April 22, 1969 G. M. DE MAY 3,439,698

SELECTIVE SOAPY WATER OR CLEAN WATER DISPENSER

Filed Jan. 25, 1967 Sheet 1 of 2

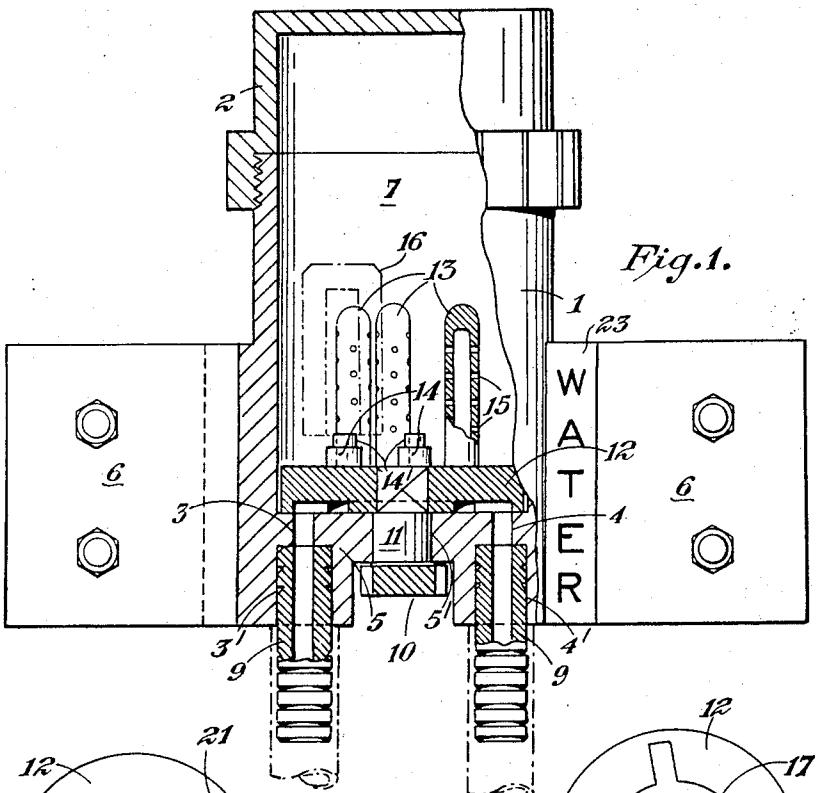


Fig.1.

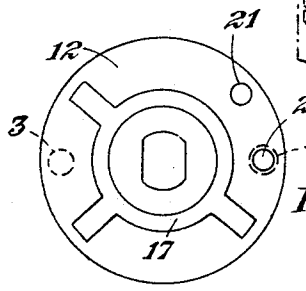


Fig.4.

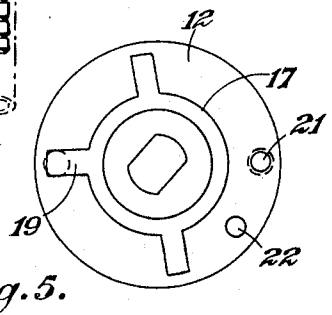


Fig.5.

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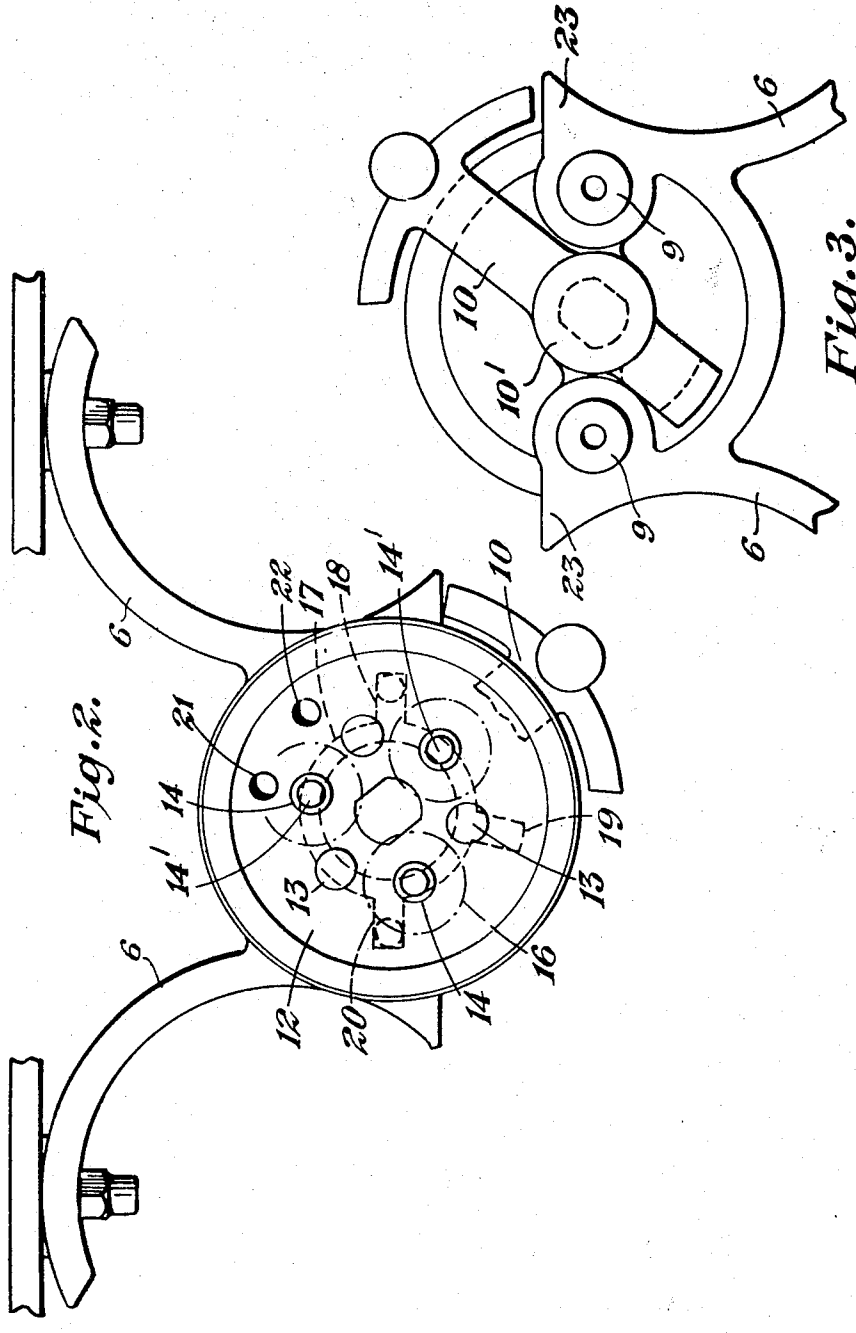


Fig. 3.

Fig. 2.

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SELECTIVE SOAPY WATER OR CLEAN WATER DISPENSER

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Int. Cl. E03c *1/046;* F17d *1/00*
U.S. Cl. 137—268 9 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for dissolving solid material in a liquid which is supplied to and withdrawn from a mixing chamber through a plate valve, formed with injection nozzles and manually adjustable to cut off the supply or to discharge solution or liquid.

This invention relates to apparatus for dissolving and mixing materials in a flowing liquid or water supply and is concerned with an improved device comprising a dispenser having a mixing chamber in which a charge of compacted or encapsulated material can be inserted and embodying a control lever for changing over from solution to clean water and vice versa at will.

According to the present invention a mixing and dispensing apparatus comprising a body having a mixing chamber and provided with a detachable cap for access to the chamber, inlet and outlet ports in the body for admission and discharge of liquid and to permit of drainage therefrom and a valve plate mounted for angular displacement within the chamber, said valve plate being provided with injection nozzle elements for the incoming liquid, said nozzle elements extending perpendicularly to the plate and serving to locate cartridges or capsules, said valve plate also being provided with outlet and drainage ports adapted to be brought into registration with the outlet port in the body, said valve plate further being provided on its underside with a feed channel, the channel having another set of ports giving access to the chamber through the injection nozzle elements, the channel also having branch limbs adapted to be brought into registration with the set of ports in the body for admission of liquid to the channel and the valve having three positions whereby

(i) Two of said limbs can be positioned to place the channel in connection respectively with the inlet and outlet ports in the body for direct passage of liquid therebetween without entering the mixing chamber or

(ii) A branch limb of the channel can be placed in connection with the inlet port and the outlet port in the valve plate can simultaneously be placed in connection with the outlet port in the body to enable liquid to pass through the chamber and out through the outlet port or

(iii) The inlet of liquid can be cut off and the drain port of the valve plate can be placed in connection with the outlet port of the body.

In a preferred embodiment of the invention the valve plate is formed of moulded plastics material and the nozzle elements are formed integrally therewith, the valve plate also being provided with spacing means to support the solid cartridges or the like in a position above the valve plate. For this purpose studs with or without spigoted ends are preferably mounted integrally with the valve plate.

One application of this invention relates to synthetic detergents which are available in liquid, powder and other forms and are usually dissolved in water by adding a quantity of the detergent to the water in a mixing device.

In one commercial application particularly when cleaning vehicles it is desirable, in order to prevent excessive use and thus wastage of the detergent, to provide a mixing chamber and to make provision either for the discharge of the detergent mixture or subsequently when cleaning down the vehicle to change from the cleansing detergent mixture to clean water.

One such embodiment of this invention is illustrated in the accompanying drawings in which,

FIGURE 1 is an elevation of a dispensing device partly in section to show the interior of the mixing chamber,

FIGURES 2 and 3 are respectively a plan and underside view with the cover removed in FIGURE 2.

FIGURES 4 and 5 are sectional views from above of the rotary valve of the device showing the arrangement of flow passages.

Referring to the drawings the dispenser comprises a cylindrical body **1** having a detachable screw-on cap 2 and within which is a mixing chamber **7**. Bores **3** and 4 are formed in base **5** of the mixing chamber **7** to act as inlet and outlet respectively and are located so as to be diametrically opposed.

Bracket arms **6**, preferably moulded integrally with the body **1**, enable the dispenser to be attached to e.g. a wall with the mixing chamber vertical. As shown in FIGURE 2 each arm is arcuate in plan so that when in position the body will stand away from the wall to provide clearance for inlet and discharge pipes. Such a construction also provides springiness and promotes shock resistance. Furthermore, the end faces of each arm provide stops for a control handle or lever **10** and are conveniently positioned for operational instructions e.g. WATER as shown in FIGURE 1.

In the base **5** is an axial bore **5'** for a spindle **11**, the spindle being moulded integrally at its outer end with handle **10** while its inner end has keyed thereto a valve disc **12**. In the bores **3**, **4**, counter bores **3'**, **4'** respectively are provided in which are inserted pipe connection nozzles **9** and it will be seen that the centre of the base is cut away to provide a recess to accommodate the head **10'** of the spindle secured to the valve disc **12**.

When the body is formed of moulded plastics material as is preferred the nozzles **9** or similar inserts can be moulded in position.

In the underside of disc **12** is an annular channel **17** having three radial branch limbs **18**, **19** and **20** of equal length, the outer ends of these limbs being capable of registration with one of bores **3** and **4**. Angularly spaced holes **21**, **22** are also provided in the valve disc **12** and it will be seen that these lie on a circle whose diameter is such that they can respectively be brought into registration with the bore **4**, the hole **21** being diametrically opposed to the limb **19**, while the hole **22** is not in diametric alignment with any of the limbs.

Moulded integrally with the valve disc, which is machined to make contact with the base of the chamber, are three equidistantly spaced, tangentially perforated, liquid injection tubes **13**. The axes are arranged to coincide with the channel **17** and have axial passages which communicate directly therewith. Liquid entering the injection tubes **13** will thus discharge into the mixing chamber through the perforations which will induce a vortical flow pattern in the chamber.

The tubes **13** serve to locate a charge of solid detergent cartridges, capsules or the like, three of which are shown in dot and dash lines in FIGURE 2. In the embodiment shown the injection tubes **13** have perforations **15** over their length but in practice the moulding including the tubes may be formed un-pierced and pierced or truncated by the user to suit his requirements.

Preferably, as shown, studs **14** having spigoted ends **14'** are provided on which the detergent cartridges **16** rest

hereby supporting the cartridges and preventing clogging of the outlet from the mixing chamber by undissolved particles of solid which have detached themselves from the solid charge. The ends of the spigots **14'** may also optionally be perforated by the user in order to facilitate solution of the cartridges when they have dissolved to a large extent.

The hole **21** in the valve disc **12** is brought into use when discharging solution at which time disc **12** is turned to bring hole **21** over the outlet **4** and channel **19** over inlet **3** as shown in FIGURE 5. Liquid entering **3** will thus flow into channel **17** via limb **19** and thence be injected into the chamber **7** via the tubes **13**, finally leaving the chamber through hole **21** and outlet **4**. The second hole **22** serves as a drain outlet to enable the contents of chamber **7** to drain out through **4** when the valve disc is in the "Off" position as shown in FIGURE 4. When passing liquid e.g. water through the dispenser, with disc **12** which in the position shown in FIGURE 2 liquid passes through inlet **3** along limb **20** around channel **17** and thence outwardly via limb **18** and outlet **4**.

The width of the channel **17** in practice is arranged to be equal to the internal diameter of the liquid injection tubes and of a depth to give a cross-sectional area for flow equal to that of the injection tubes.

In operation, having connected up the nozzles **9** to the necessary lengths of hosing, the cap **2** is removed and the detergent cartridges or capsules are placed in position, resting on the studs **14**. Having replaced the cap **2** and assuming it is desired to discharge water the valve lever **10** is moved against the stop face **23** marked "Water" when the valve disc **12** takes up the FIGURE 2 position, water entering through inlet **3** whence it flows along channel **17** and out through outlet opening **4** without entering chamber **7**. No detergent solution can therefore be produced as there is no access from mixing chamber **7** to outlet opening **4**.

In order to shut off the unit, valve lever **10** is moved to a central position when the disc is in the position shown in FIGURE 4. Inlet opening **3** is blanked off by disc **12** and no water enters the unit. Hole **22** now connects the mixing chamber with the outlet opening **4** and allows any solution remaining in the mixing chamber to drain. This avoids the breakdown of the detergent charge by dissolution when not actually in use.

To discharge detergent solution the valve lever **10** is moved against the stop face **23** opposite the inlet **3** to bring the valve disc into position shown in FIGURE 5. Water on entering inlet **3** circulates round channel **17** and from there passes into mixing chamber **7** through the holes **15** in guide tubes **13**. A swirling motion is then set up facilitating dissolution of the charge to form a mixture of detergent solution and foam which leaves the chamber through hole **21** and outlet opening **4**.

Replenishment of the mixing chamber with a fresh charge is easily achieved by unscrewing the cap **2**.

Thermoplastic materials of construction are used, preferably polypropylene but materials such as brass or aluminium alloy may be used.

The support studs **14** may be supplemented by other support means such as a raised grid or wire tray of circular plan, the tray or grid having holes to allow it to be placed in the chamber around the injection tubes and resting on the collars formed at the extension of the studs by the spigot ends **14'**.

Alternative applications for this device are the dispensing of dilute solutions of materials such as fertilizers for horticulture use, crop sprays, disinfectants for general purposes, fire retardents or extinguishers.

What I claim is:

1. In a mixing and dispensing apparatus for mixing materials with a flowing liquid and comprising a hollow body having a base and a detacheble cap, a mixing chamber enclosed within said body, inlet and outlet ports in said body for admission and discharge of liquid, the

improvement comprising a valve plate mounted for angular displacement within said chamber, a plurality of injection nozzle elements on said plate and extending into the chamber and serving to locate cartridges or capsules, outlet and drainage ports in said plate for registration with said body outlet port, a feed channel formed in said valve plate on its underside, passages through said valve plate communicating said channel with said injection nozzle elements, and a plurality of branch limbs projecting out of said channel and means for effecting displacement of said valve plate to position a selected port and/or limb for registration with said body ports so as to admit liquid to said channel and whereby,

(i) two of said limbs can be positioned to place said channel in connection respectively with said body inlet and outlet ports for direct passage of liquid therebetween without entering said mixing chamber or

(ii) one branch limb of said channel can be placed in connection with said body inlet port and said valve plate outlet port can simultaneously be placed in connection with said body outlet port to enable liquid to pass through said chamber and out through said outlet ports or

(iii) said body inlet port can be closed off and said drainage port can be placed in connection with said body outlet port to allow drainage of said mixing chamber.

2. Apparatus as claimed in claim **1**, comprising injection nozzle elements having laterally directed discharge orifices.

3. Apparatus as claimed in claim **2**, wherein said valve plate is provided with spacing means to support the cartridges or capsules in a position above said valve plate.

4. Apparatus as claimed in claim **3**, comprising a valve plate formed of synthetic plastics material and having nozzle elements moulded integrally therewith.

5. In a mixing and dispensing apparatus for mixing materials with a flowing liquid and comprising a hollow body having a base and a detachable cap secured on said body, a cylindrical mixing chamber enclosed within said body, inlet and outlet ports in said body for admission and discharge of liquid and to permit of drainage therefrom, the improvement comprising a valve plate mounted for angular displacement with said chamber and in sliding engagement with said base an axially directed spindle formed on said valve plate, and projecting through said base and means connected to said spindle externally of said body for providing angular displacement of said valve plate, said valve plate being formed integral with a plurality of tubular injector nozzle elements extending perpendicularly from said plate and serving to locate cartridges or capsules, outlet and drainage ports in said plate adapted to be brought into registration with said body outlet port, an annular feed channel formed in said valve plate on its underside, passages through said valve plate communicating said channel with said injection nozzle elements and three outwardly extending branch limbs formed in said channel and adapted to be brought into registration with said body ports so as to admit liquid to said channel, said valve plate having three positions whereby

(i) two of said limbs can be positioned to place said channel in connection respectively with said body inlet and outlet ports for direct passage of liquid therebetween without entering said mixing chamber or

(ii) one branch limb of said channel can be placed in connection with said body inlet port and said valve plate outlet port can simultaneously be placed in connection with said body outlet port to enable liquid to pass hrough said chamber and out through said outlet ports or

(iii) the body inlet port can be closed off and said

drainage port can be placed in connection with said body outlet port to allow drainage of said mixing chamber.

6. Apparatus as claimed in claim 5, wherein studs with or without spigoted ends are moulded integrally with said valve plate and form spacing means to support cartridges and capsules in a position above said valve plate.

7. A mixing and dispensing apparatus for mixing materials with a flowing liquid and comprising a hollow body having a base, a detachable cap secured on said body, a mixing chamber defined by said body and said cap, inlet and outlet ports in said body for admission and discharge of liquid and to permit of drainage therefrom, the improvement comprising a valve plate mounted for angular displacement within said chamber, a plurality of injection nozzles elements provided on said plate so as to extend perpendicularly thereto and serving to locate cartridges or capsules, outlet and drainage ports in said plate adapted to be brought into registration with said body outlet port, a feed channel formed in said valve plate on its underside, passages through said valve plate communicating said channel with said injection nozzle elements, a plurality of branch limbs formed in said channel and adapted to be brought into registration with said body ports so as to admit liquid to said channel, a spindle projecting from the underside of said valve plate and extending through said base, a lever member secured to said spindle for providing angular displacement of said valve plate and stop means provided to limit the angular displacement of said valve plate at two positions by engagement with said lever whereby said valve plate is located to discharge liquid or solution.

8. Apparatus claimed in claim 7, wherein bracket arms are moulded integrally with said body, said stop means being provided on said bracket arms.

9. Apparatus as claimed in claim 8, said bracket arms being curvilinear in plan so that when attached to the wall the apparatus possesses shock resistance.

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