No. 656,212. Patented Aug. 21, 1900.

J. POSCH.

FILTER.

(Application filed Feb. 21, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

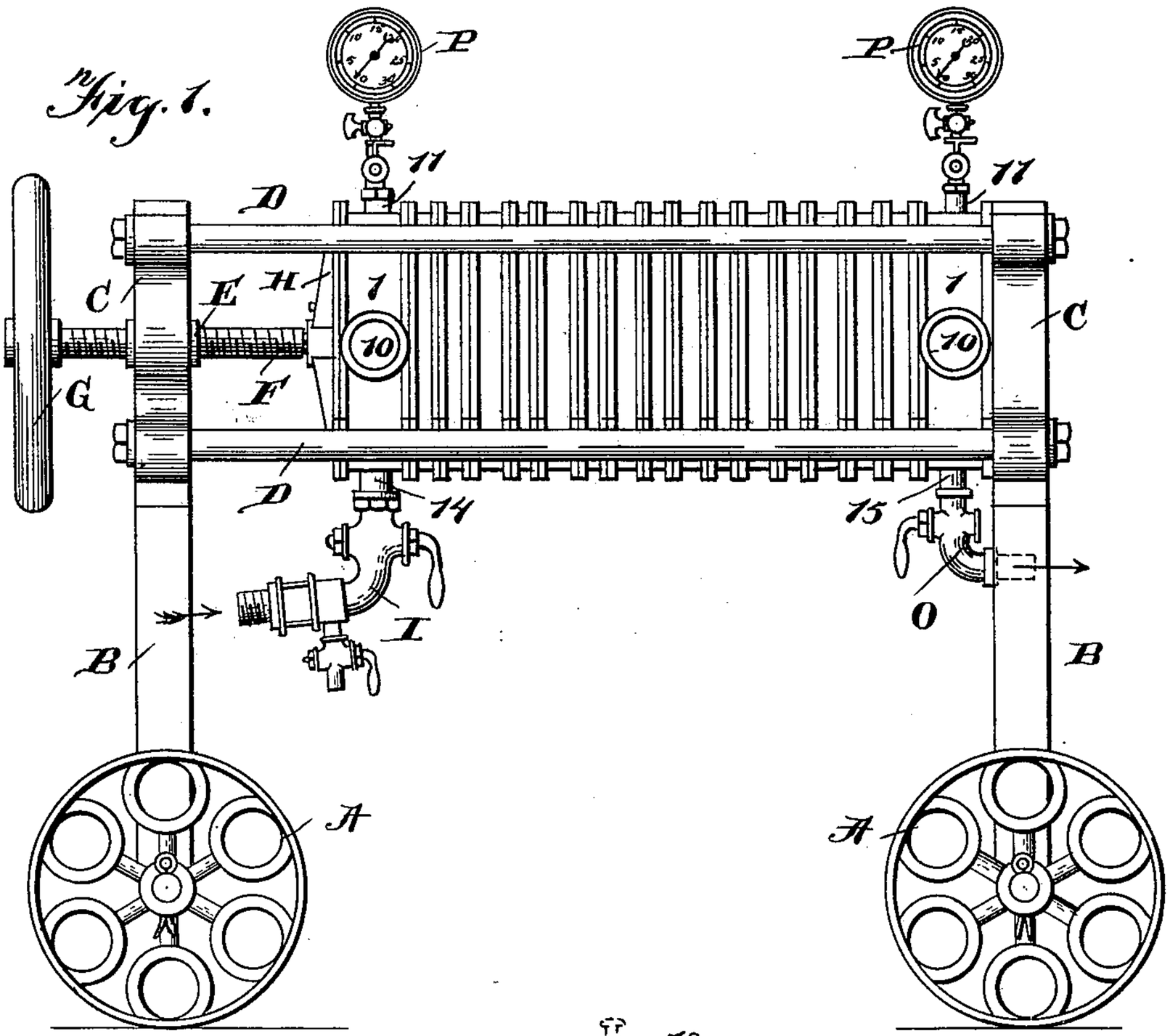


Fig. 5.

Witnesses
Geo. E. Frech.
L. Zeeser Jr.

Inventor
Joseph Posch
by
Louis Zeeser & Co.
Attorneys

No. 656,212. Patented Aug. 21, 1900.

J. POSCH.

FILTER.

(Application filed Feb. 21, 1898.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

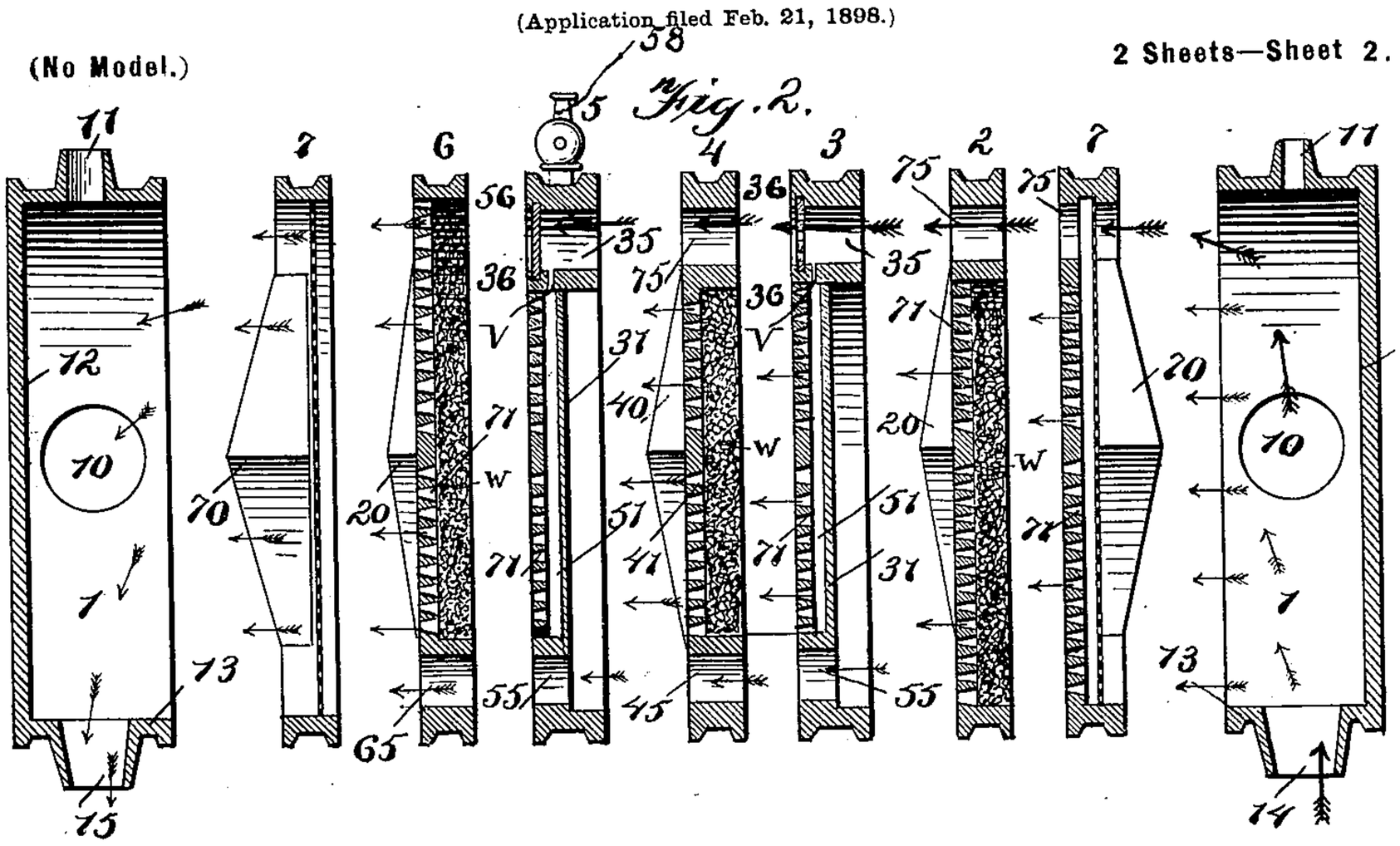


Fig. 3.

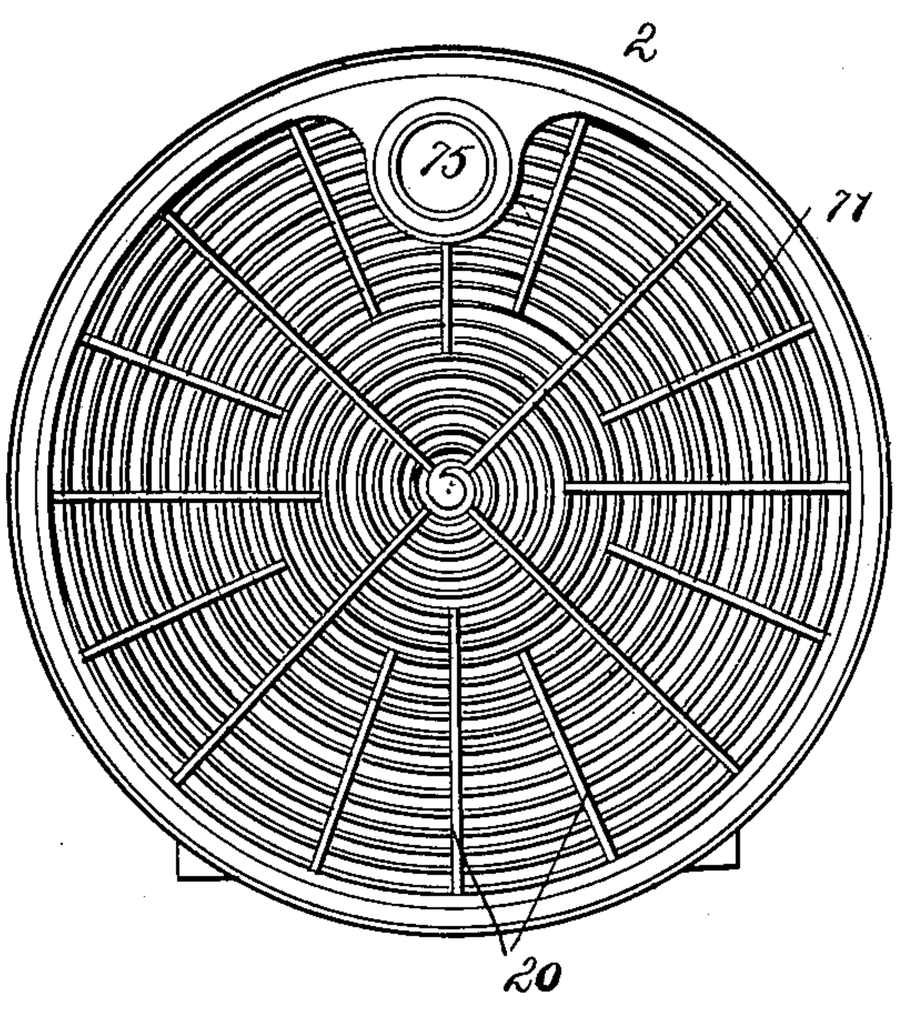
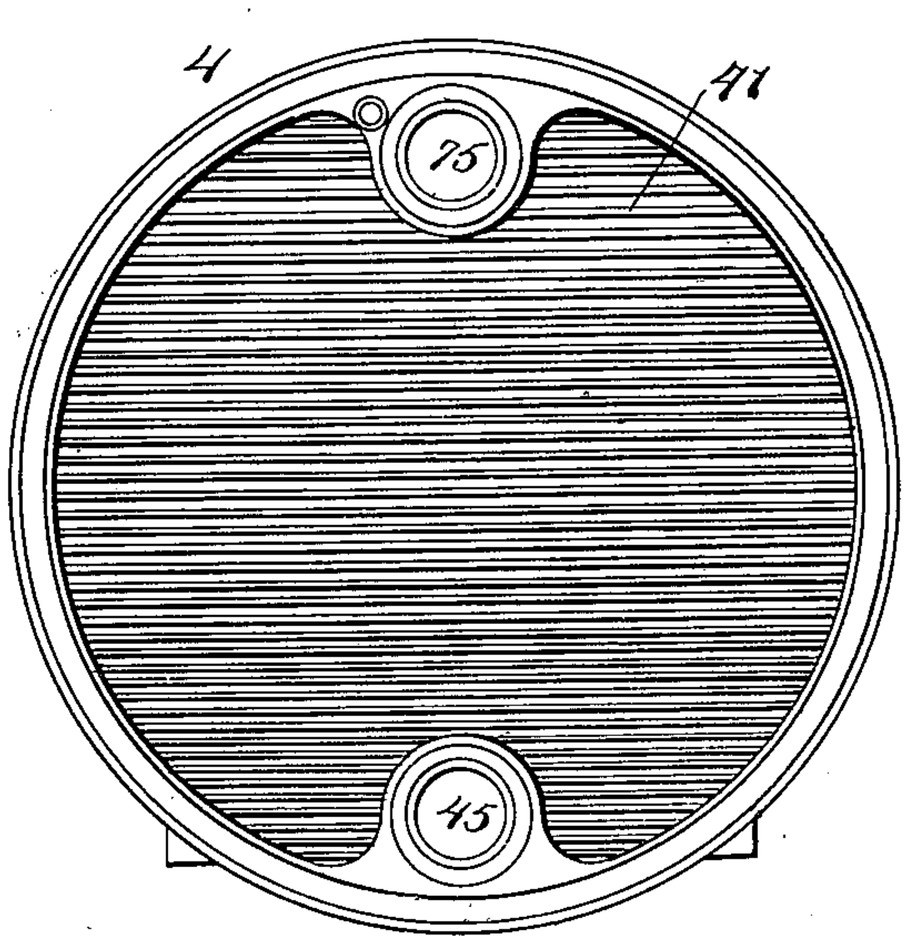


Fig. 4.



Witnesses
Geo. E. Frech;
L. Feeser Jr.

Inventor
Joseph Posch
by
Louis Feeser & Co
Attorneys

UNITED STATES PATENT OFFICE.

JOSEPH POSCH, OF ST. PAUL, MINNESOTA.

FILTER.

SPECIFICATION forming part of Letters Patent No. 656,212, dated August 21, 1900.

Application filed February 21, 1898. Serial No. 671,089. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH POSCH, a citizen of the United States, residing at St. Paul, Ramsey county, Minnesota, have invented certain new and useful Improvements in Filters, of which the following is a specification.

The invention relates to liquids, and more especially to the filtration thereof; and the object of the same is to produce a new and improved filter.

To this end it consists in the specific construction and arrangement of parts, as hereinafter more fully described and claimed and as illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the filter complete. Fig. 2 is a section of the parts of the head slightly separated. Figs. 3, 4, and 5 are plan views of details.

Referring to the drawings, A A designate wheels or other supports sustaining legs or uprights B B, carrying two end plates C C, which are connected in any suitable manner, as by bolts D D, so as to form a rigid frame or casing for the filter-head described below. In one of the end pieces C is seated a nut E, and through the latter passes a screw F, operated by power, by crank, or by a wheel G, as shown, there being a plate H swiveled on the inner end of the screw and sliding within the frame formed by the rods or bolts D, as will be clear, while the opposite end piece or plate C is rigid. Thus the latter forms the bottom and the movable plate H the top (or the two ends) of a press, within which is removably contained the filter-head, and the whole, being by preference mounted on wheels, is portable, as shown.

The filter-head is made up of plates, members, or receptacles, as best seen in section in Fig. 2. A greater or less number than here illustrated may be used; but I have shown such varieties as I consider essential to the successful operation of the machine and sufficient in number herein to make up an operative whole. Hence further showing would be mere duplication. At the ends of the pile of members are the cup members 1, each preferably having an opening 10, covered with thick glass, whereby the interior may be inspected at pleasure, and each also preferably having an opening 11, communicating with a pressure-gage P, as indicated in Fig. 1. The cup comprises a solid bottom 12 and a raised edge 13, preferably cylindrical, as shown, and in the latter at some point is formed an inlet-opening 14 in one cup and an outlet-opening 15 in the other, which openings communicate with the source of liquid supply and exhaust, as indicated at I and O in Fig. 1. The cups are somewhat deeper than the remaining dished plates or members, as seen; but all comprise a body portion and a raised and surrounding edge, and the edges are adapted to tightly contact (with or without the interposition of packing) when assembled as set forth below.

Next within the cups 1 are the strainer members 7, each preferably being ribbed and slightly conical on its outer face, as shown at 70, for the purpose of giving strength. The strainer at the inlet end of the pile preferably has a grating 71 at its inner side, as illustrated, and this member, as well as all others for substantially half the length of the pile from this end inward, is provided with an inlet-opening 75 at or near one side. Through this opening the inflowing liquid has a free and uninterrupted passage until it reaches deflectors, described below, and by which it is turned inward through vents V and filtered, passing thence and thereafter along with the other and filtered portions of the liquid in the pile.

Next inside the strainers are members 2 and 6, each also having a grating 71, upon which is supported wood-pulp W or other good filtering material, and I have herein also shown these members as provided with supporting-ribs 20 to prevent their grates from sagging or bending under pressure.

75 designates the inlet-opening in member 2, registering with that in the upper part of strainer 7, and 65 designates a similar opening in member 6, except that as this member is turned a half-revolution from the position of member 2 this opening is now an outlet. However, this opening 65 may be omitted, if desired.

Next inside the plates or members 2 and 6 are what I will term the "switch" members, as it is their function to deliver the liquid thus far unfiltered inward in position to be filtered and passed on. These are numbered

3 and 5 herein, and each has the grating 71, adjacent which is a transverse solid plate-partition 31, leaving an opening or chamber 51 between, while each has at one side an outlet-opening 55 and preferably opposite thereto an inlet-opening 35. Within the latter are located perforated switch-plates 36 and 56, respectively coarse and fine or perforated or solid, whose function is to deflect or switch part of the liquid passing through opening 35 into the chamber 51 of member 3 and substantially all of the liquid from such opening in member 5 into its chamber. As best seen in the horizontal view, the openings 35 are formed by cored passages surrounded by comparatively-thick walls, and the switch-plates are set in the passages and connected with the walls in any suitable manner. Through the inner wall is formed a passage or vent V, which is located at the inlet side of the switch-plate and communicates with the chamber 51, so that liquid flowing into the inlet 35 and retarded by the switch-plate 36 will be deflected through the vent V into the chamber 51. One or both these members 3 and 5 may be provided with air-vents or cocks 58, as indicated in the drawings.

At the center of the pile here shown is what I term the "compound" member, because it has both inlet and outlet openings. It carries a grating 41, either spiral, as shown in Fig. 3, of plain cross-bars, as shown in Fig. 4, or of any other suitable construction. In fact, any form of grating may be employed at any point, although I prefer the spiral. In the cup-shaped body of this member and on the grating is located wood-pulp W or other filtering material. Adjacent the grating may be located the supporting-ribs 40. At one side is a plain open inlet-passage 75 and at the other side a similar outlet-passage 45, these communicating with those directly above and below.

All parts being properly constructed of the desired sizes, shapes, proportions, and materials, the pile is set up or assembled, inserted within the guiding-frame formed by the bolts D, one end pressed against one plate C and the other against the follower-plate H, and the hand-wheel G is turned to press the plates or members tightly together, so as to prevent leakage. The gages are attached as shown and proper couplings made between the source of liquid-supply and the receptacle for the filtered product. The exhaust is opened at O and the inlet at I, and the course of the liquid is then as follows, (I have shown the members of the pile in Fig. 2 slightly separated and in horizontal position for sake of greater ease of reading and reference; but they could assume a vertical or oblique position without departing from the spirit of my invention:) Passing in at 14, most of the liquid flows through the strainer in member 7 and its grating, thence through the pulp and grating of member 2, and thence onto the solid member 31 of the member 3, by which it is deflected to the outlet 55, as seen in Fig. 5, whence it flows successively through openings 35, 45, 55, and 65 to the exhaust 15. I have shown by heavy arrows the unfiltered water or liquid and by lighter ones the same after it has been filtered. Some of the liquid within the cup 1, however, passes in unfiltered condition through the two registering passages 75 in members 7 and 2 into the opening 35, against the switch-plate 36, and part of it is thereby directed through vent-opening V into chamber 51, thence through grating 71, pulp and grating of member 4, against solid plate 31 of the member 5, and is thereby shed into the outlet 55 and delivered to the exhaust in filtered condition, as above described. Finally what portion of the unfiltered liquid passes through the switch-plate 36 passes through passage 75 into passage 35 in switch member 5, is there, by the switch 56, diverted inward through vent V into the chamber 51, and thence passes onward through the gratings 71, wood-pulp or other filtering material, through the strainer 7, (which, in fact, last acts on all liquid passing through this filter,) and finally joins the filtered liquid and passes out the exhaust 15.

Thus it will be seen that by the construction herein illustrated the body of liquid first and last passes through strainers, between which it is divided into three courses and each course passes through two gratings and an interposed filtering agent. The three unite in the exhaust-cup and are exhausted at 15. The gages, cocks, valves, and air-vents obviously serve their usual functions; but the employment of three (or a plurality) distinct courses through one filter-pile I consider highly advantageous. The parts can be readily separated, as for cleaning, repair, or inspection, and are reassembled in the manner above set forth. It will be noticed that the open passage 75 in the first strainer is located opposite the inlet 14. This is for the purpose of causing it to catch a considerable portion of the liquid, which enters the inlet-cup 1 under some pressure or head.

What is claimed as new is—

1. In a filter, the combination with a support; of a filter-pile comprising cup-shaped end members, one having an inlet and the other an outlet, a pair of strainer members next inside the cups, a series of grated members between the strainers, and means for clamping the members of the pile together, as and for the purpose set forth.

2. In a filter, the combination of members formed respectively with filtering portions and clear passages, such members being so relatively arranged as to leave a plurality of courses through the filter from the inlet to the exhaust.

3. In a filter, the combination of members formed with filtering portions and clear passages, such members being so arranged relatively as to form a plurality of courses through the filter from inlet to exhaust, each course

leading through a filtering compartment and all courses uniting in a single exhaust.

4. In a filter, the combination with a support; of a pile consisting of cup-shaped end members having inlet and outlet openings, grated intermediate members, filtering material proper supported on the grates, and strengthening-ribs adjacent certain of the grates, as and for the purpose set forth.

5. The herein-described filter-pile, the same comprising a cup-shaped inlet member with the supply-opening at one side thereof, filtering members next adjacent and having clear through-passages at points opposite said supply-opening, a switch member next adjacent and having a similar passage with a switch-plate therein, this member having a solid plate, a grate, and an interposed chamber into which the switch-plate delivers, and also having an outlet clear passage at its opposite side, and a cup-shaped outlet member having the exhaust-opening, all as and for the purpose set forth.

6. The herein-described filter-pile, the same comprising a pair of endmost cup-shaped members with inlet and outlet openings; strainer members next adjacent, the one near the inlet having a through clear passage; filter members next inside the strainers, each having a grating supporting filtering material proper, and these members being provided with clear passages of which one registers with that in the adjacent strainer and the other stands opposite; switch members next inside, each having an inlet clear passage with a switch-plate therein, an outlet clear passage, a solid cross-plate, and a grating with a chamber between it and the plate and into which chamber the switch-plate directs the liquid; and at the center of the pile a compound member having grating, filtering material, and opposite clear passages, all constructed and arranged for operation substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOSEPH POSCH.

Witnesses:
L. FEESER, Jr.,
GEO. E. SCALES.