

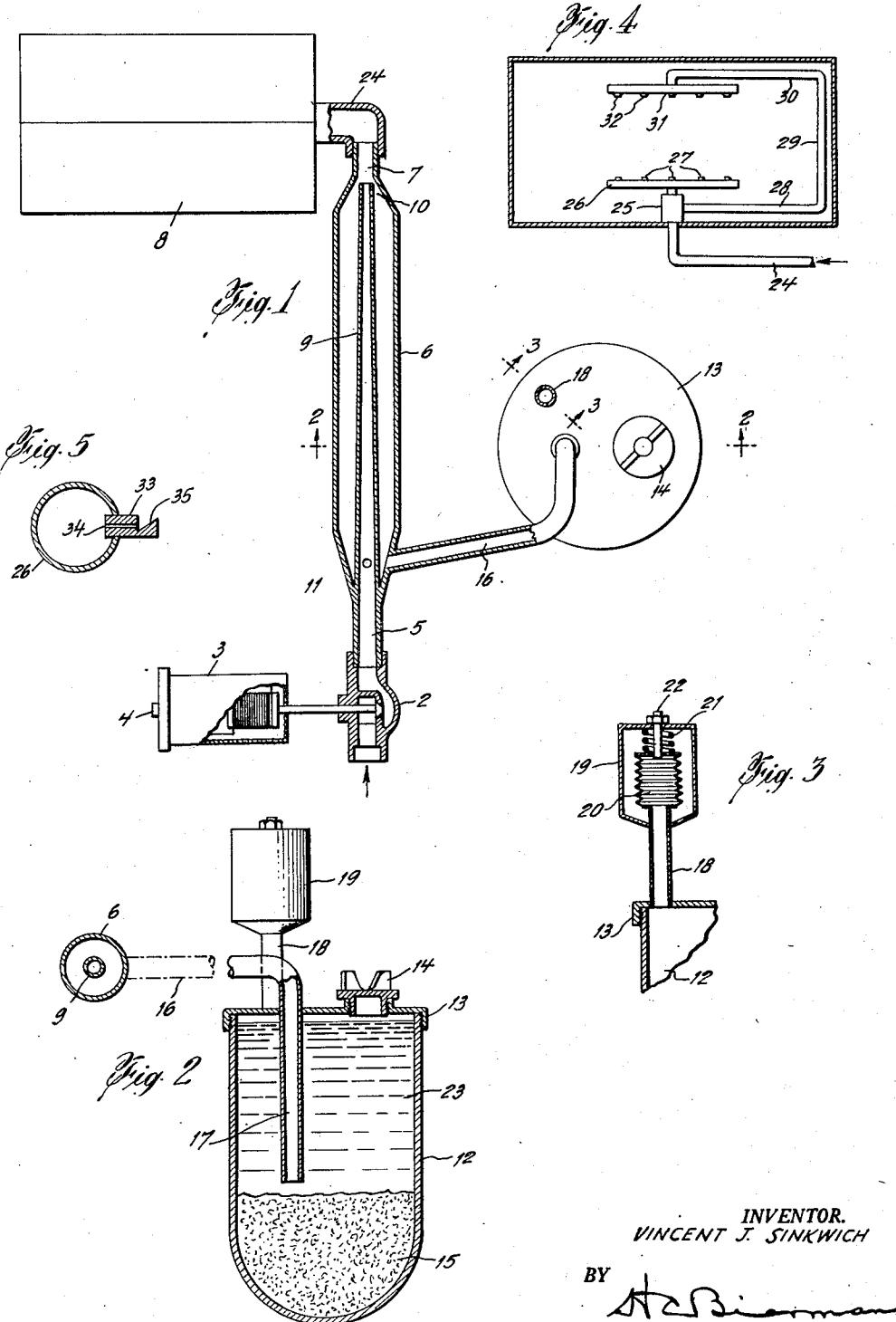
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SEALED DETERGENT AND GERMICIDE DISPENSER

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SEALED DETERGENT AND GERMICIDE
DISPENSER

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The present invention is directed to a device or apparatus for feeding or dispensing liquids such as detergents and germicides; more particularly, it is directed to an apparatus for proportioning detergent solutions for use in washing machines, such as dish washers and laundry machines.

Various types of dispensing devices are known wherein there is a container and a mechanically operating device which either automatically or manually will act to remove a portion of the contents of the container and introduce it into a washing machine or the like. However, all such devices required positive action on the part of the operator and this often became burdensome so that the operator frequently forgot to introduce any of the detergent solution into the washing machine. Also, because there was not an exact proportioning of the amount of detergent, the operator often introduced too much or two little for the desired purpose.

The present invention is intended and adapted to overcome the difficulties and disadvantages inherent in devices of the type described, it being among the objects thereof to provide an apparatus for dispensing predetermined amounts of solutions which may be attached to a washing machine or the like, which operates fully automatically.

It is also among the objects of the present invention to provide an apparatus of the type described wherein there are no moving parts and wherein the operation of the device is dependent upon variations of liquid pressure in the system.

It is still further among the objects of the present invention to provide an apparatus which is simple in construction, which does not require any effort on the part of the operator and which is quite accurate in properly proportioning and adjusting the predetermined quantities of solutions being fed to the washing machines.

In practicing the present invention, there is provided a chamber through which water from a suitable source under pressure is adapted to flow on its way to a washing machine or the like. The chamber is so proportioned that the cross-sectional area of the exit opening or outlet is less than the cross-sectional area of the inlet opening, whereby a back pressure may be built up in the chamber during the period when water is flowing through the same. There is also provided a reservoir for the detergent or other substance, which usually is in the form of flakes, powder, or the like, and which is soluble in water. Said reservoir is connected to the chamber and there is communication to an enclosure or secondary chamber containing a pressure responsive member. Means are provided for adjusting the member so that its expansion and contraction is a predetermined amount under a defined set of circumstances.

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In the operation of the device, the reservoir is partially filled with a powdered soap, for example, and water is caused to flow through the chamber, whereupon the back pressure forces water into the reservoir, causing some of the soap to dissolve to form a practically saturated solution. At the same time, water is also forced into the pressure responsive device held in the enclosure and depending on the spring pressure thereon and the pressure of the water, will expand said member to a predetermined amount. When the flow of water is cut off, the excess pressure is relieved by water flowing from the chamber to the washing machine so that the pressure becomes approximately atmospheric. Thereupon the pressure responsive member collapses and forces solution out of the same into the reservoir and out of the reservoir into the chamber. Because of the predetermined amount of movement of said member, the correct amount of soap solution for a single washing operation has now been ejected into the chamber. Upon the next operation of the valve controlling the flow of water, the water under pressure flowing through the chamber mixes and carries with it the soap solution into the washing machine where it is utilized. At the same time the back pressure built up in the chamber is transmitted to the reservoir and pressure responsive member for completion of the cycle.

In the accompanying drawing constituting a part hereof and in which like reference characters indicate like parts,

Fig. 1 is a horizontal cross-sectional view taken through the apparatus of the present invention, some parts being shown in elevation and other parts being broken away for clearness;

Fig. 2 is a vertical cross-sectional view of the apparatus taken along the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary vertical cross-sectional view taken through the enclosure of the device and showing its relation to the reservoir;

Fig. 4 is a side elevational view of the inside of a dish washing machine, and

Fig. 5 is a detail view of a nozzle.

With reference to the drawing, water 1, under usual pressures, enters valve 2, the stem of which is operated by a device 3 which constitutes an automatic solenoid operated time control. A push button 4 is provided thereon so that when the circuit is closed by movement of the push button, valve 2 is opened, allowing a predetermined quantity of water to flow, after which the valve is automatically closed.

Water enters through pipe 5 into elongated chamber 6, the venturi 7 of which is connected to a dish washing machine 8 or the like. The cross-sectional area of pipe 5 is substantially larger than the cross-sectional area of exit 7. Within chamber 6 is a Venturi tube 9, the open end 10 of which terminates at constricted exit

opening 7. At the larger end 11 thereof are a number of openings to permit the entrance of liquid contained in the outer annular part of the chamber.

A reservoir 12 is fitted with a threaded cover 13 and a threaded opening on the top thereof is closed by a suitable threaded cap 14. This constitutes a means for replenishing the supply of material 15 in the reservoir. A connection 16 from the entrance end of chamber 6 passes through cover 13 and terminates at 17 in an intermediate portion of the reservoir. Duct 18 extending upwardly from cover 13 terminates in an enclosure 19. Within the same is an accordion type diaphragm 20 of a well-known type, with duct 18 communicating with the interior thereof. A coil spring 21 at the upper end of diaphragm member 20 and contacting the top of the enclosure acts to collapse member 20. A screw and nut arrangement 22 is adapted to adjust the tension of spring 21 on member 20.

In the operation of the apparatus, the push button 4 is operated, causing valve 2 to open and allowing water under pressure to flow through pipe 5, Venturi tube 6 and exit 7 into washing machine 8. Because of the constricted exit opening 7, water is caused to flow through openings 11 and end 19 of tube 9 through connection 16 and 17, stirring up the soap or other material 15 and dissolving the same to form a substantially saturated solution 23 regardless of the quantity of material 15 in the reservoir. The pressure also causes liquid to flow up through duct 18 into bellows 20, expanding the same against the action of spring 21.

The cycle of operation is such that for, say, one-half minute there is a flow of water and all of the detergent into the machine. Then there is a continued flow for, say, another one-half minute of water alone for rinsing, automatically without operating any valves.

Then when the timer 3 operates to close valve 2, water continues to flow out of chamber 6 into machine 8 until the pressure approximates atmospheric. The relief of pressure causes bellows 20 to collapse, ejecting liquid through duct 18 into reservoir 12 and therefrom through pipe 17-16 and into chamber 6. The size of said chamber is such that none of the solution now contained therein will flow out of Venturi opening 7 but remains in the chamber. Then at the next operation of timer 3 to open valve 2, the flow of water through the Venturi tube 9 will draw with it the soap solution from chamber 6. It is thoroughly mixed during the flow so that a uniform dilute soap solution is introduced into washing machine 8.

During said flow of water, the back pressure is again built up because of restricted opening 7, causing some water to flow into reservoir 12 and into member 20, whereupon the cycle is repeated. When valve 2 is closed, the saturated solution again formed will flow into chamber 6 for the next operation.

From opening 7 the liquids enter the dish washing machine shown diagrammatically in Fig. 4 with its front door open. Pipe 24 enters through the bottom of machine 8, communicating with chamber 25 to the top of which is attached one or more hollow arms 26 having a series of spray nozzles 27 to force liquid upwardly against the dishes being washed. A pipe 28 extends laterally from chamber 25 to the side of machine 8 and then upwardly as shown at 29 to the top. It extends at 30 along the top to a central point and

terminates in one or more hollow spray arms 31 having nozzles 32 to spray liquid downwardly onto the dishes being washed. The nozzles may be constructed as shown in Fig. 5. A series of nozzle blocks 33 are anchored in arms 26 and 31. The blocks have passages 34 communicating with the inside of said arms, and deflectors 35, formed integrally therewith deflect the streams as they emerge from passages 34.

Although the invention has been described setting forth a single specific embodiment thereof, the invention is not limited to the details set forth herein but is directed to an illustration of the principles involved. Various changes in the details of construction may be made within the scope of the invention. For instance, instead of an automatically timed and operated valve, any ordinary hand valve may be used. Enclosure 19 need not be separate from reservoir 12 but the two may be combined, if desired. Also, member 20 may be of any of the well-known types of pressure expandable devices and the solution instead of entering the same may surround it to compress during the pressure stage of the operation and the liquid be ejected by the expansion thereof due to the spring. Also, a diaphragm type of member is not essential as other pressure responsive devices may be used in place thereof. The relative arrangement of the several elements, their relative proportions and configurations may be varied greatly from that illustrated herein.

The device has been described as attached to a dish washing machine, but the utility thereof is not limited thereto. It is not only adapted for operation with laundry machines and the like, but also for filling a sink or basin with predetermined amounts of solution. It may be applied to filling janitors' buckets with soap or other cleansers, industrial body showers, auto washing equipment, insecticide sprays fitted on the end of hose, and various other uses.

These and other changes in the details of construction may be made within the spirit of the invention which is to be broadly construed and not to be limited except by the character of the claims appended hereto.

I claim:

1. Apparatus for dispensing predetermined amounts of solutions comprising a pipe constituting a source of liquid under pressure connected to a chamber, an outlet from said chamber, a reservoir for soluble material, a connection for liquid from said reservoir to said chamber, the cross-sectional area of said outlet being less than that of said pipe whereby some of the liquid passing through said pipe to said outlet is caused to flow into said reservoir in contact with said material, said reservoir communicating with an enclosure, a pressure responsive member in said enclosure, whereby liquid under pressure is transmitted to said chamber, reservoir and enclosure to form a solution and compress said member and upon release of said pressure the expansion of said member ejects a predetermined quantity of solution from said reservoir into said chamber.

2. Apparatus for dispensing predetermined amounts of solutions comprising a pipe constituting a source of liquid under pressure connected to a chamber, an outlet from said chamber, a reservoir for soluble material, a connection for liquid from said reservoir to said chamber, the cross-sectional area of said outlet being less than that of said pipe whereby some of the liquid passing through said pipe to said outlet is caused to flow into said reservoir in contact with said ma-

terial, said reservoir communicating with an enclosure, a pressure responsive accordion-type diaphragm member in said enclosure, whereby liquid under pressure is transmitted to said chamber, reservoir and enclosure to form a solution and compress said member and upon release of said pressure the expansion of said member ejects a predetermined quantity of solution from said reservoir into said chamber.

3. Apparatus for dispensing predetermined amounts of solutions comprising a pipe constituting a source of liquid under pressure connected to a chamber, an outlet from said chamber, a reservoir for soluble material, a connection for liquid from said reservoir to said chamber, the cross-sectional area of said outlet being less than that of said pipe whereby some of the liquid passing through said pipe to said outlet is caused to flow into said reservoir in contact with said material, said reservoir communicating with an enclosure, a pressure responsive member in said enclosure, whereby liquid under pressure is transmitted to said chamber, reservoir and enclosure to form a solution and compress said member and upon release of said pressure the expansion of said member ejects a predetermined quantity of solution from said reservoir into said chamber, and means for adjusting the degree of expansion of said member to alter the volume of solution so ejected.

4. Apparatus for dispensing predetermined amounts of solutions comprising a pipe constituting a source of liquid under pressure connected to a chamber, an automatically timed valve for allowing a predetermined flow of liquid in said pipe, an outlet from said chamber, a reservoir for soluble material, a connection for liquid from said reservoir to said chamber, the cross-sectional area of said outlet being less than that of said pipe whereby some of the liquid passing through said pipe to said outlet is caused to flow into said reservoir in contact with said material, said reservoir communicating with an enclosure, a pressure responsive member in said enclosure, whereby liquid under pressure is transmitted to said chamber, reservoir and enclosure to form a solution and compress said member and upon release of said pressure the expansion of said member ejects a predetermined quantity of solution from said reservoir into said chamber.

5. Apparatus for dispensing predetermined amounts of solutions comprising a pipe constituting a source of liquid under pressure connected to a chamber, said chamber being elongated and said pipe being connected at one end thereof, an outlet from the opposite end of said chamber, a reservoir for soluble material, a connection for liquid from said reservoir to said chamber, the cross-sectional area of said outlet being less than that of said pipe whereby some of the liquid passing through said pipe to said outlet is caused to flow into said reservoir in contact with said material, said reservoir communicating with an enclosure, a pressure responsive member in said enclosure, whereby liquid under pressure is transmitted to said chamber, reservoir and enclosure to form a solution and compress said member and upon release of said pressure the expansion of said member ejects a predetermined quantity of solution from said reservoir into said chamber.

6. Apparatus for dispensing predetermined amounts of solutions comprising a pipe constituting a source of liquid under pressure connected to a chamber, said chamber being elongated and said pipe being connected at one end thereof, a

5 Venturi tube from said end extending centrally in said chamber for a substantial distance so that said liquid may flow through said tube, an outlet from said chamber, a reservoir for soluble material, a connection for liquid from said reservoir to said chamber, the cross-sectional area of said outlet being less than that of said pipe whereby some of the liquid passing through said pipe to said outlet is caused to flow into said reservoir in contact with said material, said reservoir communicating with an enclosure, a pressure responsive member in said enclosure, whereby liquid under pressure is transmitted to said chamber, reservoir and enclosure to form a solution and compress said member and upon release of said pressure the expansion of said member ejects a predetermined quantity of solution from said reservoir into said chamber.

20 7. Apparatus for dispensing predetermined amounts of solutions comprising a pipe constituting a source of liquid under pressure connected to a chamber, said chamber being elongated and said pipe being connected at one end thereof, a Venturi tube from said end extending centrally in said chamber for a substantial distance so that said liquid may flow through said tube, at least one opening in the side of said tube adjacent to said pipe connection, an outlet from said chamber, a reservoir for soluble material, a connection for liquid from said reservoir to said chamber, the cross-sectional area of said outlet being less than that of said pipe whereby some of the liquid passing through said pipe to said outlet is caused to flow into said reservoir in contact with said material, said reservoir communicating with an enclosure, a pressure responsive member in said enclosure, whereby liquid under pressure is transmitted to said chamber, reservoir and enclosure to form a solution and compress said member and upon release of said pressure the expansion of said member ejects a predetermined quantity of solution from said reservoir into said chamber.

35 40 8. Apparatus for dispensing predetermined amounts of solutions comprising a pipe constituting a source of liquid under pressure connected to a chamber, an outlet from said chamber, a reservoir for soluble material, a connection for liquid from said reservoir to said chamber, the cross-sectional area of said outlet being less than that of said pipe whereby some of the liquid passing through said pipe to said outlet is caused to flow into said reservoir in contact with said material, said reservoir communicating with an enclosure, a pressure responsive member in said enclosure, whereby liquid under pressure is transmitted to said chamber, reservoir and enclosure to form a solution and compress said member and upon release of said pressure the expansion of said member ejects a predetermined quantity of solution from said reservoir into said chamber, said enclosure being separate from said reservoir and a duct connecting the same.

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