United States Patent

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[73] Assignee **National Steel Corporation**

[54] **DRAWN CAN FOR ACCOMMODATING CONVENTIONAL OPENERS**
3 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **220/67**
[51] **Int. Cl.** **B65d 7/42**
[50] **Field of Search** 220/67

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ABSTRACT: Provision is made for opening a seam-free body, two-piece can with conventional plow-type can openers while maintaining substantially the same diameter container at opposite longitudinal ends by forming an elongated necked-in portion at the open end of the seam-free body; the necked-in portion being of extended longitudinal length (approximately ½-inch) to accommodate the drive wheel of a plow-type opener; and, the radial thickness and/or placement of the chime seam being such that the outer diameter of the chime seam is substantially equal to the outer diameter of the seam-free body.

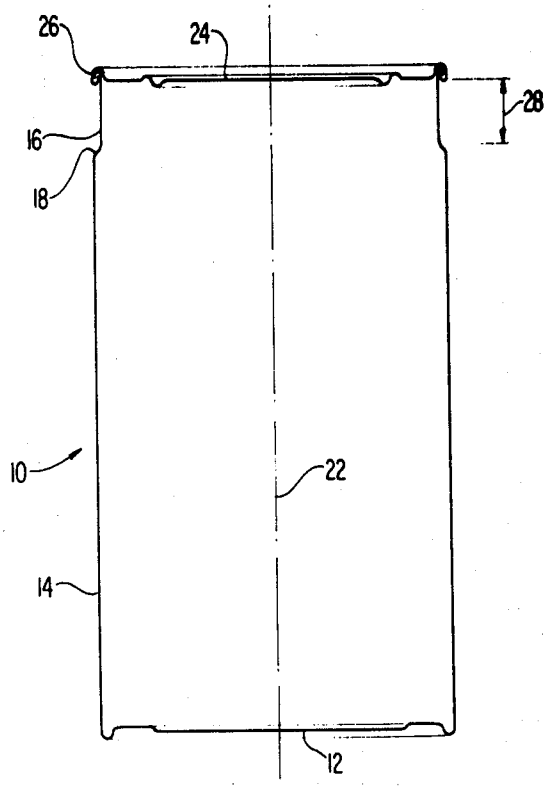


FIG. 1

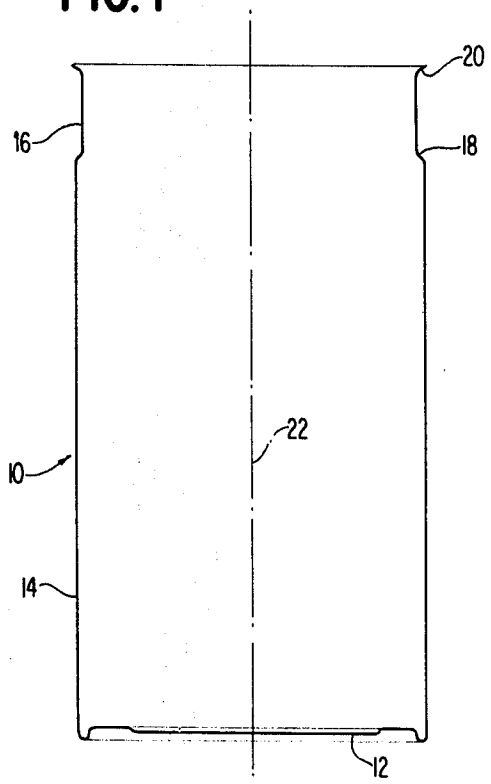


FIG. 2

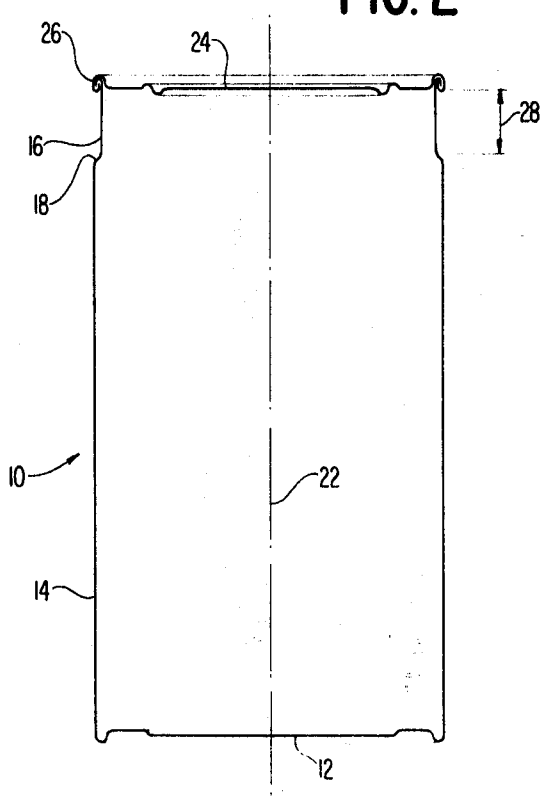


FIG. 3

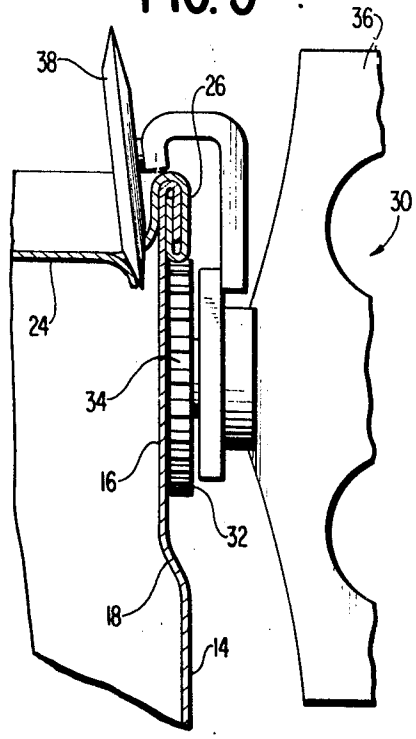
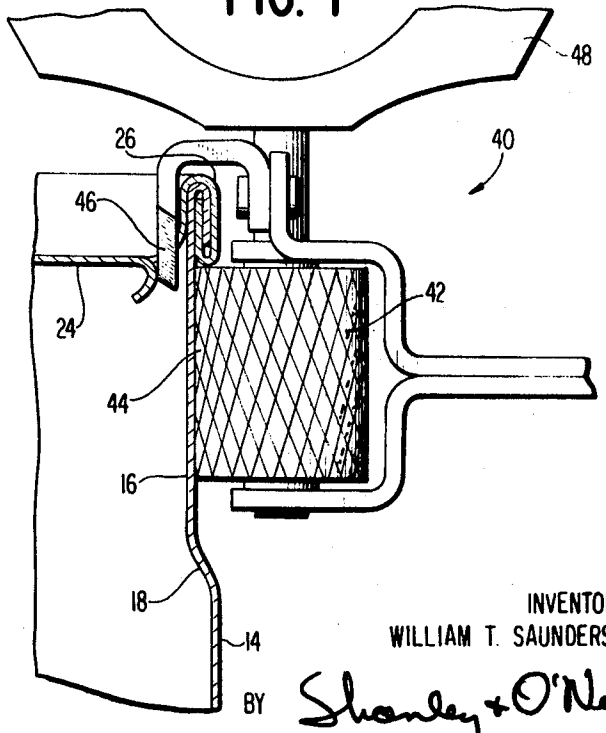


FIG. 4



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DRAWN CAN FOR ACCOMMODATING CONVENTIONAL OPENERS

This invention is concerned with two-piece sheet metal cans. In its more specific aspects, the invention is concerned with sheet metal cans having a seam-free, drawn, can body and an end closure joined to the can body by a chime seam.

The advantages in production costs and appearance of the two-piece can with its seam-free can body are well known. One disadvantage in attaching the end closure is that the chime seam will extend peripherally outwardly from the remainder of the drawn can body. To avoid this it has been necessary to recess the chime seam. This accommodation for the chime seam however creates other problems in the use of such containers by the consumer.

Prior to the present invention drawn containers for machine dispensers required easy-open end closures. There was no way of opening the can with conventional openers. The seam-free, integral, end wall cannot be opened since it provides no gripping surface and, the recessed chime seam provides no access for a conventional can opener, such as the plow-type opener. In brief, there has been no practical method for opening recessed chime cans without easy open end closures. Further, when an easy-open feature malfunctioned no failsafe feature for use of the conventional plow-type opener was provided.

It is the primary objective of the present invention to provide two-piece sheet metal can of substantially equal diameter at its opposite longitudinal ends which will accommodate conventional plow-type can openers. FIG. **1** is a sectional view in the plane of the longitudinal axis of a can body embodying the invention,

FIG. **2** is a sectional view in the plane of the longitudinal axis of a can embodying the invention, and

FIGS. **3** and **4** are exploded partial views of an embodiment of the invention with conventional plow-type can openers. In accordance with the invention, a seam-free can body is fabricated to the configuration shown in FIG. **1**. Can body **10** includes seam-free end wall **12**, a sidewall **14** of uniform diameter equal to the diameter at the seam-free end wall **12**, and a necked-in sidewall portion **16** of smaller diameter than sidewall **14** and integrally joined to sidewall **14** by ledge **18**. At the open end of the can body **10** a chime edge **20** is provided for forming a seam for attaching an end closure.

The can body can be drawn to the diameter of sidewall **14**. The necked-in sidewall **16**, ledge **18** and chime edge **20** are then formed on can body **10** which was initially drawn to uniform diameter. The necked-in portion **16** is formed prior to the chime edge **20** by use of either a funnel shaped hollow punch which gradually moves the metal inwardly around the full periphery or the necked-in portion can be formed by spinning of the container body. The top edge is trimmed prior to necking-in. The trimmed edge is then flanged for forming the chime seam.

In accordance with the invention, the necked-in portion **16** is fabricated to be elongated a predetermined amount in a direction parallel to the longitudinal axis **22**, to accommodate the drive wheel of a plow-type opener.

In FIG. **2** identical reference numerals are used where possible to show completed two-piece container of unitary can body **10** and added end closure. End closure **24** is joined to can body **10** by chime seam **26**. End closure **24** may include an easy-open feature.

In carrying out the invention, distance **28** between the bottom of chime seam **26** and ledge **18** is predetermined to be sufficient to accommodate the drive wheel of a conventional plow-type opener. It should be noted that the diameter of the chime seam **26** is substantially identical to the diameter of the uniform diameter sidewall **14** and the end wall **12** to facilitate straight rolling.

Elongation of the necked-in portion to accommodate a plow-type opener is shown in more detail in the enlarged views of FIGS. **3** and **4** in which the numerical designation of similar parts has been kept the same as in FIGS. **1** and **2** where possible. Plow-type opener **30** of FIG. **3** includes drive wheel **32** accommodated between chime seam **26** and ledge **18**. The knurled circumferential periphery **34** of drive wheel **32** drives the opener around the container by contact with chime seam **26** upon rotation of handle **36**. Rotatable cutting edge wheel **38** penetrates end closure **24**.

In the plow-type opener **40** of FIG. **4** drive wheel **42** is accommodated between the chime seam **26** and ledge **18**. The knurled cylindrical surface **44** has frictional contact with sidewall portion **16** between chime seam **26** and ledge **18**. Knife edge **46** penetrates end closure **24**. Upon rotation of handle **48**, drive wheel **42** moves the can opener about the periphery of the can.

As will be seen from FIGS. **2** through **4** a container of substantially the same diameter container at opposite longitudinal ends is provided to facilitate handling and machine dispensing is provided with a configuration which will accommodate conventional openers by making the chime seam **26** or sidewall **16** accessible as a drive surface.

With the invention, end wall **24** may be a conventional end closure or an end closure with an integral opener. Prior to the invention, a seam-free body container with a conventional end closure was not practical.

End closure **24** and can body **10** can be fabricated from flat rolled steel or other suitable sheet metal, such as aluminum. When can body **10** is fabricated from flat rolled steel coated with a nonferrous protective layer, such as tinplate, a suitable basebox weight for 12 ounce beverage container material is 75 pounds per basebox (thickness gage approximately 0.008 inch). However, any of the conventional tin mill product, for example from 55 to 135 pounds per basebox (about 0.006 inch to about 0.005 inch) can be utilized.

The predetermined distance between the chime seam **26** and ledge **18** along the sidewall may vary depending on the size of the can. About one-half inch will be sufficient to accommodate substantially all conventional plow-type openers. A practical minimum for most consumer and commercial use cans is three-eighths inch. Ordinarily, the sidewall portion **16** will not be of greater length than about five-eighths inch. Considering other dimensions discussed below, the change in volume capacity of the container is held to an acceptable minimum.

The lateral thickness of the chime seam with flat rolled steel will vary from about 0.03 inch to about 0.06 inch. This is dependent on the thickness of the material, a double hook chime seam will include five layers of plate. The difference in diameters between the sidewall portion **16** and the uniform diameter sidewall **14** is about equal to the lateral thickness of the chime seam. With flat rolled steel, a double-seam chime thickness of about one-sixteenth inch (0.0625 inch) considering sealing compound is utilized or the chime is positioned to permit use of the nominal 209 (2 9/16 inches diameter) can end on the nominal 211 (2 11/66 inches diameter) can body.

The container of the present invention can be fabricated from flat rolled steel coated with a nonferrous protective material, such as tin, chromium, and the like. The container can also be fabricated from other sheet material, such as aluminum. Or the metals can be mixed for example, the can body can be steel and the end closure aluminum. Thickness gages for aluminum vary from about 0.008 inch to about 0.015 inch. However, in general, for the conventional 12-ounce container, the nominal 2 11/16 inch diameter would be maintained for the uniform diameter portion and the nominal 2 9/16 inch diameter maintained for the necked-in portion. A similar differential in nominal diameters can be maintained in differing size cans.

Conventional plow-type can openers are manufactured to operate with the above described chime seam thickness. The structure of such can openers will not permit use with containers having no chime seam or a recessed chime seam without the accommodation for the drive wheel provided by the present invention. Attempting to use conventional openers on containers without this accommodation will result in damage to the opener in attempting to bend over the chime seam or to cut into the chime seam.

Specific materials and dimensions have been set forth in describing a specific embodiment for purposes of disclosure of the invention. Such specific teachings will enable one skilled in the art to practice the invention, however the scope of the invention is to be determined from the appended claims.

I claim:

1. A two-piece can comprising:

a unitary can body of cylindrical configuration having a seam-free sidewall symmetrically spaced from a centrally located longitudinal axis of the cylindrical configuration and a seam-free end wall closing one end of the cylindrical configuration can body, and

an end closure closing the remaining end of the cylindrical configuration can body, the end closure at such remaining end of the can body being joined to the sidewall by a chime seam,

the can body being of substantially uniform diameter from its seam-free end wall to within a predetermined distance longitudinally of the end closure chime seam and being necked-in to a smaller diameter over the predetermined distance between the chime seam and the uniform diameter portion of the can body.

the end closure chime seam having an external diameter substantially equal to that of the uniform diameter portion of the can body,

the predetermined longitudinal distance of necked-in, smaller diameter sidewall having a length about one-half inch to permit reception of a drive wheel of a plow-type can opener between the end closure chime seam and the uniform diameter portion of the sidewall.

2. The sheet metal can body of claim 1 in which the chime seam has a lateral thickness of about one-sixteenth inch.

3. The sheet metal can of claim 1 having a differential between nominal diameters of the uniform diameter portion of the can body and the necked-in portion of the can body, such diametrical differential comprising about one-eighth inch.