(No Model.)

2 Sheets—Sheet 1.

J. N. POAGE.

WATER COLUMN.

No. 531,598. Patented Dec. 25, 1894.

FIG. 1.

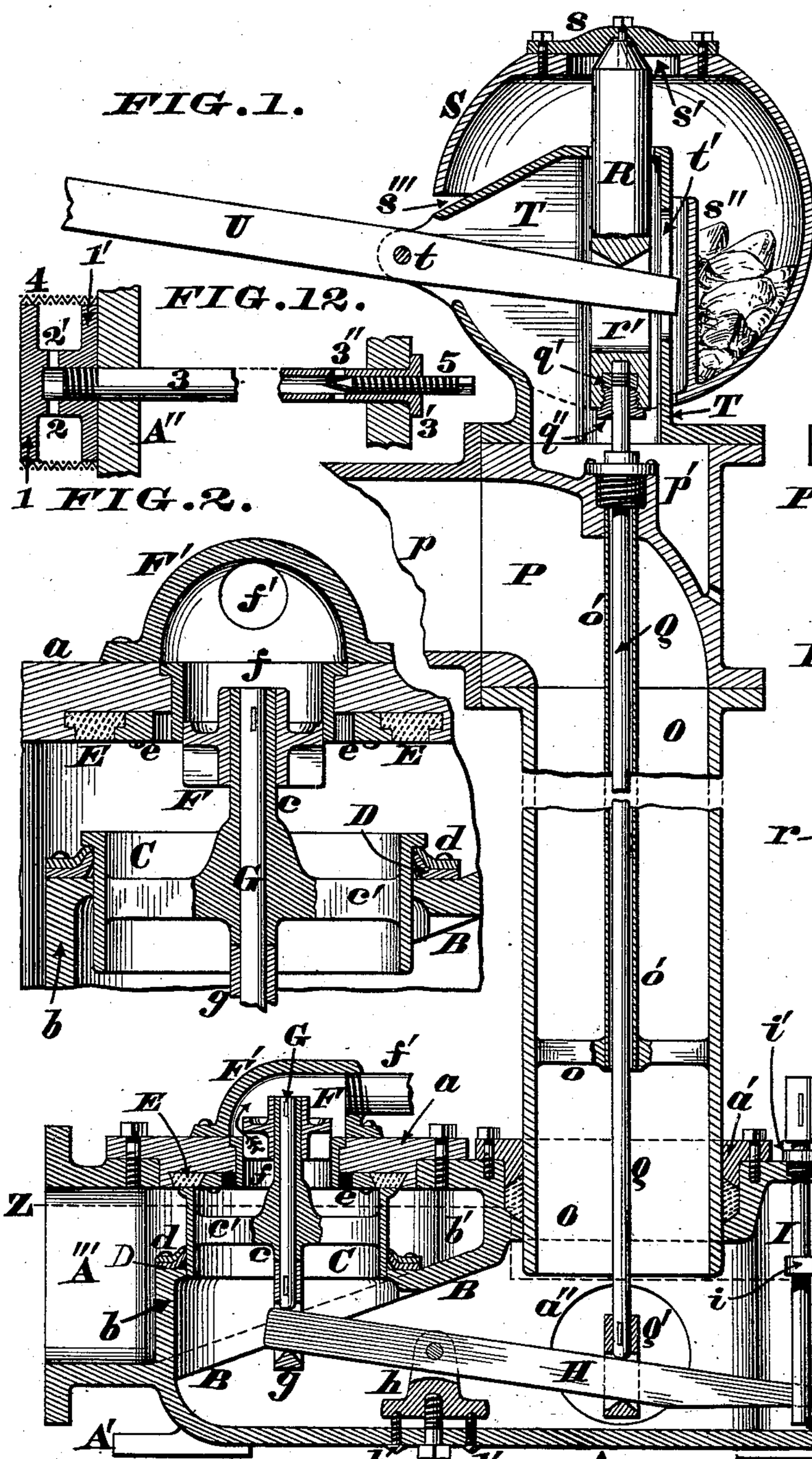

FIG. 12.

FIG. 2.

FIG. 3.

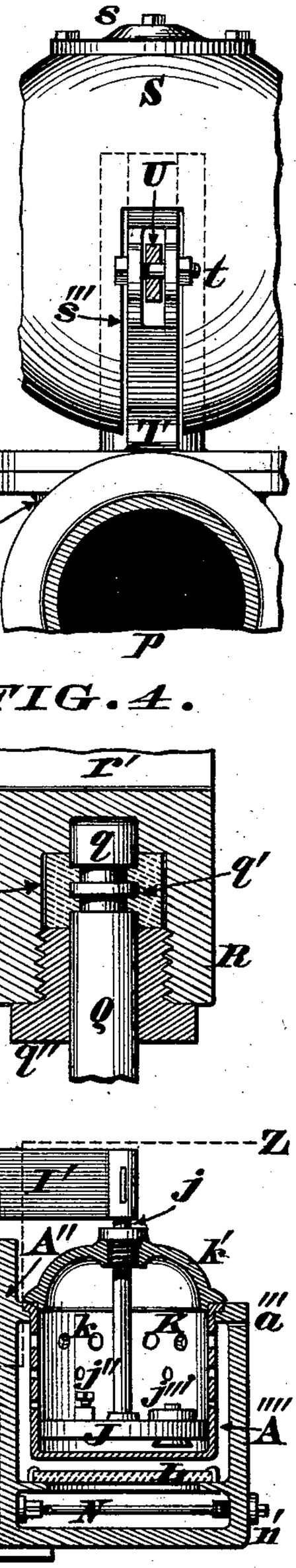

FIG. 4.

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 5.

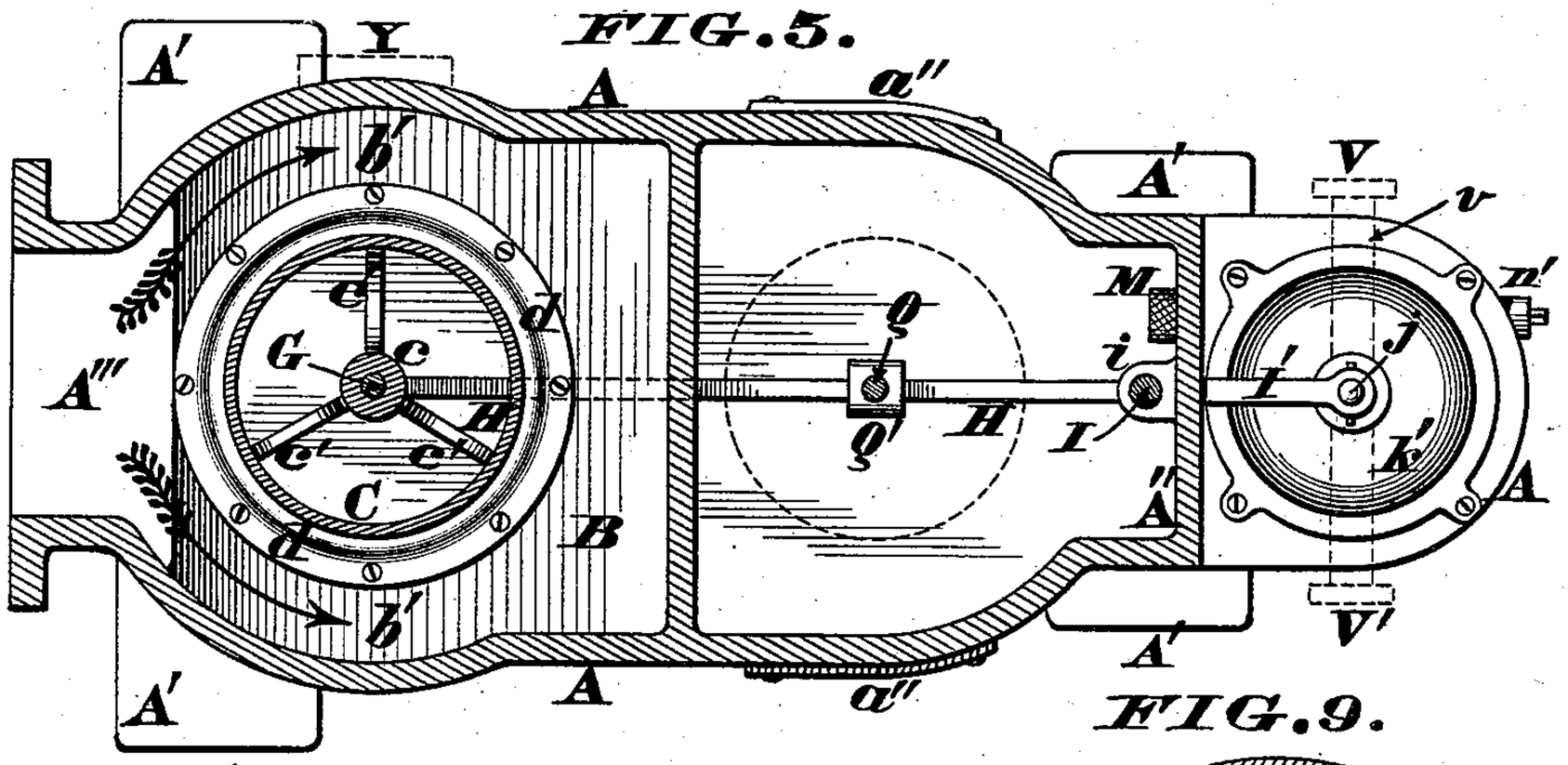


FIG. 6.

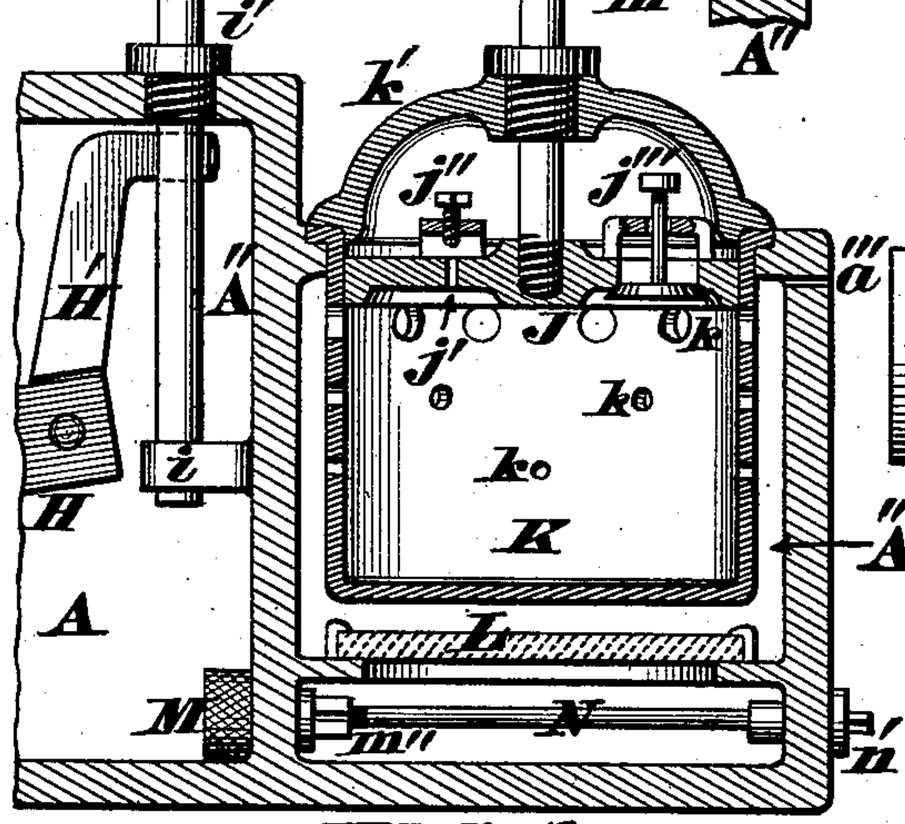


FIG. 7.

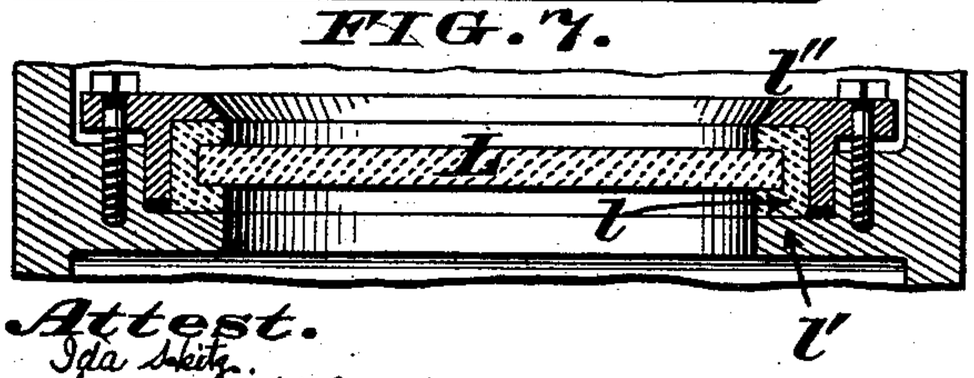


FIG. 8.

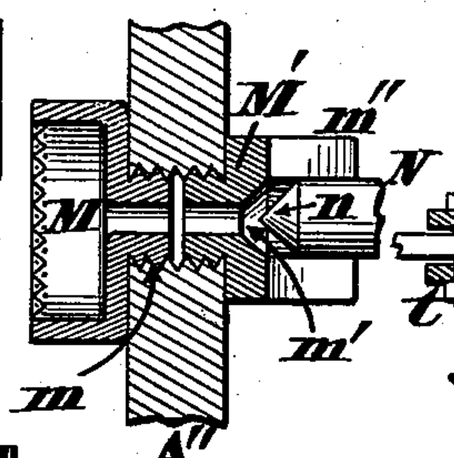


FIG. 9.

FIG. 10.

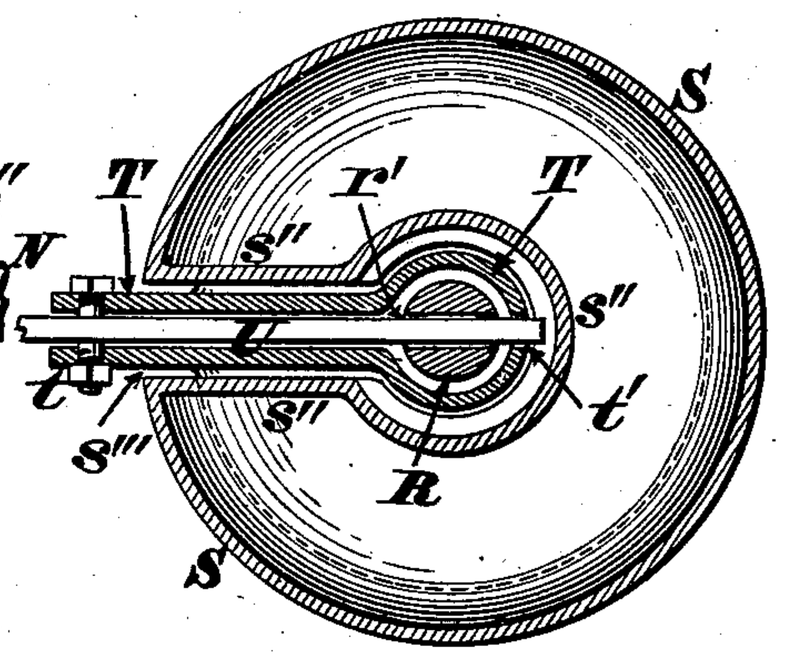
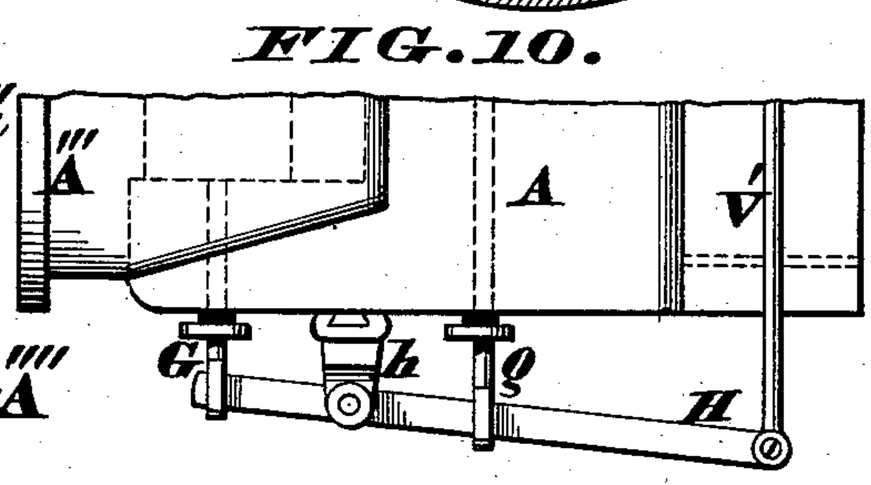
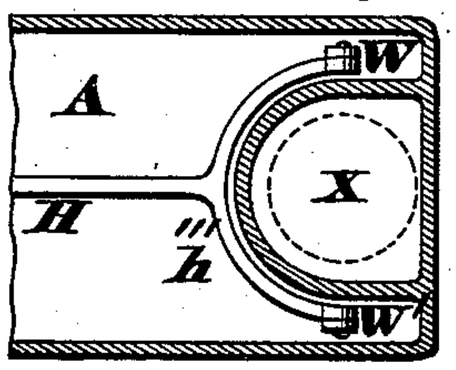


FIG. 11.





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UNITED STATES PATENT OFFICE.

JOHN N. POAGE, OF COLLEGE HILL, OHIO.

WATER-COLUMN.

SPECIFICATION forming part of Letters Patent No. 531,598, dated December 25, 1894.

Application filed July 9, 1894. Serial No. 516,935. (No model.)

To all whom it may concern:

Be it known that I, JOHN N. POAGE, a citizen of the United States, residing at College Hill, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Water-Columns; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the annexed drawings, which form part of this specification.

This invention relates to those swinging columns or cranes placed at suitable intervals near a rail-road track, for the purpose of supplying locomotive-tenders with water, and the first part of my improvements comprises a novel arrangement of inlet-valve and cataract-gear, with reference to an ascending-main of the apparatus. This ascending main projects vertically from a hollow base, and is capable of being readily swung around, either to the right or left, for the purpose of bringing the delivery end of the discharging spout to a convenient place for turning water into the man-hole of a tender; a stout shaft being located in the center of said main, and having its upper end coupled to an ordinary operating-lever. The lower end of this axial-shaft is coupled to another lever, which latter may be either internal or external, with reference to the base, and one end of this counter-lever is arranged to operate an inlet-valve and waste-valve, while its opposite end is controlled by the "cataract-gear." Consequently, when the flow of water is shut off, the cataract-gear limits the speed with which the inlet-valve closes, and thus prevents any sudden ram or concussion, either in the apparatus, or its pipe connections.

The inlet-valve and cataract gear are situated within the base, but on opposite sides of the ascending-main, and are provided with readily-detachable covers or caps, the removal of which enables the convenient inspection or repair of said valve and gear, as hereinafter more fully described.

The second part of my improvements comprises a novel arrangement of passages that permit a free and unobstructed flow of water around all sides of the inlet-valve, and then directly through the latter, the instant it is opened, as hereinafter more fully described.

My improvements further include certain minor details of construction and fitting, which will be hereinafter more fully described and then pointed out in the claims.

In the annexed drawings, Figure 1 is a vertical section of the preferred form of my water-column, the inlet-valve thereof being closed and the waste-valve opened. Fig. 2 is an enlarged vertical-section of a sufficient portion of the base to show the inlet-valve open and the waste-valve closed. Fig. 3 is a front elevation of a portion of the head of the column and its accessories, the main lever being sectioned. Fig. 4 is a section showing how the main-shaft is coupled to a connector contained within said head. Fig. 5 is a sectionized plan of the base, taken at the line Z—Z of Fig. 1. Fig. 6 is an enlarged axial-section of the cataract-gear, the plunger of the same being raised, and just started on its down stroke. Fig. 7 is an enlarged section through the filter of the cataract-gear chamber. Fig. 8 is a similar section through the strainer of said chamber. Fig. 9 is a horizontal section of the "head," taken in the plane of the main-lever. Figs. 10, 11, and 12 show three different modifications of my invention.

The lower member of my water-column is a hollow casting or base A, having flanges A′, wherewith it is securely bolted to sills laid in a pit, in the usual manner; the base being closed near one end by a vertical partition A″, and having at its opposite end an inlet A‴, communicating with a water pipe, or other source of supply. Furthermore, this base has, on top, a cap *a* and stuffing-box *a′*, and on its sides, man-holes *a″*.

B is an inclined diaphragm extending into the base, in the manner shown, and preventing any passage of water through the latter, until an inlet-valve C is opened, the valve being confined to a proper path by a tubular-guide *b* projecting upwardly from said diaphragm. *b′ b′* are annular passages around this guide, as more clearly seen in Fig. 5. The inlet-valve C is a hollow cylinder, adapted to reciprocate vertically, leakage around it being prevented by an annular-gasket D,

held in place by a ring *d*, as more clearly seen in Fig. 2.

Valve C is connected to a tubular stem *c*, by radial arms *c'*, and, when closed, is forced up against the lower side of a rubber gasket E. This gasket is fitted within an undercut groove of the cap *a*, and secured by a ring *e*, bolted to said cap.

Valve stem *c* carries a waste-valve F, adapted to reciprocate vertically within a cylindrical guide *f* secured to cap *a*, a bonnet F', being applied over the upper end of said guide, which bonnet has a drain-pipe *f'*, projecting in any desired direction. Furthermore, this valve stem *c*, and waste-valve F, are connected by a key or pin to the upper end of a rod G, to whose lower end a stirrup *g* is secured by another key or pin. By this arrangement, the valves C, F, rod G and stirrup *g* all move together, and yet can be readily separated, the one from the other, by simply removing the keys.

Stirrup *g* receives one end of a counter lever H arranged longitudinally within the base A, and capable of rocking on a fulcrum bearing *h*, supported upon a number of screws *h'*, and held in place by a bolt *h''*.

The screws *h'* are first tapped in the bottom plate of the base, and after they are passed up a sufficient distance, the outer ends of said screws are cut off and then "headed," after which act, the bearing *h* is so applied as to cause pits in its under side to rest upon the points of said screws. The bolt *h''* is finally screwed home, thereby securing the bearing accurately in its proper place within the base. This peculiar method of securing the bearing in place, is due to the fact that its location within the base is such as to prevent the latter being planed down, so as to afford a level surface that will be neither too high nor too low to secure the proper action of the lever pivoted within said bearing.

Coupled to that end of lever H most remote from the inlet-valve, is a lifting rod I, the latter being guided by a lug *i* projecting from the partition A'', and passing through a stuffing box *i'* screwed into the top of the base.

Secured to the exposed end of rod I is a rigid arm I', to which is keyed a rod *j* carrying, at its lower end, a plunger J, that traverses a cylinder K, the plunger being provided with a small channel *j'*, controlled by a regulating screw *j''*.

j''' is a downwardly-opening valve in said plunger, the details of which are more clearly seen in Fig. 6. Reference to this illustration shows that the cylinder K, is open at top, but closed at bottom, and that its sides are pierced at *k*, to communicate with a chamber A'''' within which said cylinder is fitted.

The perforations *k* may be arranged in three distinct rows, the holes in the upper series being larger and more numerous than those of the row immediately below; the lower row being composed of small holes quite remote from each other.

k' is a cap covering the cylinder K, which cap is fastened upon the base by bolts passing through lugs radiating from said cap, as seen in Fig. 5.

Chamber A'''' has at top a minute outlet *a'''*, for the escape of water, which can enter said chamber only as it percolates through a filtering medium L, composed of earthenware or other suitable porous material, or materials. This filter is usually a disk capable of being secured within the chamber A'''' in any convenient manner, but I prefer the arrangement of devices seen in Fig. 7. Here, the margin of the filter is seen inserted within a rubber ring *l*, which latter is clamped against a flange *l'*, by a gland *l''*, secured with bolts, as shown, which arrangement affords a cushioned seat that protects the filter, and also enables the ready removal of the disk, either for cleaning or inspection.

The partition A'' practically isolates the chamber A'''', from the base proper A, the only communication between them being through a strainer M, having a channeled-shank *m* screwed into said partition, in the manner seen in Fig. 8. This strainer consists of a metallic case covered on its end or sides with fine wire-cloth, and after the water has traversed it, the escape then takes place through a plug M', screwed in the opposite side of the partition. Plug M' has a seat *m'* and slotted guides *m''*, which latter confine a stem N to a proper path, the inner end of said stem being provided with a conical-valve *n* adapted to close against the seat *m'*, and the outer end of said stem being adjustable within a stuffing-box *n'*. By this arrangement of devices the quantity of water that enters the chamber A'''', and escapes therefrom at the outlet *a'''* can be regulated with the greatest accuracy.

Fitted within the stuffing-box *a'*, is the ascending main O of the apparatus, said main being supported in a vertical position and adapted to be turned, either to the right or left, in the same way as all ordinary water-columns; the top of said main having an elbow P attached to it, from which projects a horizontal spout or discharge pipe *p*. Furthermore, this elbow has a stuffing-box *p'*, which, in connection with a brace *o* confines a tube *o'* within the main O, said tube being traversed by a non-rotatable shaft Q whose lower end carries a stirrup Q', that engages with the counter lever H, at a point between its fulcrum *h* and the lifting rod I, the upper end of this shaft being scored with one or more circumferential grooves *q*, as seen in Fig. 4. These grooves have a metallic-bushing *q'* cast around them, which bushing is inserted within a socket *r*, at the lower end of a connector R, and then retained in place by screwing a nut *q''*, into the threaded portion of said socket. By this arrangement the con-

nector R can turn around the non-rotatable shaft Q, and, at the same time, elevate the latter when occasion requires.

Connector R couples this shaft Q to a plate *s*, secured over an orifice *s'*, in the top of a hollow head or sphere S, the lower portion of which is provided with a partition *s''* arranged, as seen in Fig. 9, the object of this partition being to afford a pocket for containing stones or other weights necessary to overcome the friction of the various operative parts, and thereby hold the inlet-valve securely in its closed position, as seen in Fig. 1. Again, this loaded head is slotted, as seen at *s'''* in Fig. 3, to clear a standard T, projecting vertically from the elbow P, and provided with a pivot *t*, upon which is hung the main lever W, capable of being operated by any one on a locomotive tender. The short end of lever U traverses a vertical slot *r'* of the connector R and a similar slot *t'*, of the standard.

In setting up my water-column the following adjustments must be attended to: First, the head or ball S must be so loaded as to insure a complete closure of the inlet valve C, under all circumstances; second, the valve *n* or its equivalent device 5, must be set to allow a sufficient flow of water through the chamber A'''', to compensate for any possible leakage or evaporation therefrom, a discharge of a pint per day at the outlet *a'''*, being proof that the filter L and strainer M are performing their duties; third, the screw *j''* must be so set as to permit a very limited flow of water through the channel *j'*, in order that the plunger J may complete its descending stroke quite slowly, and without producing any violent jars or concussions. These adjustments having been effected, and the column being in its normal condition, all the operative parts thereof assume the positions seen in Fig. 1, reference to which illustration shows that the inlet valve C is closed up against its seat E, thereby cutting off all communication between the water-inlet A''' and base A. In this elevated position of valve C, the waste-valve F is raised so far above the top of guide *f*, as to open communication between the base A, and waste way *f'*. Consequently, any water that might have remained in the column, above the level of said pipe *f'*, is drained off into the pit that contains the base, the pit being below the frost line in all cases.

It is evident that when the valve C is thus closed, the plunger J must be near the bottom of chamber K, on account of the peculiar arrangement of counter lever H, and it is also evident that the valve *j'''* of this plunger is now free to drop down, or away from its seat. Furthermore, it is apparent that the inlet A''', and passages *b'*, *b'*, are filled with water, under pressure, and therefore, the instant the valve C is lowered away from its seat E, an upper current of water immediately enters at the top of said valve, passes down through it, and then traverses the base A and ascending main O. As the valve continues its downward stroke, the lower current of water is divided by coming in contact with the front of the rounded guide *b*, and the two distinct currents thus formed, ascend the inclined passages *b'*, *b'*, as indicated by arrows in Fig. 5, and not being able to escape rearward, the water flows over the edge of the valve C, and then enters the base, as above described. From this explanation it is evident that the peculiar location and arrangement of the inlet A''', inclined diaphragm B, guide *b*, passages *b'*, *b'*, and hollow valve C, afford a free and unobstructed flow of water that increases the prompt action of the apparatus.

It is evident that if the diaphragm B were carried back horizontally from the top of guide *b*, the area of the inlet A''' would be restricted accordingly, and the water flowing through it would all be directed abruptly upward by contact with the vertical wall of said guide; but by sloping this diaphragm, from the bottom of said guide, the upper current, flowing through the inlet, passes directly to the open valve, while the two lower currents are gradually carried up by the inclined passages *b'*, *b'*, on the opposite sides of the valve, thus affording a great area, free from obstructions, and presenting rounded surfaces for the water to move against.

When the inlet valve C is drawn down, the waste valve F, is carried with it, but the latter does not descend so far as to escape from its guide *f*. Consequently, there can now be no flow of water at the waste-way *f'*. (See Fig. 2.) This opening of valve C is effected by operating the main lever U, in the customary manner, and as its shorter end swings up the plunger J of the cataract gear is readily raised, because the water in cylinder K, flows freely through the downwardly-opening valve *j'''*, while some of it escapes through the holes *k* into the chamber A''''; but when the lever is liberated, and the weighted head S permitted to assume its normal position, the plunger J is again forced down to the bottom of chamber K, the valve *j'''* closing against its seat the very instant this down stroke is begun. Therefore, as the largest channel of the plunger is closed, it is evident its descent must expel the water from the chamber through the side openings *k*, and as the holes in the upper row are somewhat large, very little resistance is offered to this descent; but as the plunger descends still farther, the area of the openings becomes less, and when it has passed below the lower row of holes the only avenue of escape for the imprisoned water is through the small channel *j'*. Hence, it is apparent that the completion of the plunger stroke is effected slowly and gradually, and as said plunger governs the movements of the inlet valve C, the latter is seated in such an easy manner as to prevent any violent "water rams" in the column.

The strainer, seen in Fig. 12, consists of a

pair of disks 1, 1′, separated from each other by a neck 2, screw threaded at one end to admit the threaded portion of a tube 3, a wire-cloth 4, being soldered around said disks. 2′ is a port that admits water to the neck, after passing through the cloth 4.

Tube 3 is sufficiently long to pass completely across the bottom of chamber A′′′′, and has, at its outer end a head 3′, which enables it to be screwed either into or out of the strainer 1. Furthermore, this tube has one or more outlets 3′′, controlled by a needle-valve 5. By screwing in the tube 3, the strainer 1 is clamped tightly against the partition A′′, and by properly adjusting the valve 5, the escape of water through the outlet or outlets 3′′, can be regulated, to suit circumstances.

The above is a description of the preferred form of my invention, but it is evident the details of construction can be greatly modified, to suit circumstances; one simple change being seen in Fig. 6, where the lever H has a dog H′ that operates the lifting rod I.

Another modification is seen in Fig. 10, where the bearing *h* and counter-lever H are external, being placed directly under the base A, and the rod G and shaft Q being passed through stuffing boxes, so as to engage with said lever. The plunger, in this case, is operated by a pair of side bars V V′, the position of which is indicated by dotted lines in Fig. 5, a cross head, indicated by the dotted line *v*, being provided to connect the upper ends of said bars, to which head the plunger rod *j* would be attached.

Still another change is seen in Fig. 11, where the counter lever H is forked at *h*′′′, and connecting rods W, W′, are coupled to these forks, for the purpose of operating the rod that carries the plunger, the cylinder containing the latter being indicated by the dotted circle X.

One great advantage peculiar to my present construction of water-column is the facility for inspecting and refitting all the operative parts thereof, the cataract gear being readily accessible after the cap *k*′ has been detached from the top of chamber A′′′′.

The valve mechanism is equally accessible, as the simple removal of cap *a* exposes both of the valves C, F, and after knocking out the upper key from the rod G, either or both of said valves can be detached from said rod, and new ones inserted in a few minutes. Again, by opening either of the man holes *a*′′ then knocking out the key that couples the shaft Q to the stirrup Q′, and finally removing the cap-plate *s* and lever U, the connector R, and said shaft can be withdrawn bodily out at the top of the apparatus. Said man-holes enable the ready removal of stones and other obstructions that may be accidentally or intentionally introduced into the base. The cap *k*′ can also be readily detached to permit inspection of the cataract gear, which is one of the most essential members of my column, the plunger J being metallic, and therefore, very liable to be cut out if muddy or gritty water is run through the apparatus. Hence, the arrangement of strainer and filter to reduce the flow to a minimum, and to insure the current being as clear as possible. Finally, the dotted lines Y, in Fig. 5, indicate the place where an automatic relief-valve may be applied, to prevent the apparatus being damaged in case a heavy head of water should be suddenly turned on through the inlet A′′′.

I claim as my invention—

1. The combination, in a water-column, of a hollow base; an inlet-valve fitted within said base, and near one end thereof; a special chamber near the opposite end of said base, and having a cataract-gear arranged therein; a discharging main communicating with said base; a lever that operates said inlet-valve and the cataract-plunger; and means for rocking said lever; the arrangement of these appliances being such as to enable the removal of the cataract-gear without disturbing other parts of the column.

2. The combination, in a water-column, of a hollow-base; an inlet-valve fitted therein; a capped-chamber communicating with said base; a cataract-gear fitted within said chamber; a lever that operates said inlet-valve and the cataract-plunger; a discharging-main communicating with said base between said inlet-valve and cataract-gear; and a rod or shaft that traverses said discharging-main and rocks said lever, the arrangement of these appliances being such as to enable the removal of the cataract-gear without disturbing other parts of the column.

3. The combination, in a water-column, of a hollow-base; an inlet-valve fitted therein; a special chamber having a filter at bottom, and adapted to receive a limited supply of water from said base; a cataract-gear fitted within said chamber; a lever that operates said inlet-valve and the cataract-plunger, in the manner described; a discharging-main communicating with said base between said inlet-valve and cataract-gear, and a rod that traverses said main and operates said lever, all as herein set forth.

4. The combination, in a water-column, of a hollow base, having an inlet valve and discharging main; a chamber communicating with said base by a valve-guarded passage; a filter through which water enters said chamber; and a cataract gear fitted within the latter, and regulating the closing of said inlet-valve, in the manner described.

5. In a water-column, the hollow base A, having an inlet A′′′; inclined diaphragm B; guide *b;* and side passages *b*′, *b*′, in combination with a hollow inlet-valve C, that traverses said guide *b*, as herein described.

6. In a water-column the hollow base A, having an inlet A′′′; inclined diaphragm B; guide *b;* side passages *b*′; *b*′; and cap *a*, provided with the valve seat E; in combination

with a hollow inlet-valve C, that reciprocates within said guide, and closes against said seat, for the purpose described.

7. The combination in a water-column, of the hollow base A, having an inclined diaphragm B, provided with a guide *b*, traversed by the hollow inlet-valve C; the cap *a* secured upon said base, and provided with a seat E, and open-ended guide *f*, and the waste valve F, secured to the stem of said valve C, and traversing this guide *f*, for the purpose stated.

8. The combination in a water-column of the class specified, of the discharging-main O; a shaft Q, traversing the same and operating the valve-mechanism, in the manner set forth; a standard T projecting upwardly from said main; a lever U pivoted to said standard; a hollow ball S, adapted to play up and down on said standard; and a connector R coupled to said shaft and ball, and having the short arm of said lever engaged therewith, all as herein shown and explained.

9. The combination in a water-column, of the shaft Q provided with one or more annular grooves *q;* the metallic bushing *q'*, cast around said grooves; the connector R, having a socket *r*, within which said bushing is inserted; and the nut *q''*, that surrounds said shaft and retains said bushing in place, as herein described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN N. POAGE.

Witnesses:

JAMES H. LAYMAN,

CHARLES B. CRANSTON.