May 24, 1938. E. A. WIDMANN 2,118,532

SIPHON SYSTEM

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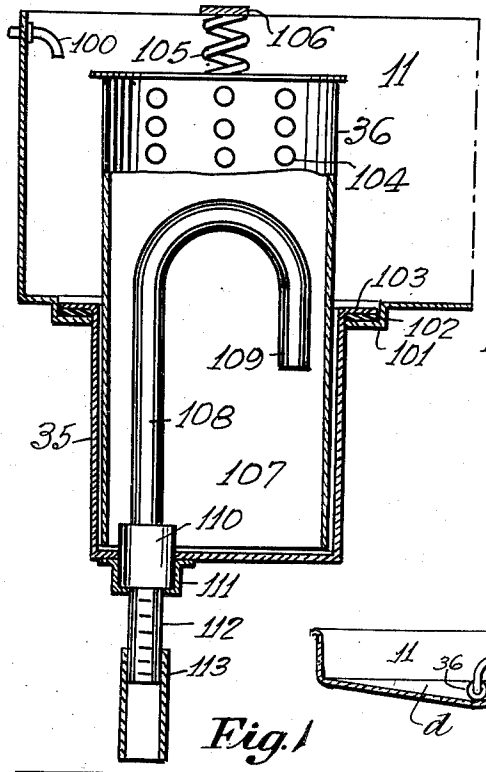


Fig. 1

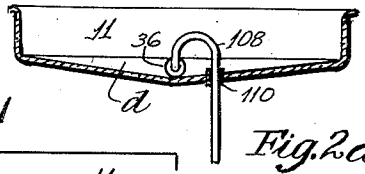


Fig. 2a

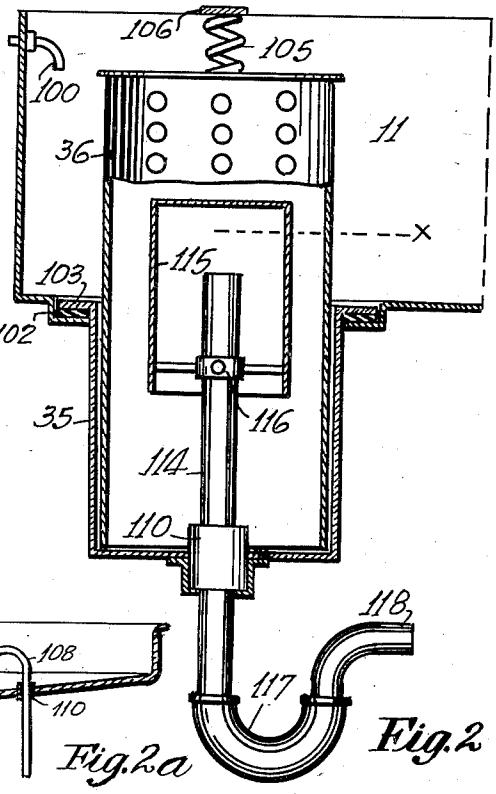


Fig. 2

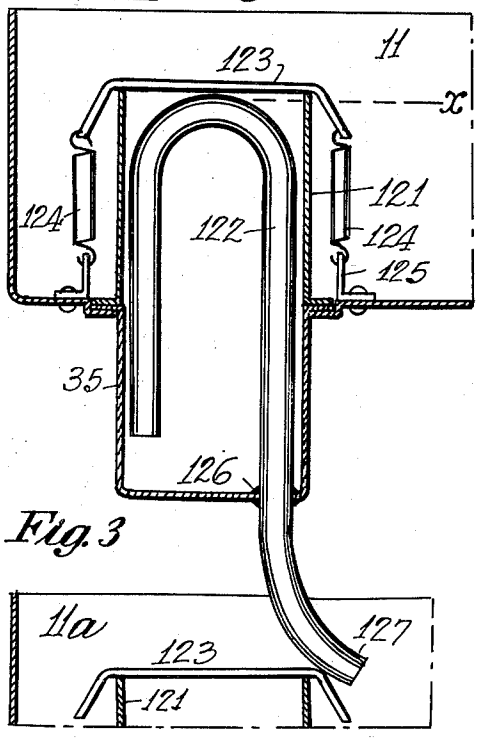


Fig. 3

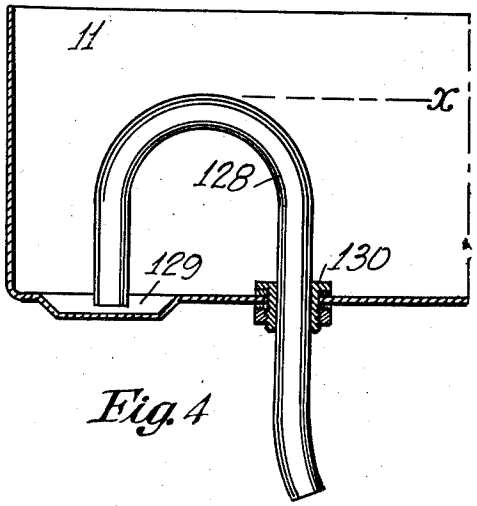


Fig. 4

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SIPHON SYSTEM

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5 Claims. (Cl. 137—106)

A particular object of the invention is to provide a siphon for transferring a measured quantity of liquid from an upper trough or tank to lower troughs; another object is to provide a siphon in each trough with a removable sump and with a protecting screen.

Other objects of the invention will be more particularly understood from the following specification and the accompanying drawing, in which

Fig. 1 is one form of siphon, with a sump, partly sectioned, that may be used to control the liquid flow;

Fig. 2 is another form of siphon and sump, partly-sectioned, for the control of a measured quantity of the liquid;

Fig. 2*a* is a sectional detail of the trough;

Fig. 3 shows in section another form of siphon and sump;

Fig. 4 is another form of siphon without removable sump, with the tank sectioned.

A machine for germinating seed under artificial stimulation in a cabinet, is disclosed in copending application, Serial No. 32,303, filed July 19, 1935; the present invention is applied to a machine of this type but it is of general use where siphons can be applied.

A siphon is provided in a removable sump which is placed in the tank or trough containing the solution, and siphons may also be placed in each trough of the vertical tier. As the liquid rises to a predetermined height, the siphon is established and a predetermined quantity of the liquid flows out of the tank to the top trough and from this trough it is siphoned to the troughs below. For this purpose the siphon tube is slidably mounted in the sump so that its height may be adjusted. In one form the siphon is established by a bell placed upon the entering end of the siphon which causes compression of the enclosed air until the siphon is established. The air pressure necessary to start the siphon regulates the height of the liquid above the siphon when it starts and thus regulates the quantity that will flow at one time. As the liquid is slowly replaced, a time interval elapses between the discharging periods of the siphon. The removable sump with the siphon enables the parts to be readily cleaned and the siphon may be removed before the troughs are replaced so that they are out of the way.

The siphon comprises the sump **35** having the flanged base **103** resting upon a gasket **102** in the depression **101** of the tank **11**. The shield **36**, with perforations **104** is placed with its open end in the sump and this shield and the sump, which are removable by lifting upwards, are held in place by spring **105** engaging the stay **106**. The siphon tube **108** passes through the rubber plug **110** with a sliding fit, this plug is held in place by clamp **111**. The lower end **112** of the siphon tube is provided with a sliding sleeve **113** and the tube is graduated to show the position of this sleeve.

Liquid in tank **11** fills the sump and as soon as it rises to the top of tube **108**, indicated by line *x*, the siphon is established, the tank is drained and the sump is drained until the liquid is below the receiving end **109** of the siphon tube. The height of end **109** is adjusted by sliding tube **108** in plug **110** so that a measured quantity of liquid represented by the height of line *x* above the bottom of the tank may be drawn from tank **11** for each discharge. Tank **11** is filled from the spigot **100** at a much slower rate than the liquid is drawn off by siphon **108** so that a time interval elapses after the siphon is broken before it can be reestablished. The speed of the flow through the siphon tube is determined by the difference in head between the receiving end of the siphon and the discharge end of this tube; the sleeve **113** is used to adjust this head so that it can be increased when a rapid flow is wanted and it can be reduced when a less rapid flow is sufficient. It would appear that as the flow into tank **11** is less than the flow through the siphon, that this intake should trickle through the siphon without establishing the siphon. In practice, there is an initial trickle, after which the siphon is established for the complete discharge. This is probably due to the fact that the tank has a comparatively large capacity and the liquid is not still in this tank, but has a wave action due to the incoming flow from spigot **100**, which wave establishes the siphon.

The siphon in Fig. 2 is inverted with the bend at **117** and the discharge at **118**. The receiving end of the tube **114** has a bell **115** adjustably secured thereto at **116** so that as the liquid rises in the sump it closes the lower end of the bell and the bend at **117** traps part of the liquid so that the air in the bell is compressed until it forces the liquid out of the bend **117** until eventually the flow enters the receiving end of the tube and discharges the liquid. The apparatus can be adjusted, for instance, so that the liquid in the tank **11** reaches the level *x* at the time the siphon is established, after which the discharge continues to the bottom of the bell **115**, thereby discharging a predetermined quantity of the liquid at each operation. As the rate of intake can be reg-

ulated with reference to the discharge, these discharges can be automatically regulated to occur at predetermined intervals. A form of this type of siphon is disclosed in U. S. Patent No. 749,445 of June 12, 1904.

The siphon **122** in Fig. 3 is soldered into the sump **35** at **126** and has a deflected discharge end at **127** which clears the top **123** of the siphon in the trough *11a* below. The shield **121** is held in place by the top **123** and the springs **124** secured to the brackets **125**. The siphon **128** in Fig. 4 has an intake sump at **129** which is not removable. The siphon tube is secured in place by the screw sleeve **130**. The siphon is established when the liquid reaches the point *x* and the head of liquid between this and the bottom is discharged each time.

The trough in Fig. 2*a*, has an inclined gutter *d* in which the tube **36** lies horizontally.

Having thus described my invention, I claim:

1. In a siphon system, the combination, a tank for the liquid to be siphoned having an aperture in its bottom, a sump in said aperture having a flange resting freely on the bottom, a siphon tube located in said sump with its end passing through the bottom of the sump, a shield for said sump engaging said sump, and means engaging the shield for holding said sump in place.

2. A tank with a cylindrical sump to accumulate the flow of liquid, a siphon tube having its receiving end located in said sump and a removable perforated cylindrical shield having an open and a closed end for said receiving end of the siphon located in said sump with the open end resting on the bottom of the sump.

3. A tank with a sump to accumulate the flow of liquid, a siphon tube having its receiving end located in said sump, a removable perforated shield for said receiving end and a spring for holding said shield in said sump.

4. In a siphon system, the combination, a tank for the liquid to be siphoned having an aperture in its bottom, a sump in said aperture having a flange, a gasket placed between said flange and the bottom of said tank, a spring holding said sump in place and a siphon tube having its receiving end located in said sump.

5. In a siphon system, the combination, a tank for the liquid to be siphoned having an aperture in its bottom, a sump in said aperture having a flange resting upon the bottom of the tank, a perforate shield engaging said sump, a spring engaging said shield to hold said shield and sump in place and a siphon tube having its receiving end located in said sump.

EUGENE A. WIDMANN.