

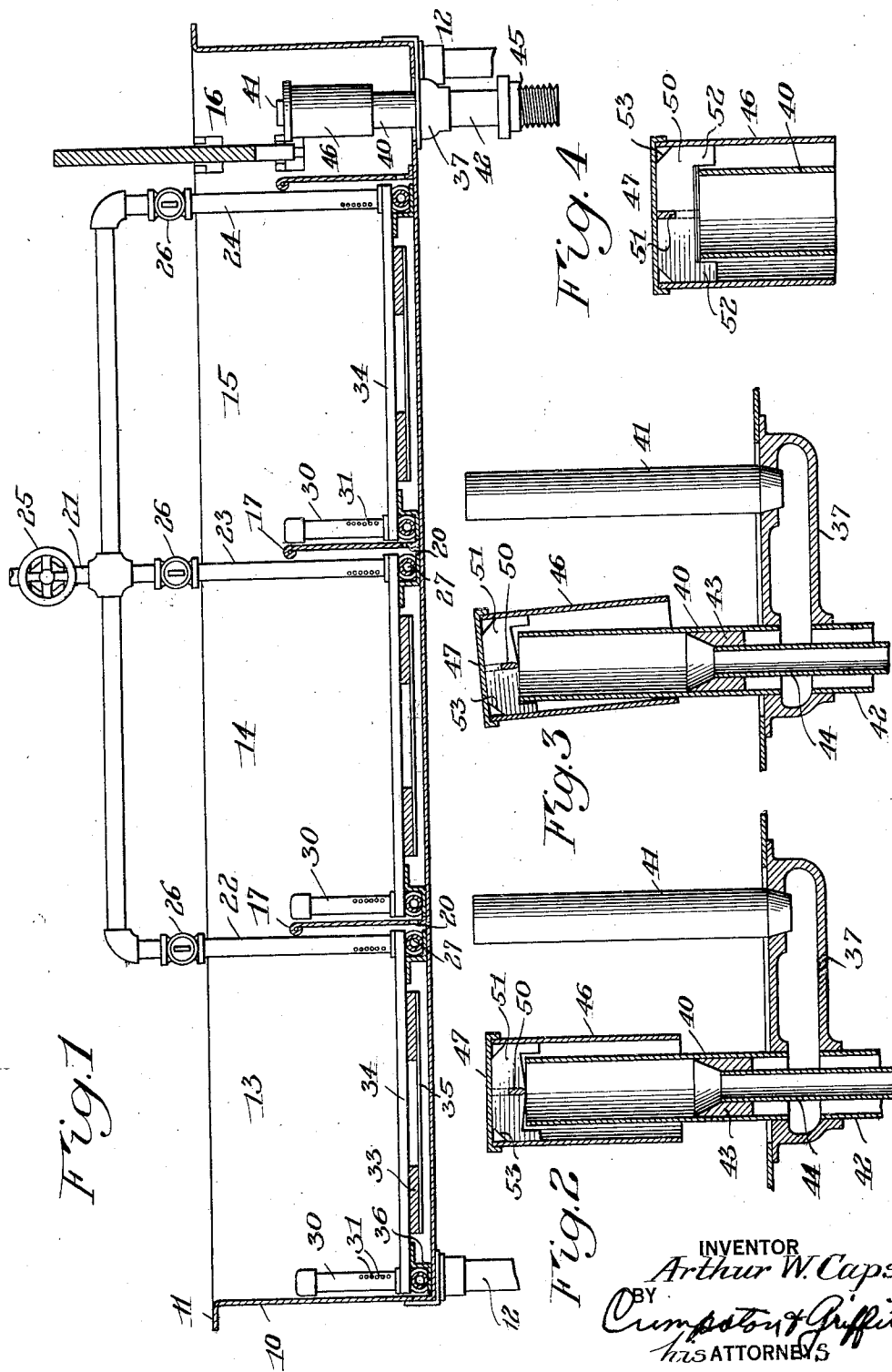
**Dec. 1, 1931.**

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**1,834,381**

# DRAINAGE DEVICE FOR TANKS

Original Filed Jan. 20, 1927



## UNITED STATES PATENT OFFICE

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## DRAINAGE DEVICE FOR TANKS

Original application filed January 20, 1927, Serial No. 162,258. Divided and this application filed February 20, 1928. Serial No. 255,787.

This invention relates to drainage devices for tanks and particularly to automatic emptying devices capable of emptying the water from the tank automatically at intervals, and the invention has for its object the provision of an efficient, sturdy and economical apparatus to perform these functions.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the accompanying drawings, in which is shown one of the various embodiments of this invention:

Fig. 1 is a sectional side elevation of a print washing tank having embodied therein the present invention;

Fig. 2 is a view partly in section of a siphoning and draining means constructed in accordance with and illustrating one embodiment of the invention;

Fig. 3 is a view similar to Fig. 2, illustrating the manner in which the siphon operates to break the siphoning action;

Fig. 4 is a view similar to Fig. 2, but taken in a direction substantially transverse of the direction in which the view shown in Fig. 2 is taken.

The present application is a division of my co-pending application, Serial No. 162,258, filed January 20, 1927, for automatic print washers.

Similar reference numerals throughout the several views indicate the same parts.

The draining device of the present invention although widely applicable has been designed for use in connection with a photographic print washing tank and has been illustrated in connection with such a device.

Referring now to the drawings in detail, there is shown a metal tank 10 having an outwardly flanged upper edge portion 11 and supporting members 12. As shown, the tank

rests with its bottom in contact with the supporting members 12, but a metal or other frame may be provided which will support the tank by means of the flange 11. The support is preferably higher at one end than at the other and the tank is positioned on the support with the drain end nearest the lower end of the support in order that the bottom of the tank will slope downwardly in the direction of the drain and emptying of the tank will be facilitated.

The tank, as shown, is divided into three washing compartments 13, 14 and 15 and a drain compartment 16 by means of the partitions 17 which extend between the sides; are supported on the bottom of the tank, and extend upwardly a little more than half the distance from the bottom to the top of the tank. Each partition is provided with a plurality of holes or openings 20 adjacent the lower edge which permit the liquid in one compartment to flow to the adjacent compartment.

A water supply pipe 21 has vertical branch members 22, 23 and 24 extending to the bottoms of washing compartments 13, 14 and 15 respectively, and a valve 25 for regulating the supply of water to the apparatus. Each of the branch members is provided with a valve 26 by means of which the flow of water to each individual washing compartment may be regulated. The branch pipes are connected to horizontal pipes 27 positioned adjacent the bottoms of the compartments and extending along three sides of each compartment. The pipes 27 have vertically extending spray pipes 30 which are closed at their upper ends by means of ordinary caps, connected thereto at the points where the said pipes extend into the corners of the compartments. The members 30 and the members 22, 23 and 24 are drilled to provide vertical rows of small holes or perforations 31 adjacent their lower ends. The said holes are drilled at a slight angle so that water

issuing therefrom is directed downwardly, and when the apparatus is in operation the holes are so positioned that the water from each spray pipe is directed along a line extending between a side wall and the center of the compartment in such a manner as to form a vortex, which tends to increase the washing effect on the prints.

Each tank is provided with means for supporting and spacing the prints from the bottoms of the compartments. Such means, in the embodiment shown, are wooden grids comprising cross members 33 and 34 and adapted to rest upon the pipes 27. In order to prevent floating of the wooden grids when the tank contains water, the grids may be provided on their bottom sides with the sheet lead weights 35 or the members 36 each having one end portion attached to a cross member 34 and the opposite end portion extending beneath a pipe 27.

The drain compartment 16 may be smaller than the washing compartments and it is provided with a bottom opening which is sealed by means of a hollow casting 37 which may be soldered or otherwise tightly connected to the bottom of the tank. The upper portion of the casting 37 is provided with a tapered opening which communicates with the hollow interior of the casting 37, and another opening adapted to receive a pipe or hollow tubular member 40 forming part of the siphon device. A hollow plug or overflow pipe 41 has a tapered end which is adapted to fit tightly within the tapered opening in the casting.

The member 40 is rigidly mounted in the casting 37 and has its lower end terminating adjacent the upper inner wall of the casting. The upper end of the pipe 40 is positioned slightly below the top of the partition 17 which is immediately adjacent thereto. Immediately below and substantially concentric with the pipe 40 a pipe 42 of substantially the same size as pipe 40 is rigidly mounted within an opening in the lower wall of the casting and has communication with the interior thereof. A tubular member 43 having relatively thick walls and an inwardly beveled end portion is mounted for sliding movement in the pipe 40 and carries a pipe 44 which extends downwardly through the casting and pipe 42. The member 43 fits snugly within the pipe 40 to provide an air tight connection while permitting sliding adjustment and its frictional retention in its adjusted position. The members 40, 43 and 44 constitute in effect a funnel with the members 40 and 43 forming the body and the member 44 the discharge spout. The member 42 is provided with a slip connection 45 for joining it to an ordinary trap of a sewer connection.

A bell member having a tubular portion 46 and an end wall 47 is loosely mounted on

the upper end of the pipe 40 in telescoping relation therewith. The end wall 47 is spaced from the end of the pipe 40 and the bell is centered by means of the crossed and interlocked supports 50 and 51 which are rigidly mounted in the bell. Each of the members 50 and 51 is provided at its opposite ends with extensions 52 which extend between the walls of members 40 and 46. The distance between the innermost portions of the oppositely disposed extensions 52 is slightly greater than the outside diameter of the pipe 40 in order to provide for a loose fit of the bell on the member 40. The lower central portion of the support 50 is provided with a straight knife edge which rests on opposite sides of the upper end of the pipe 40 while the lower central portion of the support 51 is beveled in such a manner that the outer ends of the said portion are normally spaced from the upper end of the pipe 40. The upper outer corners of the members 40 and 51 are cut away as at 53 to provide for communication between the adjacent compartments formed by the said members.

At the commencement of print washing operations, water is admitted to the tank by opening the valves 25 and 26. The flow of water to each washing compartment may be regulated by means of its associated valve 26. In this connection it may be noted that after the valves 26 have once been set in their adjusted positions it will not ordinarily be necessary to again disturb them, but the flow of water may be admitted to and cut off from the tank by means of the valve 25. The flow of water to compartment 13 should be slightly greater than the flow to compartment 14 and the flow to compartment 14 should be slightly greater than the flow to compartment 15 to insure a slight continuous flow from 13 to 14 and 14 to 15 through apertures 20 and thus eliminate the possibility of polluted liquid flowing to the final washing tank 15. The entire tank gradually fills and the water also rises in the annular space between the members 40 and 46 of the siphon, the level of the water in the tank before the siphon action has started being substantially the same as the level in the annular space. When the water rises above the top of the pipe 40 it overflows and enters the interior of the said pipe in sufficient volume to quickly fill the smaller pipe 44. The pipe 44 is sufficiently long that when a column of water has been built up the air is withdrawn from the bell thereby and a siphon is made. The entire tank is thus drained; the water passing from one compartment to another through the apertures 20 provided in the partitions 17. For the proper functioning and quick action of the siphon it is important that any possibility of air becoming trapped in the upper portion of the bell be eliminated by the provision of means of communication between the chambers formed by the members 50 and

51, such as the openings 53. It is also important that the lower end of the pipe 44 should not extend into the water in the trap into which it drains, as such a condition would prevent the operation of the siphon. The position of the pipe 44 is adjustable as pointed out above to permit proper operation of the apparatus for different water levels in the trap and to permit regulation of the flow of water through the siphon.

When the water level in the tank reaches the lower edge of the member 46 of the bell, air will be drawn through the annular chamber between the members 40 and 46 and the siphon broken. The supports 50 and 51 are constructed as above described to facilitate this breaking action. The knife edge of the member 50 and the spaced portions of the member 51 permit a slight tipping or rocking of the bell on the pipe 40 which causes any break in the contact of the water with the bell to tip the bell and further increase the size of the break, thereby preventing a re-sealing and re-establishment of the siphon. In practice, it is desirable to regulate the water flowing into the tank in such a manner that when the siphon is in operation there will be only slightly more water flowing out through the siphon than flows into the tank. For this reason it is important to provide means such as herein disclosed for insuring the proper breaking of the siphon when the water reaches a predetermined low level.

The height of the water in the tank at the breaking of the siphon may be varied by providing a bell having a member 46 of suitable length. Also the level at which the siphon will start to function may be varied by varying the length of the member 40. After the siphon is broken the tank again fills with water until the siphon is once more established, when it is again drained as in the first instance. The action is thus automatic and intermittent.

If, for any reason, the siphon fails to operate the water will build up in the tank to the level of the upper edge of the pipe plug 41 which should be slightly lower than the partition 17 when it will flow out through the said pipe plug and the casting 37 and pipe 42 to the sewer. The tank may be drained completely by removing the pipe plug 41 from its seat in the casting 37. The water will thus be permitted to flow through an opening in the lowest part of the tank and through the member 37 and 42 to the sewer.

Prints to be washed are first placed in the compartment 15 where most of the fixing or other chemical is removed. The partly washed prints may then be placed in compartment 14 and subjected to a further washing action and they may be finally treated in compartment 13 to insure the removal of all of the fixing chemicals. The above procedure in washing and the angular position of the

tank whereby the water naturally flows toward the siphon or drain together with proper regulation of the flow of water to the various compartments, insure a practically pure supply of water in compartment 13 at all times. The compartments may all contain prints at the same time and they should be moved progressively from the lowest tank to the highest as explained above.

From the foregoing it will be seen that there is herein provided an apparatus which embodies the features of this invention and achieves the objects thereof, including many practical advantages. A print washer has been provided by means of which the prints may be quickly and thoroughly washed; which when once regulated will function automatically to change the washing water after predetermined intervals; which may be inexpensively manufactured and installed; and which during its operation requires but a slight amount of attention from the operator.

As many possible embodiments may be made of the above invention, and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In apparatus of the class described, a siphon comprising a fixed inner tubular overflow member constituting one leg thereof, an outer tubular member forming the other leg of the siphon and having one closed end telescoping with said inner member, and a tubular member of substantially less capacity than the inner member slidably mounted within and adjustable to different heights in said inner member in water tight relationship thereto for the purposes set forth.

2. In apparatus of the class described, a siphon comprising a substantially vertically extending tubular overflow member, a bell member forming a leg of the siphon supported on the upper end of said tubular member in spaced relation thereto, and a pipe member of relatively smaller inside area mounted within said tubular member in water tight relationship thereto for the purposes set forth.

3. In apparatus of the class described, a siphon comprising a substantially vertically extending hollow overflow member having a top opening and a relatively smaller drain extension pipe in which a column of water may be built up, and a bell member forming a leg of the siphon, telescoping with the top portion of said hollow member and rockably supported thereon.

4. In apparatus of the class described, a hollow supporting member provided with two openings in one wall and a single opening in the opposite wall substantially con-

centric with one of the first openings, a conduit mounted in each of said openings and having communication with the interior of said hollow member, a conduit mounted within and extending between the conduits mounted in said concentric openings having a close sliding fit with one of said conduits and being spaced from the side walls of the other conduit, and a bell member telescoping with an end portion of one of said conduits.

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