R. H. THOMAS.

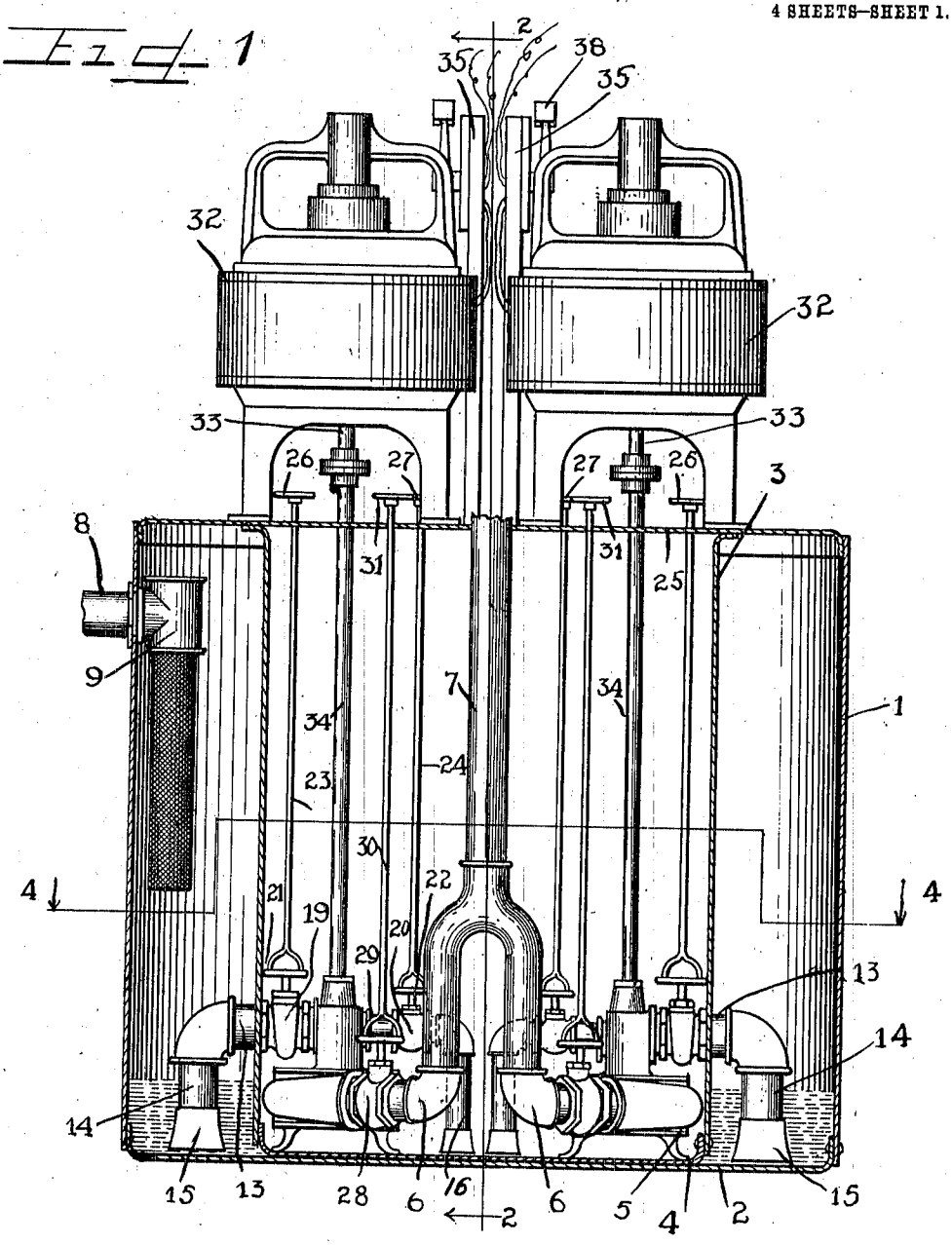
RESERVOIR AND PUMP THEREFOR.

APPLICATION FILED APR. 24, 1911. RENEWED DEC. 14, 1912.

1,059,409. Patented Apr. 22, 1913.

4 SHEETS—SHEET 1.

Fig. 1



Witnesses

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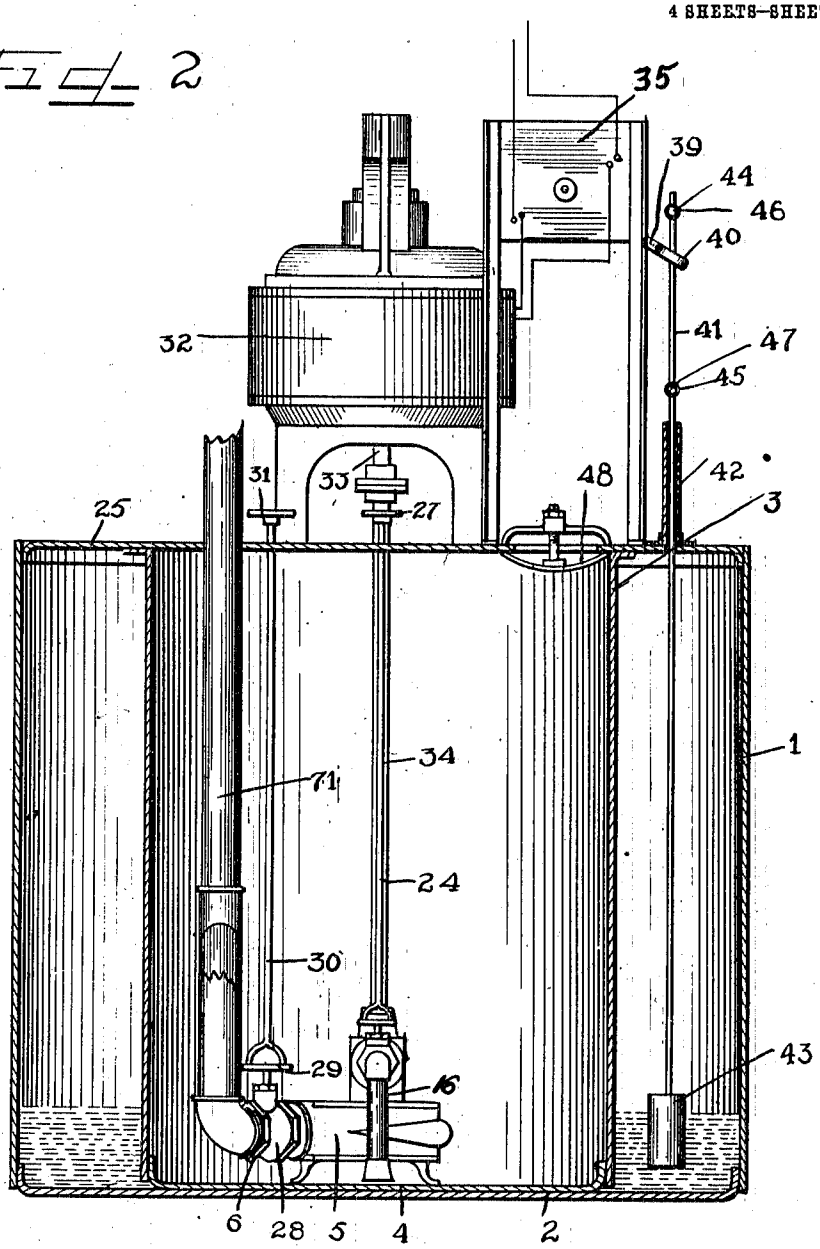
4 SHEETS—SHEET 2.

Fig. 2



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4 SHEETS—SHEET 3.

Fig. 3

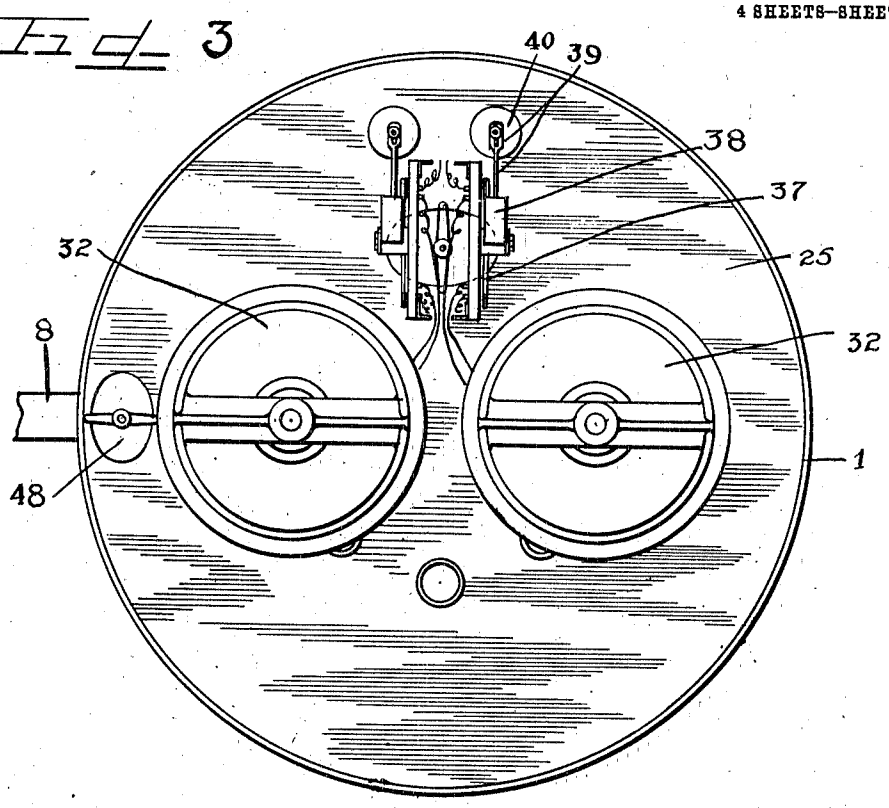


Fig. 8

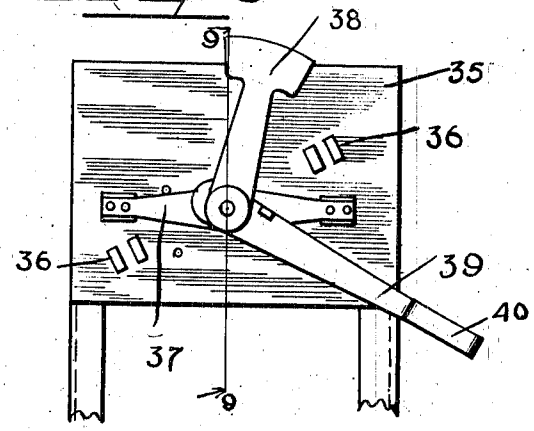
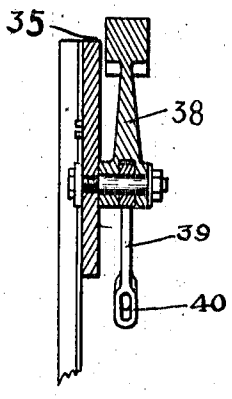


Fig. 9



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4 SHEETS—SHEET 4.

Fig. 4

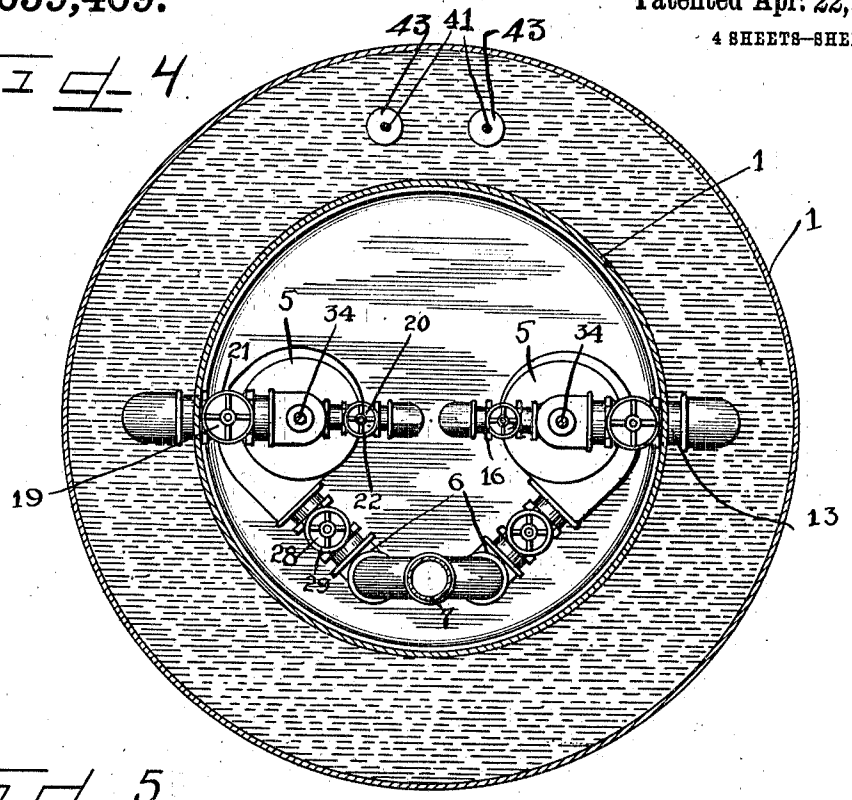


Fig. 5

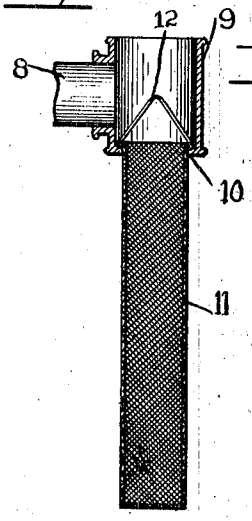


Fig. 6

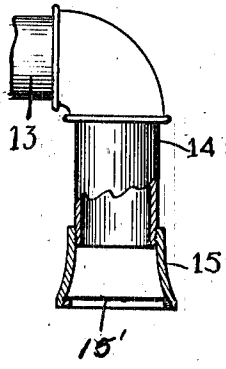
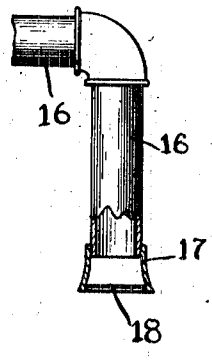


Fig. 7



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UNITED STATES PATENT OFFICE.

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RESERVOIR AND PUMP THEREFOR.

1,059,409. Specification of Letters Patent. Patented Apr. 22, 1913.

Application filed April 24, 1911, Serial No. 623,012. Renewed December 14, 1912. Serial No. 736,823.

To all whom it may concern:

Be it known that I, RICHARD H. THOMAS, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Reservoirs and Pumps Therefor; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numbers of reference marked thereon, which form a part of this specification.

This invention relates to reservoirs and pumps therefor and more particularly to a reservoir and pump adapted to be installed below the normal level of the drainage or other system with which connected, as, for example, a sewage reservoir and pump such as are sometimes installed in buildings and other locations where the level is below the sewer. In such constructions, it is important usually to economize space, to the utmost and at the same time to afford as large a reservoir as possible for the reception of the sewage, and where centrifugal pumps are employed, it is very important to so install the same as to enable the engineer or workmen to have access to the same at all times. It is also important to catch the solid constituents in the fluid for independent removal, to prevent the same passing through and possibly fouling the pumps.

It is an object of this invention to afford the largest possible reservoir for the space available and to afford in connection therewith a dry chamber for the pump or pumps contained therein, located below the normal level of the liquid in the reservoir.

It is also an object of the invention to afford a construction by means of which the pumps may be started automatically with the rise of the liquid in the reservoir above a predetermined level and stopped automatically when the level of the liquid in the reservoir has been sufficiently reduced.

It is also an object of the invention to afford a construction in which the pumps and all parts connected therewith, are so installed as to permit inspection at any time and in which the operation of the pumps is controlled from an operating floor or level at the top of the reservoir.

The invention consists in the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is a central, vertical section of a device embodying my invention, showing the pumps, motors, and discharge pipe in elevation. Fig. 2 is a central section taken on line 2—2 of Fig. 1. Fig. 3 is a top plan view thereof. Fig. 4 is a section taken on line 4—4 of Fig. 1. Fig. 5 is an enlarged, central vertical section of the inlet pipe and collector for the solid matter. Fig. 6 is an enlarged fragmentary section broken away, of the main suction pipe for the pump. Fig. 7 is a similar view of the suction pipe for the pump well. Fig. 8 is an enlarged view in side elevation of the controlling switch. Fig. 9 is a section on line 9—9 of Fig. 8.

As shown in the drawings: The reservoir 1, is cylindric and constructed of sheet metal and is provided with a bottom 2, also of sheet metal or other suitable material, connected in the lower end thereof. Positioned axially within the reservoir is an inner wall 3, also of sheet metal and of much less diameter than the outer wall 1, of the reservoir, and, as shown, also provided with a closed head 4, tightly secured therein at its lower end, which rests upon and may be permanently secured to the bottom 2, of the reservoir, affording an inner compartment which may, for convenience, be called the pump well and which is of relatively small size, being no larger than just sufficient for the operative installation of the pumps 5, which, in the drawings, are shown as two in number. Said pumps are centrifugal pumps of a familiar type, the particular construction of which forms no part of this invention, as it is to be understood that any suitable pumps may be employed. Said pumps are mounted on the floor or bottom 4, of the pump well to rotate in a horizontal plane, and the eduction or discharge pipe 6, thereof connects in a riser 7, which extends upwardly above the top of the receptacle to a height sufficient to permit the same to discharge to the sewer or other place of discharge for the contents of the reservoir, depending, of course, upon the purpose for which the device is installed, and also upon

the character and position of the installation.

Communicating through the side wall 1, of the reservoir, near the top thereof, is the inlet pipe 8, for the sewage. This inlet pipe is provided at its inner end with a T fitting 9, the branch or stem of which is screwed on said inlet pipe and the ends of which are directed upwardly and downwardly respectively. The lower end of the T is provided with a peripheral, inwardly directed flange 10, affording an inwardly projecting shoulder, and inserted through the T, and resting on said flange or shoulder 10, is an elongated basket 11, of wire net or any suitable perforated or reticulated material for the collection of the solid matter from the sewage. Said basket is open at its upper end and connected thereon is a bail 12, adapted to be engaged to permit the basket to be lifted upwardly through the T by an operator for the purpose of emptying the same.

The reservoir suction pipe 13, for each pump extends through the wall or shell 3, of the pump well and within the reservoir each is connected with a downwardly directed pipe 14, on which is secured a flaring suction head 15, having its open mouth directed downwardly and to near the bottom of the reservoir. Secured across the otherwise open mouth of the suction head 15, of each of said suction pipes, is a sheet of wire net 15′ or other perforated material, which acts to exclude from the pump any solid material that might have been discharged into the reservoir. Also connected with the suction pipe of the pump is a suction pipe 16, for the pump well, the end of which is directed downwardly to near the floor of the pump well and is provided with a flaring head 17, likewise having the mouth thereof covered by wire net 18, or other perforated material, as shown in Fig. 7.

Valves 19 and 20, are connected in the suction pipe for the reservoir and the suction pipe for the pump well, and the valve stems are provided with hand wheels 21 and 22, positioned conveniently with reference to the pumps and whereby the valves may be operated, if desired, by the workman or engineer in the pump well. Connected with each of said valve wheels is an extension rod 23 and 24, which extend upwardly above the top of the reservoir and through the metallic or other cover 25, as shown in Fig. 1, and above said cover is provided with hand wheels 26 and 27, thus enabling an operator to open or close said valves without the necessity of descending into the well. The respective branches of the discharge pipe 6, are also each provided with a valve 28, also having a hand wheel 29, for operating the same adjacent the pump and an extension rod 30, which extends through the cover and is provided with a hand wheel 31, as before described with reference to the valves for the respective suction pipes.

Mounted upon the cover or floor above the reservoir and, of course, upon any suitable support, are motors 32, one for each pump. These are shown as electric motors, and the shaft 33, of each is coupled to the pump shaft 34, which extends upwardly through the cover 25, for that purpose.

A float operated switch is provided for starting and stopping the pumps. For this purpose, as shown, a switch board 35, is provided for each motor and provided with contacts 36, suitably connected with the leads from the motor. Pivotally supported on the board between the contacts 36, on each side of the board, is a switch bar 37, provided at its ends with contact members for engaging the respective contacts 36. Integrally connected with said switch bar and extending upwardly therefrom, is a weighted arm or lever 38, and engaged thereon is a lever 39, which extends along the face of the switch board and beyond the same. Said lever is provided with a yoked end 40, through which is slidably engaged a rod 41, which extends through a sleeve 42, mounted on the cover and through said cover 25, into the reservoir, and at its lower end is provided with a float 43, at all times supported on the liquid in the reservoir.

Projections or balls 44 and 45, are secured on said float rod 41, a sufficient distance apart that the upper projection 44, will engage said lever 39, to pull the yoked end thereof downwardly, thereby shifting the switch bar out of engagement with the contacts and swinging the weighted lever 38, past the center of its support to maintain the switch bar out of circuit when the liquid in the reservoir is at its lowest level. The distance between the balls or projections 44 and 45, on said float rod, however, is such as to permit the reservoir to fill to the desired height before shifting said lever 39, upwardly, or, in other words, bringing the switch bar into engagement with the contact members 36, to start the motors and pumps. When this occurs, the weighted lever 38, is swung past the center of its support on the opposite side to maintain the contact until the pumps have reduced the level in the reservoir to a minimum. Conveniently, said projections or balls are adjustably secured by means of set screws 46 and 47, thus enabling the engineer to regulate the starting and stopping of the motors for the height of liquid in the reservoir preferred.

The operation is as follows: The construction in which the pump well is installed within the reservoir and axially thereof, permit the largest possible capacity of the reservoir for sewage to be attained, and

affords an exceedingly compact construction. The pumps are at all times accessible to the operators, a man hole 48, being provided in the cover for that purpose. Should any moisture or water accumulate in the pump well, it is only necessary to open the valve 20, in one of the suction pipes for the well to enable the well to be promptly pumped dry, and it is immaterial whether the valve for the suction pipe of the reservoir be closed or not, inasmuch as the capacity of the pump is sufficient to draw from both suction pipes simultaneously. Should the quantity to be pumped require not more than one pump, the valve 28, in the discharge pipe for the pump not in commission, may be closed, and the balls or projections on the float rod for actuating the switch for the motor for that pump may be released from the rod to permit the rod to slide freely up and down therethrough, thereby permitting the switch to remain in the position shown in Fig. 8, or, in other words, with the circuit broken. When sewage is admitted, it is strained in the basket, the liquid constituents passing into the reservoir and all solid material being collected in the basket. This is, of course, dumped from time to time as occasion may require, thereby preventing the clogging of the pumps. The screened suction pipes in the reservoir further prevent the discharge of solid material to the pumps.

Of course, inasmuch as the arm 39, loosely engages the float rod, the operator may swing the lever 38, manually to either side of the center of its support, thus throwing the motor and pump for the switch board operated, into action or out of action, as he may prefer.

Of course, it is to be understood that while I have referred to a reservoir constructed of metal sheets or plates, this is not indispensable as the walls and bottom and also the pump well, may be constructed of any material suitable for the purpose. Details of construction and arrangement may be varied without departing from the principles of this invention. I therefore do not purpose limiting the patent to be granted on this application, otherwise than necessitated by the prior art.

I claim as my invention:

1. An annular reservoir for the liquid, an axially disposed and relatively small pump chamber or well within and wholly disconnected from the reservoir, an inlet pipe for the reservoir, a removable perforated basket positioned below the inner end thereof to retain the solid constituents from the liquid admitted, a pump in the pump well, a valved suction pipe connected therewith and extending to the bottom of the reservoir, a screen across the inlet end thereof, a horizontal, screened suction pipe connected with the pump and extending to the bottom of the well, a cover for the reservoir and well, a motor mounted thereon and connected to drive the pump, a valve rod for each valve extending upwardly through the cover and adapted to be manually operated, a discharge pipe leading upwardly from the pump and through the cover and to a place of discharge, and a float and gravity operated switch adapted to start the motor when the reservoir is filled and to stop the motor when the contents are discharged.

2. An annular reservoir for the liquid, an axially disposed pump chamber or well within the reservoir, an inlet pipe for the reservoir, a removable perforated basket positioned below the inner end thereof to retain the solid constituents from the liquid admitted, a pump in the pump well, a valved suction pipe connected therewith and extending to the bottom of the reservoir, a screen across the inlet end thereof, a screened suction pipe connected with the pump and extending to the bottom of the well, a cover for the reservoir and well, a motor mounted thereon and connected to drive the pump and a discharge pipe leading upwardly from the pump and through the cover and to a place of discharge.

3. In a device of the class described an annular metallic reservoir having a metallic bottom or head secured thereon and affording an inner axial dry pump compartment or well, a pump in the bottom of said compartment, a common cover for the reservoir and well, a motor mounted on the cover and connected to drive the pump, screened suction pipes communicating with the pump and leading respectively to the bottom of the reservoir and to the bottom of the pump well, a valve for controlling each suction pipe, a valved discharge pipe leading from the pump upwardly through the cover and to a place of discharge, an inlet pipe for the reservoir, an open ended T on the inner end thereof, an elongated basket of reticulated material hung below the T and adapted to be lifted upwardly therethrough and acting to catch and retain the solid constituents from the inlet fluid, and a float operated switch for controlling the motor.

4. In a device of the class described an annular metallic reservoir, a head secured thereon and affording an inner axial dry pump compartment or well, a pump in said compartment, a cover for the reservoir and well, a motor mounted on the cover and connected to drive the pump, suction pipes communicating with the pump and leading respectively to the bottom of the reservoir and to the bottom of the pump well, a valve for controlling each suction pipe, a valved discharge pipe leading from the pump upwardly through the cover and to a place

of discharge, an inlet pipe for the reservoir, an open ended T on the inner end thereof, an elongated basket of reticulated material hung below the T and adapted to be lifted upwardly therethrough and acting to catch and retain the solid constituents from the inlet fluid.

5. In a device of the class described an annular sewage reservoir affording a dry compartment or pump well at its axis of substantially equal depth, a pump mounted therein below the normal water level of the reservoir, a cover for the reservoir and well, screened suction pipes communicating with the pump and leading respectively to the bottom of the well and to the bottom of the reservoir, valves adapted to be operated from above the cover for controlling said suction pipes and a discharge pipe connected with the pump and discharging in the reservoir.

6. In a device of the class described an annular sewage reservoir affording a dry compartment or pump well at its axis of substantially equal depth, a pump mounted therein below the normal water level of the reservoir, a cover for the reservoir and well, screened suction pipes communicating with the pump and leading respectively to the bottom of the well and to the bottom of the reservoir, valves adapted to be operated from above the cover for controlling said suction pipes, a discharge pipe connected in the pump and discharging in the reservoir, a float in the reservoir, a rod extending upwardly through the cover and connected with the float, a switch connected to control the motor, an arm connected with the switch and slidably engaging the rod, a stop spaced a distance apart on said rod above and below the lever and adapted to actuate the lever to close the switch when the reservoir is full and to open the switch when the reservoir is empty, and a weight mounted on the switch in unstable equilibrium and acting to hold the switch bar in either adjusted position until again actuated from the float.

7. In a device of the class described a reservoir affording an axial pump well, an independent bottom for the pump well resting on the bottom of the reservoir, an inlet pipe opening into the reservoir, a T connected by its stem on the inlet pipe and with its open extremities directed upwardly and downwardly, a perforated basket inserted through the T from above and suspended below said T, a centrifugal pump connected to discharge from the reservoir and from the pump well and means for driving the pump.

8. In a device of the class described a sheet metal annular reservoir affording an axial pump well, an independent bottom for the pump well resting on the bottom of the reservoir, an inlet pipe opening into the top of the reservoir, a T connected by its stem on the inlet pipe and with its open extremities directed upwardly and downwardly, a shoulder projecting inwardly around the lower end of the T, a perforated basket inserted through the T from above and suspended below said T on said shoulder, a bail connected on said basket to lift the same upwardly through the T, a centrifugal pump connected to discharge from the reservoir and from the pump well, a motor for driving the same, and a float operated switch acting to automatically start the motor and pump when the reservoir is full and to stop the same when the reservoir is empty.

9. In a device of the class described an annular sewage reservoir affording a dry compartment or pump well at its axis of substantially equal depth, a pump mounted therein below the normal water level of the reservoir, a cover for the reservoir and well, suction pipes communicating with the pump and leading respectively to approximately the bottom of the well and the bottom of the reservoir, valves adapted to be operated to control said suction pipes, and a discharge pipe leading from the pump to a place of discharge.

10. In a device of the class described an annular metallic reservoir, a head secured thereon and affording an inner axial dry pump compartment or well, a pump in said compartment, a cover for the reservoir and well, a motor connected to drive the pump, suction pipes communicating with the pump and leading respectively to approximately the bottom of the reservoir and to the bottom of the pump well, a valve for controlling each suction pipe, a valved discharge pipe leading from the pump to a place of discharge and an inlet pipe for the reservoir.

11. An annular reservoir for the liquid, an axially disposed pump chamber or well within and wholly disconnected from the reservoir, an inlet pipe for the reservoir, a pump in the pump well, a valved suction pipe connected therewith and extending to approximately the bottom of the reservoir, a horizontal, screened suction pipe connected with the pump and extending to approximately the bottom of the well, a cover for the reservoir and well, a motor connected to drive the pump, a valve rod for each valve extending upwardly through the cover and adapted to be manually operated and a discharge pipe leading from the pump to a place of discharge.

12. An annular reservoir for the liquid, an axially disposed and relatively small pump chamber or well within and wholly disconnected from the reservoir, an inlet pipe for the reservoir, a pump in the pump well, a valved suction pipe connected therewith and extending to the bottom of the res-

ervoir, a suction pipe connected with the pump and extending to near the bottom of the well, a cover for the reservoir and well, a motor connected to drive the pump, a discharge pipe leading from the pump and to a place of discharge, and a float and gravity operated switch adapted to start the motor when the reservoir is filled and to stop the motor when the contents are discharged.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

RICHARD H. THOMAS.

Witnesses:
LAWRENCE REIBSTEIN,
CHARLES W. HILLS, Jr.