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METERING AND DISPENSING UNIT FOR FLUIDIC MATERIALS

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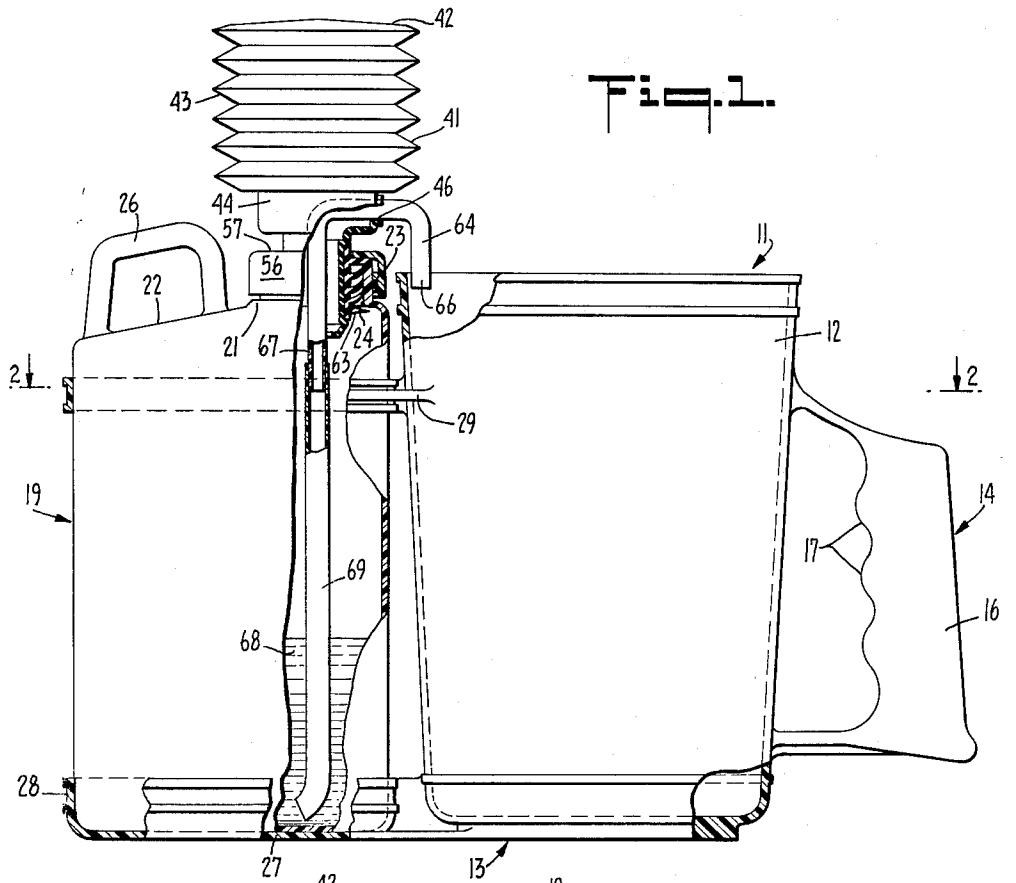


Fig. 1.

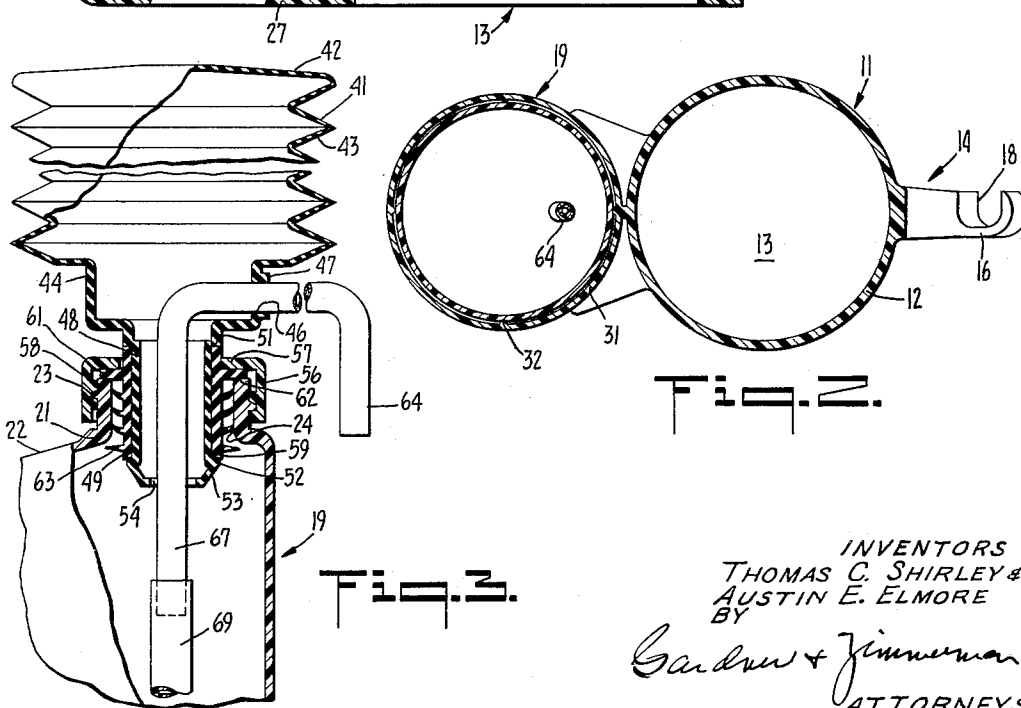


Fig. 2.

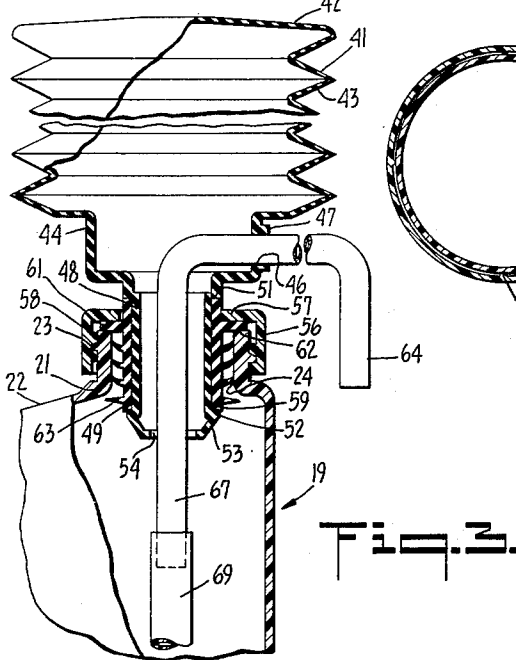


Fig. 3.

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**METERING AND DISPENSING UNIT FOR
 FLUIDIC MATERIALS**

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 4 Claims. (Cl. 141—375)

Our invention relates, in general, to apparatus for metering and dispensing fluidic materials and, more particularly, to unitary apparatus adapted to facilitate the metering, dispensing and use of various fluidic materials having corrosive and/or high solvency and cleaning properties used, for example, in janitorial and other cleaning activities or the like.

In accordance with conventional practice, cleaning of sanitary installations is frequently facilitated by pouring or shaking a cleaning preparation in powdered or liquid form directly into the toilet, urinal, or other fixture. After a suitable soaking period, the cleaning preparation is swabbed or brushed around over the fixture surfaces by means of a mop, brush, or the like, and then flushed from the fixture. Alternatively, in some instances, the cleaning preparation is dispensed to the mop, or other implement as it is held over the fixture, the fixture thus receiving the excess preparation spilled from the implement. Subsequently, the implement is used as in the previous case to scrub the cleaning preparation around in the fixture. It will be appreciated that numerous disadvantages are inherent in either of the foregoing rather primitive systems of cleaning. It is difficult to measure the precise amount of cleaning preparation requisite to the efficient cleaning of the fixture. This difficulty is enhanced by virtue of the cleaning preparation, in most instances, being added to water in the fixture and being diluted therein to an indeterminable extent. Commonly too much or too little of the preparation is used resulting either in waste or ineffective cleansing. Since effective liquid preparations are often caustic or corrosive to materials other than ceramic, or may have destructive solvent properties for such other materials, spillage and splashing which may ensue in such operations can be a significant hazard. Likewise, material which adheres to lip regions of the container of cleaning preparation, where same is liquid, may flow downwardly upon the outer surfaces of the container as well as to bottom areas where skin surfaces may come inadvertently into contact therewith or where the highly active agents may come into contact with furniture surfaces, etc. which are harmed thereby. Similarly undesirable events occur when the sopping wet brush, mop or the like is carried from fixture to fixture. Accordingly, there exists a long felt need for a means for safely and simply metering and dispensing fluidic cleansing agents as well as for facilitating the application of the material and for transporting applicator implements between operations.

In order to facilitate the use and application of cleansing preparations of the character indicated in the foregoing we provide a unitary apparatus assembly where-with essential operations may be performed without incurring the difficulties noted above. Stated briefly, such apparatus includes a storage container for the cleaning preparation in fluidic form, means for transferring a measured quantity of the preparation therefrom, and a receptacle portion into which the cleansing preparation is dispensed in measured proportions by the transferring means. An applicator may be positioned in said receptacle portion to receive the preparation so that the apparatus is arranged as a compact unit that may be safely and easily transported and operated.

Accordingly, it is an object of our invention to provide a compact unitary apparatus assembly to facilitate the dispensation and application of fluidic cleaning preparations.

Another object of our invention is to provide apparatus for storing, transporting and dispensing fluidic cleaning preparations in a safe and convenient fashion. A further object of our invention is to provide a unitary apparatus wherewith fluidic cleansing preparations may be transported and dispensed in measured amounts or in predetermined concentrations and applied to an appropriate applicator in a safe and convenient fashion.

A still further object of our invention is to provide a compact unitary apparatus for transporting and dispensing cleaning solutions including a fluid storage container or reservoir together with a receptacle, and where-with there is employed a simple bellows type means for transferring controlled amounts of fluid from said reservoir to said receptacle for application to a suitable applicator.

The invention possesses other objects and features of advantage, some of which, with the foregoing will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adapted within the scope of the invention as set forth in the claims.

With reference to said drawing:

FIGURE 1 is a side elevational view of a unitary fluid metering and dispensing apparatus assembly having a portion broken away to better display internal constructional details.

FIGURE 2 is a horizontal cross sectional view along the plane 2—2 of FIGURE 1.

FIGURE 3 is a side elevational view of bellows and bottle neck regions of the apparatus of FIGURE 1 illustrated partially in vertical cross section to better illustrate constructional details.

Considering now the invention in some detail and referring to the form illustrated in the drawing, the unitary apparatus is provided as a closed fluid storage container means in which a fluidic cleaning preparation may be disposed. Said container means is joined to an appropriate open fluid receptacle means in which an applicator appropriate for the cleansing operation to be performed may be disposed. In accordance with salient aspects of the invention, fluid transferring and metering, or measuring means, are arranged in association with neck portions of said storage container for dispensing a selected or predetermined quantity of fluid from said container into said receptacle to contact and saturate said applicator as required during cleaning operations. Accordingly, there is provided a compact unitary assembly with which an applicator, or equivalent implement may be transported and/or supplied with a fluidic cleaning preparation as required in intermittent or repetitive cleaning operations.

As regards the receptacle means mentioned in the foregoing, and referring to FIGURE 1, such receptacle means is preferably provided as an open top pitcher-like vessel 11 having a slightly tapering sidewall 12 and a closed bottom 13. The receptacle is also provided with an outwardly projecting handle 14 by which the apparatus assembly may be carried and manipulated as a unit. In this respect the handgrip portion 16 of handle 14 may be provided with convolutions 17 which improve gripping properties. To conserve materials axial and communicating portions 18 of one side of the handle 14 may be hollowed out as shown in FIGURE 2. It will be apparent

that such a receptacle construction is quite advantageously adapted for fabrication by conventional plastic molding techniques using materials such as high impact polystyrene resins or other thermoplastic or thermosetting plastic resin compositions having requisite physical properties and possessing characteristically good resistance to attack by the types of agents employed herein. Likewise, the low weight characteristics of such compositions are advantageous in reducing the effort required for transporting and manipulating same.

The storage container or reservoir means of previous mention may take the form of a bottle or jug 19 as shown in FIGURE 1 and may comprise a standard commercial container or, preferably, a plastic container produced by a conventional blow-molding or similar technique. Containers of such a character are advantageous in being substantially unsusceptible to breakage and in possessing requisite resistance to corrosive or solvent attack. More particularly the container bottle 19 may be of a convenient size of the order of one to three quarts in volume and of a generally cylindrical configuration. A neck 21 is preferably provided adjacent to an edge in the top 22 of bottle 19. The neck is provided with means such as an exterior thread 23 for attaching a stopper (not shown) or is adapted for use as described hereinafter. Likewise, the interior wall surface 24 of neck 21 is constructed to provide a substantial length of smooth and generally cylindrical surface configuration. For convenience in handling the container when detached from the assembly as well as when incorporated therein, a handle 26 may be provided, preferably on the free surface areas of container top 22 as shown in FIGURE 1. It will be appreciated that the container neck 21 may be constructed in various standardized internal diameters, e.g., 28, 32 and 38 mm. I.D.

In order to facilitate the joinder of storage container 19 to receptacle vessel 11, bottom portion 13 of said vessel may be made thicker for strength and extended outwardly in a direction opposite to said handle so as to provide a base portion 27 having a raised peripheral rim 28 within which the bottom of container 19 may be seated. Means for securing container 19 on base portion 27 may take the form of a spacer block 29 molded into the upper exterior surface of the receptacle sidewall, opposite handle 14 as shown in FIGURE 1. Such block is provided with an outwardly disposed arcuate face 31 against which the sidewall of container 19 abuts and is cradled as may best be seen in FIGURE 2. A band 32 of plastic, etc. is attached to the surface 31 and encircles container 19 so as to retain same securely upon base portion 27.

The band 32 ordinarily need only be sufficiently tight to provide a loose slip-fit about the container and the flexibility of some plastic containers, if used, may allow a tighter and more secure grip. While a detachable container reservoir was described above, it is possible that the container and receptacle vessels could be fabricated by molding as an integral unit. Alternatively, heat welding or cementing methods might be used to join the components permanently. In addition, to providing support for the container 19 it will be noticed that the extended base portion 27 also lends stability to the base to offset any tendency for the apparatus to tip over.

With the receptacle and container means assembled as set forth above, suitable fluid transfer or pumping means may now be fitted in association with neck 21 of container 19 to dispense fluid into receptacle vessel 11. In general a simple bellows or piston positive pressure type of pumping means is preferred. Moreover, it is preferred that such means be provided with a fixed capacity discharge or be adapted to discharge fluid at a controllable rate permitting dispensation of a visually determined level of fluid into such receptacle vessel.

An especially preferred means of the character mentioned is that shown in FIGURES 1 and 3 and which is

described in some detail herein, but not claimed specifically herein, such means being herein claimed only as a component of an overall combination. Such means incorporates features of more general utility than for purposes of relevance herein and accordingly a materially amplified disclosure of such means and other apparatus embodiments are set forth and are claimed specifically in our copending application Serial No. 260,212, filed Feb. 21, 1963, entitled "Coupling Mechanism and Devices Incorporating Same," Patent No. 3,214,066.

The especially preferred pump means includes a bulb portion 41 which may be similar to an ordinary syringe bulb in shape but preferably is constructed as shown in FIGURES 1 and 3. As illustrated therein bulb 41 has an upper flat or slightly convex end wall 42 and an elongated circumferentially convoluted or corrugated cylindrical sidewall 43 of molded flexible plastic or rubber being therefore what may be termed a bellows type bulb. Sidewall 43 terminates at the lower end in a somewhat constricted short cylindrical section 44 which is made with a sufficient wall thickness or of a joined material of increased stiffness so that section 44 is relatively rigid and nondeformable. A circular perforation 46 transpiercing a thickened portion 47 of section 44 is provided for purposes set forth more fully hereinafter. The cylindrical section 44 is continued at the lower end as an elongated further constricted generally cylindrical neck portion 48 having an outside diameter small enough to fit within neck 21 of container 19.

The bulb neck 48 is provided with an exterior cylindrical surface 49 of substantially uniform diameter extending from a circumferential shoulder stop 51 at the upper end to a circumferential ridge 52 at the lower end and terminates in an inwardly tapered frusto-conical nose section 53 having a substantially coaxially aligned circular orifice 54 therein. A locking ring 56 is disposed about bulb neck portion 48 and includes an upper inwardly projecting shoulder 57 and a downwardly depending skirt portion 58 threaded internally to engage thread 23 of bottle neck 21. A molded generally cylindrical sleeve 59 provided with an outwardly circumferential shoulder or flange 61 near the upper end thereof is forced over the nose 53 and ridge 52 of the bulb neck 48 so as to seat firmly along the cylindrical surface 49. Use of a flexible and slightly extensible plastic, e.g., polyethylene, polypropylene, etc., facilitates this operation. When so disposed the sleeve 59 is retained in place by the abutment of ridge 52 against the lower end thereof. Other means may likewise be employed to retain the sleeve in place.

Ring shoulder 57 may now exert pressure across the flange 61 when the ring is threaded upon bottle neck 21 whereby the lower surface of flange 61 is brought into firm contact with the uppermost end 62 of neck 21.

In order to assure proper centering and alignment between the bulb and bottle neck so as to obtain an effective seal as well as to consistently obtain optimum physical strength, a series of thin flexible circumferentially outwardly projecting fins 63 are provided on lower exterior surface portions of the sleeve 59. The fins 63 are made to project sufficiently to engage the interior bottle neck surface 24 in such a manner as to be deflected so as to exert a centering force on the sleeve 59 thereby assuring proper positioning of flange 61 with respect to the bottle neck and end 62. Moreover, circumferential fins 63 constitute siding ridges which augment sealing effects of ridge 61.

In order to provide for the transfer of fluid from container 19 to receptacle 11 a semi-rigid tube 64 is passed through perforation 46 in sealed relation to the thickened portion 47 of bulb neck section 44. Outwardly projecting portions of tube 64 are bent downwardly to provide a spout section 66 which is directed into upper interior regions of receptacle 11 so that fluid discharged therefrom enters receptacle 11. Inwardly directed portions

of tube 64 are likewise bent providing a diptube section 67 passing downwardly through the interior of the bulb neck 48, through orifice 54 and fitted loosely therein to finally terminate beyond the nose section 53 of bulb 41. Diptube 67 may be made of a sufficient length to terminate adjacent the bottom of the container 19; however, since such a bulb assembly may be used with different depth bottles it is usually more convenient to terminate the semi-rigid tube a short distance beyond nose section 53 and provide a flexible tubing section extension 69 which is slip fit over the end of diptube section 67 and extends beneath the level of fluid 68 and preferably terminates near the bottom of container 19.

With the bellows bulb pumping means arranged as shown, applied external pressure causes bulb 41 to collapse forcing air through the bulb neck 44 so as to apply a positive gas pressure to the surface of fluid 68. Fluid 68 then rises through the diptube and discharges through the spout 66 into receptacle 11. A reasonably consistent volume of fluid is discharged by depressing bulb top 42 each time to the same chosen level or fully to the limit of travel and maintaining the pressure until fluid ceases to flow from spout 66. Multiple operations may be employed if more fluid is required. Alternatively, calibration indicia may be provided on the interior wall surface of receptacle 11 to indicate filling and/or dilution levels as desired.

The pumping means described above possesses the obvious advantage that no check valves are required. The compression of the bellows bulb causes fluid to be dispensed through tube 46 as described above. When the pressure is released the bulb tends to expand, creating a reduced pressure in the container sufficient to draw residual fluid thereinto and a quantity of air in the bulb so as to reestablish initial conditions whenceforth the cycle may be repeated. Since the fluids present in the container do not at any time enter bulb 41, there is no danger that the flexibility of such bulb bellows would be undesirably affected or that the bulb would otherwise be damaged by potent agents. Of course, other means capable of producing a positive pressure in said container would obtain a similar benefit. In the event that requirements were not too stringent it is considered readily apparent that with a considerable sacrifice in basic simplicity the system shown could be converted to utilize the bellows bulb as a fluid suction device. For this purpose the tube 64 would be sealed in the bulb neck region and the tube disposed between the bulb nose section 53 while thickened portion 47 of the bulb neck would be omitted. Check valve means would be required in the diptube and spout portion of tube 64 and an air vent would need to be provided in container 19. Also, the container provided with any of the foregoing fluid pumping means could be used separately from the receptacle as a fluid dispensing container for other purposes.

A wide variety of corrosive and caustic aqueous fluids either base or acid in character, powerful detergent solutions, disinfectant solutions, scouring solutions and emulsions and other similar fluidic compositions used for cleaning, scouring and sanitation purposes as well as for other purposes may be dispensed in diluted or undiluted form from the apparatus for the present invention. A comparably wide variety of applicators such as mops, swabs, brushes, sponges, etc., may be disposed in the receptacle portion to receive the dispensed agent. When so disposed only one hand is required to transport the compact assembly from fixture to fixture leaving the other hand free for other duties. Also, the applicator may be removed and replaced without dripping and splashing since the compact unit may be moved in close proximity to the work area as needed.

What is claimed is:

1. A compact portable unitary apparatus for dispensing and applying a fluidic cleaning composition to an applicator comprising molded plastic receptacle means

adapted to receive said applicator; molded plastic bottle or jug container means having a neck outlet and adapted for the storage and transport of said fluidic composition; means detachably securing said container to said receptacle means, including a base portion extending laterally from the bottom of the receptacle means and upon which said container is seated, a band encircling said container; means to secure said band to the upper portion of said receptacle means; compressible bulb pumping means secured to said outlet, said bulb pumping means having a neck portion disposed in said neck outlet and having an opening communicating the interiors of said bulb pumping means and container means; and tube means extending from below the fluid level in said container upwardly through said opening in spaced relation thereto and thence outwardly through a side wall of said neck portion in sealed relation thereto to discharge into said receptacle.

2. A compact portable apparatus for dispensing and applying controlled amounts of fluidic cleaning composition to an applicator comprising molded plastic receptacle means adapted to receive said applicator and including a molded handle portion projecting outwardly from one side thereof; molded plastic jug or bottle container means adapted for the transport and storage of said fluidic composition and including exteriorly threaded neck outlet; means detachably securing said container to said receptacle means, said means including a base portion extending laterally outward from the bottom of said receptacle means in the direction opposite to that in which said handle projects and having a raised rim into which said container is seated, a band encircling said container; means to secure said band to the upper portion of said receptacle means, a compressible bellows bulb having an elongated semi-rigid neck portion adapted to fit within said container and including a flanged shoulder, said neck portion having a passage extending therethrough from the interior of said bulb; locking ring means engaging said threaded container neck and retaining said neck shoulder against said neck; and diptube means extending from below the fluid level of said container and passing through said passage of said neck portion in spaced relation thereto and transpiercing a side wall of said neck portion to emerge as a spout portion directed into said receptacle.

3. A compact portable apparatus for dispensing and applying controlled amounts of a fluidic cleaning composition to an applicator comprising molded plastic receptacle means adapted to receive said applicator and including a molded handle portion projecting outwardly from one side thereof; molded plastic jug or bottle container means adapted for the transport and storage of said fluidic composition and including an exteriorly threaded neck outlet; means detachably securing said container to said receptacle means, said means including a base portion extending laterally outward from the bottom of said receptacle means in the direction opposite to that in which said handle projects and having a raised rim into which said container is seated, a spacer block on the upper portion of said receptacle means on the side thereof opposite to said handle, a band encircling said container; means to secure said band to said spacer block; a compressible bellows bulb having an elongated semi-rigid neck portion adapted to fit within said container and having a passage therethrough communicating with the interior of said bulb; an interchangeable sleeve molded of flexible material and disposed upon said elongated neck portion of said bulb, said sleeve including an outwardly flanged shoulder formed thereon; locking ring means engaging said threaded container neck and retaining said neck shoulder against said neck; and diptube means extending from below the fluid level of said container upwardly through said passage of said neck portion and outwardly through a side wall thereof to define a spout directed into said receptacle.

4. Apparatus as defined in claim 3 wherein said sleeve disposed upon said bulb neck also includes at least one

thin highly flexible circumferential fin formed thereon serving to center said bulb neck in said container neck.

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