No. 646,928. Patented Apr. 3, 1900.

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APPARATUS FOR TREATING SEWAGE.

(No Model.) (Application filed Apr. 14, 1899.) 3 Sheets—Sheet 1.

Fig. 1.

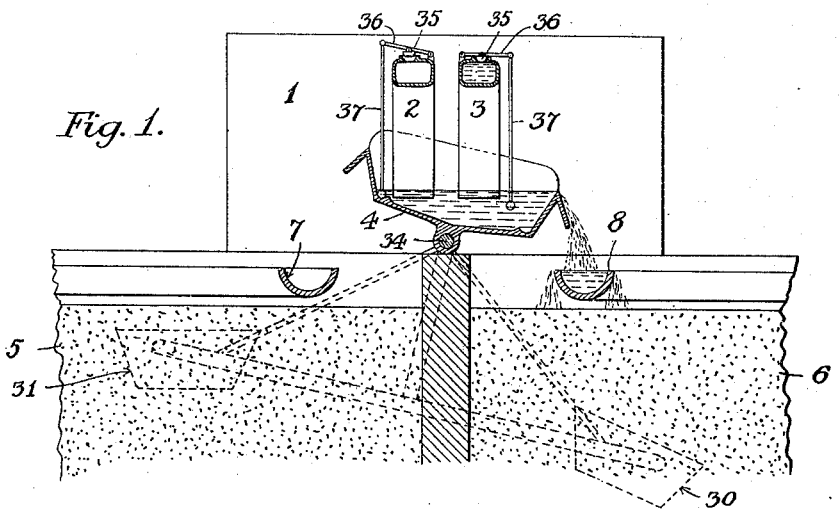

Fig. 2.

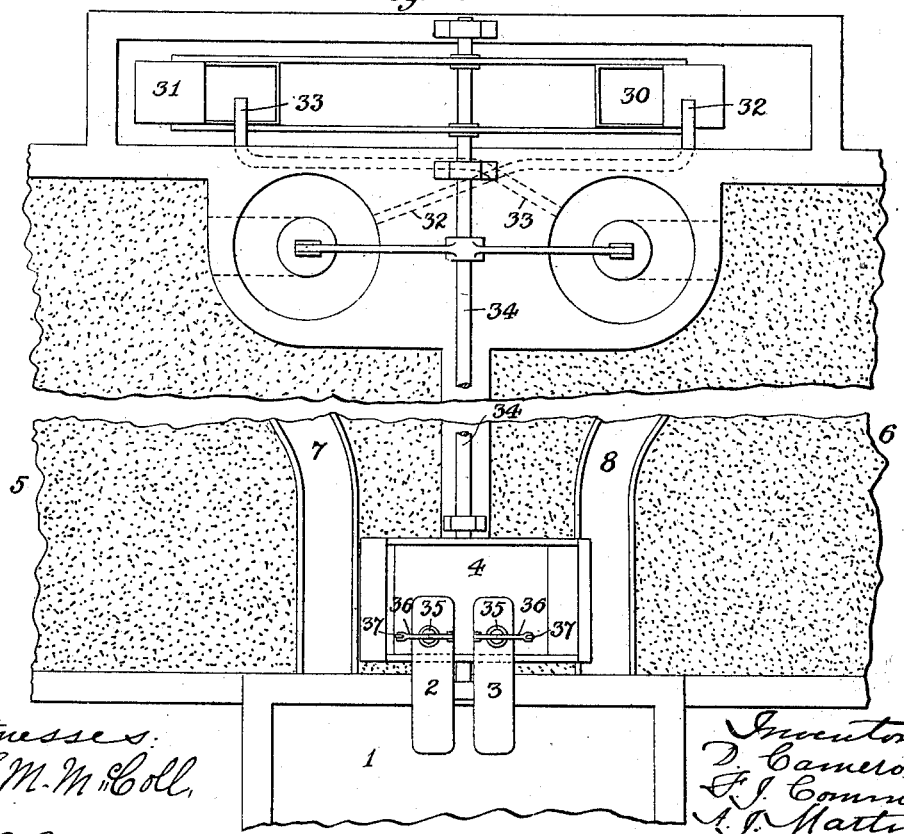

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Fig. 3.

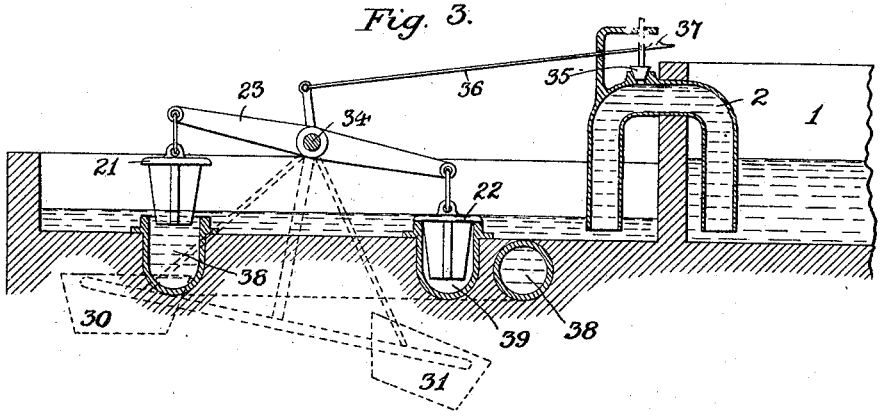

Fig. 4.

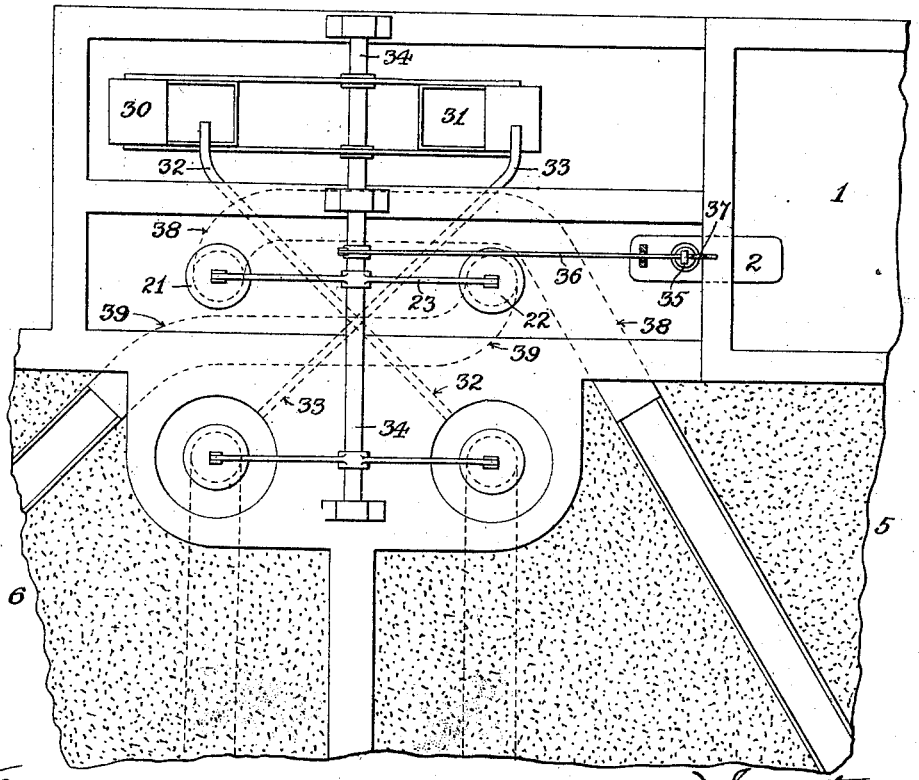

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Fig. 5.

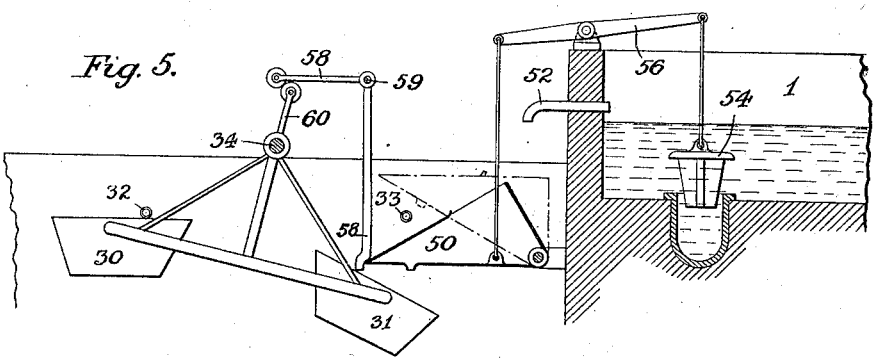
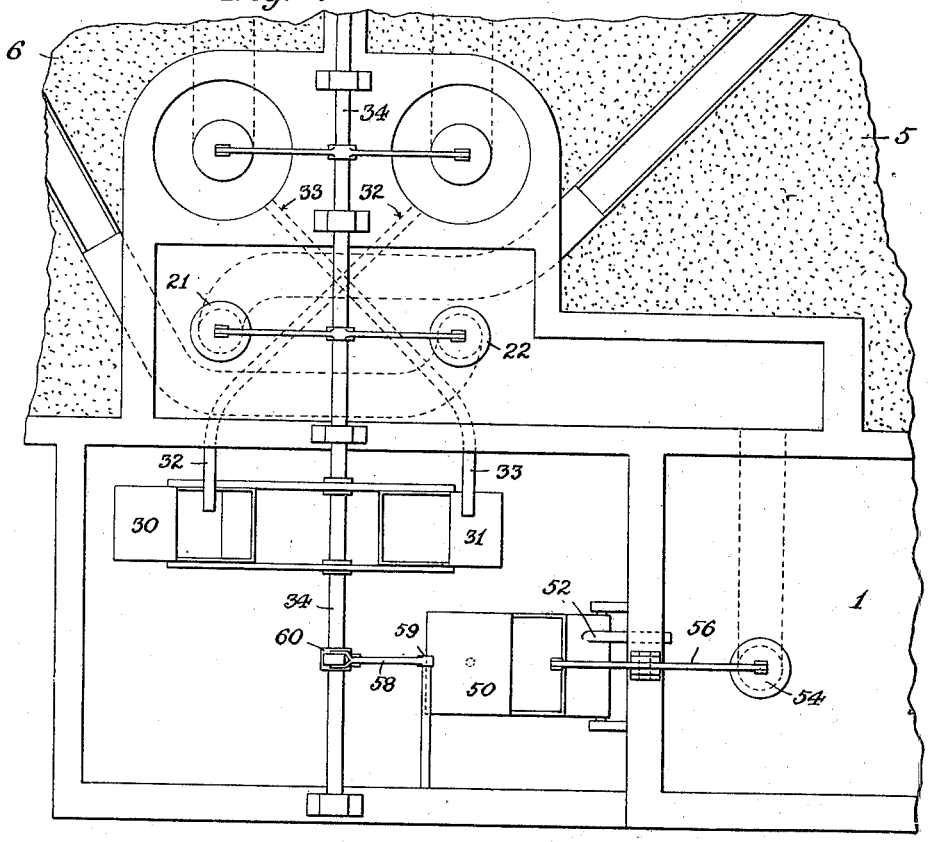


Fig. 6.



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APPARATUS FOR TREATING SEWAGE.

SPECIFICATION forming part of Letters Patent No. 646,928, dated April 3, 1900.

Application filed April 14, 1899. Serial No. 712,967. (No model.)

To all whom it may concern:

Be it known that we, DONALD CAMERON, FREDERICK JAMES COMMIN, and ARTHUR JOHN MARTIN, subjects of the Queen of Great Britain, residing at Exeter, in the county of Devon, England, have invented certain new and useful Improvements in Apparatus for Use in the Treatment of Sewage or other Liquids, (for which we have made application for Letters Patent in Great Britain, No. 19,697, bearing date September 16, 1898,) of which the following is a specification.

This invention relates to apparatus for controlling the supply of liquid to a filter or other receptacle; and it consists in means by which an accumulation of the liquid to be delivered is caused to take place, which accumulation may continue until the liquid so accumulated is sufficient to fill a filter or other receptacle, whereby a rapid filling of the latter is obtained instead of the gradual filling which would otherwise take place.

Our invention is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section, and Fig. 2 a plan view, illustrating one method of carrying out our invention, a pair of siphons and a tipping diverter being employed. Fig. 3 is a longitudinal section, and Fig. 4 a plan view, of another method of carrying out our invention and in which a single siphon is employed through which the liquid is delivered. Fig. 5 is a longitudinal section, and Fig. 6 a plan view, of a modified arrangement in which a tipping bucket controls the delivery of the liquid.

In carrying out our invention, as shown in Figs. 1 and 2, we arrange a pair of siphons 2 and 3 in such a position in connection with the receptacle 1 in which the sewage or other liquid accumulates that when the level of such liquid reaches a certain height in such receptacle it will overflow through either of same. The outer ends of the siphons dip into the liquid contained in a tipping diverter 4, over the edges of which such liquid can pass into distributing-channels 7 and 8, delivering the liquid respectively to the filters 5 and 6. This diverter is actuated in any suitable manner to deliver the liquid to either of such channels—such, for instance, as the pair of buckets 30 31, mounted on a frame secured to the shaft 34, on which the diverter is also secured, the buckets being operated by a portion of the liquid from the filter 5 or 6 flowing through the overflow-pipe 32 or 33 as soon as the filter being supplied is full.

In order to stop the flow through either siphon on the filling of one of the filters, we may arrange a valve 35 at the upper end of each siphon, the valve, being carried by levers 36, to the ends of which rods 37 are secured, which extend downward and are adapted to be lifted on the diverter being actuated, thereby lifting the valve and so admitting air to the siphon and stopping its action.

In the positions shown in Figs. 1 and 2 liquid is flowing through the siphon 3 into the diverter 4 and thence into channel 8, from which it passes into the filter or receptacle 6. As soon as the latter is full a portion of its contents will overflow through overflow-pipe 33 into bucket 31, thus depressing the latter and so changing the position of the diverter 4, and this movement will lift the rod 37, actuating the valve 35 of siphon 3, and so admit air to the latter and stop its action, while at the same time the valve 35 of siphon 2 will close by its weight. The sewage or other liquid will then commence to accumulate again in the receptacle 1 until it reaches the height necessary to charge the other siphon 2, the valve 35 of which is closed, when this siphon will be brought into action, and the above-described operations will be repeated.

In the arrangement shown in Figs. 3 and 4 it will be seen that the sewage or other liquid accumulating in the tank or receptacle 1 passes therefrom through a siphon 2 into a chamber in which valves 21 and 22, opening into passages 38 and 39, leading, respectively, to the two filters 5 and 6, are placed. The opening and closing of the valves 21 and 22 may be effected in any suitable manner; but we prefer the arrangement shown, which consists in mounting them on a lever 23, secured to a shaft 34, actuated by a pair of buckets 30 31, mounted on a suitable frame and which oscillate the shaft when one or the other of such buckets is filled by the overflow from

one of the filters or receptacles 5 6, such overflow passing through pipe 32 or 33 when the filter or receptacle is filled.

In order to allow the liquid in the receptacle 1 to accumulate, so that the filling of the filters may take place rapidly, we arrange the siphon 2 at a suitable height in relation to the receptacle 1, so that sufficient liquid will have accumulated to fill a filter by the time the level in such receptacle reaches such a height in the siphon that the latter will be fully charged and so brought into action, and we provide suitable means by which the flow through such siphon will be stopped when the filter is full. This we prefer to effect by admitting air at the top of the siphon 2 through a valve, such as that shown at 35, and which is lifted by any suitable means on the filling of the filter. The means shown in the drawings consist of an arm mounted on the shaft 34 of the buckets 30 31 and to which is pivotally connected a rod 36, passing through an extension of the valve and provided with a cam-surface 37, which acts on such extension and so lifts the valve slightly on each movement of the buckets 30 31 in either direction. Air will thus be admitted into the upper end of the siphon and so immediately stop its action.

In the position shown in the drawings bucket 31 has just been depressed, thus opening valve 21 and closing valve 22, so that the sewage or other liquid in receptacle 1 is passing from receptacle 1 into filter 5. As soon as filter 5 is filled a portion of the contents of its collecting-well will overflow through pipe 32, thus depressing bucket 30 and closing valve 21 and opening valve 22 and at the same time drawing the cam-surface 37 through the extension on the siphon air-valve 35, raising the latter, and so admitting air to the siphon and stopping the flow therethrough. As above stated, the valve 22 will be opened by this movement of the buckets 30 31; but the filter 6, supplied by this valve, will not be filled until a sufficient quantity of liquid has again accumulated in receptacle 1 to fully charge and so bring the siphon 2 into action.

According to the modification of our invention (shown in Figs. 5 and 6) the supply of sewage or other liquid from the receptacle 1 is controlled by means of a tipping bucket 50. An overflow-pipe 52 is so arranged as to deliver liquid into this bucket from the receptacle 1 when it reaches the desired height in the latter, so that the bucket when filled will be tipped on its pivot and being connected by lever 56 with the valve 54 will open the latter and so cause the filling of one of the filters or receptacles 5 or 6, the admission of the liquid to either of these being preferably controlled by valves 21 22, carried by a lever 23, mounted on the shaft 34, on which shaft a frame carrying a pair of buckets 30 31 is also mounted. These buckets are operated by overflows from the collecting-wells of the filters or receptacles 5 and 6, such overflow passing through the pipe 32 or 33 when the filter or receptacle 5 or 6 is filled.

The liquid escapes from the bucket 50 after the latter has been tipped through a small hole provided for the purpose; but such bucket is retained in its tipped position during the filling of a filter by means of any suitable catch operated by the alternating gear and which will be released from the bucket as soon as the filter is full, thereby allowing such bucket to return to its normal position and the valve 54 with which it is connected to close.

As above stated, any suitable form of catch may be employed for retaining the bucket 50 in its tipped position during the filling of a filter, the arrangement shown for this purpose consisting in an arm 60, mounted on the shaft 34, carrying the buckets 30 31, and the end of which acts on one arm of a bell-crank lever 58, pivoted at 59, and the other arm of which forms the catch to hold the bucket 50 in its tipped position. It will be seen that when the buckets are actuated in either direction the arm 60 will act on the end of the bell-crank lever and turn the latter slightly on its pivot 59, so that its other end will be removed from the path of the bucket 50, which will thus be able to return to its normal position and so close the valve 54 with which it is connected.

In the positions shown in the drawings the filter or receptacle 5 is nearly filled, the bucket 50 having been tipped and being retained in its tipped position by catch 58, while the valve 21 is open and valve 22 closed. As soon as filter or receptacle 5 is filled a portion of its contents will overflow through pipe 32 into bucket 30 and so depress the latter, this movement turning the shaft 34 so that catch 58 will be released from bucket 50, and the latter will then resume its normal position and the valve 54 with which it is connected will be closed, thus cutting off the further supply of liquid from receptacle 1, which will not be resumed until sufficient liquid has accumulated in such receptacle 1 for a portion of same to again pass through overflow-pipe 52 into bucket 50, when the latter will be again tipped and will be retained in its tipped position until filter 6 has been filled.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of a receptacle in which liquid accumulates, a vessel for receiving the liquid therefrom, means for causing the liquid to discharge from said receptacle when a desired quantity has accumulated therein, and means operated by the overflow from said vessel being filled for causing said discharge to cease.

2. The combination of a receptacle in which liquid accumulates and from which it is to be discharged, a vessel connected with said receptacle for receiving the liquid therefrom, means operated by the overflow from said receptacle for causing the liquid to discharge

therefrom when a desired quantity has accumulated therein, and means operated by the overflow from the vessel being filled for causing said discharge to cease.

3. The combination of a receptacle in which liquid accumulates and from which it is to be discharged to filters or other vessels, automatic means for causing the liquid to discharge when a desired quantity has accumulated in said receptacle, and means for automatically causing said discharge to cease by an outflow from the filter supplied thereby.

4. The combination of a receptacle for containing an accumulating liquid provided with a discharge-valve, means operated by the overflow from said receptacle for opening said discharge-valve, and a vessel for receiving the liquid discharged from said receptacle.

5. The combination of a receptacle for containing an accumulating liquid, a vessel for receiving said liquid from said receptacle, means for discharging said liquid from said receptacle, when a desired quantity has accumulated therein, said means being operated by the overflow from said receptacle, and means operated by the filling of said receiving vessel for closing the discharge means of the accumulating-receptacle.

6. The combination of a receptacle for containing an accumulating liquid provided with a discharge-valve, means operated by the overflow from said receptacle for opening said discharge-valve, a vessel for receiving the liquid discharged from said receptacle, and means operated by the overflow from said receiving vessel for closing the discharge-valve of the accumulating-receptacle.

7. The combination of a receptacle for containing an accumulating liquid, a vessel for receiving liquid from said receptacle, a bucket adapted to be tilted on the level of the liquid in the accumulating-receptacle reaching a desired height thereby opening the supply to the receiving vessel, a catch for retaining said bucket in tilted position during the filling of said vessel, and means for releasing said catch on the filling of said vessel.

8. The combination of a receptacle for containing an accumulating liquid, a vessel for receiving liquid from said receptacle, a bucket adapted to be tilted on the level of the liquid in the receptacle reaching a desired height thereby opening the supply to the receiving vessel, a catch for retaining said bucket in tilted position during the filling of said vessel, and means operated by the overflow from said vessel for releasing said catch on the filling of said vessel.

9. The combination of a receptacle for containing an accumulating liquid, provided with a discharge-valve an overflow for said receptacle disposed at a desired height therein, a vessel for receiving the liquid from said discharge-valve, a bucket connected with said discharge-valve and adapted to receive the overflow from said receptacle thereby tilting the bucket and opening said discharge-valve, and means for restoring said bucket to its normal position.

10. The combination of a receptacle for containing an accumulating liquid provided with an overflow disposed at a desired height, a discharge-valve for said receptacle, a lever connected to said discharge-valve, a bucket also connected to said lever and adapted to receive the overflow from said receptacle whereby it is tilted, a vessel for receiving the liquid discharged from said accumulating-receptacle, means for retaining said bucket in tilted position during the filling of the vessel receiving the discharge, and means for releasing said bucket on the filling of said vessel.

11. The combination of a receptacle for containing an accumulating liquid provided with a discharge-valve, a plurality of vessels connected with said receptacle, a bucket connected to said discharge-valve and operated by the overflow from said receptacle for opening said discharge-valve, a bell-crank lever having a catch thereon adapted to engage said bucket and hold it in tilted position, a shaft, an arm fixed on said shaft and adapted to engage said bell-crank lever, and a lever fixed on said shaft and having valves suspended therefrom, said valves serving to control the supply to the various vessels.

12. The combination of a receptacle for containing an accumulating liquid provided with a discharge-valve, a plurality of vessels connected with said receptacle, a bucket connected to said discharge-valve and operated by the overflow from said receptacle for opening said discharge-valve, a bell-crank lever having a catch thereon adapted to engage said bucket and hold it in tilted position, a shaft, an arm fixed on said shaft and adapted to engage said bell-crank lever, a lever fixed on said shaft and having valves suspended therefrom, said valves serving to control the supply to the various vessels, and buckets suspended from opposite sides of said shaft, adapted to receive the overflow from said vessels whereby the shaft is turned, the catch released from said tilting bucket, and one of the vessel-supply valves opened and the other closed.

13. The combination of a receptacle for containing an accumulating liquid provided with a discharge-valve, a plurality of vessels connected with said receptacle, a bucket connected to said discharge-valve and operated by the overflow from said receptacle for opening said discharge-valve, a bell-crank lever having a catch thereon adapted to engage said bucket and hold it in tilted position, a shaft, an arm fixed on said shaft and adapted to engage said bell-crank lever, a lever fixed on said shaft and having valves suspended therefrom, said valves serving to control the supply to the various vessels, buckets suspended from the opposite sides of said shaft, collecting-wells for said vessels, and overflow-pipes leading from said collecting-wells to said buckets respectively, the overflow from which

turns the shaft, releases the catch and opens the supply-valve of another vessel to be filled.

14. The combination of a receptacle for containing an accumulating liquid provided with a discharge-valve, a chamber into which said discharge-valve opens, said chamber being provided with valve-openings, vessels connected with said valve-openings and adapted to receive the discharge liquid therefrom, valves adapted to fit said openings, means operated by the overflow from said vessels for opening said valves, and means operated by the overflow from said receptacle for opening the discharge-valve thereof.

15. The combination of a receptacle for containing an accumulating liquid provided with a discharge-valve, a chamber into which said discharge-valve opens, said chamber being provided with valve-openings, vessels connected with said valve-openings and adapted to receive the discharge liquid therefrom, a shaft, a lever fixed to said shaft and having valves suspended therefrom, said valves being adapted to seat in said valve-openings, means operated by the overflow from said vessels for turning said shaft and opening said valves, and means for opening the discharge-valve of the accumulating-receptacle at determinate intervals.

16. The combination of a receptacle for containing an accumulating liquid provided with a discharge-valve, a chamber into which said discharge-valve opens, said chamber being provided with valve-openings, vessels connected with said valve-openings and adapted to receive the discharge liquid therefrom, a shaft, a lever fixed to said shaft and having valves suspended therefrom, said valves being adapted to seat in said valve-openings, buckets suspended from a frame fixed to said shaft and adapted to receive the overflow from said vessels, turn the shaft, and open one of the valves in said chamber thereby filling one of the vessels, the overflow from which cuts off the supply, and means for opening the discharge-valve of the accumulating-receptacle when a sufficient quantity of liquid has accumulated therein to fill one of said vessels.

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