Jan. 7, 1969 E. J. TOWNS 3,420,611

FOUNTAIN BRUSH HOLDING DEVICE

Filed Oct. 10, 1967 Sheet 1 of 3

Fig. 1.

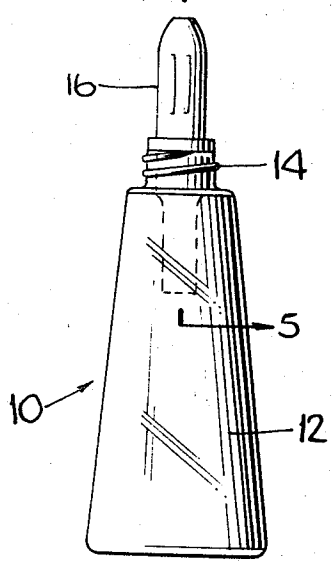


Fig. 5.

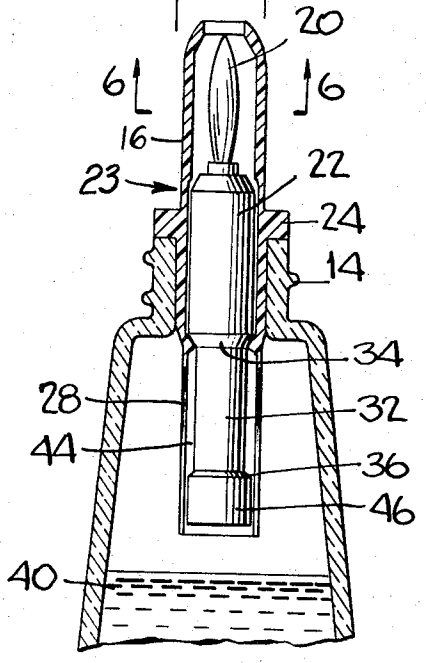


Fig. 3.

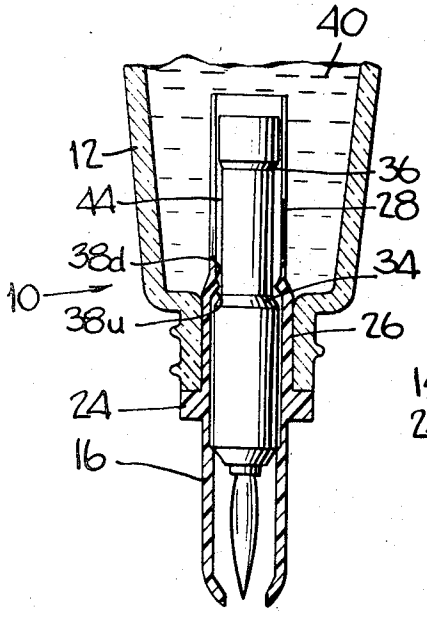


Fig. 4.

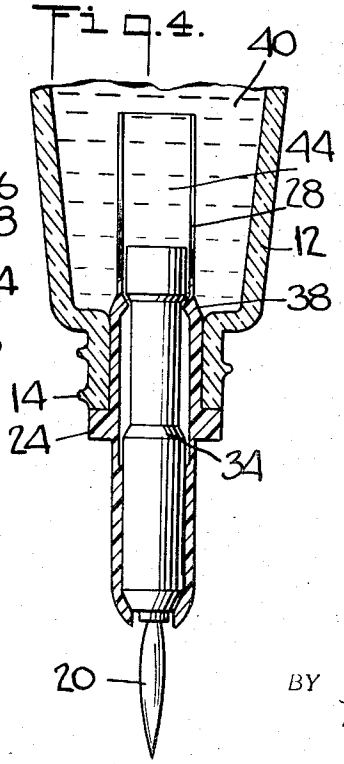
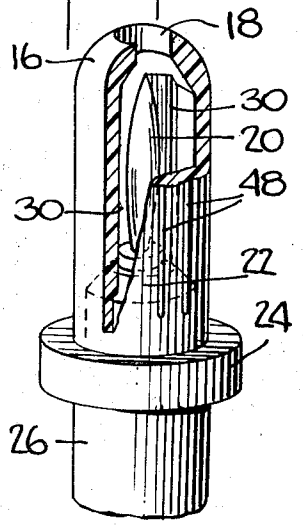


Fig. 2.



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Fig. 6.

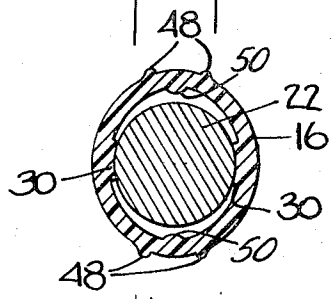
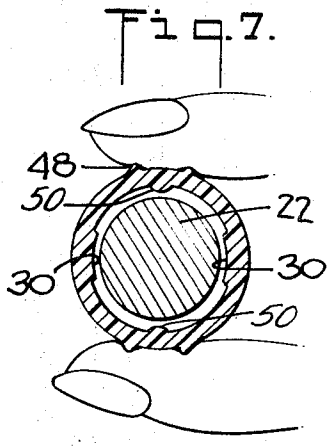


Fig. 7.



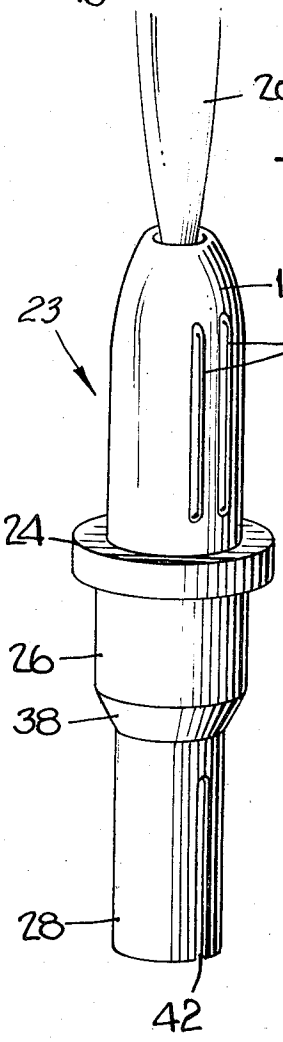
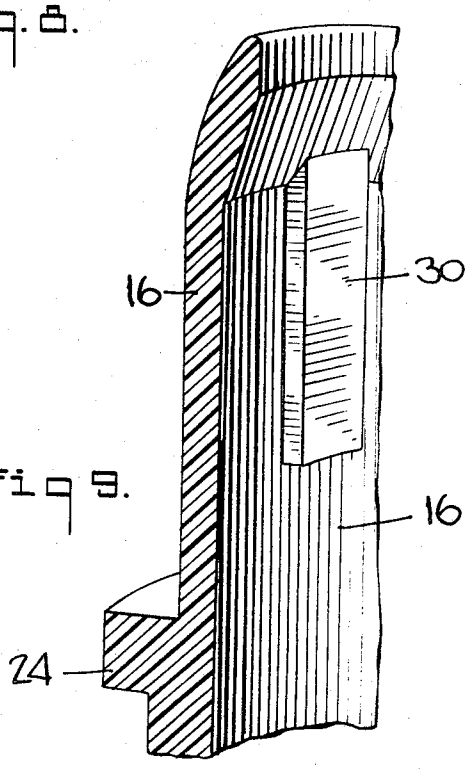


Fig. 8.

Fig. 9.



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Fig. 10.

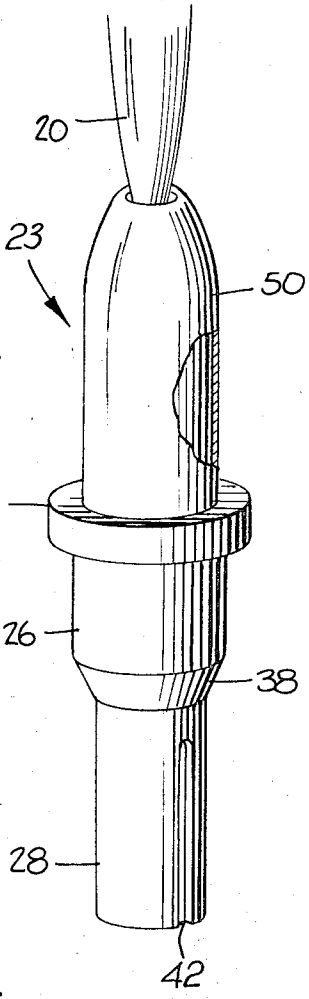


Fig. 13.

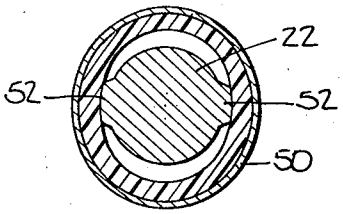


Fig. 14.

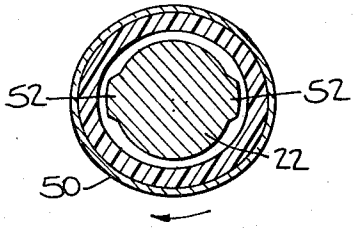


Fig. 11.

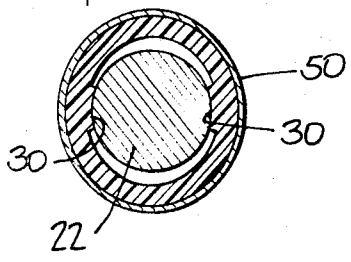
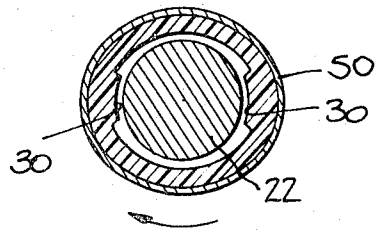


Fig. 12.



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United States Patent Office 3,420,611
Patented Jan. 7, 1969

3,420,611

FOUNTAIN BRUSH HOLDING DEVICE

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Continuation-in-part of application Ser. No. 587,527, Oct. 18, 1966. This application Oct. 10, 1967, Ser. No. 677,832
U.S. Cl. 401—115 14 Claims
Int. Cl. B43k 7/12

ABSTRACT OF THE DISCLOSURE

The embodiment of the invention disclosed in the following specification is of a fountain type of applicator adapted to be used with the brush pointing upward, such as in an eyeliner or liquid lipstick applicator. A fountain brush having a weighted base and a brush portion is held within a flexible plastic shield which shield and brush are mounted on a bottle that holds the liquid that is to be applied by the brush. The forward portion of the flexible plastic shield is oval or elliptical in cross section. When the brush and its base is in the retracted position, the brush is entirely within the shield and thereby protected. Ridges on the inside of the shield hold the brush in the retracted position even when the applicator is turned upside down. However, pressure transversed to the ridges will sufficiently deform the oval shield so as to cause the ridges to move radially outward and thus away from the base of the brush. If this pressure is applied when the applicator is in an upside down position, the base and brush will advance from the retracted position to the extended position and at the same time carry a quantity of fluid along. Once the brush is in an extended position, removal of the pressure on the shield will cause the shield to come back to its original shape and the ridges will then contact the base of the brush to frictionally hold it in the extended position the applicator is in the upright position.

This application is a continuation-in-part of application Ser. No. 587,527 filed Oct. 18, 1966 and now abandoned.

This invention relates in general to a fountain brush or liquid applicator. In one particularity, this invention relates to a simple and inexpensive mechanism for holding a fountain brush (such as the type that might be used in an eyeliner applicator) upright, in the extended position during use. This invention also relates to the valving mechanism required in such an applicator.

The type of fountain brush or liquid applicator to which this invention applies is employed in a wide variety of products. The cosmetic eye-liner mentioned above is one for which this invention has particular applicability. However, this invention could be employed with nail polish applicators, fountain ink markers, as well as any type of applicator where a liquid is held in a reservoir and is caused to flow to a retractable brush or applicator.

The brush is normally retracted within a shield for protection of the brush as well as to avoid unwanted dispensing of the liquid. In most known applicator devices, the device is turned upside down so that the brush becomes extended by virtue of gravitational pull. The brush is then employed in a brush downward position. Where there is extremely light application of the brush on the surface to which it is applied (such as in a nail polisher) then the weight of the brush and the base to which it is attached is sufficient to keep the brush extended during use. However, any substantial upward force may cause the brush to retract. More importantly, such applicator devices cannot be used in a position where the brush must be held pointing in an upwardly direction. Thus most fountain brush designs cannot be employed in a cosmetic eye-liner

or to dispense liquid nail polish. In these cases, expedients such as the use of a screw engagement to extend and retract the brush may be employed, or, more commonly, a removable cap is employed and the brush is not retractable at all.

Although one can conjure up a number of different techniques for holding the brush in the extended position, all of these techniques add a great deal of expense to the manufacture of the device and most of the techniques have the deficiency that they require an appreciable amount of time on the part of the user in order to extend or retract the brush and also generally require the use of two hands.

Accordingly, it is an object of this invention to provide a simple means to hold a fountain brush in an extended position so that the brush may be employed in an upright position even though the force of gravity tends to retract the brush. A related object is to provide a hold so that the brush may be employed in a downward position when the force of application is enough to overcome the gravitational weight of the brush and base.

It is another object of this invention to provide this basic objective in a design that is both simple and relatively inexpensive.

It is a further object of this invention to provide a fountain brush hold that can be operated with a single hand so that the user can cause the brush to be extended, apply the fluid carried by it and then cause the brush to be retracted by manipulations requiring only one hand during the cycle of operation.

It is another object of this invention to meet the above objects in a device which automatically valves an appropriate amount of fluid to the brush during the one-handed manipulation.

It is a specific object of this invention to provide a simple, integral valve and holder unit which provides appropriate dispensing control at the same time as it provides the desired holding control.

In brief, the whole mechanism of this invention is represented, in one embodiment, by a pair of opposed longitudinal ridges on the inside surface of a flexible plastic shield. The fountain brush lies within the shield so that when the fountain brush (or other liquid applicator) is held upside down, gravity tends to pull the applicator brush out from the shield through a forward opening in the shield. The two ridges extend sufficiently far into the space within the shield so as to prevent the base to which the brush is attached from moving forward. However, the ridges are made sufficiently shallow so that when the shield is flexed in a radial inward direction perpendicular to the longitudinal plane that intersects the two opposed ridges, the spacing between the ridges increases thereby permitting the brush and its base to pass by the ridges and become extended.

Other objects and purposes of this invention will become apparent from a consideration of the following detailed description and drawings in which:

FIG. 1 is a perspective view of a device embodying this invention in an upright position with the fountain brush retracted;

FIG. 2 is a partially cut-away perspective of the upper portion of the FIG. 1 device;

FIG. 3 is a longitudinal cross-section view taken through the main axis of the FIG. 1 device, when the FIG. 1 device is in an inverted position;

FIG. 4 is a longitudinal cross-section similar to FIG. 3 except that the applicator brush is in an extended position;

FIG. 5 is a longitudinal cross-section along the line 5—5 of FIG. 1;

FIG. 6 is a cross-sectional view along the line 6—6 of FIG. 5 showing the engagement between the brush base

and the longitudinal holding ridges when the slightly elliptical shield is in its normally relaxed state;

FIG. 7 is a cross-sectional view similar to FIG. 6 showing the relationship between the brush base and the shield when the user compresses the elliptical shield along its major axis;

FIG. 8 is a perspective view of the valve and holder portion of the FIG. 1 device, with the applicator brush in an extended position;

FIG. 9 is a perspective view of a portion of the shield showing part of the holding ridge;

FIG. 10 is a perspective view showing the addition of a thin metal elliptical sleeve placed over the shield;

FIG. 11 is a cross-sectional view along the line **11—11** of FIG. 10 showing the relationship between the elliptical shield and elliptical sleeve when the shield is in its normally relaxed state; and

FIG. 12 is a cross sectional view similar to that of FIG. 11 showing the relationship between the shield and sleeve when the sleeve has been rotated to compress the shield along the major axis of the shield;

FIG. 13 is a cross sectional view similar to that of FIG. 11 illustrating a second embodiment of this invention in which the ridges are built onto the brush base; and

FIG. 14 is a cross sectional view similar to that of FIG. 13 showing the relationship between the shield, sleeve and base when the shield has been compressed along its major axis.

A preferred embodiment is shown in detail in FIGS. 1 through 12. This embodiment is discussed as having application as an eye-liner, since it is contemplated that this invention will have particular applicability to such a device where the brush will be employed in an upright position.

The eye-liner **10** shown in FIG. 1 has a glass (or plastic) reservoir **12** which is shown with a threaded neck **14** so that a screw-on cap can be provided. A flexible plastic shield **16** extends out of the neck of the reservoir **12** and, as may be seen in FIG. 2, has a central opening **18**. The eye-liner brush **20** is mounted on a weighted base **22** and is normally retracted within the shield **16**. Thus the shield **16** serves to protect the brush **20** from outside contamination and damage as well as serving to protect outside surfaces from unwanted contact with the coloring material carried by the brush **20**.

As may be seen from FIGS. 2 and 5, the shield **16** is simply the forward portion of a plastic unit **23** that also includes an annular lip **24**, a central portion **26** and a rear portion **28**. The lip **24** and central portion **26** serve to mount the plastic unit **23** onto the reservoir **12**. As will be described in greater detail further on, the central and rear portions **26** and **28** serve a valving function for control of the fluid flow from the reservoir **12** as well as to control the amount by which the brush **20** is extended when in the use state.

A significant feature of the plastic unit **23** are the two opposed longitudinal ridges **30** that extend inwardly from the inside surface of the shield **16** (see particularly FIGS. 6, 7 and 9). It is the ridges **30** which: (1) prevent the brush **20** from becoming extended even when the eye-liner **10** is in the inverted position shown in FIG. 3 unless the user manipulates the shield **16** to cause the brush **20** to become extended and (2) hold the brush **20** in an extended position, as may be seen in FIG. 8, against the pull of gravity.

The operation of the device of this invention can best be understood if the configuration of the brush base **22** and its relationship to the plastic unit **23** is kept in mind. The base **22** is circular in cross-section and has an intermediate area **32** with a slightly reduced cross-section so as to provide rearwardly facing shoulder **34** and forwardly facing shoulder **36**. The plastic unit **23** has an inwardly extending ridge **38** at the area where the center portion **26** merges with the rear portion **28**. This ridge **38** provides an upwardly facing shoulder **38*u*** and a downwardly facing shoulder **38*d***. The shoulder **38*u*** engages the base shoulder **34** when the brush **20** is retracted thereby providing a stop or limit on the retraction of the brush **20** and base **22**. The shoulder **38*d*** engages the base shoulder **36** when the brush **20** is extended thereby providing a forward stop or limit on the extension of the brush **20**. In this simple fashion the limits of the excursion of the brush **20** may be established. As will be shown, this technique for limiting the excursion of the brush **20** also serves to meter the amount of eye-liner liquid supplied to the brush when the device **10** is inverted and the brush extended.

It is of some practical importance that the distance between the shoulder **38** and the rearward termination of the longitudinal ridges **30** be controlled so as to hold the base **22** snugly in position when the brush **20** is retracted. The eye-liner **10** is likely to be tumbled about and shaken when carried about between uses. If the base **22** is loosely held so that it could rattle back and forth it would be possible to shake out some of the liquid **40** and this could provide a somewhat messy eye-liner unit.

The rear portion **28** of the plastic unit contains side-wall openings **42** (see especially FIG. 8), which may be holes or slits, to provide communication through the side-wall of the rear portion **28**. Thus when the eye-liner **10** is inverted, as shown in FIG. 3, a liquid **40** will flow through the openings **42** into the annular recess **44** between the base area **32** and the side-walls **28**. When the brush **20** is released in the upside position, to become extended as in FIG. 4, the liquid **40** held in the recess **44** is carried forward and flows around the base **22** onto the brush **20**. The recess **44** can be designed to be whatever size is necessary or desirable to carry an adequate load of liquid for use during at least a single application of the brush **20**.

The rear portion **46** of the base **22** has a diameter equal to the inner diameter of the rear portion **28** of the plastic unit so that when the brush **20** is in the fully extended position the rear **46** of the base **22** will serve to block further flow of the liquid **40**.

FIGS. 6 and 7 show the means by which this invention permits the brush **20** to become retracted or extended and held in a retracted or extended position until a change in position is desired by the user. The shield **16** is molded to have a normally elliptical cross-section. In one practical embodiment a major and minor axes at the outside surface of the shield are respectively 0.355 in. and 0.320 in. The wall thickness of the shield is kept as constant as possible except for the two areas where the longitudinal opposing ridges **30** are provided. (Again, in one practical embodiment a useful wall thickness for the shield portion **16** was found to be 0.035 in.) In that particular embodiment the ridges **30** were placed opposing one another on a minor axis and built to extend an additional 0.010 in. each into the interior of the shield **16**. A shield **16** having such dimensions could then be flexed, as shown in FIG. 7, along its major axis to cause the longitudinal ridges **30** to move apart sufficiently to permit the forward portion of the base **22** to pass along the shield **16** in a longitudinal direction. Base **22** in that particular embodiment was circular in cross-section and had a diameter of 0.240 in. along its forward length.

The operation of the eye-liner **10** of this invention is very simple. The user simply takes the eye-liner in its normally retracted condition shown in FIG. 2 and inverts it as shown in FIG. 3. This permits a quantity of liquid **40** to flow into the annular recess **44**. The user then compresses the shield **16** along its major axis, as shown in FIG. 7, which causes the relatively heavy metal base **22** to be pulled downward by gravity thereby causing the brush **20** to become extended. The eye-liner **10** with brush extended downwardly is shown in FIG. 4. The user then relaxes the pressure on the shield **16** thereby causing the shield to snap back into its oval position so that the longitudinal ridges **30** frictionally engage the base **22**. The eye-liner **10** may then be turned into an upright position and the ridges **30** will exert sufficient fric-

tional force on the base **22** to prevent the base **22** and brush **20** carried thereon from retracting in normal use. After the eye-lining operation has been completed, the user with the eye-liner **10** in the upright position, applies pressure again along the major axis of the oval shield **16** causing the ridges **30** to move apart so that the base **22** will retract under the force of gravity. After releasing the shield **16** the ridges **30** will move inwardly again to prevent the base **22** and brush **20** from moving into an extended position unless the above operation is repeated.

Small indicator marks **48** should be provided so that the user will be able to identify the major axis by feel.

It contributes greatly to the simplicity of this invention for the base **22** to be circular in cross-section and the shell **16** to be oval or elliptical in cross-section. With the base **22** circular in cross-section, there is no need to radially orient the base **22**. It is impossible to orient the brush **20** and any orienting technique such as rails and grooves to keep a non-circular base **22** properly oriented would only add to the expense of the device.

The base **22** should be made out of some relatively heavy material. Metals such as stainless steel and brass are usable. In certain applications, it may be necessary to pay some attention to the corrosive effect of a liquid **40** on the particular metal selected. A metal should be selected that is compatible from a corrosion point of view with whatever liquid **40** is employed.

This invention has been described in detail in connection with a particular embodiment. It should be understood that it would be possible to make many variations in the embodiment illustrated and stay within the scope of the invention as claimed herein.

For example, the particular type of liquid feed employed herein is not a gravity feed in that the rear portion **46** of the base **22** serves to operate as a cut-off valve when in the extended position. It would be possible to employ the brush **20** holding technique alone in a device where a gravity feed of liquid is involved. Such a device would be used in the upside down position shown in FIG. 4. The holding technique of this invention might be desirable in those cases where the brush **20** is fairly stiff and considerable pressure tending to cause the brush and base to retract may be encountered.

Alternately, the brush **20** might be replaced by a roller which is employed to continuously feed liquid onto a surface and where considerable retracting pressure might be developed because of the force of the roller on the surface.

Within this application and the claims, the term "brush" is employed to indicate the actual means by which the liquid is laid down on whatever surface it is desired to apply the liquid. It shall be understood herein that there are many obvious equivalents for what is normally called a brush. For example, a roller having a moisture absorbing blotter type of material might be employed in some applications. Accordingly, the term "brush" herein shall be construed to include all such equivalent applicators.

Although a double ridge **30** embodiment has been disclosed as a preferred embodiment, it would be possible to employ a single ridge **30**. Such a single ridge embodiment is not preferred because the sizing problems are likely to be more acute and the brush when extended will tend to look askew and distract the person using the device.

Where large amounts of liquid are to be carried forward as a single charge (for example, where the liquid is quite viscous) then the spacing between base **22** and shield **16** may have to be increased. If so, then the ridges **30** will have to be thicker. In such an embodiment, it might be advisable to include small guide ridges (such as the guide ridges **50** illustrated in FIGS. 6 and 7) running longitudinally on the inside of the shield **16** at points around the circumference of the inside of the shield **16** which are displaced 90 degrees from the ridges **30**. These guides would prevent the base **22** from moving so far in a direction along the major axis of the shield **16** as to fall out of proper register with the ridges **30**. These guide ridges would, of course, have to extend inwardly by a considerably lesser amount than do the gripping ridges **30** so as not to prevent adequate compression of the shield **16** along its major axis.

A modification of this invention is illustrated in FIGS. 10, 11 and 12. As shown therein, a cylindrical metal sleeve **50** having an elliptical cross section is slip fit over the shield **16**. In one angular position (see FIG. 11) of the metal sleeve **50**, the major axis of its elliptical cross section is aligned with the major axis of the elliptical cross section of the shield **16**. When this metal sleeve is rotated 90 degrees about its longitudinal axis (see FIG. 12), the minor axis of the elliptical cross section of the sleeve **50** is aligned with the major of the elliptical cross section of the shield **16**, thereby pinching the shield **16** along its major axis in much the same way as the fingers in FIG. 7 are shown doing. In this FIG. 10 embodiment, if the metal sleeve **50** is provided with major and minor inside axes which are nominally 0.007 inch greater than the nominal outside major and minor diameters of the shield **16**, then there should be sufficient tolerance under most manufacturing techniques to assure that the sleeve **50** will be free to rotate about its longitudinal axis in order to perform its function. However, clearance is not critical as long as there is a slip fit relationship between sleeve **50** and shield **16**. As will be noted in the FIGURES 10 through 12, the indicator markers **48** are omitted in the FIG. 10 embodiment.

In this fashion, the sleeve **50** having an elliptical cross section serves as a means for automatically pinching the elliptical shield **16** just the right amount to release the base **22** and permit the applicator brush **20** to move longitudinally. The use of this metal sleeve **50** avoids under and over compression of the shield **16**.

One of the important aspects of this invention is the relationship between the ridges **30** and the base **22** of the applicator brush. What is important is that these ridges **30** exert a frictional holding force on the base **22** when the shield **16** is relaxed. It would, therefore, be possible to have ridges built onto the base **22** and extending radially outward to normally frictionally engage the inner wall of the shield **16**.

Such an embodiment is illustrated in FIGS. 13 and 14 in which the ridges between the base **22** and the shield **16** are ridges **52** on the base **22**. These ridges **52** are longitudinally arranged along the base **22** and extend radially outward in order to contact the shield **16**. The shield **16** is still elliptical in cross section with its minor axis in alignment with the ridges on the base **22**. In order for this embodiment to work effectively, it is important that the base **22** not rotate about its longitudinal axis so that the ridges on the base **22** will remain aligned with the minor axis of the shield **16**. To achieve this result, it is necessary to provide a means for preventing rotational movement of the base **22** in the shield **16**. This may be achieved by any one of a number of methods such as providing a channel and spline relationship between the rear **46** of the base **22** and the rear **28** of the plastic unit **23**. Alternatively, the rear **46** of the base **22** and the rear **28** of the plastic unit **23** could both be made elliptical with a slip fit relationship to one another so that longitudinal rotational movement between the units **46** and **28** would be precluded.

Accordingly, it should be understood that all such embodiments are intended to be covered by the following claims.

What is claimed is:

1. In a fountain brush applicator wherein the applicator brush unit is mounted in a holding unit for longitudinal reciprocal movement therein, the improvement comprising:

a flexible shield portion of said holding unit positioned to shield the brush portion of said applicator brush

unit when said brush unit is in a retracted position,

a base portion of said applicator brush unit, said base portion movable reciprocally with said applicator brush unit, and

a ridge between said shield of said holding unit and said base of said applicator brush unit when said brush unit is in the extended position, said ridge exerting sufficient pressure between said shield and said base when said brush unit is in the extended position to frictionally hold said brush unit against longitudinal movement,

said shield being spaced from said base of said brush unit, except where said ridge is positioned, so that radially inward pressure on said shield along a line perpendicular to the longitudinal plane through said ridge and the axis of said base will radially distort said shield to relieve said pressure exerted by said ridge thereby releasing said base of said brush unit, whereby said brush unit will be free to move longitudinally as long as such radially inward pressure is maintained on said shield.

2. The fountain brush applicator of claim 1 further characterized by: a second ridge between said shield and said base to form a pair of opposed ridges between shield and base.

3. In a fountain brush applicator wherein an applicator brush unit is mounted in a holding unit for longitudinal reciprocal movement therein, the improvement comprising:

a flexible shield portion of said holding unit positioned to shield the brush portion of said applicator brush unit when said brush unit is in a retracted position,

a base portion of said applicator brush unit, said base portion movable reciprocally with said applicator brush unit, and

a pair of opposed ridges on the inner surface of said shield, said ridges extending inward sufficiently to contact the base of said applicator brush unit when said brush unit is in the extended position and to exert sufficient pressure between them on said base of said brush unit to frictionally hold said brush unit against longitudinal movement,

said shield being spaced from said base of said brush unit, except where said ridges are positioned, so that radially inward pressure on said shield along a line perpendicular to a longitudinal plane through said ridges will radially distort said shield to cause said ridges to move radially outward thereby releasing said base of said applicator brush unit, whereby said applicator brush unit will be free to move longitudinally as long as said radially inward pressure is maintained on said shield.

4. The fountain brush applicator of claim 3 wherein said shield has an elliptical cross section, the minor axis of said elliptical cross section being parallel to said longitudinal plane through said ridges.

5. The fountain brush applicator of claim 4 further characterized by:

a sleeve having an elliptical cross section positioned around said shield and having a slip fit relationship with said shield when the major axis of said sleeve is aligned with the major axis of said shield, the inside minor axis of said sleeve being substantially less than the outside major axis of said shield so that when said sleeve is rotated about its longitudinal axis 90 degrees, said sleeve will exert radially inward pressure along the major axis of said shield.

6. A fountain brush applicator comprising:

a brush unit having a brush and a base, said brush being mounted on said base,

a holding unit, said brush unit being reciprocally mounted within said holding unit, said brush unit having a retracted position within said holding unit and an extended position within said holding unit,

said holding unit including a flexible cylindrical shield,

said brush portion of said brush unit being shielded by said shield when said brush unit is in said retracted position, said base portion of said brush unit being positioned within said shield when said brush unit is in said extended position,

a pair of opposed ridges between said shield portion of said holding unit and said base portion of said brush unit when said brush unit is in said extending position, said ridges exerting sufficient pressure between said shield and said base to frictionally hold said brush unit against longitudinal movement when said brush unit is in said extended position,

said shield being spaced from said base portion of said brush unit so that radially inward pressure on said shield along a line perpendicular to a longitudinal plane passed through said opposed ridges will radially distort said shield to relieve the pressure exerted by said ridges, thereby releasing said base portion of said brush unit, whereby said brush unit will be free to move longitudinally as long as such radially inward pressure is maintained on said shield.

7. The fountain brush applicator of claim 6 wherein said ridges are generally longitudinally disposed and are mounted along the outer surface of said base portion of said brush unit.

8. The fountain brush applicator of claim 7 wherein said shield has an elliptical cross section, the minor axis of said elliptical cross section being parallel to said longitudinal plane through said ridges.

9. The fountain brush applicator of claim 7 further characterized by:

a sleeve having an elliptical cross section positioned around said shield and having a slip fit relationship with said shield when the major axis of said sleeve is aligned with the major axis of said shield, the inside minor axis of said sleeve being substantially less than the outside major axis of said shield so that when said sleeve is rotated about its longitudinal axis 90 degrees, said sleeve will exert radially inward pressure along the major axis of said shield.

10. The fountain brush applicator of claim 6 wherein said ridges are generally longitudinally disposed and are mounted on the inner surface of said shield.

11. The fountain brush applicator of claim 10 wherein said shield has an elliptical cross section, the minor axis of said elliptical cross section being parallel to said longitudinal plane through said ridges.

12. The fountain brush applicator as set forth in claim 6 wherein said base has an intermediate area of reduced cross-section and said shield has a rear portion including an internal shoulder between and projecting into said intermediate area to define a limit for the excursion of said base in a direction into and out of said shield.

13. The fountain brush applicator as set forth in claim 12 wherein said intermediate area of said base and said shield rear portion form a recess, and said rear portion includes openings therein communicating with the recess.

14. The fountain brush applicator as set forth in claim 13 wherein said openings are in the form of slots.

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