

**No. 656,376.**

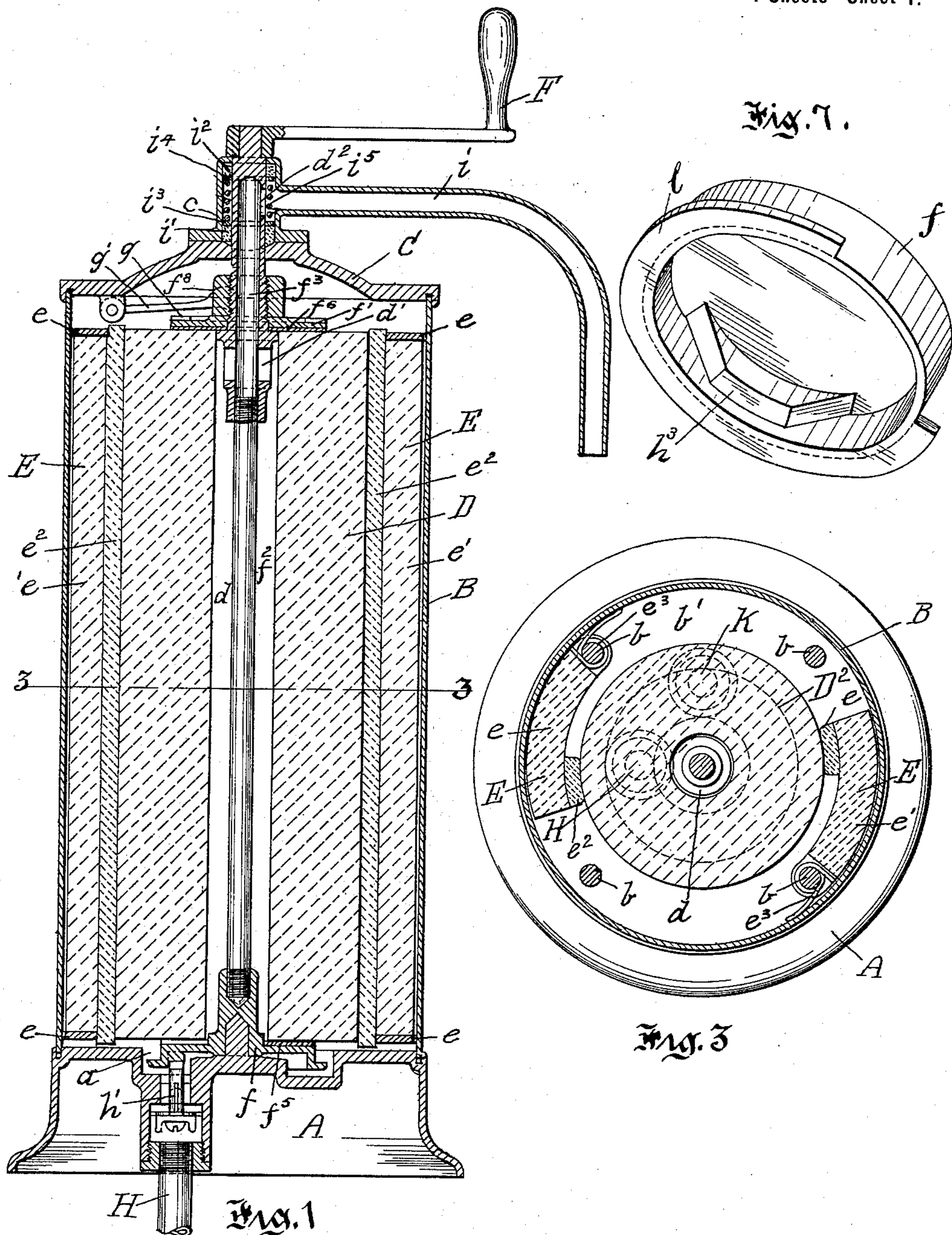
**Patented Aug. 21, 1900.**

**J. SCHINNELER.**  
**FILTER.**

(Application filed July 24, 1899.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses  
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4 Sheets—Sheet 2.

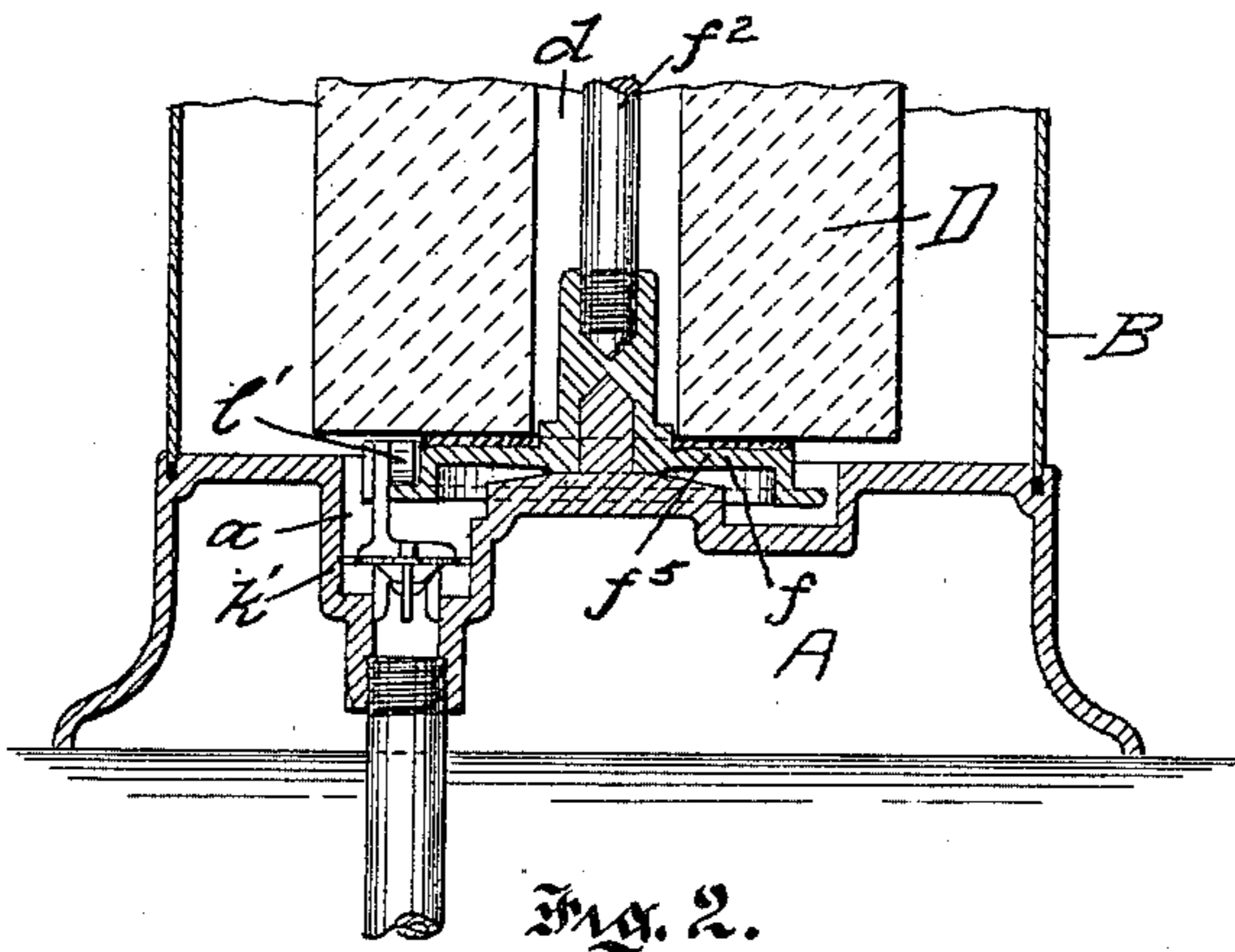


Fig. 2.

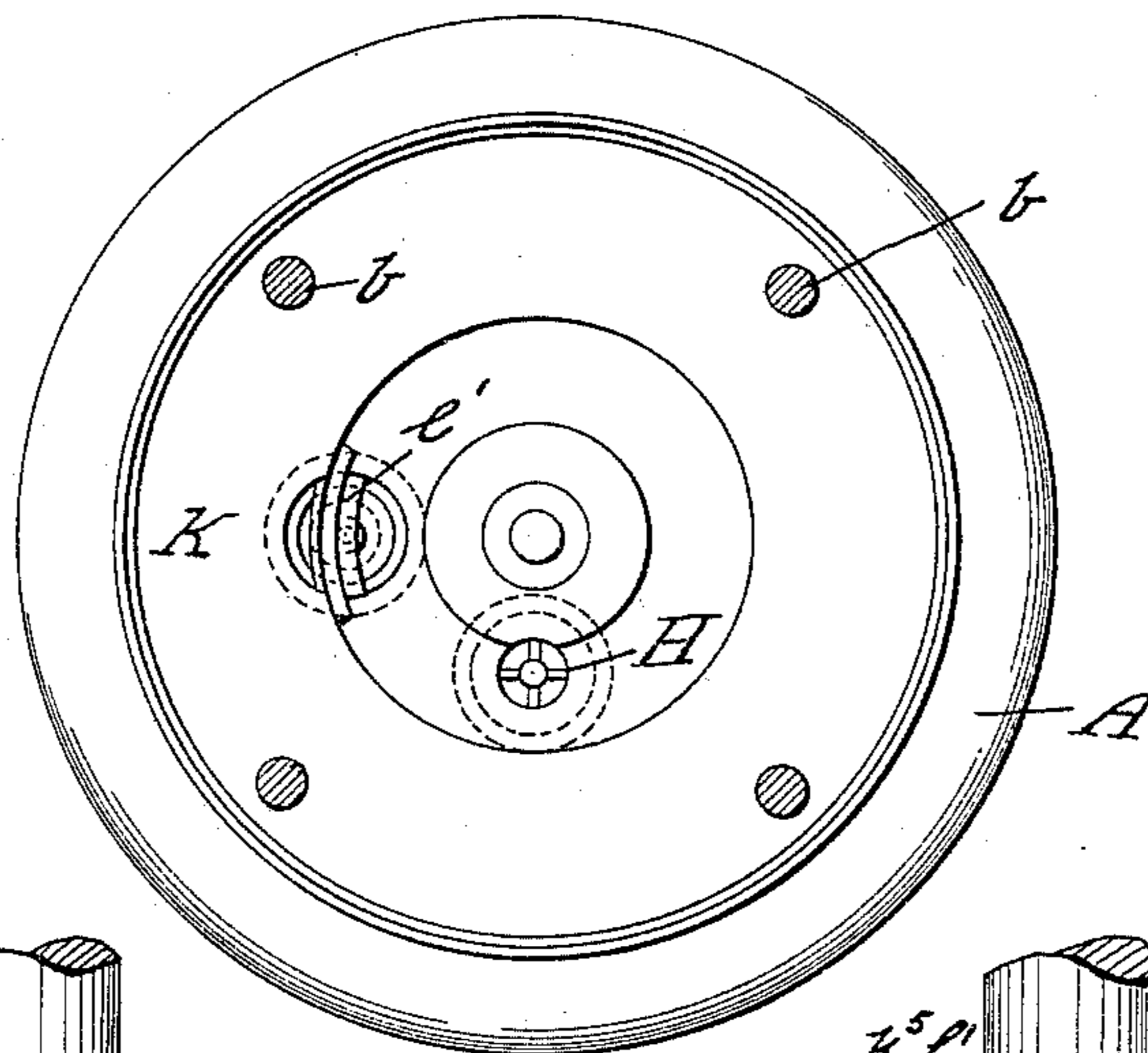


Fig. 4

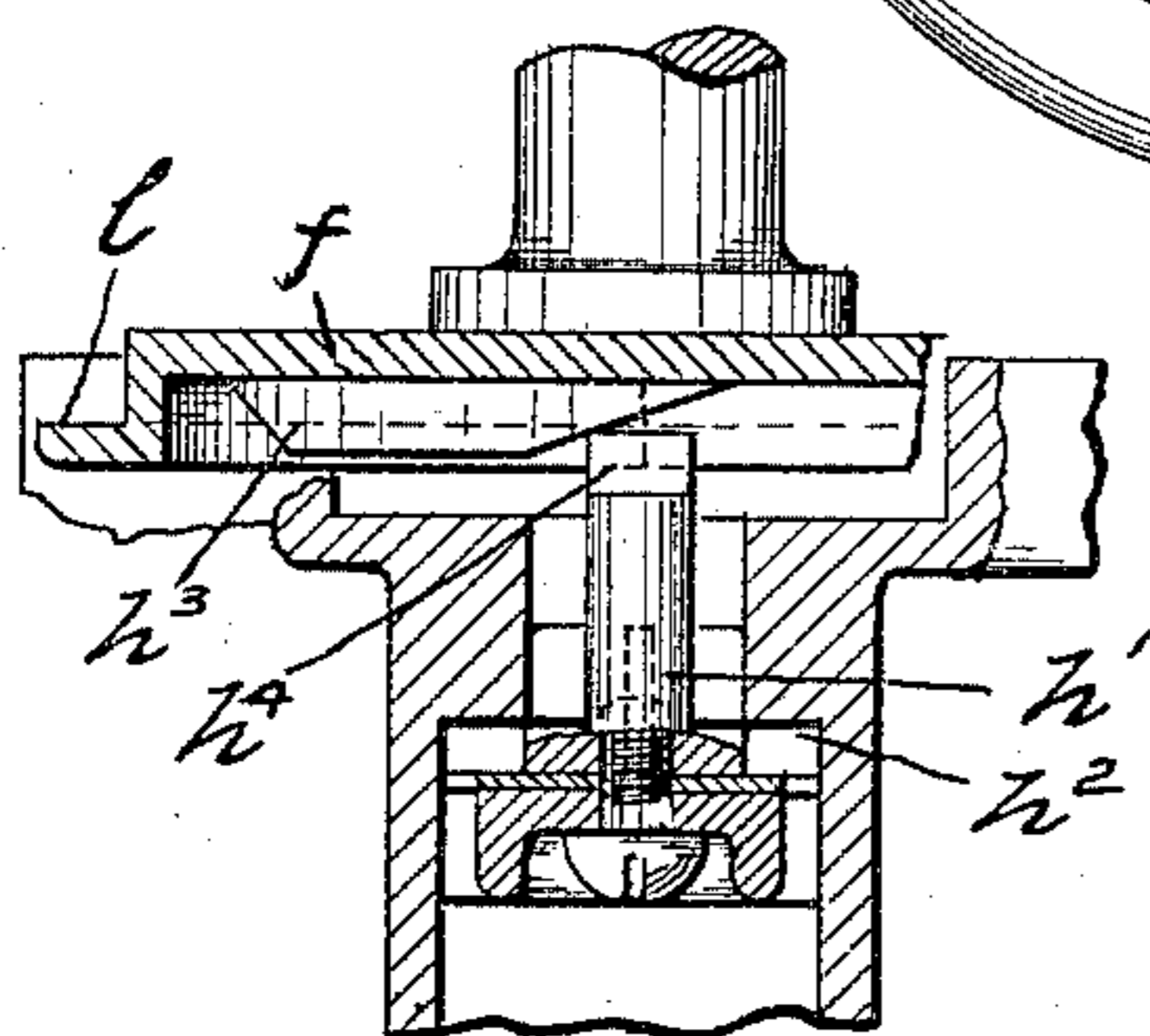


Fig. 5

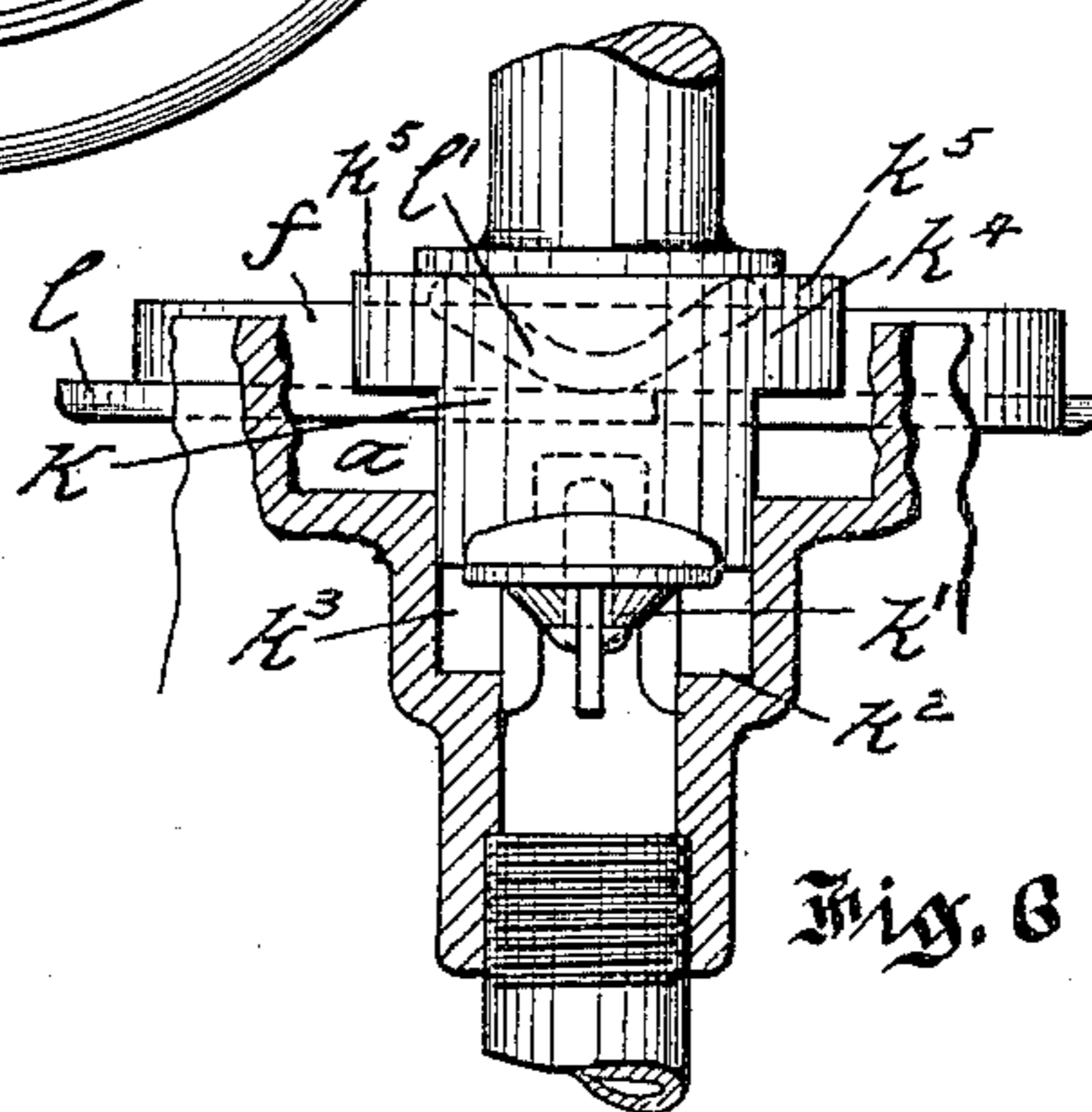


Fig. 6

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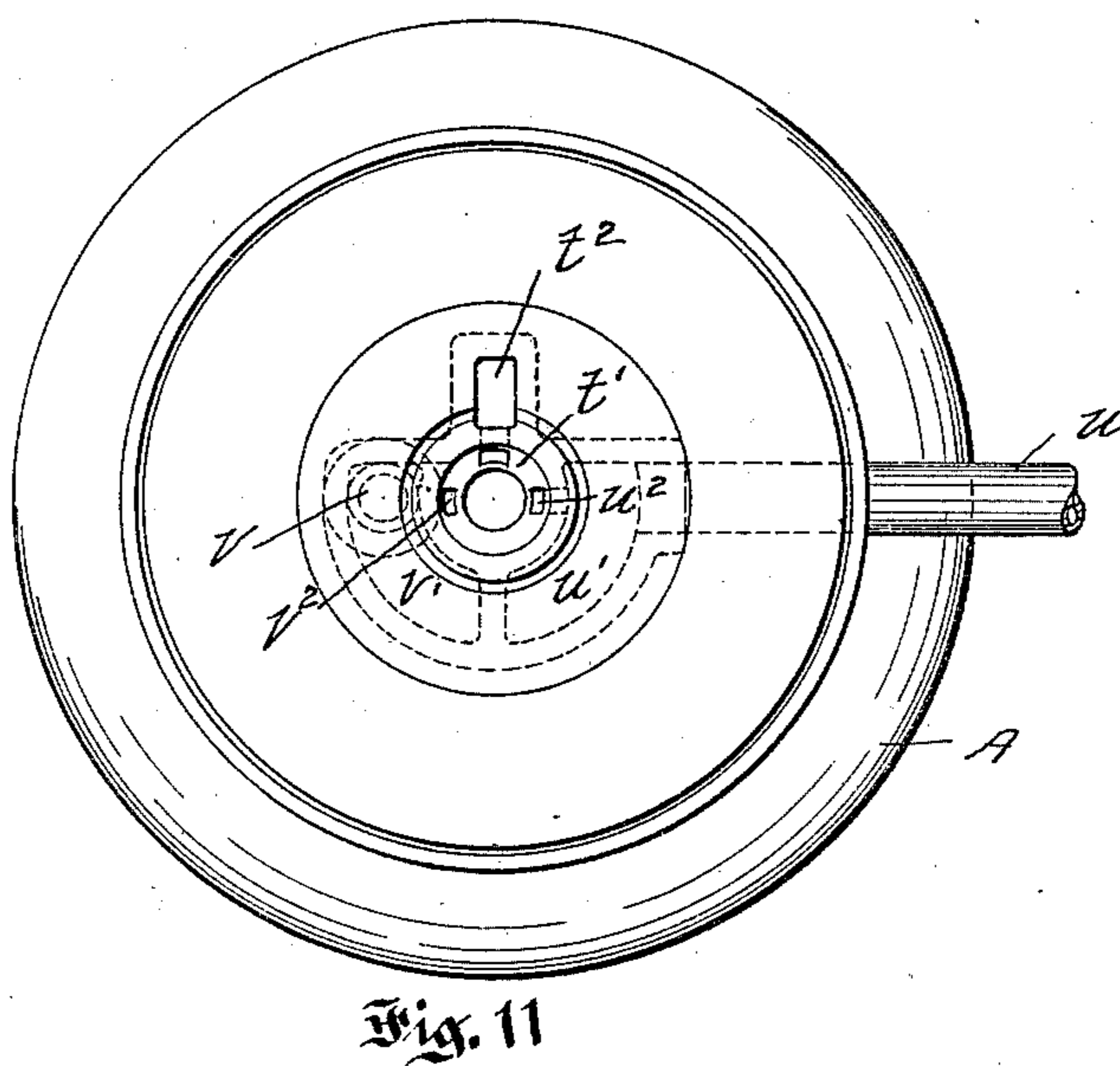
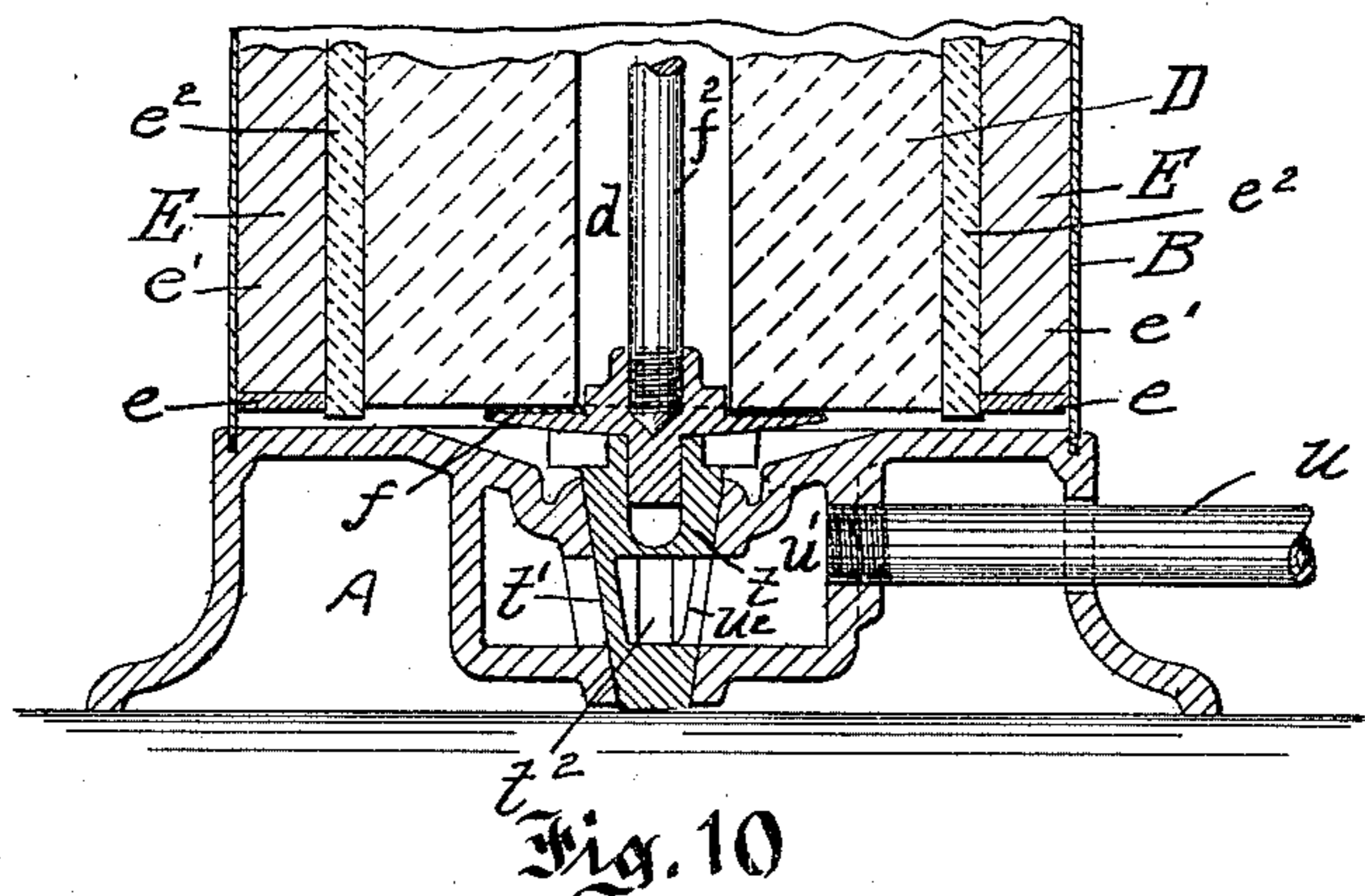
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(No Model.)

4 Sheets—Sheet 4.



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# UNITED STATES PATENT OFFICE.

JACOB SCHINNELLER, OF PITTSBURG, PENNSYLVANIA.

## FILTER.

SPECIFICATION forming part of Letters Patent No. 656,376, dated August 21, 1900.

Application filed July 24, 1899. Serial No. 724,940. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB SCHINNELLER, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Filters; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to filters, its object being to provide a filter which will automatically scour or cleanse the filtering-body in the operation of turning on or off the water-supply and one in which the water-chamber is normally empty, so that danger of freezing is practically overcome, and the air will be drawn into such chamber when emptied and will act to oxidize and destroy the bacteria adhering to the outer face of the filtering-body or walls of the casing. In filters of this class a certain compact filtering stone or body has been employed which prevents the passage of bacteria, and filters have been constructed containing such stones provided with a central passage through which the filtered water is drawn and with cleaning means fitting around the cylindrical stone for scouring or cleaning its surfaces without the necessity of opening the filter. The water-inlet pipe communicates with the space around the filtering-body and a water-waste pipe also communicates with this same space; but to clean the filter it was necessary to open this waste-pipe and mechanically revolve the scouring apparatus around the stone, so as to carry off the mud and other matter collected on the surface of the filtering-body and then to close the waste-cock, the filter therefore requiring special attention at certain intervals in the day to keep it in proper condition. As these filters are used by servants and persons who are liable to neglect the same there was always liability of the cleansing of the filter in this way being overlooked. By the present invention these difficulties are entirely overcome.

The invention includes within its scope a suitable filter in which the filtering stone or body is either revoluble, the cleaner or scraper being stationary, or if the cleaner or scraper is revolved the filtering-body remains stationary, and it includes, generally stated the following parts: a tubular filtering-

body, a scraper working on the outer face of the filtering-body, either the scraper or the filtering-body being revoluble, an inlet-pipe and a water-waste pipe, both communicating with the space around the filtering-body, valves controlling said pipes, and connections with the revoluble member—that is, the filtering-body or the scraper—for operating said valves, such construction providing for the rotation of either filtering-body or valves in order to turn on the water-supply and cause the filtering of the water or to close the water-supply, in which case the waste-pipe may be opened, and as the outer face of the filtering-body is being continually cleansed the water remaining in the space around the same will then be flushed out and such space remain free from water until it is desired to draw a further supply of filtered water, so that all fear of freezing is overcome, and the air drawn in will oxidize and destroy the bacteria on the face of the stone or on the wall of the casing, while an absolutely clean surface for the filtering of the water is always provided.

It also consists in certain other improvements in the apparatus and in the method of filtering the water, all of which will be hereinafter more fully set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal central section of a filter embodying the invention, where the filtering-body is made revoluble, the section being taken through the inlet-pipe and filtered-water or discharge pipe. Fig. 2 is a like view of the lower part of the filter through the waste-pipe. Fig. 3 is a cross-section on the line 3 3, Fig. 1. Fig. 4 is a view of the base of the filter-case, the filtering-body and scraper being removed. Figs. 5 and 6 are detailed longitudinal sections through the inlet and waste valves, respectively, showing the means of operating the same. Fig. 7 is a perspective view of the valve-operating disk. Fig. 8 is a longitudinal central section of the filter, showing its construction where the scraper or cleaner rotates and the filtering-body remains stationary. Fig. 9 is a cross-section on the line 9 9, Fig. 8. Fig. 10 is a

longitudinal section of another form of filter embodying the general invention. Fig. 11 is plan of base of Fig. 10.

Like letters of reference indicate like parts 5 in each of the several views.

The filter has the outer casing formed of the base A, shell B, and top-cover C, the base and cover being formed of castings, while the shell is formed of a section of 10 wrought-metal tubing fitting into annular packed seats, the bolts *b* passing through the base and cover and clamping the parts together. Mounted within the casing, either revoluble or stationary therein, is the filtering stone or body D, this filtering-body being generally formed of a peculiar filtering-stone well known in the art, though it may be formed of any suitable porous material being specially molded to shape. It has the 20 central passage *d*, into which the filtered water passes through the body of the stone, and its outer face is cylindrical, while against the same scraper or scrapers bear, so as to maintain such outer surface free from any 25 filth or deposit of dirt, bacteria, &c., from the water which passes through the filtering-stone. The scraper or scrapers E are either stationary or revoluble, according as to whether the filtering-stone is revoluble or held stationary. 30 In the main figures of the drawings, I have shown the filtering-body D revoluble, the scrapers E being held stationary, as that is considered the preferable form. The base A is preferably formed as shown in the main 35 figures of the drawings, and whatever its construction may be it contains the waste-valve, while it preferably contains an inlet-valve. For these reasons its construction will be more particularly set forth.

40 In the construction shown in Figs. 1 to 7 the filtering-body D is clamped between the disks *f* *f'*, connected by the bar *f*<sup>2</sup> and hollow or tubular extension *f*<sup>3</sup> thereof, which passes upwardly through the cover C and through 45 the stuffing-box *c* on said cover and carries the handle F for turning the filtering-body. As noticed in Fig. 1, a packing-ring *f*<sup>5</sup> is interposed between the lower disk *f* and the filtering-body and a packing-ring *f*<sup>6</sup> is interposed 50 between the upper disk *f'* and the filtering-body, such packing preventing the flow of the water from the space *b'* within the casing into the central space *d* within the filtering-body. The upper disk *f'* screws onto the hollow extension *f*<sup>3</sup>, the packing-ring *f*<sup>6</sup> being confined 55 between the disk *f'* and a shoulder on the tubular extension to prevent the inflow of water around the body of the tubular extension. This disk *f'* is locked in position by 60 the jam-nut *f*<sup>8</sup>. The filtered water passes from the space *d* through the ports *d'* into the tubular extension *f*<sup>3</sup> and rises through the same, escaping through ports *d*<sup>2</sup> into the filtered-water or discharge pipe *i*, formed as part 65 of the stuffing-box *c* and extending off to one side of the filter or to any desired point. Where the handle passes upwardly through

the stuffing-box, it is packed, as illustrated in Fig. 1, by means of the annular rubber rings *i'* *i*<sup>2</sup>, the metal washers *i*<sup>3</sup> *i*<sup>4</sup>, and the 70 spring *i*<sup>5</sup> between said washers, so insuring a tight joint, while permitting the filtered water to escape through the side of the stuffing-box. As it is desirable that the rotating member of the filter shall only turn in one direction, I 75 provide either disk *f* or *f'* with a ratchet-face *g*, with which a pawl *g'*, mounted in the machine, engages, and so prevents back movement.

As above stated, the base A receives the 80 inlet-pipe H and the waste-pipe K, both of which communicate with the outer space *b'* around the filtering-body. Both these pipes enter from below and open upwardly into the space *b'*. Above the pipe H is the inlet-valve 85 *h'*, closing upwardly against its seat *h*<sup>2</sup> and having an extension which rises into the course of the disk *f*, which, as shown in Fig. 5, has the cam-face *h*<sup>3</sup> pressing on the extension *h*<sup>4</sup> of the valve *h'* and forcing it down 90 against the pressure of the incoming water, and so opening communication between the water-inlet and the space *b'*. The cam-face *h*<sup>3</sup> has an incline at its forward end to force down valve and has preferably a like incline 95 at its rear end to prevent jar in the closing thereof. The water-waste opening is preferably formed at about right angles to the water-supply opening, and it contains the downwardly-seated valve *k'*, resting on the seat *k*<sup>2</sup>, 100 this valve fitting in the chamber *k*<sup>3</sup>, which extends below the annular chamber *a* in the base-casting into which the disk *f* enters. It will be noticed that the waste-valve chamber extends slightly beyond the outer edge of the 105 annular chamber *a* and that the upward extension *k*<sup>4</sup> of the valve *k'* has wings *k*<sup>5</sup> extending out and bearing on the outer face of the annular chamber *a*, so serving to hold the valve *k'* from turning. To lift this valve and 110 open the waste-outlet, the disk *f* carries the outwardly-extending flange or apron *l*, which extends around the same for a certain distance, being shown as extending around for almost three-fourths of the body of the disk, 115 this apron extending out horizontally and being adapted to take under the valve-lip *l'* on the inner face of the upward extension *k*<sup>4</sup> of the valve *k'* and lift the said valve, holding it off its seat and against the pressure of the 120 water within the space *b'*, and permit said water to waste from the chamber *b* around the filtering-body. It is preferred that the lip *l'* shall be of the shape fairly shown in dotted lines, Fig. 6, being downwardly in- 125 clined from each end toward the center, so that when the apron strikes the disk the inclined lip will ride up the edge of the apron until the lip passes above the apron, the valve being thus held open by means of the apron 130 for about two-thirds of the rotation of the filtering-body, and mechanism for turning the same.

The scrapers E may be mounted within the

filter-case in any suitable way. As they are stationary, their mounting can be made very simple. Each scraper is shown as formed of a frame having top and bottom plates  $e$ , 5 mounted upon the clamping-bolts  $b$ , and having the body portions  $e'$ , preferably formed of wood, extending between the said top and bottom plates and carrying on their inner faces the emery-blocks  $e^2$ , which bear upon 10 the outer cylindrical face of the filtering-body D. To give the necessary pressure for this purpose, I employ the spiral springs  $e^3$ , wound around the clamping-bolt and having one end bearing against the shell B, while 15 the other is connected to either top or bottom plate. The number of scrapers may be varied, according to the size of the filter, from one to three or four.

With the construction of filter above described and which forms the subject-matter of the main figures of the drawings the operation is practically as follows: When it is desired to draw filtered water from the filter, the operator turns the handle F, so as to open 25 the valve  $h'$ , this being accomplished by the incline  $h^3$  upon the disk  $f$ , which forces said valve downwardly against the pressure of the water-supply. When said valve is open, the water-waste valve  $k$  is of course closed. 30 The water flows into the outer space  $b'$  of the filter and passes through the filtering-body B into the central space  $d$  thereof, rising through the cylindrical extension  $f^4$  and passing out through the filtered-water or discharge 35 pipe  $i$ . The water will continue to pass in this course until it is desired to close the same, when the operator turns the crank F, drawing the cam-face  $h^3$  out of line with the supply-valve  $h'$  and permitting that valve to 40 close, and if it is desired to flush out the filter he turns it still farther, thus causing the apron  $l$  to lift the waste-valve  $k'$  from its seat and permit the water remaining in the space  $b'$  to flow out of the filter and into the 45 drain. In the turning of the filtering-body within the scrapers it is of course evident that they will clean the surface of the same each time water is drawn therefrom, and when desired the water may be also discharged 50 through the waste-pipe and will carry off the mud and other matter filtered from the water, so providing for the washing out of the filtering-chamber and the cleaning of the filtering-body automatically each time that the 55 filter is used. There is therefore no possibility of accumulation of filth within the filter, its cleanliness not depending on the recollection of servants or like persons, who are liable to be careless in its use. As the filtering-chamber may be kept empty except when 60 actually filtering water, there is no liability of injury to the filter even exposed to extreme cold, and it may therefore be termed "non-freezing." Whenever the space  $b'$  is 65 flushed out as above described, the air entering through the discharge-pipe  $i$  to the center of the filtering-body will be drawn through the

pores of the filtering-body into the space  $d$  and there act to oxidize and destroy the bacteria collected in said chamber from the water filtered. 70

In Figs. 8 and 9 I have shown the filter where the filtering-body is held stationary, while the scrapers are revoluble. The construction for this purpose requires but few 75 changes, the same inlet or supply valve mechanism and waste-valve mechanism in the base of the filter being employed. The changes necessary are believed to be fairly 80 shown in Figs. 8 and 9 and will be briefly described. The filtering-body P is clamped between the disks  $p$   $p'$  by means of the central pipe  $p^2$ , which has openings at its upper end communicating with the central space  $p^3$  85 within the filtering-body, and is shown as having the filtered-water discharge formed in the base-casting, the pipe  $p^2$  being secured into said casting and communicating with the passage  $q'$ , leading to the discharge-pipe  $q$ . The filtering-body is thus held stationary, the upper 90 disk  $p'$  screwing onto the pipe  $p^2$  and clamping the filtering-body in place, having an upward extension  $p^4$  fitting within the spider  $r$ , carried by the shaft R, extending through the filter-cover, and having the handle 95  $R'$  for turning the same, the upper spider  $r$  being thus rotated within the casing. Instead of forming the valve-operating mechanism in connection with the lower clamping-disk for the filtering-body I provide the lower 100 spider  $s$ , fitting around a boss on the lower disk  $p$  and turning on the same, which lower spider carries the cam-plates  $H^3$  and apron  $l$  for operating the inlet and waste valves, which have exactly the same construction as described in connection with Figs. 1 to 7. The 105 spiders  $r$  and  $s$  have arms  $r'$   $s'$  extending out beyond the filtering-body P and connected by bolts  $s^2$  and carrying the scraper or cleaner arms  $r^2$ . The scraper-arms  $r^2$  are mounted 110 upon the bolts  $s^2$ , each scraper-arm being formed of sheet metal and bent at one end to form a bearing  $r^3$ , fitting around the bolt  $s^2$ , while at the other end is provided a seat  $r^4$  to receive a block  $r^5$  of abrading material, which 115 bears upon the outer face of the filtering-body. In case the arms  $r^2$  are rigidly connected to the bolts  $s^2$  by means of the portion  $r^3$  the resilience of the arms may be relied upon to hold the blocks  $r^5$  in engagement with 120 the filtering-body. If the connection between the parts  $r^3$  and the bolts  $s^2$  is not rigid or if it is desired to reinforce the said arms, springs may be provided for the purpose of holding the blocks  $r^5$  against the filtering-body, as is 125 usual in apparatus of this general character. The operation of this construction of filter is practically the same as that above described, differing only in the fact that the scrapers are rotated around the filtering-body. Where 130 a supply of filtered water is desired, by means of the handle  $R'$  the scraper-frame is turned, so as to open the supply-pipe, and the water will be filtered by the pressure of the water

in the main until the necessary supply is obtained, when by further rotation of the scraper-frame this valve is permitted to close and the waste-valve opened, and the water within the space around the filtering-body is permitted to flow out, carrying with it the mud or other deposit which has been removed from the filtering-body by the rotation of the scrapers around the same.

10 The apparatus illustrated in Figs. 10 and 11 shows another form of valve mechanism for the lower part of the filter. The upper part of the mechanism is identical with that shown in Figs. 1 to 7, so that only the base thereof is shown. A central valve  $t$  is connected to the lower disk of the clamp for the filtering-body and is rotated thereby within the central valve-chamber  $t'$ . This valve-chamber has the port  $t^2$  opening into the space within the casing around the filtering-body, while the supply-pipe  $u$  opens into the supply-chamber  $u'$ , having a port  $u^2$  communicating with the valve-chamber  $t'$ , and the waste-pipe  $v$  communicates with a chamber  $v'$ , having a port  $v^2$  communicating with the valve-chamber  $t'$ . The valve  $t$  has formed therein a port at right angles, so that it may register either with the port  $t^2$  and the port  $u^2$ , so as to permit water to flow into the space around the filtering-body, as indicated in Figs. 10 and 11, or to register with the port  $t^2$  and the port  $v^2$ , and so provide for the waste or outflow from the space around said filtering-body when the water-supply is cut off. The operation is practically the same as above described in connection with Figs. 1 to 7, differing only in that the operator must cause the valve to register more exactly with the supply and waste ports for the filtering and cleaning operations.

In all the forms illustrated in the drawings it is clear that for any filtering operation it is necessary for the filtering-body to turn within the scrapers or the scrapers to turn around the filtering-body, and so clean its surface each time the filter is operated to draw water from the filter, and that after each filtering operation the water remaining within the space around the filtering-body may be permitted to escape, carrying off the deposit scraped from the filtering-body, so that the greatest cleanliness possible is maintained, and as the filter may be always empty except during the filtering operation the danger experienced in other filters of freezing and injuring the filter is absolutely overcome. The filter is also simple in construction and comparatively cheap in cost.

What I claim as my invention, and desire to protect by Letters Patent, is—

1. In a filter, the combination with a stationary casing, of a tubular filtering-body, a scraper working on the outer face of the filtering-body, the scraper or filtering-body being revoluble the one with relation to the other, an outwardly-opening inlet-valve and

means carried by the revoluble member for opening said valve.

2. In a filter, the combination with a stationary casing, of a tubular filtering-body, a scraper working on the outer face of the filtering-body, the scraper or filtering-body being revoluble one with relation to the other, an outwardly-opening inlet-valve and a cam-face carried by the revoluble member for opening said valve.

3. In a filter, the combination with a stationary casing, of a tubular filtering-body, a scraper working on the outer face of the filtering-body, the scraper or filtering-body being revoluble one with relation to the other, a downwardly-opening inlet-valve in the base of the casing and a cam-face carried by the revoluble member for operating said valve.

4. In a filter, the combination with a stationary casing, of an outwardly-opening inlet-valve and a rotating member within the casing having a cam-face adapted to push upon and open said valve.

5. In a filter, the combination with a stationary casing, having an inwardly-opening waste-valve having a laterally-projecting lip, of a rotating member within the casing carrying a flange or apron adapted to engage said lip and withdraw the valve from its seat.

6. In a filter, the combination with a stationary casing having an inwardly-opening waste-valve provided with an inclined laterally-projecting lip and a rotating member within the casing having a flange extending part way only around same and adapted to engage the lip and withdraw the valve.

7. In a filter, the combination with a stationary casing having a base provided with an annular central recess, of a waste-valve in said base having its valve-chamber extending partly beyond said recess, a valve in said valve-chamber having flanges bearing upon the outer wall of said recess, and a rotating member within the casing adapted to engage with and open the valve.

8. In a filter, the combination with a stationary casing having a cover and a base and bolts connecting the same, a revoluble tubular filtering-body and a scraper mounted upon one of said bolts and bearing upon the filtering-body.

9. In a filter, the combination with a stationary casing having a cover and a base and bolts connecting the same, a revoluble filtering-body and a scraper mounted upon one of said bolts and bearing upon the filtering-body, said scraper having a frame carrying a scraping-face and a spring engaging with the frame and the outer shell of the stationary case, substantially as set forth.

10. In a filter, the combination with a stationary casing, of a revoluble tubular filtering-body clamped between disks mounted within the casing and having a hollow tubular extension passing through the top thereof, a stuffing-box fitting around said tubular ex-

5 tension and having a discharge-pipe leading from the side thereof and openings in the tubular extension communicating with the interior of the filtering-body and with said discharge-pipe and means for turning the tubular extension.

10 11. In a filter, the combination with a stationary casing, of a revoluble tubular filtering-body clamped between disks mounted within the casing and having a hollow tubular extension passing through the top thereof, a stuffing-box fitting around said tubular extension and having a discharge-pipe leading from the side thereof and openings in the tu-

bular extension communicating with the interior of the filtering-body and with said discharge-pipe and means for turning the tubular extension, said stuffing-box having packing-rings above and below the outlet and the discharge-pipe and a spring between said packing-rings. 15 20

In testimony whereof I, the said JACOB SCHINNELLER, have hereunto set my hand.

JACOB SCHINNELLER.

Witnesses:

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ROBERT C. TOTTEN.