April 16, 1968 G. SCHWARTZMAN 3,378,330

FLUID DISPENSER

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FIG. 1

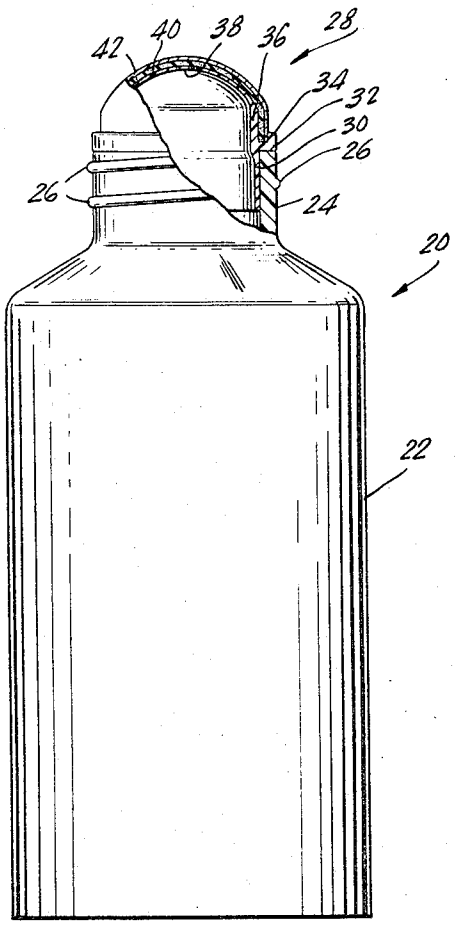
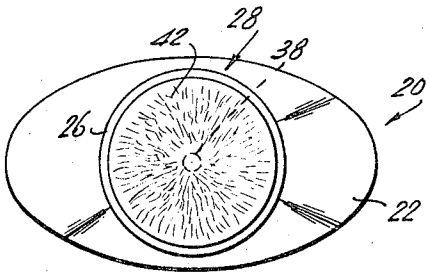


FIG. 2



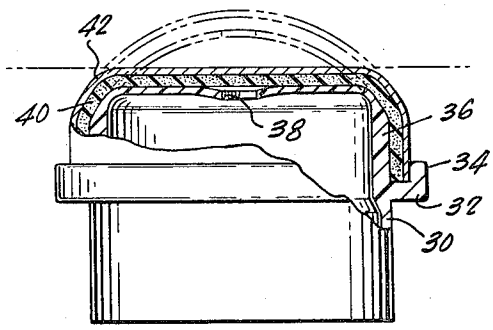


FIG. 3

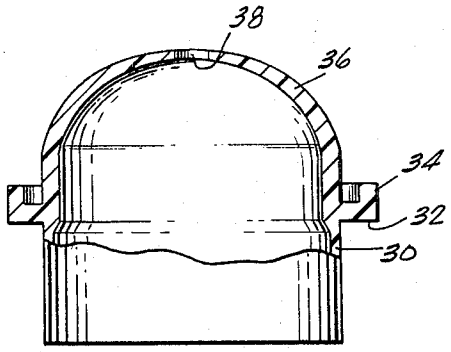


FIG. 4

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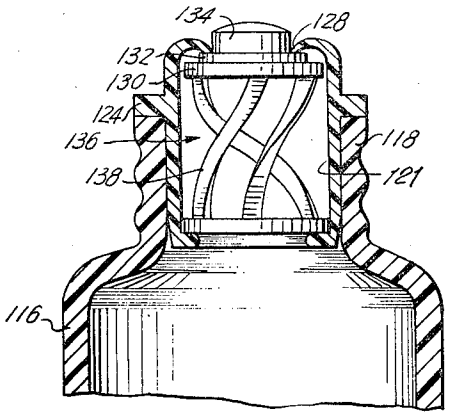
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FLUID DISPENSER

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FIG.6



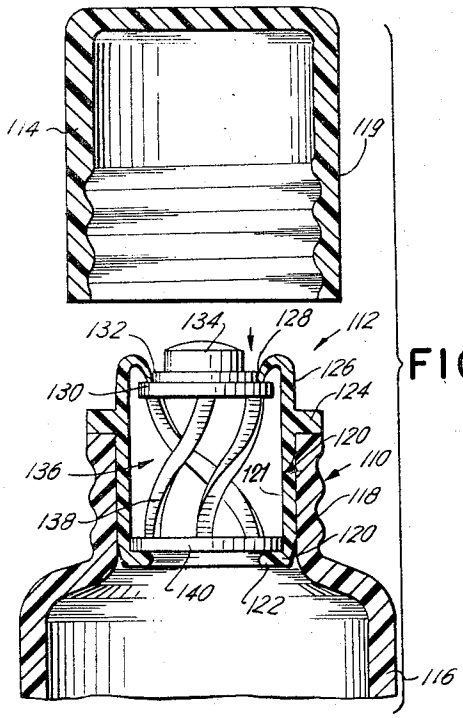
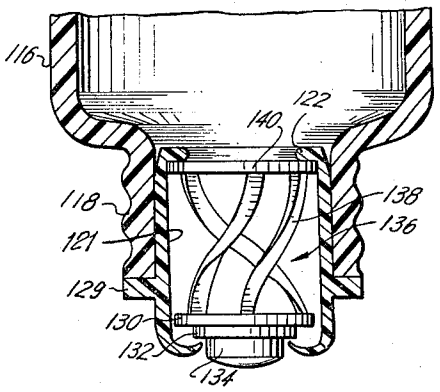


FIG.5

FIG.7



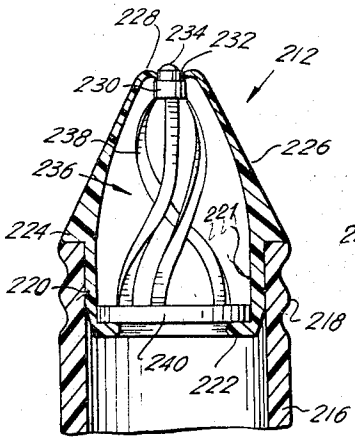


FIG.8

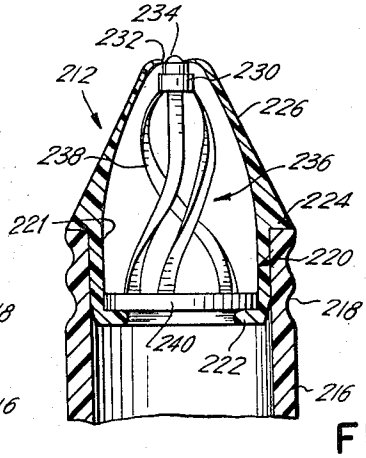


FIG.9

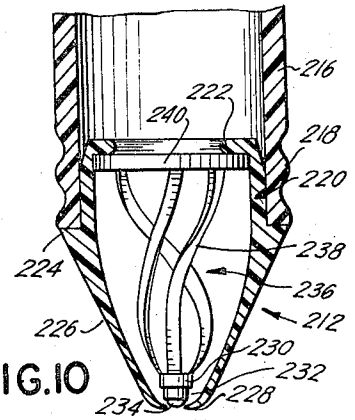


FIG.10

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FLUID DISPENSER

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6 Claims. (Cl. 401—260)

ABSTRACT OF THE DISCLOSURE

An applicator comprising a fluid container having a neck. A retaining ring which has a projecting portion is fitted in the neck. The retaining ring includes an arcuate inwardly turned re-entrant resilient free edge forming a valve seat. A stepped valve member is provided and is movable with respect to the valve seat to control fluid flow through the retaining ring. The re-entrant free edge engages the sides and upper surfaces of the stepped valve member to successively form an initial seal and a secondary seal.

This invention relates to fluid applicators or daubers especially adapted for use in applying hair coloring, cosmetics, shoe polish or medications and for applying fluids to unevenly contoured surfaces.

It has been found that there are many instances in which it is desirable to be able to impart an even amount of fluid or the like to rigid surfaces for the purpose of marking or printing thereupon wherein uniform flow of fluid is important in that the printing or the like must be uninterrupted, even and uniform.

In the past applicators have been produced which are provided with applicator surfaces which actuate mechanical valves within the applicator head, which valves are separated from the surface by a cover or the like. However, these prior art valve assemblies may limit the amount of fluid dispensed. This is particularly true especially prior to the first use of the applicator where sealing means have been utilized to prevent the evaporation, leakage or spilling prior to the first use thereof. During the first use, the material being disposed in such applicators will often be dispensed in too small a quantity.

Therefore, a further object of this invention is to overcome the disadvantage of a prior art applicator by providing for maximum fluid distribution.

Further, it is an object of this invention to provide for a constant flow of fluid from the applicator to a surface while also providing for a leakproof, spillproof package with a minimum of moving parts.

An additional object of this invention resides in the provision of a fluid applicator having novel valve means which are dislocated after the initial use and which will not cause clogging or blockage of the applicator during further and successive uses thereof.

Still further objects and features of this invention reside in the provision of a fluid applicator which is inexpensive to manufacture, simple to use and capable of dispensing fluid in a uniform manner so that the applicator is especially adapted for use in applying paints, inks, pigments and the like in thin line marks and which applicator may be made in any convenient size and shape as may be desired.

These, together with the various ancillary objects and features of this invention, which will become apparent as the following description proceeds, are attained by this applicator, preferred embodiments of which have been illustrated in the accompanying drawings, by way of example only, wherein:

FIG. 1 is a side elevational view of a first embodiment of a fluid applicator constructed in accordance with the

concepts of the present invention, with a portion of the applicator being broken away showing details of the construction of the applicator head;

FIG. 2 is a top plan view of the applicator in accordance with the present invention;

FIG. 3 is an enlarged detail view, partially in section, of the applicator head of the present invention with the applicator surface in a depressed position;

FIG. 4 is an enlarged detail view partially in section of the applicator head of the present invention prior to the installation of the cover;

FIG. 5 is an exploded vertical sectional view of a second embodiment of an applicator constructed in accordance with the concepts of the present invention showing the valve assembly sealed prior to initial use;

FIG. 6 is a sectional view of the applicator shown in FIG. 5 with the cap removed and with the valve assembly in the closed position after initial use;

FIG. 7 is a sectional view of the applicator shown in FIGS. 5 and 6 illustrating the applicator with the valve assembly in the open position, inverted ready for application to a surface;

FIG. 8 is a sectional detail view of a further modified form of applicator with the cap removed showing the valve assembly in the closed, sealed position prior to the initial use;

FIG. 9 is a sectional detail view of the applicator shown in FIG. 8 with the valve assembly in the closed position after initial use; and

FIG. 10 is a sectional detail view of the applicator of FIGS. 8 and 9 with the valve in the open position inverted permitting the flow of fluid onto the surface to which the fluid is being applied.

With continuing reference to the accompanying drawings, particularly with reference to the embodiment shown in FIGS. 1 through 4, wherein like reference numerals designate similar parts throughout the various views, reference numeral **20** is used to generally designate the applicator of the present invention. The applicator **20** is secured to a squeezable bottle or tube body **22** which has a hollow neck **24** provided with screw threads **26** thereon. The applicator head is generally designated as **28** and has a retaining ring **30** which is adapted to be force fitted into the neck **24** of the squeezable container or tube **22**. The retaining ring **30** includes integrally a flange or shoulder **32** having an upwardly extending peripheral rim **34**. An upwardly extending tapering deformable dome is formed from a resilient synthetic material such as polyurethane, polyethylene or nylon. The dome **36** is provided with an aperture **38** formed therein which allows fluid to pass from the interior of the container **22** through the hollow neck **24** to the applicator surface. Located immediately above the tapering dome **36** is a two-ply cover **37** including a layer of coarse polyurethane foam or the like **40**, which is porous in nature and will allow fluid to pass therethrough and to become saturated therewith. Immediately above the coarse polyurethane foam **40** is a layer of fabric **42** such as mohair or the like, which may be bonded to the polyurethane foam, which will readily permit fluid to pass therethrough.

The cover **37** is press fitted between the upwardly extending dome **36** and the upwardly extending peripheral edge **34** and is secured therein by swaging, gluing or other known means so as to prevent the cover **37** from coming free from the applicator head.

A new and ususual result is obtained by the use of the tapering dome **36** in that due to the tapering shape of the dome **36**, there is attained a substantially horizontal applicator surface, as is seen in FIG. 3, which extends substantially the full diameter of the applicator and which results in an applicator surface capable of use in applying fluid over a larger area than heretofore possible.

In FIG. 3 there is seen an enlarged sectional detail view of the applicator head described in FIG. 1 wherein the applicator head has been placed against a horizontal surface thereby causing the cover **37** to depress and deform the upwardly extending tapering dome **36** to conform to the contour of the surface against which the applicator is placed. It will be noted from the dotted lines in FIG. 3 that the dome immediately upon being released will spring back or seek to regain its original shape.

FIG. 4 shows in detail the upwardly extending dome **36** with the aperture **38** therein prior to the installation of the cover **37** of coarse polyurethane foam **40** and fabric **42**.

In order to use the applicator described in FIGS. 1 through 4, the user merely squeezes the container **22** thereby causing the fluid to pass through the aperture **38**, to saturate the foam **40** and pass through to the fabric **42**. The applicator is then placed against the surface to which the fluid is to be applied and the same is rubbed thereagainst thereby applying the fluid to the desired surface. Due to the fact that the upwardly extending tapering dome **36** is of a resilient deformable material, the applicator surface **42** of fabric will flatten to an unusual extent against the surface which the applicator is placed thereby causing even and relatively large quantity distribtuion of the fluid from the container to the desired surface.

Referring now specifically to the embodiment of the invention illustrated in FIGS. **5** through **7**, there is seen an applicator **110** for dispensing fluid having an applicator assembly **112** with the cover **114** removed thereform. In FIG. 5 the applicator is shown in a sealed condition in which the applicator would be received from the factory. The container for this embodiment may be of any convenient size and is generally designated as **116** having a threaded neck portion **118**. The applicator assembly **112** is formed with a retaining ring **120** having a projecting portion **121** which is inwardly tapered along the lower edge thereof as seen at **120** and is provided with an inwardly extending swagged base portion **122**, the purpose of which will be described as the specification continues.

In order to install the applicator assembly **112** in the container **116**, the projection **121** is merely pressed downwardly into the hollow neck section **118** until the stop means or outwardly extending peripheral edge **124** bears against the upper rim portion of the neck section **118**. Extending upwardly above the neck **118** of the container **116** and beyond the peripheral flange **124** and oppositely extending with respect to the projecting portion **121** is a valve seat member **126** having an inwardly and downwardly curved re-entrant resilient free edge **128** forming a valve seat. In the sealed condition, as delivered from the factory, the inwardly and downwardly extending edge **128** rests against the upper surface of the valve shoulder **130** of valve member **136** and presses inwardly against the circular peripheral side edge of the valve neck **132**. Centrally located above the valve neck **132** is the valve head section **134** which may be of a circular configuration as is the valve neck **132** and the valve shoulder **130**. The valve shoulder **130** and the valve neck **132** together with the valve head **134** form a two stepped upper portion for the valve member **136**.

The valve member **136** includes helical spring legs **138** integrally formed with the lower portion of the valve shoulder **130** at their upper ends, while the lower ends of legs **138** are integrally formed with the base **140**. The valve member **136** is inserted into the retaining ring prior to the swaging of the lower edge **122** with the spring legs **138** continuously under compression.

When the applicator described in FIG. 5 is used, the valve head **134** is depressed downwardly thereby allowing the inwardly and downwardly extending edge **128** of the valve assembly to slip inwardly toward the circular neck portion **132** of the valve assembly, and allowing the free edge forming the valve seat **128** to overlie the upper surface of the valve neck **132** as is seen in FIG. 7.

After the first use of the applicator, the valve assembly will come to a closed position when released as is best seen in FIG. **6** wherein the valve seat **128** engages the circular side walls of the valve head **134** and prevents upward movement of the valve member **136** by resting against and abutting the upper peripheral shoulder of the valve neck **132**. In this position no fluid can pass through the retaining ring, in view of the fact that the inwardly and downwardly extending edge **128** is in contact with the circular side wall of the valve head **134** and with the upper surface of the valve neck **132**, thereby closing the valve.

Referring now specifically to FIG. 7, the valve is seen in the open position wherein the valve head **134** is depressed against the force of the helical spring **136**, thereby allowing fluid to flow between the side walls of the valve head **134** and the upper edge of the valve neck **132**.

It is to be noted that movement of the stepped upper portion of the valve assembly with respect to the valve seat will also cause rotation of this stepped upper portion of the valve member **136** due to the fact that the spring legs **138** will impart a twist or turn to the stepped upper portion relative to the base **140**. Hence, this action will tend to readily free the valve member from the retaining ring should there be any evaporation of the fluid which might become sticky.

Referring now specifically to the embodiment shown in FIGS. 8 through 10, there is seen an applicator for dispensing of fluid generally designated as **210**, including an applicator assembly **212**. The container for this embodiment may be of any convenient size and is generally designated as **216** having a threaded neck portion **218**. The applicator assembly **212** is formed with a generally conical shaped retaining ring **220** having a projecting portion **221**. The retaining ring is inwardly tapered along the lower edge thereof as seen at **120** and is provided with an inwardly extending swaged base portion **222**, the purpose of which will be described as the specification continues.

In order to install the applicator assembly **212** in the container **216**, the projection **221** is merely pressed downwardly into the hollow neck section **218** until the stop means or outwardly extending peripheral edge **224** bears against the upper rim portion of the neck section **218**. Extending upwardly above the neck **218** of the container **216** and the outermost peripheral edge **224** of the applicator assembly **212** is a valve control member **226** having an inwardly curved resilient free edge **228** forming a valve seat. In the sealed condition, as delivered from the factory, the inwardly extending edge **228** rests against the upper surface of the valve shoulder **230** and presses inwardly against the circular peripheral side edge of the valve neck **232**. Centrally located above the valve neck **232** is the valve head section **234** which may be of a domed configuration.

The valve member **236** includes helical spring legs **238** integrally formed with the lower portion of the valve shoulder **230** at their upper ends, while the lower ends of legs **238** are integrally formed with the helical spring base **240**.

When the applicator described in FIG. 8 is used, the valve head **234** is depressed downwardly thereby allowing the inwardly and downwardly extending edge **228** of the valve assembly to slip inwardly toward the circular neck portion **232** of the valve assembly, and allowing the free edge forming the valve seat **228** to overlie the upper surface of the valve neck **232** as is seen in FIG. 9.

After the first use of the applicator, the valve assembly will come to a closed position when released as is best seen in FIG. 9 wherein the downwardly, inwardly extending valve seat **228** abuts the circular side walls of the head portion **234** and prevent upward movement of the valve head **234** by resting against and abutting the upper peripheral shoulder of the valve neck **232**. In this position no fluid can pass through the retaining ring in view of the fact that the inwardly extending edge **228** is in

contact with the valve head 234 and with the upper surface of the valve neck 232, thereby closing the valve.

Referring now specifically to FIG. 9, the valve is seen in the open position wherein the valve head 234 is depressed against the force of the helical spring 236, thereby allowing fluid to flow between the valve head 234 and the upper edge of the neck section 232.

A latitude of modification, substitution and change is intended in the foregoing disclosure, and in some instances, some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

I claim:

1. An applicator comprising a fluid container having a neck, a retaining ring having a projecting portion fitted in said neck, said retaining ring including an arcuate inwardly turned re-entrant resilient free edge forming a valve seat at the opposite end thereof from said projecting portion, a valve member movable with respect to said valve seat to control fluid flow through said retaining ring, said valve member including a stepped upper portion, said stepped upper portion including a valve head having a cylindrical side wall, a valve neck of larger diameter than said valve head, and a valve shoulder having a cylindrical side edge with a surface perpendicular to said cylindrical side wall of said neck, said valve shoulder being of larger diameter than said valve neck, said valve seat initially resiliently engaging said valve shoulder to form an initial seal abutting said shoulder and said neck, said initial seal being broken by application of force to said head, the valve seat being thereafter engageable with said upper surface of said valve neck to form a secondary seal, and spring means intergral with said stepped upper portion normally urging said upper portion against said valve seat.

2. An applicator according to claim 1 wherein said retaining ring is of substantially cylindrical shape.

3. An applicator according to claim 1 wherein said retaining ring is of a conical shape.

4. An applicator comprising a fluid container having a neck, a retaining ring having a projecting portion fitted in said neck, said retaining ring including an arcuate inwardly turned re-entrant resilient free edge forming a valve seat at the opposite end thereof from said projecting portion, a valve member movable with respect to said valve seat to control fluid flow through said retaining ring, said valve member including a stepped upper portion, said stepped upper portion including a valve head having a cylindrical side wall, a valve neck of larger diameter than said valve head having a cylindrical side wall and a valve shoulder having a cylindrical side wall with a surface perpendicular to said cylindrical side wall of said neck, said valve shoulder being of larger diameter than said valve neck, said valve seat initially resiliently engaging said valve shoulder to form an initial seal abutting said shoulder and said neck, said initial seal being broken by application of force to said valve head, said valve seat being thereafter engageable with the upper surface of said valve neck to form a secondary seal, and tapered spring means including a plurality of helical legs integral with said stepped upper portion normally urging said upper portion against said valve seat, said valve member including a base secured in said projecting portion, said base being of substantially greater diameter than said valve shoulder.

5. An applicator comprising a retaining ring having a projecting portion, said retaining ring including an arcuate inwardly turned re-entrant resilient free edge forming a valve seat at the opposite end thereof from said projecting portion, a valve member movable with respect to said valve seat to control fluid flow through said retaining ring, said valve member including a stepped upper portion, said stepped upper portion including a valve head having a cylindrical side wall, a valve neck of larger diameter than said valve head having a cylindrical side wall, and a valve shoulder having a cylindrical side wall with a surface perpendicular to said cylindrical side wall of said neck, said valve shoulder being of larger diameter than said valve neck, said valve seat initially resiliently engaging said valve shoulder to form an initial seal abutting said shoulder and said neck, said initial seal being broken by application of force to said valve head, said valve seat being thereafter engageable with the upper surface of said valve neck to form a secondary seal.

6. An applicator comprising a retaining ring including an arcuate inwardly turned re-entrant resilient free edge forming a valve seat, a valve member movable with respect to said valve seat to control fluid flow through said retaining ring, said valve member including a stepped upper portion, said stepped upper portion including a valve head having cylindrical side walls, a valve neck of larger diameter than said valve head, said valve neck having an upper surface perpendicular to said cylindrical side wall and a cylindrical side edge, and a valve shoulder of large diameter than said valve neck, said valve shoulder having an upper surface perpendicular to said cylindrical side edge, said valve seat initially resiliently engaging the upper surface of said valve shoulder and the cylindrical side edge of said valve neck to form an initial seal, said initial seal being broken by application of force to said valve head, said valve seat being thereafter engageable with said upper surface of said valve neck and said cylindrical side walls of said head to form a secondary seal.

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