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3,499,572

EASY-OPENING STRUCTURE HAVING A WELDED WEAKENING LINE

Filed April 8, 1968

4 Sheets-Sheet 1

FIG. 1

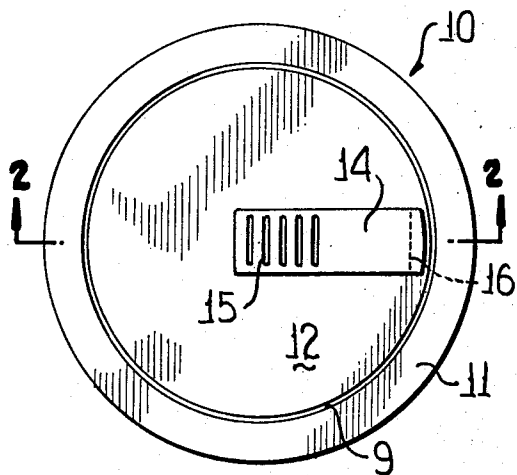


FIG. 5

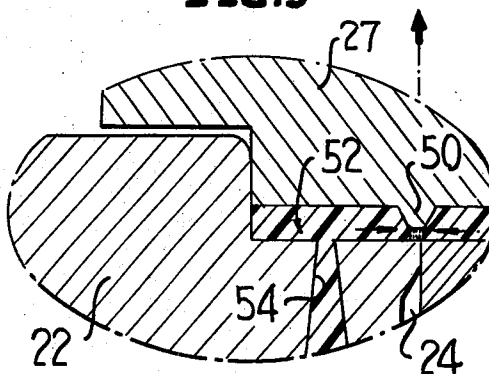


FIG. 2

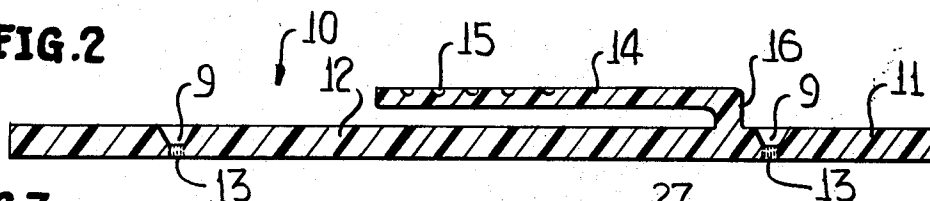


FIG. 3

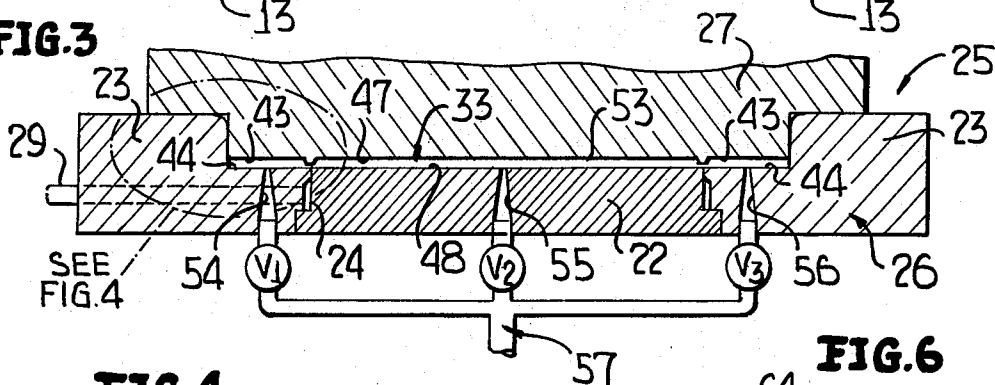


FIG. 4

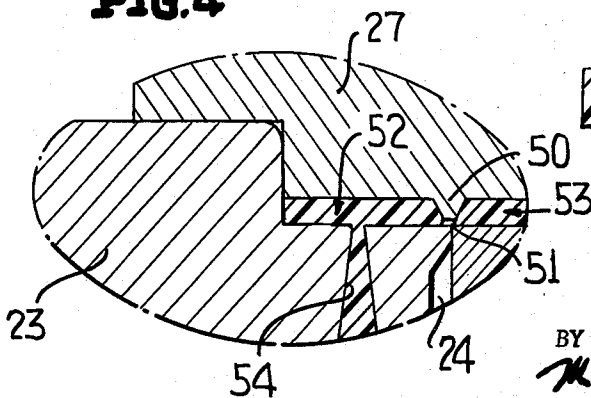
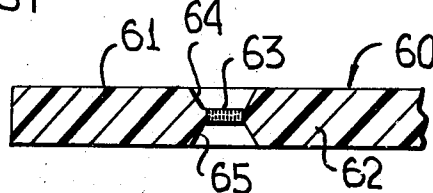


FIG. 6



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FIG. 7

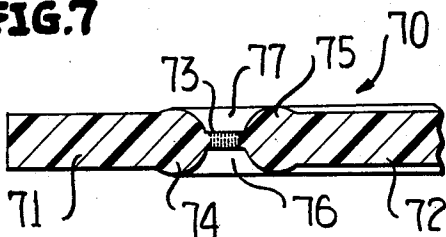


FIG. 8

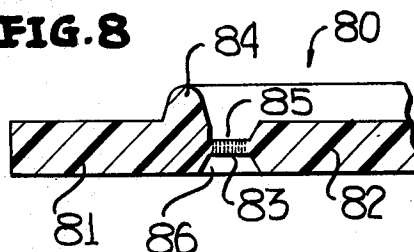


FIG. 9

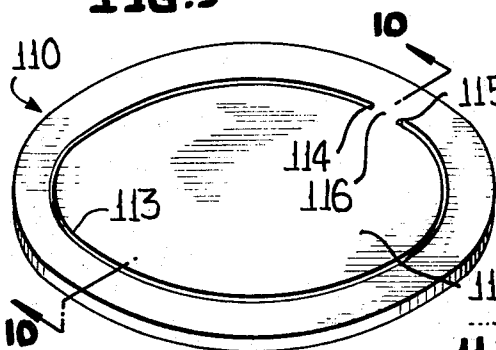


FIG. 12

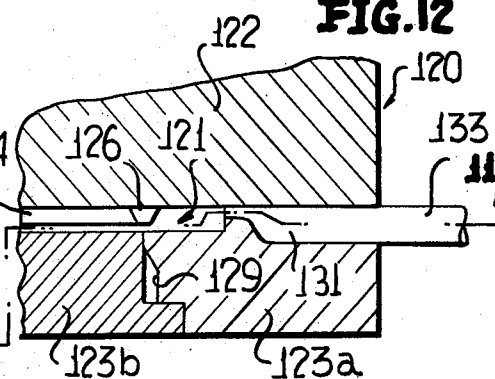


FIG. 10

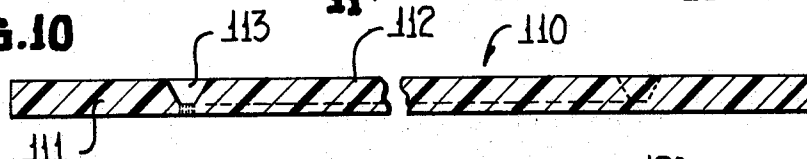
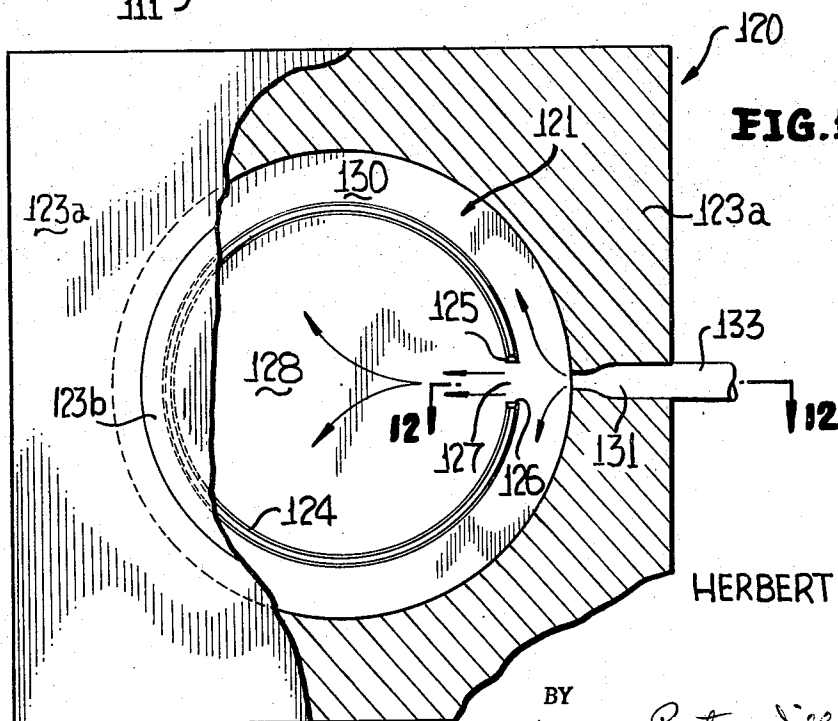


FIG. 11



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FIG. 13

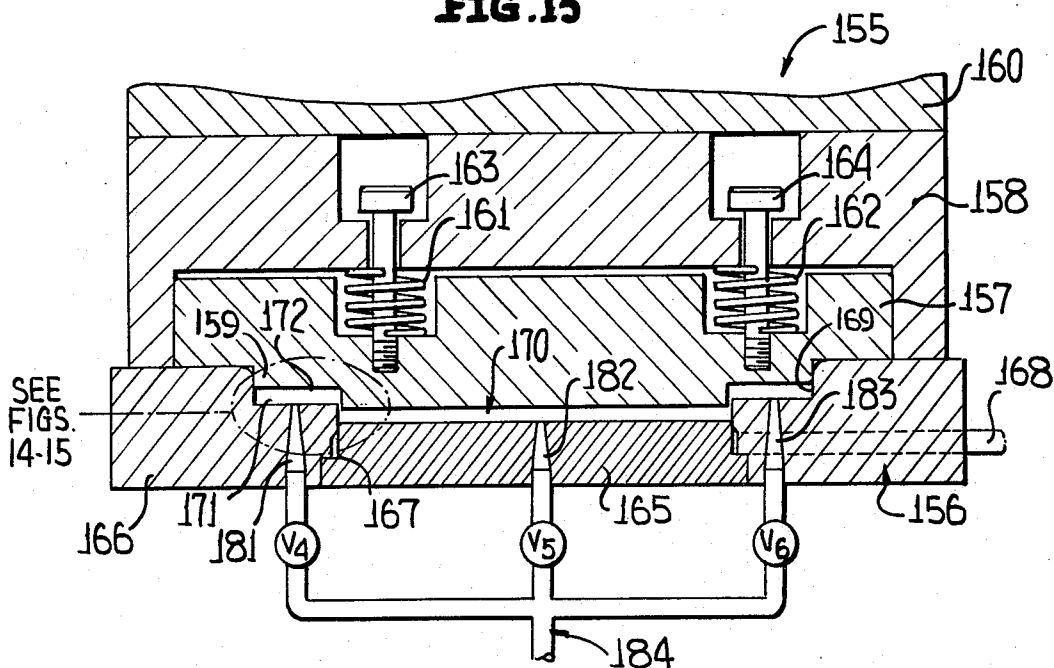


FIG. 14

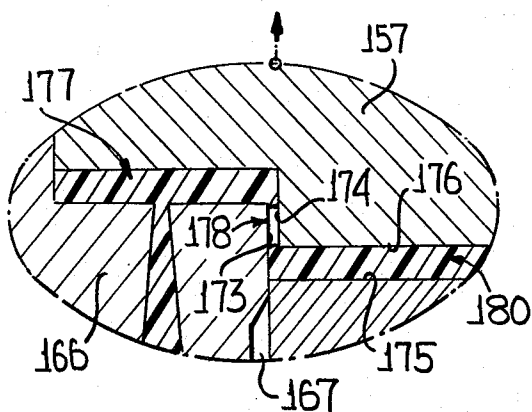
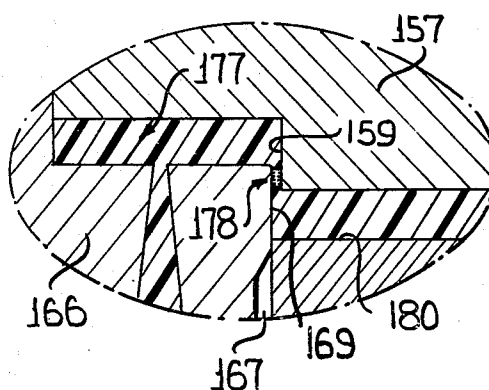


FIG. 15



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FIG. 16

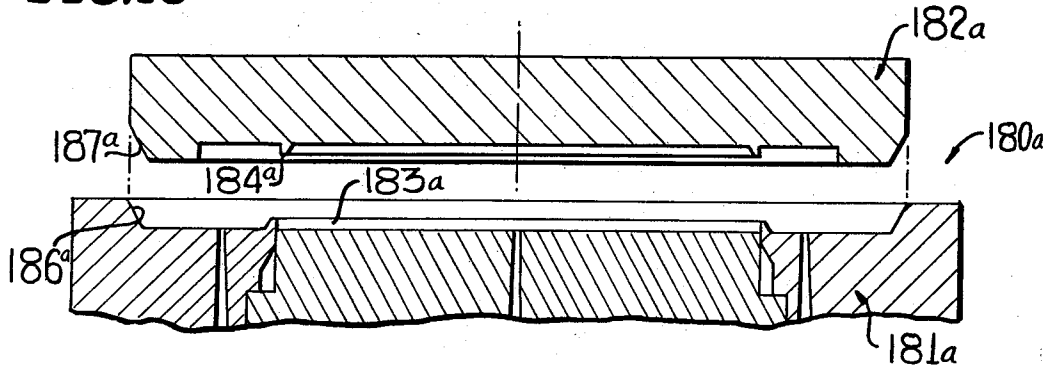


FIG. 17

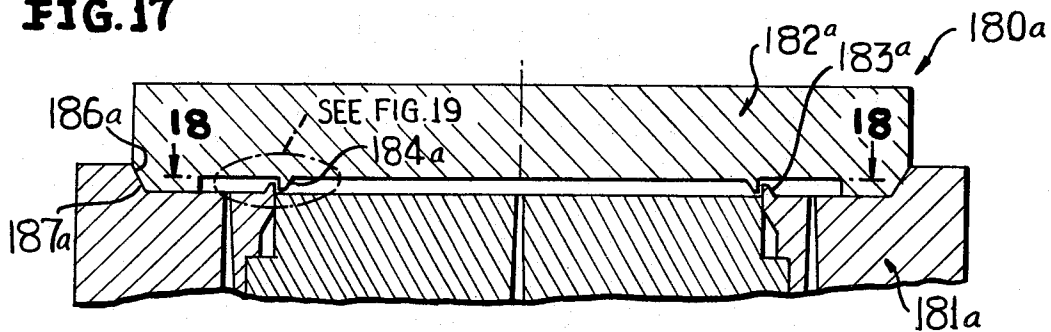


FIG. 18

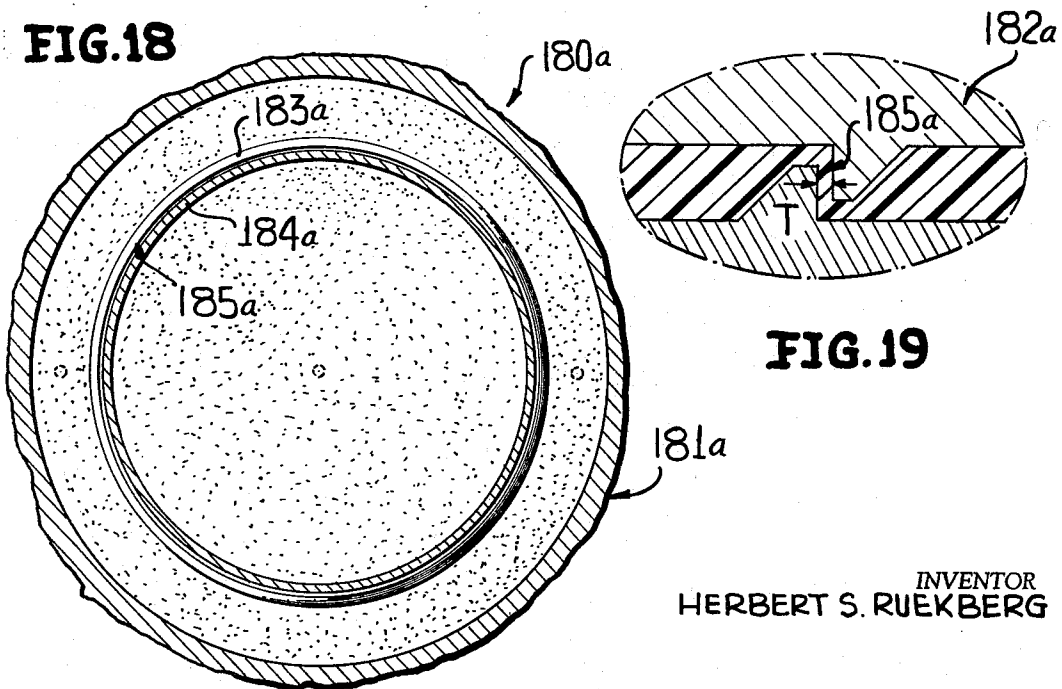


FIG. 19

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EASY-OPENING STRUCTURE HAVING A WELDED WEAKENING LINE

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Int. Cl. B65d 17/12

U.S. Cl. 220—54

5 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to improvements in articles which are designed to have openings formed therein for numerous purposes, and more particularly to container structures such as but not limited to, can ends, crown caps, closures, container bodies, etc. which are constructed entirely from synthetic plastic material in such a manner that the conventional "score line" between a tear-out panel and a remaining portion of the container structures is eliminated. In lieu of the usual "score line" the various components of this invention are provided with a rupturable weld line of fused material which is inherently weaker than remaining material and sets-off a removable or fracturable panel from a remaining portion of the components. Thus, when a force is applied to the tear panel a rupture occurs along the weld line to effect, for example, the formation of an opening through which products may be dispensed or, in the case of crown closures, the entire removal of the closure from an associated bottle or similar container.

One of the more conventional easy-opening type container structures presently manufactured is what is generally referred to as an easy-opening can end which is constructed entirely of metallic material, such as tin plate, aluminum, etc. A continuous "score line" is formed generally in an upper surface of the can end to define a removable or at least partially removable tear-out panel. An apertured pull tab which is also generally constructed from metallic material is separately united to the tear-out panel by an upset rivet, a weld or similar conventional securing means. Such conventional can ends have met with a relatively high degree of success particularly in the packaging of pressurized or gas-generating products. However, disadvantages of such structures are also numerous and well known to persons skilled in the art, chief among which is the relatively high cost of manufacturing the separate components and assembling the same, and the susceptibility of users being cut by the ragged edge of the tear-out panel and/or the opening formed in the can end upon the removal of the tear-out panel.

It has also become recently popular to form "crown closures" which can be removed by partially or entirely removing an integral pull tab which is generally simply an extension of the peripheral skirt of the crown closure. A pair of "score lines" extend from the gripping portion of the crown closure upwardly along the peripheral skirt and partially or completely across the end panel and down the opposite side of the skirt. The crown closure is removed by simply grasping and pulling the tear strip and subsequently removing the closure from its associated container. Here again such metallic crown closures have met with a relatively high degree of success but among several disadvantages the most serious are cases of persons being cut by the ragged edges during the removal of the tear strip. Just as common are the numerous cases of persons cutting their feet by stepping upon such discarded closures, particularly at beaches.

In keeping with the above it is a primary object of this invention to provide a novel easy-opening structure which

substantially eliminates the above-noted and other disadvantages of conventional structures and particularly container structures, although the invention is not limited to the container or packaging art. The invention encompasses all structures formed of synthetic thermoplastic material which in operation or use desirably or necessarily require the removal of a panel from a wall of the particular article. One such example is the construction of electrical junction boxes provided with numerous "pop-out" plugs which are selectively removed for receiving electrical wires.

In accordance with this invention articles of the type heretofore described are formed by a novel method which includes injecting thermoplastic material into a mold cavity such that a first portion of the thermoplastic material is at least partially inboard of a second portion of the thermoplastic material with adjacent edges of the portions in contiguous relationship. These edges are thereafter "flash-fused" to each other at elevated temperature and pressure thereby forming an inherently weak weld line at the fused edges upon the setting thereof when the material has been cooled. The first and second portions of the thermoplastic material may be introduced into the mold cavity by injecting a single stream of thermoplastic material into the cavity and subsequently dividing the same into the first and second portions, or by injecting plural streams into the cavity to form the thermoplastic article. The specific article which is molded by the novel method of this invention will, of course, vary upon the particular configuration of the mold cavity and may be, for example, any one of the articles heretofore described.

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 claimed subject matter, and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a top plan view of a novel one-piece easy opening container structure constructed in accordance with this invention, and illustrates a can end having a weak circular weld line joining a tear-out panel and an integral pull tab to a remaining annular portion of the can end.

FIGURE 2 is an enlarged fragmentary sectional view taken generally along line 2—2 of FIGURE 1, and more clearly illustrates the construction of the weld line.

FIGURE 3 is a schematic sectional view taken through the axis of a mold in which the can end of FIGURES 1 and 2 is formed, and illustrates relatively movable mold bodies defining a central circular cavity and an outer annular cavity joined to each other along a narrow annular gap.

FIGURE 4 is an enlarged fragmentary sectional view of the encircled portion of FIGURE 3 and illustrates thermoplastic material in the cavities just as it is about to "flash" across and/or into the annular gap.

FIGURE 5 is a fragmentary sectional view similar to FIGURE 4, and illustrates the formation of the weld line by the intermingling and fusion of the thermoplastic material in, and/or adjacent the annular gap.

FIGURES 6 through 8 are enlarged fragmentary sectional views of can ends identical to the can end of FIGURES 1 and 2, except for the particular cross-sectional configuration of the can ends in the areas of the weld line.

FIGURE 9 is a top perspective view of another can end constructed in accordance with this invention, and illustrates a discontinuous weld line between a central tear-out panel and a remaining annular peripheral portion of the can end.

FIGURE 10 is an enlarged sectional view taken generally along line 10—10 of FIGURE 9, and more clearly illustrates the cross-sectional configuration of the can end.

FIGURE 11 is a bottom view with parts broken away for clarity of a mold in which the can end of FIGURES 9 and 10 is formed, and illustrates a single stream of thermoplastic material being introduced into a mold cavity and divided into two portions which ultimately "flash" reunite to form the can end of FIGURES 9 and 10.

FIGURE 12 is an enlarged fragmentary sectional view taken generally along line 12—12 of FIGURE 11, and more clearly illustrates the components of the mold and the configuration of the cavity defined thereby.

FIGURE 13 is a schematic sectional view taken through the axis of a mold similar to the mold of FIGURE 3, and illustrates a vertical annular gap between axially offset mold cavities.

FIGURE 14 is an enlarged fragmentary sectional view of the encircled portion of FIGURE 13, and illustrates thermoplastic material in the cavities just as it is about to "flash" across and/or into the annular gap.

FIGURE 15 is a fragmentary sectional view similar to FIGURE 14, and illustrates the formation of the weld line by the intermingling and fusion of the thermoplastic material in, and/or adjacent the annular gap.

FIGURE 16 is a fragmentary sectional view of a mold similar to the mold of FIGURE 13, and illustrates a pair of mold bodies provided with frusto-conical surface portions which assure axial alignment of the mold bodies and concentricity of the mold cavities in the closed position thereof to impart perfect concentricity to a score line of a closure molded therein.

FIGURE 17 is a fragmentary sectional view of the mold of FIGURE 16, and illustrates the frusto-conical surface portions in mating relationship in the closed position of the mold bodies.

FIGURE 18 is a fragmentary sectional view taken generally along line 18—18 of FIGURE 17, and illustrates a pair of concentrically aligned circular ribs of the upper and lower mold bodies between which is defined an annular vertical gap within which is formed a score line of a closure formed in the mold.

FIGURE 19 is an enlarged fragmentary sectional view of the encircled portion of FIGURE 17, and illustrates the particular configuration of the score line of the closure formed in the mold of FIGURES 16 through 18.

A novel and preferred embodiment of an easy-opening container structure constructed in accordance with this invention is fully illustrated in FIGURES 1 and 2 of the drawings, and is generally designated by the reference numeral 10. In this embodiment of the invention the container structure 10 is exemplified as a can end, although it is to be understood that the invention is directed to all types of easy-opening structures and is not to be considered limited by reference thereto as can ends, crown caps, closures, reclosure caps, etc., but encompasses each and every one and other such structures. The container structure 10 includes an end panel (unnumbered) which is of a generally perfectly circular configuration, and is defined by an outer annular portion 11, a central portion 12 of a circular configuration, and a web 9 of reduced thickness in or adjacent to which is a circular weld line 13 formed of fused material of the panel portions 11 and 12 as will be apparent more fully hereafter. The weld line 13 is similar to what is conventionally termed a "score" line since it is adapted to be ruptured to remove the tear-out panel 12 from the remainder of the can end 10. However, as distinguished from conventional "score" lines which are simply areas of reduced wall thickness the weld line 13 is an area formed by the intermingling and fusion of streams of flowing plastic which "flash-unite" at the web 9 between the portions 11, 12 as will be more fully apparent hereinafter during the description of the method of forming

the can end 10. However, it is sufficient at this point merely to recognize that the bond strength of the weld line 13 is appreciably weaker than the strength of remaining portions of the can end 10 due to the inherent weakness of the fused material of the two portions of plastic material which in effect forms a weakened "score" line in the absence of a conventional "score," groove, or similar post-weakening as in conventional can ends although in accordance with the invention the thickness of the material at the weld line 13 is preferably reduced as compared to remaining portions to augment or facilitate the desired tearing action. This is graphically depicted in FIGURE 2 by the dashed vertical lines in the area of the weld line 13 which indicates an intermingling and/or flashing over of the material of both portions 11, 12 for forming the weld line 13, as will be more fully set forth hereinafter.

The can end 10 also includes an integral pull tab 14 having a ribbed gripping end portion 15 and an opposite end portion (unnumbered) joined by an upstanding neck 16 to the tear-out panel 12. In order to remove the panel 12 the end portion 15 is gripped and pulled in a conventional manner.

Reference is now made to FIGURES 3 through 5 of the drawings which illustrate the manner in which the can end 10 is injection molded in a mold 25. The mold 25 includes a pair of relatively movable mold bodies 26, 27, the latter of which is carried by a movable platen of an injection molding machine, and the former of which is defined by a central portion 22 and an encircling annular portion 23 between which is defined an annular venting chamber 24 connected by one or more ports 29 to a conventional vacuum source (not shown). The platen which carries the mold body 27 is reciprocated in a conventional manner to open and close a cavity 33 defined between the mold bodies 26, 27.

The cavity 33 is defined by opposed annular surfaces 43, 44, and opposed central circular surfaces 47, 48 between which is an annular rib 50 of the mold body 27 which forms an annular gap 51 (FIGURE 4). The surfaces thereby define an annular chamber 52 (FIGURE 4) joined by the narrower annular gap 51 to a central circular chamber 53 which respectively form the portions 11, 9 and 12 of the can end 10 as will be more apparent hereafter.

Three gates 54, 55 and 56 regulated by valves V_1 through V_3 , respectively, are in fluid communication with the cavity 33, and with an injection cylinder (not shown) of a conventional construction by conduit means 57.

In the normally closed position of the mold bodies 26, 27 (FIGURES 3 and 4) heated flowable synthetic thermoplastic material, such as polyethylene, polystyrene, etc., is pressure-injected into the chambers 52, 53 of the cavity 33, as illustrated in FIGURE 4. At the same time or just prior to the injection of the thermoplastic material into the chambers 52, 53 air is evacuated from the cavity 33 via the minute annular gap between the circumferential opposing surfaces of the mold portions 22, 23 above the venting chamber 24, the venting chamber 24 itself, and the port 29 which is connected to a suitably valved vacuum source (not shown), such as a pump. The purpose of evacuating the air from the cavity 33 is to prevent the trapping of air between the two portions of the plastic material as they flow toward each other, as will be more apparent immediately hereafter, although in some cases the evacuation of the air is unnecessary.

Since the plastic material flowing under pressure in the mold will follow the path of least resistance, which in this case is the chambers 52, 53, these chambers will fill, as shown in FIGURE 4. The annular gap 51 is shown exaggerated in its depth in FIGURE 4 and is in fact of a depth which prevents the plastic material from "flashing" across or filling the gap 51 until both chambers 52, 53 are completely filled. Once the chambers 52, 53 are filled, as shown in FIGURE 4, the pressure continues to

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build up in the chambers 52, 53 until it is sufficient to cause the plastic material to flash into and/or through the gap 51, as indicated by the opposed unnumbered headed arrows in FIGURE 5. The absence of entrapped air in the annular gap 51 due to the evacuation heretofore noted permits the thermoplastic material in the chambers 52, 53 to satisfactorily unite, commingle and fuse forming the weld line 13 at, in or immediately adjacent the thinner web 9 joining the panels 11, 12 (FIGURE 5). Thus, the significance of this method is controlling the flow of the thermoplastic material such that the weld line (the line of weakness formed where at least two streams of plastic material meet and fuse) is formed at the gap 51 forming the web 9 surrounding the tear panel 12, thereby rendering the panel 12 readily removable because of the thinner web of material joining the panels 11, 12 and the location of the weld line 13 thereat.

By comparing FIGURES 4 and 5 it will be noted that the chambers 52, 53 and the gap 51 are axially shorter in FIGURE 4 as compared to FIGURE 5. This change in the dimensions of the chambers and gap is caused by the pressure build up after the chambers 52, 53 are completely filled which causes the mold body 27 and/or the platen carrying the same to move as indicated in FIGURE 5. It is pointed out that it is not necessary for the mold bodies 26, 27 to shift axially relative to each other to force the plastic material into the gap 51. However, with such movement the gap 51 may be initially (FIGURE 4) so small as to prevent the plastic material from entering, or may in fact be completely closed to prevent irregular or indiscriminate flashing into the gap until such time as the chambers 52, 53 are, in fact, completely filled.

While it is desirable to contour the cavity 33 to form an integral pull tab therewith, it is to be understood that this is not completely necessary and a separate pull tab can be adhesively or otherwise secured to the panel 12 after the can end 10 has been molded in the absence of the pull tab 14, as just described. Furthermore, the particular cross-sectional configuration of the can end may also be varied depending, for example, upon the different flow characteristics of different plastics, and in this respect reference is now made to FIGURES 6 through 8 of the drawings which illustrate identically injection molded can ends differing only in the particular configuration thereof in the area of the weld lines.

In FIGURE 6, a can end 60 is basically identical to the can end 10 in the sense that it includes an outermost annular panel 61, a central circular tear-out panel 62 and a weld line 63 joining the panels 61, 62. As compared to the can end 10 the can end 60 is formed in a mold which is provided with two opposed circular ribs which form concentric circular grooves 64, 65 in opposite surfaces of the can end between which lies the weld line 63 of fused or flash welded material from both portions 61, 62. By pulling a pull tab (not shown) molded integrally with or separately connected to the tear-out panel 62 the latter can be removed with relative ease as the weld line 63 ruptures in the manner heretofore described relative to the can end 10.

Another can end 70 is illustrated in FIGURE 7 and includes an outer annular panel 71 and a central circular panel 72 joined together by a horizontal web 73 which includes the fused material. Adjacent annular portions 74, 75 are molded to a somewhat bulbous configuration by an appropriately contoured mold cavity which also forms annular concentric grooves 76, 77 in opposite surfaces of the can end 70.

A can end 80 of FIGURE 8 includes an outermost annular panel 81, a central circular tear-out panel 82 and an annular web of material which is defined by a web 83 of flash material. Due to the particular configuration of the mold cavities (not shown) in which the can end 80 is injection molded, the annular portion 81 is provided with an upwardly directed annular bead 84 which merges with an upwardly opening annular groove 85 which is

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in turn disposed in concentric relationship to a downwardly opening annular groove 86.

The can ends heretofore described are each particularly adapted to have their associated tear-out panels completely removed to gain access to a product packaged within a container to which the can ends are secured. However, in accordance with this invention it is equally possible to injection mold a can end with a tear-out portion which is partially (not completely) removed from the remainder of the mold cavities (not shown) in which the can end 80 and 10 which illustrate this type can end.

The can end 110 of FIGURES 9 and 10 also includes an outer generally annular panel or portion 111 and a central generally circular tear-out panel 112, the latter two panels being joined to each other along a weld line 113 which is generally of an annular configuration but terminates at ends 114, 115 between which is an area of material 116 forming a bridge between the panels 111, 112. Assuming a pull tab is joined to the tear-out panel 112 diametrically opposite to the area 116 a pull on the tab would progressively rupture the weld line 113 to but not beyond the ends 114, 116. In this manner the tear-out panel 112 may be swung back to the position illustrated in FIGURE 9 for reclosure purposes.

The manner in which the can end 110 is injection molded will be now described with particular reference to FIGURES 11 and 12 which illustrate a mold 120 having a cavity 121 defined by opposite surfaces (unnumbered) of mold bodies 122, 123. The mold body 122 includes a downwardly directed generally circular rib 124 (FIGURE 11) having ends 125, 126 between which is defined a radial passage 127 joining a centermost cavity portion 128 of the cavity 121 with an outermost annular portion 130. A gate 131 is in alignment with the passage 127 and is connected by a conduit 133 to a conventional injection cylinder (not shown). The mold 120 is also provided with an annular venting chamber 129 disposed between mold portions 123a, 123b of the mold body 123. The opposing cylindrical surfaces of the mold portions 123a and 123b underlie the rib 124 at exactly its center which is the ideal line of fusion along which the streams of material should unite. By thus locating the venting gap air is not entrapped, as was heretofore noted, and the weld line is formed approximately along the center line of the thin web 113 joining the panels 111, 112, as is clearly shown in FIGURE 10 of the drawings.

As flowable heated thermoplastic material is injected into the cavity 121 through a gate 131 the singular stream issuing from the gate 131 divides into two portions as indicated by the unnumbered headed arrows in FIGURE 11. One portion of the stream begins filling the annular cavity portion 130 while the portion of the stream passing through the passage 127 begins filling the cavity portion 128. When both portions 128, 130 are substantially filled the pressure of the thermoplastic material causes the two portions of the plastic material to flash across the gap defined by the undersurface of the rib 124 and the opposing surface of the mold body 123 thereby forming the fused or merged weld line 113. After the material has cooled and set the mold bodies 122, 123 are opened and the can end is removed.

In each of the can ends heretofore described, the webs of the fused material are disposed in planes generally normal to the axis of the can ends and parallel to a plane taken through the can ends. However, it is also possible in accordance with this invention to form a can end or similar closure in which the web of fused material is disposed with its length generally parallel to the can end axis with the removable panel portion being disposed in a plane offset but parallel to a plane taken through a remaining portion of the can end.

As is diagrammatically illustrated in FIGURE 13, a mold for forming a can end of the aforementioned type is generally designated by the reference numeral 155 and includes a pair of relatively movable mold bodies 156,

157, the latter of which is slidably mounted in a housing 158 which is clamped to the movable platen 160. A pair of springs 161, 162 encircling respective bolts 163, 164 normally urge the mold body 157 to the position illustrated in FIGURE 13. A cylindrical portion 159 of the mold body 157 is in the closed position of the mold bodies 156, 157 at all times in contact with a cylindrical surface 169 of the mold body 156 whereby cocking or canting of the mold bodies is prevented during an injection operation.

The mold body 156 is defined by a central portion 165 and an encircling annular portion 166 between which is defined an annular venting chamber 167 connected by one or more ports 168 to a conventional vacuum source (not shown). The housing 158 and the mold body 157 carried thereby is reciprocated in a conventional manner to open and close a cavity 170 defined between the mold bodies 156, 157.

The cavity 170 is defined by opposed annular surfaces 171, 172, opposed circumferential surfaces 173, 174 (FIGURE 14) and opposed central circular surfaces 175, 176. The surfaces 171, 172 thereby define a generally annular chamber 177 joined by an annular gap 178 between the surfaces 173, 174 to a chamber 180 between the surfaces 175, 176.

Three gates 181 through 183 regulated by valves V4 through V6, respectively, are in fluid communication with the cavity 170, and with an injection cylinder (not shown) of a conventional construction by conduit means 184.

In the normally closed position of the mold bodies 156, 157, as indicated by the solid lines of FIGURE 14, heated flowable synthetic thermoplastic material is pressure-injected into the chambers 177, 180 until the same are substantially filled, as shown in FIGURE 14. At the same time or just prior to the injection of the thermoplastic material, these same chambers are evacuated through the minute annular gap between the circumferential opposing surfaces of the mold portions 165, 166 above the venting chamber 167, the venting chamber itself, and the port 168 to again prevent the entrapment of air within the annular gap 178. Once the chambers 177, 183 are completely filled, the pressure continues to build up causing the mold body 157 to move away from the mold body 156 against the force of the springs 161, 162 until the pressure is sufficient to cause the plastic material to flash into and/or through the annular gap 178, as shown in FIGURE 15. Here again it is to be noted that during the latter-noted relative movement the mold body 156 cannot cock or cant or shift the mold cavity axes because of the contact between the cylindrical portion 159 and the mating surface 169.

By comparing FIGURES 14 and 15, it will be noted that the chambers 177, 180 are deeper and that the gap 178 is axially shorter in FIGURE 15 than in FIGURE 14. This change in the dimensions of the chambers and gap may, if desired, be varied by adjusting the spring tension of the springs 161, 162 to vary the length of the web of fused material to alter the opening characteristics of the finally finished can end. Of course, a like spring bias construction of the mold 25 may be provided for providing axial movement between the mold bodies 26, 27 in the manner heretofore described for in the latter case varying the thickness of the weld line, as opposed to varying the length thereof in accordance with the practice schematically illustrated in FIGURES 13 and 15 of the drawings.

As can be appreciated, it is preferable for the score lines of each of the closures heretofore described to be of a commercially repetitive construction commercial-wise, namely, each score line must be of a uniform thickness in order that a predetermined opening force can be applied to consistently fracture each closure. In order to accomplish this function, a mold 180a of FIGURES 16 through 18 has been provided, and includes a pair of relatively movable mold bodies 181a, 182a which are of a construction similar to the mold bodies 26, 27, respectively, of the mold 25 of FIGURE 3. However, as op-

posed to the single rib 50 of the mold 25 which forms a horizontal score line, the mold bodies 181a, 182a are provided with respective ribs 183a, 184a between which is formed a vertical annular gap 185a (FIGURE 19) in the closed position of the mold 180a. As is best illustrated in FIGURE 18 of the drawings, the ribs 183a, 184a are in perfect concentricity due to a pair of generally frusto-conical tapered surfaces 186a, 187a (FIGURES 16 and 17) of the respective mold bodies 181a, 182a. Thus, with the frusto-conical surfaces 186a, 187a in mating engagement with each other, the ribs 183a, 184a are maintained in exact concentric uniform thickness T (FIGURE 19) of score lines formed from one casting to the next. As was heretofore noted, during the injection of molten plastic material into the mold cavity (unnumbered) forces which tend to separate the mold bodies 181a, 182a may do so. However, the thickness of the score line will remain the same irrespective of such separation and approximately the same opening force and therefore a generally uniform predetermined opening force can be applied to consistently fracture each closure so molded.

While preferred embodiments of the invention have been thus far described, it is to be understood that variations may be made in each without departing from the scope of this invention. For example, while only a single runner 131 has been illustrated in conjunction with the mold 120, it is to be understood that another runner may be disposed diametrically opposite the runner 131, and that conventional venting of the various cavities and cavity portions can be provided as found necessary.

An alternate method to assure that the fusions or welding which produces the various weld lines will occur at or immediately adjacent the annular gaps, for example, is by sequential injection molding. For example, with the valves V₁, V₃ of FIGURE 3 temporarily closed the valve V₂ is opened and the chamber 53 is completely filled using enough pressure to fill without the material flashing through the gap 51. Immediately thereafter the valves V₁ and V₃ are opened to fill the chamber 52 with sufficient pressure to flash through the gap 51 and weld with the periphery of the material in the chamber 53. It may, of course, be desirable to sequentially injection mold articles in the opposite manner by first filling the chamber 52 and thereafter filling the chamber 53 with sufficient pressure to flash through the gap 51.

In lieu of the springs 161, 162 of the mold 155, other devices may be employed, such as fluid motors, which can be triggered by pressure buildup or by the position of associated injection plungers to open the gap 178 (or the gap 51 of the mold 25) more precisely.

In each of the various molds which include projecting ribs, such as the rib 124 of the mold body 122, the lower face of the rib 124 may initially contact the opposed portion of the surface of the mold body 123. Both cavity portions 128, 130 would therefore be completely closed during the injection of the plastic material therein and would only open after complete filling by, for example, suitably regulating springs or other means to open beyond the pressure necessary to completely fill the closed cavity chambers, thereby effecting precise flash fusion of both streams of material at the desired instant.

While preferred forms and arrangement of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in details and arrangement of parts may be made without departing from the spirit and scope of the invention as defined in the appended claimed subject matter.

I claim:

1. An article of manufacture comprising a tear portion and a remaining portion, said tear portion being welded to said remaining portion by a rupturable weld line of fused material of said tear and remaining portions, and said weld line having a bond strength which is less than the strength of material of said remaining and tear portions whereby the application of a force to said tear por-

tion causes a rupture along said weld line upon the relative displacement of said tear and remaining portions.

2. The article of manufacture as defined in claim 1 wherein said wall is constructed from synthetic polymeric plastic material and is of an integral one-piece generally homogeneous construction.

3. The article of manufacture as defined in claim 1 wherein said wall is a container end panel, and said at least tear portion is a tear-out panel of said end panel adapted for removal to gain access to a product packaged in a container with which the article is associated.

4. An easy-opening type article comprising a tear panel and a remaining panel portion, said tear panel being joined to the remaining panel portion by a welded web, the tear panel and remaining panel portion each having inner and outer parallel surfaces, said web being disposed generally normal to said surfaces, and said

article being entirely formed from molded generally homogeneous polymeric plastic material.

5. The easy-opening type article as defined in claim 4 wherein a weld line of fused material is disposed contiguous said web.

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