

[54] **PLASTIC COVER FOR CYLINDRICAL CONTAINERS OF LARGE CAPACITY**

[75] Inventor: **Sidney Dry**, Chicago, Ill.

[73] Assignee: **National Industrial Containers**, Chicago, Ill.

[22] Filed: **Aug. 29, 1972**

[21] Appl. No.: **284,635**

[52] U.S. Cl. **220/60 R, 150/5, 229/43**

[51] Int. Cl. **B65d 43/10**

[58] Field of Search **220/60 R, 97 C; 215/41, 215/97 F; 229/43; 150/5**

[56] **References Cited**

UNITED STATES PATENTS

3,474,928 10/1969 Hurtt 220/60 R
3,609,263 9/1971 Clementi 220/60 R

3,610,306 10/1971 Summers 220/60 R
3,627,170 12/1971 Pulliam 220/60 R
3,770,156 11/1973 Yates 215/41

Primary Examiner—George T. Hall

[57] **ABSTRACT**

A cover for a drum having an overhanging annular lip about the open end of the drum in which the cover is a unitary plastic member having a central body portion, an annular skirt depending from the periphery of the body portion to define a cylindrical section having a diameter corresponding to the lip, a flange extending inwardly from the end of the skirt which is adapted to snap into position beneath the lip when the cover is displaced into position of use, to lock the cover on the drum, and a resilient corrugated section adjacent the skirt joining the skirt portion with the body portion.

11 Claims, 2 Drawing Figures

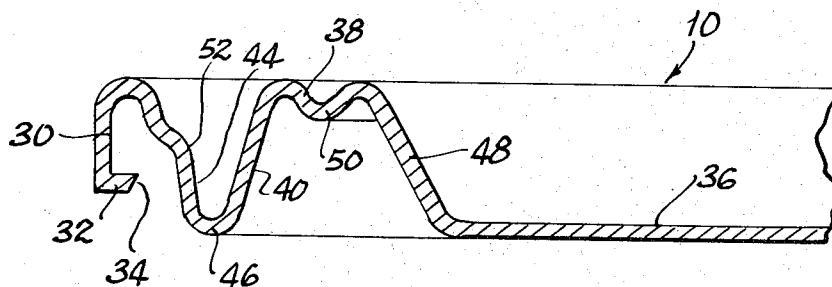


FIG. 1

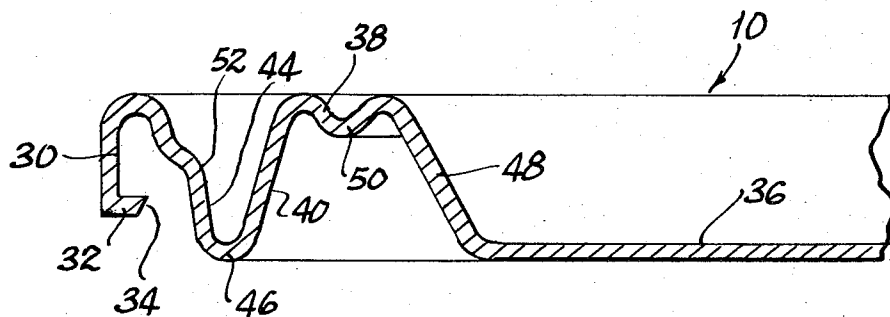
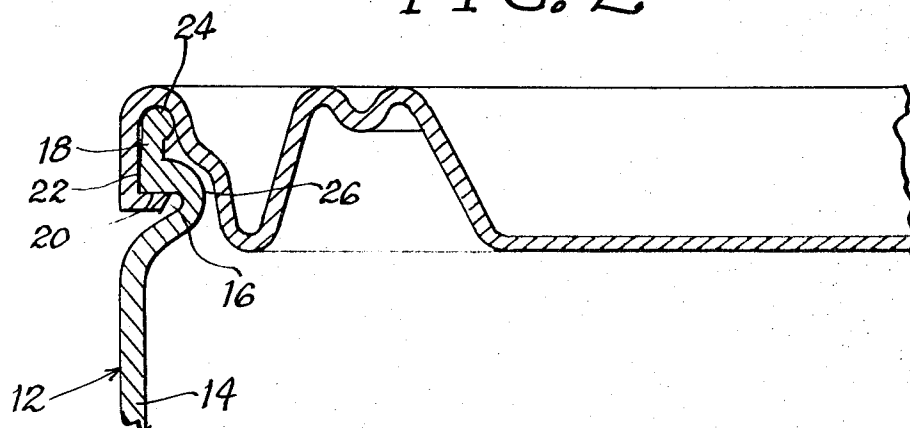


FIG. 2



PLASTIC COVER FOR CYLINDRICAL CONTAINERS OF LARGE CAPACITY

This invention relates to a cover which is adapted to snap into position releasably to secure the cover in position of use for sealing the open end of a cylindrical container such as a drum of large capacity, which may be formed of metal, fiber, plastic material, or the like.

Drums of the type described have been provided with covers in the form of disc members having a peripheral portion which rests on a curvilinear lip provided at the upper edge of the drum. The cover is secured in position of use on the drum by a lock ring in the form of a separate metal band, which is concave in cross-section in order to embrace the nested curvilinear edge portions of the cover and lip, when the metal band is drawn tightly about the peripheries of the mating edge portions.

Utilization of a separate locking member, releasably to secure the cover onto the drum, is undesirable for a number of reasons including cost of the separate locking member, exposure of the separate locking member to loss or destruction, difficulties in operating the separate locking member to effect a tight grip, especially when damage has occurred.

Thus, it is an object of this invention to provide a new and improved self-locking cover which snaps into locking engagement with the annular lip at the upper end of the container, which is easily removable from the container and reusable to establish closure of the same or another container, which is capable of withstanding considerable internal pressure or load without disengagement of the cover from the drum, and which can be applied or removed in a simple and efficient manner, without the need of special tools.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the accompanying drawing in which:

FIG. 1 is a sectional elevational view of an edge portion of a cover embodying the features of this invention, and

FIG. 2 is a view similar to that of FIG. 1 showing the cover in position of use on the open end of a drum.

In the illustrated modification the cover is identified by the numeral 10 and the container is identified by the numeral 12.

The container may be illustrated as a 5-10-25-55 gallon drum of conventional construction having a body portion 14 of cylindrical shape with an upper edge portion configured to receive a cover including an annular recessed portion 16 terminating in an annular lip portion 18 of slightly smaller diameter than the body portion of the drum but of larger diameter than the base of the recessed portion 16 to provide a relatively flat, outwardly extending land portion 20 beneath the vertical side wall portion 22 of the lip 18, which terminates in a curvilinear upper end portion 24. The interior wall of the lip portion is provided with an inwardly extending curvilinear hump 26 in the area of the annular recessed portion 16 and land 20.

It will be understood that the drum 12 can be a container of different capacity and formed of different material such as a metal drum, a plastic drum, a fiberboard drum and the like, and that the construction at the upper end may vary somewhat in the lip portion. However, any such modification should include an inwardly

extending substantially flat land 20 below and preferably forming a part of the lip portion 18 at the upper edge of the container.

The cover, embodying the features of this invention, comprises a disc member having a diameter corresponding to the diameter of the annular lip 18 on the upper end of the drum. The curvilinear disc member terminates in a peripheral depending skirt 30 of cylindrical shape, having a length corresponding to the height of the lip outer wall 22 with an annular flange 32 extending inwardly substantially perpendicularly from the lower edge of the skirt. The flange extends inwardly for a distance which is adapted to be less than the base of the recessed portion 16 but greater than the difference between the inner diameter of the skirt and the outer diameter of the lip, so that the annular inwardly extending flanged portion 32 will underlie the land when the cover is in sealing position on the drum to lock the cover in its assembled relation. The inner edge 34 of the flange tapers inwardly from the bottom edge upwardly to provide a cam surface for outward displacement of the flanged end portion in response to positive engagement between the inner edge 34 of the flange and the lip 18 as the cover is forced downwardly over the open end of the drum toward closure position.

The relatively flat body portion 36 of the cover is joined to the annular skirt portion 30 by an outer corrugated section located immediately adjacent the skirt portion and which includes in sequence a relatively flat section 38 at a level preferably, though not necessarily above the body portion 36, a downwardly extending corrugation 40 which extends angularly downwardly from the outer edge of the relatively flat portion 38, and an upwardly extending corrugation 44 which extends annularly outwardly to the upper edge of the skirt portion 30, with the lower edge of the upwardly extending corrugation 44 and the lower edge of the downwardly extending corrugation 40 being joined by a curvilinear base portion 46.

In the preferred practice, the body portion 36 is at a level below the lower edge of the skirt portion 30, but this is not essential, since the body portion 36 can be at any level with reference to the skirt portion between a level slightly below its upper edge to below the lower edge.

The relatively flat portion 38 extends outwardly at a level about the body portion 36 and is joined thereto by an upwardly extending corrugation 48, preferably disposed at an angle within the range of 20° to 45° with the axis of the drum. Instead of forming the portion 38 as a relatively flat section, it is preferably formed with one or more minor grooved portions 50 intermediate its edges.

The two outermost corrugated sections 40 and 44 are disposed to form a V section therebetween in which the walls extend in opposite directions from the base at an angle within the range of 15° to 30° with the axis of the drum. The upwardly and outwardly extending corrugation 44 is formed with an annular curvilinear hump 52 corresponding somewhat in location and curvature to the hump 26 in the inner wall of the container.

The described annular corrugated portions, adjacent the lip portion, and interconnecting the lip portion with the body portion of the cover, provides flexibility which enables the skirt portion 30 to extend angularly sufficiently to enable the skirt portion to be displaced rela-

tive the lip portion into and out of position for latching the cover onto the drum. As a result of such angular relationship, the flanged edge portion of the skirt resiliently engages the side wall of the lip in a manner to cause the flanged edge portion to snap into locking position beneath the lip as the flanged end portion clears the lip during relative downward displacement to lock the cover onto the drum.

In addition, by reason of the angular corrugated connection between the body portion and the lip, adjacent the lip portion, any load, weight or force which is generated from within the drum onto the body portion of the cover, instead of tending to lift the cover off of the drum, will instead have the effect of tightening the grip of the cover onto the drum. This results primarily from the pivotal action between the body portion of the cover and the lip about the base 46 of the two outermost corrugations 40 and 44, coupled with the corrugated arrangement in between, whereby such force or load which tends to lift the body portion of the cover, will in fact cause rotation about the pivot, while the angular corrugations operate to effect outward displacement of the pivot with the result that the end portion embracing the lip of the drum will be fixed more firmly to embrace the lip portion to enhance the gripping relationship.

For this purpose, it is desirable for the curvilinear base 46, joining the two outermost corrugations 40 and 44, to extend to a level below the skirt and preferably below the flanged portion and more preferably to a level corresponding somewhat to the level of the body portion 36 of the cover while the relatively flat intermediate portion is at a level above the lower edge of the skirt but no higher than the upper edge of the skirt.

Under such circumstances, the cover can resist displacement by loads which currently require a locking metal band for securing the cover onto the drum.

At the same time, excessive force is not required to effect outward displacement of the flanged skirt portion 32 for purposes of clearing the skirt by an amount sufficient to enable the cover to be lifted from the drum for purposes of removing the cover to gain access to the interior of the drum. To facilitate access to the space between the lip 18 and skirt 30, to unlock the cover, the skirt portion is not continuous in that it is omitted in periodically spaced apart circumferential portions to enable a tool to be inserted upwardly between the lip 18 and skirt 30 for outward displacement of the skirt to clear the flanged portion.

The cover can be fabricated of metal, plastics, or laminates formed of metal, plastic or plastic paper combinations, but it is preferred to form the cover of plastic material such as polyethylene, polypropylene, polyvinyl polymers and copolymers and the like, with or without fiber reinforcement, since such plastic covers can be molded in one piece in a simple and economical operation.

It will be understood that changes may be made in the details of construction, arrangement and operation without departing from the spirit of the invention, especially as defined in the following claims.

I claim:

1. A cover for a cylindrical container having an overhanging annular lip portion about the open end with an inwardly extending shoulder at the base of the lip, comprising a disc member, a skirt extending downwardly from the periphery of the disc member to form a cylindrical section having a diameter corresponding to the diameter of the lip portion and a length corresponding to the length of the lip portion, and an annular flange extending inwardly from the skirt which snaps into position to lock the cover onto the container when the cover is displaced into position of use on the container, said disc member comprising a relatively flat central body portion and an outer corrugated portion having a first portion which extends angularly inwardly and downwardly from the upper edge of the skirt portion for a distance below the lower edge of the skirt portion and greater than the distance between the lip portion and inwardly extending shoulder at the base of the lip portion of the container, a second portion which extends angularly inwardly and upwardly from the lower edge of the first portion for a distance to extend above the inwardly extending shoulder at the base of the lip portion of the container and above the lower end of the skirt of the cover but not above the upper edge of the skirt portion, and a connecting portion which extends angularly inwardly and downwardly for a distance below the skirt portion of the cover and the inwardly extending shoulder portion of the container and which connects the second portion with the body portion to position the body portion at a level below the skirt portion of the cover and the inwardly extending shoulder of the container, whereby lifting force on the body portion from within will react on the first inwardly and downwardly extending portion of the outer corrugation to cause outward displacement thereof in the direction toward the inwardly extending shoulder of the container and to establish an increased gripping relationship of the lip of the container between the skirt and the first portion of the cover.

2. A cover as claimed in claim 1 in which the skirt extends substantially perpendicularly from the disc member and is formed as an integral part thereof.

3. A cover as claimed in claim 1 in which the flange extends inwardly towards the axis of the disc member and substantially perpendicularly from the skirt portion.

4. A cover as claimed in claim 1 in which an outermost corrugation comprises a first portion which extends downwardly for a distance to extend beyond the lower end of the skirt portion and inwardly towards the center of the disc member at an angle within the range of 15° to 30°, and the next adjacent portion extends inwardly and upwardly from the lower end of the first portion.

5. A cover as claimed in claim 4 in which the next adjacent section extends upwardly and inwardly at an angle within the range of 15° to 30°.

6. A cover as claimed in claim 4 in which the two portions forming the corrugation are joined at their lower end by a curvilinear section.

7. A cover as claimed in claim 4 in which the corrugated section includes a relatively flat horizontally extending portion joined at its outer end to the upper end of the next adjacent portion and at about the same level thereof.

8. A cover as claimed in claim 7 which includes one or more annular grooves in the relatively flat horizontally extending portion.

9. A cover as claimed in claim 7 in which the connecting portion extends at an angle within the range of 20° to 45° with the axis of the disc member.

5

10. A cover as claimed in claim 9 in which the cover is an integral unit formed of a molded plastic material selected from the group consisting of polyethylene, polypropylene, polyvinyl polymer and copolymer, with or without fiber reinforcement.

6

11. A cover as claimed in claim 4 in which the first portion of the corrugated section has an upwardly extending annular humped portion intermediate its ends.

* * * * *

5

10

15

20

25

30

35

40

45

50

55

60

65