June 2, 1970 P. P. GACH 3,515,307

REPLACEABLE CAP

Filed Jan. 8, 1969

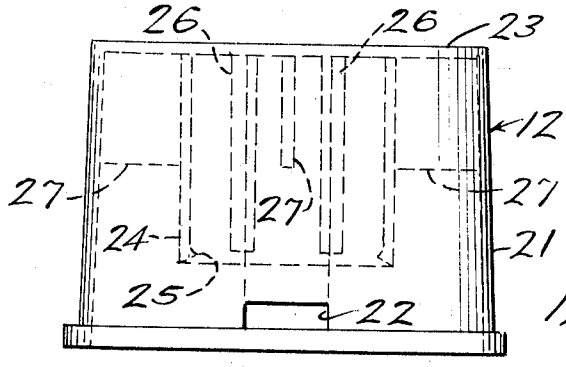


FIG-4-

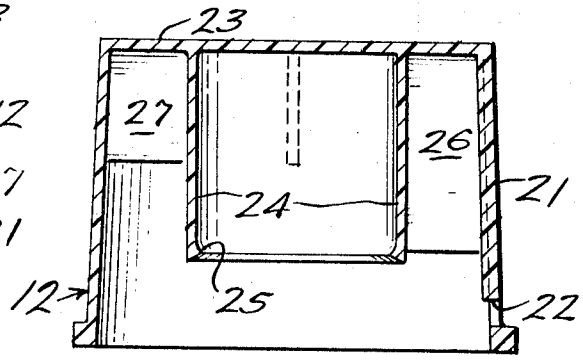


FIG-5-

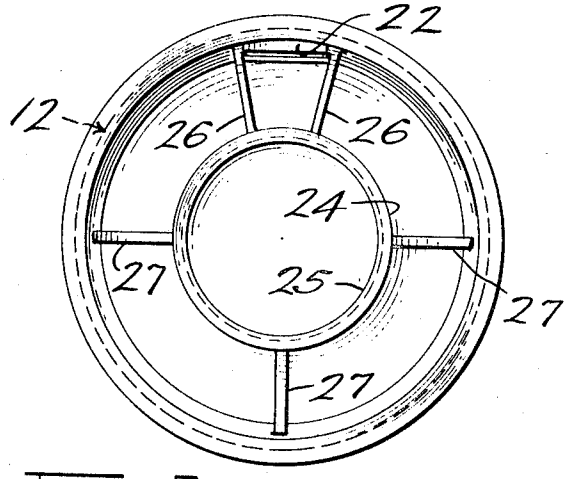


FIG-2-

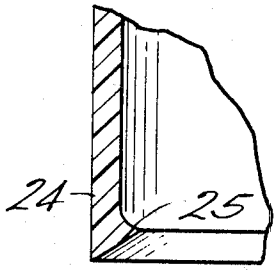


FIG-3-

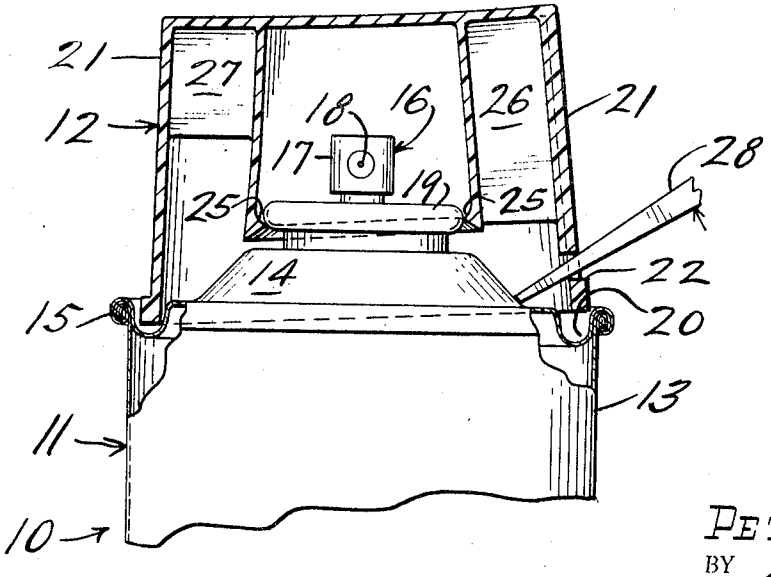


FIG-1-

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REPLACEABLE CAP

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ABSTRACT OF THE DISCLOSURE

A one piece tamperproof replaceable cap for aerosol spray cans and the like, preferably constructed of semi-flexible plastic material. The cap consists of a tubular outer skirt having an access opening therein, a circular top integrally mounted on the upper end of the outer skirt, a tubular inner skirt concentrically positioned within the outer skirt and depending from the top, and reinforcing ribs connecting the outer and inner skirts. The inner skirt has an inturned locking lip adjacent its lower edge. The access opening in the outer skirt is so positioned that a tool inserted within the hole can be used as a lever to exert an upward force on the cap to free the locking lip from the collar of the container on which it has been placed.

BACKGROUND OF THE INVENTION

This invention relates to a tamperproof replaceable cap for use with a dispensing container such as an aerosol spray can.

Dispensing containers, for example, aerosol cans, consist of cylindrical can bodies having dispensing openings provided in their upper ends. Often, a valve structure is provided in combination with the dispensing opening and the contents of the container are dispensed under pressure through the valve structure. A cap is conventionally placed over or upon the upper end of the dispensing container to surround and protect the dispensing opening.

A problem encountered by merchants who market this type of container is that customers often remove the caps from the container prior to purchase. This may be done either to test or sample contents of the container prior to purchase or, when the price of the container is stamped on the cap, to replace the cap of a container which bears a higher selling price with a cap from a container having a lower selling price.

Still another problem is that in the home, children often take the container, remove the cap and dispense the contents through the valve causing damage to furniture, carpets and the like. This is particularly dangerous when the aerosol container contains corrosive solutions.

It is the primary object of the present invention to provide a tamperproof snap-on replaceable cap which has a tamperproof position in which the cap and a dispensing container are connected in a manner such that the cap can be removed only by inserting a tool through an access hole in the cap wall.

It is a further object of the present invention to provide a tamperproof replaceable cap which has locking means for the retention of a cap on a dispensing container after the cap has been initially removed from its tamperproof position.

Other objects of this invention will become apparent from the following specification and drawings, in which:

FIG. 1 is a fragmentary view in elevation, with parts in cross section, of a dispensing container and a tamperproof replaceable cap, according to the present invention;

FIG. 2 is a bottom view of the tamperproof replaceable cap of the invention;

FIG. 3 is an enlarged fragmentary view in cross section of the locking lip portion of the inner skirt of the tamperproof replaceable cap of the invention;

FIG. 4 is an elevation view, with the interior parts shown in phantom, of the tamperproof replaceable cap of the invention; and

FIG. 5 is a cross-sectional view taken along the line 5—5 of FIG. 4.

SUMMARY OF THE INVENTION

Briefly, the invention relates to an improved tamperproof replaceable cap for use on a dispensing container having an upright body and an upstanding rim on its upper end. A circular receiving groove is disposed adjacent the rim. The container also has a dispensing opening surrounded by a collar located at the upper end of its body.

The tamperproof replaceable cap comprises a cup shaped body including a top and an integral depending skirt having an access opening therein. The lower portion of the skirt extends downwardly into the receiving groove in close relationship with the container when the cap is in an initial tamperproof position. The cap has a second depending skirt located interiorly of and concentric with the outer depending skirt. A locking means is positioned on the lower edge of the skirt and is effective to lock the cap onto the container collar. The cap has a plurality of generally vertical supporting ribs connecting the inner skirt with the outer skirt. A portion of the supporting ribs extend approximately half way down the length of the inner skirt. The remaining supporting ribs which are disposed on each side of the access hole in the outer skirt extend substantially all the way down the length of the inner skirt and also connect the inner skirt with the outer skirt. In order to remove the cap a tool must be inserted in the access opening of the outer skirt and levered against the container, thus exerting an upward force on the outer skirt which, in turn, lifts the locking means on the inner skirt upwardly over the container collar, which surrounds the dispensing opening, thereby removing the cap.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a container and cap assembly is generally indicated at **10**. The assembly **10** includes a dispensing container **11** and a tamperproof cap **12**, according to the present invention.

The dispensing container **11** has a cylindrical and upright body **13**. In the present embodiment, the body **13** has a domed top **14** secured to its upper end by an annular upstanding rim **15**. A valve mechanism, generally indicated by the reference number **16**, is mounted on the domed top **14** and includes a valve actuator **17** having a dispensing opening **18**. The valve mechanism **16** is surrounded by an annular collar **19**. Although the dispensing container **11**, illustrated in FIG. 1, is a pressurized container, the present invention is not limited to a tamperproof replaceable cap for a pressurized container, but is equally suitable for use on non-pressurized containers. The dispensing container **11** has a circular, receiving groove **20** located in its upper surface adjacent the rim **15**.

The one piece cap **12** is comprised of an outer skirt **21**, which has an access opening **22** cut in it, a top **23**, and an inner skirt **24** positioned concentrically within the outer skirt **21** and depending from the top **23**. A puncturable sealing member may be placed over the access opening **22**. Puncturing of the sealing member indicates tampering. The bottom edge of the inner skirt **24** curves inwardly forming a circumferential locking lip **25**. The continuous lip **25** engages the underside of the collar **19** of the dispensing container **11** to prevent removal of the

cap 12 from the container 11 without leveraging forces. Thus the lip 25 serves as locking means to retain the cap 12 on the container 11. Preferably the curvature of the lip 25 is complementary with the curvature of the underneath side of the collar 19. The locking lip 25 extends completely around the circumference of the inner skirt 24.

Vertical supporting ribs 26 are located on either side of the opening 22 in the outer skirt 21. The supporting ribs 26 connect the inner annular skirt 24 with the outer skirt 21 and extend from the top 23 of the cap 12 down to a point adjacent the locking lip 25.

Shorter vertical reinforcing ribs 27 connect the inner skirt 24 and outer skirt 21 at various circumferential locations. The ribs 27 extend from the top 23 downwardly approximately one-half the vertical height of the inner skirt 24.

Referring to FIG. 1, the inner skirt 24 is positioned over the collar 19 of the dispensing container 11 in an encircling and protecting relationship with the valve mechanism 16. FIG. 1 shows the cap 12 in the locked or captive position. The bottom of the outer skirt 21 is positioned within the receiving groove 20 of the dispensing container 11. The opening 22 in the outer skirt 21 provides an entrance for a tool, for example a screwdriver 28.

Referring to the drawing, the screwdriver 28 is inserted through the opening 22 and leveraged against the container 11. Further upward movement of the screwdriver causes both the outer skirt 21 and the inner skirt 24 to distort because the two skirts are connected via the reinforcing ribs 26 and 27. This lifts a portion of the locking lip 25 from beneath the collar 19 of the container 11. In this position a slight upward rotation of the cap 12 causes it to be removed completely.

It is important that the reinforcing ribs 26 adjacent the opening 22 in the outer skirt 21 extend downwardly from the top 23 a distance substantially equal to the length of the inner skirt 24. When this is done, the leveraging force imparted to the outer skirt 21 is more efficiently transmitted to the inner skirt 24.

It is to be understood that the height of the inner skirt 24 is sufficient to receive the valve mechanism 16 and that the bottom of the outer skirt 21 will be seated in the groove 20 of the dispensing container 11 when the cap 12 is in locking engagement with the container 11. In the preferred embodiment there is a frictional engagement between the bottom of the outer skirt 21 and the sidewalls of the groove 20.

Preferably, the one piece cap 12 is molded of a thermoplastic material such as the polyolefin resins. These resins can be pigmented with opaque and/or colored material.

After the tamperproof cap 12 has been removed, the user may remove at least a portion of the contents of the dispensing container 11 by actuating the valve mechanism 16. The user may then replace the cap 12 on the container by forcing the locking lip 25 vertically downwardly over the collar 19.

While the present invention has been disclosed with a specific arrangement and disposition of the parts, it should be especially understood that numerous modifications and changes may be made without departing from the scope of the appended claims.

What I claim is:

1. A one piece locking cap for spray cans and the like having an annular collar which surrounds a dispensing opening comprising, in combination an outer skirt having an access opening defined therein, an integral top, a semi-flexible inner skirt positioned concentrically within the outer skirt and depending from said top, said inner skirt having a continuous locking lip adjacent its lower edge, said locking lip being engageable beneath the annular collar of such container to retain said cap on such container, and at least two reinforcing ribs connecting the inner and outer skirts, the first of said ribs being adjacent the access opening and extending downwardly from said top a distance substantially equivalent to the length of the inner skirt and the second of said ribs being disposed at a predetermined location around the circumference of said inner skirt and depending from said top a distance less than the length of said inner skirt, whereby a tool may be inserted within the access opening to exert an upward force on said cap to remove said locking lip from beneath the annular collar of the container.

2. A tamperproof replaceable cap for use on a dispensing container having an upright body including a circular groove adjacent its upper end and an upstanding annular collar surrounding a dispensing opening, said tamperproof replaceable cap comprising, in combination, a cup shaped body including a cover and an integral depending skirt, said integral depending skirt defining an access opening adjacent its lower edge, the lower portion of said skirt adapted to extend downwardly into such receiving groove in frictional engagement with such container when said cap is in an initial tamperproof position, an inner skirt depending from said cover, said inner skirt having a locking rim on the lower portion thereof, said locking rim when in the initial tampreproof postion being engaged beneath the collar of such container, and at least two sets of generally vertical reinforcing ribs connecting the inner and outer skirts, at least one of the ribs in the first of said sets being positioned adjacent such access opening and extending downwardly from said top a distance substantially equivalent to the length of said inner skirt and the second of said sets being disposed at spaced positions around the circumference of the inner skirt and depending from said top a distance substantially less than the length of said inner skirt, whereby a tool may be inserted through said access opening and used as a lever against said container to remove said inner skirt from the collar of the container.

3. A one piece locking cap for spray cans and the like having an annular collar which surrounds a dispensing opening comprising, in combination, an outer skirt having an access opening defined therein, an integral top, a semi-flexible inner skirt positioned concentrically within the outer skirt and depending from said top, said inner skirt having a continuous locking lip adjacent its lower edge, said locking lip being engageable beneath the annular collar of such container to retain said cap on such container, and at least two sets of reinforcing ribs connecting the inner and outer skirts, the first of said sets being adjacent the access opening and extending downwardly from said top a distance substantially equivalent to the length of the inner skirt and the second of said sets disposed at predetermined locations around the circumference of said inner skirt and depending from said top a distance equivalent to approximately one-half of the length of said inner skirt, whereby a tool may be inserted within the access opening to exert an upward force on said cap to remove said locking lip from beneath the annular collar of the container.

4. A tamperproof replaceable cap for use on a dispensing container having an upright body including a circular groove adjacent its upper end and an upstanding annular collar surrounding a dispensing opening, said tamperproof replaceable cap comprising, in combination, a cup shaped body including a cover and an integral depending skirt, said integral depending skirt defining an access opening adjacent its lower edge, the lower portion of said skirt adapted to extend downwardly into such receiving groove in frictional engagement with such container when said cap is in an initial tamperproof position, an inner skirt depending from said cover, said inner skirt having a locking rim on the lower portion thereof, said locking rim when in the initial tamperproof position being engaged beneath the collar of such container, and at least two sets of generally vertical reinforcing ribs connecting the inner and outer skirts, the first of said sets positioned adjacent such access opening and

extending downwardly from said top a distance substantially equivalent to the length of said inner skirt and the second of said sets disposed at various positions around the circumference of the inner skirt and depending from said top a distance substantially equivalent to one-half the length of said inner skirt, whereby a tool may be inserted through said access opening and used as a lever against said container to remove said inner skirt from the collar of the container.

5. A cap, according to claim 4, wherein said locking rim has an interior curvature complementary to the shape of the container collar and wherein the bottom edge of said locking rim is angularly disposed upwardly and inwardly.

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