

United States Patent

Ragetti

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[54] SHEET METAL CONTAINER
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[21] Appl. No.: 109,110

[30] Foreign Application Priority Data

Jan. 26, 1970 Great Britain.....3,580/70

[52] U.S. Cl.220/42 C, 220/24.5

[51] Int. Cl.B65d 41/00

[58] Field of Search220/42 B, 42 C, 24 A, 24 B, 220/24.5, 60 A

[57] ABSTRACT

A metal container having a lid which is secured to a top flange of the container by outward radial pressure. The lid center panel is of frusto-conical configuration and the lid is secured to the container by axial pressure upon the center panel which forces the lid rim outwardly to tightly engage the container rim and permanently deform said rims.

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5 Claims, 9 Drawing Figures

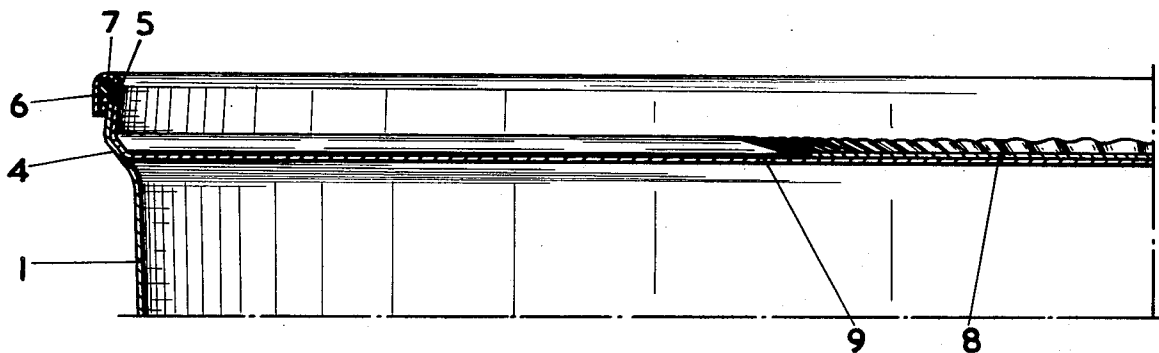


FIG. 1

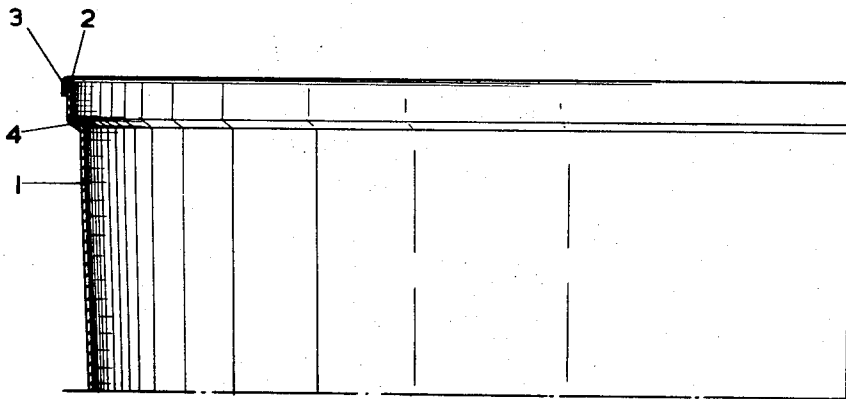


FIG. 2

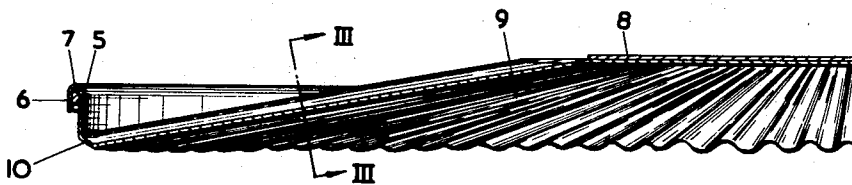


FIG. 3

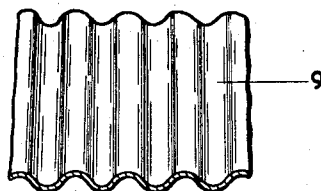


FIG. 4

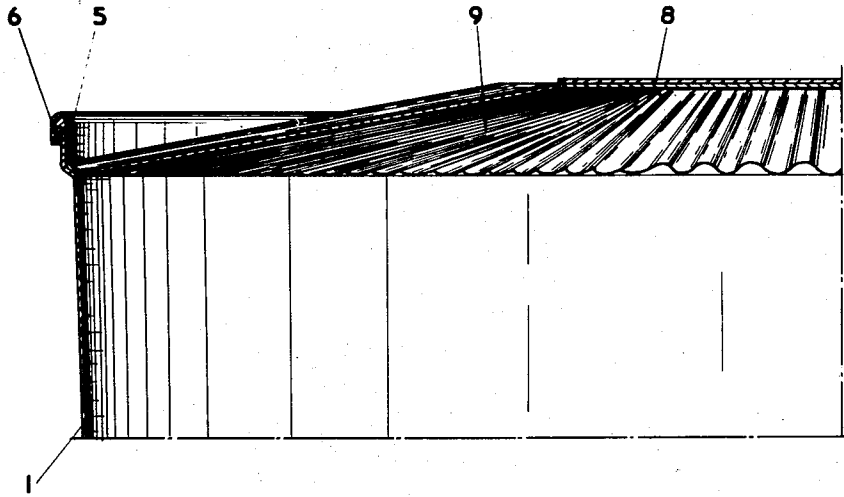


FIG. 5

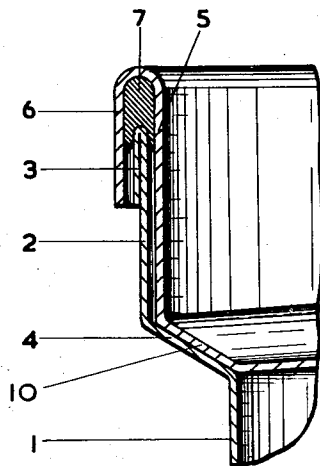


FIG. 6

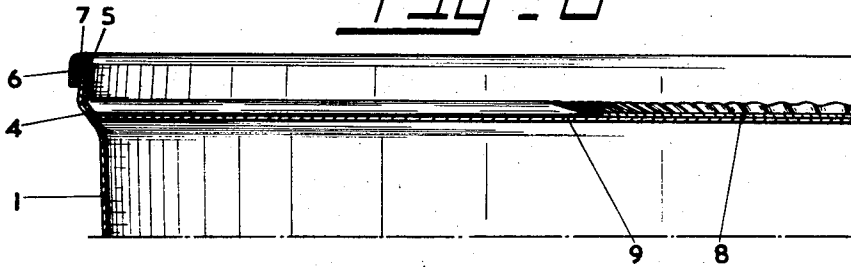


FIG. 7

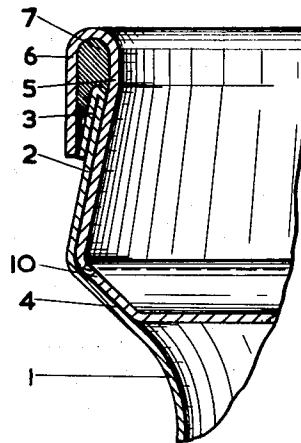


FIG. 8

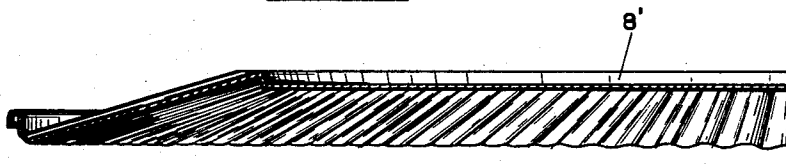
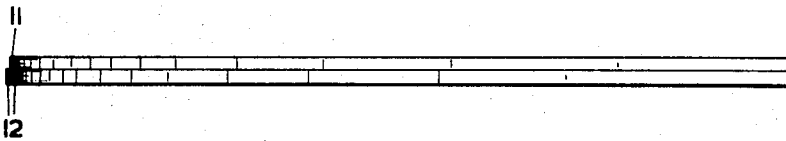


FIG. 9



SHEET METAL CONTAINER

The invention relates to a sheet metal container with a lid, said container having a cylindrical rim on which the lid is secured. Such containers are known in various embodiments and the lid may be secured in a detachable or non-detachable manner. When using a non-detachable fastening, folding or welding is applied. With detachable fastenings, clamping straps are often used.

The object of the invention is to provide a generally non-detachable fastening, i.e., a fastening in which either a separate detachable closure in a wall of the container or in the lid has to be provided for emptying the container or a lid which has to be destroyed before emptying the container. The object of the invention is a connection of the lid to the container body, in which an excellent sealing may be obtained in a relatively simple manner.

According to the invention, said object is achieved in the following way: The container body is provided with a cylindrical rim and an inwardly directed shoulder, located just below this cylindrical rim; a lid, consisting of sheet metal, comprises also a cylindrical rim, with a diameter that fits the inside diameter of the rim of the container and a height that corresponds with the height of the rim of the container, while the upper end of said cylindrical rim is flanged outwardly in an inverted U-shape manner, and a center part in the form of a cone frustum with a very large apex angle, said cone frustum having a flat apex and a serrated conical surface defined in principle by the generatrix of cones with a common summit; the lid, when positioned in the cylindrical rim of the body, and resting on the shoulder, is pressed down by axial pressure and consequent radial expansion into a position, in which the center of the lid lies slightly below the dead center determined by a horizontal plane through the lower edge portion of the cylindrical rim. When the lid is pressed in, the outer circumference of the lid, where the conical part connects to the cylindrical rim, is enlarged in diameter by expansion in radial and circumferential direction, which entails an additional outward pressing of the part of the cylindrical body rim which connects to the preferably conical shoulder, whereby both the outside rim of the lid and the rim of the container are conically deformed and, thus, finally mutually retained. While axial pressure force is exerted, the lid may be supported by the rim of the container, preferably only by the shoulder located just below the rim. The serrated profile of the conical surface portion of the lid is necessary in order to provide the expansion, gradually increasing outwards, in the circumferential direction.

The cylindrical internal surface of the rim of the container and the cylindrical external surface of the rim of the lid are preferably roughened e.g., by sand blasting. This is useful for increasing the coefficient of friction between the matching rims of the lid and the body.

According to the invention, it is also possible to place a circular band provided with glue between the cylindrical internal surface of the rim of the container and the cylindrical external surface of the rim of the lid. However, it is preferred to provide a sealing ring of the inverted U-shaped upper end of the rim of the lid against which ring the end of the rim of the container is pressed, in particular when no band provided with glue is used.

Finally, the flat center portion of the lid may be recessed in order to provide an adequate and clearly limited contact surface for the pressing punch which must deform the lid.

When the lid should preferably be provided with a detachable closure it will be evident that said closure should be positioned in the flat center portion when placed in the lid.

Other objects and advantages of this invention will become apparent upon a review of an illustrative embodiment, given by way of example and not of limitation, as illustrated by the following drawings in which:

FIG. 1 is a partial view of an upper end of a container with the rim shown in section;

FIG. 2 shows an unassembled lid, partially in section;

FIG. 3 is a sectional view along line III—III of FIG. 2;

FIG. 4 shows the container and lid assembled, partially in section;

FIG. 5 is an enlarged view in section of a portion of FIG. 4;

FIG. 6 shows the assembled container, partially in section;

FIG. 7 is an enlarged view of a portion of FIG. 6;

FIG. 8 shows an alternate embodiment of the lid and

FIG. 9 is a view of a circular band, partially in section.

FIG. 1 shows one portion of the upper end of a container with rim 2, the end of said rim being folded over (indicated by 3), said rim 2 connecting to the wall of the container 1 via a conical shoulder 4.

FIG. 2 shows the lid in not yet assembled position, said lid comprising a cylindrical rim 5 also with a flanged end 6 forming a U-shape profile in which a sealing ring 7 is provided. In addition, the lid has of a flat center portion 8 and a conical surface portion 9, shown in cross-section in FIG. 3 according to line III—III indicated in FIG. 2.

FIG. 4 shows the lid positioned on the container 1 before the lid has been deformed.

FIG. 5 is similar to FIG. 4 but on a larger scale with the lid and the transition portion between the serrated conical surface and the cylindrical rim portion 5 supported by the conical shoulder 4 of the container, said transition portion being indicated with 10. The rim length of the container is such that the rim 3 has been pressed in the sealing element 7 provided in the inverted U-shape profile formed by 5 and 6.

FIG. 6 shows the situation when the lid has been drawn down in its final position by applying an axial, vertical force which has acted upon the flat center portion 8.

FIG. 7 shows the afore-mentioned final position on a larger scale. This shows that the outside rim of the lid has obtained a larger diameter with simultaneous, corresponding deformation of the upper portion of the container at the place of the rim 2 as well as below the shoulder 4, said rim 2 of the container and the rim 5 of the lid having taken a conical form.

When exerting the axial downward force the lid will be inclined to expand in radial direction as a result of its slightly conical form. If the conical surface were flat, it would, together with the cylindrical rim, offer too much resistance to obtain the required position of the lid and undesirable deformation near the center portion might occur, should the extremely high pressure

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forces, which are necessary, be exerted. The conical surface may, however, give slightly in circumferential direction by the serrated form of said surface.

The result of the cold deformation here is that the pressure present in the rim after closing the lid is so high, that not only a very solid attachment is obtained, but that even the lid will be kept in the deformed position beyond the dead center.

It should be noted that it is known with small packages or closures to open a flat conical lid comprising parts gripping around the outside rim of the container, by drawing down said lid and closing same by inward pressure on said parts gripping the outside rim.

FIG. 8 shows another embodiment of the lid, which differs from the embodiment shown in the previous figures by the fact that the center portion 8' is recessed. In addition, a circular band 11 is shown in FIG. 9, which band is provided with coatings of glue 12 on either side. Said band is provided along the inside of the cylindrical body rim above the shoulder or the outside of the cylindrical lid ring under the U-shaped flange and will be secured tightly between the rim of the lid and the rim of the container when the lid has been positioned with consequent deformation. The glue will then act as an additional effective sealing element.

What is claimed is:

- 1. A sheet metal container having a cylindrical rim on which a lid is secured comprising:
 - a. an inwardly directed shoulder on said container located just below the rim;

b. a sheet metal lid having a rim with its upper edge flanged outwardly in an inverted U-shape, the rim having a diameter which fits the inside diameter of the container rim and a height corresponding with the height of the container rim;

c. a raised center part on said lid in the form of a cone frustum with a very large apex angle having a flat apex and a serrated conical surface, the serrations being principally defined by the generations of cones with a common apex;

d. the lid, when positioned on the container cylindrical rim, resting on the shoulder and held in place as the result of axial pressure upon the center of the lid and resultant radial expansion so that the center of the lid lies slightly below the dead center as determined by a plane through the lower edge of the cylindrical rim.

2. The container of claim 1 in which the internal surfaces of the container rim and the external surface of the lid rim are roughened.

3. The container of claim 1 including a circular band having a sealant thereon positioned between the internal surface of the container rim and the external surface of the lid rim.

4. The container of claim 1 including a sealing ring in the inverted U of the rim, against which the container rim is pressed.

5. The container of claim 1 in which the raised center portion of the lid is recessed.

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