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Pearson

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[54] **CONTAINER WITH SLIP-ON CAP RETAINING MEANS**

[75] Inventor: **William S. Pearson,** Hampstead, Md.

[73] Assignee: **Cypro Incorporated,** Hampstead, Md.

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[51] **Int. Cl.**[2] **B67B 3/02**

[58] **Field of Search** ..... 222/182, 402.1, 562; 220/42 A, 352, 353; 215/317

[56] **References Cited**

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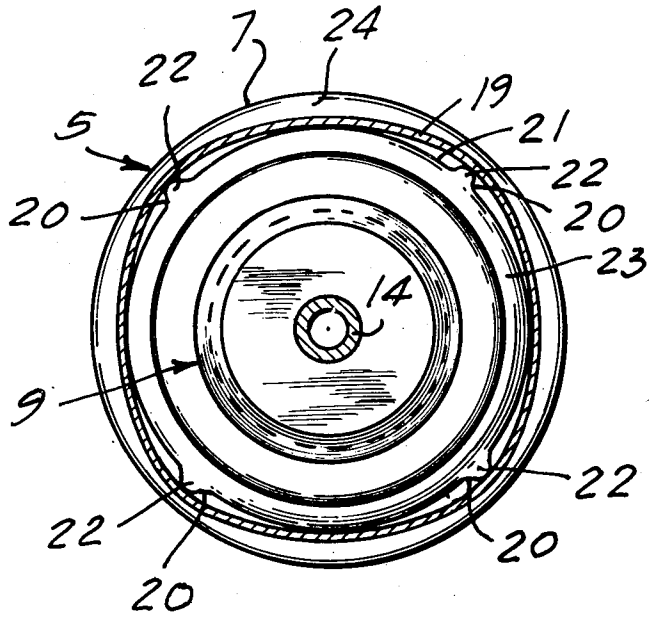
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Primary Examiner—Stanley H. Tollberg
Assistant Examiner—Norman L. Stack, Jr.
Attorney, Agent, or Firm—Hill, Gross, Simpson, Van Santen, Steadman, Chiara & Simpson

[57] **ABSTRACT**

A bottle-type container having a body topped by a neck of smaller diameter for receiving a closure, includes a collar of substantial length between the neck and the body and provided with a plurality of circumferentially spaced outward projections for press-on retaining engagement by the skirt of an overcap applied over the neck, there being stop shoulder means located adjacent to the body end of the collar engagable by an edge on the cap skirt in the fully applied position of the cap.

6 Claims, 3 Drawing Figures



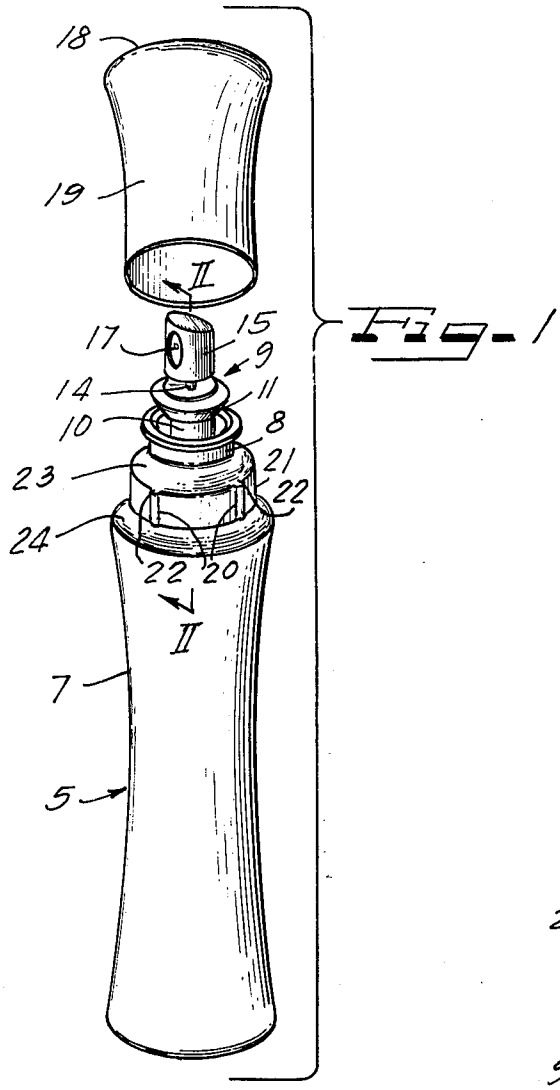
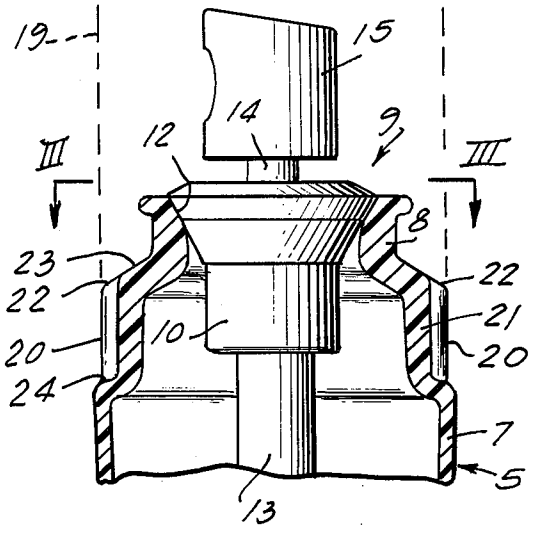


Fig-1

Fig-2



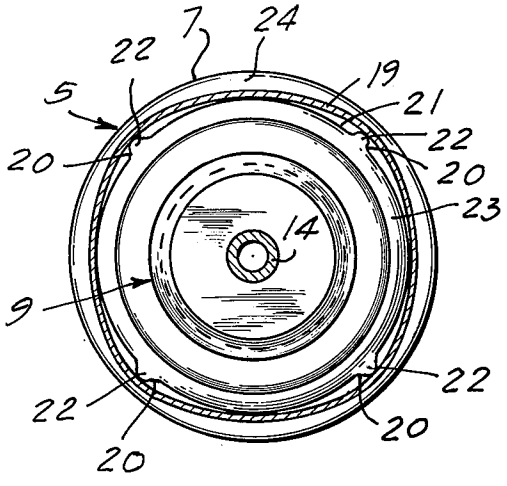


Fig-3

CONTAINER WITH SLIP-ON CAP RETAINING MEANS

This invention relates to improvements in bottle-type containers, and is more particularly concerned with such containers adapted to be equipped with slip-on overcaps.

As heretofore constructed, spray valve equipped bottle-type plastic containers such as may be used for various aerosol preparations including cosmetic, medical, and the like, are commonly equipped with slip-on overcaps retained in place frictionally by engagement with the spun over or crimped metal crowns by which the aerosol valves are secured to the containers. This requires fairly large diameter necks on the containers on which to anchor the cap skirt and to accomodate the overcap. With the introduction of aerosol valve structures with plastic bodies adapted to be ultrasonically welded to the container neck, the use of a metal crown or ferrule is not necessary to retain the valve in place, but in order to accomodate the standard overcap structures, such a cap or ferrule has been retained to provide a frictional collar surface for retaining engagement by the overcap. However, this defeats one of the important advantages of the all plastic valve structure which would otherwise be highly desirable for handling aerosol preparations that are not compatible with metal, such as some medicinal preparations.

It is accordingly an important object of the present invention to provide new and improved bottle-type containers, and especially of the type suitable for handling aerosol preparations, which will overcome the disadvantages, deficiencies, shortcomings and problems in prior containers of this type and which will provide new and improved slip-on cap retaining means.

Another object of the invention is to provide new and improved slip-on retaining means for bottle-type containers.

A further object of the invention is to provide a new and improved plastic aerosol container construction which will effect economies in material and yet provide for improved performance.

Still another object of the invention is to provide a new and improved aerosol container on which the aerosol valve and the container can be entirely free from metal parts.

Other objects, features and advantages of the invention will be readily apparent from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawing although variations and modifications may be effected without departing from the spirit and scope of the novel concepts embodied in the disclosure, and in which:

FIG. 1 is an exploded perspective view of an aerosol container and slip-on cap and illustrating features of the invention;

FIG. 2 is an enlarged fragmentary vertical sectional elevational view taken substantially along the line II—II of FIG. 1; and

FIG. 3 is a sectional plan view taken substantially along the line III—III of FIG. 2.

By way of illustration a bottle-type aerosol container 5 molded from suitable plastic is provided with an elongated hollow body 7 topped by a neck 8 of substantially smaller diameter than the body and adapted for receiving a container closure in the form of an aerosol spray valve 9. In an all plastic construction of the spray valve

9, it comprises a valve housing 10 having a frustoconical downwardly facing outwardly flaring shoulder 11 which is engaged in assembly with the container upon a complementary frustoconical seat 12 about the inside of the lip of the neck 8. In such assembly the shoulder 11 is permanently hermetically secured to the seat 12 as by means of ultrasonic welding. A customary tubular stem 13 projects inwardly from the valve 10 and a customary axially shiftable tubular trigger and outlet stem 14 extends outwardly from the valve 10 and carries the customary depresser head button 15 provided with a spray orifice 17 whereby upon digital depressing of the spray head 15 a normally closed spring biased valve mechanism of the valve 10 will be opened for spraying of the pressurized contents from the container 5.

During periods of non-use it is customary to enclose the spray head 15 and the container neck 8 by means of a suitable overcap 18 having a generally cylindrical resiliently flexible skirt 19. Such caps are fairly standardized in the industry and the skirts thereof will engage frictionally on and about the crimp skirts of the customary valve securing crowns for aerosol spray containers. According to the present invention, however, any need for any such metal crowns is eliminated, the neck 8 is of substantially reduced diameter as compared to the standard inside diameter of the cap skirt 19. This effects saving of significant container material while nevertheless permitting adequate concentration of material in the neck 8 for thorough welding of the valve shoulder 11 thereto and for adequate support to withstand all normal requirements for strength and endurance and even a substantial additional mass of material for increased safeguard against abuse.

New and improved means for retaining the overcap 18 in place on the container 5 comprise a plurality of circumferentially spaced outward protrusions 20 on a collar 21 of substantial length provided between the body 7 and the neck 8. Although as best seen in FIG. 2 the collar 21 may be of gradually diminishing thickness from the vicinity of the neck 8 toward the body 5, the outside peripheral surface of the collar 21 is desirably substantially straight cylindrical and slightly smaller diameter than the inside undistorted diameter of the overcap skirt 19 to avoid interference fit binding of the cap when applied in closing relation on the container 5. On the other hand, the protrusions 20 extend radially to a diameter which is slightly greater than the undistorted inside diameter of the skirt 19 so as to effect a firm frictional retaining engagement with the skirt of the overcap. In a preferred form, the protrusions 20 comprise longitudinally extending ribs located in suitable circumferentially spaced relation, such as at four places spaced 90° apart, as best visualized in FIG. 3. At their ends nearest the neck 8, the ribs 20 have leadin cam shoulders 22 merging with an annular sloping shoulder 23 leading from the neck 8 to the collar 21 and serving as an assistance in guiding the lower edge of the skirt 19 into centered relation relative to the collar 21 and into retaining engagement with the friction ribs 20.

As the cap 19 is pressed home into container top closing position, engagement of the ribs 20 with the inner wall surface of the skirt 19 causes the skirt to stretch deflectably radially outwardly as forced by the relatively unyielding ribs 20, with reactive radially inward deflection of the skirt intermediate the ribs 20 so that the skirt engages frictionally with the circumferen-

tially arcuate areas of the collar **21** intermediate the ribs, thus supplementing the frictional engagement with the ribs themselves. There is actually a mutually beneficial coactive frictional retaining effect between the ribs **20** and the intermediate areas of the collar **21** since not only do the ribs cause the inwardly deflected portions of the skirt to engage the collar but as the intermediate portions of the skirt engage the collar they are held against further inward deflection and thus resist further radial outward deflection of the skirt at the ribs. Thus a firm frictional retaining engagement with the skirt is assured not only at the ribs **20** themselves, but also at the intermediate areas of the collar **21** where the skirt actually has greater area of contact with the inner wall surface of the stretchably deflected skirt. Nevertheless, application and removal of the skirt **18** with respect to the container **5** can be effected with longitudinally applied digital pressures comparable to those customary in applying and removing the skirt in respect to a container supplied with the conventional metal crown structure. In a typical practical example, where the outer circumferential diameter of the cylindrical collar **21** is about 0.820 inch, the ribs **20** may have a rounded profile about 1/**16** inch radius and with a projection distance of about 0.008 inch. Length of the skirt **21** and of the ribs **20** may be about 0.295 inch in such example.

In the fully applied position of the cap **18** on the container **5**, the lower edge of the skirt **19** engages stop means comprising an annular shoulder **24** located adjacent to and about the body end of the collar **21** and thus about the lower ends of the ribs **20.** Thereby the cap is held in proper position for enclosing the head end of the container **5** and more particularly the neck **8** and the spray head **15.** Further, this provides a substantially sealed engagement between the overcap **18** and the container **5** protecting the spray head nozzle **17** from the drying effects of free atmosphere.

It will be understood that variations and modifications may be effected without departing from the spirit and scope of the novel concepts of this invention.

I claim as my invention:

1. In a bottle-type container having a body topped by a neck of substantially smaller diameter than the body and adapted for receiving a container closure, the improvement comprising:

an annular collar of substantial length between the body and the neck;

stop shoulder means located adjacent to the body end of said collar;

an overcap within which said neck and collar are received, said overcap having a resiliently flexible skirt which is of an undistorted inside diameter greater than the principal diameter of said collar;

a plurality of substantially circumferentially spaced diametrically opposite prominent outward protrusions on said collar extending to a greater diameter than the undistorted inside diameter of said skirt; and

circumferentially arcuate areas of substantial width on said collar intermediate said protrusions and lying on a common diameter which is less than said undistorted inside diameter of said skirt;

whereby said skirt receives said collar in press-on engagement wherein areas of the skirt directly engaged by said protrusions are stretched radially outwardly and effect corresponding radially inward deflection of the areas of the skirt intermediate the protrusions into frictional retaining engagement with said arcuate areas, so that there is dual frictional retention of the skirt to hold the overcap in place on the container.

2. A container according to claim **1,** having in combination therewith a closure comprising an aerosol spray valve device having an annular plastic shoulder, the container comprising plastic material, and said plastic shoulder being permanently secured in hermetically sealed relation to said neck, said stop shoulder means comprising an annular sealing surface engageable by the overcap skirt edge so that the spray valve device is sealed against atmosphere by the overcap.

3. A container according to claim **1,** wherein said protrusions are longitudinally extending ribs.

4. A container according to claim **3,** wherein said ribs have leadin cam ends adjacent to said neck.

5. A container according to claim **4,** including an annular sloping leadin surface about said neck and leading to and merging with the leadin ends of said ribs.

6. A container according to claim **3,** including leadin cam shoulder means between said neck and said collar and on the adjacent ends of said ribs to facilitate reception of the skirt into assembly about the collar and onto said ribs.

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