C. E. MILLER.

AUTOMATIC INTERMITTENT SOLUTION CONTROL.

APPLICATION FILED MAR. 8, 1912.

1,067,786.

Patented July 15, 1913.

2 SHEETS—SHEET 1.

FIG. 1.

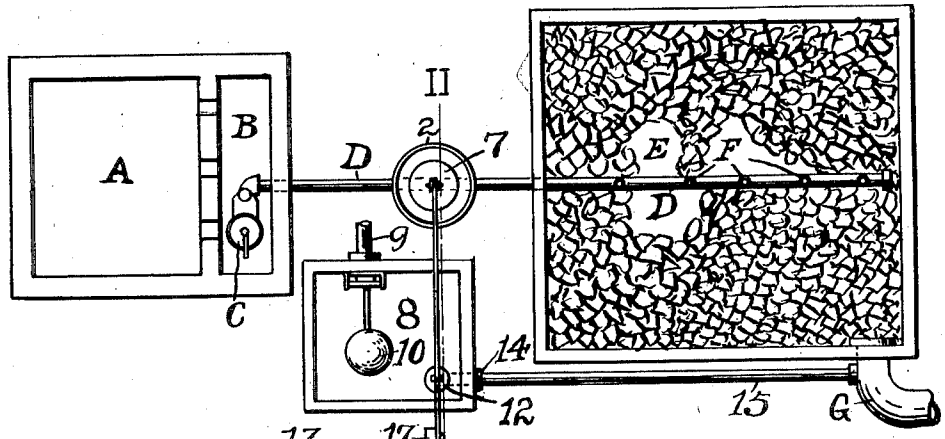
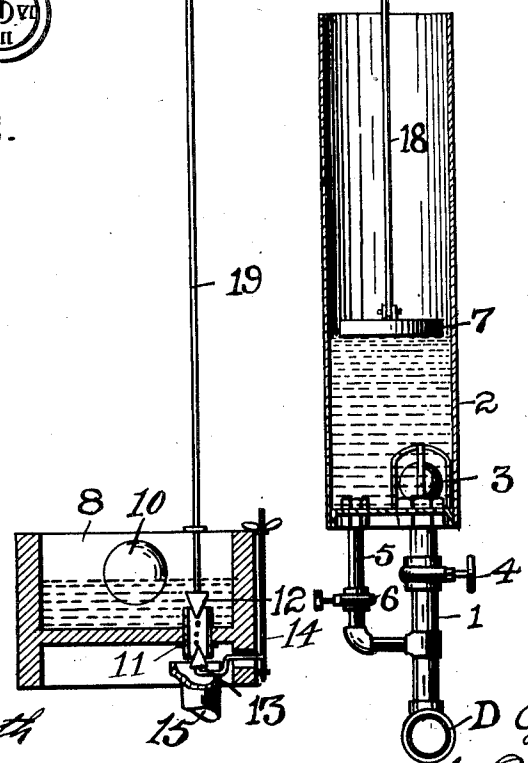


FIG. 2.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

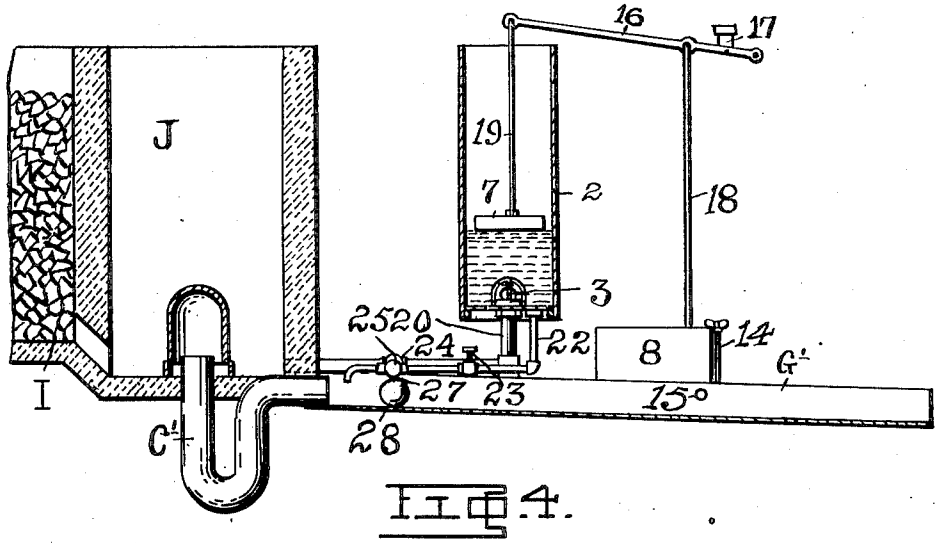


Fig. 4.

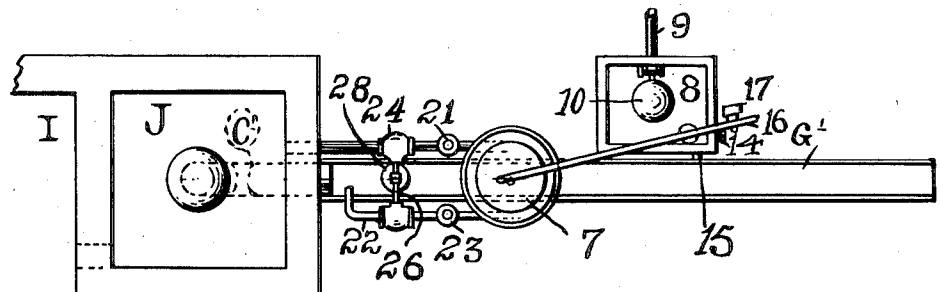
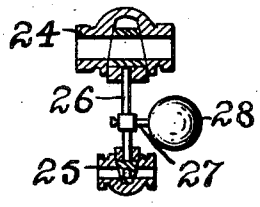


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

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AUTOMATIC INTERMITTENT SOLUTION CONTROL.

1,067,786. Specification of Letters Patent. Patented July 15, 1913.

Application filed March 8, 1912. Serial No. 682,531.

To all whom it may concern:

Be it known that I, CYRUS E. MILLER, a citizen of the United States, and residing in the borough of Bellevue, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Automatic Intermittent Solution Controls, of which the following is a specification.

My invention consists in new and useful improvements in liquid feed mechanism.

It is particularly intended for the introduction of germicide solution into filtrates, but is applicable to many other analogous uses.

My object is to provide for the introduction of germicides or other liquids into intermittently discharged filtrates or other substances, and for the cutting off of the supply of the former when the latter are not discharging.

The invention is especially adapted for use in connection with bacterial sewage-disposal plants wherein the filtrates are intermittently discharged from the sprinkling, contact or other forms of fillers. Since the germicide solutions cannot be introduced into the bacterial filters without halting the bacterial action therein, the former must be mingled with the filtrates as they leave the plant. It is now the practice to feed a constant supply of germicide solution into the filtrate discharge sewer, a large proportion of which solution is wasted as the filtrates are discharged only at intervals.

My invention provides means whereby the germicide supply is controlled by the filtrate discharge so that when the filtrates are passing from the fillers, the solution is admitted thereto and mingled therewith, but when the flow of filtrates cease, the supply of germicide is also cut off. The quantity of solution admitted to the discharging filtrates is also automatically adjusted to the quantity of filtrates discharged, and as the flow of filtrates diminishes, the quantity of solution fed into the discharge sewer is correspondingly reduced.

In the accompanying drawings, which are merely illustrative of the principles of my invention and not intended to limit the scope of the same to the construction shown, Figure 1 is a plan view of a bacterial sewage-disposal plant provided with an aërobic filter of the sprinkling type, fitted with my invention; Fig. 2 is an enlarged cross section of the same along the line II—II in Fig. 1; Fig. 3 in a vertical, longitudinal section, partially broken away, of an aërobic filter of the contact type fitted with my invention; Fig. 4 is a plan view of the same, and Fig. 5 is an enlarged detail on horizontal section of Fig. 4 but showing the valves in the reverse position to that shown in the preceding figure.

The following is a detailed description of the drawings, reference being first had to Figs. 1 and 2 showing my invention used in connection with the sprinkling type of aërobic filter. In such figures, A is the anaërobic tank and B is the siphon-chamber thereof. C is the siphon and D is the main distributing pipe connecting said chamber B with an aërobic filter E into which said pipe D discharged through sprinklers F—F. G is the discharge sewer for the filtrates leading from the bottom of filter E. The liquids discharged intermittently by siphon C from the chamber B into the filter E are sprinkled onto the latter and drip down through its contents, usually broken stone, and escape through the sewer G. The discharge through sewer G is thus seen to be intermittent, trailing off into a trickle as the flow through pipe D ceases and the fluid adhering to the filtering material in the filter E drops down to the bottom thereof and escapes. 1 is a vertical pipe leading from the pipe D intermediate of chamber B and the filter and of less diameter than pipe D. The upper end of pipe 1 communicates with the bottom of an open top cylinder 2 a downwardly closing valve 3 being provided for the mouth of pipe 1. I have shown a caged ball-valve for this purpose as a convenient device. 4 is a hand-valve in pipe 1 to regulate the capacity thereof. 5 is a by-pass pipe, of smaller diameter than pipe 1 and connecting the bottom of cylinder 2 with the pipe 1 below the valve 4. 6 is a hand-valve in pipe 5 to regulate the capacity thereof. 7 is a float in cylinder 2. The top of cylinder 2 is preferably somewhat above the level of the tops of sprinklers F—F in the tank E. 8 is a germicide-solution feed tank located adjacent to the cylinder 2 and above the level of sewer G. 9 is a feed pipe entering tank 8 near the top thereof and connected with a source of constant supply of solution, not shown. The

mouth of pipe 9 is controlled by a float valve 10, so that the germicide in tank 8 is kept at a substantially constant level. 11 is a vertical tube fixed in a port in the bottom of tank 8. 12 is a conical valve plug adapted to be seated in the upper end of tube 11. 13 is a tapered stopper located below the lower end of tube 11 and vertically adjustable, as by means of rod 14, so that the discharge capacity of said tube 11 may be regulated as desired. 15 is a pipe leading from the lower end of tube 11 to the sewer G adjacent to the outlet of filter E. 16 is a lever pivoted to a fixed support, as at 17, and having its larger free end extending above the tank 8 and the cylinder 2. 18 is a connecting rod whose lower end is pivoted to the float 7 and whose upper end is pivoted to the larger end of lever 16. 19 is a second rod, connected at its lower end to valve plug 12 and at its upper end to the lever 16 intermediate of rod 18 and pivot point 17.

The operation of the mechanism is as follows: When the siphon C is not discharging, no fluid stands in the cylinder 2 and the float 7 descends, allowing the lever 16 also to descend and seating the plug 12 in the top of tube 11, thus preventing the escape of the germicide solution from the tank 8. When the siphon C discharges the contents of chamber B through pipe D and sprinklers F—F into the filter E and thence through the sewer G, the fluid from pipe D rises through pipe 1 into the cylinder 2 raising the float 7 and with it the lever 16 and the valve-plug 12, thus allowing the germicide to flow from tank 8 through pipe 15 into the sewer G to mingle with and sterilize the filtrates. As the flow of the liquid lessens and ceases through the pipe D, the ball valve 3 prevents the escape of the liquid from tank 2 directly through the pipe 1, but said valve closes and the contents of tank 2 escapes more slowly through the by-pass 5, thus lowering the float 7 more gradually and continuing the escape of the germicide from tank 8 at a gradually reducing volume until the liquids in cylinder 2 are sufficiently lowered to close the port in the bottom of tank 8.

The reason for prolonging the supplying of germicide to the sewer G after the cessation of flow through the pipe D is to enable germicide to be supplied to the filtrates discharging through the sewer G as the result of the drip through the sprinklers F—F and from the contents of the filter E. I am thus enabled to prolong the flow of the germicide at a diminishing rate until the discharge of filtrates through sewer G has entirely ceased.

The valve 4 enables me to regulate the admission of liquid through pipe 1 into cylinder 2 so that the valve-plug 12 will properly respond to the siphonic action in pipe D, while the valve 6 enables me to regulate the capacity of by-pass 5 so that the admission of germicide to the sewer G will be prolonged at the properly diminishing rate until the discharge of filtrates ceases through sewer G.

H is a recording device fixed adjacent to the short end of lever 16 and actuated thereby to register the operations of the germicide feed.

Referring now to Figs. 3, 4 and 5, wherein my invention is shown applied to the discharge of a contact aërobic filter, I represents such filter, J its siphon chamber and C^1 its siphon. The siphon discharges the contents of the chamber J intermittently into the discharge sewer G^1. The cylinder 2 and the germicide tank 8 are located adjacent to said sewer, the top of which is preferably open adjacent to the chamber J, said tank 8 communicating with said sewer by means of pipe 15 as before described. A pipe 20 leads from the bottom of chamber J up into the bottom of cylinder 2 where its discharge mouth is controlled by downwardly closing ball-valve 3. 21 is a hand-valve in pipe 20 to control its capacity. 22 is a by-pass pipe connecting the bottom of cylinder 2 with the sewer G^1 and provided with an adjusting valve 23. 24 is a horizontal valve in pipe 20, and 25 is a similar valve in pipe 22, said valves being in alinement and yoked together for simultaneous, operation by any convenient means, such as a rod 26, the valves being set so that when one is open the other is closed. The rod 26 is provided with a rigid arm 27 bearing on its free end a float 28 which normally extends down to the bottom of sewer G^1, in which position the valve 24 is closed, preventing the admission of filtrates into the cylinder 2 and thus cutting off the escape of germicide from the tank 8. The valve 25 in pipe 22 is open.

When the siphon C^1 discharges into sewer G^1, the rise of filtrates in sewer G^1 raises the float 28, turns the rod 26, opening the valve 24 and closing the valve 25. The filtrates now enter and rise in cylinder 2, raising the float 7 and permitting the escape of germicide from the tank 8 into the sewer G^1 to mingle with and sterilize the filtrates. As the flow of filtrates passes, the float 28 descends gradually closing the valve 24 and thus preventing the precipitous escape of the contents of cylinder 2 and the consequent immediate cessation of the supply of germicide to the sewer I^1. However, the closing of valve 24 entails the opening of valve 25 in by-pass 22 thus permitting the gradual escape of the contents of cylinder 2 through the pipe 22 into the sewer G^1 and the consequent delayed gradual closing of the valve in the bottom of tank 8.

By this means germicide is fed to the sewer G^1 in diminishing amount until all the filtrates have passed therefrom.

It is thus evident that my invention provides a convenient and economical method of sterilizing the filtrates of bacterial sewage-disposal plants.

While I have described my invention in connection with siphonic filtrate discharge, it will be understood that intermittent discharge of any character will serve the purpose.

What I desire to claim is:—

1. In a sewage-disposal plant from which the filtrates are discharged by intermittent action, a germicide supply adapted to communicate with the outlet of said plant, means controlled by said intermittent action whereby the germicide is admitted to the filtrates at said outlet intermittently in unison with the discharge of the filtrates, and means for prolonging the admission of the germicide temporarily after the cessation of said intermittent action.

2. In a sewage-disposal plant from which the filtrates are discharged by intermittent action, a germicide supply adapted to communicate with the outlet of said plant, means controlled by said intermittent action whereby the germicide is admitted to the filtrates at said outlet intermittently in unison with the discharge of the filtrates, and means for prolonging the admission of the germicide in a diminishing flow after the cessation of said intermittent action.

3. An intermittent liquid-feeding device composed of a tank for said liquid, a discharge-valve for said tank, a receptacle, a pipe leading to said receptacle, means for causing an intermittent flow of a second liquid into said receptacle through said pipe, means for preventing the escape of said second liquid from said receptacle through said pipe, a smaller pipe for the escape of said second liquid from said receptacle, and means whereby said discharge-valve is controlled by the level of said second liquid in said receptacle.

4. In communication with a sewage disposal plant discharging by intermittent siphonic action, a germicide tank communicating with the filtrate-discharge sewer of said plant, a valve controlling said communication, a float tank, a float in said tank adapted to operate said valve, and means whereby the passage of filtrates through said sewer operates to admit a portion of the filtrates into said float tank to raise said float, for the purposes set forth.

5. In combination with a sewage-disposal plant discharging by intermittent siphonic action, a germicide tank communicating with the filtrate discharge of said plant, a valve controlling said communication, a float-tank, a pipe connecting said float-tank with the siphon-pipe whereby said float tank receives liquid during the siphonic discharge, a by-pass of less capacity than said pipe leading from said float-tank, means for preventing the escape of liquid from said float-tank by said pipe, and a float in said tank controlling said valve.

Signed at Pittsburgh, Penna., this 6th day of March 1912.

CYRUS E. MILLER.

Witnesses:
E. A. LAWRENCE,
J. H. HARRISON.