

[54] COSMETIC APPLICATOR

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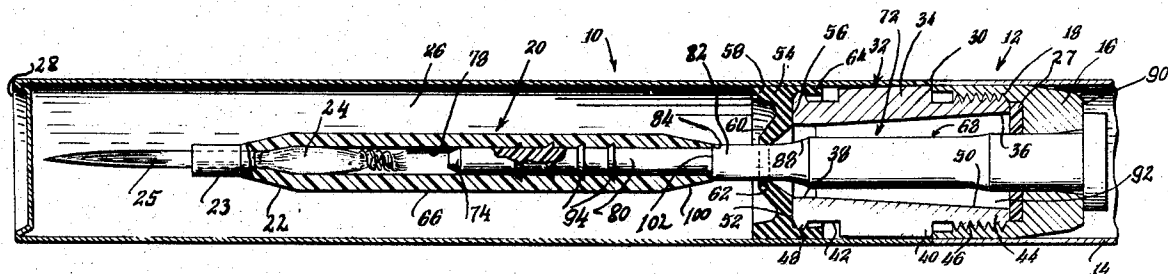
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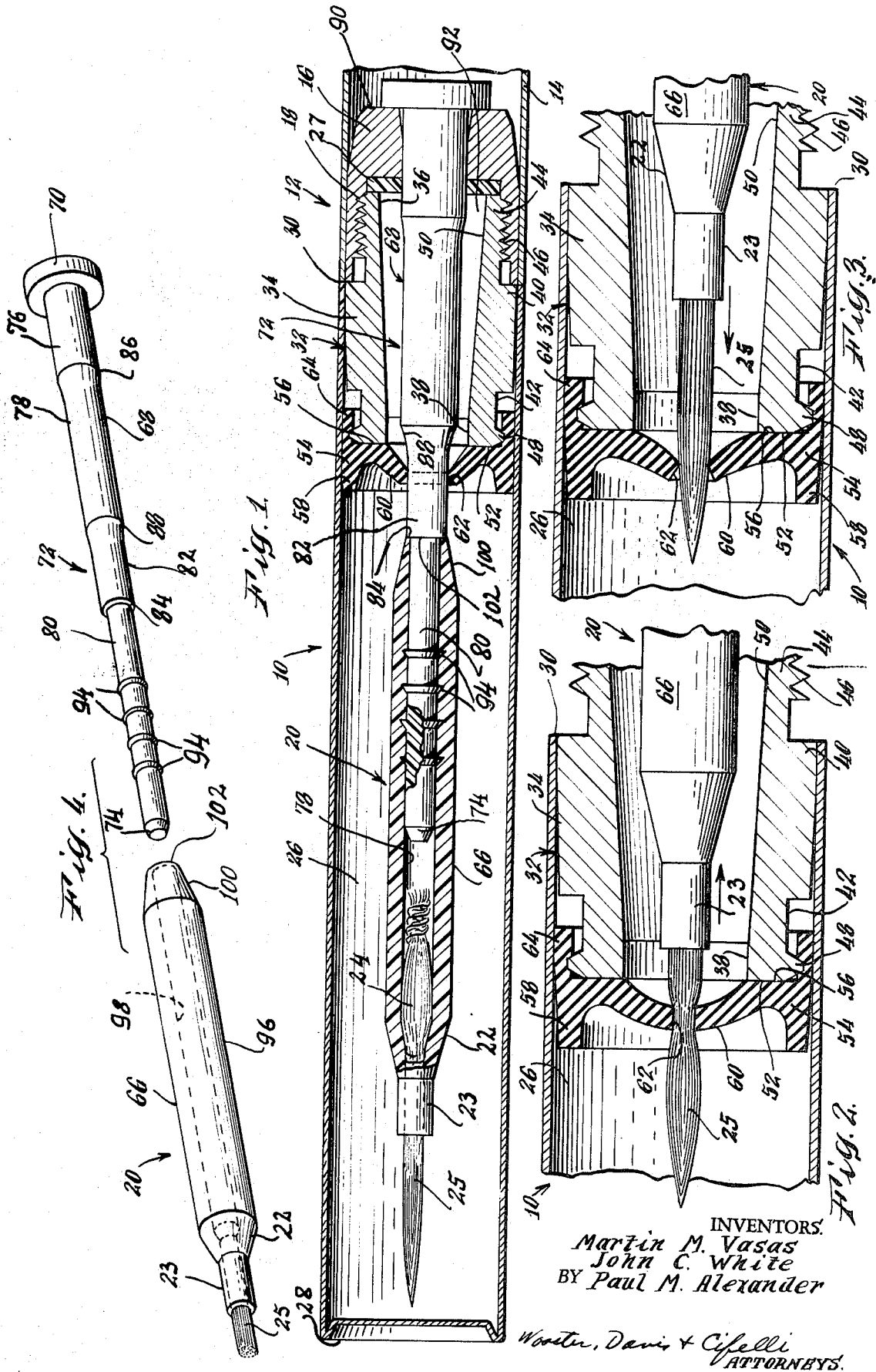
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ABSTRACT

A cosmetic applicator including a normally liquid cosmetic containing reservoir and a self-contained brush. The open end of the reservoir is closed by a centrally apertured annular resilient diaphragm which provides means for sealing the reservoir against leakage and for wiping excess cosmetic from the bristles of the brush when the latter is being removed from the reservoir. The brush includes a two-part shaft with a peripheral depression defined intermediate the two parts and which projects through the diaphragm when the applicator is not in use. The depression is dimensioned such as to permit the diaphragm to maintain an unstressed condition as opposed to its stressed conditions caused during insertion and removal of the brush into and from the reservoir.

9 Claims, 4 Drawing Figures





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COSMETIC APPLICATOR

BACKGROUND OF THE INVENTION

The present invention relates to a brush-type cosmetic applicator for the application of a cosmetic, in particular liquid eye liner.

In copending U.S. Pat. application Ser. No. 672,306 now U.S. Pat. No. 3,549,266, filed Oct. 2, 1967, by Martin M. Vasas and assigned to the same assignee as the present invention, there is disclosed a brush-type cosmetic applicator. The cosmetic applicator disclosed therein incorporates novel means which prevents the bristles of the applicator brush from splaying and from being deformed when inserted in the applicator reservoir and which, at the same time, seals the reservoir against leakage and wipes excess cosmetic from the bristles when the brush is being removed from the reservoir. Such novel means is in the form of a soft flexible rubber or rubber-like diaphragm closing the open end of the reservoir. The diaphragm is concave and defines a conical wiping portion including a brush-receiving aperture having a diameter slightly smaller than the widest diameter of the tip of the brush with which it is designed to be used. The softness and resiliency of the diaphragm permit the brush to be inserted through the aperture without deforming or splaying the bristles. As the brush is inserted into the reservoir, the compressive insertion force exerted by the bristles and the brush shaft against the sides of the aperture, causes the thin conical wiping portion to be expanded and causes it to be stressed and displaced in direction of insertion of the brush. Following such insertion, e.g., in the rest position of the applicator, the brush shaft extends through the diaphragm with the brush tip fully immersed in the reservoir, in which condition the aperture of the diaphragm is considerably expanded and forms a fluid-tight seal around the shaft. In order to apply the cosmetic, the brush is removed from the reservoir during which the diaphragm is stressed by the shaft and the brush tip and its wiping portion is displaced in opposite directions as a result of the reversed compressive force exerted on the wiping portion. Upon complete removal of the brush, the diaphragm assumes a non-expanded and unstressed condition.

Even though the aforementioned construction is useful and highly effective, it will be apparent that the considerable expansion of the aperture of the diaphragm and the constant stress and displacement of its wiping portion caused by the shaft when the applicator is not in use, ultimately causes material fatigue of the diaphragm which, consequently, reduces its sealing characteristics.

SUMMARY OF THE INVENTION

Object of the present invention is to overcome this disadvantage and to provide a cosmetic applicator having improved means permitting the diaphragm to maintain an unstressed sealing condition when the applicator is not in use.

Such a cosmetic applicator according to the invention includes a liquid reservoir having an open end and closure means received in the open end and including a flexible diaphragm defining a brush-admitting aperture therein; brush means being insertable through the aperture into the reservoir, such brush means including an outer tubular member carrying a brush tip, an inner rod member received in part in the tubular member, and a peripheral depression defined between the tubular member and the rod member and extending through the aperture in the rest position of the applicator.

BRIEF DESCRIPTION OF THE DRAWINGS

The manner in which the objects of the invention are achieved will be more readily understood by reference to the attached drawings wherein:

FIG. 1 is an elevational view of an eye liner applicator incorporating the present invention;

FIG. 2 is an enlarged cross sectional view of the improved closure showing the eye liner brush being withdrawn therefrom;

FIG. 3 is a view similar to FIG. 2 illustrating the brush entering the closure; and

FIG. 4 is an enlarged exploded view of the novel brush assembly embodied according to the invention and incorporated in the arrangement of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, in which like reference numerals index like parts, and with attention initially directed to FIG. 1, there is illustrated, for illustration purposes only, an eye-liner applicator having a body 10 and a cap 12. The cap comprises a cylindrical shell 14 having an open end within which is mounted a metallic cup-shaped insert 16 provided with internal threads 18 and supporting the inner end of a brush holder assembly 20 which, at its outer end 22, includes a brush 24 formed of fine bristles, such as sable, and terminating in a long tapered tip 25. A sealing ring 27 is seated within the insert 16 and surrounds the inner end of the assembly 20.

The body 10 comprises a normally liquid cosmetic containing cylindrical reservoir 26 having a closed end 28 and an open end 30. Mounted within the open end 30 by a friction fit is a closure member 32, illustrated in detail in FIG. 2. The closure member 32 comprises a metallic plug 34 which is substantially cylindrical in shape. The plug 34 includes an outer end defining a circular aperture 36 and an inner end defining a circular aperture 38 of substantially smaller diameter than the outer aperture 36. In addition, the plug carries a raised circumferential flange 40 dimensioned to be press-fitted within the opening 30 of the reservoir 26 and to form a fluid-tight seal between the respective engaging surfaces of the plug and the open end of the reservoir 26. The flange 40 is positioned between an internal portion 42 and a cylindrical neck 44 which carries external threads 46 designed to mate with the threads 18 on cap 12. The internal portion 42 of the plug terminates in a peripheral enlargement or rim 48 having an outer diameter less than that of the flange 40. A conical guideway 50 extends axially through the plug 34 and communicates the respective apertures 36 and 38. The innermost end of the plug 34 is formed into an external planar end face 52. A diaphragm 54, made of a flexible plastic material, preferably neoprene, is slipped over and retained on the plug 34.

The diaphragm 54 includes an inner end having an internal planar end face 56 abutting the inner end face 52 of the plug, an outer cylindrical flange 58, and a generally conical wiping portion 60 defining a central circular aperture 62 aligned and communicating with the aperture 38 of the plug 34. The brush holder assembly 20 extends axially through the guideway 50 and through the respective apertures 38 and 62 into the reservoir. The diameter of aperture 62 is slightly smaller than the widest diameter of the brush tip 24 with which it is designed to be used. The outer end of the diaphragm is generally cup-shaped and includes a side wall 64 terminating internally at the end face 56 and externally in the flange 58. The side wall 64 and the flange 58, as clearly shown in FIGS. 2 and 3, normally are tapered in direction of the innermost end of the diaphragm 54 and by slipping the latter onto the end of the plug 34, the rim 48 penetrates the cup-shaped end of the diaphragm till it is positioned directly adjacent the internal end face 56 of the diaphragm with the respective end faces 52 and 56 abutting each other. In this condition, the flange 58 tends to be pulled inwardly behind the rim 48 while the side wall 64 is stretched outwardly. The diaphragm is securely retained on the plug 34 by frictional engagement and provides an additional friction fit between the plug 34 and the inner surface of the reservoir 26.

The brush holder assembly 20, shown in detail in FIG. 4 is seen to constitute a two-piece assembly including a cylindrical tube 66 made of a thermoplastic material, preferably ethylene acetetic vinyl, and an elongated stiffener rod 68 retainably received in the tube 66 and also made of a thermoplastic material but, in this instance, preferably of polypropylene. The rod 68 includes a peripheral locking flange 70 at its inner-

most end which is anchored within the cap 12 behind the insert 16, a stepped surface 72 which gradually outwardly decreases in diameter, and an outermost conical end 74 which facilitates insertion of the rod into the tube. The stepped surface 72 includes a pair of inner surface portions, 76, 78, of relatively large diameter, an outer surface portion 80 of smaller diameter, and an intermediate surface portion 82 having a diameter smaller than the inner surface portions, 76, 78, but larger than the outer surface portion 80. A planar peripheral shoulder 84 interconnects the surface portions, 80, 82, while frusto-conical shoulders, 86, 88, interconnect the respective surface portions 76, 78 and 82. As shown in FIG. 1, the surface portions of largest diameter, 76, 78, extend from the flange 70 through the rear end 90 of the insert 16 into the interior 92 of the former. The outer surface portion 80 is provided with a plurality of sharp-edged peripheral ribs 94 which, as will presently be explained, serve to anchor the surface portion 80 within the tube 66.

The tube 66 includes an outer cylindrical surface 96 and an inner cylindrical surface 98 having a diameter generally equal to that of outer surface portion 80 with which inner surface 98 is designed to tightly mate. The surfaces, 96, 98, at the end 22 of the tube, are tapered and terminate in a ferrule 23 to fix the brush 24 in the tube. At the inner end 100 of the tube, the outer surface 96 is tapered inwardly and terminates in an end face 102.

In assembling the tube and the rod, the outer surface portion 80 of the rod is pressed into the tube till the shoulder 84 of the rod is seated against end face 102 of the tube, as shown in FIG. 1. Due to the corresponding diameters of the inner surface 98 of the tube and outer surface portion 80 of the rod, a friction fit is obtained between such surfaces. In addition, the peripheral ribs 94, inclined in direction of insertion of the rod, dig into the inner surface 98 and prevent inadvertent removal of the rod from the tube. Thus assembled, surface portion 82 of the rod constitutes a peripheral depression therein intermediate the inner end 100 of the tube and adjacent surface portion 78 of the rod. The brush holder assembly 20 is dimensioned such that in inactive or rest position of the applicator, shown in FIG. 1, surface portion 82 extends through the diaphragm in fluid-tight relation therewith. Due to its comparatively small diameter, the depression or surface portion 82 constitutes an area of minimum stress for the diaphragm which permits the latter to maintain a generally non-expanded and unstressed sealing condition.

The manner in which the present invention operates will be clear from an inspection of FIGS. 1, 2 and 3. As the brush 24 is originally inserted into the plug 34, its tip 25 is guided toward the aperture 62 of the diaphragm via the tapered guideway 50 and inner aperture 38 of the plug 34. The tip then enters the aperture 62, as shown in FIG. 3, in which position it will be noted that the ends of substantially all the bristles have passed through the aperture. As the brush is further inserted and the brush tip passes into the reservoir 26, the force exerted by the bristles and the tube end 23 against the periphery of the aperture causes the thin conical wiping portion 60 to be inwardly stressed, gradually increasing the size of aperture 62 and allowing the tube 66 to enter into the reservoir via the tapered end surface 22. At this point, the diaphragm is considerably expanded as a result of the outer cylindrical surface 96 exerting maximum stress on the wiping portion 60. As a result of such expansion, the flange 58 is pressed outwardly and peripherally engages the inner surface of the reservoir. As the tube is still further inserted to its position shown in FIG. 1, the diaphragm experiences a gradual decrease in enlargement and stress of its wiping portion as a result of the tapered end surface 100 of the tube. In its normal carrying condition of FIG. 1, the aperture is considerably relaxed and assumes an unstressed condition in which it forms a fluid-tight seal around the surface section 82 of the rod 68. Also, in its normal carrying condition, the brush tip is completely immersed in the liquid cosmetic contained within the reservoir and the cap 12 is screwed to the body 10 by the engagement of threads 18 and

46, as illustrated in FIG. 1. In order to apply eye liner, the cap 12 is screwed from the body 10 and withdrawn with the tube 66 sliding through the aperture 62 and reversing the latter's direction of displacement or stress, FIG. 2. In this position, the inner edge of the aperture becomes a wiping member, wiping excess cosmetic fluid from the brush tip. In fully withdrawn position of the brush assembly 20, the diaphragm again assumes an unstressed condition.

It will be understood by those skilled in the art that the dimensions of the enclosure means of this invention may be varied to suit the individual application. However, for the disclosed eye liner, the diaphragm 54 had an outer surface tapering from 0.396 inches to 0.386 inches, and an unstressed aperture size of maximum 0.07 inches. The base of the cone formed by wiping portion 60 was 0.310 inches and the thickness of the inner edge of wiping portion forming the aperture 62 was 0.020 inches.

The outer end 23 of the tube 66 had a diameter of maximum 0.087 inches; the outer cylindrical surface 96 had a diameter of maximum 0.150 inches; and section 82 of the rod 68 had an outer diameter of 0.090 inches.

It is believed that the construction and operation of the invention will now be apparent to those skilled in the art. It will also be apparent that many variations and modifications may be made in this invention without departing from its spirit and scope. Accordingly, the foregoing description is to be construed as illustrative, rather than limiting.

What is claimed is:

1. A cosmetic applicator device comprising: a reservoir body open at one end; a closure supported in the open end and including a flexible wall arranged transversely of said body open end, said wall defining an aperture therein permitting access into said body; and brush means insertable through said aperture into said body, said brush means comprising an elongated assembly having a brush at one end thereof, said assembly having a fixed elongated outer surface with a portion of reduced diameter therein arranged to fit snugly within said aperture with a liquid-tight fit and constituting a zone of minimum stress for said wall to maintain said wall in a sealing but generally unflexed condition when said assembly is housed in said body.

2. A device as defined in claim 1, wherein a plug is mounted in said open end of said body for support of said closure, said plug having an end portion normally abutting said flexible wall of said closure, and said end portion of said plug abutting said flexible wall forming a backing against which said flexible wall is pressed in removal of said assembly from said body to establish by said flexible wall a wiper movable over said assembly and said brush.

3. A device as defined in claim 2, wherein said closure is generally cup-shaped in form and includes an annular wall mounted on said end portion of said plug and retained against the inner peripheral wall of said reservoir body.

4. A device as defined in claim 2, wherein said plug includes a tapered bore communicating with said aperture, and wherein said plug is threaded for mounting of a detachable cap in connection therewith, said cap supporting said assembly at the other end thereof.

5. A device as defined in claim 3, wherein said end portion of said plug includes a peripheral rim frictionally engaging said annular wall of said closure and locking the latter against said peripheral wall of said body with a liquid-tight fit.

6. A device as defined in claim 1, wherein said assembly comprises an outer tubular portion and an inner rod-shaped portion including an outer end received in said tubular portion, and wherein said portion of reduced diameter is defined in said rod-shaped portion directly adjacent said tubular portion.

7. A device as defined in claim 6, wherein said outer end of said rod-shaped portion includes a plurality of sharp-edged ribs anchored in the inner peripheral surface of said tubular portion to secure said outer end against inadvertent removal from said tubular portion.

8. A device as defined in claim 6, wherein said tubular portion includes an outer cylindrical surface and a tapered inner end joining said cylindrical surface and said portion of reduced diameter.

9. A device as defined in claim 8, wherein said tubular portion includes a tapered outer end terminating in a ferrule for fixing said brush in said tubular portion.

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