Jan. 13, 1931. R. C. MURRAY 1,788,404

SOLUTION TANK

Filed Jan. 25, 1928 2 Sheets-Sheet 1

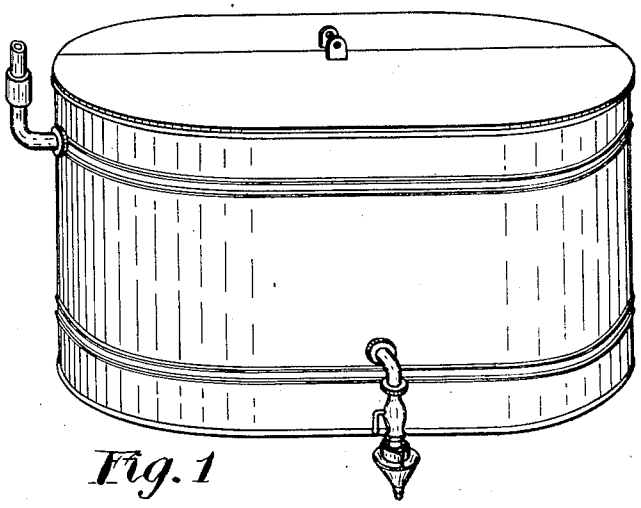


Fig. 1

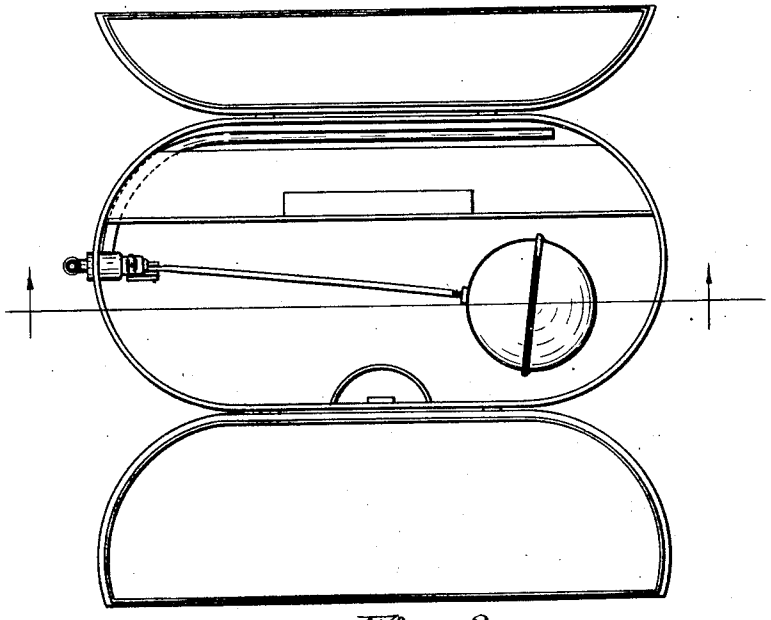


Fig. 2

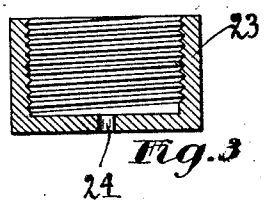


Fig. 3

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SOLUTION TANK

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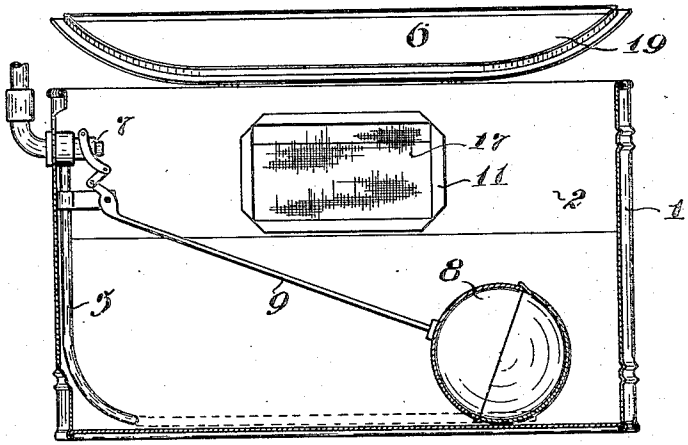


Fig. 4

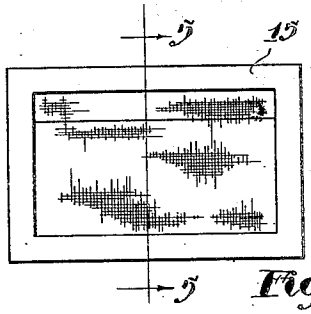


Fig. 5

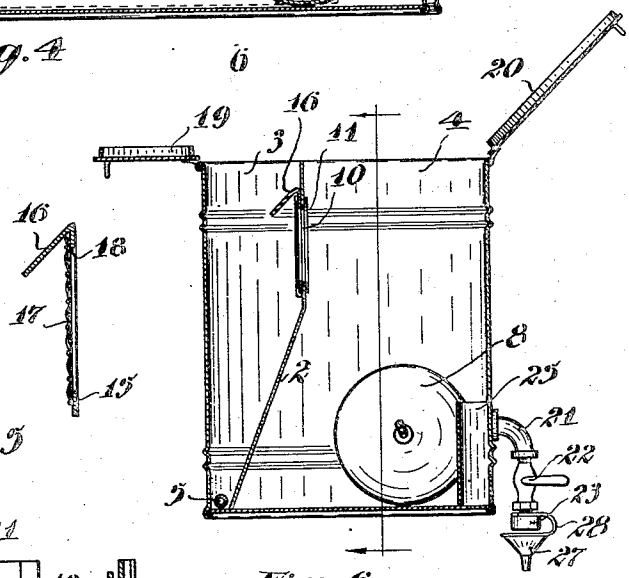


Fig. 6

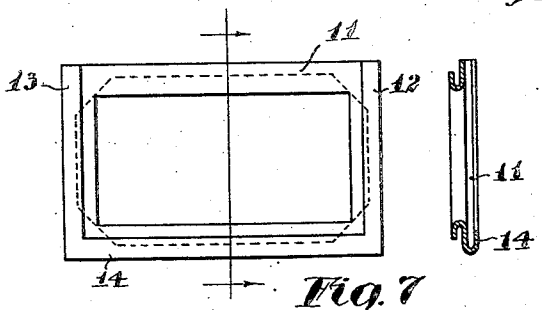


Fig. 7

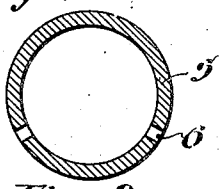


Fig. 8



Fig. 9

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Patented Jan. 13, 1931

1,788,404

UNITED STATES PATENT OFFICE

ROBERT C. MURRAY, OF ST. PAUL, MINNESOTA, ASSIGNOR TO ECONOMICS LABORATORY, INC., OF ST. PAUL, MINNESOTA, A CORPORATION OF DELAWARE

SOLUTION TANK

Application filed January 25, 1928. Serial No. 249,485.

The present invention relates to a constant head solution supply mechanism.

In dish washing machines and solution tanks, solution is constantly being lost from the tank while in use. This solution is replaced by water to keep a constant depth of water in the tanks and a quantity of soap or soluble compound is thrown in by hand from time to time by the operator in an attempt to keep the strength of the solution in the tank substantially uniform. With this method it is difficult to maintain a solution of proper strength.

An object of the present invention is to maintain a quantity of soap solution at a substantially constant head and to feed this solution from the tank at a predetermined rate of flow.

In order to attain this object, there is provided, in accordance with one feature of the invention, a tank having a compartment therein for containing a soluble substance and having a supply of water arranged to feed into the compartment containing said soluble substance, the water flowing from this compartment into an outer compartment wherein float controlled means are arranged to maintain the liquid level in the second compartment at a substantially constant head. From the second compartment the liquid is released through a metered orifice.

These and other features of the invention will be more fully brought out in the following description and the accompanying drawings, wherein:

Figure 1, is a view in perspective of a device embodying the present invention.

Figure 2, is a view in top elevation thereof, with a pair of hinged covers opened to expose the interior thereof.

Figure 3, is a view in transverse, vertical section of a cap having an opening therein.

Figure 4, is a sectional view on the line 4—4 of Figure 2.

Figure 5, is a view in front elevation and transverse section, respectively, of a screen mounted upon a frame.

Figure 6, is a sectional view on the line 6—6 of Figure 4.

Figure 7, is a view in front elevation and transverse section, respectively, of a recessed frame adapted to receive the screen shown in Figure 5.

Figure 8, is an enlarged transverse sectional view of a water supply pipe showing the position of the opening therein; and

Figure 9, is a view in perspective of a small funnel with a spring clip for affixing it in position beneath the metered orifice through which the solution is discharged from the tank.

Referring to the drawing in detail, a container 1 may be made of sheet copper, or other suitable material, with a vertical partition 2 mounted therein to have water-tight connection with the walls and bottom of the container 1. This partition divides the container 1 into two compartments 3 and 4, the partition preferably sloping rearwardly, as best shown in Figure 6, so that the bottom thereof is spaced from the rear wall a sufficient distance to permit a water feed pipe 5 to lie along the bottom of this compartment. The outer, or free end, of the water supply pipe 5 is closed and a plurality of perforations 6 (see Figure 8) are provided at spaced intervals throughout the portion of the pipe within the compartment 3 to direct water escaping from these openings in a downwardly and outwardly direction so as to impart a swirling motion to the water as it enters the compartment 3. The pipe 5 penetrates the partition 2 and is carried upward and connected to a float controlled valve 7. This valve is operated by a float 8 carried by a float arm 9 in a customary manner. An opening 10 is provided in the partition 2 and within this opening is mounted a frame 11, the ends 12 and 13 and lower edge 14 of this frame being bent inwardly

and upwardly to form a slide in which a screen frame 15 may be inserted. The screen frame 15 is preferably of a single sheet of metal with the upper end 16 thereof bent over, as illustrated in Figure 5, to protect a screen 17 which covers the opening 18 in the screen frame 15 from the soluble material when charging the compartment 3 with this material.

A hinged cover 19 is provided to cover the rear compartment 3 and a second hinged cover 20 is provided to cover the forward compartment 4. An elbow 21 is mounted in the side of the compartment 4 and is provided with a shut-off cock 22 to control the flow of liquid therethrough. A cap 23 is threadedly secured below the shut-off cock 22 and is provided with an orifice 24 therein, the size of the orifice being determined by the viscosity of the solution to be used and the rate of flow required. A baffle plate 25 is mounted around the interior of the opening to the elbow 21, said baffle being open at the upper end and having water-tight connection with the floor and wall of the compartment 4. This baffle plate is intended to prevent the entrance of any soap, or other particles, which might collect on the floor of the compartment 4 into the elbow 21, which particles might tend to clog the metered opening 24 in the cap 23.

The operation of the device is as follows:

A quantity of soap material or washing compound, which may be in either a powdered or granulated form or in chunks, is placed in the rear compartment 3 and water is introduced through the valve 7 and the water supply pipe 5. This water is discharged through the opening 6 in the water supply pipe 5 and swirls upwardly through the compound contained in the compartment 3 and overflows through the screened opening 11 into the forward compartment 4. As the liquid rises in the forward compartment 4 it carries the flat 8 upwardly with it and when the predetermined level is obtained the float valve 7 is closed. By opening the shut-off cock 22 the solution contained in the forward compartment is released through the metered opening 24 and passes downwardly through the funnel 27 which is mounted beneath the metered opening 24 by means of the spring clips 28. The device may be mounted above a dishwashing machine or tank to maintain the solution therein at a substantially uniform strength. The rate of flow may be varied by substituting caps 23 having different size openings therein. Since the requirement for each individual tank may be readily determined and once determined is substantially constant, no provision is made for variation of the flow while in use, although such variation could be readily accomplished by well known means if required.

I claim:

1. A solution tank of the character described, comprising a container having a compartment for containing soluble material, a source of liquid supply arranged to discharge into the lower part by said compartment, said compartment and said tank being arranged so that the solution overflows from said compartment into said tank, float controlled means in said tank to regulate the flow of liquid into said compartment, and a metered discharge outlet connected to said device to control the flow of solution from said device.

2. A solution tank of the character described, comprising a container having a portion thereof arranged to receive a supply of soluble material, liquid supply means arranged to discharge into the lower portion thereof, an overflow opening from said portion containing said soluble material into said container, a metered opening to control the flow of solution from said container, and float controlled means operatively connected to said liquid supply means to maintain a substantially constant head of solution above said metered opening.

3. A solution tank of the character described, comprising a container, a compartment therein for containing a soluble substance, said compartment having a screened overflow opening in a wall thereof, a source of liquid supply arranged to discharge into the lower part of said compartment, float controlled valve means connected to said source of liquid supply to maintain a substantially constant head of solution in said container, and a discharge outlet in said container to discharge solution contained therein.

4. A solution tank of the character described, comprising a container having a partition therein to divide the container into two compartments one of said compartments being adapted to receive a quantity of soluble material and having a source of liquid supply connected thereto to discharge into the lower portion thereof, said partition having a screened opening therein to permit water to overflow from the first compartment to the other of said compartments, a float controlled valve in said second compartment connected to said source of liquid supply to control the flow of liquid therethrough, and a discharge opening from said second compartment, said opening having control means associated therewith to control the flow of solution therethrough.

5. A solution tank of the character described, comprising a container having a partition therein to divide said container into two compartments, said partition having an overflow opening therein and being offset at the bottom to reduce the width of one of said compartments at the lower end thereof, a perforated liquid supply pipe positioned at

the reduced lower end of said compartment, a removable screen positioned over the opening in said partition to cover it, a sloping deflector plate positioned above said screen, a float controlled valve in the other of said compartments to control the flow of liquid through said perforated pipe, and a discharge opening in said second compartment, said opening having control means associated therewith to control the flow of liquid from said second compartment.

In testimony whereof I affix my signature.

ROBERT C. MURRAY.