April 23, 1968 G. SCHWARTZMAN 3,379,490

NARROW LINE APPLICATOR

Filed Nov. 1, 1965

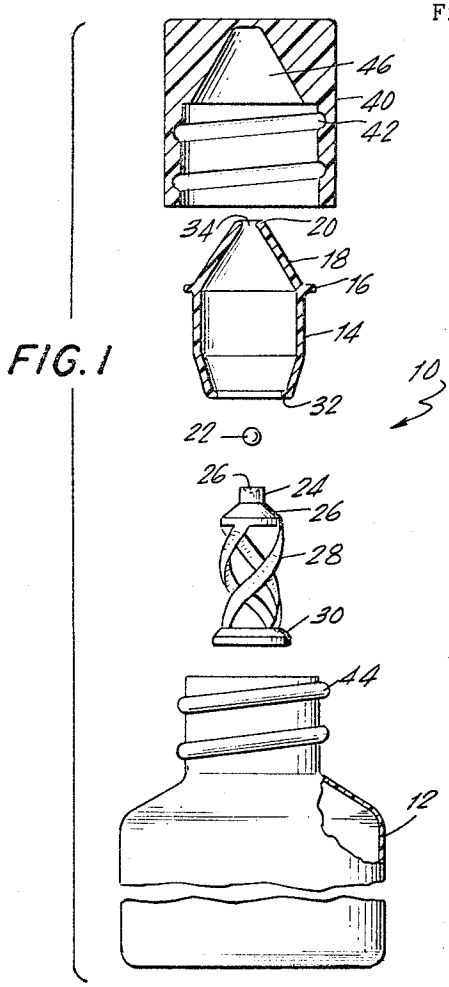

FIG. 1

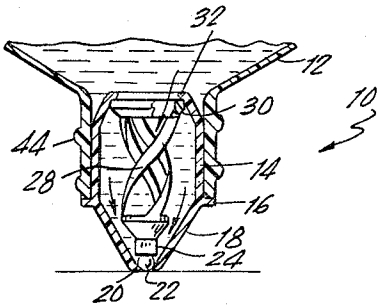

FIG. 4

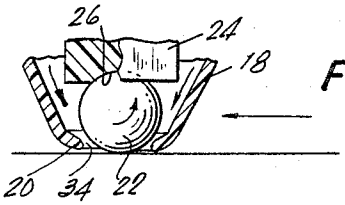

FIG. 5

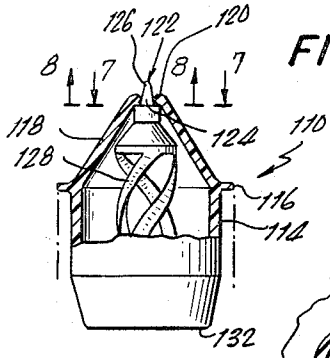

FIG. 6

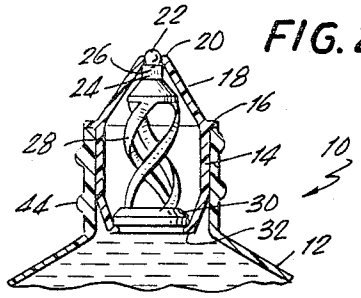

FIG. 2

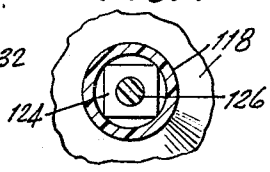

FIG. 7

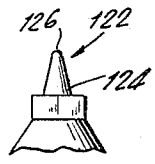

FIG. 9

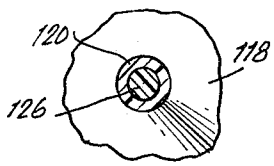

FIG. 8

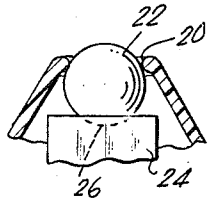

FIG. 3

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NARROW LINE APPLICATOR

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ABSTRACT OF THE DISCLOSURE

An applicator comprising a retaining ring including a hollow cylindrical body having an upwardly tapering neck terminating in an inwardly extending arcuate convex upper lip. The neck has an arcuate circular opening therein, with said lip surrounding said opening and forming a valve seat and having a ball valve member of synthetic plastic material, extending partially through said opening.

This invention relates to an applicator for applying small amounts of viscous and non-viscous fluids to limited surface areas in narrow lines, dots or dashes.

An object of this invention resides in the provision of means for facilitating the application of fluid or the like to surfaces regardless of the contour thereof.

Another object of this invention resides in the provision of novel valve means which are selectively actuated and which are adapted to selectively control the flow of fluid from the applicator in varying amounts onto surfaces notwithstanding the contours thereof, so that fluid such as glue, adhesives, or the like may be conveniently placed upon any surface and in various crevices, corners, or upon uneven surfaces where access is difficult.

In the past applicators have been produced which have been provided with various types of applicator ends which serve to actuate mechanical valves. However, the prior art valve members normally are designed so as to allow for the dispensing of a viscous fluid, such as glue and the like, only in a single width, which cannot be varied at the will of the user.

It is therefore a further object of this invention to overcome the disadvantages of the prior art applicators by providing for a better control of the fluid emanating from the applicator so as to assure that the fluid being applied may be spread along an entire surface at the precise thickness and in the exact amount required by the user.

Still another object of the invention resides in the provision of an applicator with the valve formed of a material which will not be readily chemically or mechanically affected by the fluid which is dispenses, which valve will not scratch or mar the surface over which it is passing, and which will provide for a smooth flow of the fluid from the applicator.

Still further objects, features and advantages of this invention reside in the provision of an applicator which is inexpensive to manufacture, simple to use, and which is capable of metering fluid of various viscosities in an effective manner so that the applicator may be adapted for all types of application work, for applying glue, liquid polish, medications, cosmetics, oils, ink and the like, which applicator may be placed within any size dispenser, as is desired.

These, together with the various ancillary objects and features of the 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 drawing, by way of example only, wherein:

FIG. 1 is an exploded sectional view of the elements of an illustrative embodiment of the applicator of the invention;

FIG. 2 is a sectional detail view illustrating the assembled applicator of the invention, and further illustrating the valve member in a closed position;

FIG. 3 is a partial sectional detail view illustrating the valve member and dispensing means;

FIG. 4 is a sectional view, similar to that of FIG. 2, but illustrating the applicator in use with the valve member open;

FIG. 5 is a partial sectional detail view, similar to that of FIG. 3, but illustrating the applicator in use with the valve open;

FIG. 6 is a cross-sectional view of a modified form of applicator structure, wherein the valve member is of a non-rotating type;

FIG. 7 is a plan view of the applicator illustrated in FIG. 6 taken along the plane of line 7—7;

FIG. 8 is a plan view of the applicator taken along the plane of line 8—8 in FIG. 6; and,

FIG. 9 is an enlarged detail view of the valve member employed in this embodiment.

With continuing reference to the accompanying drawing, wherein like reference numerals designate similar parts throughout the various views, reference numeral **10** is used to generally designate the applicator comprising the present invention. This applicator includes a container **12**, wherein the retaining ring **14** is positioned. The retaining ring **14** includes a body designed to fit into the neck of the container **12** and further includes a peripheral flange **16** provided with a tapering upwardly extending neck portion **18** terminating in an inwardly swaged lip **20** of enlarged cross-sectional dimensions, which lip **20** is designed with an arcuate convex inner surface so as to retain the ball **22** therein, and to prevent the valve from being dislocated from the applicator head. The ball **22** is part of a valve assembly.

The ball **22** is carried by a cylindrical carrier **24** having a hemispherical indentation **26** provided in the upper surface thereof. Directly below and integral with the carrier **24** is a tapering shoulder **26** having integral spring means **28** formed in helical coils integrally therewith. The valve assembly **30** further includes a base of enlarged dimensions and having a bore therethrough. The base is integral with the helical spring means **28**. The base **30** is held in place within the retaining ring **14** by a downwardly tapering and inwardly swaged lower end **32**, as is best seen in FIGS. 2 and 4. The swaged end **32** thus retains the valve member **22** within the retaining ring **14** below the inwardly swaged upper lip **20** in a continually stressed condition under compression so that the ball **22** is continually urged into and partially through the opening **34**, thereby pressing in a tight sealing manner against the inwardly extending lip **20** for the purpose of closing the opening **34** and preventing flow of fluid from the container **12** into the space between the upwardly extending neck **18** and the inwardly extending upper swaged lip **20** of the retaining ring **14**.

A dome-shaped cap **40** is provided having screw threads **42** therein, which are adapted to engage the screw threads **44** on the neck of the container **12**. The cap is formed having a hollow center portion **46** of a size such as to permit the upwardly extending neck **18** and the valve member **22** to fit within the hollow center portion **46** without abutting the walls or the top thereof.

Referring specifically to FIG. 2 of the drawing, there is seen the assembled applicator with the ball **22** in the closed position abutting the inwardly extending swaged upper lip **20** of the applicator body in order to form the seal and prevent the passage of fluid through the valve body.

The base **30** is formed with a central opening therein so as to allow the passage of fluid from the applicator body **12** through the open central portion of the helical

spring permitting fluid to reach the opening **34** when the ball **22** is pressed inwardly.

Referring now to FIG. 4, there is seen the applicator of this embodiment wherein the ball **22** is depressed against a surface, thereby placing additional compression on the helical spring **28** and allowing fluid to pass through the opening **34** to the surface by passing between the rotating spherical valve **22** and inwardly swaged upper lip **20**. In this position viscous fluid passes around the edges of the rotating spherical valve **22** and is dispensed onto the surface by the rotating action of the ball **22** dispensing the viscous fluid in an even manner. The amount of fluid which will be dispensed may be regulated by the user, depending upon the amount of pressure applied by the container upon the spherical valve member. In the event that slight pressure is used, the opening **34**, between the ball **22** and the inwardly swaged upper lip **20**, will be small and with a correspondingly greater pressure exerted upon the container **12**, the ball **22** will exert a greater depression force upon the helical spring **28**, causing the opening **34** to become larger thereby permitting the flow of a greater amount of fluid onto the surface.

The ball **22** is free to rotate within the carrier and thus is self cleaning. In use, it has been found that the ball **22** is best formed of a nylon, or other synthetic plastic material, which is impervious to the fluid to be used within the applicator, for the reason that the plastic or nylon ball **22** is not likely to scratch the surface upon which viscous fluid is being dispensed by the applicator, and at the same time such a ball constructed of nylon or plastic is relatively free of surface tension and is thereby unlikely to build up a residue of the fluid being dispensed thereby.

Referring now specifically to FIGS. 5 through 9, there is seen a second embodiment of the present invention wherein reference numeral **110** generally designates the applicator.

It is to be understood that the applicator in this embodiment may be used in any type of applicator body without reservation as to size and shape as may be the valve body illustrated in FIGS. 1 through 5.

The applicator comprises a container, not illustrated, wherein a retaining ring **114** is positioned. The retaining ring **114** has a body designed to fit within the neck of the container, and includes a flange **116**, which is adapted to fit and to abut the upper rim of the neck so as to form a uniform surface, as shown generally in FIG. 6.

The applicator herein is formed with an upwardly extending tapering neck portion **118** having an inwardly swaged thickened arcuated upper lip **120**. The valve assembly generally designated as **122**, includes an elongated tapering conical portion **124** terminating in a hemispherical rotating tip **126**. The conical portion **124** is formed integrally with and as a part of an enlarged base section. Due to its enlarged cross-section, the body **124** is prevented by the inwardly extending swaged upper lip **120** from passing through the opening **128** thereby maintaining the body portion **124** within the neck portion **118**. The base conical portion **124**, is formed integrally with a helical spring **132** having an enlarged base section, as illustrated in FIGS. 1 and 4, not shown herein, which is also to be swaged within the lower edge of the retaining ring **114** to maintain the same in its operative position.

In operation, the user merely inverts the applicator and places the hemispherical tip **126** against the surface to which the viscous fluid is to be applied. As pressure is exerted upon the tip **126**, the tip is driven against the compression force of the helical spring **132**, thereby

bringing the conical portion **124** away from the lip **120** and allowing fluid to pass between the tip **126** and the lip **120** and through the opening **128**. As greater pressure is applied to the hemispherical tip **126** by pressure on the applicator body, more fluid will be able to pass through the opening **128** as the tip **126** is depressed. Due to the tapering configuration of the portion **124**, more fluid is allowed to pass between the tapering body **124** and the inwardly swaged upper lip **120** the further the tip is depressed. When the pressure is released, the helical spring **132** drives the conical portion **124** upwardly against the inwardly swaged lips **120** so that the lip **120** abuts the conical portion **124** and prevent the flow of fluid through the opening **128**, which opening is thereby closed.

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 claim be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

I claim:

1. An applicator comprising a retaining ring including a hollow cylindrical body having an upwardly tapering neck terminating in an inwardly extending upper lip, said lip being of an enlarged cross sectional dimension and having an inner arcuate convex surface, said neck having an arcuate circular opening therein, said lip surrounding said opening with said arcuate convex surface forming a valve seat, a valve assembly for engaging said valve seat, said valve assembly further including helical spring means and having an enlarged base, said body having a downwardly tapering portion engaging said base retaining said valve assembly in said body, said base having a central bore therethrough, said valve assembly further including a valve carrier integral with said helical spring means, said carrier being upwardly tapered and terminates in a cylindrical portion provided with a substantially hemispherical indentation, said valve assembly further including a ball of synthetic plastic material having an upper hemispherical portion partially extending through said opening, said spring means normally urging said ball partially through said opening and against said valve seat, said body having an outwardly extending peripheral flange integrally formed therewith at the lowermost portion of said neck, a container having an open neck, said body being disposed in said open neck to limit entrance of said body into said container so that said tapering neck extends outwardly of said container.

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