Dec. 17, 1968 H. F. W. ARFERT 3,416,698

OPENING MEANS FOR A CONTAINER

Filed Feb. 13, 1967 2 Sheets-Sheet 1

FIG-1

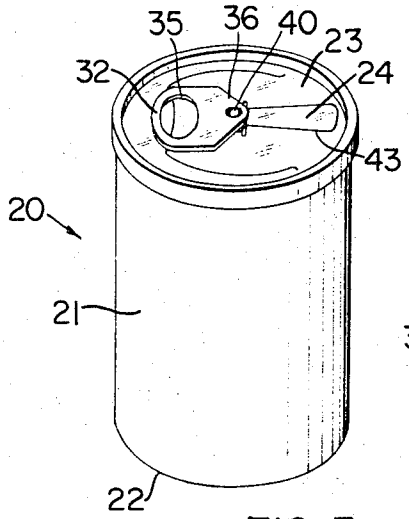


FIG-2

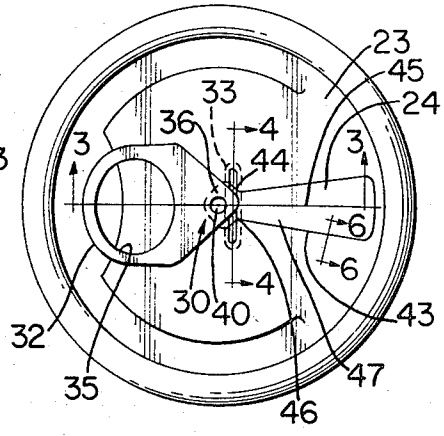


FIG-3

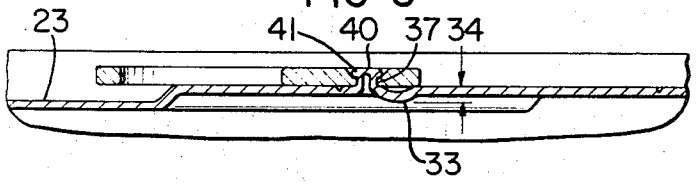


FIG-4

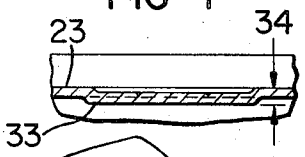
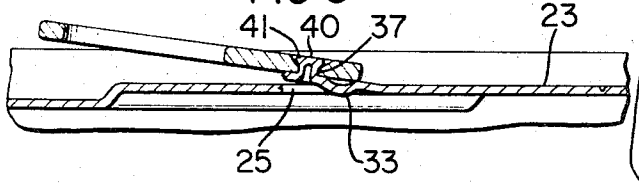


FIG-5



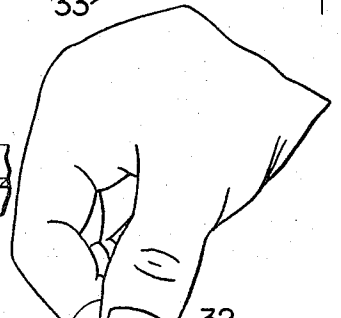


FIG-6

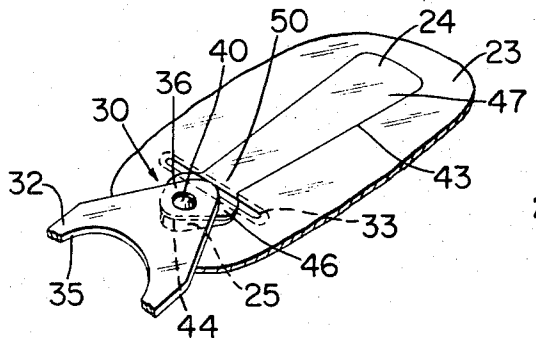
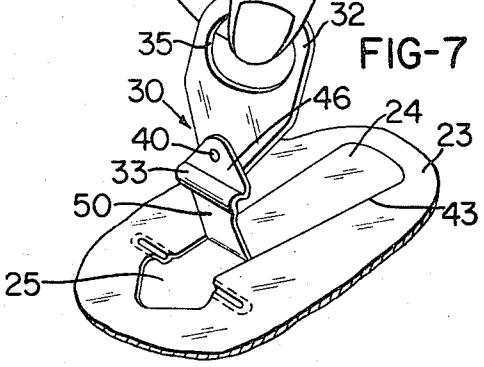


FIG-7



INVENTOR.
HORST F. W. ARFERT

BY Glenn, Palmer, Matthews & Lyne

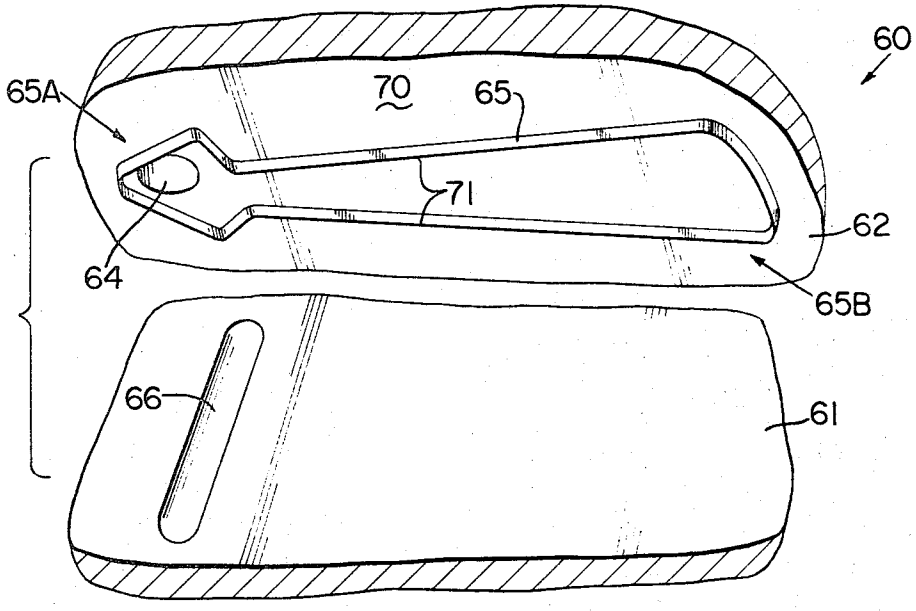
HIS ATTORNEYS

Dec. 17, 1968 H. F. W. ARFERT 3,416,698

OPENING MEANS FOR A CONTAINER

Filed Feb. 13, 1967 2 Sheets-Sheet 2

FIG-8



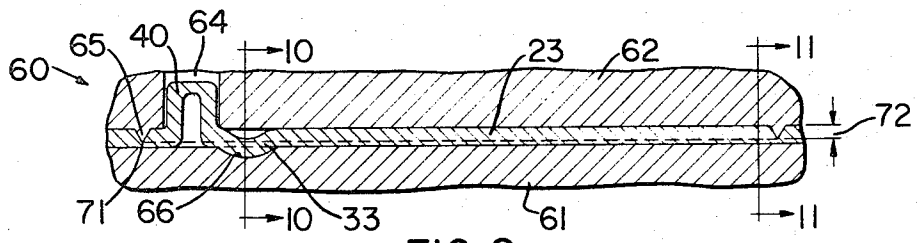


FIG-9

FIG-10

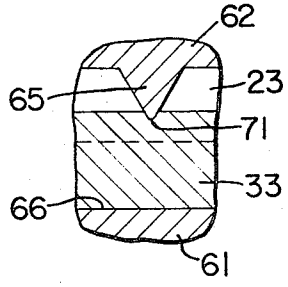
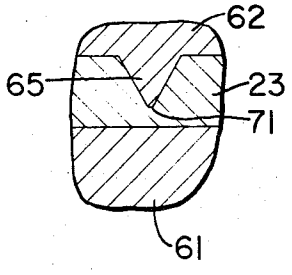


FIG-11



INVENTOR.
HORST F. W. ARFERT
BY Kenn Palmer
Matthews & Lyne
HIS ATTORNEYS

United States Patent Office 3,416,698 Patented Dec. 17, 1968

3,416,698

OPENING MEANS FOR A CONTAINER

Horst F. W. Arfert, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va., a corporation of Delaware

Filed Feb. 13, 1967, Ser. No. 615,747
14 Claims. (Cl. 220—54)

ABSTRACT OF THE DISCLOSURE

This disclosure relates to easy-open opening means for outside wall means of container means wherein substantially constant depth score means is provided in such wall means to define a substantially elongated tearout strip which provides a dispensing opening for such container means and such wall means has reinforcing means across one end portion of such tearout strip which prevents blowout of such tearout strip in the event of high pressure in such container means, to an apparatus for and method of making such opening means, and to blanks for making same.

This invention relates to container means and more particularly to easy-open opening means for outside wall means of container means, to an improved apparatus for and method of making such outside wall means, and to blanks for making same.

Presently, many products such as carbonated beverages, for example, are sold in containers such as cylindrical metal cans which have opening means provided as an integral part thereof. Such present opening means are usually defined by score means provided in an end wall of a given can of carbonated beverage to define a tearout strip and such present score means are comparatively shallow to assure such tearout strip does not blow out due to high pressure in such can. In addition, score means in present cans are generally not of uniform depth making it necessary to apply a severing force of different magnitude at different positions along the associated tearout strip. However, if in an effort to reduce the force required to sever a given tearout strip of a present can the score depth is too great, there is danger that such tearout strip will blow completely out in the event of excessive pressure buildup in such can or the rush of carbonated gas immediately after initial popping of a tearstrip during severing thereof. The preferred design is to provide a tearout strip in outside wall means of container means which can be easily severed using a substantially constant force of comparatively small magnitude yet which has sufficient metal residual provided at a preselected location thereon to prevent blowout thereof.

Accordingly, it is a feature of this invention to provide container means of simple and economical construction and having easily opened outside wall means.

Another feature of this invention is to provide improved outside wall means for container means wherein such outside wall means has an easily severable tearout strip which can be torn away with a substantially constant force of comparatively small magnitude to define a dispensing opening in such container means and which has integral reinforcing means provided therein to prevent blowout of such tearout strip in the event of buildup of excessive pressure in such container means.

Another feature of this invention is to provide an improved apparatus for making such easy-open outside wall means.

Another feature of this invention is to provide an improved method of making such easy-open outside wall means.

Another feature of this invention is to provide improved blanks for making such outside wall means.

Therefore, it is an object of this invention to provide easy-open outside wall means for container means and an improved apparatus for and method of making same having one or more of the novel features of this invention as set forth above or hereinafter shown or described.

Another object of this invention is to provide improved blanks for making such easy-open outside wall means.

Other objects, uses, and advantages of this invention are apparent from a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a perspective view of improved container means of this invention.

FIGURE 2 is a view looking normal to the top wall of the container means of FIGURE 1.

FIGURE 3 is a sectional view on the line **3—3** of FIGURE 2.

FIGURE 4 is a sectional view on the line **4—4** of FIGURE 2 and taken through reinforcing means provided in association with tear strip means provided in such top wall.

FIGURE 5 is a view similar to FIGURE 3 illustrating the manner of initially severing tear strip means provided in such top wall by using such reinforcing means as a fulcrum to enable easier initial severing by pull means provided in such top wall.

FIGURE 6 is a fragmentary perspective view illustrating the tear strip means provided in the top wall of the container of FIGURE 1 partially severed away and particularly showing the location and manner of providing such reinforcing means in such top wall means to prevent blowout of such tear strip means in the event of excessive pressure buildup within the container means of FIGURE 1.

FIGURE 7 is a view similar to FIGURE 6 illustrating such reinforcing means completely severed to illustrate more clearly the position thereof.

FIGURE 8 is a fragmentary perspective view illustrating an exemplary embodiment of an apparatus used to make an easy-open opening means for the top wall of the container means of FIGURE 1.

FIGURE 9 is a fragmentary sectional view illustrating a manner of forming and scoring the improved top wall for the container means of this invention shown in FIGURE 1 while using the improved apparatus of FIGURE 8 and particularly showing the thickness of such top wall greatly exaggerated to highlight certain features of this invention.

FIGURE 10 is an enlarged fragmentary sectional view on the line **10—10** of FIGURE 9.

FIGURE 11 is an enlarged fragmentary sectional view on the line **11—11** of FIGURE 9.

While the various features of this invention are hereinafter illustrated and described as being particularly adaptable for providing improved easy-open opening means for container means such as cylindrical beverage cans for carbonated beverages, or the like, and to an improved apparatus for and method of making such easy-open opening means, it is to be understood that the various features of this invention can be utilized singly or in any combination thereof to provide easy-open opening means for other uses as desired.

Therefore, this invention is not to be limited to only the embodiments illustrated in the drawings, because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

In the exemplary embodiment of this invention illustrated particularly in FIGURE 1 of the drawings an improved container means or can **20** having easy-open open-

ing means is illustrated. Can **20** has outside wall means comprised of a substantially right circular cylindrical wall **21** and a pair of end walls or closures at opposite ends thereof and shown as a bottom wall **22** and a top wall **23**. Top wall **23** has substantially elongated tear strip means shown as a tearout strip or tear strip **24** which is adapted to be torn away as shown particularly in FIGURES 5–7 of the drawings to define a dispensing opening designated generally by the numeral **25** for dispensing or removing the contents of can **20** therethrough. Tearout strip **24** is preferably defined in top wall **23** by suitable score means provided in such top wall as will be described in detail subsequently.

Tearout strip **24** has one end portion designated by the numeral at **30** which is located substantially near the center of top wall **23** and tearout strip **24** extends substantially radially outwardly from the center of top wall **23** toward the outer circumference thereof so that its outer end is near the outer periphery of top wall **23**.

Pull means shown as a pull ring device **32** is fastened to end portion **30** of tear strip **24** to enable tearout strip **24** to be easily severed to provide dispensing opening **25** in can **20**. Tearout strip **24** of this invention is easily severed as compared with conventional tearout strips and utilizes reinforcing means which is shown as a bead means or bead-like portion **33** which is preferably formed as an integral part of top wall **23**. The bead-like portion **33** of this example extends beneath the inside surface of top wall **23** and is preferably formed by indentation means provided in top wall **23**. The downward projection of bead-like portion **33** beneath the top surface of wall **23** is shown at **34** and portion **33** is constructed so that it requires greater force to tear thereacross, as will be describde subsequently, and thereby assures that in the event of high pressure buildup within can **20** tearout strip **24** will not blow completely out.

Pull ring **32** has a finger receiving opening **35** enabling it to be easily grasped to sever tearout strip **24**. Pull ring **32** also has a comparatively rigid inner tab end as shown at **36** which is preferably arcuate in peripheral outline and has an opening **37** provided therethrough.

Rivet means shown as a rivet **40** is provided in top wall **23** for fastening pull ring **32** to the inner end portion **30** of tearout strip **24**. In this example of the invention, rivet **40** is formed as an integral part of tearout strip **24** and comprises an upwardly extruded metal portion as shown in FIGURE 9 of the drawings. Pull ring **32** is fastened in position in a known manner by placing its opening **37** in surrounding relation about the upwardly projecting rivet means or rivet **40** prior to riveting the top portion thereof to define a rivet head as shown at **41** and thereby fix pull ring **32** to tearout strip **24**.

As seen particularly in FIGURE 2 of the drawings, rivet **40** is fastened to inner end portion **30** of tearout strip **24** so that the major portions of pull ring **32** and tearout strip **24** are arranged on opposite sides of rivet **40**. In addition, it will be seen that with the major portions of pull ring **32** and strip **24** thus arranged on opposite sides of rivet **40**, reinforcing means **33** is provided substantially between the terminal end of tab **36** and rivet **40**. Reinforcing means **33** is also arranged adjacent the terminal end of end portion **30** and is spaced inwardly therefrom. The above described placement of reinforcing means **33** enables it to provide a rigid fulcrum means to enable easier tearing thereacross upon lifting and pulling pull ring **32**.

Reinforcing means **33** is provided to prevent tearout strip **24** from blowing out (due to excessive pressure within can **20**) either during storage and handling of can **20** or after initially popping tearout strip free to open can **20**. As seen in FIGURES 5–7, after initially lifting pull ring **32** upwardly to open can **20**, end portion **36** is used as a lever end which engages top wall **23** at a location adjoining reinforcing means **33** and such reinforcing means serves as a rigid fulcrum enabling easier tearing thereacross.

As previously mentioned, tearout strip **24** is defined by score means provided in top wall **23** and such score means is of such depth and configuration to enable tearout strip **24** to be easily torn away with a substantially constant tearing force of small magnitude. As seen particularly in FIGURES 2, 6, and 7 of the drawings, tearout strip **24** is defined by a substantially U-shaped score means **43** cooperating with a substantially arrowhead-shaped score means **44**.

U-shaped score means **43** has a base portion which lies adjacent the outer periphery of circular top wall **23** and open ends adjacent the center portion of such top wall **23**. The arrowhead-shaped score means **44** also has a pair of open ends which are adapted to be connected together with the open ends of U-shaped score means **43** in a symmetrical manner about a common axis designated by the numeral **45**. Thus, it is seen that score means **44** and **43** outline elongated tearout strip **24** having a substantially arrowhead-shaped portion and an adjoining portion of substantially U-shaped outline respectively and designated by the numerals **46** and **47** respectively.

Portions **46** and **47** define a neck in strip means **24** at their junction as illustrated at **50** and reinforcing means **33** is provided immediately adjoining neck **50**. The narrow transverse dimension of neck portion **50** assures that immediately after tearing tearout strip **24** past the reinforcing means or downward projection **33**, the tearing force necessary to continue severing tearout strip **24** is comparatively small and at a minimum.

Score means **43** and **44** defining the entire outer periphery of tearout strip **24** are substantially V-shaped and have a pair of sides joined by an arcuate base or bottom portion. The arcuate base is preferably defined by a small radius arc generally of the order of .001 inch and such arcuate base promotes easier tearing of tearout strip **24** while also enabling the magnitude of required severing force to be more accurately predictable.

Top wall **23** is of substantially uniform thickness throughout and each score means **43** and **44** has the same uniform depth from the top surface of top wall **23** and substantially about the entire periphery of tearout strip **24**. The depth of score across the top surface of downwardly projecting bead portion **33** is considerably less and provides increased metal residual which, of course, makes it more difficult to sever across the limited width of reinforcing means **33** and provides the reinforcing protection against blowout as previously mentioned.

Thus, except for the increased force required to sever through reinforcing portion **33**, the force required to sever tearout strip **24** is small when compared with conventional tearout strips; furthermore, the amount of required severing force remains substantially constant over the full length of strip **24**.

Reinforcing means or bead means **33** extends downwardly within can **20** and completely across arrowhead portion **46** transverse to common axis **45** and beyond opposite sides or side edge means of such arrowhead portion. Bead means **33** comprises a single elongated portion which extends beneath the top surface of wall **23** an amount **34**, as previously mentioned, and bead means **33** is preferably provided as an integral part of the material defining top wall **24**. Bead means **33** has an arcuate cross-sectional configuration and by being provided as an integral part of top wall **23** has added strength and rigidity.

Outside wall means or top wall **23** of can **20** is preferably formed using the exemplary apparatus designated generally by the numeral **60** in FIGURE 8 of the drawings and shown in fragmentary perspective view. Apparatus **60** comprises a pair of cooperating die means shown as a supporting or back-up die **61** and scoring die means or a scoring die **62**.

Apparatus **60** is used to score completely around the entire periphery of tearout strip **24** and in this example

of the invention rivet **40** is preferably preformed in a substantially flat sheet of stock used to form top wall **23**. However, it will be appreciated that apparatus **60** may be slightly modified to enable rivet **40** and score means defining tearout strip **24** to be formed simultaneously or to provide rivet **40** in tearout strip **24** after suitably scoring top wall means **23** to define such tearout strip.

Die means or die **62** has opening means shown at **64** for receiving preformed rivet **40** and, as shown, such rivet is preferably formed as an integral part of tearout strip **24**. Die **62** also has scoring knife means designated by the numeral **65**. Scoring knife **65** has continuous scoring edge means and defines substantially U-shaped score line **43** and arrowhead-shaped score line **44** in a simultaneous manner. Score line **43** defines the outer portion **47** of tearout strip **24** which has a corresponding U-shaped outline while score line **44** defines the arrowhead-shaped portion **46** of such tearout strip. The detailed description of scoring knife means **65** will be presented in more detail subsequently.

Die means **61** in this example of the invention has recess means or a recess **66** which is provided therein for receiving integral projection **33** which defines the reinforcing means previously described. As will be seen particularly in FIGURE 9 of the drawings, recess **66** is provided immediately adjacent opening **64** in die **62**.

Rivet **40** is preferably integrally formed in top wall **23** so that it extends upwardly above the top surface of the inner end portion of tear strip **24**. Reinforcing means **33** is provided in tear strip **24** so that it extends downwardly beneath the bottom surface of tear strip **24** and it will be seen that top surface means of tearout strip **24** and top wall **23** immediately adjacent indentation means defining projection **33** is substantially flat. This arrangement enables pull ring **32** to be placed and riveted by rivet **40** so that it lies substantially flatly against top wall **23** yet projection **33** provided from the bottom surface of tear strip **24** provides the desired rigid fulcrum to enable easier severing of strip **24** through reinforcing portion **33**.

In this example of the invention as die **62** is urged against supporting die **61** so that its scoring knife **65** engages the top surface of the blank used to form top wall **23**, a portion of metal is urged by the compressing action into recess **66** as seen in FIGURE 9. This results in scoring knife **65** providing a shallower depth score across bead means **33** as seen in FIGURE 10 to thereby provide increased metal residual thereacross and define reinforcing means **33**.

The above described technique of scoring top wall **23** to define tear strip **24** and simultaneously form and score (to a shallower depth) integral bead-like projection **33** also has the added advantage of eliminating problems which might otherwise occur in the positioning and alignment of projection or bead **33** relative to the peripheral score means defining strip **24**. Thus, it is merely necessary to locate recess **66** relative to knife **65** and reinforcing bead **33** is thereafter properly located for volume production.

Scoring knife means **65** is used to simultaneously form U-shaped score means **43** and arrowhead-shaped score means **44** together with forming projection **33** while also simultaneously providing a shallower score means across the recessed surface portion of projection **33**. However, it will be appreciated that integral projection **33** may be suitably similarly formed prior to scoring using scoring means **65** and prior to insertion in apparatus **60** and in such latter instance recess **66** merely provides a recess for receiving the preformed reinforcing projection **33** in nested relation.

Scoring knife means or scoring knife **65** is provided in the lower substantially planar face **70** of die **62**. The terminal scoring edge **71** of scoring knife **65** extends outwardly from planar die face **70** an equal distance, as shown at **72**, and the entire scoring edge **71** lies in a plane substantially parallel to die face **70**.

Thus, as seen particularly from the sectional views shown in FIGURES 9, 10, and 11 and as previously explained, score means **43** and **44** provided in top wall **23** and defining the entire outer periphery of tearout strip **24** are of substantially constant depth, except across reinforcing means or portion **33** as previously explained. The constant depth score means enables tearout strip **24** to be severed with a substantially constant tearout force which is of comparatively low and fairly accurately predictable magnitude as will be presently described.

Score means **43** and **44** defining the outer periphery of tearout strip **24** are formed by the terminal outer edge **71** of scoring knife **65**. Edge **71** has a radius of about .001 inch which enables providing an arcuate substantially .001 inch base to score means **43** and **44**. Scoring knife **65** also has a configuration which corresponds to the peripheral configuration of tear strip **24** and, of course, is defined by arrowhead-shaped portion **65A** at one end and a substantially U-shaped portion **65B** at its opposite end and portions **65A** and **65B** provide a continuous knife edge.

As previously mentioned, top wall **23** is preferably made of metal. However, it has been found that metal containing aluminum is especially desirable in defining top wall **23** because of the ease with which aluminum is scored and formed. Obviously top wall **23** may be made of any suitable material.

Dies **61** and **62** of apparatus **60** preferably engage opposite sides of top wall means **23** sandwiching such top wall therebetween. Dies **61** and **62** are brought into engagement using a predetermined controlled pressure so as to accurately define the score means about the entire periphery of tearout strip **24**. The predetermined pressure which is employed will, of course, vary with the type of material used to form top wall **23**.

In this example of the invention rivet **40** is illustrated and described as being made as an integral part of tearout strip **24** and hence of top wall **23**. In some applications, however, rivet **40** may be separately provided and suitably riveted in position to attach a suitable pull ring means to strip **32**.

Although the improved easy-open opening means of this invention is illustrated as being provided in top wall **23** of cylindrical container **20**, it will be appreciated that such easy-open opening means could be provided in any wall of a container irrespective of its shape, size, or intended use.

Terms such as "upwardly," "downwardly," "top," "bottom," "sides," and the like, have been used in this disclosure of the invention merely to correspond to the arrangement of components illustrated in the drawings and such terms should not be considered as limiting the scope of this invention in any way.

Thus, it is seen that this invention provides easy-open opening means for container means which utilizes a severable tearout strip which can be opened using a substantially constant pulling force of small magnitude and which utilizes improved reinforcing means to assure such tearout strip is not blown out with increased pressure in such container means. In addition, this invention provides an improved apparatus for and method of making such easy-open opening means for container means.

Further, this invention provides improved blanks for making easy-open opening means for container means.

While the form of the invention now preferred has been disclosed as required by statue, other forms may be used, all coming within the scope of the claimed subject matter which follows:

What is claimed is:

1. A container having easy-open opening means comprising, an outside wall, a substantially elongated tear strip in said wall adapted to be easily torn away to define a dispensing opening for said container, a pull device having a rigid inner end, rivet means fastening said inner end to one end portion of said tear strip, and rein-

forcing means adjacent and spaced from said one end portion for preventing blowout of said tear strip in the event of high pressure in said container, said reinforcing means being provided as a part of said wall, extending completely across said one end portion, and being arranged between the terminal edge of said inner end and said rivet means to provide a fulcrum to enable easier tearing across said reinforcing means.

2. A container as set forth in claim 1 in which said tear strip is defined by score means in said wall and adapted to be torn away with a tearing force of substantially constant magnitude.

3. Container means having easy-open opening means comprising, outside wall means, substantially elongated tear strip means defined by score means in said wall means and adapted to be easily torn away to define a dispensing opening for said container means, said score means comprising a substantially U-shaped score means having an open end and a substantially arrowhead-shaped score means also having an open end with said open ends being connected together in a symmetrical manner about a common axis to define said elongated tear strip means having a corresponding substantially arrowhead-shaped portion and having an adjoining portion of substantially U-shaped outline, said portions of defining a neck in said tear strip means at their junction, pull means having a rigid inner end, rivet means fastening said rigid inner end of said pull means to one end portion of said tear strip means with the major portions of said tear strip means and pull means being arranged on opposite sides of said rivet means, and reinforcing means adjacent and spaced from said one end portion for preventing blowout of said tear strip means in the event of high pressure in said container means, said reinforcing means comprising bead means extending completely across said arrowhead portion transverse said common axis and beyond opposite side edges of said arrowhead portion and said score means being of a uniform depth at all locations on opposite sides of said bead means and having a shallower depth through said bead means to provide increased metal residual thereacross, whereby said tear strip means is easily torn initially with a given force and after tearing through said bead means is easily torn by pulling said pull means with a pulling force approximately equal to said given force.

4. Container means as set forth in claim 3 in which said bead means is defined by indentation means in top surface means of said outside wall means.

5. Container means as set forth in claim 3 in which said score means comprises substantially V-shaped score means having an arcuate base portion to thereby promote easy tearing.

6. A blank being cut and scored to define easy-open opening means in an outside wall for a container comprising, a substantially elongated tear strip in said wall adapted to be easily torn away to define a dispensing opening therethrough, and reinforcing means provided in said wall and extending across said strip adjacent and spaced from one end portion thereof, said reinforcing means extending substantially transverse to and outwardly beyond opposite side edges of said one end portion of said elongated tear strip, whereby said reinforcing means prevents a blowout of said tear strip upon using said blank to form a portion of a pressurized container.

7. The blank as set forth in claim 6 in which said tear strip is defined by a substantially uniform depth score means which enables said tear strip to be torn away with a tearing force of substantially constant small magnitude.

8. The blank as set forth in claim 6 and further comprising an integral rivet provided in said tear strip adjacent the terminal end of said one end portion for fastening the inner end of a pull device for said tear strip thereto so that the major portions of said tear strip and pull device are arranged on opposite sides of said rivet, said rivet extending upwardly from the top surface of said tear strip and said reinforcing means extending downwardly from the bottom surface of said tear strip, and with said reinforcing means being provided between the terminal edge of said inner end and said rivet means to provide a rigid fulcrum to enable easier tearing across said reinforcing means.

9. The blank as set forth in claim 8 in which said reinforcing means comprises an integral bead defined by an indentation in its top surface.

10. The blank as set forth in claim 9 in which said score means comprises substantially V-shaped score means having an arcuate base portion to thereby promote easier tearing with a tearing force of substantially constant magnitude.

11. An outside wall for a container said outside wall having easy-open opening means comprising, a substantially elongated tear strip in said wall defined by score means in said wall and adapted to be easily torn away with a force of substantially constant magnitude to define an access opening for said container, a pull device having a rigid inner end fastened to one end portion of said tear strip, and reinforcing means decreasing the effective depth of opposed portions of said score means in said wall and being arranged adjacent and spaced from said one end portion to prevent blowout of said tear strip in the event of high pressure in said container.

12. An outside wall as set forth in claim 11 in which, said reinforcing means comprises bead means extending completely across and beyond opposite side edges of said one end portion with said score means being of uniform depth through said wall at all locations on opposite sides of said bead means and having a shallower depth through said bead means to provide increased metal residual thereacross, whereby said tear strip means is easily torn initially with a given small magnitude force and after tearing through said bead means is easily torn by pulling said pull device with a pulling force approximately equal to said given force.

13. An outside wall as set forth in claim 12 in which said score means comprises substantially V-shaped score means having an arcuate base portion to thereby promote easy tearing.

14. An outside wall as set forth in claim 13 in which said bead means is defined by an indentation in the top surface of said outside wall.

References Cited

UNITED STATES PATENTS

2,250,426	5/1966	Fraze	220—54
3,315,837	4/1967	Boik et al.	220—54

GEORGE T. HALL, *Primary Examiner.*