EASY OPENING TAPERED CAN


Original application May 29, 1961, Ser. No. 113,328.
Divided and this application Nov. 4, 1964, Ser. No. 408,797

3 Claims. (Cl. 220—97)

This application is a division of my application Serial No. 113,328, entitled, Easy Opening Tapered Can and Method of Making Same, filed May 29, 1961.

This invention relates in general to new and useful improvements in the construction of cans, and more particularly to a novel tapered can and the method of making same.

Small tapered cans have been desired by the industry for years. However, can of this type present a feed problem. In order to expeditiously fill tapered cans, they must be stacked and a single can at a time fed from a stack of cans. However, in the past, either the cans in the stack wedged together with the result that they would not feed, or adjacent cans became so internested that the flanges thereof were too closely spaced or were touching so as to prevent the feeding of an individual can.

It is therefore the primary object of this invention to provide a novel tapered can wherein the taper of the body of the can is such that the can can be readily stacked without the cans wedging one within the other, and at the same time, the flanges of the cans are sufficiently spaced to permit the feeding of the cans in the customary manner.

The problem of handling tapered cans appeared to be an unsolvable one. However, after much experimentation, it was found that there is a critical angle of taper for the bodies of the cans, and if this angle of taper is maintained, the cans bodies will not wedge together even though pressure may be applied to opposite ends of a stack of internested cans, and at the same time, the desired spacing between the flanges of the cans is maintained. It is to this that the primary concept of the present invention is directed.

A further object of this invention is to provide a novel closed can having easy opening means, the cover of the can being provided with a circumferential weakening line and the cover being reinforced adjacent the weakening line, whereby a pressure exerted on the can cover by a blunt instrument, such as a spoon, etc., will be sufficient to rupture the cover of the can along the weakening line and thus permit the closed can to be opened by one not possessing a can opener.

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 drawings.

In the drawings:

FIGURE 1 is a vertical sectional view taken through a flat blank from which the tapered can, which is the subject of this invention is formed.

FIGURE 2 is a vertical sectional view taken through the can after an initial deep drawing operation.

FIGURE 3 is a vertical sectional view taken through the can after the bottom portion of the can body has been reduced by a further drawing operation.

FIGURE 4 is a vertical sectional view of the can after the body thereof has been tensioned and the can body has assumed a straight taper.

FIGURE 5 is a diagrammatic view showing generally the manner in which the stopped body of the can is tensioned and straightened to have a taper.

FIGURE 6 is a vertical sectional view through the can, showing the completed can after the bottom thereof has been upwardly recessed and a depending annular bead has been formed at the intersection of the bottom with the body of the can, and the waste of the blank has been trimmed to define the desired flange of the can.

FIGURE 7 is a vertical sectional view showing a plurality of the tapered cans in nested stacked relation.

FIGURE 8 is a perspective view of a closed can in accordance with this invention.

FIGURE 9 is an enlarged fragmentary vertical sectional view taken through the cover portion of the can and shows the specific construction of the end panel of the cover to facilitate the opening thereof without the use of a customary can opener.

FIGURE 10 is an enlarged fragmentary vertical sectional view similar to FIGURE 9, but shows a modified arrangement for facilitating the opening of the can.

FIGURE 11 is an enlarged fragmentary vertical sectional view taken through another form of can end showing a different relationship of the groove and reinforcing bead.

FIGURE 12 is another enlarged fragmentary vertical sectional view showing yet another relationship of groove and bead.

Reference is now made to the drawings in detail, wherein there is illustrated in FIGURE 8 a closed can formed in accordance with this invention, the closed can being generally referred to by the numeral 11. The closed can 11 includes a drawn can, generally referred to by the numeral 12, and a cover or can end, generally referred to by the numeral 13, closing the upper end of the can 12.

The details of the can 12 will be first described. As is best illustrated in FIGURES 6 and 7, the can 12 includes a tapered body 14 which terminates at the upper open end of the can 12 in an outwardly directed flange 15 for the purpose of receiving a can end or cover and effecting the sealing of the can end or cover to the can 12. The can 12 also includes a recessed bottom panel 16 which is connected to the lower edge of the tapered can body 14 by means of a small diameter bead 17 which extends continuously about the bottom panel 16. At this time it is pointed out that although it is desirable to provide the can 12 with the recessed bottom panel 16 and the bead 17, these are not required features of the can 12, and if desired, the can 12 could have a flat bottom panel with no beads, such as the bead 17.

Referring now to FIGURE 7 in particular, it will be seen that there is illustrated three of the cans 12 in nested, stacked relation. In practice, numerous of the cans 12 will be nested and stacked within a machine from which individual cans 12 will be fed to a filling apparatus wherein in the desired fill will be placed within the cans 12 prior to the application of the covers or can ends 13 thereto in the customary manner. It is to be noted that the bottom panels 16 of the cans 12 are spaced apart, and the flanges 15 are similarly spaced. In order to properly feed individual ones of the cans 12 from the nested stack, it is necessary that the flanges 15 be spaced apart to permit the feed mechanism to engage the flange 15 of the lowermost can and urge the same downwardly while retaining the remainder of the cans in an elevated position. Since
the flanges 15 must be spaced, it will also follow that the bottom panels 16 will have to be spaced a like distance. Therefore, the contact between adjacent cans in a stack is restricted to the engagement of the bodies 14 of the cans 12.

The nesting of tapered cans has heretofore presented a problem. As stated above, it is necessary that the bottom panels 16 be spaced so that the flanges 15 will be spaced to facilitate the feeding of the lowermost can body from the stack of can bodies. This, of course, restricts the angle of taper of the body 14 of the can body 12. On the other hand, heretofore, when cans have been formed with tapered bodies and are nested and stacked, any force urging the cans into further nested relation will result in the wedging of the cans one within another so as to prevent feeding of a single can.

In the past, when the angle of taper of the body of a tapered can is made such that the flanges were properly spaced for feeding, the can bodies had a tendency to wedge together. This problem has plagued the can forming the panel manufacturer for many years. However, it has been found through much development that if the angle of taper, indicated as angle a in FIGURE 4, is maintained between 10 degrees and 11 degrees, with 10½ degrees being the optimum angle, wedging of the cans together is eliminated. Accordingly, the angle of taper of the body 14 of the can body 12 is controlled to be between 10 degrees and 11 degrees, and preferably 10½ degrees. As a result, the cans 12, when internested and stacked, as is shown in FIGURE 7, do not wedge together and at the same time, the flanges thereof are sufficiently spaced to permit the lowermost can of the stack to be fed therefrom.

A novel method of forming the can 12 has also been developed, and the steps in the method are illustrated in FIGURES 1 through 6. A flat blank 20 of the necessary dimensions is provided, the blank 20 being shown in FIGURE 1. The blank 20 is first deep drawn to provide a bottom panel 21, a cylindrical body 22, with the bottom panel being connected to the body 22 along a radius 23, and a large flange 24 at the open end of the body 22.

Referencing now to FIGURE 3, it will be seen that the partially formed can of FIGURE 2 is further drawn so as to deepen the shape of the panel 21 and thereby reduce the diameter of the lower portion of the body 22 to provide a reduced diameter lower body portion 25 and a larger diameter upper body portion 26 connected together by an intermediate offset portion 27. At the same time, while the diameter of the bottom panel 21 is substantially retained, the radius 23 has been reduced.

In the forming of the body 22 in the manner illustrated in FIGURE 3, the amount of metal involved has been accurately determined so that the total extent of metal between the flange 22 and the bottom panel 21 is sufficient to provide the desired can body 14 of the finished can 12. The partially formed can of FIGURE 3 is then gripped in a manner so as to hold the shape of the bottom panel 21. At the same time, the flange 24 is gripped and a force exerted to move the bottom panel 21 and the flange 24 away from each other. When such a force is applied, the body 22 of the partially formed can of FIGURE 3 is placed under tension so that the reduced lower body portion 25, the larger diameter upper body portion 26 and the intermediate offset portion 27 are all simultaneously tensioned and straightened to provide the can body. In making the angle a, which angle is between 10 degrees and 11 degrees, and is preferably approximately 10½ degrees. At the same time, the radius 23 is again further reduced. The tensioning and drawing of the partially formed can from the outline of FIGURE 3 to the outline of FIGURE 4 is diagrammatically illustrated in FIGURE 5. The partially formed can is illustrated in dotted lines as it appears in FIGURE 3, and the shape of the partially formed can body, as it appears in FIGURE 4, is superimposed thereover, as shown by a solid line.

In the final shaping of the can 12, the bottom panel 21 is recessed to define the recessed bottom panel 16 and the radius 23 is further extended to define the bead 17. In addition, excess material 28 of the blank 20 is removed from the flange 24 to provide the final flange 15 of the can 12.

The cover or can end 13 is secured to the can body 14 by a double seam 30 formed in the customary manner with a conventional closing machine (not shown). The can end 13 includes an end panel 31 and a chuck wall 32, the recessed end panel 31 being connected to the chuck wall 32 by the usual chuck wall radius 33. The end panel 31 has the underside thereof provided with a circumferential recess 34 disposed immediately adjacent to the chuck wall radius 33.

The end panel 31 is also provided with an inwardly directed circumferential bead 35 disposed adjacent to and inwardly of the annular groove 34. By providing the bead 35, the can end 13 can be opened either by utilizing a can opener in the customary manner or by use of an implement, such as a spoon or the like. The annular groove 34 is disposed generally in alignment with the cutter wheel (not shown) of a conventional can opener and when a conventional can opener is utilized, the can end 13 is readily ruptured with that portion of the can end 13 in the vicinity of the chuck wall radius 33 being flattened by the pressure of the cutter of the can opener and forced against the inner surface of the can body 14. In this manner, a smooth opening is provided. On the other hand, when a conventional type of can opener is not available, if a sharp downward pressure is exerted in overlying relation to the annular groove 34, due to the reinforcement of the end panel 31 by the bead 35, the can end 13 will rupture along the line of weakening due to the annular groove 34 and the closed can 11 may thereby be opened without requiring the use of a conventional can opener.

In FIGURE 10, there is illustrated a slightly modified form of end 13 wherein the end panel 31, in lieu of being provided with an annular groove 34 and the flange thereof, is provided with an annular groove 36 in the upper surface thereof in the same position as the annular groove 34 with respect to the chuck wall radius 33. Further, the end panel 31 is reinforced by a bead 37, which bead corresponds to the bead 35, but is upwardly directed. The bead 37 reinforces the end panel 31 inwardly of the annular groove 36 in the same manner as does the bead 35. The end panel 31 shown in FIGURE 10 may be removed either utilizing a conventional can opener or by means of an implement, such as a spoon, in the manner described above with respect to the form of can end illustrated in FIGURE 9.

In FIGURE 11 there is illustrated another modified form of end 13 wherein the end panel 31 is provided with an annular groove 38 on the underside thereof. However, in lieu of having a downwardly projecting bead, such as the bead 35 of FIGURE 9, the end panel 31 of FIGURE 11 is reinforced by an upwardly facing bead 39.

In FIGURE 12 there is illustrated a further and modified form of can end 13. In this form of can end, the end panel 31 is provided with an annular groove in the upper surface thereof similar to the construction of FIGURE 10. However, in lieu of having an upstanding reinforcing bead, such as the bead 37 of FIGURE 10, the end panel 31 is provided with a depending bead 40.

It is to be understood that while this invention is specifically disclosed in conjunction with a drawn can having an integral bottom, if a recessed seam is used, a can having a separate can end may be utilized in accordance with the invention.

From the foregoing, it will be seen that novel and advantageous provision has been made for carrying out
3,248,003

the desired end. However, attention is directed to the fact that variations may be made in the example method of forming the can body and in the can body construction disclosed herein, without departing from the spirit and scope of the invention, as defined in the appended claims.

1. A container particularly adapted for feeding without jamming from a stacked internested arrangement, said container comprising a bottom and a body tapering towards said bottom, the angle of taper of said body ranging from 10 to 11 degrees, said body having an outwardly directed flange at the upper end thereof by means of which a container top may be secured to said body, and the container, when stacked with like containers, having said flange spaced from like flanges of other containers whereby container feed means may be engaged with said container flange for feeding said container.

2. The container of claim 1 wherein said container is a drawn sheet metal can.

3. The container of claim 2 wherein said bottom is recessed within said body and is connected to said body by a depending peripheral bead.

References Cited by the Examiner

UNITED STATES PATENTS

1,079,903 11/1913 Norton .................. 220—97
1,789,981 1/1931 Katzinger ............... 113—120
1,839,272 1/1932 Sinko .................. 113—120
2,060,038 11/1936 Christman .......... 113—120
2,112,231 3/1938 Speidel ................ 220—54
2,412,178 12/1946 Seligh ............... 220—97
2,879,917 3/1959 Flack .................. 220—97
2,946,478 7/1960 Clair .................. 220—54

FOREIGN PATENTS

572,551 10/1945 Great Britain.

LOUIS G. MANCENE, Primary Examiner.

THERON E. CONDON, Examiner.