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LIGHT WEIGHT METAL DOUBLE SEAM HAVING
EASY OPENING FEATURES
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3,073,480

FIG. 1

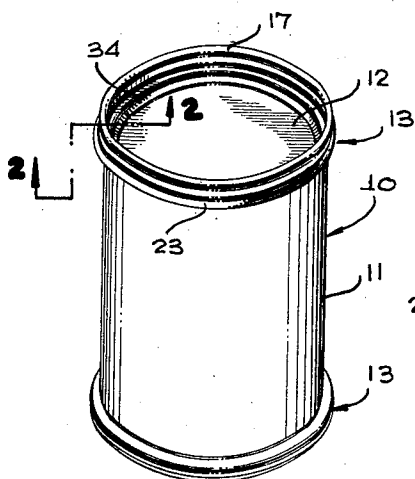


FIG. 2

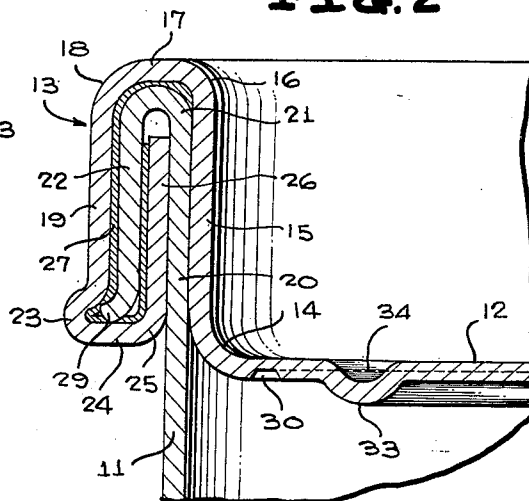


FIG. 3

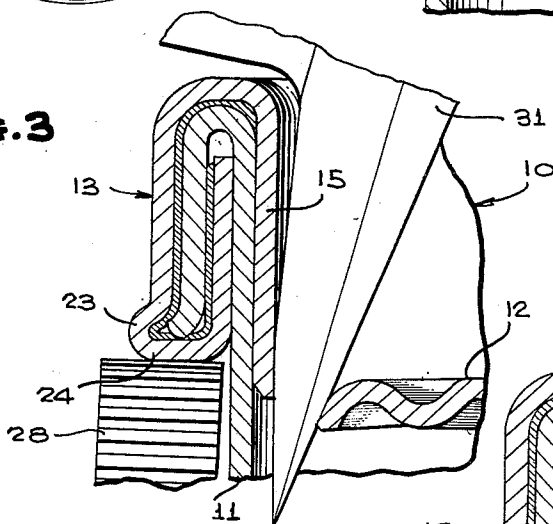


FIG. 5

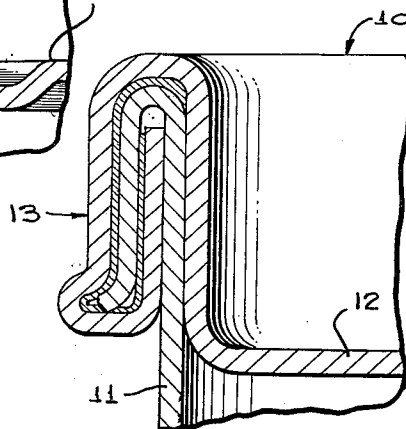
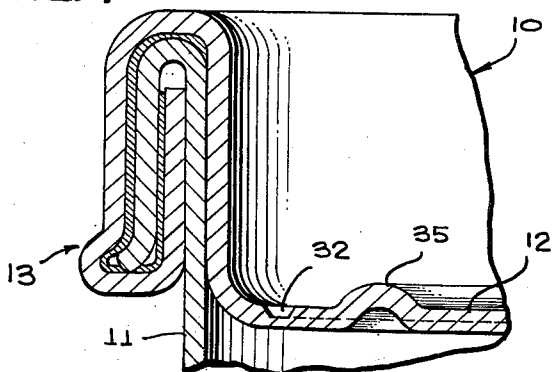


FIG. 4



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LIGHT WEIGHT METAL DOUBLE SEAM HAVING EASY OPENING FEATURES

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This invention relates in general to new and useful improvements in can construction, and more specifically relates to a novel double seam for use in seaming a can end onto a can body wherein the can end and can body are formed of light weight metal as compared to the weight of metal customarily used in the forming of cans.

At the present time, a great majority of the metal cans being produced are fabricated from metal of a thickness of 0.008 inch and greater. These cans are provided with double seams securing the can ends to the can bodies. The double seams provide a lower panel which is of a sufficient width to be properly engaged by existing can opener drive wheels. In fact, it is the existence of this lower panel of a conventional double seam between a can end and a can body on which the design of can openers has been based in the past. However, for economy purposes, the trend in the can making art has been to use thinner metal sheets from which the cans are fabricated. While this has the beneficial result in that more cans can be produced from a given weight of thin sheets than can be produced from the same weight of standardly used thick sheets, a can formed in the conventional manner utilizing the thin sheets meets with a deficiency in that the seam is of an insufficient thickness to be properly engaged by a can opener drive wheel.

The drive wheels of can openers now commercially available have gripping teeth on the circumference thereof for engaging the underside or lower panel of the double seam. The undersurface of the double seam is thus used as a track for the can opener drive wheel as the drive wheel turns during a can opening operation. When the double seam is fabricated in the conventional manner from thin sheet metal, a tight leak-proof seam does not have an undersurface wide enough to ensure that the can opener drive wheel will not slip out from under the double seam and up onto the side of the double seam causing skidding, binding and other malfunctions of the can opener. This problem is even more acute in view of the increasing trend towards thin walled metal cans made from aluminum. The aluminum is a relatively soft metal as compared to the usual tin plated steel commonly used for cans, and when there is a minimum bearing of the can opener drive wheel on the double seam, there may be a rupturing of the metal and an increased tendency for the can opener drive wheel to slip out from under the double seam.

In view of the foregoing, it is a primary object of this invention to provide a novel double seam which may be readily formed utilizing existing types of can closing machines and wherein the double seam is provided with a relatively wide underside or lower panel specifically for the purpose of providing proper bearing support for a can opener drive wheel whereby a can formed of a relatively thin metal as compared to that customarily used in the can making industry, may be readily opened utilizing existing can openers.

In accordance with the invention, it is proposed to tightly form the upper portion of the double seam in the customary manner, but to form the seaming rollers with recesses so that the extreme lower portion of the double seam is not compressed in the normal manner, thus leaving the lower portion of the double seam in a relatively expanded state as compared to the upper portion of the

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same seam. This in itself is not new. In the past, it has been proposed to provide double seams with relatively wide lower portions or lower panels, but for an entirely different purpose. Attention is directed, for example, to applicant's prior Patent No. 2,327,424, issued August 24, 1943. Although this seam is provided with a relatively wide and flat undersurface or lower panel, the double seam is so constructed whereby a can opener cutting wheel may engage the underside of the double seam to sever the metal of the can end at that point and thus provide the can end with a depending flange formed by the seaming wall of the double seam and the can end could be used as a reclosure for the can when the can is so opened. While this double seam has the same general over-all appearance as the double seam of this application, it will not meet the requirements of the present invention. It is to be noted that the outer portion of the lower panel of applicant's prior seam is unsupported. It is this outer portion on which the can opener drive wheel bears, and should the outer portion of the lower panel of the double seam be deformed or upwardly deflected in any manner, the can opener drive wheel will slip upwardly in the undesired manner described hereinbefore. Accordingly, it is another object of this invention to provide a double seam of the general type commonly used in seaming a can end to a can body, but to specially form the lower portion of the double seam so as to have a relatively wide lower panel which terminates in an outwardly directed curl integrally connected to the seaming wall, and the curl and lower panel being reinforced by a terminal flange depending from the body hook and extending downwardly and outwardly generally into the curl to reinforce the curl and the outer portion of the lower panel against upward deflection.

A further object of the invention is to provide a novel double seam for use in the forming of metal cans from a light weight metal as compared to the standard metal now being used, the double seam providing a relatively wide lower panel to facilitate the proper engagement of a conventional can opener drive wheel therewith, the seam being particularly adapted for use in forming metal cans from a light weight metal, such as aluminum, and in relatively thin gauges.

With the above, and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawing.

In the drawing:

FIGURE 1 is a top perspective view of a can formed in accordance with the invention.

FIGURE 2 is an enlarged fragmentary vertical sectional view taken through the upper portion of the can of FIGURE 1 and shows the specific details of the double seam between the upper can end and the can body.

FIGURE 3 is an enlarged fragmentary vertical sectional view, similar to FIGURE 2, and shows portions of a can opener in the process of opening the can.

FIGURE 4 is an enlarged fragmentary vertical sectional view, similar to FIGURE 2, and shows a slightly modified form of can end construction.

FIGURE 5 is another enlarged fragmentary vertical sectional view, similar to FIGURE 2, and shows a plain can end construction in accordance with this invention.

Referring now to the drawings, it will be seen that there is illustrated in FIGURE 1 a can formed in accordance with this invention, the can being generally referred to by the numeral 10. The can 10 includes a can body 11 which has secured to opposite ends thereof can ends 12, the can ends 12 being secured to the can body 11 by means of double seams formed in accordance with this

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invention and generally referred to by the numeral 13. This invention being primarily directed to the construction of the double seam 13 and secondarily directed to the formation of the can end to facilitate the opening of the can, only the specific details of the double seam and the associated portion of the can end will be specifically described hereinafter.

The can end 12 is partially recessed within the can body 11, and in the formation of the double seam 13, the can end 12 is provided with a chuck wall radius 14 which terminates at its upper edge in a chuck wall 15. The can end 12 is reversely bent at the upper end of the chuck wall 15 to define a seaming panel radius 16, a seaming panel 17 and a seaming wall radius 18. The seaming wall radius 18 terminates in a depending seaming wall 19 which is widely spaced from the chuck wall 15.

The can body 11 has a body wall 20 which extends up between the chuck wall 15 and the seaming wall 19 and bears against the outer surface of the chuck wall 15. The body wall 20 is reversely bent at its upper end in the form of a body hook radius 21 and a depending body hook 22 integrally connected to the lower end of the body hook radius 21. The body hook 22 is disposed inwardly of and adjacent to the seaming wall 19, but spaced outwardly from the body wall 20.

The seaming wall 19 terminates at its lower end in an outwardly directed curl 23 which, in turn, terminates in a relatively wide inwardly directed lower panel 24. The inner end of the lower panel 24 is in the form of an end hook radius 25 which terminates in an upwardly directed end hook 26. The end hook 26 bears against the outer surface of the body wall 20 and is disposed between the body wall 20 and the body hook 22.

The provision of the curl 23 permits the lower panel 24 to be relatively wide as compared to its width had the seaming wall 19 terminated at its lower end directly into the lower panel 24. Thus, the provision of the outwardly directed curl 23 permits the increase in width of the lower panel 24. The advantage of this will become more apparent hereinafter.

In order to provide a proper seal between the can end 12 and the can body 11, a sealing compound 27 is disposed within the double seam 13. The sealing compound 27 is disposed between the body hook radius 21 and adjacent portions of the seaming panel radius 16, the seaming panel 17 and the seaming wall radius 18. The sealing compounds 27 also extends between the seaming wall 19 and the body hook 22 and down into the interior of the curl 23. The sealing compound 27 also overlies the lower panel 24 and extends up between the body hook 22 and the end hook 26.

In the formation of a conventional double seam, the width of the underside of the seam is substantially equal to the thickness of the metal of the seaming wall, the body hook and the end hook, together with whatever spacing there may be between these three components of the double seam. Although the width of the underside of a conventional double seam is sufficient for the proper engagement of a can opener drive wheel, such as the drive wheel 28 illustrated in FIGURE 3, when the metal from which the can is formed is of the standard thickness, when a can is formed of a relatively thin metal, the width of the underside of the double seam is proportionally reduced with the result that the width in cans formed of very thin metal presents insufficient bearing for the can opener drive wheel 28. It is for this purpose that the curl 23 and the relatively wide lower panel 24 are provided. By so forming the double seam 13, a can, such as the can 10, formed of a relatively thin metal may provide suitable bearing area at the underside of the double seam for the engagement of a can opener drive wheel.

In the formation of the double seam 13, the second seaming roll is shaped so as to tightly compress the upper portion of the double seam 13, but not to compress as

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tight the extreme lower portion of the double seam 13. It is in this manner that the curl 23 is formed utilizing conventional double seaming equipment, but with a special second seaming roll.

At this time, it is pointed out that the body hook 22 does not terminate above the lower portion of the seam in the conventional manner. In accordance with the invention, the lower end of the body hook 22 terminates in a terminal flange 29 which is outwardly and downwardly directed and which is wedged into the curl 23. Thus, the curl 23 and the lower panel 24 are reinforced by the terminal flange 29. This is of particular importance in this invention in that it is against the lower panel 24 that the can opener drive wheel 28 bears. If the curl 23 and the lower panel 24 are not properly reinforced, such as by the terminal flange 29, the can opener drive wheel 28 will have a tendency to move away from the can body 11 and to deform the curl 23 and the outer part of the lower panel 24 so that the can opener drive wheel 28 will slide outwardly and up around the double seam 13, thus preventing the desired can opening operation. On the other hand, when the terminal flange 29 is provided, the lower panel 24 and the curl 23 are sufficiently reinforced to prevent this undue distortion of the lower part of the double seam to permit the proper use of a conventional type can opener. The terminal flange 29 is of particular importance in conjunction with cans formed of thin aluminum in that aluminum is relatively soft as compared to steel and may be easily distorted or ruptured.

At this time, it is pointed out that since the double seam 13 can be formed with conventional can closing or seaming equipment, although the double seam 13 is of a special construction, it may be formed in the customary manner and at the same rate as conventional double seams.

The present invention is readily adaptable to existing thickness of metal presently being used in the formation of conventional cans. However, the invention is particularly directed to the formation of cans from metals having a thickness no greater than 0.008 inch and is suitable for use in the formation of cans of metal having a thickness of as little as 0.0055 inch.

The proper opening of a can, such as the can 10, formed of a relatively thin metal also presents a problem in that it is desired that the free edge of that portion of the can end remaining attached to the can body as a result of the double seam not present a ragged edge which would result in the accidental cutting of the user. To this end, it is proposed to provide the underside of the can end 12 with a circumferential recess 30 which is disposed immediately adjacent to the chuck wall radius 14 and generally in alignment with the path of a cutter wheel 31 of a conventional can opener. The weakening of the can end 12 by the provision of the groove 30 permits the can end 12 to be readily cut through by the use of the cutter wheel 31. Further, the relative proportions of the can end construction and the cutter wheel 31 is such that when the can end 12 is cut in the manner best shown in FIGURE 3, the cutter wheel 31 will also bend that portion of the can end 12 which previously defined the chuck wall radius 14 so that it lies in the same plane with the chuck wall 15 and is flat against the inner surface of the body wall 20 of the can body 11. If desired, the weakening groove may be formed in the upper side of the can end 12 as indicated by the groove 32 in FIGURE 4.

The weakening of the can end 12 either by the formation of the groove 30 or the formation of the groove 32, facilitates the opening of the can 10 by means other than a can opener. To this end, in FIGURE 2, the can end 12 is provided with an inwardly directed circumferential bead 33 inwardly of the annular groove 30. A suitable implement can be placed in an upwardly opening recess 34 defined by the formation of the bead 33 and

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pressure exerted downwardly on the can end as the implement is moved along the length of the groove 34 to break or rupture the can end 12 along the weakening groove 30.

In FIGURE 4, the can end 12 is provided with an upwardly directed bead 35 disposed adjacent to and inwardly of the weakening groove 32. The bead 35 may be used for the purpose of applying pressure to the can end 12 immediately adjacent the weakening groove 32 to also facilitate the rupture of the can end 12.

Although the can end has been specifically illustrated and described as being provided with means for facilitating the opening thereof in addition to the double seam 13, the can end 12 may be plain, as is shown in FIGURE 5.

From the foregoing, it will be readily apparent that there has been devised an extremely simple and practical double seam construction which may be readily formed and may be used in the closing of cans which are formed of thin metal. At the same time, the specific double seam 13 permits the proper engagement of a can opener drive wheel therewith, and the ready opening of cans formed of thin metal wherein the cans are formed either of tin plated steel or aluminum.

From the foregoing, it will be seen that novel and advantageous provision has been made for carrying out the desired end. However, attention is again directed to the fact that variations may be made in the example can construction disclosed herein without departing from the spirit and scope of the invention, as defined in the appended claims.

I claim:

1. In a can formed of thin metal having a maximum thickness of 0.008 inch, a double seam between a can end and a can body, said double seam including an inner chuck wall on the can end, a next outer body wall of the can body, said can end having an outwardly directed upper seaming panel connected to said chuck wall by a seaming panel radius, an outer seaming wall spaced from said body wall and connected to said seaming panel by a seaming wall radius, said seaming wall terminating at the lower end thereof in an outwardly directed lower curl, said curl terminating at its lower end in a generally flat lower panel which in turn terminates in an end hook radius, a terminal end hook of said can end integrally connected to said end hook radius and disposed next outwardly of said body wall, a body hook radius connected to said body wall and extending around the end of said end hook below said seaming panel, a body hook depending from said body hook radius and being disposed intermediate said seaming wall and said end hook, and a terminal flange on said body hook, said terminal flange extending downwardly and outwardly and projecting generally into said curl and reinforcing said lower panel against upward deflection.

2. The double seam of claim 1 wherein a sealing compound is disposed between adjacent portions of said seam within said seam.

3. In a can formed of thin metal having a maximum thickness of 0.008 inch and having a double seam between a can body and a can end, said double seam being relatively thin as compared to a normal can double seam due to the thinness of the metal and being particularly

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formed for engagement by a can opener drive wheel, said seam having a wide generally flat lower panel for engagement by a can opener drive wheel, said lower panel terminating at its outer edge in a curl which projects outwardly beyond and is integrally connected to the usual seaming wall, said double seam also including a body hook disposed inwardly of said seaming wall and terminating in a terminal flange, said terminal flange extending downwardly and outwardly and projecting generally into said curl and reinforcing said lower panel against upward deflection.

4. In a can formed of thin metal having a maximum thickness of 0.008 inch, a double seam between a can end and a can body, said double seam including an inner chuck wall on the can end, a next outer body wall of the can body, said can end having an outwardly directed upper seaming panel connected to said chuck wall by a seaming panel radius, an outer seaming wall spaced from said body wall and connected to said seaming panel by a seaming wall radius, said seaming wall terminating at the lower end thereof in an outwardly directed lower curl, said curl terminating at its lower end in a generally flat lower panel which in turn terminates in an end hook radius, a terminal end hook of said can end integrally connected to said end hook radius and disposed next outwardly of said body wall, a body hook radius connected to said body wall and extending around the end of said end hook below said seaming panel, a body hook depending from said body hook radius and being disposed intermediate said seaming wall and said end hook, and a terminal flange on said body hook, said terminal flange extending downwardly and engaging said lower panel to reinforce the same against upward deflection.

5. In a can formed of thin metal having a maximum thickness of 0.008 inch, a double seam between a can end and a can body, said double seam including an inner chuck wall on the can end, a next outer body wall of the can body, said can end having an outwardly directed upper seaming panel connected to said chuck wall by a seaming panel radius, an outer seaming wall spaced from said body wall and connected to said seaming panel by a seaming wall radius, a generally flat lower panel connected to said seaming wall and terminating in an end hook radius, a terminal end hook of said can end integrally connected to said end hook radius and disposed next outwardly of said body wall, a body hook radius connected to said body wall and extending around the end of said end hook below said seaming panel, a body hook depending from said body hook radius and being disposed intermediate said seaming wall and said end hook, and a terminal flange on said body hook, said terminal flange extending downwardly and engaging said lower panel to reinforce the same against upward deflection, said lower panel having a width in excess of the combined thicknesses of said seaming wall, said body hook and said end hook.

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