Aug. 12, 1969 H. F. LUKE 3,460,707

TAMPER-PROOF CLOSURE FOR DISPENSER CANS

Filed Jan. 31, 1968 2 Sheets-Sheet 1

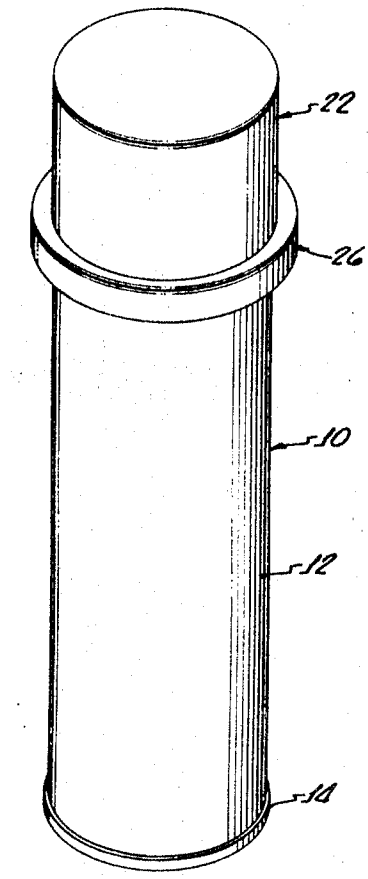


FIG. 1.

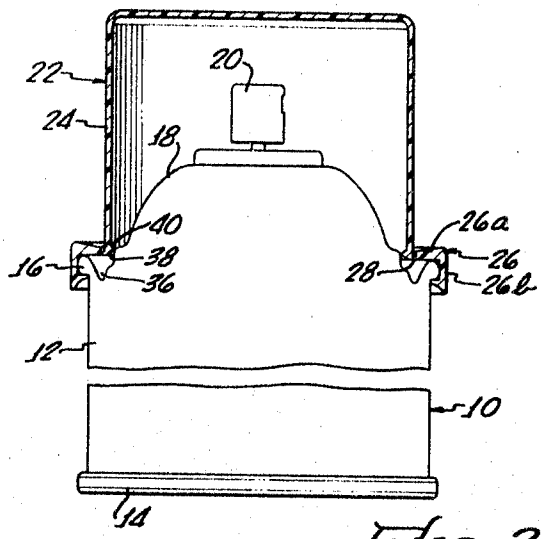


FIG. 2.

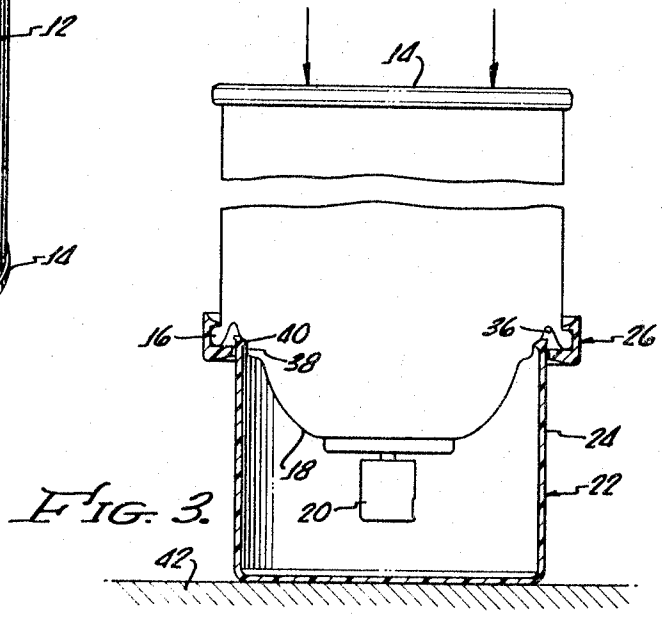


FIG. 3.

INVENTOR.
HENRY F. LUKE

BY
FOWLER, KNOBBE
& MARTENS
ATTORNEYS.

Aug. 12, 1969 H. F. LUKE 3,460,707

TAMPER-PROOF CLOSURE FOR DISPENSER CANS

Filed Jan. 31, 1968 2 Sheets-Sheet 2

FIG. 4.

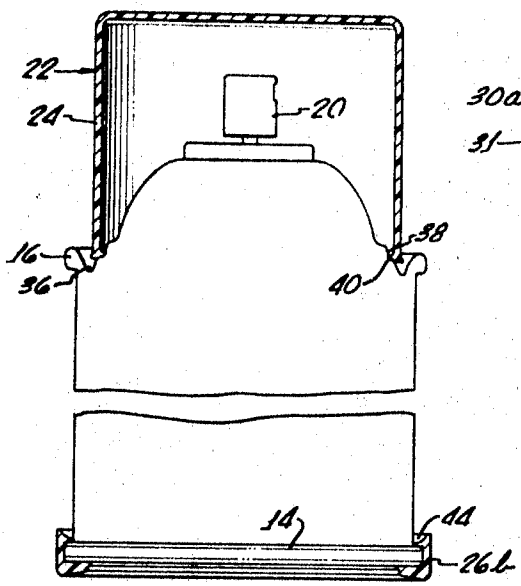


FIG. 5.

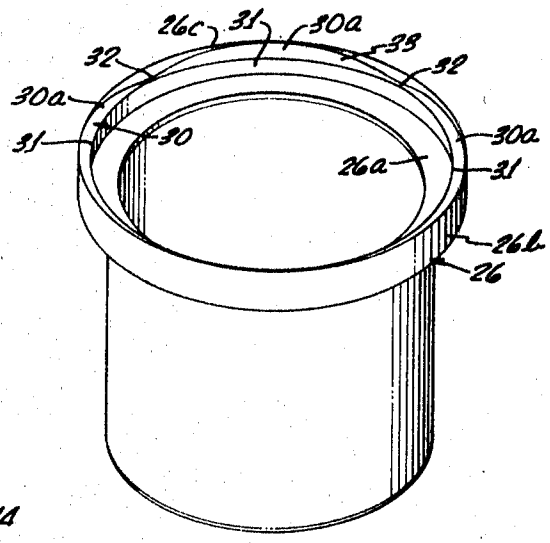


FIG. 8.

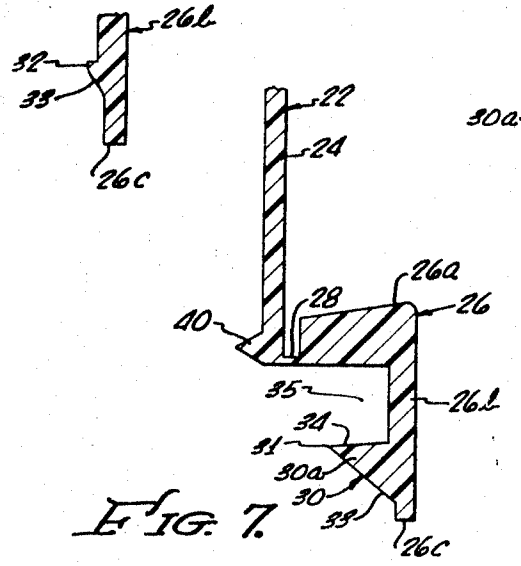


FIG. 7.

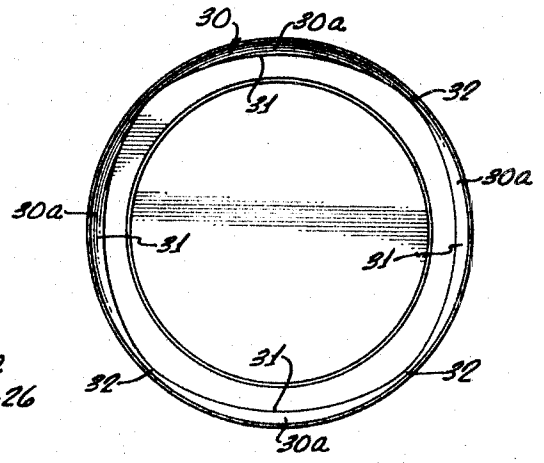


FIG. 6.

INVENTOR.
HENRY F. LUKE

BY
FOWLER, KNOBBE
& MARTENS
ATTORNEYS.

United States Patent Office 3,460,707
Patented Aug. 12, 1969

3,460,707

TAMPER-PROOF CLOSURE FOR DISPENSER CANS

Henry F. Luke, 2102 Serrano Ave.,
Newport Beach, Calif. 92661

Filed Jan. 31, 1968, Ser. No. 701,912
Int. Cl. B65d *17/00, 43/10, 47/10*
U.S. Cl. 220—27 1 Claim

ABSTRACT OF THE DISCLOSURE

A dispenser can top is closed by a cap having a skirt which prevents the cap from being removed by hand; however, by striking the end of the cap on a table, a web joining the skirt to the cap body is broken. The cap body can then be removed and subsequently reused to cover the dispenser valve. Once separated from the cap body, the skirt can be easily removed by hand and snapped onto the bottom of the can to serve as a coaster for collecting drippage from the can.

BACKGROUND OF THE INVENTION

This invention relates to a can and cap structure and, more particularly, to an improved tamper-proof reusable closure or cap for aerosol dispenser cans.

One of the needs for aerosol dispenser cans is that of a reliable, reusable cap which is initially tamper-proof. Such a cap is desirable to prevent customers from removing the cap and testing the contents in a store before buying the item. Some known caps include a break-away portion which, when removed, enables the cap body to be reused to cover the container. Since it is necessary to break a portion of the cap to remove it, the prospective purchaser is deterred from attempting to sample the contents. In the known dispenser caps of this variety, only the body portion of the cap is reused and the remaining portions are either discarded or remain on the top of the can.

One of the uses for which aerosol dispenser cans have proven to be highly popular is for small painting jobs. With cans containing a material, such as paint, a small amount of leakage or drippage from the dispenser valve often occurs. This material typically rolls down the side of the can causing the bottom of the can to become sticky or messy from the wet paint. To prevent such drippage from undesirably marking a surface, it is advisable to place the can on a suitable disposable item, such as an old newspaper, for example. This approach is not completely satisfactory in that such a disposable item may not always be conveniently available, plus the can must always be set in the same spot or the protective item must be moved to the new location. If all paint is not used at a given time and the remainder is to be used at a later date, the can bottom should be wiped before being placed on a storage shelf. Hence, it can be seen that a need exists for a convenient solution to this problem which is neat, handy and does not add to the cost of the product.

SUMMARY OF THE INVENTION

In accordance with this invention, a dispenser cap is provided which solves both the tampering and the drippage problem. The can is provided with a cap having a skirt which snaps onto the upper end of the can and cannot be easily removed by hand with the cap intact. The skirt is connected to the cap body by material which can be broken away in a positive manner such as by sharply striking the end of the cap against a solid surface. The remaining cap body is sized to fit with a mating surface on the can top so that the cap is reusable for covering the dispenser. The cap skirt remains unbroken, and due to its flexibility it may now be easily removed by hand from the top of the cap. By forming the skirt to fit over a portion on the top of the can which is approximately the same diameter as the bottom of the can, the skirt may be easily snapped onto the can bottom to serve as a convenient coaster or drippage collector which will remain with the can.

DETAILED DESCRIPTION AND DRAWINGS

For a more thorough understanding of the invention, refer now to the following detailed description and drawings, in which:

FIG. 1 is a perspective view of an aerosol dispenser can with the cap of the invention positioned thereon;

FIG. 2 is a side elevational view of the can and cross-sectional view of the cap in position on the top of the can;

FIG. 3 shows the can and the cap inverted from the position of FIG. 2 and illustrates the manner by which the body of the cap is broken away from the cap skirt;

FIG. 4 illustrates the separated cap body being reused to cover the top of the can and the cap skirt being used as a coaster for the can;

FIG. 5 is a perspective view of the open end of the cap illustrating the nature of the skirt;

FIG. 6 is a plan view of the open end of the cap further illustrating the nature of the skirt;

FIG. 7 is an enlargement of the right lower edge of the cap of FIG. 2, showing the detail of the lower portion of the cap body, the skirt and the break-away portion; and,

FIG. 8 is an enlarged cross-sectional view of the skirt cylindrical wall, rotated about 45° from that of FIG. 7.

Referring first to FIG. 1, there is illustrated a typical aerosol dispenser can **10** having a generally cylindrical body or side wall **12** having a circular lower end with an outwardly extending bead **14** formed thereon at the seam between the side wall and bottom wall of the can. As can be seen from FIG. 2, the top of the can body **12** also has a circular bead **16** which is formed by the seam or joint between the body **12** and a generally dome-shaped top **18**. Centrally positioned in the top **18** is a dispenser valve **20** of conventional variety.

The top of the can and the valve are enclosed by a one-piece cap **22** having a generally inverted cup-shaped body **24**, joined to an annular skirt **26** by a thin, annular, radially extending wall or web **28**. As can be seen from FIGS. 2 and 7, the skirt **26** has a somewhat inverted L-shaped cross-section with an annular radially extending wall **26*a*** formed integral with an outer cylindrical wall **26*b***. The web **28** extends between the bottom edge of the cap body and the lower edge of the horizontal wall **26*a***.

On the inner surface of the cyindrical wall **26*b*** spaced slightly from the lower or open end **26*c***, is an inwardly extending annular retaining flange **30** as may be seen most clearly in FIGS. 5, 6 and 7. The radial dimension of the flange **30** smoothly varies from a maximum at four points **31** which are arcuately spaced 90° to a minimum at four points **32** which are arcuately spaced 90°. Thus, in effect, the flange **30** is formed of four equally spaced arcuate segments **30*a*** which extend inwardly a maximum amount at their midpoints **31** and taper to a minimum at their end points **32**.

The lower surface **33** of the flange **30**, as seen in FIGS. 5, 7 and 8, tapers towards the cap end **26*c***, and the axial length of the surface **33** smoothly varies from maximums at points **31** to minimums at points **32**. The top surface **34** is generally horizontally oriented parallel to wall **26*a*** and perpendicular to wall **26*b***. The flange **30** and the walls **26*a*** and **26*b*** define an annular groove or recess **35** having an axial dimension approximately equal to the axial thickness of the bead **16** on the upper end of the can, and a diameter approximately equal to the diameter of the bead. Due to the tapered surface **33** and the flexibility of the skirt **26**, the dispenser cap **22** may be easily snapped by

hand into position on the can, wherein the skirt cooperates with the bead **16** to hold the cap on the can, as shown in FIG. 2.

As can be seen from FIGS. 2–4, an annular groove **36** is formed in the outer periphery of the can top **18**. The groove side walls are formed by the inner surface of the bead **16** and the substantially cylindrical wall **38** formed on the can top **18** spaced inwardly from the bead **16**. The annular web **28** and the cap body are located over or axially aligned with the groove **36**, as best seen in FIG. 2. A small inwardly extending annular lip **40** is formed near the bottom edge of the cap body **24**. The inner diameter of this annular lip **40**, which may be more clearly seen in FIG. 7, is slightly smaller than the diameter of the cam cylindrical wall **38**. As seen in FIG. 2, the lip **40** just engages the upper end of the cylindrical wall **38**.

The cap is made of a material which is strong and somewhat flexible, but which is still brittle enough to be readily breakable in thin sections. A particularly suitable plastic material is polyethylene, which is also easily moldable.

As explained, the skirt is flexible enough such that the cap **22** may be snapped into position on the top of the can as shown in FIG. 2, wherein the skirt **26** cooperates with the upper bead **16** to hold the cap on the can. The snug fit and the construction of the cap are such that it cannot be easily removed by hand. Although the material is somewhat flexible, the rigidity of the combined skirt **26**, the web **28** and the cap body **24** and the flange **30** resist removal. Hence, a prospective purchaser of the item cannot reach the dispenser valve **20** without breaking the cap.

To separate the cap body **24** from the skirt **26**, it is necessary to sharply strike the end of the dispenser cap with sufficient force to rupture the thin web **28**. A very convenient way to perform this operation is to grasp the can **10** about its cylindrical body, invert the can and strike the cap against a supporting surface **42**, such as a table top, as indicated by the arrows in FIG. 3. This action ruptures the web break-away portion **28**, and causes the cap body **24** to telescope further onto the top of the can be sliding into the annuar groove **36**. The frictional fit of the can body with the wall **38** is such that the cap body **24** may then be easily removed by hand so that the dispenser valve **20** is accessible.

Due to its dimensions and the nature of its material, the cap skirt **26** is sufficiently flexible to now be easily removed by hand from the upper bead **16**. More specifically, an axial removal force is applied to the lower end **26***c* of the skirt which, due to the varying inner diameter of the flange **30**, enables the flange to deform so that the flange segment **30***a* receiving the force slips over the annular bead **16**. Removal is easiest if the force is applied at a midpoint **31** of a flange segment **30***a* since it is this portion which must move out radially the furthest to permit removal.

It should be noted that it is the absence of the break-away portion **28** which permits the flexible skirt to be deformed sufficiently such that the flange **30** can slip over the edge of the bead **16**. That is, the inner edge of the radial wall **26***a* must move inwardly to permit a flange segment to slip over the bead, but when the cap is intact, inward movement of the wall **26***a* is resisted by the web **28** and the cap body **24**. Although the annular web **28** is quite thin, in an axial direction, it does have considerable strength in the radial direction, which is its greatest dimension. Consequently, it is the web **28** which in effect prevents the skirt from being removed from the can when the cap is still intact.

Since the lower bead **14** on the cam is approximately the same size in diameter as the upper bead **16**, the skirt **26**, separated from the cap body **24**, may be easily snapped onto the bottom bead **14** as shown in FIG. 4 to serve as a coaster for the cap. As can be seen, the open end **26***c* of the wall **26***b* is spaced slightly from the can body **12** with the result that an annular dam **44** is formed around the base of the can which serves to collect any drippage flowing down the side of the can. Note that bead **14** fits snugly within the groove **35** so that the liquid cannot seep beneath the can. As mentioned above, such an arrangement is particularly helpful when the can is used to contain material such as paint.

The cap body **24**, although no longer tamper-proof, is reuseable to close the upper end of the can, as can be seen in FIG. 4. Since the inner diameter of the annular lip **40** is slightly less than the diameter of the cylindrical wall **38**, the annular lip frictionally engages the cyindrical wall as the cap body **24** is telescoped onto the can into the annular groove **36**.

What is claimed is:

1. A dispensing can structure, including:

a generally cylindrical can body having side walls, a top, and a bottom with an outwardly extending upper annular bead formed at the intersection of the top and the side walls, and a lower annular bead substantially equal in diameter and size to the upper bead formed at the intersection of the bottom and the side walls of the can;

a dispensing valve positioned in the can top;

an annular groove formed in said can top with the upper bead forming an outer side wall of the groove and a substantially cylindrical wall on the can top spaced inwardly from the bead forming an inner side wall of the groove, and the bottom of the groove extending below the upper bead;

an initially tamper-proof and reusable cap for the can having an inverted generally cup-shaped body enclosing the dispensing valve and including an annular skirt having a generally L-shaped cross-section with a generaly horizontal wall and a generally vertical wall, the skirt including flange means extending inwardly from the vertical skirt wall spaced from the horizontal wall to define a recess for snugly receiving said upper bead, the flange means having an effective diameter smaller than that of the upper bead, the flange means being tapered toward the open end of the cap and the cap skirt being sufficiently flexible to permit the skirt to be easily snapped onto the upper bead while the flange means prevents the skirt from being easily removed by hand so long as the cap is intact;

a radially extending thin annular wall forming a break-away portion connecting said horizontal wall of the skirt to the lower end of the skirt body, the break-away portion being rupturable without breaking the skirt or the cap body by striking the end surface of the cap body against a solid surface thereby applying an axially directed force to the break-away portion;

the cap skirt having sufficient flexibility such that once severed from the cap body, it may be easily removed from the upper bead by hand and snapped onto the lower bead to serve as a coaster for the can; and,

the open end of the cap body having an inwardly extending annular lip defining a diameter slightly smaller than that of said cylindrical wall on the can top whereby said cap body may be telescoped into said groove with the annular lip in frictional engagement with the cylindrical wall to provide a reusable cover for the can.

References Cited

UNITED STATES PATENTS

3,170,603	2/1965	Kitterman	222—182
3,369,712	2/1968	Osrow	222—182

GEORGE T. HALL, Primary Examiner

U.S. Cl. X.R.

215—42; 220—60; 222—182, 541