

No. 733,885.

PATENTED JULY 14, 1903.

W. G. TOUSEY.
WATER FILTER.

APPLICATION FILED DEC. 23, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

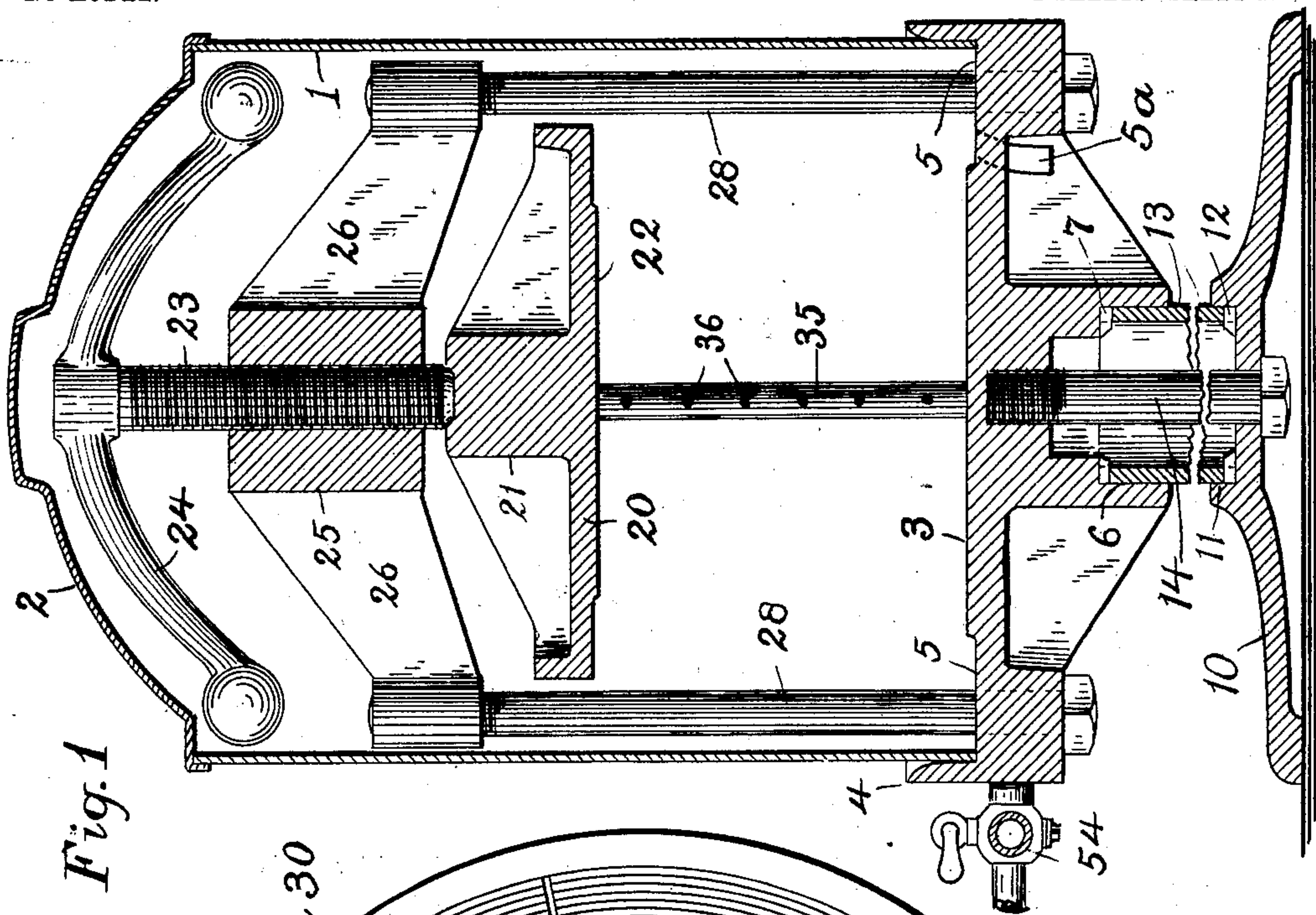


Fig. 1

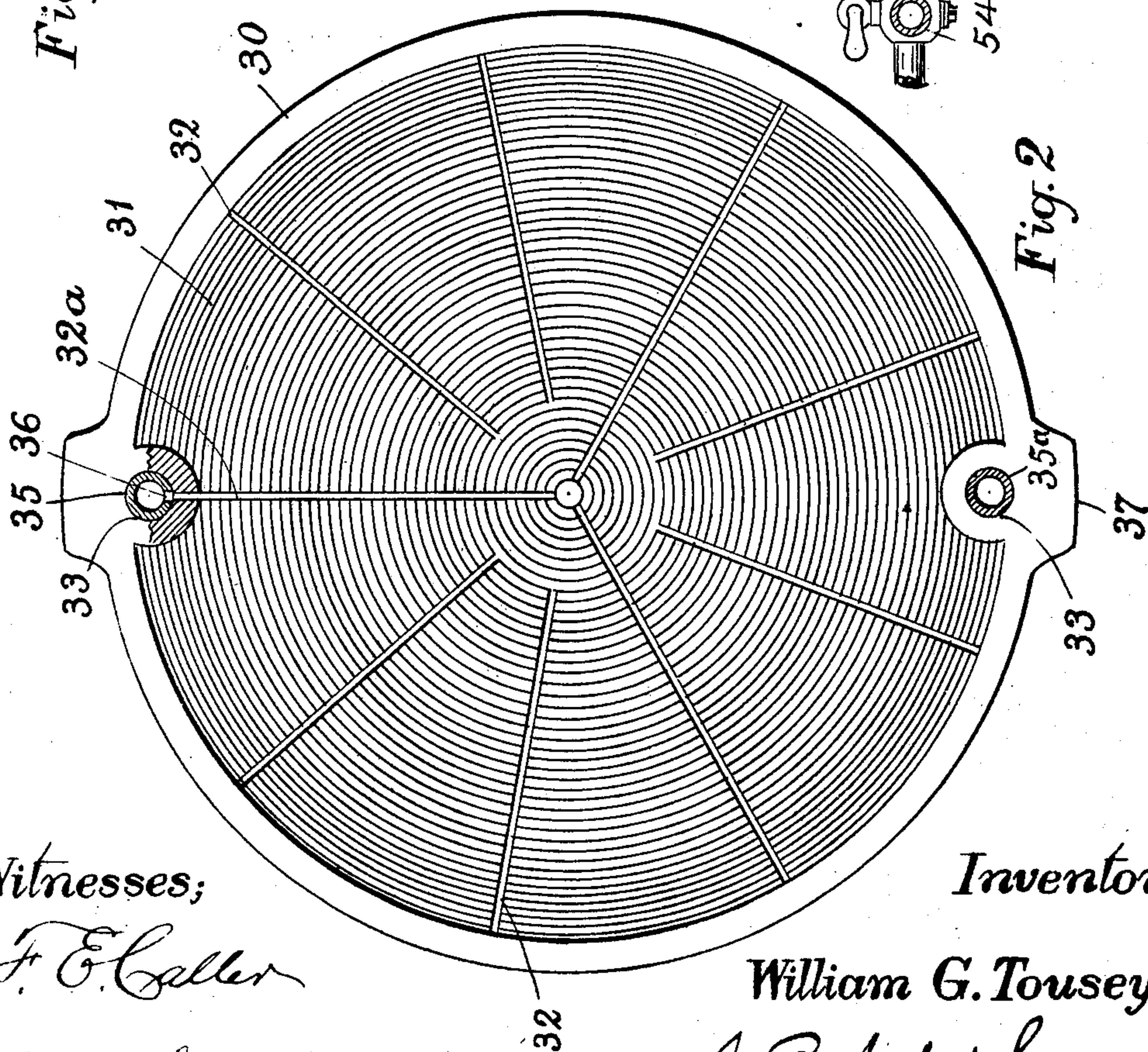


Fig. 2

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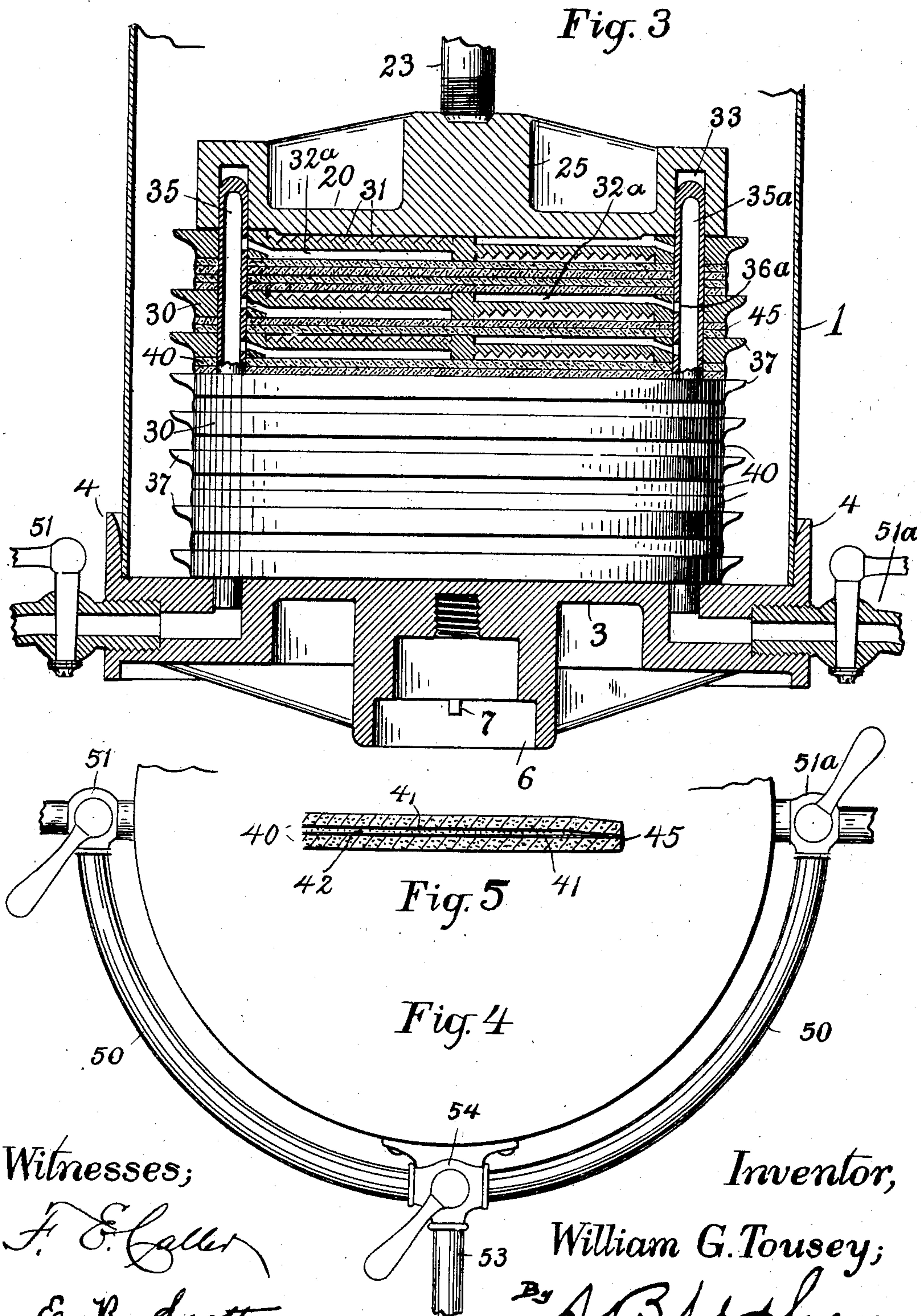
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UNITED STATES PATENT OFFICE.

WILLIAM G. TOUSEY, OF SOMERVILLE, MASSACHUSETTS.

WATER-FILTER.

SPECIFICATION forming part of Letters Patent No. 733,885, dated July 14, 1903.

Application filed December 23, 1902. Serial No. 136,349. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. TOUSEY, a citizen of the United States, and a resident of Somerville, in the county of Middlesex, State of Massachusetts, have invented certain new and useful Improvements in Water-Filters, of which the following is a full, clear, and exact description.

Referring to the drawings forming part of this specification, Figure 1 is a central vertical section of the parts for containing and supporting the filtering apparatus proper, but without the latter. Fig. 2 is a plan view, partly in section, of one of the filter-tablet-separating disks. Fig. 3 is a central vertical section of the main portion of the filtering apparatus. Fig. 4 is a detail view of the water connections looking down upon the apparatus, and Fig. 5 is a transverse section of a part of the filter-tablet.

The reference-numeral 1 designates a thin-walled cylinder composing a part of the case which incloses the filtering apparatus, and 2 is the top thereof, preferably fixed thereto. The bottom plate 3 is formed with a vertical flange 4, within which fits the lower edge of the cylinder 1, and is provided with supporting means consisting of a base 10 and a tubular post 13. The filter is adjusted to any desired height in order to fit it for standing either upon a table, shelf, or the floor by selecting a tubular post of the proper length. The bottom plate, the post, and the base are rigidly secured together by a bolt 14 passing through the base and post and tapped into the bottom plate, as shown in Fig. 4, and the parts are kept from turning one on another by the lugs 7 12 within the sockets 6 and 11, respectively, the post ends fitting within said sockets and being terminally notched to receive said lugs. Within the case, near the upper part thereof, is a yoke 26, rigidly joined to the bottom plate 3 by the bolts 28 and containing a clamping-screw 23 in its hub 25, such screw being operated by the arms or other hand-grasping means 24. Said screw abuts against the hub 21 of the upper clamping member 20, between the under surface 22 of which and the upper surface of the bottom plate 3 are clamped the parts composing the filtering members proper. Such filtering members consist of the filter-tablets 40,

separated one from another by the disks 30, the latter being formed to force the water to traverse the tablets from face to face thereof. Said disks 30 are preferably made from hard rubber or other non-corrodible material and are each formed with a large number of annular concentric closely-located grooves or corrugations 31 and an odd number of radial grooves 32 on each face thereof. At two diametrically opposite points in each disk are two transverse holes 33 for the passage of the tubes 35 rising from the bottom plate 3 and communicating with the water inlet and outlet 51 and 51^a. At frequent intervals in each tube 35 are openings designed to communicate with the grooves 32^a of said disks, said grooves being extended through the rims of the disks by suitable small holes, as shown in Figs. 2 and 3. As shown in Fig. 2, there are nine radial grooves, such odd number being used in order to have but one groove, as 32^a, come in line with a hole 33. While both faces of a disk are similarly grooved, the radial groove 32^a of the under face is arranged to come in line with the tube 35^a and to communicate therewith in the manner already described. The object of this is to afford an ingress for the water to the space immediately above each filter-tablet and a corresponding egress from the space below the same.

The filter-tablets 40 are of substantially equal diameter to the disks 30 and are apertured to permit the passage of the tubes 35 35^a. They are composed of fibrous material suitably treated, as will be described hereinafter.

In preparing the apparatus I place a disk 30 upon the bottom plate 3, then a filter-tablet on said disk, then another disk, another tablet, and so on up until the desired height is reached and a disk contacts with the clamping member 20. The screw 23 is then turned and sufficient pressure applied to the clamping member to render the rims of the disks 30 water-tight in their contact with the filter-tablets 40. As shown in Fig. 3, the openings 36 in the tubes 35 35^a are located to come in line with the holes leading through the disk-rims to the radial grooves 32^a; but said openings may be made much more frequent, enough so to constitute practically a continuous slot and to thereby render it immaterial how many

tablets are inserted between any pair of disks or how much compression is given to the tablets by the clamping members. The unfiltered water being admitted through the inlet 51, it rises in the tube 35 and passes through the openings 36 to the spaces above the filter-tablets 40. Thence it percolates down through the said tablets and is thereby filtered and passes out through the openings 36^a to the tube 35^a, and thence down to the exit 51^a.

As a means for cleansing the filter I provide the supply-pipe 53 with two branches 50, one of which connects with the inlet 51 and the other with the outlet 51^a, a three-way valve 54 being introduced at the juncture of said supply-pipe and branches. The inlet 51 and outlet 51^a are each provided with a similar three-way valve, such valves and branches permitting me to reverse the current through the filter for a moment or two, and thereby lift off from the filter-tablets their accumulations of sediment and discharge the same at 51. After a brief space the valves are turned to their normal positions and the filtering operation continued.

In my Patent No. 634,512 I set forth a filter-tablet which, with some modifications and improvements, I prefer to use in my present apparatus. Said tablet is preferably of fibrous material impregnated with aluminium hydroxid or similar salt. For my present apparatus, however, I have improved such tablet to the extent of making it a combination of two single tablets cemented together at their edges and having their inner surfaces enameled or impregnated with aluminium hydroxid or other filtering material 41, as shown in Fig. 5. By this arrangement several important results are attained. For example, first, the enameled or coated surfaces are protected from injury during handling; second, a fibrous untreated surface of the tablet is always presented to the unfiltered water to act as a relatively coarse filter medium, protecting the more refined filtering material within from too-speedy clogging and, moreover, economizing its special virtues; third, this combination of two tablets permits when occasion calls for it of the inclusion of more special filtering materials—as, for example, finely-powdered charcoal 42, Fig. 5, or substances capable of some specific chemical effect that may be sought; fourth, this double tablet prevents the aluminium hydroxid or whatever other filtering material may be included between the two parts thereof from being carried away bodily by the current, whichever direction is given thereto; fifth, finally this combination provides a very effective filter medium which can be replaced with ease and at a trifling cost, a feature which I regard as of the highest importance in practical filtration. I further improve this combination-tablet by treating its peripheral edges with an insoluble coating, as varnish, (indicated in Fig. 5 by the slightly-curved

lines 45.) This gives firmness to the rim of the tablet, makes it easy to separate the tablets one from another after they have done service in the press, and prevents the water from percolating radially from within the tablet.

The flange 4 and the beveling of its inner edge are for the purpose of receiving whatever moisture may condense on the exterior of the cylinder 1 and conducting it to the waste-channel 5 in the bottom plate 3 and from thence to the drip-pipe 5^a, thereby preventing any sloppiness about the filter.

While I often employ a single combination-tablet between each pair of disks, I usually increase the number, as shown beneath the topmost disk in Fig. 3 and above the second disk from the bottom. The more numerous the number of tablets between each pair of disks the more refined is the filtrate produced.

The capacity of this filter can easily be changed to meet varying requirements by increasing or diminishing the number of filter members in the press. For instance, the capacity can be reduced by using at the bottom of the pile several disks without intervening filter-tablets, every alternate one of such disks being reversed or turned through an arc of one hundred and eighty degrees, and thus presenting to the same tube 35 or 35^a both openings to the same space included between each pair of disks, and so cutting off all flow through such spaces from one tube to the other, thus shutting off the passage of water at such portion of the members and using but one or two tablets at the upper part, and thus reducing the capacity of the filter accordingly, or the capacity of the filter can be largely increased by substituting longer tubes 35 and bolts 28 and using a proportionally larger number of filter members. Such elongated tubes and bolts, together with additional filter members, I provide with the apparatus as put upon the market.

In addition to the function performed by the tubes 35 of directing the incoming water to the disks 30 they serve the purpose of enabling the disks and tablets to be easily and accurately piled, the upper ends of the tubes being rounded or pointed to more readily permit of their entering the openings in the disks and tablets.

The projections 37 (shown in Figs. 2 and 3) serve simply as ears for the more easy removal of the disks.

What I claim as my invention, and for which I desire Letters Patent, is as follows, to wit:

1. In a filter, the combination of a group of superposed filter-tablets and separating-disks, a bottom plate supporting the same and having the diametrically opposite water inlets and outlets, clamping members located external to said disks and filter-tablets for pressing the same down upon said plate, and two tubes rising from said plate through diametrically opposite openings in said tablets

and disks, each tube being perforated throughout its length along the line of its periphery nearest the centers of said disks and tablets; whereby such tubes serve both as guides for
5 the accurate placing of the disks and tablets, and to prevent the loose tablet fibers from being carried by the water passing through the tablets from said inlet to said outlet into the filtrate, substantially as described.

10 2. In a filter, the combination with the disks and filter-tablets having transverse openings near their peripheries, and the clamping members, the lower one of which has the water inlet and outlet, of the tubes rising from the
15 lower clamping member and communicating with said inlet and outlet; said tubes having the openings communicating with the disks, and having their upper ends pointed or rounded, whereby said tubes serve the double
20 function of directing the water to and from the filtering members and of enabling the latter to be readily and accurately put in place, substantially as described.

3. In a filter, the combination of the clamping members the lower one of which has the
25 water inlet and outlet, the tubes rising from the lower clamping member and communicating with the said inlet and outlet and each having a line of perforations, and the disks and filter-tablets clamped between said clamp-
30 ing members and having openings penetrated by said tubes; each of said disks having on each face a series of annular grooves and a number of radial grooves, the radial grooves of one face communicating with one of said
35 tubes and the radial grooves of the other face communicating with the other of said tubes, substantially as described.

In testimony that I claim the foregoing invention I have hereunto set my hand this 18th
40 day of December, 1902.

WILLIAM G. TOUSEY.

Witnesses:

GEORGE A. MOORE,
A. B. UPHAM.