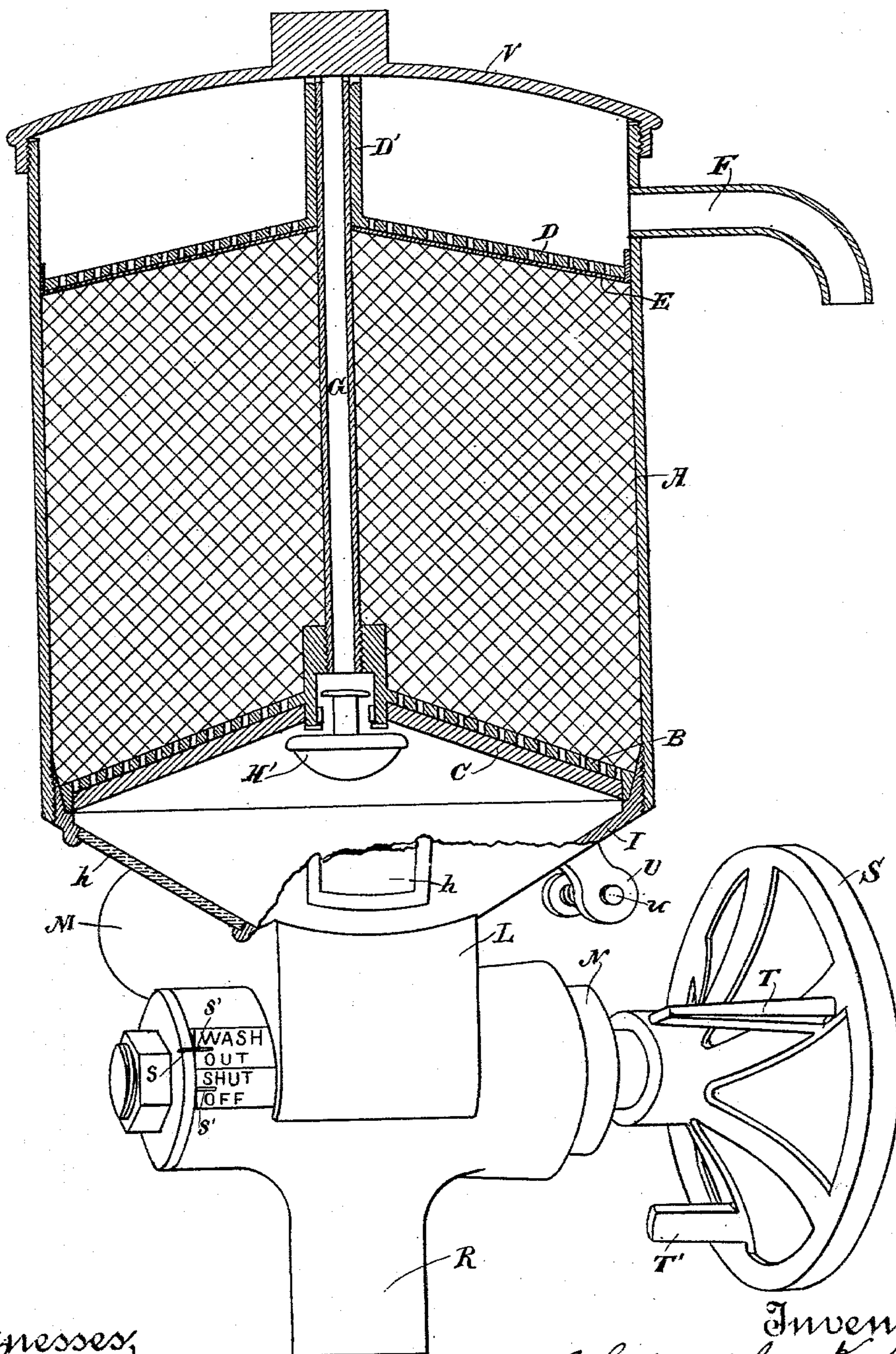


C. K. LAMB.
FILTER.

No. 561,675.

Patented June 9, 1896.

Fig. 1.



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attys

(No Model.)

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C. K. LAMB.
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No. 561,675.

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Fig. 2.

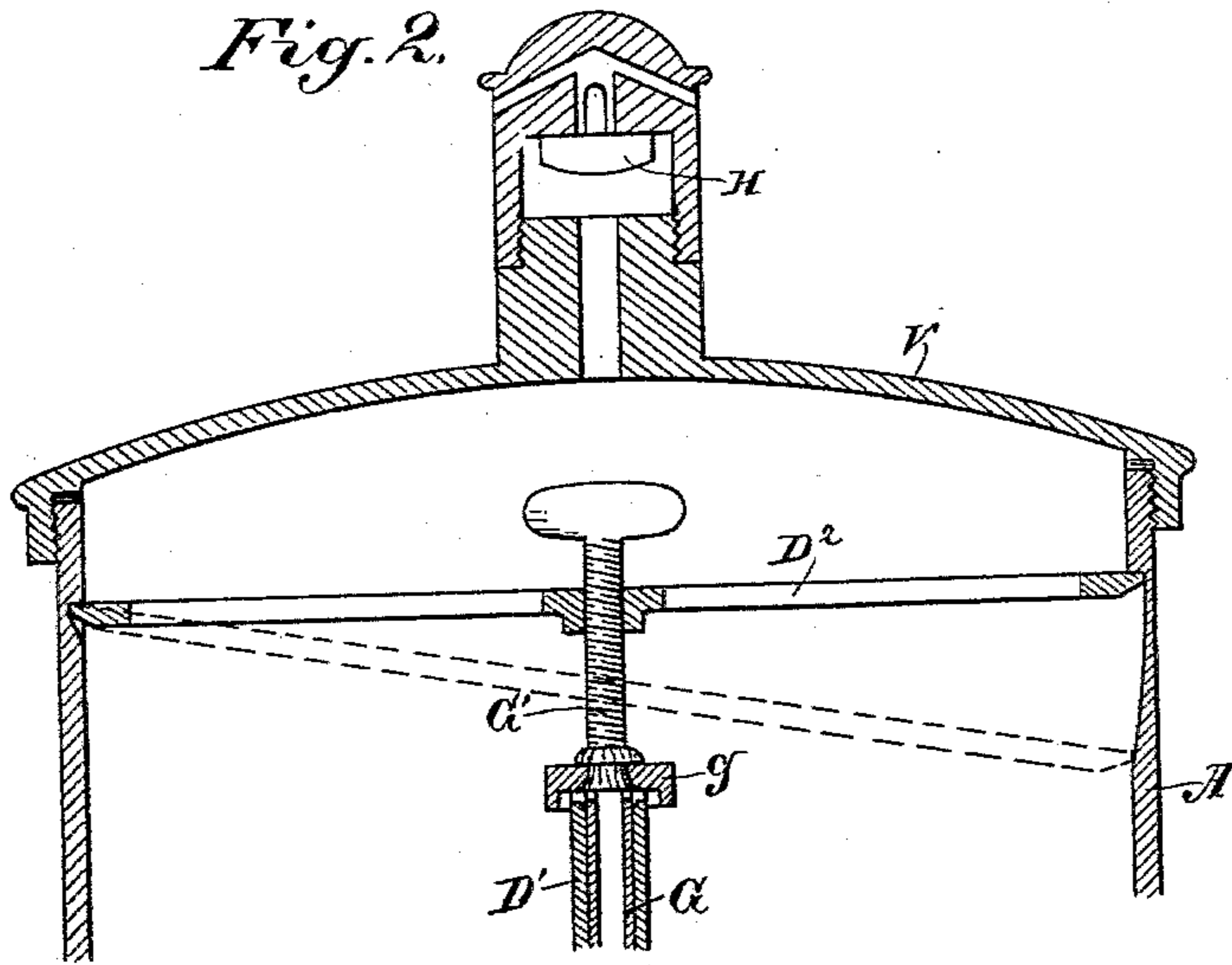


Fig. 3.

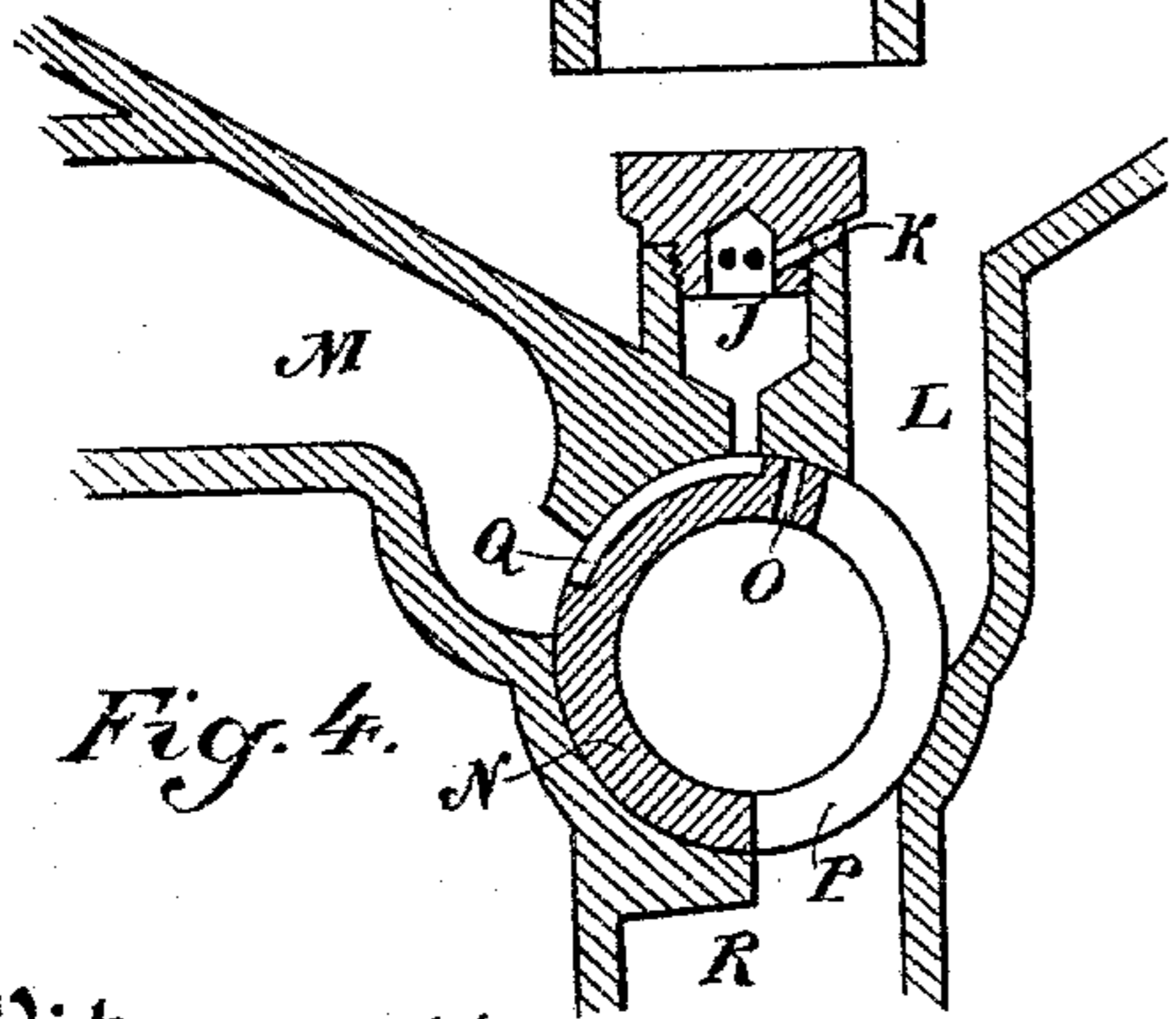
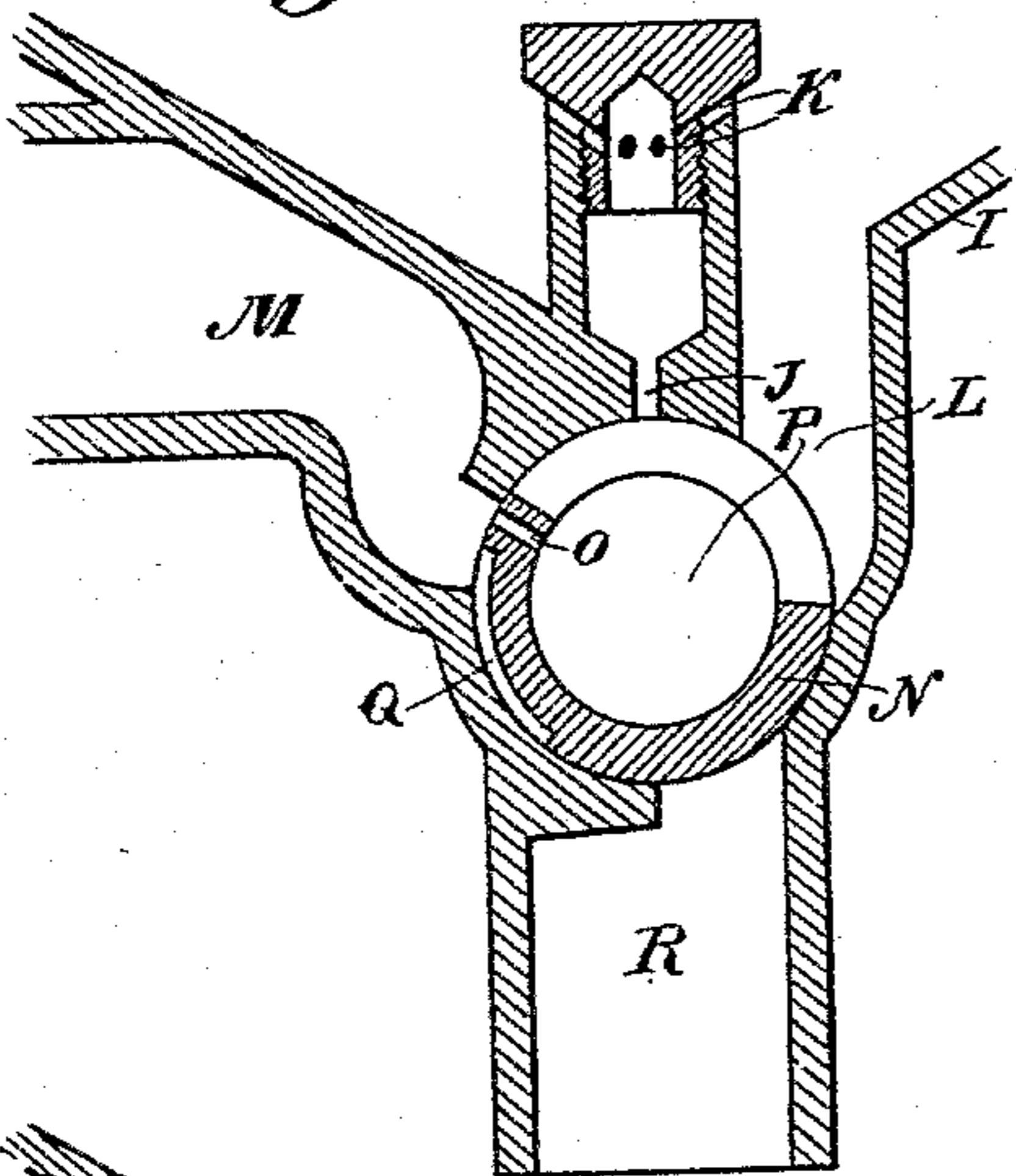


Fig. 4.

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Fig. 5.

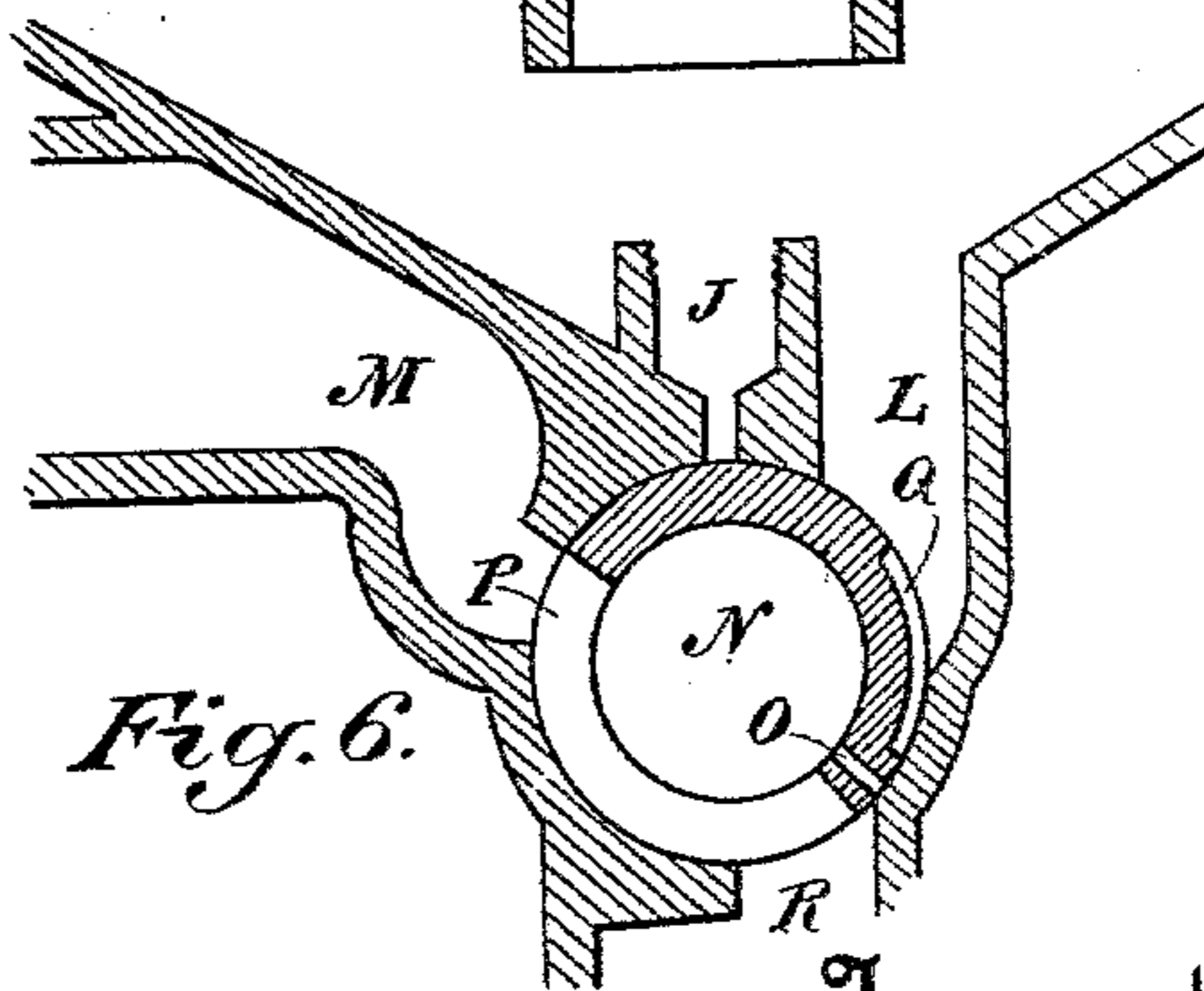
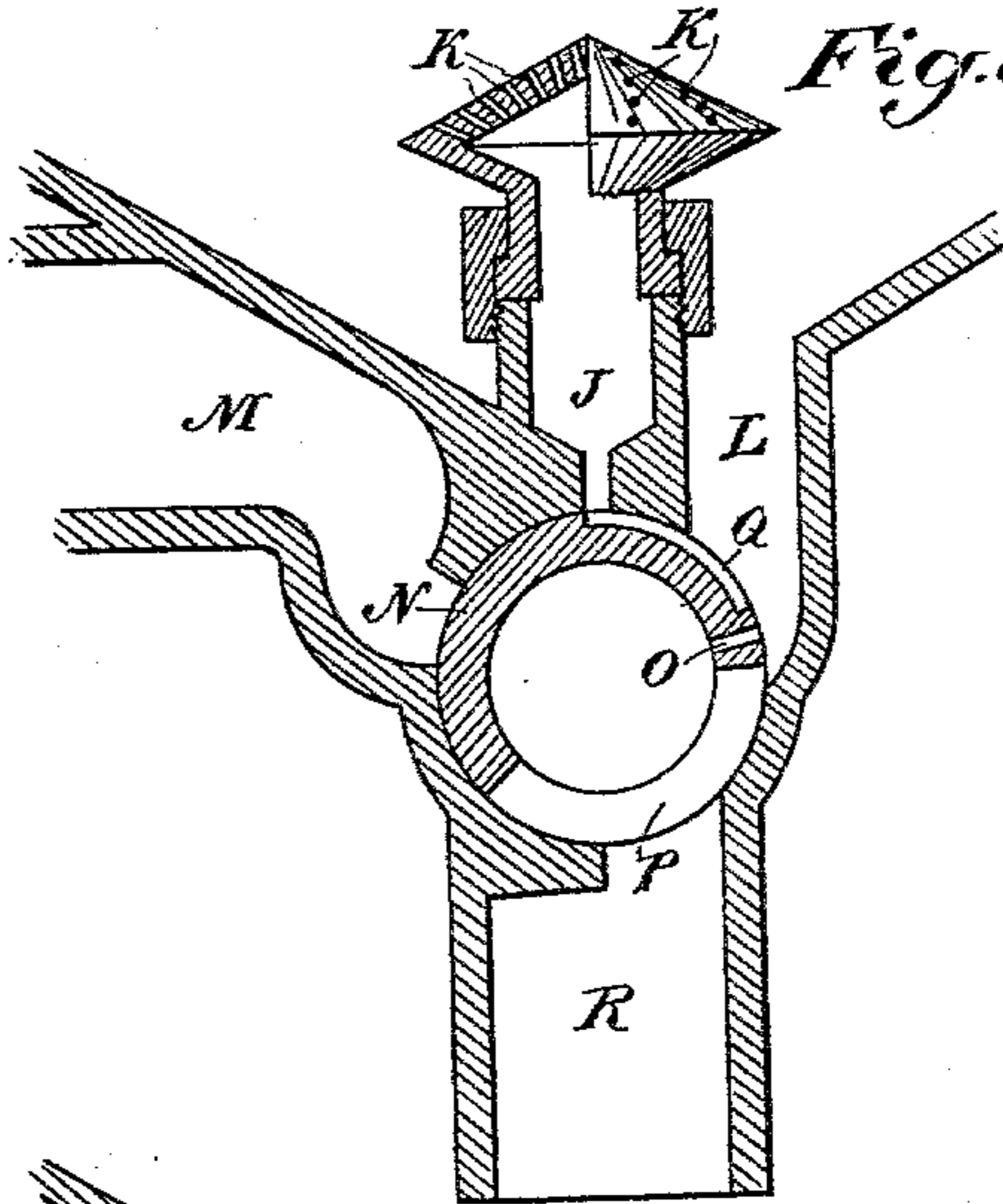


Fig. 6.

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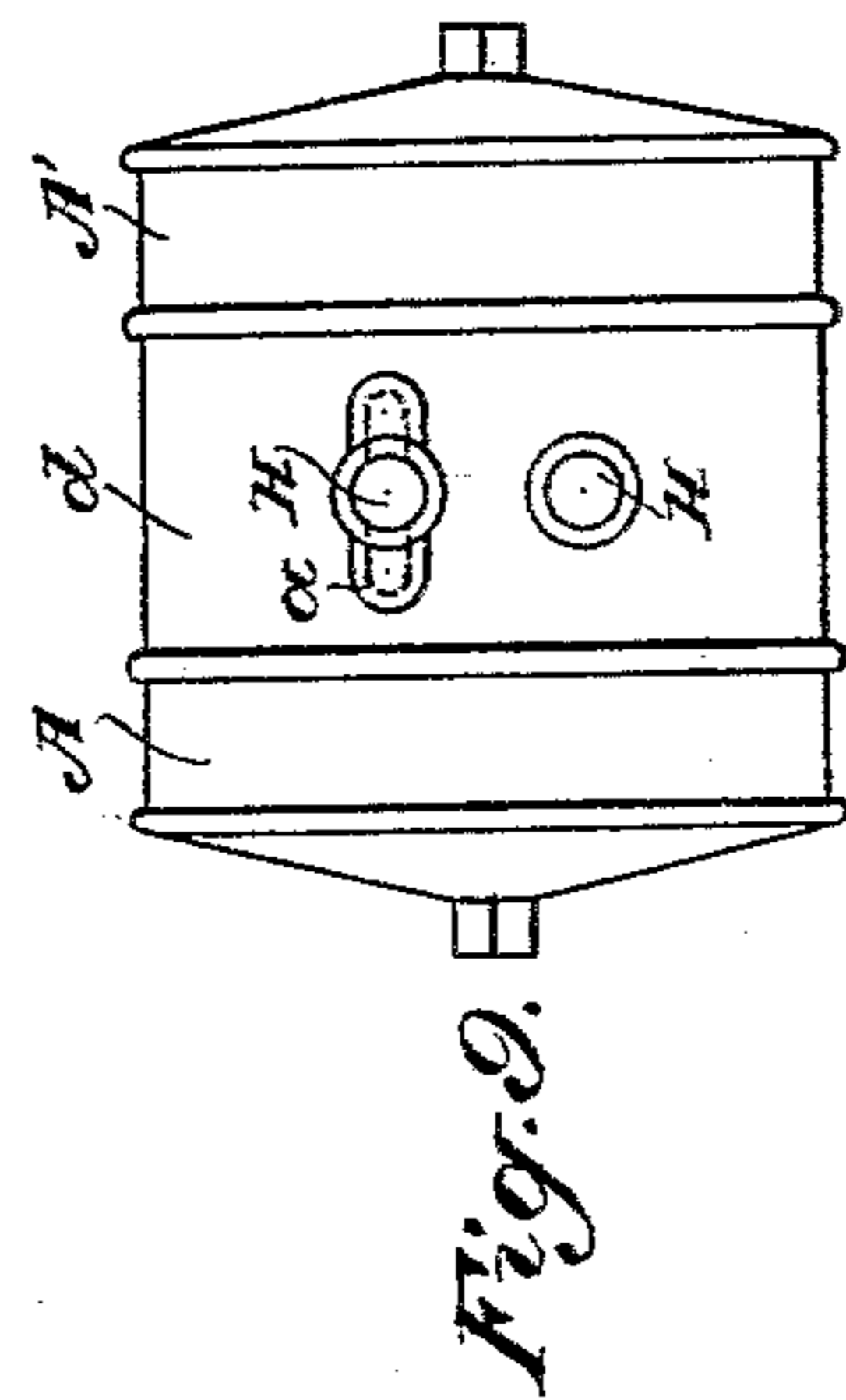
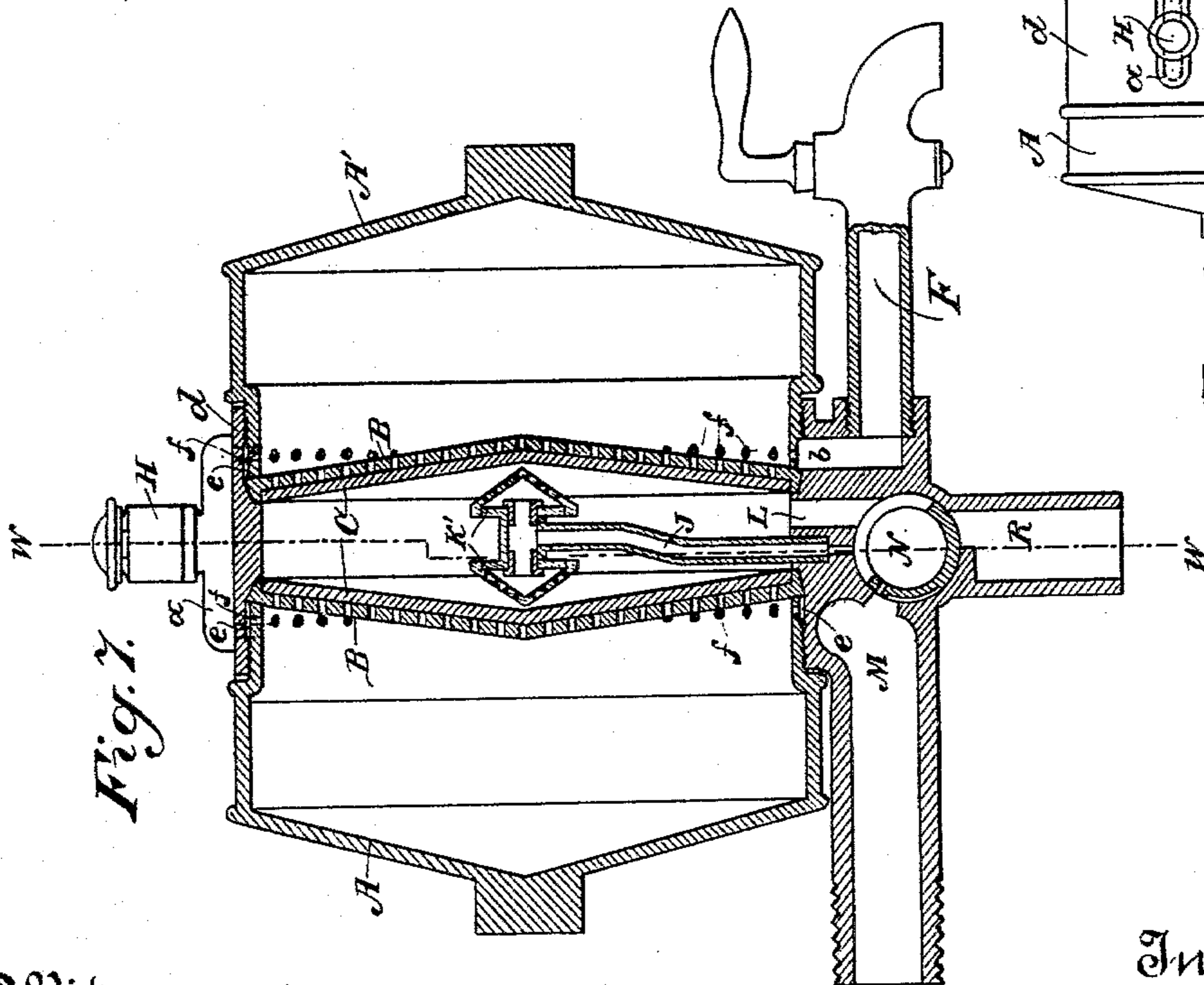
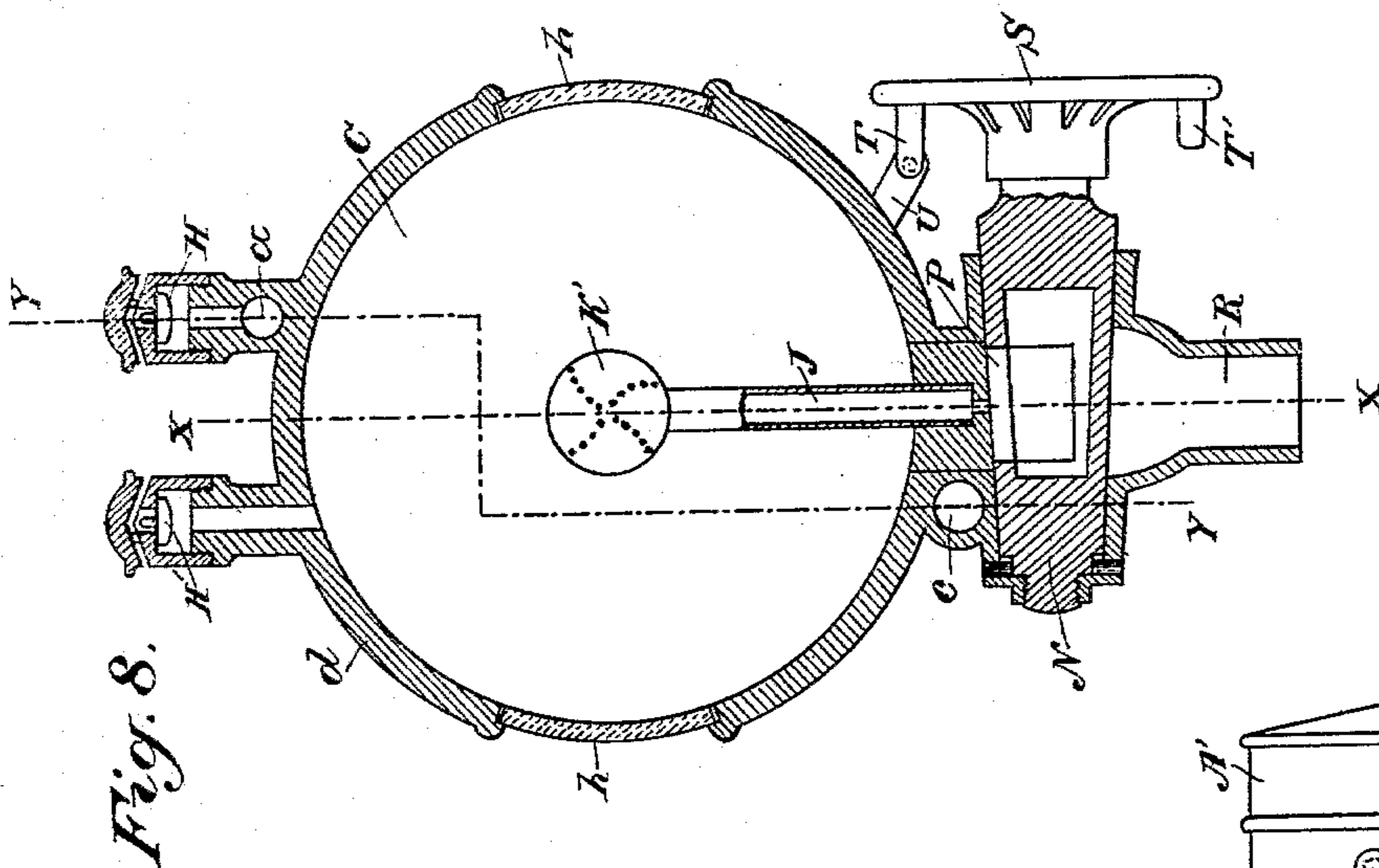
(No Model.)

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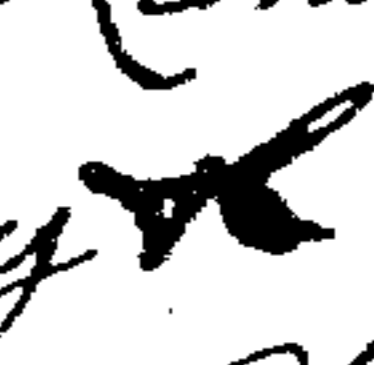
C. K. LAMB.
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No. 561,675.

Patented June 9, 1896.



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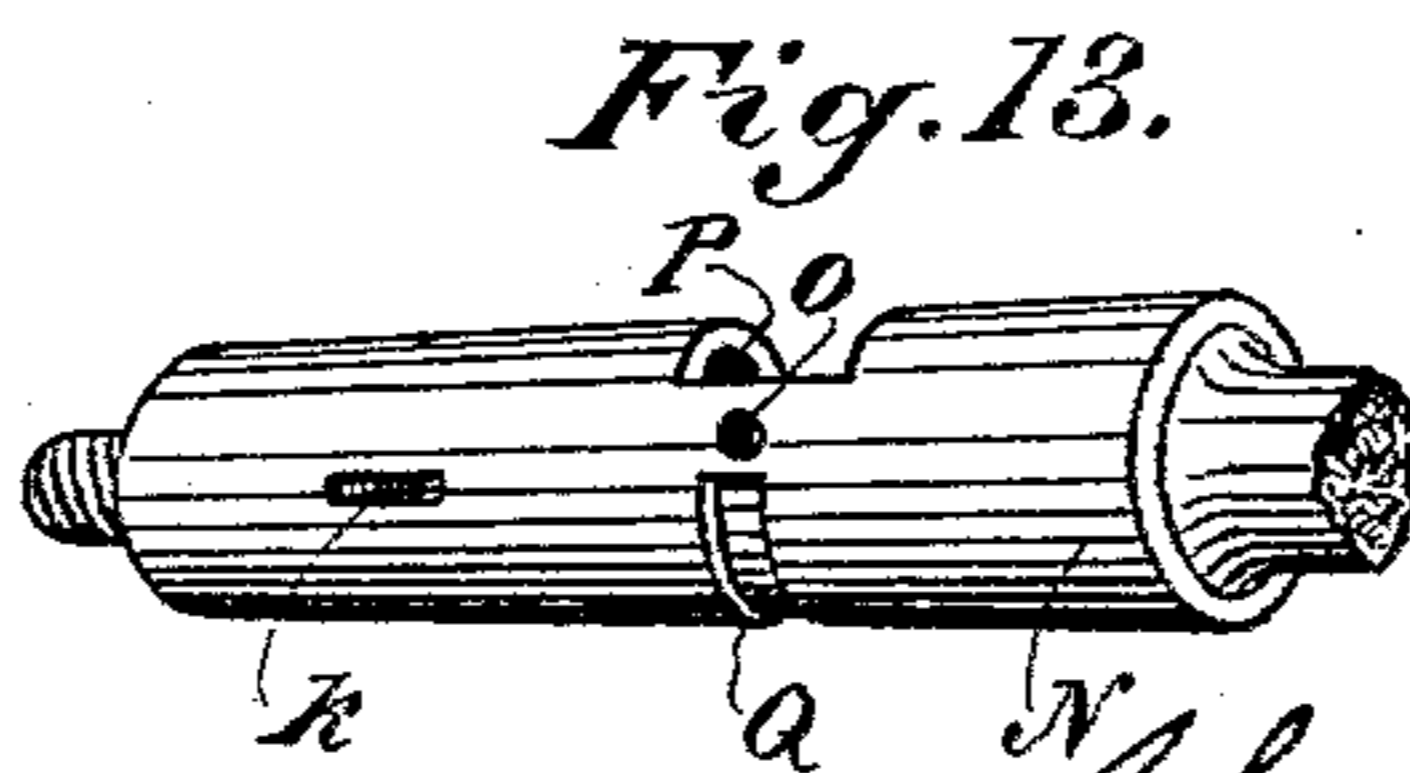
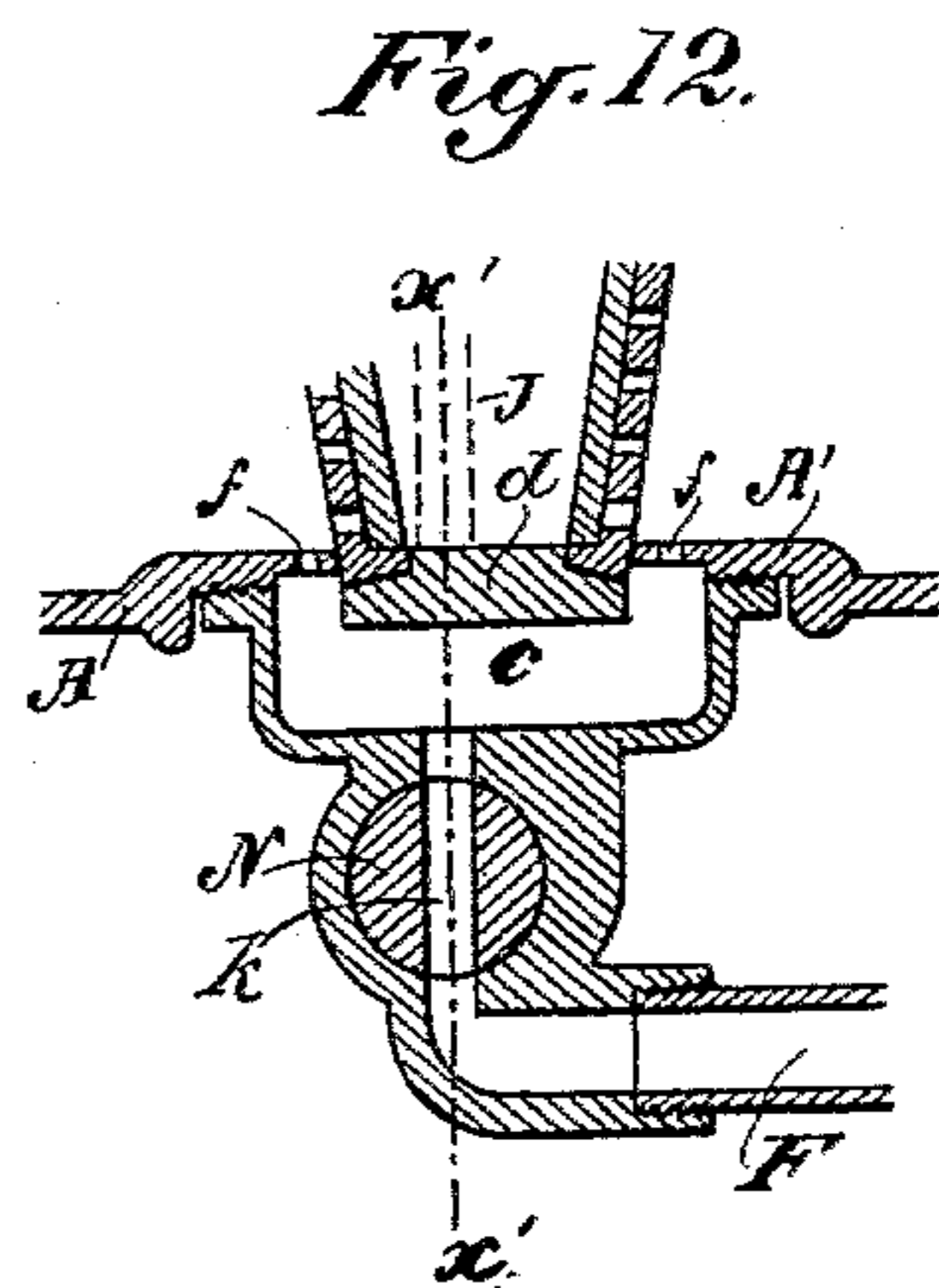
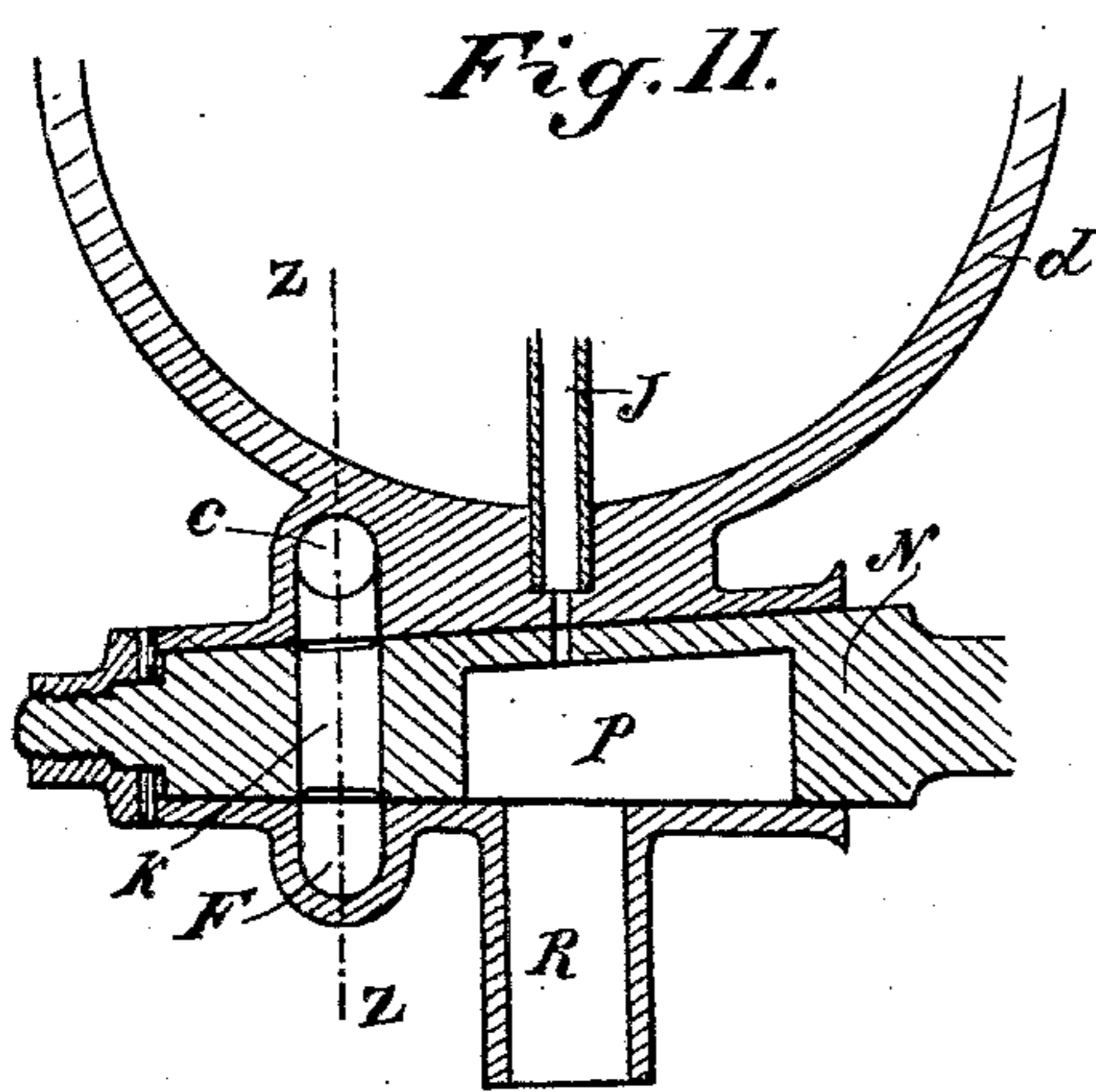
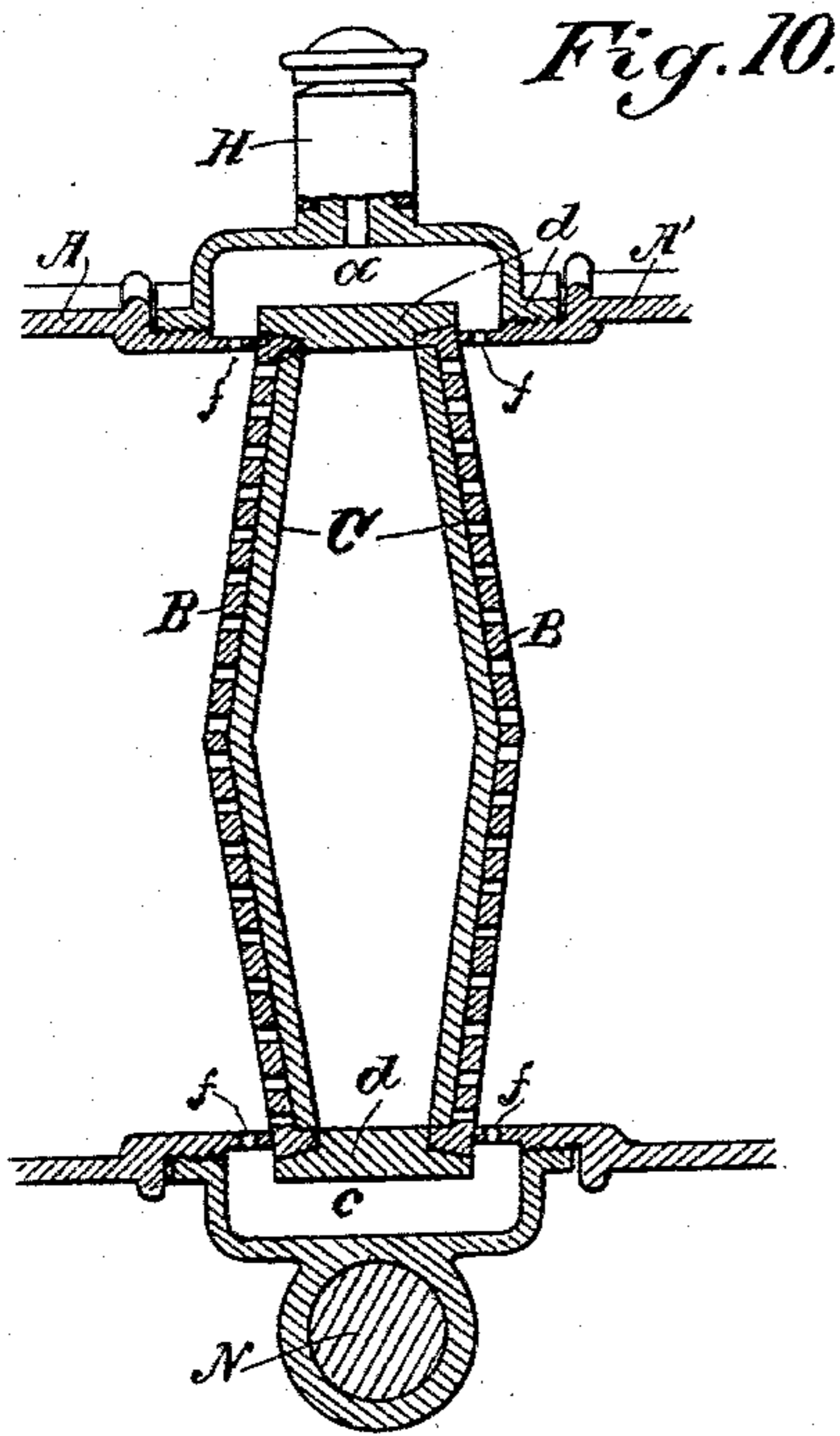
(No Model.)

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C. K. LAMB.
FILTER.

No. 561,675.

Patented June 9, 1896.



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UNITED STATES PATENT OFFICE.

CHRISTOPHER K. LAMB, OF SAN FRANCISCO, CALIFORNIA.

FILTER.

SPECIFICATION forming part of Letters Patent No. 561,675, dated June 9, 1896.

Application filed July 10, 1893. Renewed October 24, 1895. Serial No. 566,779. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER K. LAMB, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Filters; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improved apparatus for filtering water both for private and public uses.

It consists in certain details of construction, all of which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of my filter and exterior view of the supply and discharge cock. Fig. 2 is a section of the upper part of the reservoir as extended. Figs. 3, 4, 5, and 6 show the different positions of the bottom cock. Fig. 7 is a section through line $x x$ of Fig. 8, showing the filter standing horizontally. Fig. 8 is a section of the same on line $w w$, Fig. 7. Fig. 9 is an exterior plan view of the same. Fig. 10 is a cross-section on line $y y$ of Fig. 8. Fig. 11 is a cross-section on line $x' x'$ of Fig. 12. Fig. 12 is a cross-section on line $Z Z$ of Fig. 11. Fig. 13 is a detail view of the cock shown in Figs. 11 and 12.

The object of my invention is to provide a filtering apparatus which may be used either in double or single form, a novel mechanism for supplying water to be passed through the filter or to cleanse it and discharge sediment therefrom by means of a single cock, and means for easily separating or securing the parts together.

In the construction of my apparatus I employ either one or two filtering plates and chambers. In case of a single filter water is supplied from the bottom, passing upwardly through the filter and discharging from an open delivery-pipe or a cock in the upper part, and either with or without a storage-reservoir.

When a double filtering apparatus is employed, the filter-plates are arranged to receive water centrally between them and discharge it outwardly through the filter-plates upon each side, the two horizontally-arranged water-chambers being connected both at top

and bottom and having a common discharge-cock. The supply-cock connects with a pipe with suitable spray-nozzles, by which the surfaces of the filter-plates and the interior of the sediment-chambers may be cleansed simultaneously and the sediment discharged.

In Fig. 1 I have shown my apparatus as applied to a single vertical filter, in which A is the filter-case, having the flat cone-shaped perforated disk B, fitted by a ground-joint into the lower part with its concaved surface presented downwardly. Beneath this is a correspondingly-shaped disk or cone C, of suitable filtering material, cemented into the disk B, through which the water to be filtered first passes and afterward through the perforated cone B. Above these cones the case A is filled with a mass of granulated charcoal to any suitable or desired height, and upon this is fitted a second perforated conical disk D, having beneath and around it a disk of asbestos cloth E to hold the charcoal in place, and through which the water must pass from the charcoal before passing through the disk D. Above this disk is the discharge pipe or cock F, from which the water may be drawn as desired.

The space above the upper perforated disk D may be made of any suitable or desired size, either just sufficient to receive the water as it passes through the filter, as shown in Fig. 1, or it may be enlarged, so as to make a reservoir of some considerable size, the upper part of which is shown in Fig. 2.

Through the center of the disks B, C, D, and E passes a tube G, which allows air to escape from the chamber beneath the lower cone C when water is admitted therein, and this air escapes out through the upper portion, as shown, by means of a valve H', which opens by falling downward, and which will not be closed by any pressure of the escaping air, but which will be closed as soon as the water reaches the valve and lifts it against its seat.

In Fig. 1 the air escapes into the upper chamber through openings in the upper end of the pipe G. When the reservoir is extended, as shown in Fig. 2, the air in its upper part is allowed to escape as the chamber fills with water through a similar valve H in

the top of the chamber, this valve being also closed by the upward pressure of water when the reservoir is full.

The bottom of the filter-chamber is made conical, its convex surface presented downwardly, as shown at I, and water is admitted through the central opening or passage at J, Fig. 3. From this passage it passes out through a spray-nozzle, with openings at K, and impinges against the bottom of the filter-plate C when the valve is in position, Fig. 4, thus washing off any sediment or dirt which may be collected thereon. At the same time the passage L at one side of the passage J is open for the purpose of allowing the sediment and dirty water to be discharged. The supply takes place through a pipe M, which is cast or formed with the bottom of the filter-chamber, so that it serves as a support for the filter, and it is screw-threaded, so that it may be attached directly to a service-pipe without any intervening faucet. This pipe M curves downwardly beneath the bottom and center of the filter-chamber and discharges into the barrel in which the cock N turns. This cock is made with a small opening O, which may either be turned directly into line with the supply-passage M, as in Fig. 3, or it may be turned until it is closed by coinciding with some unperforated part of the barrel within which the cock turns, as in Figs. 4 and 6. Upon the opposite side the cock has a large cut-away portion or opening, as shown at P, and a small channel Q extends from a point near the passage O part way around the circumference of the exterior of the cock N.

The operation will then be as follows: When the cock N is turned to such position that the small passage O is in line with the inlet-pipe M, Fig. 3, the discharge-passage R will be closed and water will pass through this passage O and cross the diameter of the cock, striking upon the opposite side of the chamber in which the cock turns. This checks the velocity of the water, and it rises slowly through the passage L, filling the chamber beneath the filtering-disk C and rising through the disks and the charcoal and the upper disks E and D into the reservoir and discharge-chamber above. As the water rises in this lower chamber the air is forced out, as previously described, through the pipe G and valve H.

After the filter has been running for some time, if it is desired to wash it out, the cock N is turned to the position shown in Fig. 4, when the small passage O will be closed against one side of the chamber in which the cock turns, and the passage Q will connect the inlet-pipe M with the passage J, while the large opening P upon the opposite side of the cock will connect the passage L with the discharge-pipe R. Water will thus flow through the passage Q from the pipe M, thence through the passage J, thence through the jet-nozzle K and wash off the bottom of the filter, the sediment being carried into the bottom and

discharged directly through the passage L and the outlet-pipe R. If the water supply from the pipe M is to be entirely cut off, it is done by turning the cock into the position shown in Fig. 5. When in this position, there will still be an opening from the sediment-chamber through the passage L to R to discharge the chamber. When in position of Fig. 6, the water will flow directly from pipe M to pipe R, and therefore will not be filtered at all.

The means for operating the cock may be of various descriptions. In the present case I have shown a hand-wheel S, having lugs T, T' projecting inwardly from it. Upon the outside of the bottom of the filter-case is a projection U, against which these lugs will strike when the wheel has been turned in either direction sufficiently for that purpose. When one of these lugs T is turned to the right in contact with the stop, the cock is in position to admit water into the filter. A screw *u* passes through the stop and is adjustable, so that the cock will be stopped at any desired point, and the amount of water thus admitted to flow through the filter is regulated as may be desired. When turned to the left until the lug T' strikes the stop, the cock will stand in position to allow water to flow directly from the pipe M through the pipe R without being filtered.

Upon the washer of the cock is made a mark *s*, and upon the exterior of the chamber or barrel, within which the cock turns, corresponding marks *s'* are made with words or characters, which indicate that when the mark upon the washer is in line with the upper mark the cock is in position to supply water to wash out the chamber, and when in the other position the supply of water is entirely cut off.

The cover V of the apparatus is secured in place by means of screw-threads formed around its periphery fitting corresponding threads upon the periphery of the upper part of the reservoir or filter-case. The cover is provided with a hexagonal nut, to which a correspondingly-shaped wrench is fitted, so that it may be easily turned for the purpose of removing or securing the cover. The interior of the cover may be adapted to fit upon the top of the sleeve D', which extends upwardly from the upper perforated disk D, as shown in Fig. 1, thus holding it securely in place when the cover has been put on, preventing it from rising or the ground-joint from leaking, or these parts may be secured by a cross-bar D², Fig. 2, the ends of which engage with notches at the sides of the case, and a screw G', passing through the bar D², is regulated to press upon a plate *g'*, resting upon the top of the sleeve D'. When the cover has been removed, the upper disk is easily removed by means of a hook formed at the opposite end of the handle of the wrench, so as to be inserted into a perforation in the disk to pull it out.

The upper part of the filter-case is slightly

reamed out around the top to allow the asbestos cloth and the upper perforated disk to be easily introduced, and when forced down they make a tight fit within the interior of the case, which is bored out smoothly for the purpose, thus preventing any leakage around the edge of the upper disk.

When the filter is made double, I employ a cylindrical ring *d*, which stands approximately vertical above the cock N and admission-openings, and two filters are fitted into the ends of filter-cases, which are secured one to each side of the ring, so that their axis is horizontal and coincides with that of the ring. In this construction the filter-cases A A' are fitted upon each side of this ring by means of screw-threads, as shown, Figs. 7 and 10, and the perforated plates B are also fitted with ground-joints upon each side of the ring, so as to form tight joints and leave a chamber between them into which the water is first introduced in the same manner as described for the single filter.

The cases A screw into the ring *d* until the inner ends press against the perforated disk, and thus force the latter to fit closely in the ground-joints. Annular channels *e* are formed between the outer ring *d* and the inner ends of the cases A, as shown in Fig. 7, and holes *f* are made through the cases to allow water to escape into the channels *e* and thence to the discharge. In this case I have extended the admission-passage J, by which the filters are washed, to about the center of the intermediate space and have applied to the end of it the double spray-nozzles K' in place of the single one shown in the single construction, the operation being essentially the same in both cases, as the water is delivered through these two nozzles upon the opposing filtering-surfaces C, so as to wash them off, and the sediment falls down and passes out through the passage L, as previously described. In this construction the upper part of the two chambers A are connected by a passage A, which unites them as shown. The water after passing through the filter C and perforated plates B in this construction escapes through the holes *f* into the channels *e*, and from the channels it passes to the discharge-passage through openings *b* in the lower part of each of the chambers, the two communicating with the passage, so that water from both parts of the filter may be delivered by the same discharge F.

In Figs. 11 and 12 I have shown the apparatus with the cock N made longer and having a port *k* through it and corresponding with the discharge-passage C. This passage connects the filtered-water chambers with the discharge-passage at the same time when the cock N is in such a position as to admit water through the spray-pipe J, as in Fig. 4, thus washing out the sediment-chamber at the same time when filtered water is being drawn. Both passages are closed at the same time by

turning the cock to the position for closing, as previously described.

In order to observe the interior of the receiving-chamber of the filter and to ascertain whether the filter-plates are clean, I insert plates of glass *h* in openings in the sides or bottom of the chamber.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a filter, an exterior cylindrical case having a receiving-chamber for the water to be filtered, a conical perforated plate or plates fitted to form ground-joints with the interior periphery of the case, a plate of filtering material similarly shaped, and fixed to the receiving side of the perforated plate, a filling of charcoal within the case and exterior to the filter-plates, a second perforated conical disk with a lining of asbestos cloth fitted against its interior surface, a water-receiving chamber with discharge-pipe exterior to the said filtering-plates, a water-tight cover fitting the outer end of the case, and means for holding the perforated disks and filter-plates in position and allowing the escape of air from the sediment and reservoir chambers, consisting of the tubular sleeves extending upwardly and forming contact with the cover, substantially as herein described.

2. In a filter, an exterior case having supply and discharge passages, and a cock whereby water is admitted into the sediment-chamber, a conical perforated plate fitting the case with a ground-joint, a similarly-shaped filtering-disk, fixed to the perforated plate adjacent to the sediment-chamber, a filling of charcoal within the case exterior to the perforated plate, a second perforated plate exterior to the charcoal, with an asbestos disk fitting its inner side, a water-receiving chamber with discharge-passage exterior to these plates, mechanism whereby the plates are held in position and the joint maintained tight, air-escape passages from the sediment and reservoir chambers, and valves H H' adapted to fall and allow air to escape and to close when the water has reached the valves, whereby the air-passages are closed, substantially as herein described.

3. In a filter, a chamber to receive the water to be filtered, a perforated disk fitting the interior periphery thereof with a ground-joint, a filter-plate cemented to the perforated plate on the side adjacent to the receiving-chamber, a chamber upon the opposite side of the filter-disk into which the filtered water is delivered, a supply-passage formed with and extending outwardly from the lower side of the filter-case and having a passage opening into the barrel of the supply-cock, a cock N turning in said barrel having the inner opening O, the discharge-opening P and the groove or channel Q made upon its exterior surface, in combination with the inlet-openings L and J, a spray nozzle or nozzles connected with the

opening J whereby the surface of the filter-plate may be washed and a discharge-passage R for the escape of the sediment during the washing, and for the direct delivery of unfiltered water without passing through the filter, substantially as herein described.

4. In a filter, a chamber into which the unfiltered water is received, a perforated plate fitted with a ground-joint around the interior of said chamber, a filter-disk cemented to the perforated plate on the side adjacent to the receiving-chamber, a reservoir exterior to the perforated plate adapted to receive the filtered water, having communication with the delivery-pipe, means whereby the water may be delivered into the receiving-chamber under pressure and caused to pass through the filter-plate, and means whereby the water may be discharged directly from the receiving-chamber, and the supply-water delivered through a jet-nozzle upon the surface of the filter-plate whereby it is washed and the sediment discharged, substantially as herein described.

5. In a filter, the receiving and reservoir chambers with intermediate filter-plates as shown, in combination with a cock turning in a barrel and provided with a cut-away portion P and small opening, and having a circumferential channel in its imperforate portion, the

lower portion of the filter-casing having the passage M with which the cut-away portion and passages of the plug may be aligned, and a passage opposite thereto through which sedimentary deposits may be discharged, whereby water may be directed through the filter, or against the filter-plates to wash them, or delivered without passing through the filter, a device on the cock for turning the latter provided with stops parallel with the cock, and an adjustable stop on a fixed portion of the filter-casing in the path of the stops on the cock to limit the movement of the latter, substantially as herein described.

6. In a water-filter, the exterior case, the filter-plates fitted therein, with peripheral ground-joints, a screw-threaded cover engaging threads on the case and holding the plates in position and allowing the escape of air from the sediment and reservoir chambers, and an exterior projection on the cover by which it is turned to secure and remove it, substantially as herein described.

In witness whereof I have hereunto set my hand.

CHRISTOPHER K. LAMB.

Witnesses:

GEO. H. STRONG,
S. H. NOURSE.