

May 17, 1966

J. HENCHERT ETAL

3,251,515

CONTAINER CLOSURE

Filed June 10, 1964

3 Sheets-Sheet 1

FIG. 1

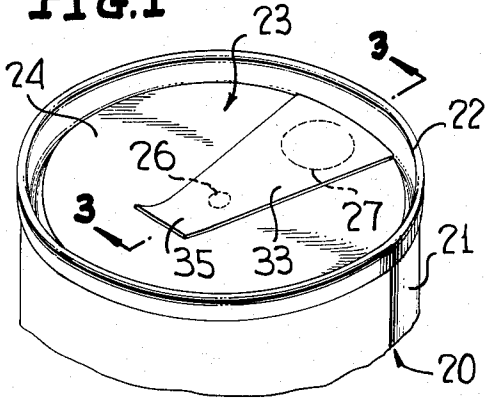


FIG. 2

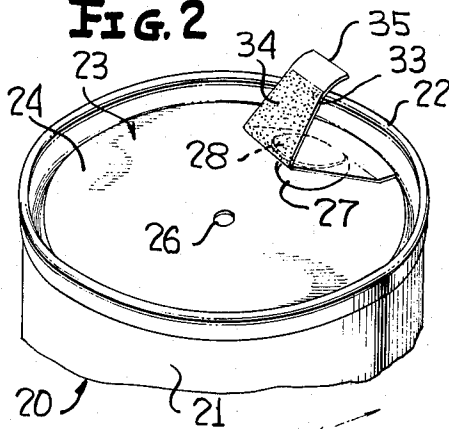


FIG. 3

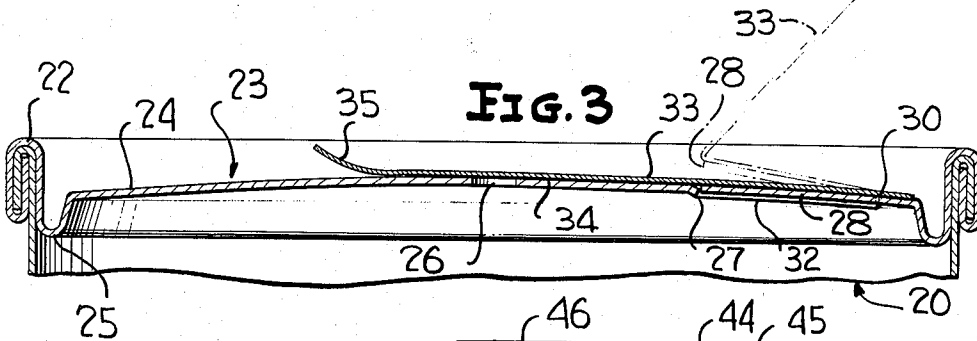


FIG. 4

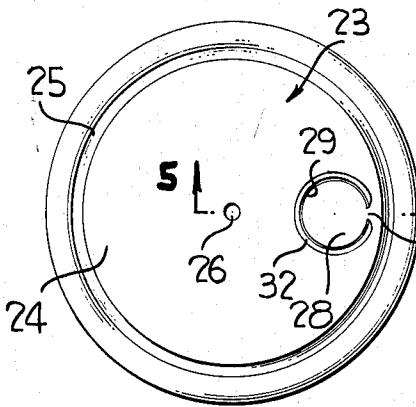


FIG. 20

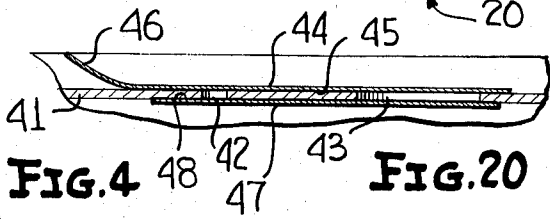


FIG. 5

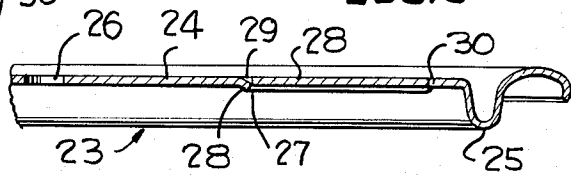
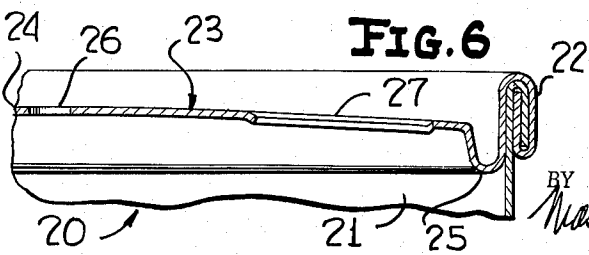


FIG. 6



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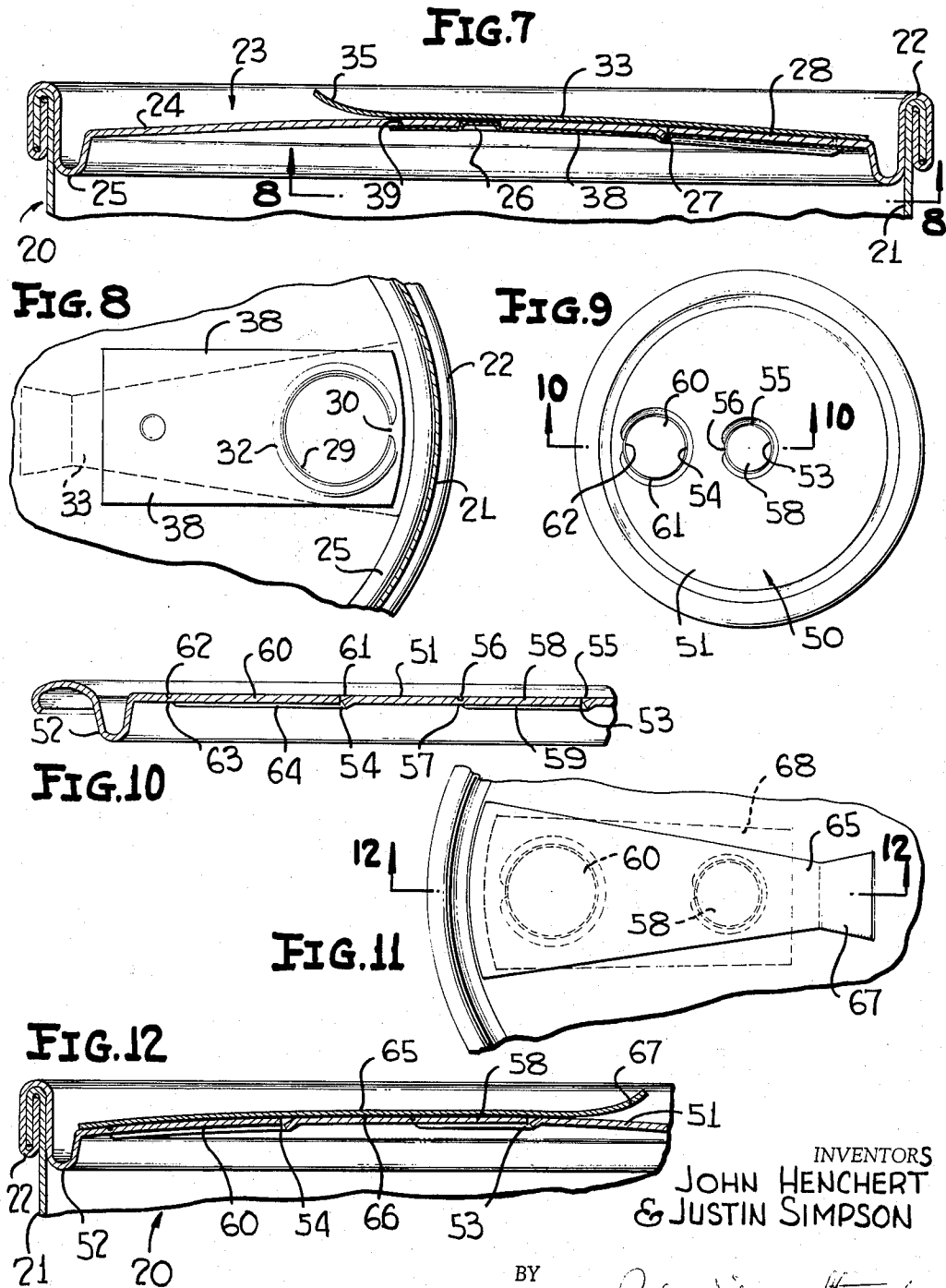
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FIG.13

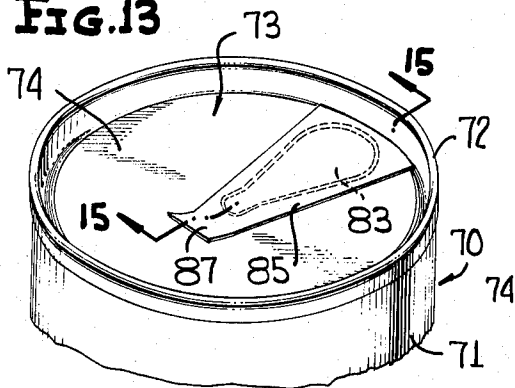


FIG.14

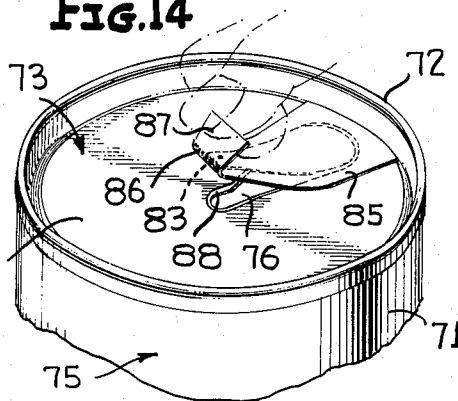


FIG.19

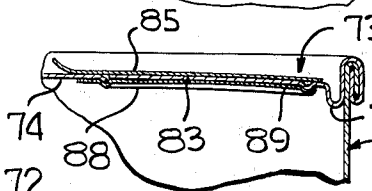


FIG.21

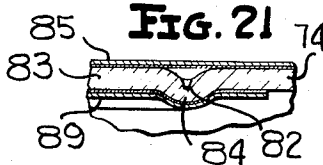


FIG.15

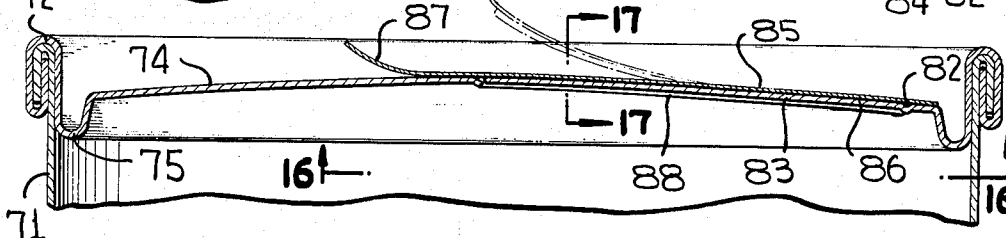


FIG.17

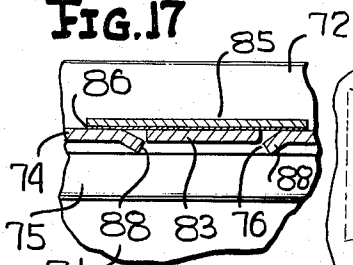


FIG.16

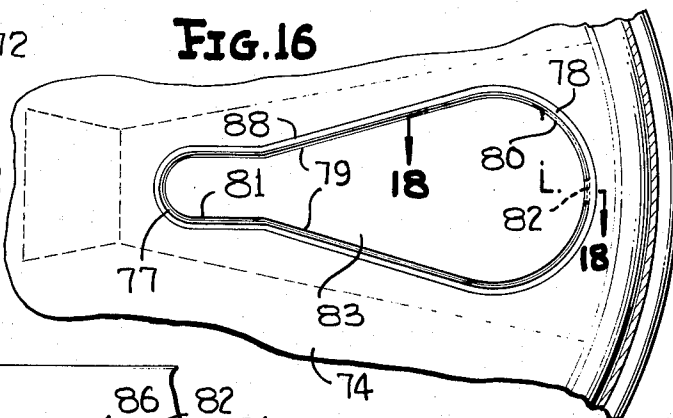
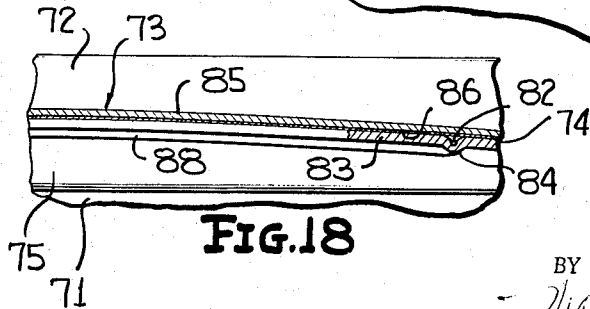


FIG.18



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3,251,515
CONTAINER CLOSURE

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Filed June 10, 1964, Ser. No. 373,935
18 Claims. (Cl. 222-487)

This invention relates in general to new and useful improvements in container construction, and more particularly to a novel container end closure of the easy opening type.

This invention particularly relates to a container end closure which is constructed in a manner wherein the same may be opened for the purpose of dispensing the contents of an associated container. Container closures of this type have three principal requirements. The primary requirement is that the necessary seal of the container be maintained during normal handling conditions. Another requirement is that the means for opening the container be of a nature wherein the opening may be accomplished with ease. A further requirement is that during the opening of the container, accidental injury to the person opening the container is prevented.

In the past the principal manner of facilitating the opening of a container without the use of conventional types of can openers has been by the outlining of a tear strip portion by weakening lines with there being secured to the tear strip portion a pull member to facilitate the rupture of the end closure and the tearing of the tear strip therefrom. While end closures which are so formed have proved to be successful, they have been more difficult than desired to open. Accordingly, it is the primary object of this invention to provide a novel container end closure having easy opening means which may be actuated with a minimum of effort.

Another object of this invention is to provide a novel end closure for containers which has the necessary openings pre-formed therein by machine, and the openings are sealed by means of a tape which is sufficiently bonded to the end closure to seal the openings during the normal use of the end closure, and which tape may be readily peeled therefrom to open the container.

Another object of this invention is to provide a novel end closure for containers wherein the necessary dispensing opening is formed therein and the dispensing opening is sealed by means of a flexible tape which is bonded to the exterior of the end closure, and the slug which is struck from the end closure in the forming of the dispensing opening is retained within the dispensing opening and serves to reinforce the tape against bulging and the progressive peeling thereof from the end closure.

Another object of this invention is to provide a novel end closure which has a dispensing opening therein defined by a cut line which extends a major portion of the distance around the dispensing opening and wherein the portion of the end closure which is removable to define the dispensing opening is retained within the plane of the end closure by a minor connection so that the material which is removed in the forming of the dispensing opening remains in place until such time as the container of which the end closure is a part is opened, the dispensing opening being sealed by a flexible tape bonded to the outer surface of the end closure and the tape being bonded to the material to be removed with

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the material being automatically removed upon the removal of the tape.

A further object of this invention is to provide a metal end closure for containers, such as cans, the end closure including an end panel which has a dispensing opening defined therein by means of a cut line, and there being retained within the dispensing opening the slug which is to be removed from the end panel in the forming of the dispensing opening, the edge of the end panel defining the dispensing opening being inwardly recessed to prevent hanging up of the removable material as it is being progressively drawn out of the dispensing opening, and there being a flexible tape secured to the exterior surface of the end panel and to the removable portion thereof whereby the tape may be progressively torn from the end panel and the dispensing opening cleared by the removal of the removable portion.

A still further object of this invention is to provide a novel can end wherein the necessary dispensing opening is defined by a cut line which primarily defines the dispensing opening and which leaves a slug within the dispensing opening connected to the remainder of the can end panel by means of a relatively weak connection, the end panel being downwardly recessed along the cut line so as to provide clearance for the removal of the slug, and there being releaseably bonded to the outer surface of the end panel a tape which retains the slug in place and seals the dispensing opening, the end panel further having bonded to the underside thereof a second tape or coating which protects the raw edge of the end panel around the dispensing opening against the contents of the associated can.

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 fragmentary top perspective view of a can having a can end formed in accordance with this invention.

FIGURE 2 is a fragmentary perspective view similar to FIGURE 1 and shows an intermediate step in the opening of the can of FIGURE 1.

FIGURE 3 is an enlarged fragmentary transverse vertical sectional view taken along the line 3-3 of FIGURE 1 and shows the specific details of the easy opening feature of the can end, the sealing tape being shown in a partially removed position by phantom lines.

FIGURE 4 is a plan view of the can end as it appears in an incomplete stage of manufacture and shows the specific details of the opening formed therein.

FIGURE 5 is an enlarged fragmentary vertical sectional view taken along the line 5-5 of FIGURE 4 and shows the specific structural details of the incomplete can end.

FIGURE 6 is an enlarged fragmentary vertical sectional view similar to the right-hand half of FIGURE 3 and shows the can as it appears in its opened state.

FIGURE 7 is an enlarged fragmentary vertical sectional view similar to FIGURE 3 and shows a slightly modified form of can end construction.

FIGURE 8 is an enlarged fragmentary horizontal sectional view taken along the line 8-8 of FIGURE 7 and shows the specific details of the underside of the can end of FIGURE 7.

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FIGURE 9 is a plan view of another form of can end in an intermediate stage of manufacture thereof and shows the specific details of the openings formed therein.

FIGURE 10 is an enlarged fragmentary vertical sectional view taken along the line 10—10 of FIGURE 9 and shows further the structural details of the can end of FIGURE 9.

FIGURE 11 is an enlarged fragmentary plan view of a can incorporating the can end of FIGURE 9.

FIGURE 12 is an enlarged fragmentary vertical sectional view taken along the line 12—12 of FIGURE 11 and shows more specifically the details of the can end of FIGURE 11.

FIGURE 13 is a fragmentary top perspective view of another can utilizing still a further form of can end construction.

FIGURE 14 is an enlarged fragmentary perspective view similar to FIGURE 13 and shows the can end in its partially opened state.

FIGURE 15 is an enlarged fragmentary vertical sectional view taken along the line 15—15 of FIGURE 13 and shows more specifically the details of the construction of the can end, the can end being illustrated in a partially opened condition by phantom lines.

FIGURE 16 is an enlarged fragmentary horizontal sectional view taken along the line 16—16 of FIGURE 15 and shows the specific details of the underside of the can end of FIGURE 15.

FIGURE 17 is an enlarged fragmentary transverse vertical sectional view taken along the line 17—17 of FIGURE 15 and shows further the details of the construction of the easy opening portion of the can end.

FIGURE 18 is an enlarged fragmentary vertical sectional view taken generally along the line 18—18 of FIGURE 16 and shows other structural details of the can end.

FIGURE 19 is a fragmentary vertical sectional view taken through a modification of the can end of FIGURES 13 through 18.

FIGURE 20 is an enlarged fragmentary sectional view through a can end similar to that shown in FIGURE 7 with the exception that the slug formed in the forming of the dispensing opening is removed.

FIGURE 21 is an enlarged fragmentary section showing the details of the hinge connection shown in FIGURE 18.

Referring now to the drawings in detail, it will be seen that there is illustrated in FIGURES 1, 2, 3 and 6 a can which is formed in accordance with this invention, the can being generally referred to by the numeral 20. The can 20 includes a conventional can body 21 to which there is secured by means of a conventional double seam 22 a can end formed in accordance with this invention. The can end is of the easy opening type and is generally referred to by the numeral 23.

Referring now to FIGURE 3 in particular, it will be seen that the can end 23 includes an end panel 24 which is surrounded by a depending shock absorbing bead 25. The can end 23 is particularly adapted for use with a can containing a beverage and is provided with easy opening means for the dispensing of such beverage from the can 20. As a result, the end panel 24 is provided with a centrally located vent opening 26. Further, the end panel 24 is provided with a radially offset dispensing opening 27 which is disposed adjacent the shock absorbing bead 25.

Reference is now made to FIGURES 4 and 5 which show the can end 23 in its intermediate stage of manufacture and prior to the double seaming thereof to the can body 21. It will be seen that the vent opening 26 is formed by merely stamping the desired metal of the end panel 24. On the other hand, the dispensing opening 27 is not completely formed and there remains within the dispensing opening 27 the slug 28 of metal which is formed in the forming of the dispensing opening 27. In forming the dispensing opening 27, the end panel 24 is

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cut entirely through along a line 29 which extends entirely about the dispensing opening 27 except along a small portion 30 of the periphery of the dispensing opening 27 remote from the vent opening 26. The remaining uncut portion is of the minimum width required and extends between the remote ends of the cut line 29 to provide relatively weak hinge connection between the slug 28 and the remainder of the end panel 24 which will break easily when the slug 28 is lifted.

It is to be understood that in the forming of the cut line 29, it is desired to remove a minimum amount of metal. On the other hand, if there is too tight of a fit between the slug 28 and the adjacent portions of the end panel 24, the slug 28 will have a tendency to hang up in the end panel 24 and will not be readily removed in the desired manner which will be described in detail hereinafter. Accordingly, the end panel 24 is inwardly depressed to define an inwardly directed angular flange 32 entirely about the cut line 29. By so recessing the end panel 24 about the periphery of the slug 28, it will be seen that the slug 28 may be readily removed from the end panel to leave clear the entire dispensing opening 27.

Referring once again to FIGURES 1, 2 and 3, it will be seen that the can end 23 also includes a sealing strip or tape 33 which is bonded to the upper surface of the end panel 24 by means of a suitable adhesive 34. The adhesive 34 does not extend the full length of the tape 33 and leaves free of the end panel 24 a grip portion 35 which may be grasped between one's fingers to facilitate the progressive peeling of the tape 33 from the end panel 24. It is also to be noted that the tape 33 is bonded to the slug 28. Thus, when the tape 33 is being peeled from the end panel 24, as is shown in solid lines in FIGURE 2 and in phantom lines in FIGURE 3, when the slug 28 is reached, the end thereof adjacent the vent opening 26 will be progressively lifted with the slug 28 hinging about the relatively weak connection 30. As the tape 33 is continued to be removed, the slug 28 will be pulled entirely out of the plane of the end panel 24 and the connection 30 broken.

At this time it is pointed out that the tape 33 must be formed of a material of sufficiently high strength to resist rupture and at the same time must be gas and liquid impervious in that in the construction of the can end 23, the tape 33 must seal the end panel 24 along the cut line 29. It has been found that tapes formed of metallized Mylar perform satisfactorily. It has also been found that the tape may be formed of metal foil, such as aluminum and steel foils, however, it will be readily understood that the above-listed tape materials are not the only tape materials that will suffice and the invention is not so limited.

It is also pointed out at this time that since all of the metal shearing operations, with the exception of the breaking of the connection 30, are performed by machine, the cutting operations may be downwardly directed ones and any burrs which may result will project down into the can 20. In addition, it will be seen that the forming of the flange 32 around a major portion of the dispensing opening 27 also greatly reduces the danger of any one becoming accidentally cut on the raw edge surrounding the dispensing opening 27.

It is to be noted that if the slug 28 were not permitted to remain within the dispensing opening 27, pressure within the can 20 would effect an upward bulging of the tape 33 overlying the dispensing opening 27. This upward bulging would result in a progressive peeling away of the tape from the end panel 24 surrounding the dispensing opening 27 with the bulge progressively increasing in diameter until it reaches the edges of the tape 33, at which time the seal would be broken. However, when the slug 28 is bonded to the underside of the tape 33, the slug 28 reinforces the tape against bulging and the pressure can exert only a direct upward force on the

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tape 33 through the slug 28. This will not effect the peeling away of the tape from the end panel 24.

FIGURES 7 and 8 illustrate a modification of the embodiment shown in FIGURES 1, 2 and 3 in that the can end is provided with a second tape 38 bonded to the underside of the end panel 24 in addition to the tape 33 bonded to the upper surface of the end panel. The tape 38 is secured in place by means of a suitable adhesive 39. The purpose of the tape 38 is to seal the raw metal edges of the end panel 24 resulting from the forming of the vent opening 26 and the dispensing opening 27 against contact by the product within the can 20. It is to be understood that while the metal can end 23 is normally protected, either by means of a metal coating or a lacquer-like coating, the cut raw edges of the metal surrounding the openings 26 and 27 will be exposed. By applying a tape or film 38 to the underside of the end panel 24 in alignment with the vent opening 26 and the dispensing opening 27, the contents of the can 20 are prevented from contacting these metal edges in the end panel 24 until the can has been opened in the normal manner described above. It is also anticipated that the protective covering 38 may be sprayed on the can end or otherwise applied in the form of a coating.

It is to be understood that the film or tape 38 is relatively weak and may be easily ruptured. It is also to be noted that when there is pressure within the can 20, as is shown in FIGURE 7, that portion of the film or tape 38 which is aligned with the vent opening 26 may extend into the vent opening 26 and directly bond to the underside of the tape 33. On the other hand, that portion of the film or tape 38 which underlies the slug 28 is preferably bonded to the underside of the slug 28 so that when the tape 33 is peeled off of the end panel 24 in the opening of the can 20, that portion of the film 38 which is bonded to the underside of the tape 33 through the vent opening 26 will be torn away as will that portion of the film 38 which is bonded to the underside of the slug 28. Thus, the necessary rupturing of the film 38 will occur in the normal opening of the can 20.

Reference is now made to FIGURE 20 in particular and shows a slightly modified form of can end panel prior to the securing of the associated can end to a can. The illustrated end panel is referred to by the numeral 41 and has a vent opening 42 and a dispensing opening 43 formed therein. In the forming of these openings 42 and 43, no slugs remain. A tape 44, which is like the tape 33, is adhesively bonded to the upper surface of the end panel 41 by means of a suitable adhesive 45 with one end thereof left free of the end panel 41 to define a grip portion 46.

The raw metal of the end panel 41 surrounding the openings 42 and 43 is sealed against contact with the contents of a can of which the can end will become a part by means of film or tape 47 which is adhesively bonded to the end panel 41 by means of adhesive 48. It is to be noted that the film 47 is separated from the tape 44 at the openings 42 and 43. However, when the end panel 41 and its associated can end become parts of a can in which a product under pressure is packaged, the pressure may force the film 47 through the openings 42 and 43 into contact with the tape 44 and bonds between the tape and the film will result similar to that shown in FIGURE 7. Then, when the tape 44 is torn off of the upper surface of the end panel 41, those portions of the film 47 aligned with the openings 42 and 43 will be torn away to leave uninterrupted openings in the end panel 41 for dispensing purposes.

The covering 47 may also be applied in the form of a film by spraying or other coating means.

Reference is now made to FIGURES 9, 10, 11 and 12 wherein there is illustrated another form of can end which is generally referred to by the numeral 50. The can end 50 is of the same general construction as the

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can end 23 and includes an end panel 51 surrounded by a shock absorbing bead 52. The end panel 51 is provided with a centrally located vent opening 53 and a radially offset dispensing opening 54. The openings 53 and 54 are formed in like manners.

The vent opening 53 is formed by making a cut 55 almost entirely around the vent opening 53 with the ends of the cut 55 terminating towards the dispensing opening 54 and being centered with respect to a radial line extending through the centers of the openings 53 and 54. The ends of the cut 55 are joined by a score line 56 which completes the defining of the outline of the vent opening 53 and which provides for a weak connection 57 between the metal slug 58 defined by the cut 55 and the end panel 51. Also, the end panel 51 is downwardly offset along the cut line 55 to define a downwardly and inwardly sloping flange 59. The flange 59 provides clearance for the lifting of the slug 58 out of the end panel 51 with the slug 58 hinging along the connection 57.

In the forming of the dispensing opening 54, a slug 60 is formed with the slug 60 being defined by an almost complete circle cut line 61 and a short score line 62 which completes the outline of the dispensing opening 54. The score line 62 defines a weak connection 63 between the slug 60 and the end panel 51. In order to facilitate the removal of the slug 60 by hinging the same upwardly about the connection 63, the end panel 51 is downwardly and inwardly flanged, as at 64, along the cut line 61.

Referring now to FIGURES 11 and 12, it will be seen that the can end 50 is sealed by means of a tape 65, which is like the tape 33. The tape 65 is secured to the end panel 51 and the slugs 58 and 60 by means of an adhesive 66. An end portion of the tape 65 is free to define a grip portion 67 through which the tape 65 may be progressively peeled from the end panel 51. It will be readily understood that when the tape 65 is peeled from the end panel 51, first the slug 58 will be lifted upwardly out of the vent opening 53 and removed with the tape 65, after which the slug 60 will be lifted in a like manner and removed with the tape 65.

Reference is now made to FIGURE 11 wherein there is shown in phantom lines a second film or tape 68 which may be secured to the underside of the end panel 51. The film 68 corresponds to the film 38 and provides for the sealing of the raw edges of the end panel around the vent opening 53 and the dispensing opening 54. It is to be understood that the film 68 is not required with all products and will be utilized only when necessary. Since the film 68 is bonded to the undersides of the slugs 58 and 60, those portions of the film 68 bonded to the slugs will be torn from the remainder of the film when the slugs 58 and 60 are removed.

In FIGURES 13 through 18 there is illustrated another form of can which is generally referred to by the numeral 70. The can 70 includes a conventional can body 71 to which there is secured by means of a double seam 72 an easy opening can end, which is generally referred to by the numeral 73. The can end 73 is of a conventional type, except for the easy opening feature, and includes an end panel 74 defined by a circumferentially extending shock absorbing bead 75. The can end 73 is specifically adapted for the direct dispensing of a liquid from the can 70, either by pouring or by drinking directly from the can. To this end, the end panel 74 has defined therein a combined vent and dispensing opening 76, the outline of which is best shown in FIGURE 16. The opening 76 is defined at its inner end by a small radius curve 77 and at its outer end by a large radius curve 78. The curves 77 and 78 are connected together by straight line portions 79. This particular outline of the combined vent and dispensing opening 76 provides for not only the proper venting of the can 70 as the beverage contained therein is being dispensed therefrom, but also due to the fact that the outer end of the opening 76

is defined by the large radius curve line 78, which is of an extent in excess of 180 degrees, a stream pouring action will result when a liquid is poured through the opening 76.

A major part of the large radius curve line 78 is defined by a cut 80. A second cut 81 extends around the small radius curve 77 and along the straight line portions 79. It is to be noted that the adjacent ends of the cuts 80 are spaced apart and are joined together by a score line 82. The score line 82 leaves a small amount of material between the slug defined by the cut lines 80 and 81, the slug being referred to by the numeral 83, and the remainder of the end panel 74. The relatively weak connection below the score line 82 is referred to by the numeral 84 and may be readily ruptured when the slug 83 is progressively lifted starting from the end thereof defined by the small radius curve 77.

In accordance with this invention, the end panel 74 is provided with a combined sealing and opening facilitating tape 85 which corresponds generally to the tape 33 and which is secured to the upper surface of the end panel 74 and to the slug 83 by means of a suitable adhesive 86. The inner end of the tape 85 is not bonded to the end panel 74, but is left free to define a grip portion 87.

Referring now to FIGURES 16 and 17 in particular, it will be seen that all along the cut lines 80 and 81 the end panel 74 is downwardly and inwardly depressed to define flanges 88. The flanges 88 provide clearance around the slug 83 and thus permit the pivoting of the slug 83 out of the end panel 74 without any binding. The scored uncut hinge connection 84 may also be depressed to merge with the flange 88, as shown in FIGURES 18 and 21, thereby providing a continuous depression about the opening.

When it is desired to open the can 70 and dispense the liquid contained therein, it is merely necessary to grasp the grip portion 87 and peel off the tape 85. In peeling off the tape 85, since the slug 83 is bonded to the tape 85, the slug 83 will hinge about the connection 84 and eventually be broken from the end panel 74 and removed with the tape 85.

When it is desired to seal the raw edges formed by the cuts 80 and 81 against attack by the product contained within the can 70, a further tape or film layer 89 will be suitably bonded to the underside of the end panel 74 in alignment with the slug 83. The film 89 will be bonded to the slug 83 and will be relatively weak so that when the slug 83 is lifted out of the plane of the end panel 74, the film 89 will rupture about the periphery of the slug 83 and that portion of the film attached to the slug will be removed therewith leaving a clean opening through which dispensing of a liquid can take place.

Although only several preferred embodiments of the invention have been specifically illustrated and described herein, it is to be understood that other minor variations may be made in the easy opening can end constructions of this disclosure within the spirit and scope of this invention, as defined by the appended claims.

We claim:

1. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and remove said slug, said end panel being inwardly depressed along a major portion of the peripheral edge of said end

panel defining said dispensing opening to assure freedom of movement of said slug out of said dispensing opening.

2. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and remove said slug, said slug being severed from said end panel except for a minor connection with said end panel remote from said tape end portion, and said end panel being inwardly depressed along a major portion of the peripheral edge of said end panel defining said dispensing opening to assure freedom of movement of said slug out of said dispensing opening.

3. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and removing said slug, said end panel being inwardly depressed along a major portion of the peripheral edge of said end panel defining said dispensing opening to assure freedom of movement of said slug out of said dispensing opening, said depressed peripheral edge portion being along that portion of said dispensing opening adjacent said tape end portion.

4. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and remove said slug, said slug being severed from said end panel except for a minor connection with said end panel remote from said tape end portion, and said end panel being inwardly depressed along a major portion of the peripheral edge of said end panel defining said dispensing opening to assure freedom of movement of said slug out of said dispensing opening, said depressed peripheral edge portion being along that portion of said dispensing opening adjacent said tape end portion.

5. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal

said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and remove said slug, said slug being severed from said end panel except for a minor connection with said end panel remote from said tape end portion, the material of said connection being of a lesser thickness than said end panel.

6. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and remove said slug, said end panel being inwardly depressed along a major portion of the peripheral edge of said end panel defining said dispensing opening to assure freedom of movement of said slug out of said dispensing opening, said slug being severed from said end panel except for a minor connection therewith and said depressed peripheral edge portion being substantially fully around said dispensing opening except along said connection.

7. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and remove said slug, said end panel being inwardly depressed along a major portion of the peripheral edge of said end panel defining said dispensing opening to assure freedom of movement of said slug out of said dispensing opening, said depressed peripheral edge portion being along that portion of said dispensing opening adjacent said tape end portion, each end of said depressed peripheral edge portion terminating alongside an edge of a readily breakable connection between said slug and said end panel.

8. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and remove said slug, and a second tape bonded to the underside of said end panel of said slug and sealing the edge of said end panel defining said vent opening against contact with a product disposed in a container of which said container end closure is a part.

9. A container end closure of the easy opening type including an end panel, a dispensing opening through said

end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and remove said slug, and a second tape bonded to the underside of said end panel of said slug and sealing the edge of said end panel defining said vent opening against contact with a product disposed in a container of which said container end closure is a part, said second tape being weak as compared to the first-mentioned tape and being rupturable by the outward movement of said slug.

10. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, the slug of material of said end panel which is removable in the forming of said dispensing opening being seated in said dispensing opening, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said slug being bonded to said tape and reinforcing said tape against outward bowing due to internal pressure when said end closure is part of a sealed container, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening and remove said slug, said dispensing opening being elongated and including an inner vent portion, said opening being defined by an inner small radius curve and an outer larger radius curve with straight line portions joining said curves.

11. The container end closure of claim 10 wherein said slug has a minor connection with said end panel along said large radius curve.

12. The container end closure of claim 11 wherein said end panel is inwardly depressed along said small radius curve and said straight line portions to assure freedom of movement of said slug out of said end panel.

13. The container end closure of claim 10 wherein said end panel is inwardly depressed along said small radius curve and said straight line portions to assure freedom of movement of said slug out of said end panel.

14. A container end closure of the easy opening type including an end panel, a dispensing opening through said end panel, and a strip of flexible gas and liquid impervious tape overlying said dispensing opening being releasably bonded to said end panel surrounding said dispensing opening to seal said end panel, said tape having an end portion free of said end panel for facilitating the peeling of said tape from said end panel to uncover said dispensing opening, and a second tape bonded to the underside of said end panel in alignment with said dispensing opening and sealing the edge of said end panel defining said dispensing opening against contact with a product disposed in a container of which said container end closure is a part, said second tape being bondable to the first-mentioned tape through said dispensing opening by pressure within an associated container and being weak as compared to said first tape for rupturing when said first tape is removed.

15. A container end closure of the easy opening type including an end panel, said end panel having a removable slug for readily forming a dispensing opening in said end panel, said slug being defined by a cut line extending entirely about said slug except for a short hinge connection between said slug and the remainder of said end panel, the remainder of said end panel being inwardly depressed along said cut line to eliminate frictional locking of said slug in said end panel, and readily rupturable

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sealing means temporarily sealing said end panel along said cut line.

16. The container end closure of claim 15 wherein said end panel is of a reduced thickness along said hinge connection to facilitate the hinging of said slug relative to said end panel.

17. The container end closure of claim 15 wherein said end panel is of a reduced thickness and is depressed along said hinge connection to facilitate the hinging of said slug relative to said end panel.

18. The container end closure of claim 15 wherein said sealing means is in the form of a tape overlying said end panel and having a free starting end remote from said

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hinge connection, said tape being bonded to both said slug and to the remainder of said end panel.

References Cited by the Examiner

UNITED STATES PATENTS

2,023,151	12/1935	Sebell	220—48
2,111,025	3/1938	Galler	239—57
2,238,821	4/1941	Peppers	220—27
2,898,015	8/1959	Borah	222—484
3,151,765	10/1964	Griese	220—53

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