CONTAINER AND SAFETY CLOSURE SEAL THEREFOR

6 Claims, 7 Drawing Figs.

ABSTRACT: A squeeze-type or glass container and a safety closure therefor wherein the container and closure have portions that are interengangeable in sealing relationship when the closure is mounted on the container neck to make the closure difficult to remove especially by children and the closure having a flush fitted flap integral with it and resting in a recess in the top of the closure and on a partition at the bottom of the recess and having at least one dispensing opening. The flap has an integral plug or bung or covering element to seal the opening in flush flap position. The flap may be swung from its flush position on the closure to an open position by a proper user to lift the plug or covering element and uncover the dispensing opening in the partition of the closure, the sealing fit of the closure or the container and the normally flush position of said flap making it very difficult it not impossible for children to lift the flap of the closure from its flush position or to remove the closure from the container, thus providing safe storage for dangerous container contents and preventing unauthorized access thereto.
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RELATED APPLICATIONS


BACKGROUND OF THE INVENTION

Squeeze-type containers are frequently used for dangerous contents and unauthorize use especially by children must closures prevented. Such containers and also rigid safety con-

15 tainers and closures intended to prevent the access to or removal of dangerous contents therefrom by children or ac-

20 cidental removal by others are prevalent but not have not been popularly accepted by the public or producers of such con-

25 tainers for a number of reasons. Among these are complexity of construction and assembly contributing to excessive and impractically high manufacturing costs, difficulty of manipu-

30 lation in application and opening of the closure so that only people with a computer bent or thoroughly familiar with the

35 structure can use it without annoyance and also because of the relatively short life of the closure. A further difficulty with known prior art closures of this type is an inability to mass-produce them and undesirable overall size of the parts forming the structure.

This invention relates to a safety container of the squeeze bottle or rigid bottle type, and of a closure therefor of rela-

45 tively simple construction that is inexpensive to produce on 

50 a mass production basis and fully effective for its intended pur-

55 poses, making it difficult for children to gain access to dan-

60 gerous contents but yet permit simple manipulation by a

65 proper user for authorized removal of such contents and which provides safe and effective sealing against leakage when in closed condition.

Further features and objects of the invention are the provi-

70 sion of improved safety containers and closures therefor of a 

75 quickly mountable type that may be originally applied as by

80 pressure or the like, and which closures are substantially leak-

85 proof and are extremely difficult if not impossible to remove

90 from the container by children once they have been applied to the contained.

Other objects and features of the invention will become ap-

95 parent from the following detailed description and the accom-

100 panying drawings forming a part hereof, wherein:

FIG. 1 is a partial perspective view of a container and a 

105 safety closure mounted thereon and embodying the invention;

FIG. 2 is a plan view illustrating the closure cap after appli-

110 cation to the container after the latter has been filled;

FIG. 3 is a sectional view of the container and closure cap of 

115 FIG. 1 taken along the plane of line 3--3 of FIG. 2;

FIG. 4 is a similar view of the closure of FIG. 1 in its open 

120 condition;

FIG. 5 is a sectional view similar to that of FIG. 3 of a 

125 modified form of closure;

FIG. 6 is a fragmentary sectional view of a further modified 

130 form of closure and container, and

FIG. 7 is a similar fragmentary sectional view similar to FIG. 

135 6 of still another modified form of closure and container.

DETAILED DESCRIPTION

Referring to the drawing and first to FIGS. 1-4 inclusive, the reference character 10 denotes a so-called squeeze bottle 

145 type of container or receptacle of any suitable material although preferably a flexible moldable synthetic material such as high density polymer or polyethylene, polypropylene, copolymers of these materials or other moldable plastic having the characteristics of a solid ethylene polymer that may be deformed by squeezing so as to eject contents thereof. In the embodiment shown, this container 10 has substantially tubular shape with circular cross section and walls of substantially uniform thickness except at the bend 11

150 providing the open neck region 12 whereat the walls are thickened for purposes presently to be described. The upper 

155 rim 13 of the container about the container neck is internally 

160 and externally tapered. An externally provided annular groove 

165 of substantially semicircular section is provided in the thinned bend 11 of the container and the upper wall portion 

170 adjacent this groove is tapered to join the outer wall of the neck region 12. The lower wall portion 16 below groove 14 is 

175 substantially perpendicular.

If the container 10 is of flexible moldable material, its 

180 above-described components may readily all be formed during the 

185 molding process. A safety cap 17 preferably of a molded synthetic material such as Polyolomer, a product of Eastman Kodak Company or such other material as is mentioned above is provided for

190 force-fitted mounting as a closure over the neck 12 of chan-

195 tainer 10 after the latter has been filled. The inner sidewall 18 

200 of this cap 14 is provided with a semicircular annular inwardly 

205 projecting bead 19 so located near its lower skirt portion 20 to 

210 fit tightly onto the groove 14 in sealing relationship therewith and the skirt portion 20 is intended to closely engage on the 

215 surface 16. The sidewall 18 of closure 17 is thickened at 21 in 

220 its upper region and provided with a tapered wall 22 which is 

225 joined to wall 18 by a curved portion 23.

The upper or top wall 24 of closure 17 is provided with a 

230 recess 25 whose bottom defines a transverse partition 26. This 

235 partition 26 is provided with a tubular annular projection 27 

240 which has a tapered outer sidewall 28 facing reversely tapered 

245 wall 22 and defining with it a tapered annular groove 29 into 

250 which the tapered upper end 13 of the neck of the container 

255 may enter with a force fit when the closure cap is forcibly 

260 pressed onto said container neck 12. This force fit provides a 

265 second seal for the container contents. At least one opening or 

270 perforation 30 is provided in the partition 26 of wall 24 within 

275 the confines of the projection 27, so that container contents 

280 may be ejected when the container is squeezed. This opening 

285 30 is normally closed off as by a stopper or plug 31 which is in-

290 tegral with a concealed flap 32 integral with the top wall 24. 

295 Plug 31 is sufficiently larger dimensional than opening 30 as 

300 to require force to insert it into opening 30 thereby effectively 

305 sealing off said opening in the closed condition of flap 32.

Authorized opening of the flap 32 of cap 17 from its flush 

310 fit in the recess 25 and the sealed closed condition of its plug 31 

315 in the opening 30 is effected by hinge movement of said con-

320cealed flap. This flap or tab 32 is integrally hinged at 33 to an 

325 edge of said top wall 24 of said closure and normally fits close-

330 ly within the shallow recess 25 which is located in the central 

335 portion of said top wall 24. This recess 25 is of substantially 

340 rectangular shape and has opposite substantially vertical 

345 sidewalls 34 being joined by an end wall 35. The flap 32 is 

350 joined integrally at 33 to the closure cap 17 at its outer edge 

355 region and has an overall contour complementary in shape to 

360 the recess 25 terminating in a feathered edge 36 falling short 

365 of wall 35, and being provided also on its underface with the 

370 stopperlike projection 31 which is designed to fit tightly into 

375 and seal off opening 30 when the flap 32 lies flush within the 

380 recess 25. This tight fit also serves to retain the flap in its 

385 flush condition in said recess.

The unattached end of flap 32 which is provided with the 

390 thin flexible feathered edge or lip 36 is slightly spaced from 

395 wall 35 to permit insertion of a fingernail or other prying 

400 means under lip 36 to swing the flap 32 out of its nested 

405 retained position in recess 25 about its hinged joint 33 at with 

410 its closed cap 17.

In an alternative closure embodiment 17a as seen in FIG. 5, 

415 the flap 32a is provided with an integral tapered recess 37a 

420 and skirt 37b that in the nested condition of said flap 32a fit 

425 respectively over a complemental annular nose 38a projecting 

430 upwardly into recess 25a around opening 30a and a recess 37c 

435 into which it fits tightly to seal opening 30a and retain flap 32a 

440 in its nested condition in recess 25c. The hinged joints 33 and 

445 33a when flaps 32 or 32a are swung to the open condition seen 

450 in FIG. 4 permit these flaps to remain in their open condition
without tending to return to closed condition so that the contents of the container may be squeezed out of the latter through the uncovered openings 30 or 30a.

Further modifications of cap closures and containers are illustrated in FIGS. 6 and 7. In FIG. 6, the container 10c is somewhat further modified by providing the annular groove 4 ec therefor with a smaller annular groove 39c. Similarly, the closure cap 17c is modified by providing its annular bead 19c with a further annular bead 40c complementary in shape to groove 39c so that upon mounting of closure 17c on the container the respective beads 19c and 40c will fit tightly and sealingly in the respective recesses 14c and 39c, thus serving to maintain the closure 17c more securely on the container 10c on which it has been mounted. For like purposes, a reversal of structure is seen in FIG. 7 wherein the annular groove 4 dc of the container 10d is provided with an annular bead 41d and the bead 19d of closure 17d is provided with an annular recess 42d shaped to snugly receive the bead 41d when the closure 17d is mounted on container 10d. Closure 17c or 17d otherwise may have the flap structure of FIGS. 1-4 or 5.

The caps 17 and 17a, 17b or 17c are molded preferably by injection molding and the synthetic plastic material thereof which may be the aforesaid Eastman Polyacrylate or polyethylene, polypropylene or copolymers of these materials which in the wall thickness at the hinge 33, 33a as employed are sufficiently flexible to permit hinged movement of the respective flaps and yet provide sufficient strength to prevent their tearing away when grasped for hinging movement to opening condition or repeated opening or closing of the flaps.

Although closures 17, 17a, 17b and 17c have been shown in FIGS. 1-7 as applicable to flexible squeeze-type containers they are likewise applicable to containers of different shapes and of rigid materials such as glass.

In such event the respective closures or caps require a modified flap provided with two protrusions designed to close and seal off two separate openings in the partitions like 26 thereof, one being for the ejection of liquid contents and the other for admission of air to replace dispensed liquid from the rigid container.

In all modifications after a container is filled, the closure caps 17, 17a, 17c or 17d with their flaps in nested condition are forced onto its open neck and the interengaging tapered surfaces and respective beads and grooves provide multiple seals to prevent leakage and also prevent removal. Thereafter, the opening of the closures can only be effected by prying the respective flaps into unfolded condition by a fingernail or other prying means and uncovering of the flap openings. To reclose the containers, the flap of its closure is again simply repositioned in flush condition. This may be repeated indefinitely as required to permit removal of selected amounts of container contents. On application of closures to the containers their respective beads are guided over the tapered wall portions 15, 15a, 15c or 15d into seating and sealing engagement in respective grooves 14, 14a, 14c or 14d of container 10, 10a, 10c or 10d.

Ordinarily children will find it difficult to unseat the flaps for opening. Likewise, accidental opening will not be avoided because the attempted user will be required first to manipulate the flap to an unseated condition to expose the openings or apertures, thus warning the user in dark or dimly lighted rooms of the dangerous contents of the container.

While specific embodiments of the invention have been disclosed, variations in structural detail within the scope of the appended claims are possible and are contemplated. There is no intention, therefore, of limitation to the abstract or exact disclosure herein presented.

1. A container and safety closure means therefor, said container having a neck and an annular groove adjacent the base of said neck, said safety closure means comprising a one-piece force-fittable closure cap having a wall whose inner face has a beaded projection complementary to the groove in said neck and adapted to engage in said groove surface in such disposition as to prevent accidental removal of the mounted closure or cap from said container after it has been force fitted thereon and provide a seal for container contents, additional seal means between the neck of the container and said closure member, a flap portion integral with said cap and swingable hingedly therefrom, and at least one recess in said cap for receiving and retaining said flap in flush disposition relative to the top surface of said cap, said recess having at least one opening and said flap having a means for closing each such aperture for closing off and sealing such opening and said flap being swingable from said flush disposition to an open position to remove such means from such aperture without requiring removal of said cap from said container.

2. A container and safety closure therefor according to Claim 1, wherein said last-mentioned means is a plug integral with said cap that is tightly engaged in said opening in said flush disposition in said cap or closure.

3. A container and safety closure therefor according to claim 1, wherein said last-mentioned means includes a tapered skirt that extends from said flush cap into a complementary recess about said opening in said cap.

4. A container and safety closure therefor according to claim 1, wherein said groove has a further groove therein and said bead had a further bead engageable in said further groove.

5. A container and safety closure therefore according to claim 1, wherein said groove has an annular bead and said beaded portion has a complementally shaped annular groove in which said annular bead is engageable.

6. A container and safety closure means according to claim 1, wherein said neck has a tapered upper portion and said closure cap has a tapered groove into which said portion fits to provide said additional seal means.