

No. 730,485.

PATENTED JUNE 9, 1903.

E. SIMONETON.

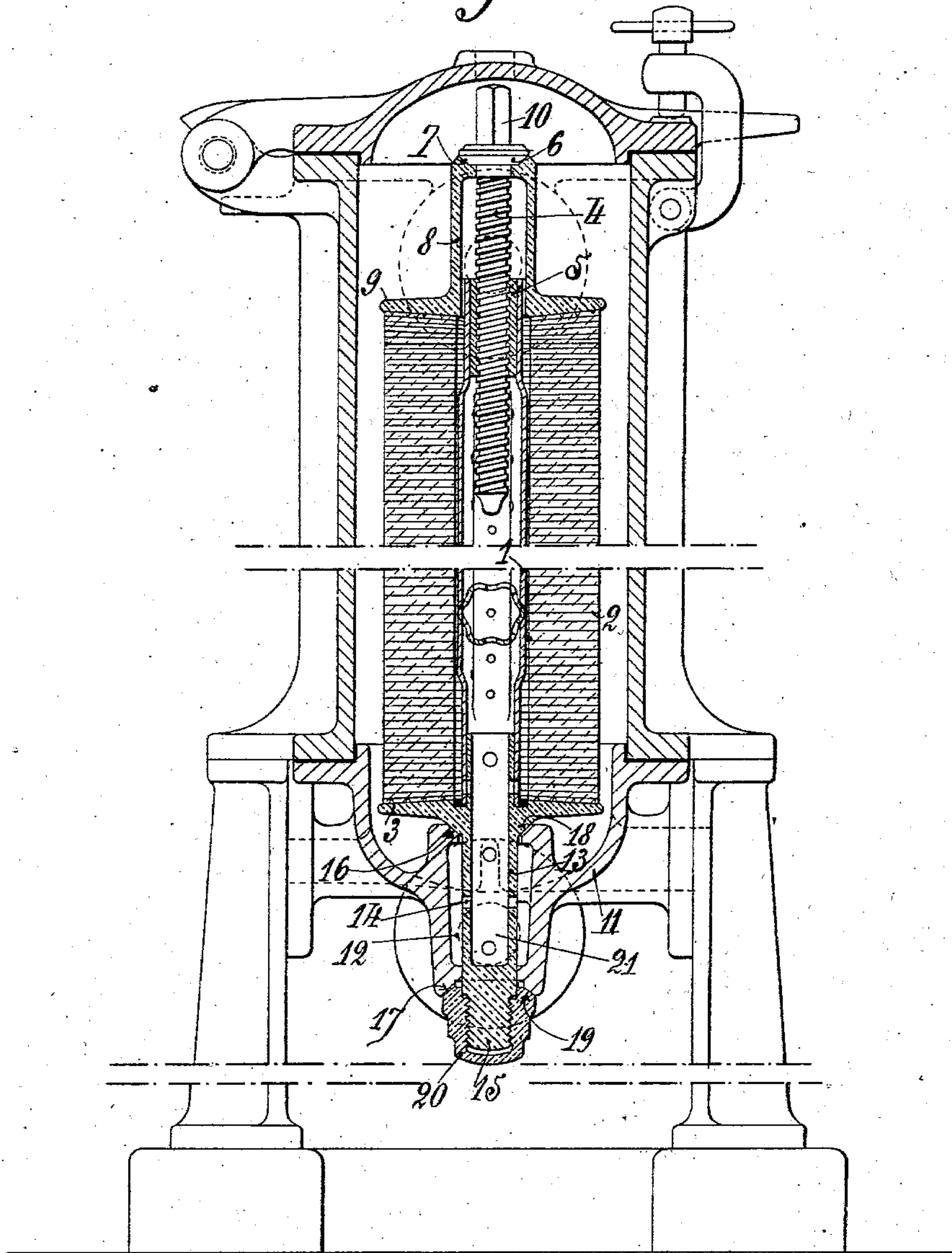
DISK FILTER.

APPLICATION FILED OCT. 27, 1902.

NO MODEL.

4 SHEETS—SHEET 1.

*Fig. 1.*



Witnesses,

Wm B. Kerkam,

Gustave R. Thompson.

Inventor:

Emmanuel Simoneton  
by *Frederick H. H. H. H.*  
att'y.

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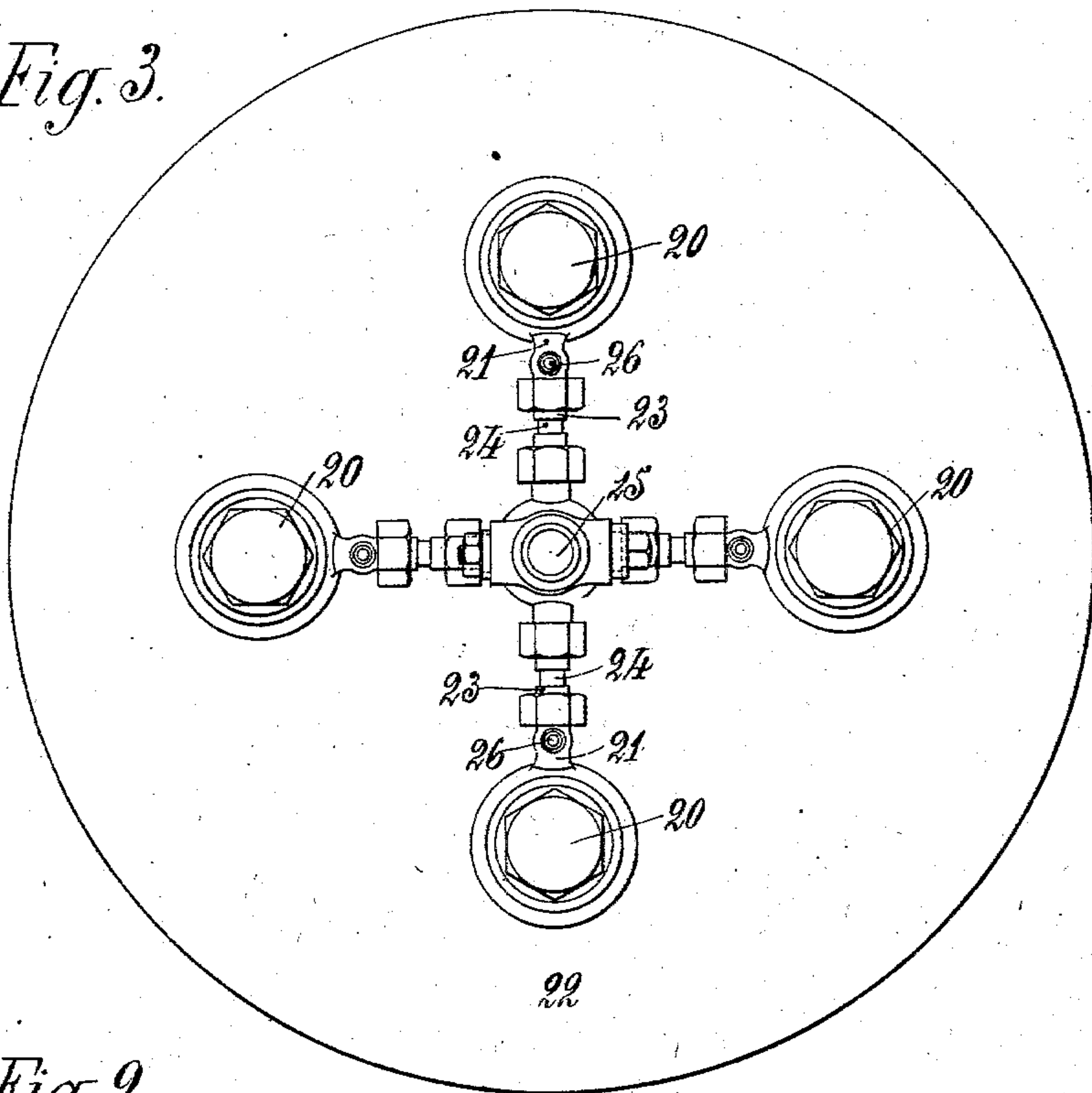
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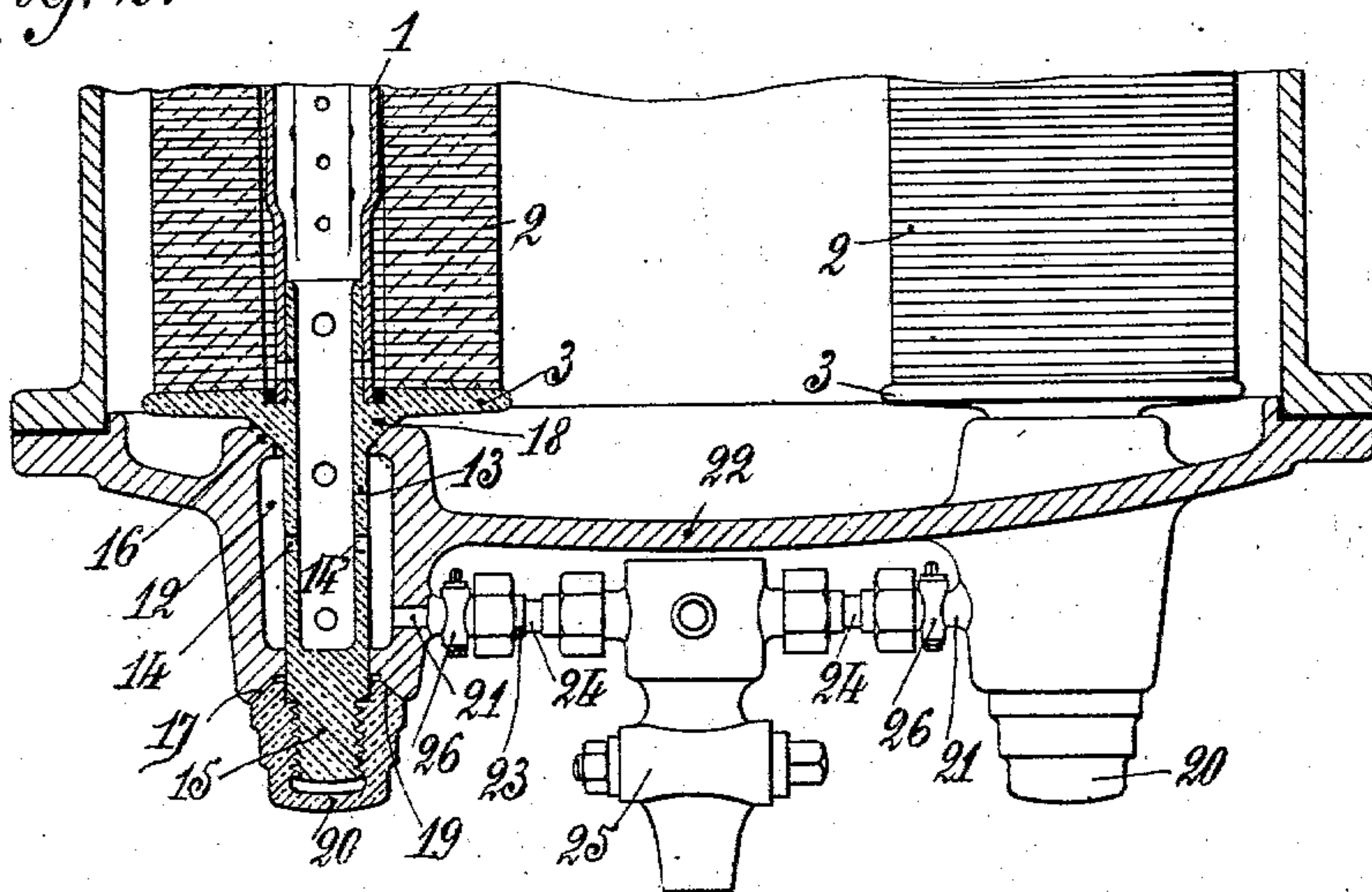
NO MODEL.

4 SHEETS—SHEET 2.

*Fig. 3.*



*Fig. 2.*



Witnesses:

Mr B. Kerkam  
Gustave R. Thompson

Inventor:

Emmanuel Simoneton,  
by Philip Mauro,  
Atty.



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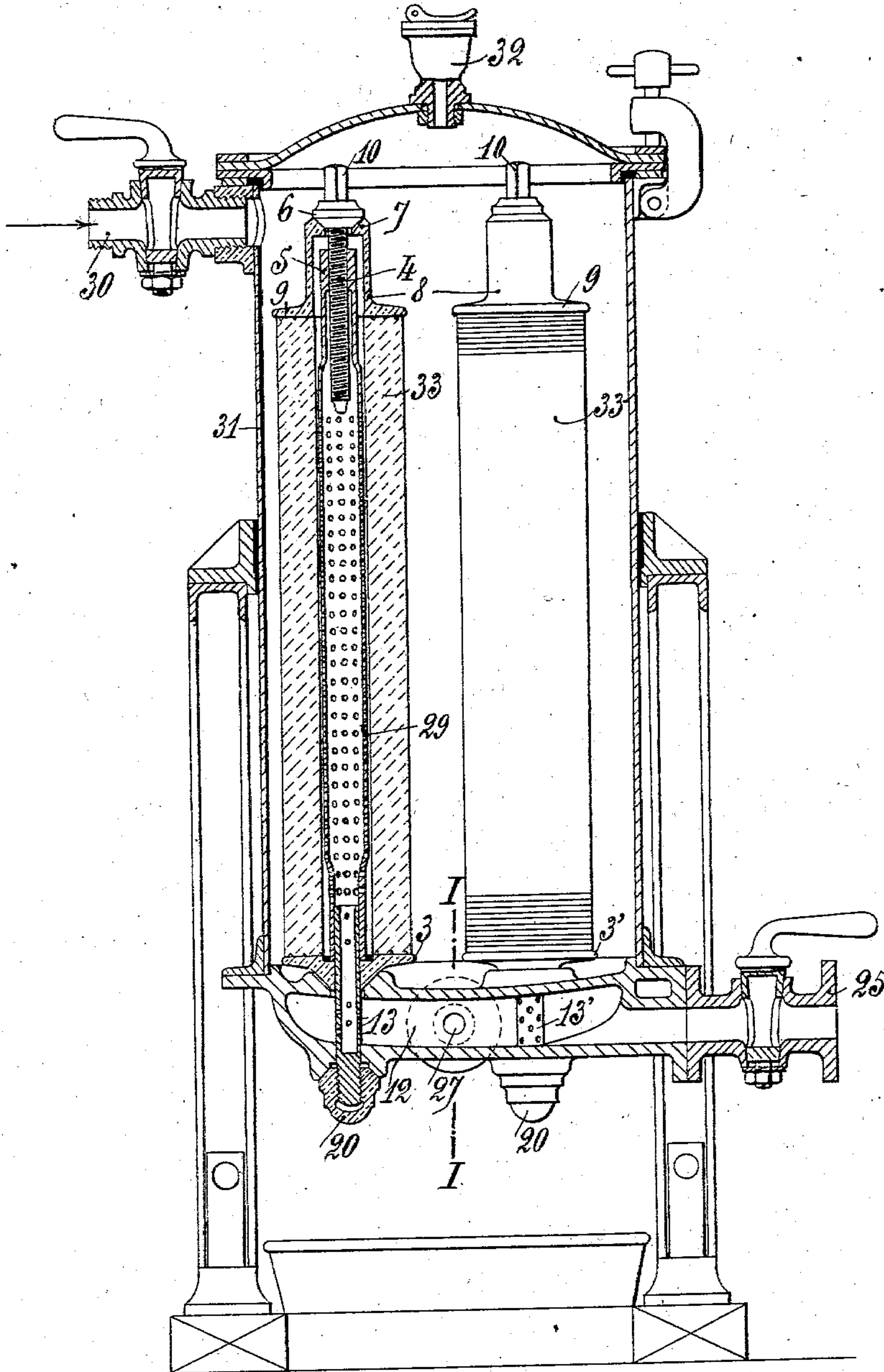
E. SIMONETON.  
DISK FILTER.

APPLICATION FILED OCT. 27, 1902.

NO MODEL.

4 SHEETS—SHEET 3.

*Fig. 4*



*Witnesses:*

*Wm. B. Berkman,  
Gustave R. Thompson.*

*Inventor:*

*Emmanuel Simoneton,  
by E. J. Haurio,  
att'y.*

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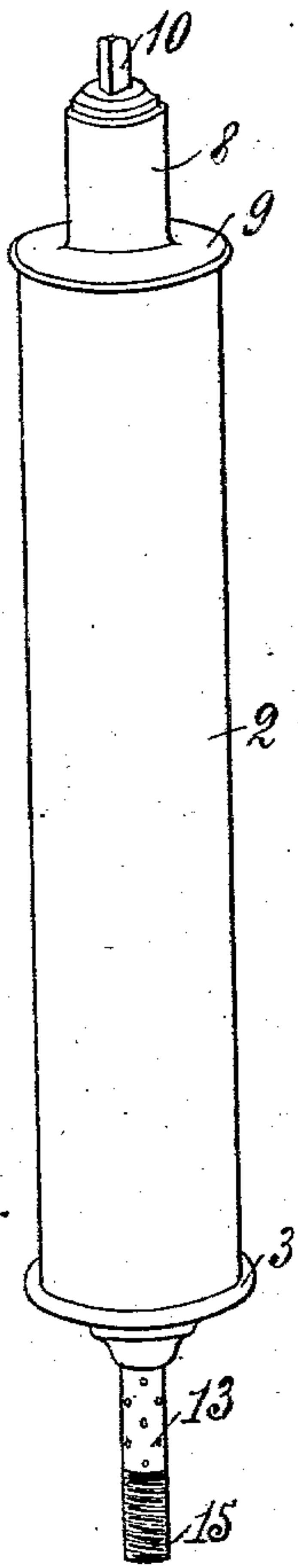
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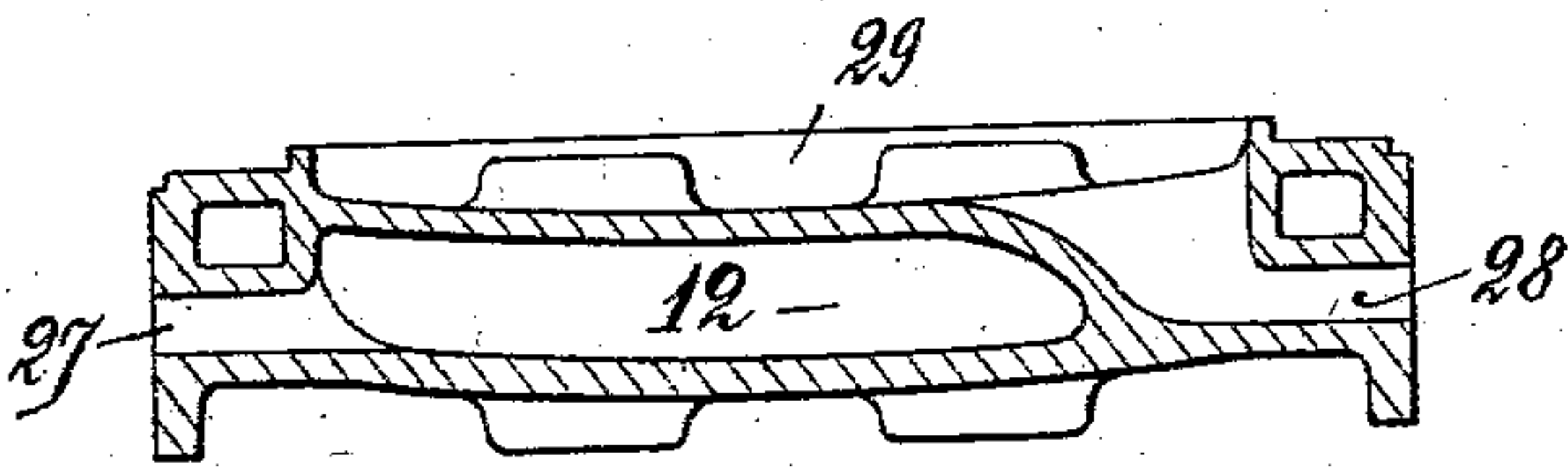
NO MODEL.

4 SHEETS—SHEET 4.

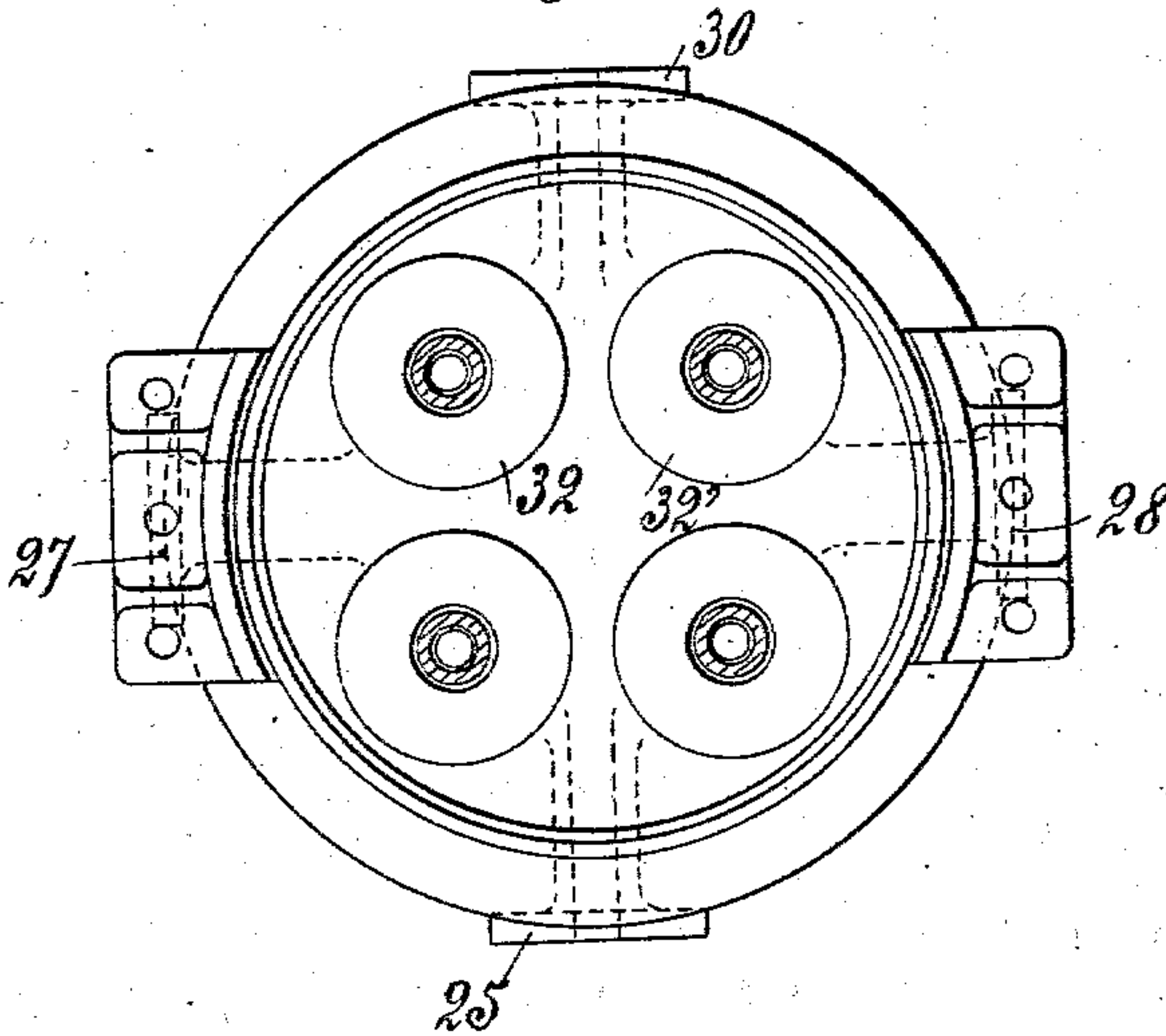
*Fig. 5.*



*Fig. 6.*



*Fig. 7.*



Witnesses:

Mr B. Herkany

Gustave R. Thompson.

Inventor:

Emmanuel Simoneton.

by Amos James  
Atty.



# UNITED STATES PATENT OFFICE.

• EMMANUEL SIMONETON, OF PARIS, FRANCE.

## DISK FILTER.

SPECIFICATION forming part of Letters Patent No. 730,485, dated June 9, 1903.

Application filed October 27, 1902. Serial No. 128,936. (No model.)

*To all whom it may concern:*

Be it known that I, EMMANUEL SIMONETON, constructing engineer, of 41 Rue d'Alsace, city of Paris, Republic of France, have invented  
5 new and useful Improvements in and Connected with Disk Filters, which improvements are fully set forth in the following specification.

This invention relates to improvements in  
10 disk filters. These filters are generally constructed in the following manner: In a cylindrical casing into which the liquid to be filtered is introduced under pressure or without pressure a pile of disks made of some  
15 textile or other suitable filtering material is arranged vertically. The disks are strung on a hollow shaft formed by two perforated tubes fitted one into the other, the one having an upper and the other a lower platform between  
20 which the disks are pressed. The tightening is generally effected by acting simultaneously from above and below on a screw running through the two platforms. The lower tube has a cock which discharges into a double  
25 bottom of the vessel in which the filtered liquid collects. The wine or other liquid to be filtered enters the vessel, passes through the pile of filtering-disks, by which it is filtered, then into the bipartite central collector already mentioned, through holes formed there-  
30 in, and runs off in a filtered condition through the lower part. The disadvantages of such arrangement are as follows: The mounting of the disks on the bipartite collector is a delicate operation. When the upper tube is  
35 placed in the center of the formed pile, the inner rims of the disks may be torn. After being set up, the device is often insufficiently rigid. The india-rubber joints placed under  
40 the lower plate are therefore defective. Finally and especially, the removal of the pile when this is requisite from any cause—such as damage, necessity of washing, &c.—cannot be effected except by loosening the screw  
45 which tightens the upper plate and taking down piece by piece the pile, which is without support as soon as the screw is loosened. This latter difficulty has certainly hitherto prevented this kind of filter from being used as  
50 constantly as might be desired, and the attainment of the important result referred to in the course of this specification—viz., the facil-

ity of arranging several filtering elements in a single vessel.

The present invention is intended to obviate these disadvantages by the employment  
55 of a single collecting-tube supporting the whole arrangement, forming part with the lower plate and supporting an external metallic joint and an internal metallic joint  
60 formed immediately over the double bottom of the filter-casing, to which they are made tight by a nut engaging with a screw-threaded part at the end of the collector referred to. Thus by simply removing this nut the whole  
65 pile may be removed without being loosened. The pile may likewise be put in place instantly. This device is illustrated in the accompanying drawings.

Figure 1 is a vertical section through the  
70 axis of the device applied to a filter with a single element. Figs. 2 and 3 are respectively a vertical section and inverted plan illustrating the method of mounting several  
75 filtering elements together in a single vessel. Fig. 4 is a vertical section illustrating another form of the method of mounting several filtering elements together in a single filter. Fig.  
80 5 represents one of the elements illustrated in Figs. 2 or 4 as removed or ready for being put in place. Finally, Figs. 6 and 7 are respectively a section through I I in Fig. 4 and  
85 a plan illustrating the arrangement of the double bottom of the filter according to the form shown in Fig. 4.

As will be seen in Fig. 1, the hollow core or collector 1, on which the filtering-disks 2  
are strung, is formed by a perforated tube having connected thereto a platform 3, on  
90 which the pile rests. The disks are thus tightened simply by means of a screw 4 engaging in a nut 5, placed in the upper part of the tube, to which it is firmly attached. This tightening operation may consequently  
95 be effected before mounting the filter-body in the cylinder by bringing the two plates together without the bottom of the filter being used in any way as a support.

The faced edges of the head 6 of the screw 4 lodge against a faced seating 7, forming a  
100 metallic joint. This seating terminates in a cap 8 in which the screw engages and which forms part with the upper platform or plate 9, causing it to descend and compress the



disk when the screw is turned with a key or hand-wheel mounted on the square screw extension 10.

In the bottom 11 of the filter is a chamber 12, which is either cast therewith or formed therein by some means, and constitutes in some degree a double bottom, with which the stem 13, forming an extension of the collector or core, engages. This socket communicates through openings 14 14', &c., with the chamber 12 and terminates in a solid piece 15, which is screw-threaded externally.

In order that the liquid to be filtered and entering the chamber 12 through the stem 13 may be thoroughly isolated, two joints are necessary, the one in the upper part of the chamber, separating it from the unfiltered liquid in the filter, the other in the lower part, separating it from the outer air. In the present arrangement these two joints have the peculiarity of being metallic and both being made tight by the same organ which renders the collector, and consequently the filtering material, immovable. For this purpose the edges 16 and 17 of the upper and lower opening of the chamber 12 are made conical, each of the conical surfaces being symmetrically arranged in relation to the horizontal plane of the chamber. These edges are carefully faced.

On the upper edge 16 a counter-truncated piece 18 rests, which is likewise faced and formed on the under surface of the platform 3. Against the lower edge 17 a faced truncated counterpart 19 rests, which is formed on the periphery of a screw-nut 20, engaging with the screw-thread of the stem 13. It will be easily understood that the tightening of this nut at the same time that it renders the collector and the platform 3, which is firmly attached thereto, immovable on the bottom of the vessel also tightens the joints and makes them impermeable.

The filtered liquid escapes through a junction or cock 21, mounted in the side of the chamber 12. The effect of this is as follows: The stem 13 not carrying the discharge cock or pipe, this being on the chamber 12, the simple loosening of the nut 20 and its removal are sufficient for enabling the completely-mounted filtering material to be taken out of the top of the filter at one operation without interfering with the pipes.

The combination of devices above described renders it easy to set up several filtering elements in the same filter. This combination is illustrated in Figs. 2 and 3, as seen by the figures, the chambers 12, &c., corresponding to each element being put together or cast together on the ordinary bottom 22 of the filter; but over each discharge-opening 21 a pipe 23 is screwed, which opens into the casing of a central cock 25, through which the filtered liquid escapes. A cock 26, mounted on the opening 21 of each element, enables any particular filtering element to be isolated as may be desired, if in looking through the

glass eye-hole this element is seen to be filtering badly. Should this element need repairing, the loosening of the corresponding nut will enable it to be instantly removed and replaced by another duly prepared element. Consequently the action of the filter is not stopped. When no importance is attached to the isolating of each element, the combination of several filtering elements in a single filter may be effected in a similar manner, only a single chamber 12, constituting, in fact, a double bottom, being provided for all these elements. This form of the invention is shown in Figs. 4, 6, and 7. In this form the bottom of the filter, besides the ordinary discharge cock 25, is furnished with two cocks which communicate one through the opening 27 with the interior of the chamber 12, the other through the opening 28 with the interior of the filter. These two cocks are opened when the washing and cleaning out of the apparatus are effected. When the apparatus is washed, the water flows in an inverse course to that which is taken during the filtering of the liquid. It enters under pressure through 27, rises in the perforated collectors 1, passes through the filtering disks, pours into the filter, and runs out through 28. Whatever the arrangement may be, Figs. 1, 2, or 4, the working is the same and is easily understood.

The liquid to be filtered, contained in a tank which discharges into the filter, enters through the cock 30, which is gradually opened in order to avoid any rushing in of the liquid, fills the cylinder 31, the air in which escapes through the air-cock 32. The filter being filled, the liquid having no other outlet passes through the filtering-body 33 33', &c., formed by the disks, depositing on the outside the matters in suspension contained in it. After getting rid of these matters the filtered liquid passes into the perforated collectors 29, &c., and through the perforated extension casings or pipes 13 13', &c., into the chamber 12, Figs. 4 and 6, from which it is discharged through the cock 25.

The advantages of the filter with several elements are as follows: Filtration entirely out of reach of the air, owing to the employment of metallic joints easily tightened by the nuts 20. Any mixing of the filtered and the unfiltered liquid is rendered impossible by these same joints, which entirely separate the interior of the collectors and of the chamber containing the filtered liquid from the interior of the vessel containing the liquid to be filtered; recovery of all the liquid contained in the filter without the necessity of drawing it off, owing to the arrangement of the double bottom with emptying-cock; proper washing of the filtering elements in a few minutes without removing them from the filter, also due to the double bottom with the openings for washing and emptying; easy placing and removal of the filtering elements, owing to the method of fixing by the nut 20. Finally and chiefly, by means of this combination of sev-



eral elements in one vessel large quantities of liquid are filtered in a small space. - A cylinder containing four elements one meter in height by forty centimeters in diameter will filter fifteen hundred hectoliters of beet-root juice at 105° and six hundred hectoliters of syrup at 22° Baumé in a day of twenty-four hours.

What I claim, and desire to secure by Letters Patent, is—

1. In a filter, a filter-body, a tubular core surrounded thereby and into which the filtered liquid enters after passing through the filtering-body, a discharge-chamber, a hollow stem constituting an extension of the core passing through and discharging the filtered liquid into the discharge-chamber, and means engaging the stem exterior to the discharge-chamber for removably holding the filtering-body and core securely in place.

2. In a filter, a filter-body, a support on which said filter-body rests, a tubular core surrounded by said filter-body and into which the filtered liquid enters after passing through the filtering-body, a discharge-chamber, a hollow stem passing through openings in the upper and lower walls of the discharge-chamber constituting an extension of the core and discharging the filtered liquid into the discharge-chamber, a seating on the upper opening of said chamber, a facing on said support adapted to bear upon said seating, a nut or cap engaging the stem exterior to the discharge-chamber for removably holding the filtering-body and core securely in place and a facing on said nut or cap adapted to bear against the seating on the lower opening of said discharge-chamber, the application of said facings to said seatings forming tight joints.

3. In a filter, a plurality of filtering-bodies, platforms on which said filtering-bodies rest, a tubular core for each filtering-body surrounded thereby and into which the filtered liquid enters after passing through said filtering-body, a discharge-chamber for each

tubular core, a hollow stem passing through openings in the upper and lower walls of the discharge-chamber constituting an extension of each core and discharging the filtered liquid into its respective discharge-chamber, a seating on the upper opening of each discharge-chamber, a facing on each platform adapted to engage said seating, a nut or cap engaging each stem exterior to the discharge-chamber, a facing on said nut or cap adapted to bear against the seating on the lower opening of said discharge-chamber, whereby said nut or cap acts to removably hold its filtering-body and core securely in place and to apply said facings to their respective seatings to form tight joints, and connections between said discharge-chambers and a common discharge-opening.

4. In a filter, a filtering-body, a tubular core surrounded thereby and into which the filtered liquid enters after passing through said filtering-body, a support connected to said core and on which the filtering-body is adapted to rest, a plate movable independently of the core bearing against the upper end of the filtering-body, and a screw passing through said plate and engaging the core for pressing the plate against the filtering-body.

5. In a filter, a filtering-body, a tubular core surrounded thereby and into which the filtered liquid enters after passing through said filtering-body, a support connected to said core and on which the filtering-body is adapted to rest, a cap into which said tubular core projects, a plate integral with said cap and a screw passing through said cap and engaging the core for pressing the plate against the filtering-body.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EMMANUEL SIMONETON.

Witnesses:

DOMINIQUE CASALONGA,  
EDWARD P. MACLEAN.