United States Patent [19]

Walker

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[54] **PRESSURIZED CONTINUOUS FLOW LIQUID APPLICATOR WITH SHUT-OFF VALVE**

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[21] Appl. No.: **288,862**

Related U.S. Application Data

[63] Continuation of Ser. No. 85,764, Oct. 30, 1970, abandoned, which is a continuation of Ser. No. 50,263, June 26, 1970, which is a continuation-in-part of Ser. No. 794,175, Jan. 27, 1969, abandoned.

[52] **U.S. Cl.**..... **401/188,** 401/203, 401/197

[51] **Int. Cl.**..... **A46b 111/02,** B44d 3/28

[58] **Field of Search**..... 401/188, 196, 183, 401/203; 222/212

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Primary Examiner—Lawrence Charles
Attorney—A. C. Nolte, Jr.

[57] **ABSTRACT**

A system for the application of liquid to a surface, such as by painting, washing and waxing, in which the liquid source is maintained under a constant super-atmospheric pressure and a flexible cable is connected between the pressurized liquid source and the liquid applicator. A shut-off valve can selectively pinch-off the cable in order to cut off the liquid supply to the applicator. The liquid applicator can be fixed or movable to selected positions and may be in the form of a roller.

2 Claims, 21 Drawing Figures

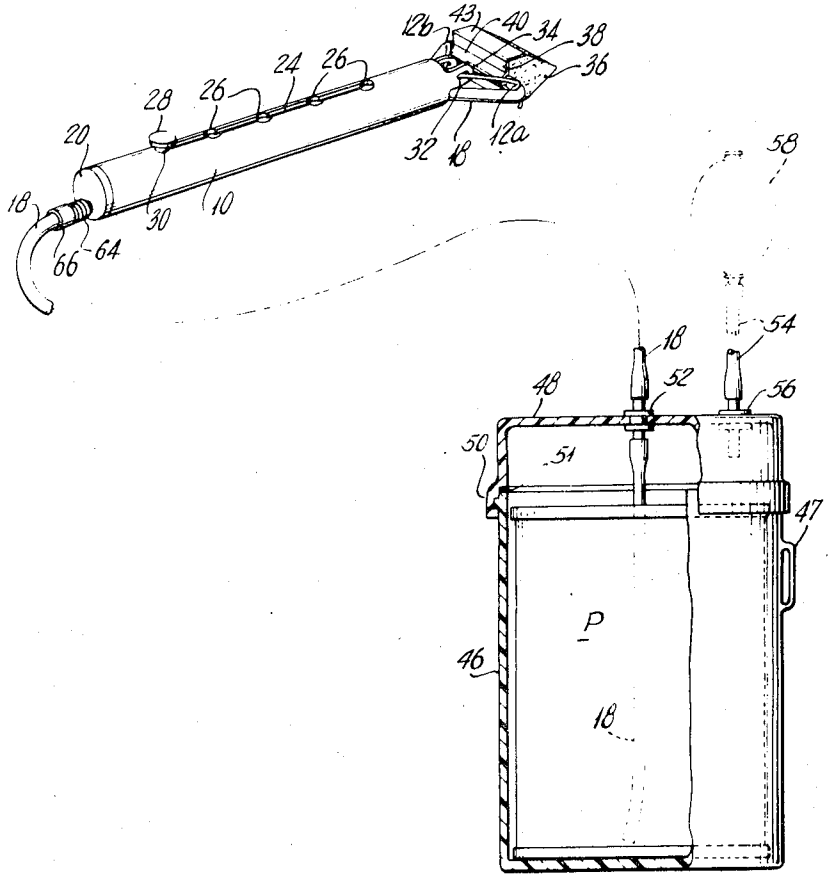
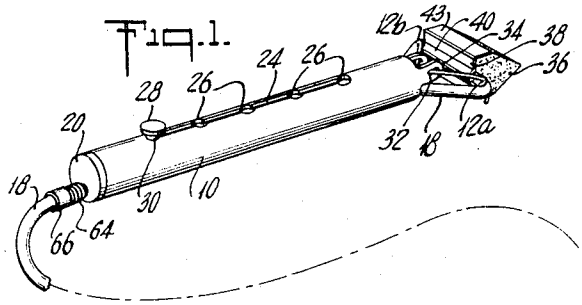


Fig. 1.



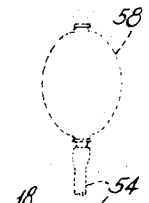


Fig. 2.

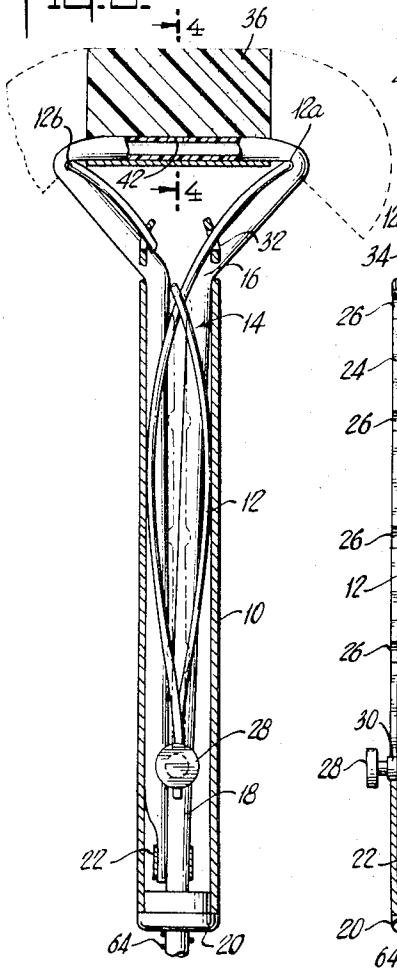


Fig. 3.

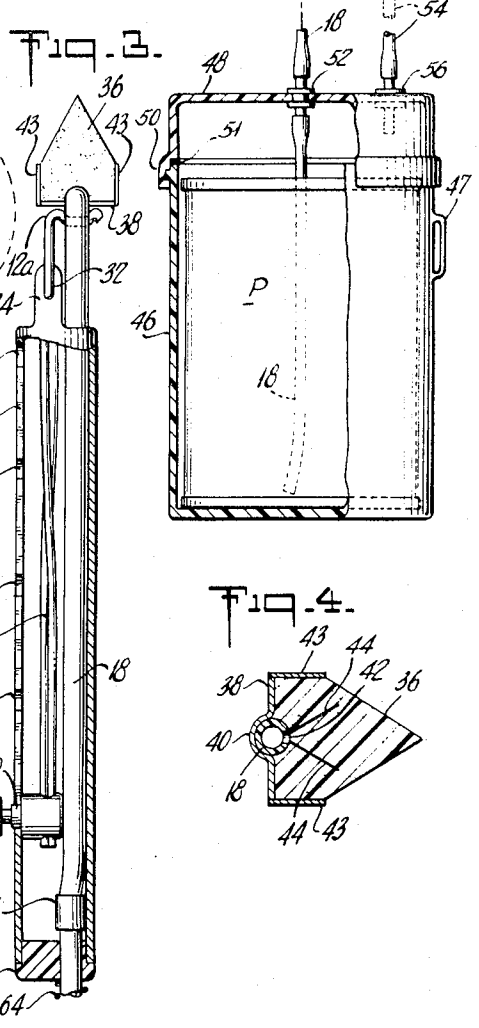


Fig. 4.

Fig. 5.

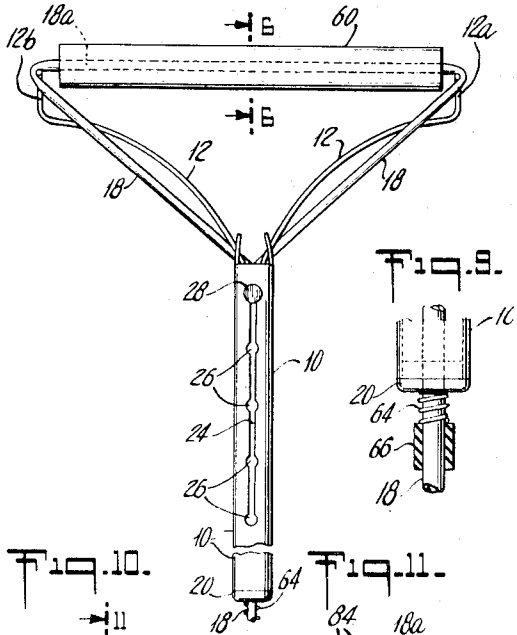


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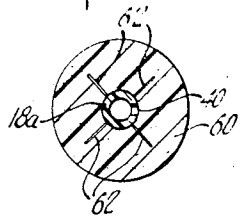


Fig. 8.

Fig. 7.

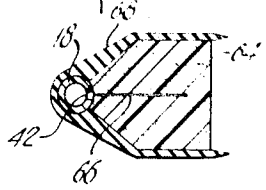


Fig. 10.

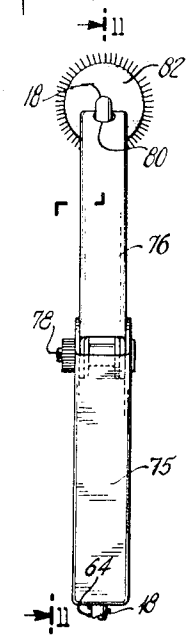


Fig. 11.

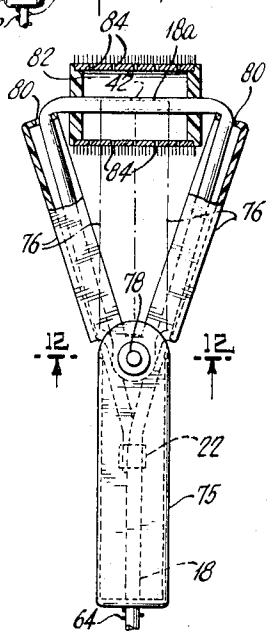


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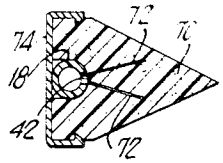


Fig. 12.

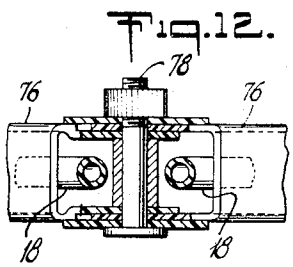


Fig. 13.

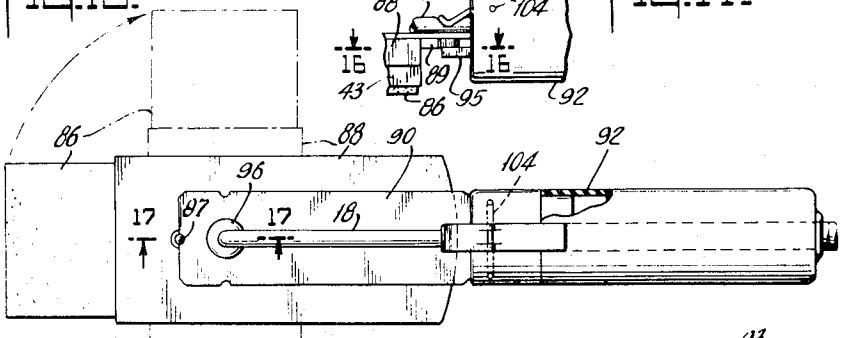


Fig. 14.

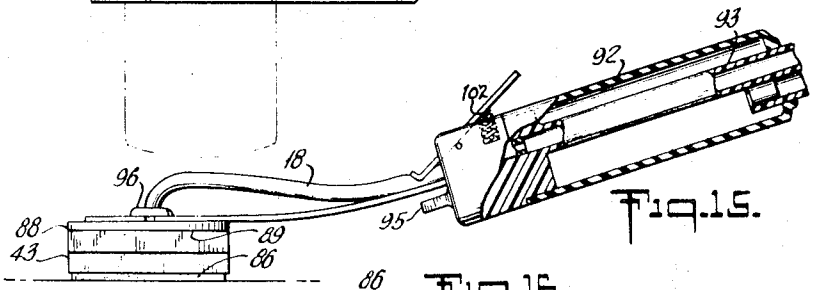


Fig. 15.

Fig. 16.

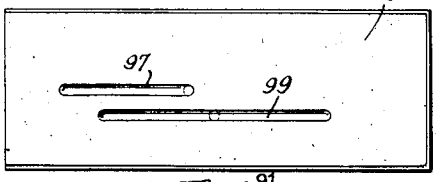
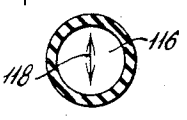


Fig. 21.



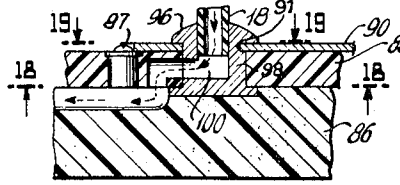
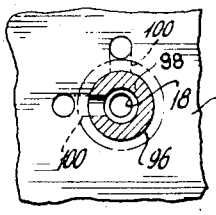


Fig. 17.

Fig. 20.

Fig. 19.

Fig. 18.



PRESSURIZED CONTINUOUS FLOW LIQUID APPLICATOR WITH SHUT-OFF VALVE

This application is a continuation of application Ser. No. 85,764 filed Oct. 30, 1970, now abandoned, which is a continuation of application Ser. No. 50,263 filed June 26, 1970 which is a continuation-in-part of application Ser. No. 794,175 filed Jan. 27, 1969, now abandoned.

BACKGROUND OF THE INVENTION

The use of a liquid applicator, such as a paint brush or roller employed in painting, involves the frequent dipping of the paint brush or roller in a paint can or a paint tray, respectively. In many cases, the painter uses a ladder or scaffold which requires frequent bending to dip the brush or roller in the paint container and also may involve the descending from the ladder in order to dip the implements in paint containers resting on the floor. This type of painting operation obviously involves a great deal of time to intermittently renew the paint supply which thereby lessens the speed of painting. It is, therefore, extremely desirable to have a continual source of paint supply, or other liquid supply fed to the applicator, such as a paint brush. or roller, so that the painter or cleaner may upon command, by means of a valve at his fingertips, turn the paint or other liquid supply on and off.

It should be apparent that although pressurized painting devices are known, none of these devices have the distinct advantages of the apparatus of the present invention.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a pressurized, continuous-flow liquid applicator which is portable and may be worn and carried by the user.

It is another object of the present invention to provide a pressurized, continuous-flow liquid applicator having an adjustable width of brush, roller or squeegee.

It is a further object of the present invention to provide a painting method which is more efficient than present known method and which minimizes paint wastage and involves much less drip and spatter.

It is another object of the present invention to provide a painting or cleaning device which has less friction and requires less effort since paint or liquid is dispensed from within the applicator to thereby lubricate the entire applicator surface when it is being used. Moreover, the paint or the liquid spreads on the applied surface more evenly.

A still further object of the present invention is to provide a liquid applicator which can be of a convex or a concave form, to be particularly effective in painting or cleaning structures having curves, such as boats.

Another object of the present invention is to provide a painting system which does not permit the paint to thicken from continuous air exposure, and additionally used less paint.

It is another object of the present invention to provide a liquid applicator for painting, window washing, car washing, waxing or any type of liquid application. Moreover, the brushes, rollers and squeegee are disposable thereby reducing the clean-up time to a minimum.

A further object of the present invention is to provide a paint container packaged in the form of a flexible plastic bag which can be inserted in a portable pressurized container.

An object of the present invention is to provide a control valve which closes the flexible tube by pinching the exterior thereof thereby making the flow of paint or liquid semi-automatic.

Another object of the present invention is to provide an air pumping device in the handle of the brush or squeegee which pumps up liquid to the brush or squeegee merely by the natural motion of the brush or roller in painting or by the manipulation of the squeegee in cleaning.

A still further object of the present invention is to provide a paint applicator surface which is constituted of a plastic foam material that is provided with an adhesive surface for removably fixing the plastic foam to the applicator holder.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be more clearly understood from the following description of specific embodiments of the invention together with the accompanying drawings in which:

FIG. 1 is a partial perspecgive and partial sectional view of the pressurized liquid applicator constructed in accordance with the teachings of the present invention;

FIG. 2 is a sectional view of the applicator and handle;

FIG. 3 is another sectional view of the applicator and handle;

FIG. 4 is a sectional view of the applicator taken along the lines 4 — 4 of FIG. 2;

FIG. 5 is a front elevational view of a slightly modified construction of the device shown in FIG. 1 in which a roller is utilized;

FIG. 6 is a sectional view of the roller shown in FIG. 5;

FIG. 7 is a sectional view of another form of the liquid application;

FIG. 8 is a sectional view of a further modification of the liquid applicator;

FIG. 9 is a detail of construction of the adjustment locking spring for the flexible tubing for the constructions shown in FIG.S 10 and 11;

FIG. 10 is alternative construction of the pressurized liquid applicator as shown in FIG. 1, but illustrated with a roller that can be varied in length;

FIG. 11 is a sectional view taken along the lines 11 — 11 of FIG. 10;

FIG. 12 is a sectional view taken along the lines 12 — 12 of FIG. 11;

FIG. 13 is a partial sectional and partial top plan view of a further modification of the pressurized liquid applicator shown in FIG. 1, in which the applicator can be changed from a brush to an elongated applicator;

FIG. 14 is a fragmentary sectional view of a detail of construction of the structure shown in FIG. 13;

FIG. 15 is a side elevational view of the device shown in FIG. 13;

FIG. 16 is a sectional view taken along the lines 16 — 16 of FIG. 14;

FIG. 17 is an enlarged sectional view of a detail of construction of the applicator shown in FIG. 13 and taken along the lines 17 — 17 thereof;

FIG. 18 is a sectional view taken along the lines 18 — 18 of FIG. 17;

FIG. 19 is a sectional view taken along the lines 19 — 19 of FIG. 17;

FIG. 20 is a partial sectional and partial elevational view of another modification of the pressurized applicator shown in FIG. 1;

FIG. 21 is a sectional view taken along the lines 21—21 of FIG. 20.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to the drawings, and especially FIGS. 1 – 4 thereof, the present pressurized liquid applicator is provided with a hollow handle 10 and a flexible frame 12 having a portion referred to generally by numeral 14 which is adapted to be retracted or projected out of the opening 16 in the top of hollow handle 10. A flexible plastic tubing 18 of the type adapted to recover its original configuration after being deformed is inserted into the hollow handle 10 through closure cap 20. The tubing 18 is supported by the frame ends 12a and 12b. The free end of the tubing 18 is closed off at the bottom of the handle 10 by means of a clamp 22.

The handle 10 is provided with an elongated slot 24 having spaced enalrged openings 26. A finger operator 28 attached to the frame 12 also projects through the slot 24. The operator 28 is provided with a neck portion 30 of reduced diameter. Thus, when the finger portion 28 is depressed the neck portion 30 is lowered into the opening 26 and because of its reduced diameter it is possible to move the operator from one opening 26 to another opening 26. When this occurs the frame 12 moves longitudinally in the hollow handle and a part thereof moves through openings 32 in the ears 34 located at the end of the handle 10 adjacent to the top thereof.

Mounted on the top or horizontal portion 18*a* of the plastic tubing 18 is a polyurethane plastic foam liquid applicator 36 provided with a backing member 38 having a looped portion 40 through which the horizontal portion 18*a* passes. This backing member 38 may be of an adhesive type that can be peeoled off and the liquid applicator disposed of after use. A hole 42 in the horizontal portion 18*a* permits the liquid, such as paint, cleaning fluid or wax to penetrate through the hole 42 into the interior of the plastic foam applicator 36. Guide members 44 embedded in the applicator 36 direct the liquid towards the working surfaces of the applicator 36. A light-weight flexible skirt 43 is shown in FIG. 4 extending along the sides of the applicator 36 and spreads the same evenly therein.

Referring to FIG. 1, a cannister 46 is shown having a cover 48 with an air-tight circumferential flange 50. The dimensions of the cannister are chosen to be such as to permit an opened paint can P to fit snugly therein. In addition, as a safety precaution, an annular relief gasket 51 of flexible plastic is shown within the flange 50. Moreover, a belt loop 47 is shown for optional use with a shoulder belt. The plastic tubing 18 is inserted through the cover by means of an air-tight fitting 52. In order to pressurize the cannister 46 to approximately 5 – 10 lbs. pressure a line 54 is inserted through the cover 48 by means of an air-tight fitting 56 and a bulb 58 connected to the line. Thus, by squeezing the bulb a few times the cannister 46 is pressurized sufficiently to permit the entire contents of the paint can P to be pressure-fed through the flexible plastic tubing to the applicator 36. It is within the scope of the present invention to provide a paint container in the form of a throw away plastic bag formed to fit in the cannister 45.

FIGS. 5 and 6 illustrate the pressure-fed liquid applicator as shown in FIGS. 1 – 4. However, the frame 12 is shown in its most extended position with the finger operator 28 in the topmost enlarged opening 26 and the applicator 60 is in the form of a roller. As seen in FIG. 6, the roller 60 has the tubing portion 18a located in the longitudinal opening in the roller with guide vanes 62 embedded in the roller in order to evenly spread out the paint or liquid being forced out of the tube from the opening 42 into the roller, and subsequently to the entire circumferential surface thereof.

FIG. 9 is a device for holding the flexible plastic tubing taut when the tubing is adjusted upwardly or downwardly within the handle 10. This device is an helical spring 64 captured between the closure cap 20 and a rubber friction sleeve 66, the latter being capable of being moved on said tubing 18 by means of the application of certain amount of manual force thereto.

FIG. 7 discloses a liquid applicator 64 having an external squeegee surface 68 and a vane 66 located in the center of the dispensing opening 42 of the tubing 18. The vane 66 ensures the even distribution of the liquid to the squeegee surface 68.

FIG. 8 is another embodiment disclosing the liquid applicator 70 having the plastic tubing 18 therein with vanes 72 for spreading the liquid forced out of the opening 42. A relatively stiff backing member 74 is provided for the applicator 70.

FIGS. 10 – 12 show a handle unit fabricated preferably of a hard plastic material in which the hollow handle 75 has two arms 76 connected thereto at pivot 78. Each of the arms 76 has holes 80 at their free ends through which the flexible plastic tubing 18 passes. Rotatably mounted on the tubing portion 18a is a roller 82 having openings 84 through which the liquid pentrates to the exterior thereof.

FIGS. 13 – 16 show an alternative embodiment of the present invention in which a liquid applicator 86 is provided with a rigid support 88. Mounted on the rigid support 88 is a flexible metal or plastic plate 90, the latter being also secured to a hollow flexible handle 92. The handle 92 is provided with an internal rigid sleeve 93 surrounding the tubing 18. Thus, the flexible handle 92 may be pressed inwardly and pressurized aainst the rigid sleeve 93 without collapsing or twisting the handle.

On the forward end of the handle 92 is a rigid projection 95 which is adapted to engage another projection 89 on the rigid support 88. This interconnection is clearly shown in FIG. 14. Thus, there is no flexing of the applicator when the same is rotated to the full ine position of FIGS. 13 and 15, since the projections 89 and 95 are interlocked, however, when the applicator is rotated to the dotted line position of FIG. 13 the plate 90 may be flexed. The latter condition is especially useful when using the applicator with an extension handle to reach the uppper parts of walls or windows, when painting or cleaning wide swaths. The plastic tubing 18 passes through the hollow handle 92 and further passes through opening 91 in plate 90, which is sealed against liquid leakage by means of seal member 96. The metal plate 90 is pivoted to support 88 by a pivot pin 98. The seal 96 is provided with channels 100 through which the paint or other liquid may be dispersed through channels 97 and 99 to the applicator 86. In order to stop the flow of paint or other liquid through the tubing 18 a spring-biased pinch valve 102

is shown in FIG. **14** pivoted at **104** and when closed, pinches the tube **13** against the metal plate **90** to thereby selectively shut off the liquid supply to the applicator **86.** It should also be noted that hollow handle **92** is sufficiently flexible to permit squeezing of the handle to pressure up the liquid supply upon the ordinary motion of painting, washing or waxing. Thus, as the user manipulates the handle of the liquid applicator, the ordinary hand movements cause a gradual increase in pressure in the flexible handle to ensure sufficient pressure therein to provide a continuous flow of liquid to the applicator upon demand.

The metal plate **90** is provided with arcuate notches **85** in which a cylindrical projection **87** mounted in the support **88** selectively engages therein to form a locking arrangement for the applicator **86** relative to the hollow handle **92.**

FIGS. **20** and **21** disclose a simplified but reliably effective form of the present invention in which a hollow, flexible handle **106** forming a liquid reservoir, is provided with a head portion **108** of semi-rigid material, such as hard rubber, that is adapted to snap over an annular flange **110** of the handle **106.** The head portion **108** is provided with a backing member **112** for the plastic foam liquid applicator **114.** The head portion **108** is also provided with a normally closed, one-way slit valve **116** whereby upon the application of pressure to the head portion **108** the slit **118** opens to form a passage for the movement of liquid from the hollow handle reservoir to the liquid applicator **114.** Another one-way valve **120** is shown in the bottom of the handle so tha when the handle **106** is squeezed, one-way valve **116** opens to permit the paint or other liquid to be forced through the slit **118** into the applicator **114.** When the pressure on the handle **106** is released, valve **116** closes the one-Way valve **120** opens to permit a fresh supply of paint or liquid to be drawn into the handle **106** which additionally functions as a reservoir.

It is to be noted that as stated hereinbefore, the paint or liquid container may be in the form of a plastic bag. In addition, the pressurizing structure for the plastic bag may take the form of two rigid plates connected at one end by a flexible strap to form a V-shaped container for the plastic bag. Means can be provided for adjusting the spacing between the rigid plates thereby controlling the amount the plastic bag is squeezed. Obviously, if more pressure is desired to be put on the liquid, the rigid plates are selectively moved closer together.

The applicator **36** of polyurethane plastic foam or similar material may be cut to any desired width and applied to the horizontal portion **18***a* of the plastic tubing **18.**

What is claimed is:

1. A liquid applicator having intermittent or continuous flow comprising a hollow flexible handle defining an interior space, a flexible tube, a liquid source connected to said tube, a backing element at one end of said handle in communication with the interior space of said handle and having an applicator member secured thereto, said member being provided with a first valve through which communication with said space is established said valve being normally closed and opening only after a predetermined pressure is applied to said backing element to permit liquid in said space to penetrate through said valve to said applicator member, an additional valve in said handle through which communication between said tube and space is established, said valve operating in reverse to the operation of said first mentioned valve selectively and alternately to permit and prevent liquid entering said space, said handle being unsupported whereby during use it flexes to constitute means to draw liquid from said container through said additional valve and to push liquid drawn through said additional valve through said first valve to said applicator member.

2. A liquid applicator as claimed in claim **1** wherein said first valve is a one-way slit valve.

* * * * *