

[54] CAN END WITH INSEPARABLE TEAR STRIP

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Related U.S. Application Data

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[52] U.S. Cl. 113/121 C, 113/15 A

[51] Int. Cl. B21d 51/26

[58] Field of Search 113/15 R, 15 A, 121 C; 220/54

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[57] ABSTRACT

A can end in which the tear strip is defined by a non-continuous score which is formed so that the tear strip is prevented from being completely removed from the can ends. Coined formations are positioned in the area about the score line to prevent the formation of sharp edges against which a user could cut himself. In one embodiment of the invention, the end wall is coined so as to form a score ledge situated beneath the horizontal plane of the end wall and the tear strip is further coined or formed to a position beneath the horizontal plane of the score ledge. When a score is formed in the ledge, the tear strip is coined slightly further away from the horizontal plane of the ledge to absorb the metal flowing away from the score. In another embodiment, ridges are coined into the end wall and the tear strip on opposite sides of the legs of the score to accomplish the same result.

5 Claims, 16 Drawing Figures

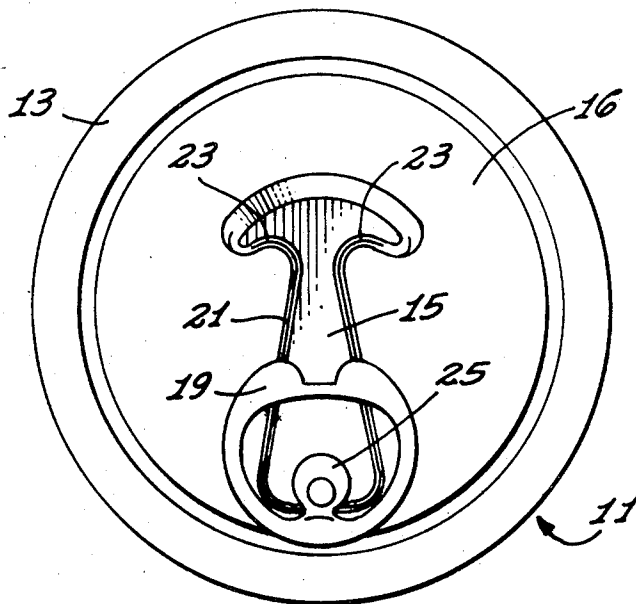


Fig. 1

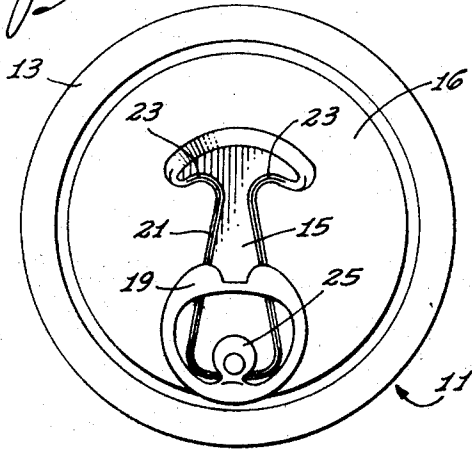


Fig. 2

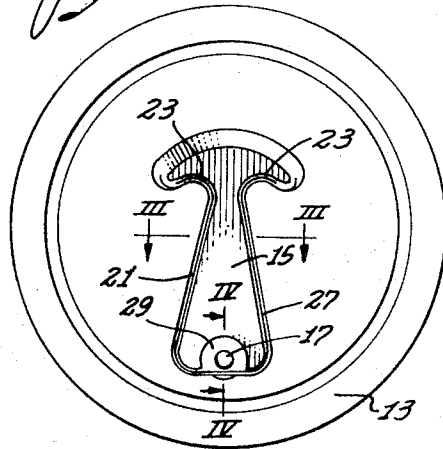


Fig. 3

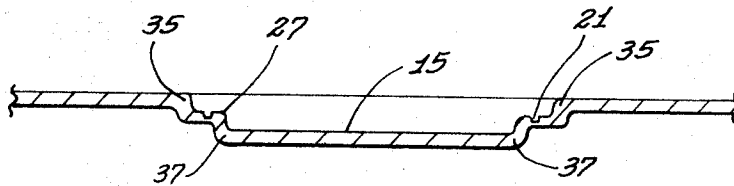


Fig. 4

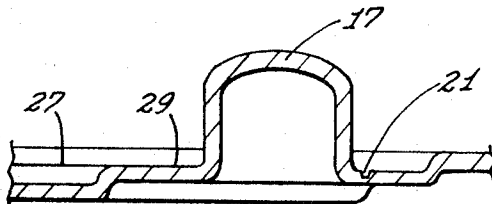


Fig. 5

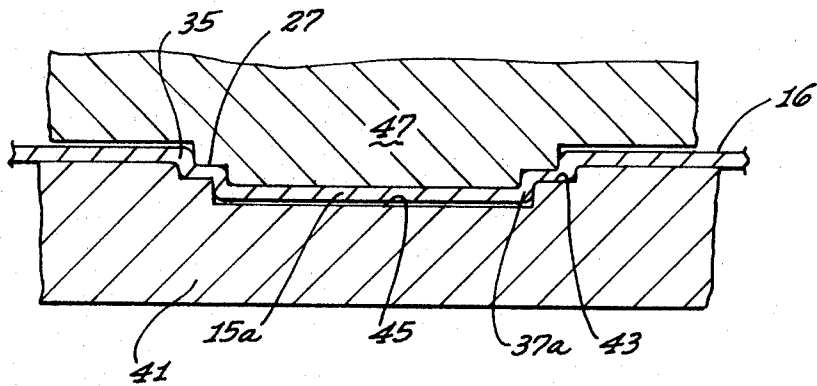


Fig. 6

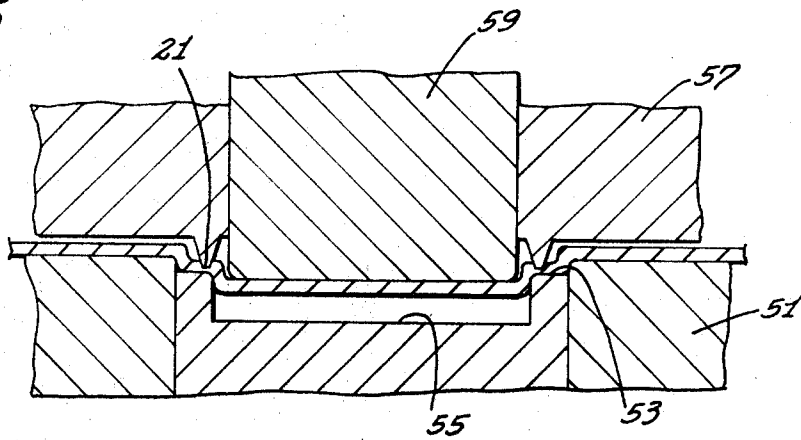


Fig. 7

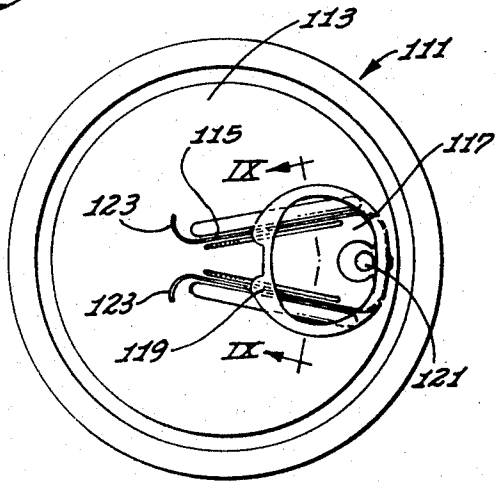


Fig. 8

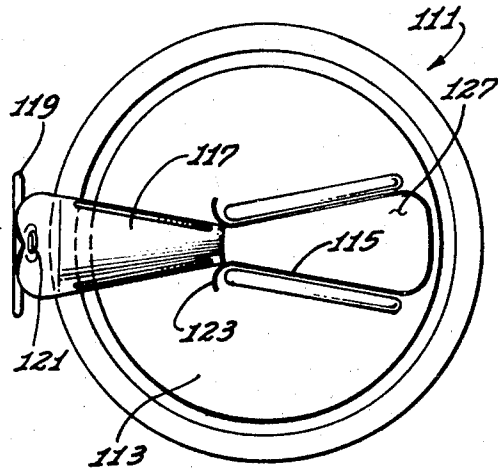


Fig. 9

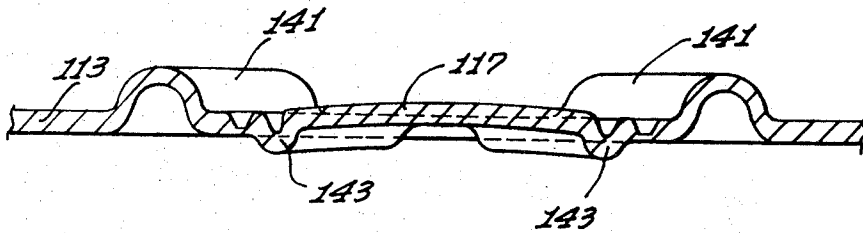
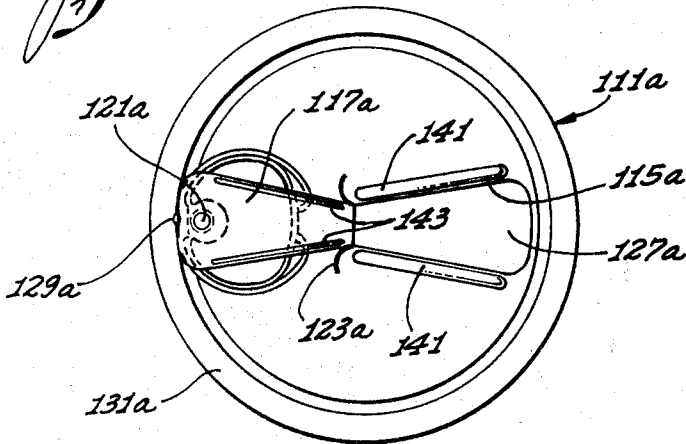
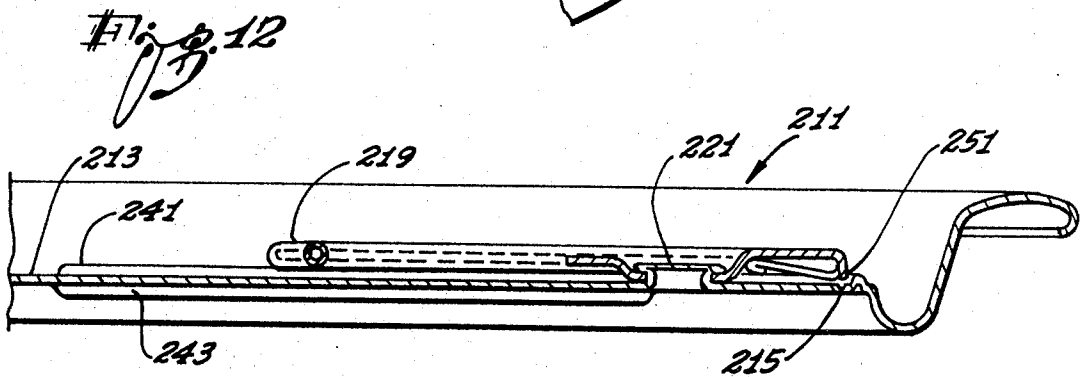
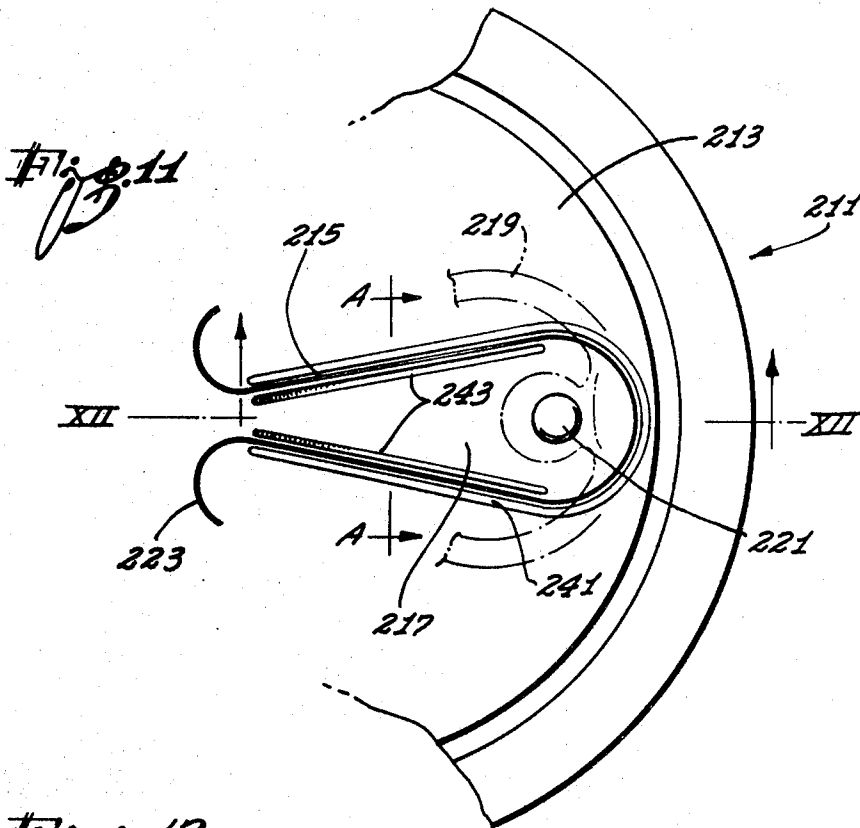
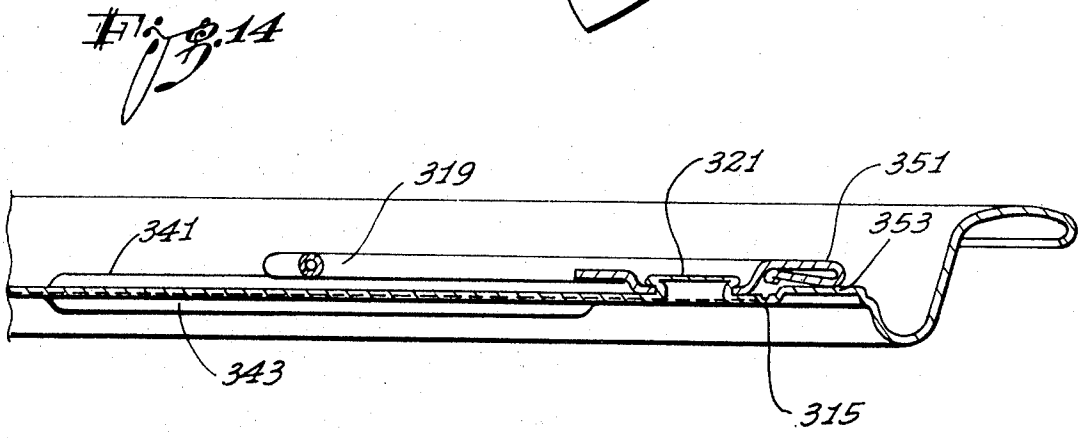
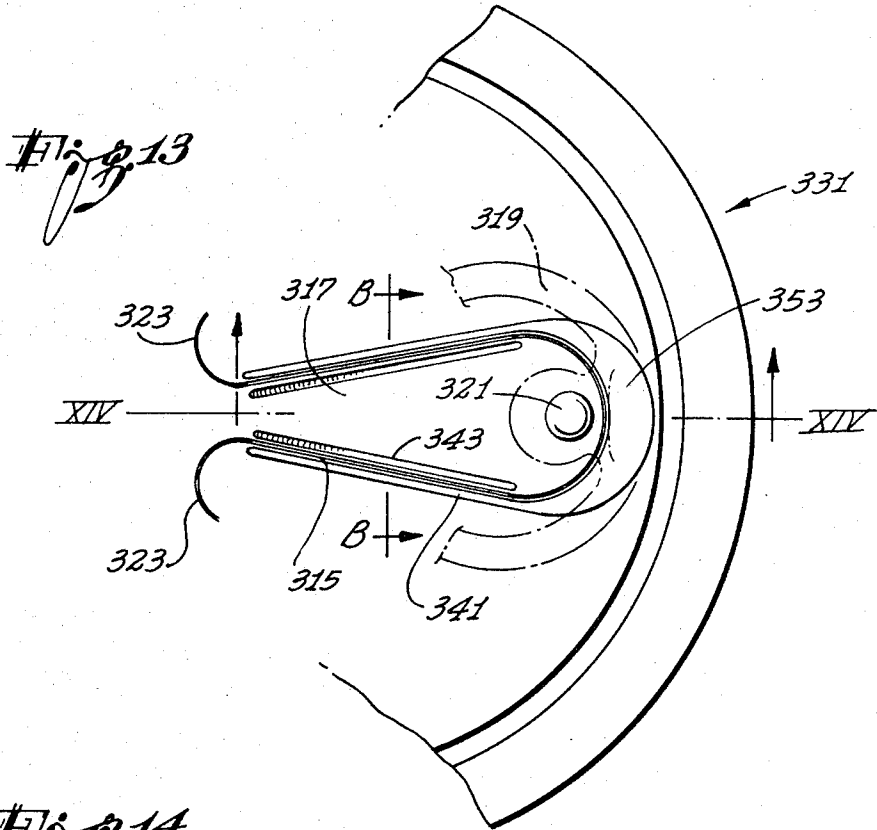
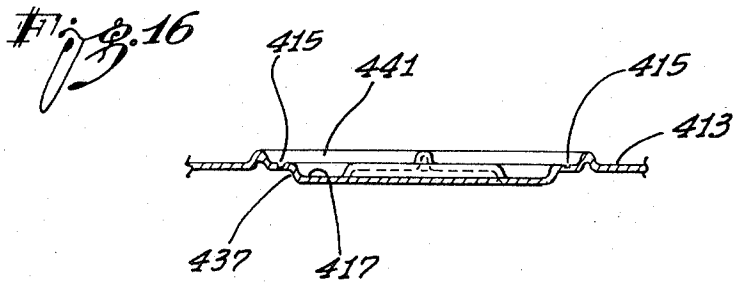
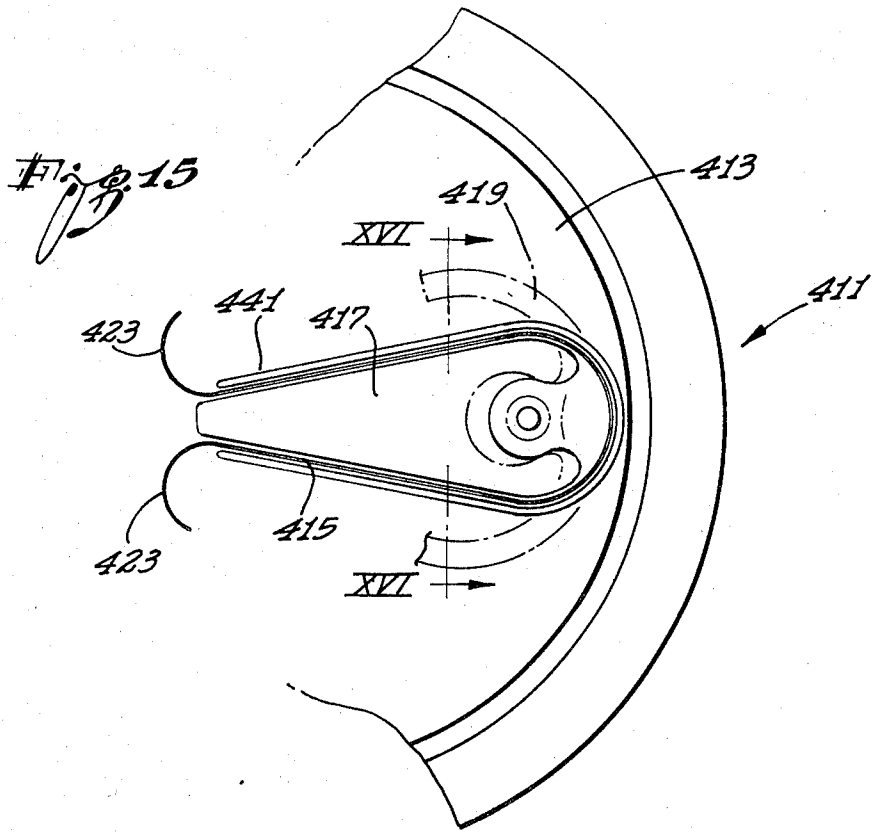


Fig. 10









CAN END WITH INSEPARABLE TEAR STRIP**CROSS-REFERENCE TO RELATED APPLICATIONS**

This is a divisional application of application Ser. No. 103,255, filed on Dec. 31, 1970 now U.S. Pat. No. 3,757,989, for Can End With Inseparable Tear Strip.

BACKGROUND OF THE INVENTION

This invention relates to easy opening cans and more specifically to such cans which are readily opened by severing a tear strip, defined by a line of score, from a wall of the can to expose the contents thereof.

Easy opening cans have been well accepted by the public and particularly for cans containing beer, carbonated beverages, and other liquids. In most of the beverage cans, a tab or lever is permanently joined to a tear strip which is configured so that a pouring spout or opening will be provided when the tear strip is pulled away from the end wall of the can end by rupturing a continuous score line which defines the tear strip. The tab is lifted to initiate rupturing of the score and the tab and the tear strip are then completely removed from the can by pulling on the tab to sever the continuous score line.

Easy opening cans have been highly commercially successful since they eliminate the necessity of an opener or similar tool and are thus very convenient for use at recreational areas such as beaches, parks, and the like.

As the public is becoming more aware of the problems of human ecology, more care is being exercised in the disposal of the cans after they have been used to reduce litter. Unfortunately, the same care has not been exercised in disposing of the tab and tear strips which are removed from the cans and this has begun to create a substantial litter problem in many areas throughout the world. For example, when easy opening cans are used on beaches, cans and most other litter which is left in the sand can be easily removed by passing a rake through the sand. However, the tabs and tear strips are small enough to pass through the tines of the rake and are therefore not removed during normal litter cleanup. This can present a very serious problem since, in many cases, the edge of the metal defining the periphery of the tear strip is sharp enough to cut a person stepping or falling on it. Further, since most of these can ends are manufactured from non-ferrous metal, the tabs and tear strips cannot be picked up during litter removal by magnetic equipment.

In view of all these factors, many jurisdictions are beginning to consider ordinances which prohibit the use and/or sale of easy-opening cans. Consequently it has become necessary to find a solution to this problem which will prevent littering while still providing the public with the advantages and convenience of easy-opening cans. In order to produce this result, it has been proposed that the tear strip be defined by a non-continuous score so that, on completion of the severing of the score line, the tear strip is still firmly attached to the can end wall so that it cannot become separated therefrom. This concept has been clearly shown in U.S. Pat. No. 3,327,891. When the tear strip is pulled away from the end wall in a can end such as that taught by the cited patent, the user is able to gain complete and free access to the contents of the can but does not create a litter problem because, when he disposes of the

can, the tab and tear strip will still be attached and will be discarded together with the can body. It has been found, however, that the abrupt score line ending shown in that patent will allow a user to pull the strip away either by exerting a large enough force to break an unscored portion of the end wall beyond the ends of the legs of the score or by bending and rebending the strip across a very sharp crease which may occur between the ends of the score legs. In either event, the advantages of the non-removable tear strip are thereby voided.

While this concept prevents the formation of additional litter, a further problem is created in that some means must be provided to prevent the user of the can from cutting himself on the sharp edge of the tear strip. Since most people drink the contents directly from the can, it is quite probable that the user's nose will contact a tear strip which is not fully removed from the can. If the edge of the strip is sharp, it is possible that he may cut his nose on it. On the other hand, if a sharp edge is formed around the pour spout, he may cut his lips on it.

Consequently, it is expected that unless can ends are provided with non-removable tear strips by the manufacturers voluntarily, laws will be passed requiring that these actions be taken. Therefore, it is necessary to provide a method and apparatus for forming such easy-open can ends which will not injure the user.

SUMMARY OF THE INVENTION

The present invention relates to an easy-open can end, and the method of manufacturing such a can end, from which the tear strip is not removable and the tab and pour spout or opening are provided with protective surfaces to prevent the user from being injured by sharp metal edges. In one embodiment of the present invention, a can end may be provided with a rivet which is to be staked over the attachment portion of a tab. The can end is then coined downwardly in the area adjacent the rivet to provide a stepped surface including a scoring ledge immediately adjacent the end wall and spaced downwardly therefrom and a tear strip immediately adjacent the scoring ledge and spaced downwardly therefrom.

When this coining has been accomplished, a scoring tool is used to create a score on the ledge. A user may sever the score by pulling the tear strip away from the end wall, thereby creating a pouring spout or opening. When the scoring tool acts on the material of the scoring ledge, it causes metal in the can end to flow in opposite directions away from the score since the under-surface of the ledge is closely supported by a die surface opposite the scoring die.

Most can ends are provided with a protective coating on the side thereof which will be inside the can in order to prevent contact between the contents and the metal of the can end. This is necessary to prevent acids in the contents from acting upon and weakening the metal and from having their properties change or taste tainted by the metal. When very high pressures are exerted on a small area, such as during coining or scoring operations, the protective coating is easily damaged, requiring that the can end be recoated after the machining operations are completed. Recoating of can ends requires that additional expense be incurred which might otherwise be avoided.

It will therefore be apparent to those skilled in the art that it is desirable that the scoring ledge have as wide a surface as possible to minimize the unit pressure exerted thereon during coining, thereby reducing the possibility of damage to the protective coating. On the other hand, it is necessary that the scoring ledge be manufactured as narrow as possible so that the metallic edges of the pouring spout and the tear strip will be closely protected by the vertical surfaces extending between (1) the ledge and the end wall and (2) the ledge and the tear strip.

In accordance with the present invention, the scoring ledge is manufactured sufficiently wide to prevent damage to the protective coating but narrow enough so that the metallic edges formed by a score positioned substantially in the center of the ledge will be protected by the vertical surfaces to prevent injury to the user. Thus, in the preferred embodiment, the can end is coined to provide the stepped product in which the median step comprises a scoring ledge. The ledge is wide enough to prevent damage to the enamel, but narrow enough to provide the protection desired and is thinned by the coining so that a relatively wide scoring tool may be used which penetrates the scoring ledge a relatively small distance.

As scoring is accomplished, the metal displaced by the scoring tool tends to flow in directions substantially perpendicular to the movement of the tool since the ledge is supported by a die. Therefore, some of the displaced metal will flow toward the tear strip and, if unchecked, will create a ridge extending substantially along the longitudinal center of the tear strip. In other words, the displacement of the metal can cause a distortion of the can end. In order to prevent this distortion, as the score is being formed in the ledge, a coining or punching tool may be used to exert a slight stretching force on the tear strip so that the displaced metal flowing toward the tear strip is taken up by a slight elongating of the vertical surface between the ledge and the tear strip.

The coining and scoring of the can end may be performed so that the configuration of the scoring ledge and the score is such that a continuous score is not formed. Instead, at the end of the tear strip distal from the point of attachment of the tab, the ledge and the score are flared outwardly and slightly back toward the attachment end to form force reversing curves in the score line. As severing of the score reaches the reversing curves, it will be difficult for a user to exert a severing force on the tab which will pull the tear strip away from the end wall. This is because the pulling force required to sever the score in the area of the reversing curves would have to be directed in opposite directions either alternately or simultaneously and the disclosed configuration of the curves prevents that from being done. Further, the curves also tend to prevent the natural formation of a sharp crease at the end of the tear strip. In other words, a consumer is positively prevented from pulling the tear strip away from the can end without expending a relatively considerable time and effort.

When severing reaches the reversing curves, the user will be able to fold the tear strip against the end wall of the can so that it is out of his way and he is able to drink or pour the contents without interference. He will be protected from the edges of the severed score by the

vertical surfaces of the coined steps so that he will not suffer injury therefrom.

In an alternate embodiment of the invention, the score may be formed and coined between substantially parallel coined indentations, each of which provides a protective surface to prevent contact between the sharp edge of the severed score and the user. With the exception of the coined indentations, no coining of the can end is required to produce the desired result and the score may be formed in substantially the same configuration as in the first embodiment so that the tear strip cannot be removed from the can end. Of course, additional embodiments, some of which will be described below, of the basic concepts will be readily apparent to those skilled in the art when the inventive concepts herein are fully understood.

Further objects, advantages, and modes, and such additional embodiments of the present invention will be readily apparent to those skilled in the art after they have read the Detailed Description and referred to the accompanying drawings which illustrate what are presently considered to be a preferred embodiment of the best mode contemplated for utilizing the novel principles which are defined in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a can top formed in accordance with the present invention;

FIG. 2 is a view similar to FIG. 1, illustrating the can top prior to the time that a tab is fastened to the tear strip;

FIG. 3 is a partial sectional view of a portion of the can top shown in FIG. 2, as seen along a line III—III therein;

FIG. 4 is a partial sectional view of the can top of FIG. 2, as seen along the line IV—IV therein;

FIG. 5 is a partial sectional view of a coining tool and can end, shown after the coining step has been completed;

FIG. 6 is a partial sectional view of a scoring tool and the can end, showing the score being formed therein;

FIG. 7 is a plan view of a first alternate embodiment of a can end formed in accordance with the present invention;

FIG. 8 is a plan view of the can end shown in FIG. 7, illustrating a position which may be assumed by the tear strip after the score has been severed;

FIG. 9 is a partial sectional view of the can end of FIG. 7, taken along a line IX—IX therein;

FIG. 10 is a plan view of a can end such as that shown in FIG. 7, illustrating a position which may be assumed by the tear strip after the score has been severed, if the position of the score and the size of the panel opening are suitably adjusted;

FIG. 11 is a partial plan view of an alternate embodiment of the present invention;

FIG. 12 is a partial sectional view of the can end of FIG. 11, as seen along a line XII—XII therein;

FIG. 13 is a partial plan view of an alternate embodiment of the present invention;

FIG. 14 is a partial sectional view of the can end of FIG. 13, as seen along a line XIV—XIV therein;

FIG. 15 is a partial plan view of an embodiment of the present invention, which is a "hybrid" of some of the other embodiments; and

FIG. 16 is a partial sectional view of the can end of FIG. 15, as seen along a line XVI—XVI therein.

DETAILED DESCRIPTION

A can end 11 shown in FIG. 1, is formed having a peripheral flange 13 by which the end may be attached to a can body (not shown). A tear strip 15 is formed in the end wall 16 of the can end and a rivet 17 is formed integral therewith for attachment of a tab 19 thereto. The tear strip 15 is defined along the major portion thereof by a score 21 which is formed so as to pass adjacent the rivet and end in a pair of reversing curves 23.

When a user lifts the portion of the tab nearest the center of the can end, the score is ruptured so that, when a finger is placed into the central opening of the tab, the tab may be lifted to sever the score and pull the tear strip 15 away from the end wall to form a pouring spout or opening. Due to the formation of the reversing curves 23 of the score line 21, the user will not be able to tear the tear strip away from the can end due to the previously described reasons. Instead, the tab and tear strip will remain attached to the can end and when the can is discarded, the tear strip and tab will be discarded along with it.

A similar can end has been illustrated in FIG. 2, shown prior to the time that the rivet 17 is staked over the attachment portion 25 (FIG. 1) of the tab 19. As shown in that figure, the score line 21 is formed on a ledge 27 intermediate the end wall 16 and the tear strip 15. Relative to the end wall, ledge 27 is at approximately the same depth as the upper surface of the material 29 surrounding the unstaked rivet 17.

It will be realized by those skilled in the art that the portion 29 of the can end is of a reduced thickness due to a formation of the rivet dimple 17 and, in this particular process, the portion 29 is formed so that its upper surface is approximately the same level as the upper surface of the ledge 27. Since both elements are of approximately the same thickness and at the same depth relative to the upper surface of the end wall 16, the score line formed thereon will be continuous and the residue, i.e., the metal between the bottom of the score line and the inner surface of the can end, will be substantially equal. This will allow the can end to be scored without creating areas of weakness in the residue which might cause microscopic cracks to be formed and result in leakage of the contents or contamination.

The ledge 27 is formed between a pair of vertical offsets 35 and 37 in order to produce protective surfaces which will prevent a user from cutting himself on the sharp edges of the severed score. In other words, when the score 21 is severed along its length, the vertical offset 35 will prevent the portion of the score at the end wall panel 16 from cutting the lips of the user and the vertical offset 37 will prevent the portion of the score on the tear strip 15 from cutting his fingers or nose when he drinks from the can. It will be realized, of course, that the illustrations of such a can end shown in FIGS. 3 and 4 are highly enlarged. In actual practice, the width of the ledge 27 will be approximately 0.030 inch. Thus, with the score positioned between the vertical offsets, the distance between the remaining edge of the severed score and the adjacent offsets will be approximately 0.015 inch or less. This dimension is small enough to prevent the score edges from cutting into the user's skin.

In manufacturing can ends, it has been found desirable to produce the score in such a way that the residue will be approximately 0.004 - 0.006 inch so that the

strength of the can end is retained, to prevent contamination or leakage, while allowing the score line to be easily severed with a minimum of effort. In presently manufactured can ends, which have no ledge such as 27, a relatively narrow scoring tool must be used since, in some cases, it must penetrate the end wall panel to a distance of approximately 70 percent of the panel thickness. Narrow scoring tools are therefore preferred since their use reduces the possibility of damage to any protective coating which may be on the inner surface of the can end to prohibit contact between the metal of the can end and the contents. If a wide scoring tool is used, the coining of the metal which naturally occurs during scoring will allow the protective coating to be damaged as the wide tool penetrates to the proper depth.

In can ends formed in accordance with the present invention, the reduced thickness of the ledge allows a wider scoring tool to be used since the production of a residue having a thickness within the desired range requires substantially less penetration of the scoring tool into the material of the ledge. Comparing presently manufactured can ends with those formed in accordance with the present invention, for example, if both can ends are manufactured from stock having a thickness of 0.0135 inch, presently available can ends must be penetrated approximately 70 percent in order to produce a score having a residue of approximately 0.004 inch. On the other hand, if the ledge 27 is coined sufficiently so that its final thickness is 0.008 inch, it must be penetrated only 50 percent by the scoring tool to produce a residue of approximately 0.004 inch. In view of the fact that wider scoring tools are less costly to produce and have a longer tool life, this result is deemed to be highly desirable and its value is greatly increased due to the fact that the reduced penetration required of the scoring tool reduces the potential damage to the protective coating.

Referring now to FIG. 5, it can be seen that in production, the can end wall 16 is supported by a suitable die 41 having an outer recess 43 and an inner recess 45. When a coining tool 47 is moved against the end wall, the ledge 27 is formed between the offsets 35 and 37a. At the same time, a pullout panel 15a is formed between the opposite sides of, and below the level of, the ledge 27.

When this has been completed, the can end is moved onto a second die structure 51 having an outer recess 53 and an inner recess 55. A scoring tool 57 and a punch 59 are moved toward the preformed can end as shown in FIG. 6 so that the scoring tool forms the line of score 21 in the ledge 27. When the scoring tool acts on the ledge, it performs some coining of the metal therein because the metal displaced from the area of the score line must move away from it. If the metal flowing toward the pullout panel or tear strip 15a is not controlled, undesirable wrinkles and stresses will be created in the panel which will create, at best, an aesthetically unappealing can end and, at worst, a can end which leaks. Therefore, a punch 59 acts against the panel 15a to produce a slight stretching force on the offset 37a and the panel to prevent such wrinkling from occurring. This action results in the panel 15a and the offset 37a being stretched to form the panel 15 and offset 37 as shown in FIG. 6.

Referring once again to FIG. 1, it will now be realized that the production of the tear strip 15 and ledge 27 at

reduced levels will provide the additional advantage of allowing a consumer to get the end of his finger or his fingernail beneath the bottom of tab 19 at the end thereof away from the rivet. He is therefore able to lift the tab for initial rupturing of the score line more easily.

Referring now to FIGS. 7-9, there is shown a can end 111 having an end wall 113 with a score 115 therein defining a tear strip 117. A tab 119 is suitably attached to the tear strip by means such as an integral rivet 121 which is formed as an integral part of the strip. The score line 115 ends in a pair of reversing curves 123 so that the tear strip cannot be completely severed from the end wall when a consumer opens the can. Instead, the tear strip will be bent back away from a pouring spout or opening 127 formed by the removal of the tear strip. As shown in FIG. 8, the tab 119 may be pulled so as to extend beyond the periphery of the can end and down along the side of the can. This will cause the tear strip to be pulled substantially flat against the can end to be out of the way.

As shown in FIG. 10, wherein like parts have been labeled with identical labels, followed by the letter a, the suitable positioning of the reversing curves 123a of the score line 115a will allow the tear strip and tab to be tightly positioned against the upper surface of the end wall 113a. If the ends of the score line are properly positioned, the nose 129a on the tab, which is used as the force application point for initial rupturing of the score line, will fit tightly against the inner surface of the attachment flange 131a, by means of which the end is attached to a can body. Consequently, when the user opens such a can, he may flatten the tab against the tear strip and then push the tab and the tear strip tightly against the top of the can and the friction between the nose 129a and the flange 131a will retain these elements in the illustrated position.

Referring now to FIG. 9, a partial cross section of a can end has been illustrated to show the alternate means for protection of the consumer when the can end is open, for the can ends shown in FIGS. 8 and 10. As shown, a ridge or beam 141 is coined in the end wall 113 to extend upwardly therefrom and a similar, smaller ridge 143 is coined downwardly into the tear strip 117 adjacent each of the major legs of the score 115. Bearing in mind that the illustration is a greatly enlarged view of a portion of the can end, it will be realized that these coined ridges are closely adjacent the score so that, when the tear strip is moved back to the position of FIG. 8 or FIG. 10, each of the ridges will be so closely positioned relative to its adjacent edge of the score that the user cannot cut himself due to the very small distance which the score edge can move against his skin before the adjacent ridge prevents penetration.

As an additional advantage, the positioning of the ridges 141 and 143 is such that when they are coined, the material in the area of the score will be placed in compression due to the coining forces exerted and therefore will be strengthened. This will reduce the possibility of microscopic cracks being formed in the score residue and will also reduce the possibility of damage to the protective coating on the underside of the can when the score is formed.

As shown in FIGS. 11 and 12, a can end 211 has been illustrated having a score line 215 formed within an end wall panel 213 to define a tear strip 217 therein. A

front opening tab 219 is suitably attached to the tear strip 217 by means such as an integral rivet 221.

The score line is formed so as to end in a pair of reversing curves 223 which prevent a consumer from completely removing the tear strip 217 from the can end when he opens the can.

A ridge or curved beam 241 is formed about the outside of the score line 215 as shown in FIG. 11 and a pair of ridges 243 are coined into the tear strip adjacent the score line. With the exception of the fact that the ridge 215 extends along the score line about the area of the rivet, a sectional view of the can end 211 taken along the line A—A would be substantially identical to the sectional view shown in FIG. 9.

Those skilled in the art will realize that the formation of the ridges 141 and 241 in the can ends 111 and 211 will cause the tabs to be held in a slightly elevated position relative to the can end, allowing easier initial gripping of the tab by the consumer when he desires to open the can. In other words, when the consumer places his fingernail or the end of his finger against the left end of the tab 219, as shown in FIG. 12, he will be able to exert some force from beneath the tab so that the rupturing end 251 of the tab will move downwardly to rupture the score 215 in the area about the rivet 221. He can then insert his finger into the central opening of the tab and exert an upwardly directed force to sever the score line back to the area of the reversing curves 223.

In the can end 211, the ridges 243 in the tear strip 217 and the ridge 241 which extends about the external edge of the score line will prevent the consumer from cutting himself on the edges of the severed score in a manner similar to that described above.

With reference now to FIGS. 13 and 14, a can end 311 is shown having a score line 315 which ends in reversing curves 323 which prevent a tear strip 317 from being completely removed from the can when the score line is severed by pulling on a tab 319.

When a consumer lifts the left end of the rear opening tab 319, as shown in FIG. 14, a lever end 351 of the tab will act against an expanded section or platform 353 of a ridge 341 which extends about the outer edge of the score line 315, causing the score to be ruptured in the area about a rivet 321. The expanded section 353 provides a raised platform against which the lever section 351 can act to increase the force which will be exerted on the score line by lifting the tab 319.

With the exception of the fact that the ridge 341 extends about the periphery of the score line and forms the platform at 353, a sectional view of the can end, as seen along the line B—B of FIG. 13 would be substantially identical to the sectional view shown in FIG. 9.

Now with reference to FIGS. 15 and 16, there is shown a can end 411 having a score line 415 formed in an end wall 413 to define a tear strip 417. A ridge 441 extends about a major portion of the periphery of the score line to prevent a consumer from cutting himself against the edge of the score line in the end wall 413 when the tear strip is pulled away from the end wall.

The score line end in suitable reversing curves 423 which prevent the tear strip from being completely removed from the can when a consumer severs the score line.

In this embodiment, the tear strip 417 is coined to a reduced level, as shown in FIG. 16, forming a vertical offset 437 which will be sufficiently close to the tear

strip edge of the score line to prevent the edge from penetrating the skin of the user and cutting him. The ridge 441 may be similar to ridge 241 in the embodiment of FIG. 11 or 341 in FIG. 13 and the tear strip 417 may, if desired, be similar to the tear strip 15 in the embodiment of FIGS. 1 and 2.

It will be realized that the vertical differential between the upper surface of the ridge 441 and the upper surface of the tear strip panel 417 will be such that the lifting end of the tab is even more accessible to the consumer so that he can more easily open the can end.

Thus, in all of the illustrated embodiments, a non-removable tear strip is formed in an easy opened can end and a variety of devices have been illustrated which will serve to protect the consumer and prevent him from injuring himself on either the end wall panel or the tear strip. It will be realized, of course, that similar or identical protection devices could be used with can ends and tear strips from which the tear strip is made completely removable by the formation of a continuous score line therein.

Each of the disclosed embodiments provides the further advantages of allowing easy access to the tab without requiring deformation thereof to allow the consumer to insert his fingernail or the end of his finger beneath the lifting end. Additionally, in several of the disclosed embodiments of the invention, the coined formations in the area of the scores sufficiently reduces the metal thickness in the scoring location to allow the manufacturer to use a wider scoring tool, having a longer tool life, without damage to the protective coating on the inner surface of the can.

Many modifications, alterations, and similar changes to the above-described embodiments of this new and improved concept will now become apparent to those skilled in the art without exceeding the protected scope of this invention as defined in the following claims.

Wherefore, what is claimed as the invention is:

1. A method of forming an easy open can end having an end wall and a removable tear portion in the end wall which is at least partially circumscribed by a score

line in the can end, said method comprising: coining a can end wall to define a planar coined border which at least partially circumscribes a tear portion;

forming a first offset surface in said can end which is inclined vertically to the plane of said coined border and lies outside of said border;

forming a second offset surface in said can end which is inclined vertically to the plane of said coined border and lies inside said coined border within said tear strip.

forming a score line within said coined border,

placing said score line between said first and second offset surfaces and sufficiently close to both of said offset surfaces to provide protection from the second offset surface against cuts from the sharp edge on the tear portion and protection from the first offset surface against cuts from the sharp edge remaining on the can end after severance of the can end along the score line in at least partial removal of the tear strip from the can end, and said coined border being formed in a plane which is intermediate to the plane of said tear portion and the plane of the balance of said end wall.

2. The method of claim 1 including deforming said tear portion to move the plane of said tear portion away from the plane of said coined border as said score line is formed within said coined border.

3. The method of claim 1 wherein said score line is formed by penetrating said coined border to a depth of approximately 50 percent of the thickness of said border.

4. The method of claim 1 including forming said score line with end configurations which prevent the complete separation of said tear strip from said can end.

5. The method of claim 4 wherein said score line terminates at a pair of reversing curves which prevent removal of said tear strip from said can end.

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