

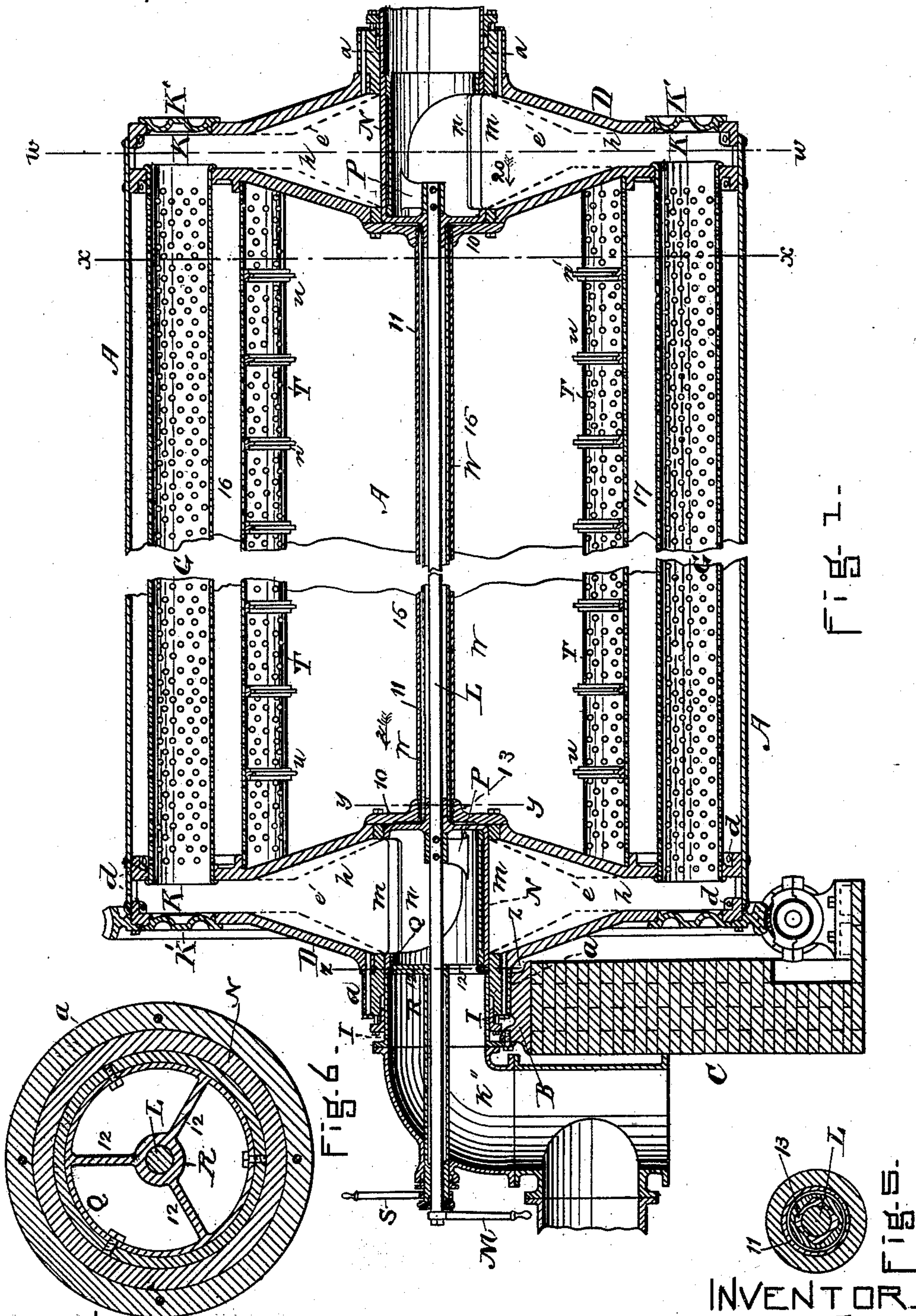
(No Model.)

3 Sheets—Sheet 1.

J. A. CROCKER.
FILTERING MACHINE.

No. 424,464.

Patented Apr. 1, 1890.



WITNESSES.

Harry C. Amer.
C. C. Schiller, Jr.

INVENTOR.
J. A. Crocker
per
J. W. Stearns
Att'y.

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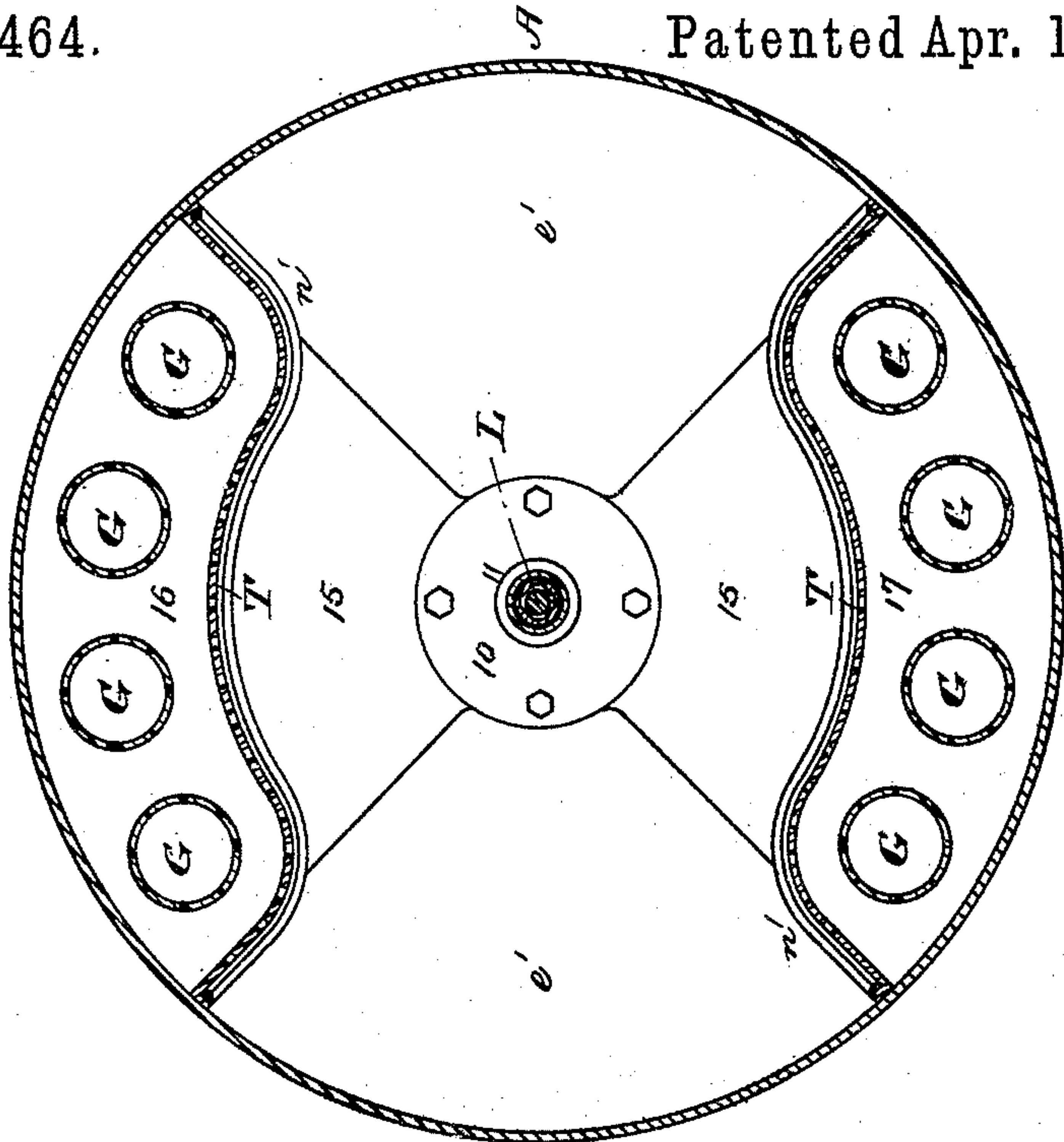


Fig. 1.

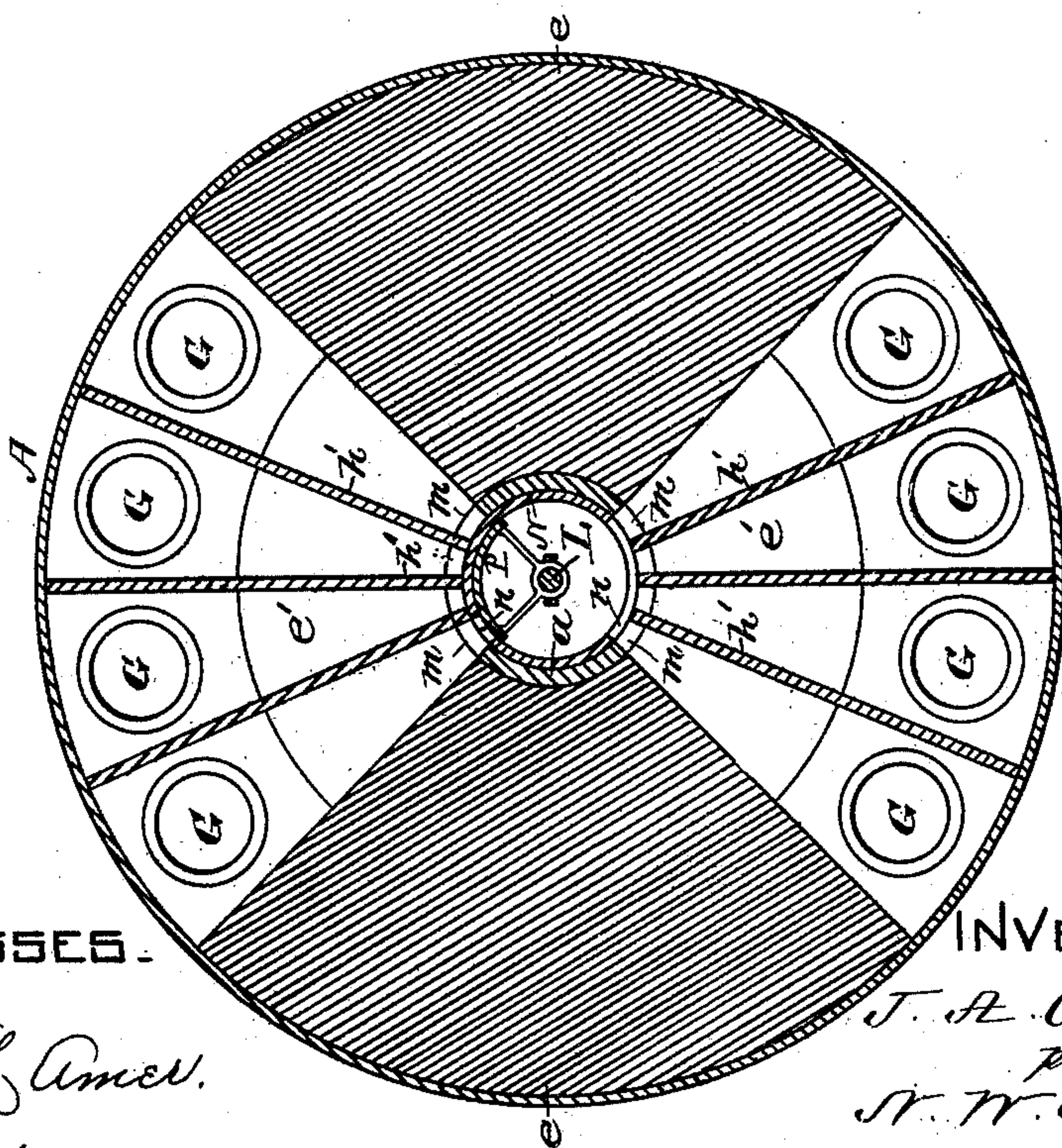


Fig. 2.

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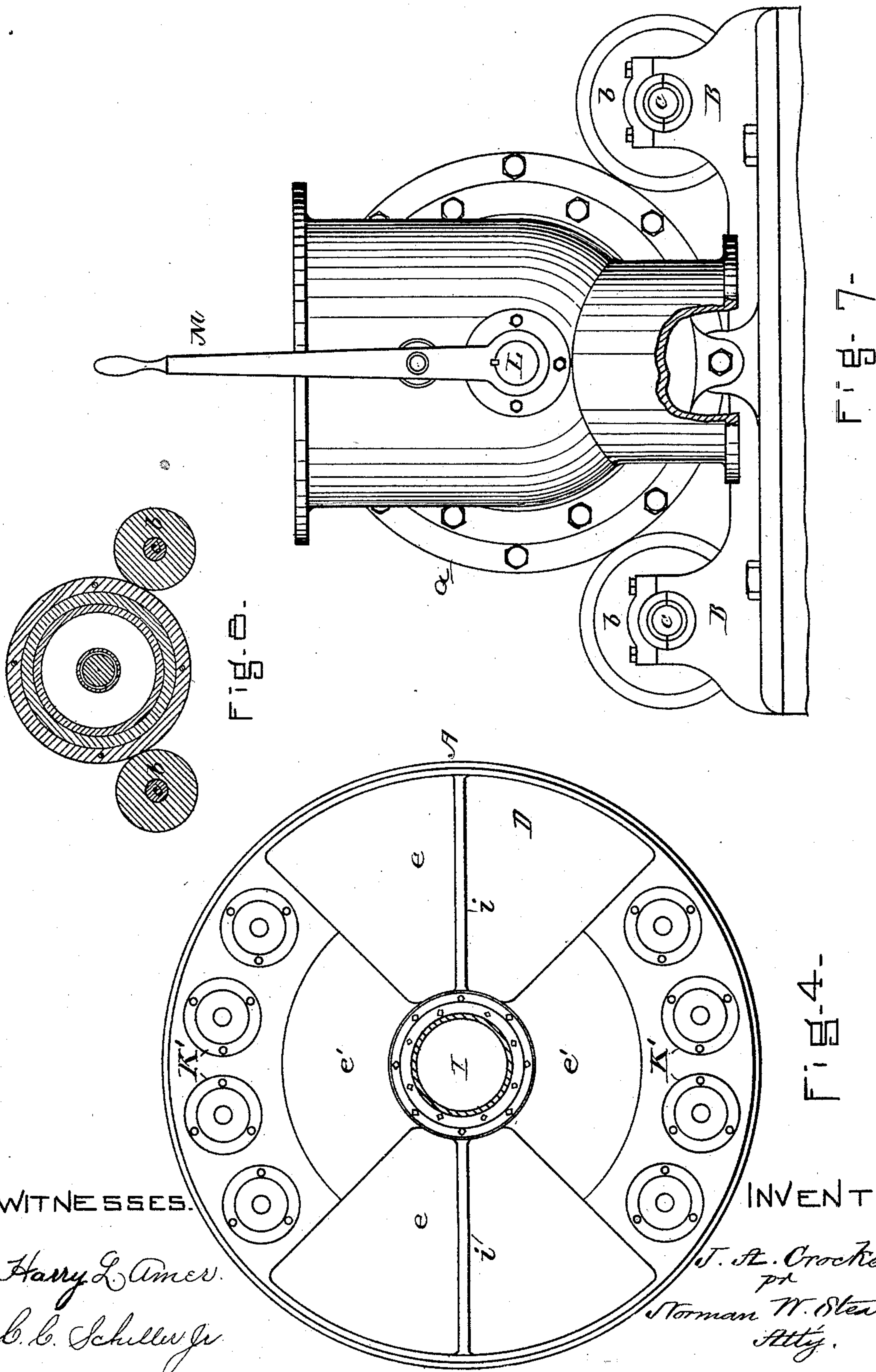
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UNITED STATES PATENT OFFICE.

JAMES ALLEN CROCKER, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE
CROCKER FILTERING COMPANY OF NEW YORK.

FILTERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 424,464, dated April 1, 1890.

Application filed December 26, 1889. Serial No. 334,908. (No model.)

To all whom it may concern:

Be it known that I, JAMES ALLEN CROCKER, of Brooklyn, Kings county, New York, 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 longitudinal vertical section through the center of my improved filtering-machine. Fig. 2 is a transverse vertical section on the line *ww* of Fig. 1. Fig. 3 is a transverse vertical section on the line *xx* of Fig. 1, looking in the direction of the arrow 20. Fig. 4 is an end elevation of the outside of the filtering-machine. Fig. 5 is a section on the line *yy* of Fig. 1, looking in the direction of the arrow 21. Fig. 6 is a section on the line *zz* of Fig. 1, looking toward the arrow 21. Fig. 7 is an end elevation showing one of the journals and its bearings. Fig. 8 is a section through a journal and its bearings.

My present invention relates to the filtration of large bodies of water for supplying cities, towns, &c., for drinking and manufacturing purposes, and the primary object of this invention is a filtering-machine whose construction is particularly adapted to enable its filter-bed to be cleansed while the machine is stationary or during its revolution; and my invention consists in two pairs of rotating valves or sleeves, one pair located in each head of the machine, one of each pair being operated by a solid valve-rod, and the other of the pair by a valve-sleeve, both rod and sleeve passing centrally through the machine and extending outside its heads, in order that they may be readily accessible for manipulation.

My invention also consists in a pair of perforated sheets located between the center of the machine and two series of perforated tubes, one perforated sheet on each side of the center.

My invention also consists in certain other details, to be hereinafter described and claimed.

In the said drawings, A represents a cylindrical receptacle, whose hollow journals *a* are caused to revolve on friction-rolls *b*, which

have their bearings *c* in boxes B, located on a foundation of masonry C.

D D are the two opposite heads of the machine, the inner and outer walls thereof being riveted at *d* to the cylindrical shell A, each head consisting of four portions *ee'e'e'*, each portion representing a quadrant, two portions *ee* being diametrically opposite each other and of single thickness, and the remaining portions *e'e'* also diametrically opposite and of double thickness, with a space *h* serving as a water-passage between them, said water-passage being divided by partitions *h'* into separate compartments, each communicating with the center or hollow journal *a*, and with one of the perforated filtering-pipes G, to be presently described. Each water-passage is wider at the center of the end of the casing where the hollow journal *a* communicates with the hollow head D, in which the passage *h* is located, said passage tapering to about one-half this width at its outer periphery, measured in a horizontal direction. (See Fig. 1.) The outer portion of each head is re-enforced by webs or braces *i*. (See Fig. 4.) Each outer wall of the portions *e'e'* is provided with a number of independent openings K, over each of which is fitted an independent cover K', said openings being made in order to admit of the introduction of the two series of perforated pipes G, which (separated by the partitions *h'*) are arranged in a horizontal position side by side, (in two groups,) one diametrically opposite the other. The cover for each opening may consist of a shouldered screw-plug K, Fig. 1, with a washer interposed between it and the wall; or the cover may be a round plate bolted in place. Each series of these pipes extends between and communicates with the water-passages *h h* in the two correspondingly-located opposite double heads of the casing.

The inner walls of the portions *e'e'* of the heads are provided with a number of circular openings corresponding to the number of the pipes to be secured therein, four, for instance, in the upper part of each head and four in its lower part being shown in the drawings, (see Figs. 2, 3, and 4,) a number of pipes in each series being preferred on account of the greater area of surface obtained thereby.

Leading from the circular opening in the center of each head of the casing are two rectangular holes or ports $m m$, divided by the inner ends of the ribs i and diametrically opposite one port communicating with the divided upper portion of the water-passage h and the other with the divided lower portion of the water-passage h , and within the circular opening of each head the hollow journal a is located and is secured immovably thereto, so as to revolve in common therewith around a stationary hollow sleeve I , through which the water to be filtered passes from a pipe K'' , connected therewith, one hollow sleeve being intended to be connected with a supply-pipe and the other with a discharge-pipe.

Each of the journals a is provided with two rectangular openings or ports $m m$, divided by the webs $h' h'$, diametrically opposite each other, of corresponding size, and in line with the rectangular ports of the subdivided hollow portions $e' e'$ of the heads of the casing.

Closing the open end of each of the hollow journals a and belted thereto is a cover 10 , the opposite covers being connected by a pipe 11 , extending longitudinally over and around the valve-pipe connection W , in order to keep the filtrant from contact therewith.

Through the center of the filtering-machine, and extending outside thereof, is a solid rod L , to which are secured two rotary valves $P P$, each of the form of a quarter of a circle, one in each head, and the position of the valve in one head being exactly the reverse of that of the valve in the other head. One of the outer ends of this rod L passes through one of the water-pipe elbows connected with the hollow head corresponding thereto, (see Fig. 1,) and is provided with a lever M for reversing the position of the valves, the valve-rod passing through an ordinary water-tight stuffing-box.

Each of the quadrantal valves $P P$ is surrounded by another rotary valve N , the outer end of which is open and the inner end closed, (see Fig. 1,) the latter being formed with a square hub 13 , Fig. 5, and connected with this square hub is the pipe-connection W , surrounding the solid rod L , with a space interposed between them, this pipe connecting the valve N in one head with the valve N in the other head.

Within the open end of one of the valves N is bolted a ring Q , provided with radial arms 12 , extending to a sleeve R , which is provided with a lever S at its outer end, and by which the valves $N N$ are manipulated. Each of these valves N is provided with ports n , each port being equal in length to the length of the water-passage h , and one port only in each valve is equal in width to the sum of the widths of the portions of the subdivided water-passages h , and another port in each valve is equal in width to only one of the portions of the subdivided water-passage h . The periphery of each of the valves N comes into contact with and controls the ports $m m$ of the correspondingly-located hollow journals

a . The position of these valves $N N$ is reversed in the opposite heads. The two series of valves can thus be operated independently or simultaneously, as occasion requires. The object of the aforesaid construction is to direct the flow of water through a single port or subdivided passage leading to one perforated tube G independently of or altogether, which may be readily done by operating one or both valve-rod levers until their valves are brought to register with their corresponding ports. When the flow is directed through a single port and passage leading to a single perforated tube G , it causes a powerful local agitation, greater than would occur at this point were the flow directed through all the tubes simultaneously, the result of which is a more complete disintegration or breaking up of the filter-bed, which thus permits a more thorough elimination of the sediment therefrom during the cleansing-operation.

$T T$ are two perforated plates, one on each side of the center, (and between the hollow pipe or sleeve surrounding the valve-rods,) and a group of perforated pipes G , making three compartments $15 16 17$, for the reception of the filtering material, the inner one around the center (outside the sleeve) containing a finer filtrant than that contained in either of the outer compartments $16 17$, formed between the perforated plates T and their contiguous portions of the casing, one of the objects being to enable one to use a finer filtrant to do the body of the work, and the coarse material to prevent the finer from being carried away by the water, and in order to prevent the escape of the finer filtrant, which must be separated from the coarser. Another advantage resulting from this construction is, I am enabled to use perforated tubes of thicker material and perforations of a larger size, thus insuring greater durability and a freer flow of water. The perforated plates $T T$ are formed of sections bolted together at u and supported and strengthened by ribs n' of T-shaped iron extending transversely therewith, the outer ends of the T -irons being riveted to the shell or casing.

I claim—

1. The combination, with a filtering-machine having hollow heads, of a valve-rod L , carrying a pair of valves $P P$, and a tubular valve-connection W , surrounding the rod L and provided with a pair of valves $N N$, both pairs of valves being operated simultaneously or independently of each other, as and for the purpose described.

2. A valve-rod L , having a pair of quadrantal valves $P P$ secured in reversed or diametrically-opposite positions thereto, and a hollow sleeve-connection W , having a pair of circular valves $N N$ secured thereto, in combination with a filtering-machine having two groups of perforated tubes G and two heads $D D$, with subdivided water-passages $h h$ leading to said tubes, as and for the purpose described.

3. In a filtering-machine, the perforated partition-plates T T, in combination with and interposed between the two groups of perforated pipes G, as and for the purpose set forth.

5 4. In a filtering-machine having two groups of perforated tubes G G located diametrically opposite each other, a pair of perforated sectional division-plates T T, located one on each side of the center of the machine and

between it and the corresponding group of 10 perforated tubes G, as and for the purpose specified.

Witness my hand this 21st day of December, 1889.

JAMES ALLEN CROCKER.

In presence of—

N. W. STEARNS,
J. K. TILLEY.