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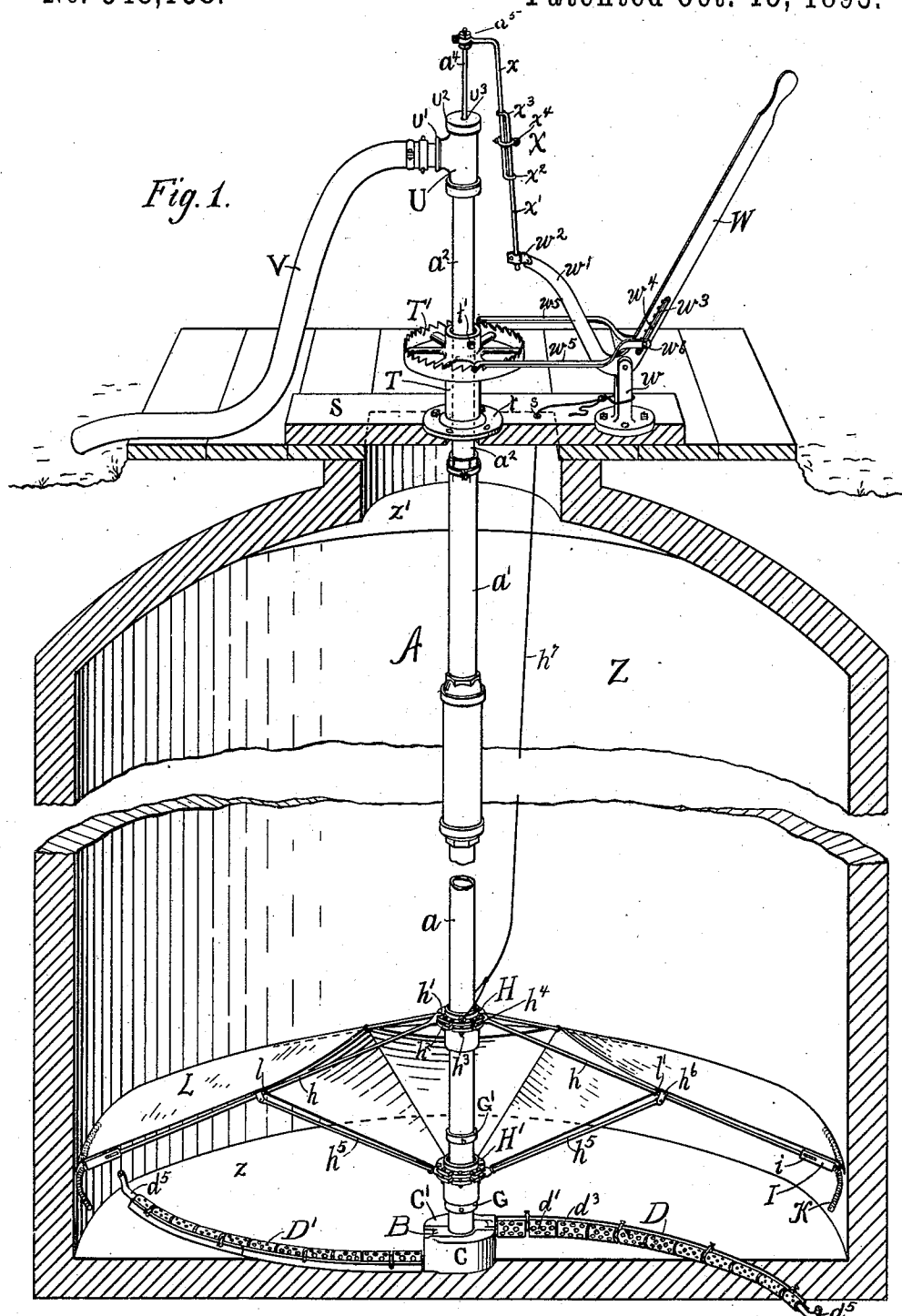
2 Sheets—Sheet 1.

W. M. PRATHER.

APPARATUS FOR CLEANING RESERVOIRS, CISTERNS, &c.

No. 548,138.

Patented Oct. 15, 1895.



Witnesses

1418, Berlinlinen.
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(No Model.)

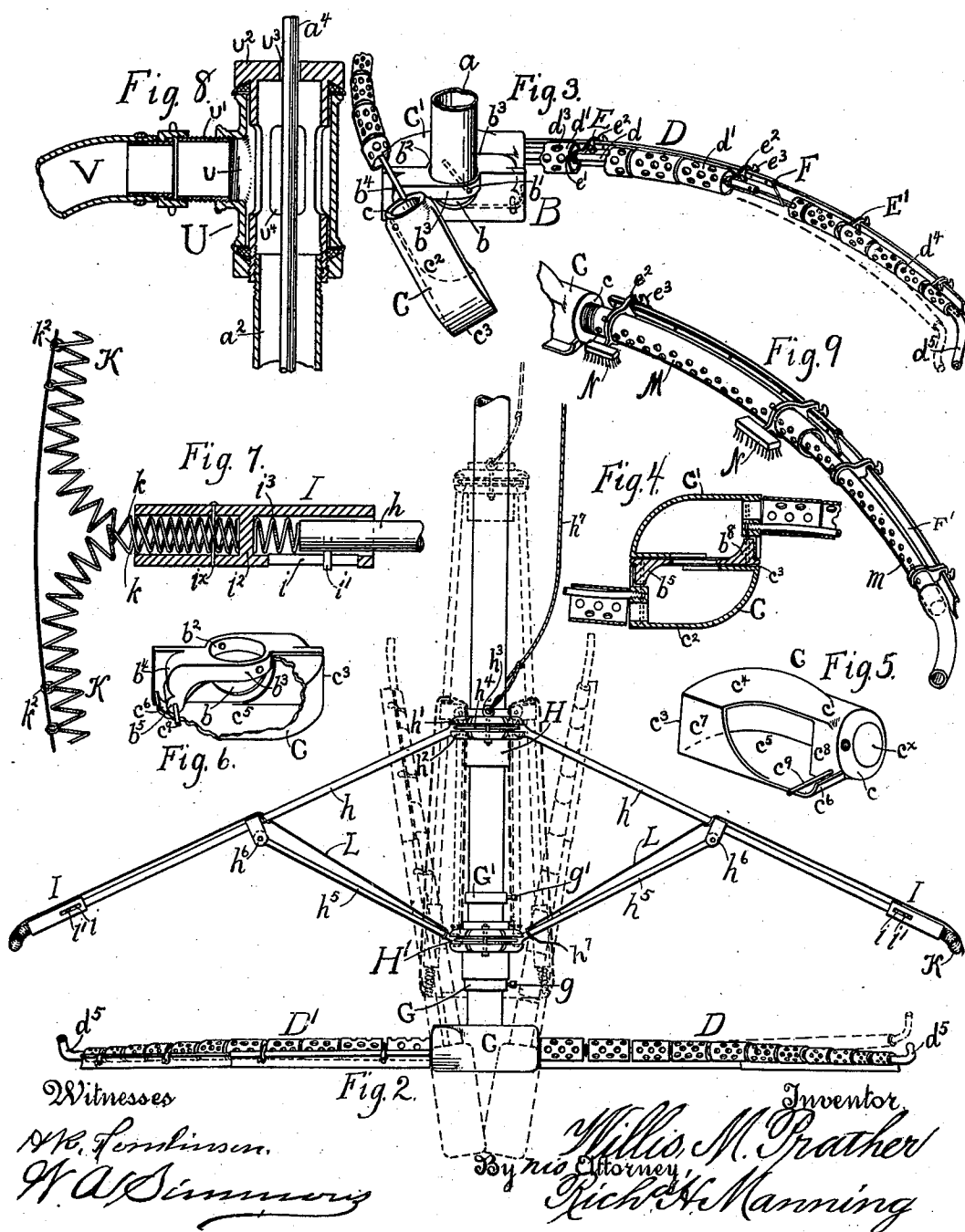
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UNITED STATES PATENT OFFICE.

WILLIS M. PRATHER, OF KANSAS CITY, MISSOURI.

APPARATUS FOR CLEANING RESERVOIRS, CISTERNS, &c.

SPECIFICATION forming part of Letters Patent No. 548,138, dated October 15, 1895.

Application filed November 16, 1893. Serial No. 491,177. (No model.)

To all whom it may concern:

Be it known that I, WILLIS M. PRATHER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Apparatus for Cleaning Reservoirs, Cisterns, &c.; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The objects of my invention are, first, to obtain a suction upon the impure water and the sedimentary deposit at the bottom of the reservoir coextensive with the area over which the cleaning apparatus is made to operate; second, to enable the cleaning-arms to be extended over a greater or less area, in proportion to the extent of the reservoir; third, that the arms may rise and also fall into position automatically; fourth, to enable the ends of the arms supporting the folding cover to yield when brought into contact with the sides of the cistern.

My invention further consists in the novel construction and combination of parts, such as will first be fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a vertical sectional view of a cistern, showing the cleaning apparatus in position and the various parts in readiness for operation. Fig. 2 is a detail view of the lower end of the tube connected with the pump, showing the cover in section and the cover-supporting rods, and also the cleansing-arms in an extended position, also showing in dotted lines the position of the said parts when closed upon the tube in entering or being drawn from the cistern. Fig. 3 is a detail view in perspective of the perforated foot-plate, showing the lower end of the tube connected therewith, and also the pivoted receivers on both sides of the plate, with the curved rod carrying the series of perforated tubes and the clamps on the rods supporting the extension brushes in position. Fig. 4 is a horizontal sectional view of the foot-plate and receivers. Fig. 5 is a detail in perspective view of one of the receivers. Fig. 6 is a detail view of the plate, showing a broken portion of one of the receivers. Fig. 7 is a

detail sectional view of the end of one of the cover-supporting rods, showing the adjustable extension and the flexible attachments for the cover. Fig. 8 is a detail sectional view of the rotating and non-rotating parts of the pump at its upper end and the registering openings. Fig. 9 is a view of a modification of the curved extension arm connected with the receiver.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents the cylinder of an ordinary suction-and-force pump, which is arranged within and part way in a downward direction toward the bottom of the cistern or reservoir Z. To the lower end of the cylinder A is attached the upper end of a tube or liquid-conductor *a*, which also extends in the direction of and nearly to the bottom of the reservoir and to the lower end of which is attached the foot-plate B. Said plate extends downwardly to and rests upon the bottom of the cistern and in a horizontal direction an equal distance from opposite sides of the tube *a*. In a transverse direction to and in the plate B and directly beneath and in the line of the diameter of the lower end of tube *a* is a circular opening *b*, in which said tube extends a short distance. (See Fig. 3.) Upon one side of plate B, extending from the line of its upper edge and the side of the circular opening *b*, is a collar *b'*, the inner side *b²* of which extends partly around the tube to the opposite side of the opening *b*. The outer side *b³* of said collar extends outwardly a short distance in line with its inner side from the same point of beginning upon one side of the opening *b*, thence in a line parallel with and in the direction of the other end of plate B to within a short distance of the end of said plate, at which point the end of said collar is curved downwardly and inwardly, as at *b⁴*. To the plate B, directly beneath the end *b⁴*, is a lug *b⁵*, which extends outwardly in line with the outer side *b³* of the collar *b'*, the under side of which lug describes a curved line from the end *b⁴* of the said collar, extending nearly to the lower edge of the plate B, thence upwardly toward the opening *b* to the under side of the said collar. In the lug *b⁵* is a perforation *b⁶*, which extends through plate B, for the purpose hereinafter described. Upon the other side of plate B is cast or formed the

other part of the collar, which also has an extension and a lug b^8 , which are precisely the same in construction as the first-described portion of the collar b and lug b^5 , the end of the curved extension of said collar, however, extending in the opposite direction from the collar b and toward the other end of plate B. The lug b^8 is provided with a perforation which extends through a plate B in the same manner as in lug b^5 .

On both sides of the plate B are hollow vibrating vessels or receivers C C', each one of which is made of the same height and length as the plate B. The end c of the receiver C opposite the lug b^5 on the plate B is at right angles thereto and in line with the adjacent end portion of said plate. The outer side of said end extends in nearly the line of a full circle, which forms the neck c' . From the square end c of the receiver the outer side c^2 extends rearwardly to the other end and to the side of the plate B in a single outwardly-curved line, terminating at a point c^3 . The top c^4 of the receiver extends from the point c^3 toward the other end of the receiver and to the collar b in line with the side of plate B, thence describes the outward line of the said collar, and terminates with the circular outer side c' of the neck at the other end of said receiver. The bottom c^5 of the receiver describes the lines of the outer curved side c^2 , and also the line of the lower edge of plate B, and beneath the line of the neck c' of the end c of the receiver C and extending from said line to the side of plate B the position of said bottom at said point is bent upward and forms a stop at c^6 , so as to extend partly around the lug b^4 and toward the wedge-shaped groove formed by the meeting lines of said lug and the curved end b^4 of the collar b' . The inner side c^7 of the receiver extends from the stop c^6 beneath the lug b^4 , thence beneath the line of the opening b and a short distance past said opening, the edge of said side extends upwardly to the top c^4 , the remainder of said side extending in a parallel position with and close against the plate B. A portion c^8 of the neck c' of the receiver extends within the receiver and from the top c^4 downwardly to the bottom c^5 and closes the opening from the neck c to the lug b^8 on the plate B. Extending through the plate B and the lug b^8 is a pivot c^9 , which extends through the neck c' of the end c of the receiver C. The other receiver C' is constructed in precisely the same manner as the receiver C and is pivoted to the lug b^8 of said receiver. These receivers may be made longer than the plate B, if desired. In the end c of receiver C is an opening c^x , which communicates with the interior of the said receiver. At one side of the opening c^x in the direction of the lug b^8 and in the end c of receiver C is inserted one end of a rod d of the cleaning-arm D, the other end of which rod extends outwardly as far as required and is bent forward in a curved line. Upon rod d is arranged a number of

short thimbles or tubes $d' d' d'$. The tubes $d' d'$ are placed endwise in position and at the receiver C are of a sufficient diameter to extend around the opening c^x in the end c of the receiver. Toward the outer end of the rod d the series of tubes d' decreases in diameter and at the extreme outer end of said rod are slightly larger than said rod. In each thimble or tube are made a series of perforations d^3 . In the thimbles or tubes adjacent to the end c of the receiver the perforations are made of a considerable size, and toward the end of rod D the perforations in the thimbles are reduced in size, as at d^4 . To the extreme outer end of rod D is attached a short piece of rubber hose d^5 . Extending around the rod d , between adjacent ends of the perforated thimbles $d' d'$, near the receiver C is the circular end e of a thin clamping-plate E, in which is fitted an adjusting-screw e' , which binds against the rod d . The other end of the plate E is forked, as at e^2 , and the forked portions bent in a downward direction a short distance. In one of the forked portions is fitted a clamping-screw e^3 . At the proper distance apart and upon rod d are arranged other clamping-plates E, which are constructed precisely alike.

Between the forked portions of the clamps E E', and extending from the end c of the receiver C to the outer end of the rod d is a scraper F, which consists of a flexible plate, preferably made from rubber, which describes the curved course of the rod d and is clamped between the forked ends of the clamping-plate E, the lower edge of the scraper extending downwardly to a position in line with the under side of the thimble d' on said rod. Extending from the receiver C' and its end c in an opposite direction to the arm D is an arm D', which is constructed in precisely the same manner as the arm D. The weight of the receivers C C' each exceed the weight of the respective arms D D', and each turns readily upon the pivot. Extending around tube a , beneath the pump cylinder, is a sliding flanged collar H, which is notched at required points in the line of the circumference, and in which notches are fitted the inner perforated ends of the respective rods $h h h$. The flanged collar H is made in two horizontally-separate parts $h' h^2$, which are screwed together by means of the clamping-screws h^3 . The perforated ends of the rods $h h$ are connected with the plates $h' h^2$ by means of a wire h^4 , which extends around the collar H, through the perforated ends of the rods $n n$ and is clamped between the said plate $h' h^2$, thus holding the rods in a pivoted position. Beneath the collar H and around the tube a is extended a flanged collar H', which is precisely the same as the flanged collar H, and to which collar H' are pivoted the lower ends of ribs $h^5 h^5 h^5$ in the same manner as the rods h upon the collar H, the upper ends of which ribs are pivotally connected at h^6 with the respective rods at a point equidistant

from the outer and inner ends. The end of each rib h^5 for a short distance from the collar H' is bent downwardly at h^7 in a curved line, which facilitates the attachment of the cover hereinafter described. Around the outer end of rod h is fitted a sleeve extension I, in the side of which and at the end in which the rod h is inserted is a longitudinal slot i . In the side of rod h and extending through the slot i is fixed a pin i' . Within the sleeve I and attached fixedly at a point equidistant from the ends is a partition i^2 . On one side of partition i^2 , in the direction of the end of rod h , is a spiral spring i^3 , one end of which bears on said partition and the other against the end of said rod. Within the other end of sleeve I is inserted the interwoven inner ends $k k$ of the separate spiral springs K K, which are secured within the said sleeve and against the adjacent portion of the partition i^2 by the pin i^x , which extends through the sleeve I. The outer ends of each spring K K extend from the outer end of the sleeve I in opposite directions and fold with the cover. Upon each one of the other rods h are similar sleeves I, constructed and arranged in like manner, the spring K K of each sleeve approaching quite near the springs upon an adjacent sleeve.

A circular cover L, composed of preferably yielding material—such as canvas, rubber, or oil-cloth—is attached to the upper side of rod h , extending from the springs K K on one sleeve, to which the outer circular edge of the cover is attached by rings k^2 to each sleeve in succession. Said cover extends to the pivotal point h^6 of the ribs h^5 , at which point is an opening l , through which the rods h are extended outward and above the remaining portion of the cover, which portion extends to the collar H' on the tube a and is secured to and around said collar by means of the clamping-bolts which secure the separate parts of the said collar together. Extending around tube a , at a point a short distance above the receivers C C', is an adjustable band or plate G, which is secured at the desired height by the adjusting-screw g . Extending around the tube a , between the collars H H', and a short distance above the collar H' when resting on the band G, is an adjustable band G', which is secured in position by the adjusting-screw g' .

Instead of employing a rod d and placing the tubes d' over said rod, I may make the tubular portion of the arm in one piece, or, as shown at h , in Fig. 9, extended part of the distance in one piece, which piece is loosely held in the opening c of the receiver C at one end, and in the other end an extension m , smaller in diameter, is fitted so as to telescope. In this construction the perforations are in the forward and under portions of the tubes and the scraper F' also made in separate parts, and one part fitted within another in the same manner as the tubes M m. The clamps e^2 , which support the scrapers, are ar-

ranged upon the respective tubes M m, and in advance of the tubes M m are brushes N N, which are secured to forward extensions of the clamp e^2 and brush the sediment in advance of the tubes.

To the upper end of the pump-cylinder A is attached a short tube a' , larger in diameter than the tube a , in the upper end of which is fitted adjustably to the lower end of a tube a^2 , the other end of which tube a^2 extends upwardly through the circular opening z' in the upper part of the cistern Z. Over the opening z' is a movable platform S, through which passes loosely the upper end of the tube a^2 . Around the opening in the platform S for the tube a^2 is a flanged seat t , in which is fitted the lower end of a rotary sleeve T', which also extends around and is adjustably secured to the tube a^2 by the set-screw t' , and extends a short distance in height. To the upper end of the sleeve T' is attached rigidly a ratchet-wheel T, in the upper circular edge of which are ratchet-teeth t^2 . In the extreme upper end of the tube a^2 are longitudinal slots $u^4 u^4$, (see Fig. 8,) which are arranged a short distance apart and extend in series around the said tube. Around the said slotted end of tube a^2 is fitted the pump-head U, in which the upper end of tube a^2 rotates, and which is provided with a discharge-outlet u , which regulates alternately with each longitudinal slot $u^4 u^4$. To the neck of the outlet u' is attached the hose V by means of the usual hose-coupling. The upper end w^2 of the pump-head is perforated at w^3 , and through which is extended the upper end of the piston-rod a^4 , which connects at its lower end with the piston in the pump A.

Upon the platform S and in a position a short distance from the pump-tube h^2 is mounted a standard w , which extends a short distance in height and to which is pivoted the lower end of a pump-operating lever W. To the lower end of lever W is attached rigidly one end of an extension-arm w' , which extends in the direction of the pump-tube a^2 in an upwardly-curved line, and upon the upper end and side is pivoted with an eye w^2 , which is pivoted to said arm. To the upper end of the piston-rod a^4 is attached a small clamp a^5 , in which is secured one end of the piston-operating rod X, which consists of two adjustable portions $x x'$. The end of the portion x which is fitted within the clamp a^5 extends a short distance in a horizontal direction and is then bent in a downward direction and provided with a loop x^2 at its lower end. The upper end of the other portion x' of the rod X extends through the loop x^2 , and is also provided with a loop x^3 , which extends around the portion x of the said rod. The two parts of the rod X are secured adjustably by means of the adjustable clamping-collar x^4 , which extends around both movable portions of rod X.

In the lower end of the lever W is a longitudinal slot w^3 , in one side of which are the

notches w^4 . Extending from each side of the lever W to the upper part of the ratchet-wheel T are ratchet-operating levers $w^5 w^5$, the ends of which on both sides of slot w^3 are clamped adjustably by the adjusting-nut and bolt w^6 . The extreme outer ends of the levers $w^5 w^5$ are bent downward so as to form pawls, which engage with the ratchet-teeth of the ratchet-wheel T. To the collar H of the cover-supporting rods is attached one end of a rope h^7 , the other end of which rope is extended upwardly through the perforation s in the platform S. In the operation of my improved cleansing apparatus, and particularly in its first introduction within the cistern, the parts are connected together, as seen in Fig. 1, and both the cover and cleansing apparatus are in a closed position, as seen in dotted lines in Fig. 2. In this position the folds of the cover pass between the ends of the spiral springs K K on the respective rods $h h$, and the cover is thereby folded within a small compass and enabled to pass within a very small opening provided in the cistern for the ordinary elevation of the water. The cleansing apparatus is also in a closed position, the weight of each receiver C C being sufficient of duty to cause the cleansing-arms to move upwardly and fold as close as possible against the folds of the cover L. In this position of the several parts the complete apparatus is lowered within the cistern, and as soon as the vibrating ends of receivers C C strike the bottom of the receiver, the weight is removed and by a slight torsion applied to tube a and the receivers the movement is communicated to the arms, which are extended outwardly and rest upon the bottom of the receiver, and the cover L is also permitted to expand its fold and gradually press the yielding ends of the rod h against the side of the cistern and cover the bulk of water in the cistern so far above the cleansing-arms D D' as may be contaminated with sediment or floating animalculæ. The lever W is then operated and suction is caused by the pump A to be exerted through the receivers C C', which causes a current which moves toward and into the said receivers, and simultaneous with the movement of the pump-lever rotation is imparted through the ratchet-wheel T and ratchet-arms w^5 to the pump-tube a and the cleaning-arms D D' described a circular line of movement on the bottom of the cistern, the separate tubes d' rotating on the rod d and crushing the coarse material which obstructs its movement, and at the same time the curvature of the arm tending to draw the larger material, which dissolves slowly, toward the receiver C C'. The scrapers F as soon as the sediment is agitated prevent the passage rearwardly of any of the sediment and keep both coarse and fine matters subject to the action of the suction of the pump, and also to the disintegration by the tubes and the dissolving action caused by the agitation of the sediment, which later is more effectually accomplished by the brushes in advance of the

tubular parts of the cleansing-arms. The rotation of the arms brings into action the hose d^5 on the ends of said arms, in which movement the sides of the cistern a short distance from the bottom are also in contact. When it is desired to cause suction through the arms, the construction is employed as seen in Fig. 9. The action of the pump is continued until the discolored water is entirely expelled, its place being taken by the clear water above the cover L, which finds its way past the outer edges of the cover. As the water rises in the tube a it is discharged through the hose V, the head U remaining stationary while the openings register with the discharge outlet. In this manner the impurities in a cistern are removed from the water without removing only so much of the water as is necessary to the best results. When the operation is completed, the rope h^7 is operated to draw the collar H in an upward direction and the folds of the cover together, which action brings the lower collar H' against the band G' and the rods $h h$ are drawn together, and upon lifting the pump-tube from the cistern the receivers, which have also received the sedimentary deposits, are increased in weight by the deposits which remain therein and following toward the vibrating end assist the automatic action of the arms in closing upon the folds of the cover, as first described.

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

1. In a cistern cleansing apparatus a revoluble fluid discharging conductor having a receiver, and an extended rod connected with said receiver having separate revoluble perforate thimbles mounted thereon as and for the purpose described.

2. In a cistern cleansing apparatus, a tube and a fluid discharging apparatus, connected therewith, and vibrating receivers for the sediment, having an opening communicating with said tube, as and for the purpose described.

3. In a cistern cleansing apparatus, a tube and a fluid discharging apparatus, connected therewith, vibrating receivers having extended arms, and an opening connected with said tube, and means for raising said arms automatically substantially as shown and described.

4. In a cistern cleansing apparatus, a tube and a fluid discharging apparatus, connected therewith, vibrating receivers having fluid openings pivotally connected with said tube, and extended hollow perforate arms, connected with said receivers, and extending within said fluid openings, substantially as and for the purpose described.

5. In a cistern cleansing apparatus, a tube and a fluid discharging apparatus, connected therewith, a foot plate at the lower end of said tube, having an opening and vibrating receivers for the sediment pivoted to the said foot plate, and also having openings for the sedi-

ment, and openings registering with the opening in said foot plate, and communicating with said tube substantially as shown and described.

5 6. In a cistern cleansing apparatus, a tube and a fluid discharging apparatus, connected therewith, a foot plate having a transverse opening, and self closing vibrating receivers, pivoted to and upon both sides of said foot
10 plate and having openings registering with the opening in said foot plate, and extended hollow perforate arms, connected with said receivers, having scrapers for the sediment substantially as described.

15 7. In a cistern clearing apparatus a tube and a fluid discharging apparatus connected therewith, a foot plate having a transverse opening and self closing vibrating receivers, pivoted to and upon both sides of said foot
20 plate, and having openings registering with the opening in said foot plate, and extended

hollow perforated arms, connected with said receivers, having scrapers in separate adjustably extended parts, substantially as shown and described.

25 8. In a cistern cleaning apparatus, a fluid discharging tube, a cover for the sediment, and rods for supporting said cover having yielding sleeves at their outer ends substantially as described.

30 9. In a cistern cleansing apparatus, a fluid discharging tube, a cover for the sediment and rods for supporting said cover, having yielding sleeves at their outer ends and folding spring attachments for said cover within
35 said sleeve, substantially as shown and described.

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