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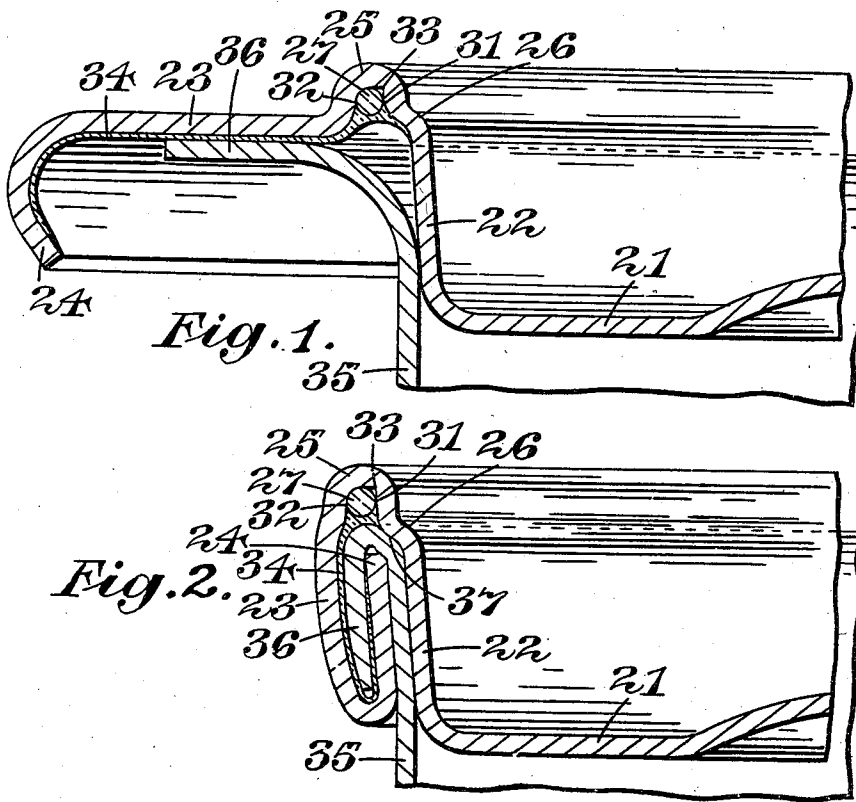
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TINS OR SHEET METAL CONTAINER

Filed Feb. 18, 1938

2 Sheets-Sheet 1



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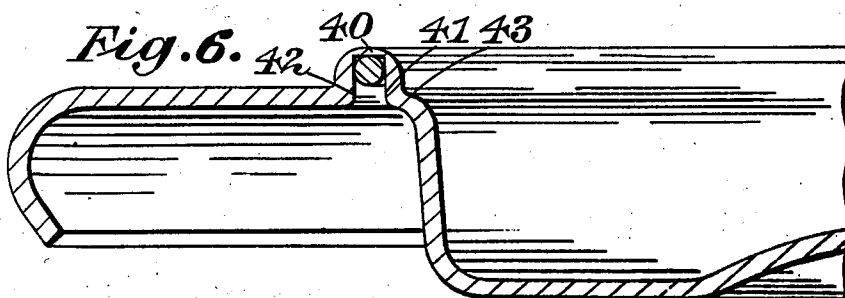
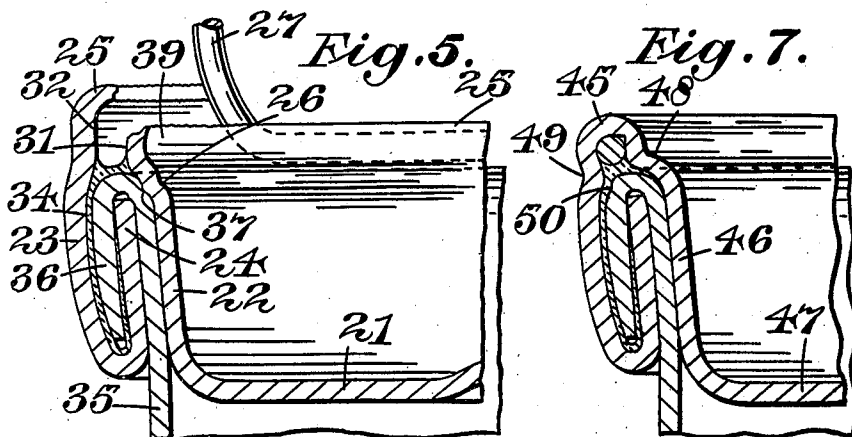
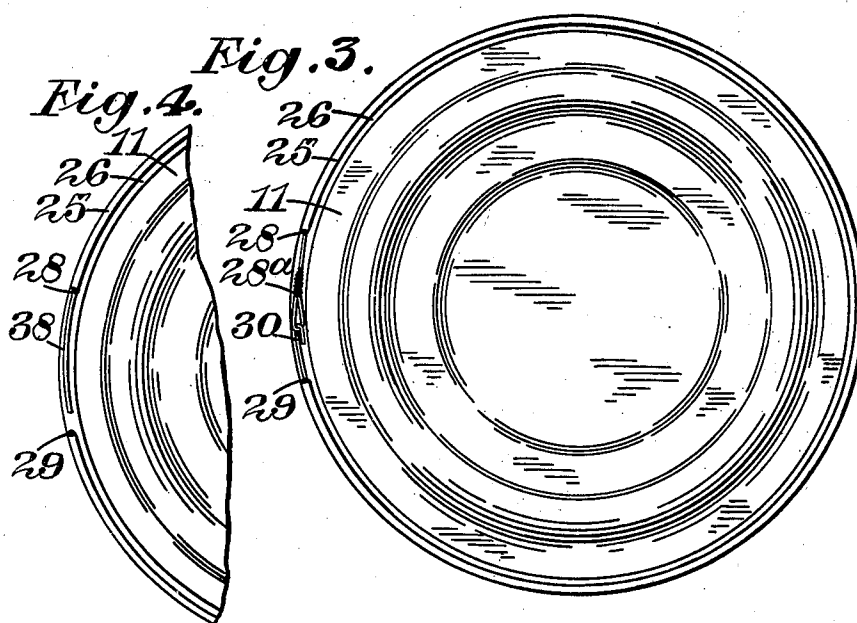
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TINS OR SHEET METAL CONTAINER

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2 Sheets-Sheet 2



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TIN OR SHEET METAL CONTAINER

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Application February 18, 1938, Serial No. 191,230
In Great Britain July 1, 1937

6 Claims. (Cl. 220—49)

This invention is for improvements in or relating to tins or sheet metal containers, cans and the like of the well-known kind having an end-closure or cover provided with a marginal flange which is interfolded with an out-turned flange at the end of the can-body so that the marginal flange of the end-closure lies outside and embraces the outer wall of the can-body. Interlocking of the marginal flange of the end-closure and the can-body may be effected in several different ways. The present invention is directed to the known canister construction in which interlocking is effected by interfolding the parts according to the known operations of double or multiple seaming.

More specifically, the invention relates to an improved construction of end-closure of the kind having an opening device comprising a wire which is so arranged that it lies within the pressed circumferential portion of the end-closure with an end protruding through the closure to the outside thereof whereby the wire can be pulled or wound upon a key so as to open the container by causing the wire to cut through the wall of the end-closure.

End-closures are secured to cylindrical can-bodies in a double or multiple seaming operation by spinning together the marginal flange of the end-closure and a flanged lip at the end of the can-body by means of seaming rollers. To effect seaming the end-closure or cover is placed on the lipped end of the can-body so that the as yet unspun marginal flange of the cover overlies the flanged lip. The marginal flange of the closure and flanged lip are then both bent downwards and pressed radially inwardly by the spinning rollers to form a compact sealing flange at the end of the can wherein the marginal flange and the flanged lip are interlocked in hooked relationship.

One object of the present invention is to provide an improved end-cover capable of being applied to and united with a can-body in a double or multiple seaming operation and housing or being intended to house a wire-rip opener in such a manner that the wire-rip is isolated or shut-off from the interior of the seamed container.

A further object of the invention is to provide an end-cover in which the wire-rip may be held in position without slipping off the cover during transport.

Another object of the invention is to provide an end-cover for interfolding with a can-body in which the location of the rip-wire is such and

the interfolded parts so co-operate that any tendency for the contents of the can to penetrate the seam so as to contact with the rip-wire is reduced to a minimum.

5 The invention accordingly comprises a can-end cover-blank of the type comprising a metal closure member having a central depression to fit within the mouth of a can to be closed and a marginal portion constituting a flange for interfolding with the can-body, in combination with a ridge, for housing a rip-wire upset within the area of and around the marginal flange near its inner edge, the said ridge facing in a direction opposite to that of the central depression.

15 Preferably a gap is provided in the ridge and is constituted by a non-upset portion of the flange, the end of the ridge or both ends of the ridge being perforated at the gap to permit the passage therethrough of a rip-wire.

20 An important feature of the invention lies in the provision of a weakened zone in the apex of the ridge to facilitate cutting of the metal of the end-cover by the rip-wire. To this end the ridge may be provided with an inner concave surface comprising a substantially non-divergent inner tubular wall and a divergent outer wall and the weakened zone may be constituted by the line of joining of the said walls.

25 Different embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

30 Figure 1 is a fragmentary section on an enlarged scale of a circular can-end cover-blank constructed in accordance with the invention, positioned upon a cylindrical can prior to seaming, the section being taken along a diameter of the cover and in a plane containing the central axis of the can-body.

35 Figure 2 shows the form of the parts of Figure 1 when interfolded after seaming,

40 Figure 3 is a plan view of a seamed end-cover showing on an enlarged scale a preferred manner of anchoring the ends of the rip-wire,

45 Figure 4 is a fragmentary plan view showing another method of anchoring the ends of the rip-wire,

Figure 5 is a view of the seamed construction of Figure 2 showing the rip-wire in the course of opening the can, and

50 Figures 6 and 7 are central sectional views of modified forms of cover in accordance with the invention.

Referring to Figures 1, 2 and 3 the can-end cover-blank in accordance with the invention comprises a depressed portion 21, bounded by an

upstanding wall 22 which flares into a marginal flange 23 the periphery of which is rolled over at 24. According to the invention a ridge 25 is upset within the area of and around the marginal flange 23 to face in the opposite direction to the central depression constituted by the parts 21 and 22. The ridge 25 is spaced from the inner edge of the flange 23 so as to divide-off from the major portion 23 of the flange a narrow inner rim or shoulder 26. As will be more fully explained hereinafter the rim or shoulder 26 plays an important part in effectively sealing the interior of the ridge against penetration of the contents of the can thereto.

The ridge 25 is intended to house a rip-wire opener 27 which is carried inside the ridge nearly completely around the cover-blank. The marginal flange 23 is however not upset over a portion of the circumferential extension so that a gap is provided in the ridge the end walls of the ridge being denoted by the reference numerals 28 and 29 (Figure 3). The ends 28^a and 30 of the rip-wire 27 pass through holes pierced in the end walls 28 and 29 of the ridge and the rip-wire is maintained under tension by forming the end 28^a with a loop and the end 30 as a hook for engagement in the loop.

The rip-wire 27 may consist of a single wire, for example a steel wire of circular cross-section or it may comprise a plurality of wires twisted or braided into a wire cord. Alternatively the rip-wire may comprise wire of a non-circular section, for example rectangular, square or triangular cross-section and the expression rip-wire as employed in the present specification and claims includes such alternative forms of opening wire.

An important aspect of the present invention lies in the provision of means whereby the rip-wire 27 is prevented from falling out of the interior ridge 25 after insertion, for example during transit of the cover-blanks during the manufacturing process. To obviate any tendency for the rip-wire 27 to come away from the interior of the ridge 25 the latter may be upset with an inner concave surface consisting of a substantially non-divergent or cylindrical inner wall 31 joined to a curved or divergent outer wall 32. The two walls 31 and 32 preferably join substantially at a right angle (as indicated at 33) and the upsetting of the inner wall 31 is preferably effected in such a manner that the metal of the blank is reduced in thickness at the line of joining of the two walls to provide a line of weakening in the ridge to facilitate ripping of the metal by the rip-wire 27. The sharp angle 33 between the two walls 31 and 32 acts to facilitate cutting of the metal by the rip-wire by concentrating the stress, brought to bear by the rip-wire on the walls, at the angle so as to start cracking of the metal. The straight or cylindrical inner wall 31 obviates any tendency for the rip-wire 27 to slip out of the ridge, as would easily occur if the wall 31 were curved like wall 32, since the rip-wire can be tightened around the substantial cylindrical inner wall and held thereon under tension by frictional engagement of the wire with the wall, the ends of the wire being anchored as by looping together as shown in Figure 5. If however it is desired to increase the grip of the wire in the ridge prior to seaming the wire may be additionally secured by means of solder spotted onto the wire (preferably at a point diametrically opposite to the gap in the ridge) or the wire may be moistened with an adhesive such as a

viscous shellac solution before or after threading so that when once tightened under tension the wire becomes cemented in the ridge. Alternatively, the interior of the ridge may be so moistened with an adhesive or both the wire and the interior of the ridge may be so moistened.

The cover-blank may be provided as usual with a gasket 34 of a latex compound applied to the underside of the marginal flange in known manner. To increase the grip of the wire 27 upon the inner wall 31 of the ridge 25 the latex compound may also be deposited in the mouth of the ridge 25 as shown in the drawing. The rip-wire 27 may also be fixed inside the ridge 25 prior to seaming by deforming the outer wall of the ridge so as to press it onto the wire.

As will be apparent from Figure 1 the rip-wire 27 is located at the top of the interior of the ridge and the degree of upsetting of the ridge is such that the rip-wire is housed above a plane containing the upper surface of the marginal flange. This feature is important as it permits the metal of the flared lip 36 of the can-body 35 to be squeezed on or into the mouth of the ridge during the seaming operation.

In the seamed assembly shown in Figure 2 the curled rim 24 is bent up and flattened between the lip 36 and the can-body 35, and the gasket 34 is squeezed between the interfolded parts. The narrow rim or shoulder 26 becomes somewhat more pronounced in the seaming operation and the indentation of the metal at the shoulder 26 is communicated to the metal of the can-body in the region where it is turned back upon itself so as to deform the metal of the can-body to interfit with the shoulder 26. The shoulder in the can-body is indicated at 37. At the same time as the shoulder 37 is being formed the metal of the can-body is caused to flow to some extent into the interior of the ridge 25 and in this way the rip-wire 27 is positively shut-off from the interior of the can. The sealing of the rip-wire from the contents of the can is effective even in the instance that the sealed can is immersed in a heating bath. Such treatment may raise the internal pressure of the can to such an extent as to cause the central depressed portion of the end-cover to bulge outwards so that a strain comes upon the seam tending to cause separation of the wall 22 from the can-body 35. Even if such a strain should occur and the contents of the can should penetrate between the walls 22 and 35 the contents do not penetrate the seam beyond the interfitting shoulders 26 and 37 as the strain tending to open the parts 22 and 35 only tends to force the shoulder 26 into more intimate contact with the shoulder 37.

In the embodiment of the invention shown in Figure 4 one end of the rip-wire is cut off and soldered at its point of emergence from the end 29 of the ridge 25 whilst the other end is brought out of the end 28 of the ridge as a straight length 38 to lie flat in the gap between the ends of the ridge.

Referring now to Figure 5 of the drawings, the rip-wire 27 is shown as having been acted upon to cut through part of the ridge 25. As will be seen, the ridge 25 has been ripped along the weakened zone constituted by the joining line of the inner and outer walls of the concave surface of the ridge and the rip-wire has acted to hinge the top of the ridge outwardly on the top of the seam member 33. The end-cover member is thus left with an upstanding peripheral flare 39 of a

shape which is convenient to grasp in removing the end-cover member from the can-end.

According to Figure 6 the ridge is upset with a thinned apical portion 40 which joins inner and outer walls 41 and 42 respectively each of which are substantially cylindrical and non-divergent so as to stand normal to the general plane of the blank. This modified cover may be assembled to a can-end by a seam as described with reference to Figure 5 to obtain deformation of the lip of the can-body into a shoulder (such as the shoulder 37 of Figure 2) which interfits with a shoulder 43 on the end-cover.

In the alternative form of seamed end-cover illustrated in Figure 7 the end-cover is upset with a ridge 45 which is spaced from the upstanding wall 46 at the central depressed portion 47 by a shoulder 48. Shoulder 48 is somewhat wider than the corresponding shoulders 26 and 43 of the preceding constructions and in such a case the seamed end may conveniently be formed with an indented portion 49 around the outside of the seam. The indentation 49 is communicated to the inner layer of the seam to produce a deformed portion 50 on the bent-over lip of the can-body. The relatively wide shoulder 48 has the advantage of facilitating upsetting of the ridge 45 with the correct interior configuration.

With regard to the relative dimensions of the rip-wire and the thickness of the end-cover it is found that cover-blanks constructed in accordance with the invention, for example of tinned-iron plate of approximately 10 to 11 thousandths of an inch in thickness, may readily be opened by a circular-section steel rip-wire having a diameter of approximately 8 to 10 thousandths of an inch.

It has been stated hereinabove that the ends of the rip-wire may be looped as in Figure 3 or may be brought out of the ridge and soldered in position as in Figure 4. It will be understood that in the latter case the holes pierced in the ends of the ridge to permit the passage of the rip-wire are closed by the solder. Alternatively, solder may be dispensed with and the holes closed by deformation of the metal during the seaming operation.

Instead of passing each end of the rip-wire through a hole in the ridge one end of the ridge may be closed and one end of the wire fixed inside the closed end as by soldering, the other end of the wire passing through a hole in the other end of the ridge.

In the construction of Figure 3 the looped ends of the wire may be ironed down flat in the gap in the ridge. When the rip-wire is provided with a free end 38 as in Figure 4 the free end may be tucked away underneath the seamed flange at the side of the can or may be brought inside the end-cover and bent down the wall 22 to lie on the depressed portion 21.

To facilitate opening of the cans a cross-bar may be attached to the free end 38 of the wire or the looped end 29 or the said ends may for instance be provided with a ring through which a finger can be slipped. Alternatively, the free end of the rip-wire may be threaded into a key which is intended to be rolled along the ridge of the can so rolling the rip-wire around the key and ripping the metal of the ridge.

The conventional can-end without rip-wire is commonly provided with a slight outward divergence of the upstanding wall of the depressed central portion. It is a feature of the present invention that the can ends should be formed with

upstanding walls 22 which diverge from a true cylindrical shape to an extent which is slightly in excess of 5°. It is found that a divergence of the walls 22 of this order renders it more easy to remove the end-cover from the can-body after the metal of the ridge has been parted by the rip-wire. If the wall 22 is deformed slightly during the seaming operation so as to bring it to a divergence which is slightly less than the divergence in the blank it is found that the end-cover may be made practically self-opening when the ridge metal has been parted by the rip-wire as the end-cover shows a tendency to spring out of the can-end.

End-covers in accordance with the invention may be applied by the canner as a final cover to a filled can, so as to constitute the top, or may be applied by the can manufacturer to the can-body before it is filled, so as to constitute a bottom. Alternatively, the canner may be supplied with both can-tops and can-bottoms and hollow can-bodies so that both can ends are applied in the cannery.

Whilst the invention has been described hereinabove with reference to cylindrical can-bodies and can-end cover-blanks which are circular, the invention is equally applicable to non-cylindrical cans and covers, therefore, for example can-bodies of oval or rectangular cross-section.

I claim:

1. A container end closure made of bent sheet metal, comprising a central portion having its edges bent upwardly to form a flange adapted to fit within the body of a container, then bent outwardly to form a shoulder, then bent upwardly, outwardly and downwardly to form a ridge with a channel therein, and then bent outwardly to form a skirt adapted for lock-seaming, and a rip wire in the channel, the innermost face of the ridge extending upwardly in such a direction relative to the central vertical axis of the closure that its does not project upwardly and inwardly toward the axis at any point, the channel being of a width approximating the diameter of the rip wire.

2. A container end closure made of bent sheet metal, comprising a central portion having its edges bent upwardly to form a flange adapted to fit within the body of a container, then bent outwardly to form a shoulder, then bent upwardly, outwardly and downwardly to form a ridge with a channel therein, and then bent outwardly to form a skirt adapted for lock-seaming, and a rip wire in the channel, the innermost face of the ridge extending upwardly in such a direction relative to the central vertical axis of the closure that it does not project upwardly and inwardly toward the axis at any point, the channel being of a total depth approximating the diameter of the rip wire and being of a width approximating the diameter of the rip wire.

3. A container end closure made of bent sheet metal, comprising a central portion having its edges bent upwardly to form a flange adapted to fit within the body of a container, then bent outwardly to form a shoulder, and then bent upwardly in a direction substantially parallel to the central vertical axis of the closure, then outwardly and then downwardly to form a circumferential ridge with a channel in its underside, and then outwardly to form a lock-seaming skirt, and a rip wire in the channel, the channel having a width from top to bottom approximating the diameter of the rip wire and being devoid of re-entrant surfaces.

4. A container end closure made of bent sheet metal, comprising a central portion having its edges bent upwardly to form a flange adapted to fit within the body of a container, then bent outwardly to form a shoulder, then bent upwardly, outwardly and downwardly to form a ridge with a channel therein, and then bent outwardly to form a skirt adapted for lock-seaming, said ridge having a gap in its circumference, and a rip wire in the channel having one end extending through one of the ends of the ridge at said gap, the innermost face of the ridge extending upwardly in such a direction relative to the central vertical axis of the closure that it does not project upwardly and inwardly toward the axis at any point, the channel being of a width approximating the diameter of the rip wire.

5. A container end closure made of bent sheet metal, comprising a central portion having its edges bent upwardly to form a flange adapted to fit within the body of a container, then bent outwardly to form a shoulder, then bent upwardly, outwardly and downwardly to form a ridge with a channel therein, and then bent outwardly to form a skirt adapted for lock-seaming,

and a rip wire in the channel, said wire having one end extending through the ridge and along the upper surface of the closure, the innermost face of the ridge extending upwardly in such a direction relative to the central vertical axis of the closure that it does not project upwardly and inwardly toward the axis at any point, the channel being of a total depth approximating the diameter of the rip wire and being of a width approximating the diameter of the rip wire.

6. A container end closure made of bent sheet metal, comprising a central portion having its edges bent upwardly to form a flange adapted to fit within the body of a container, then bent outwardly to form a shoulder extending around the periphery of the flange, then bent upwardly forming a straight vertical wire supporting wall extending completely around the shoulder, and then bent outwardly to form a skirt adapted for lock-seaming, and a rip wire tensioned about said vertical wall and in contact therewith, said vertical wall being of a height approximating the diameter of the rip wire.

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