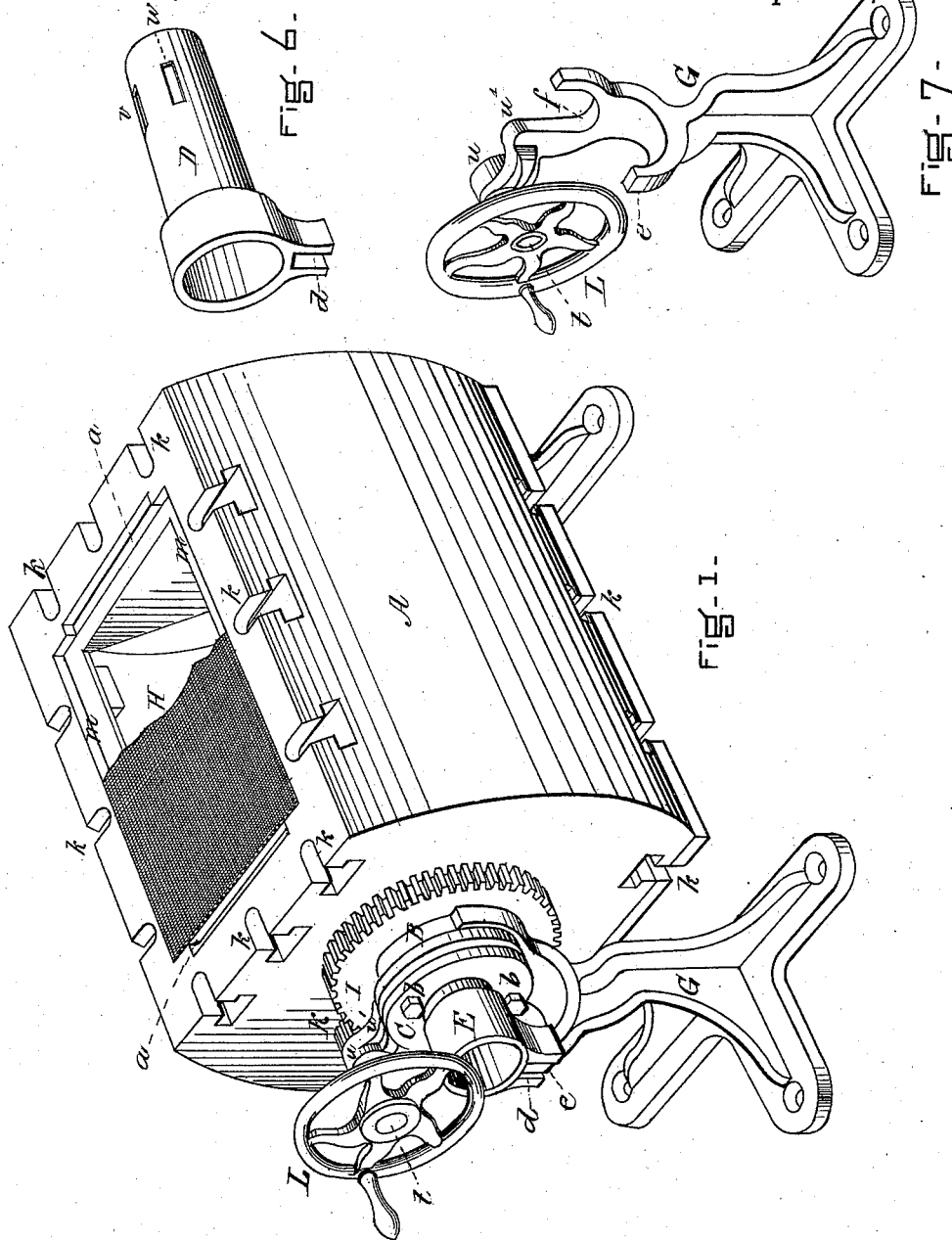
2 Sheets—Sheet 1.

J. A. CROCKER.

FILTER.

No. 305,574.

Patented Sept. 23, 1884.



WITNESSES

*L. W. Stearns*  
*E. J. Stearns*

INVENTOR

*James A. Crocker,*  
*Per Norman W. Stearns,*  
*Attorney.*

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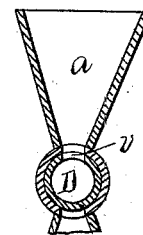
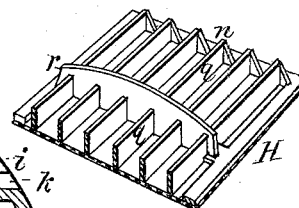
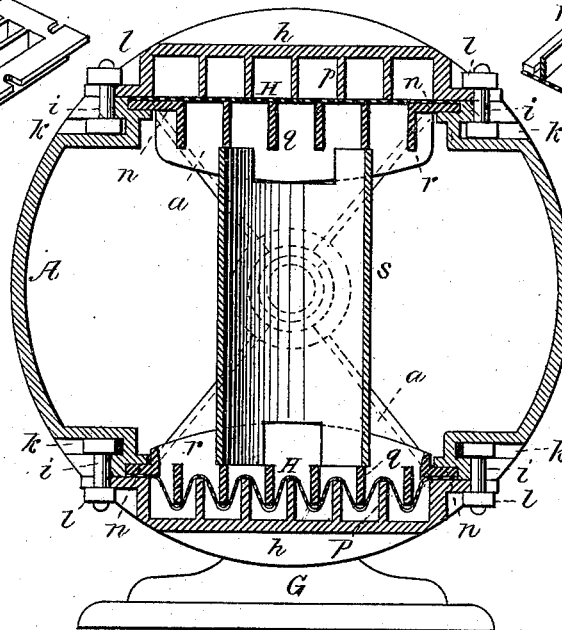
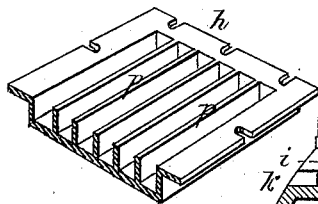
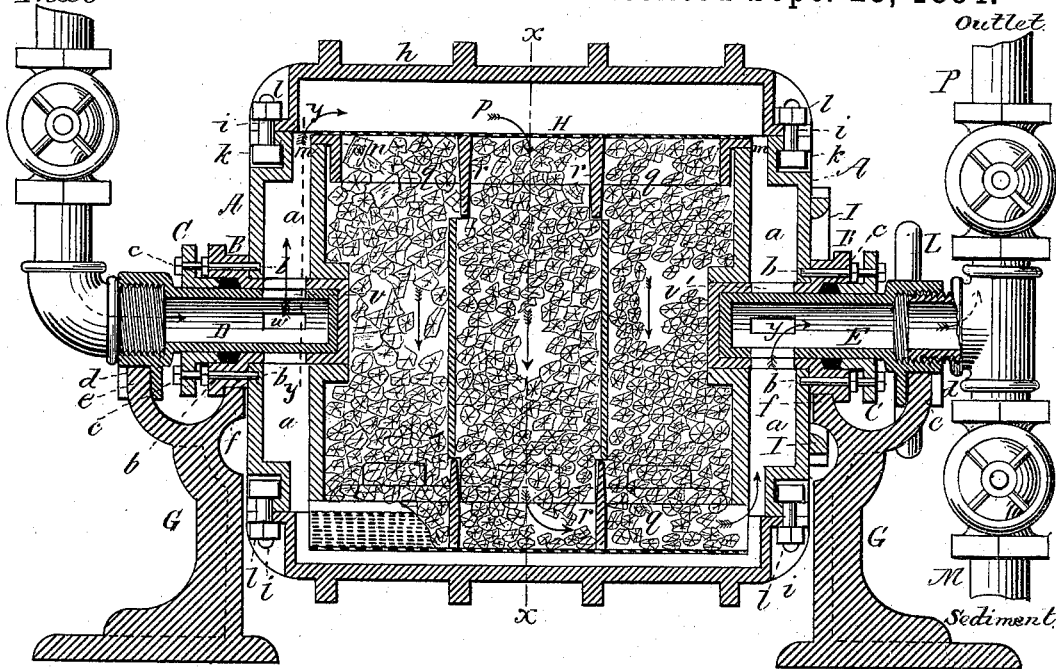
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# UNITED STATES PATENT OFFICE.

JAMES A. CROCKER, OF BOSTON, MASSACHUSETTS.

## FILTER.

SPECIFICATION forming part of Letters Patent No. 305,574, dated September 23, 1884.

Application filed April 26, 1883. Renewed May 7, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES ALLEN CROCKER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Filtering-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of a filtering-machine having my improvements applied thereto. Fig. 2 is a vertical longitudinal section through the center of the same. Fig. 3 is a transverse vertical section on the line *x x* of Fig. 2. Fig. 4 is a view of the inner side of a portion of one of the covers of the casing of the machine. Fig. 5 is a view of the inner side of a portion of one of the strainer-frames. Figs. 6 and 7 represent one of the pipe-connections and one of the supports of the casing detached; Fig. 8, a section through one of the water-passages on the line *yy* of Fig. 2, showing nothing beyond the cutting-plane.

My present invention has particular reference to that class of filters designed to remove sediment and impurities from water used for manufacturing and domestic purposes, and has special relation to the construction of a filtering-machine recently invented by me, in which a single shell or casing is rotated upon hollow stationary journals, which also serve as inlet and outlet pipes for the passage of the water to be filtered.

My present invention consists, first, in combination with a filtering-machine, of a pinion and gear for rotating and reversing the same when of considerable weight and size; secondly, in a pair of standards or brackets for supporting the casing, said brackets serving as bearings for the hubs of the same, and also as stops for preventing the rotation of the pipe-connections during the revolution of the casing upon its hubs, one or both of said bracket-supports being provided with an arm in which the shaft of the reversing-pinion bears; thirdly, in an improved construction and arrangement of the strainer-frames; fourthly, in an improvement in the inlet and outlet passages of the casing; fifthly, in an auxiliary support for the strainer-frames, the several features referred to being hereinafter fully described and specifically claimed.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, the filtering-machine is composed of a single shell or casing, A, having a passage, *a*, formed within each end and extending from outside to outside of the same, (from top to bottom,) the size or area in cross-section of said passage increasing on each side of its center as it recedes therefrom.

B B are the hollow hubs which form the axes on which the casing is revolved, the passage through each hub communicating with the center of the contiguous passage *a*, and being located in a direct line therewith.

When the machine is of ordinary size, the casing and its hubs are preferably cast integral with each other; but when it is of considerable size and weight it is more convenient to form the hubs separately from the casing and provide the latter with circular holes for their reception, and secure them by bolts *b*, Fig. 2. Within each hub is fitted a gland, C, for holding a packing, *c*, which surrounds a pipe-connection, D or E, which passes into the gland and hub and forms the inlet or outlet pipe for the passage of the water to and from the casing, D being the inlet and E the outlet pipe, a reliable water-tight joint being thus insured between the pipe-connection and the hub. Each pipe-connection is enlarged at its outer end, and provided with a recess, *d*, in order that it may fit over a projection, *e*, rising from the outside of each one of a pair of bracket-supports, G, the inner portions of which form bearings *f*, in which rest the hubs on which the casing revolves, the said projections serving as stops to keep the pipe-connections stationary during the reversal of the casing, the prevention of the revolution of the inlet and outlet pipes being to preserve the proper position and relation of the water-passages. The upper and lower sides of the casing A are provided with covers *h*, held in place by a series of bolts, *i*, projecting from the outer edges of each side and end of the casing, the heads of the bolts fitting into shouldered recesses *k* formed therein, their tightening-nuts *l* being readily loosened when the covers are to be removed. A rectangular seat, *m*, is formed in each open side (top and bottom) of

the casing for the reception of the frame *n* of a wire-gauze strainer, H, of corrugated form (see lower part of Fig. 3) when the water is under a low pressure, or flat (as shown in upper part of Fig. 3) when the water is under a high pressure, both strainers being either corrugated or flat at one time. The length of the outside of the water-passage *a*, formed within the casing, is equal to the width of the strainer, and is on a level with the outer surface of the same when flat, and when corrugated on a level with the inner bends or curves of the corrugations, by which arrangement the sediment is prevented from lodging, and is more readily carried over the corrugations out through the casing-passages *a*. Upon the inner side of each cover are formed a series of parallel longitudinal ribs, *p*, which, when the cover is in place, come into contact with the outer surface of the wire-gauze, thus always serving to support and prevent the sagging and bursting of the same when in a position above it. The inner side of each strainer-frame is also provided with a series of longitudinal ribs, *q*, and with transverse ribs *r*, which afford additional strength and support thereto; and to still further guard against the deflection of the strainer-frame by the immense pressure of the water thereon I intend to employ auxiliary supports *s*, passing through the filtering material (not shown) and bearing against the inner edges of the ribs of both strainer-frames. (See Fig. 3.)

When the machine is large and heavy, I employ the following mechanism for rotating and reversing the same:

I is a large circular gear, either formed integral with or made separate from and bolted to one end of the casing.

K is a pinion which engages with said gear I, the shaft *t* of the pinion resting in bearings *u*, formed in an arm, *u'*, projecting out from the bracket-support at this end of the casing, and being turned by a hand-wheel, L, on the outer end of the pinion-shaft.

Each pipe-connection D E is provided with three ports or openings, *v w y*, the port *v* being located at the top of the inlet-pipe D and at the bottom of the outlet-pipe E, each port *v* communicating with its contiguous casing-passage *a*. The ports *w y* of each pipe D E are diametrically opposite each other, and when the casing is rotated, so as to bring the strainers at its sides, (both in vertical positions parallel to each other,) the casing-passages *a* communicate with these ports and the water passes only on the outsides of the strainers, carrying off the heavy sediment accumulated thereon. M is the waste or sediment pipe through which the water flows for a short time after reversing the filter-casing.

When the parts are in the position seen in Fig. 2, the water, when turned on, passes freely in the direction of the arrows through the inlet-pipe D through the upper branch of its contiguous casing-passage *a* into the space between the upper strainer and its cover, thence

down through said strainer into the filtering material, the greater or heavier portion of the sediment contained in the water being deposited on the outer surface of the upper strainer, while all or nearly all of the small remainder is taken up or absorbed by the filtering material, the water flowing next through the lower strainer down into the space between it and the lower cover, from whence it rises through the lower branch of the opposite casing-passage *a* and port *v* in the outlet-pipe E, out in a horizontal direction through said pipe into the upper branch of a distributing-pipe, P. Each support G for the casing must have a bearing, *f*, for its contiguous hollow hub, and a stop, *e*, for holding the hollow pipe-connection D E stationary. But one support only need be provided with the arm *u* for the bearing *u* of the shaft of the pinion K, and, if desired, the machine may be hung on one pair of bearings and the shaft of the reversing-pinion in an independent bearing, the feature of this portion of my invention being the revolution of the casing in any convenient way by gearing.

Instead of the outer end of either the inlet or outlet pipes being bifurcated or provided with a recess, *d*, and the outer end of each bracket-support G having a projection, *e*, to fit therein, the construction of these parts may be reversed and the supports G be forked to receive a projection on the pipe.

By my present invention the weight of the casing rests on the bracket-supports, whereby greater strength and solidity are insured than where the weight of the filter bore entirely on the inlet and outlet pipes, forming hollow journals for it to rotate on, as set forth in one of my recent inventions, and where the weight is great I prefer the employment of supports having bearings for the hubs, as herein described.

I claim—

1. As an improvement in filtering-machines, a casing, A, provided with a gear, I, and two supports, G, having bearings *f f* for the hubs of the casing, in combination with a pinion, K, and a support having a bearing for the shaft of the pinion, as and for the purpose set forth.

2. The supports G, having bearings *f f* and stops *e e*, in combination with a casing, A, having hollow hubs B B, and inlet and outlet pipe connections D E, substantially as described.

3. In combination, the casing A, provided with a gear, I, the pinion K, and two supports, G G, having bearings *f f* for the hubs of the casing, one of said supports also having a bearing, *u*, for the shaft of the pinion, as set forth.

4. The support G, having a bearing, *f*, for the hub of the casing A, a bearing, *u*, for the shaft of the pinion K, and a stop, *e*, for preventing the revolution of an inlet or outlet pipe connection, D or E, the two bearings *f u* and the stop *e* being formed integral with the support and with each other, as specified.

5. In combination with a filtering-machine,

a single shell or casing, A, provided with inlet and outlet passages *a a*, which increase in area in cross-section in opposite directions from their centers to their outsides, substantially as described.

5 6. A casing, A, with its inlet and outlet passages *a a*, and strainers located in the same plane with or outside of the plane of the outlet ends of said passages, in combination with  
10 covers provided with ribs resting on the outer surfaces of the strainers, as specified.

7. An auxiliary support, *s*, for the strainer-frames *n*, extending from the inside of one to the inside of the other and located within the filtering material, substantially as described. 15

Witness my hand this 19th day of April, 1883.

JAMES A. CROCKER.

In presence of—

CHAS. M. REED,  
N. W. STEARNS.