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CONTAINER OPENING DEVICE

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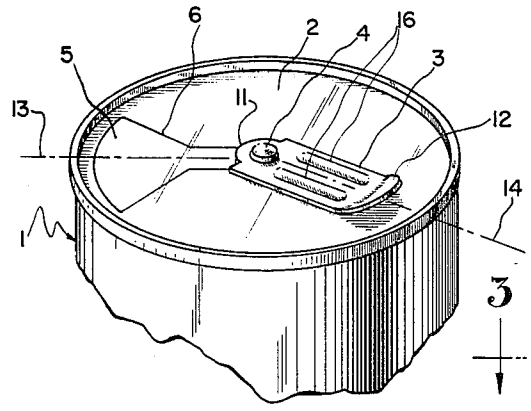
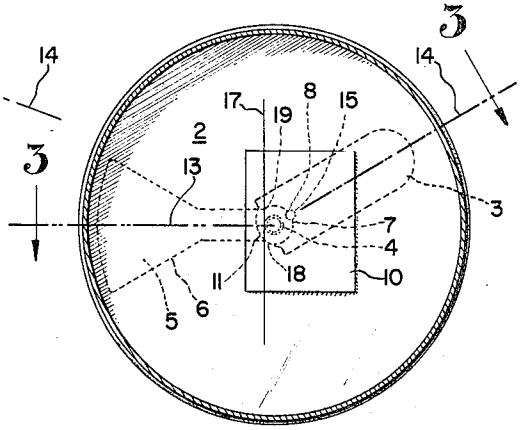


Fig. 1

Fig. 2



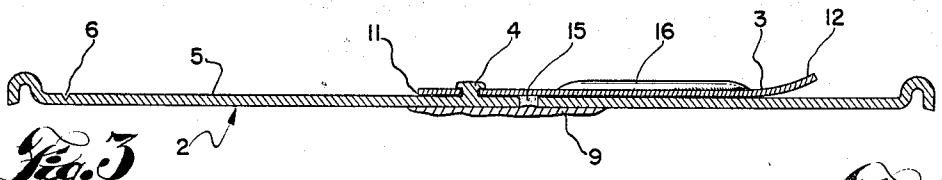


Fig. 3

Fig. 5

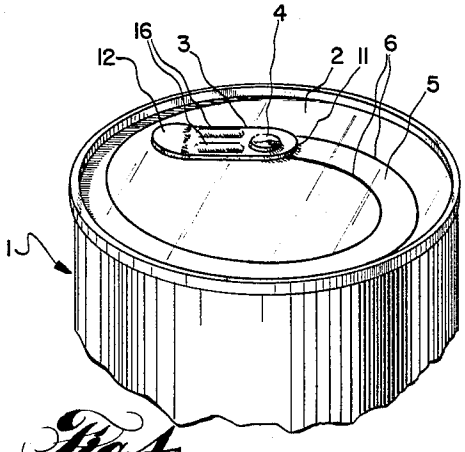
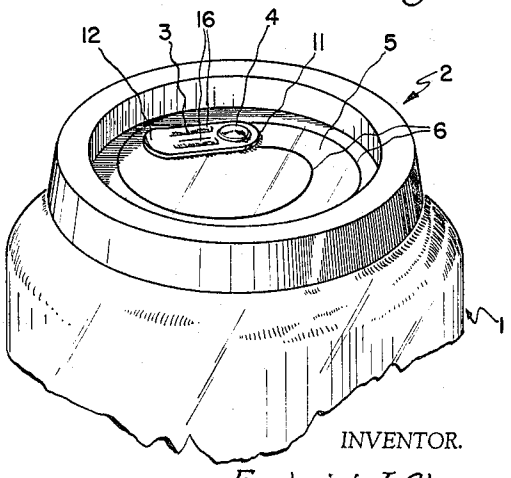


Fig. 4



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CONTAINER OPENING DEVICE

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9 Claims. (Cl. 220—54)

This invention relates generally to containers adapted to be opened by means of a scored portion having an affixed pull-tab, thereby eliminating the need for a separate opener. More specifically, it relates to an improvement which facilitates opening of the container by reducing the amount of force required to lift the pull tab to cause initial severance of the tear strip.

Opening devices of this type have generally presented a problem in raising the pull-tab to cause initial severance of the tear strip. This is so in spite of the fact that the pull tab has been affixed to the tear strip in such a manner that one end of the tab acts as a fulcrum in a second class lever. This mechanical advantage has proved insufficient to permit raising of the tab with a minimum amount of force.

Applicant has discovered that by providing a relatively small hole penetrating through the residual thickness of the scoring in the container panel, in close proximity to the tab fastening means, the pull-tab may be raised without any difficulty. A suitable sealing material is placed either in the hole to fill same or on the underside of the container end or closure. Opening may be commenced without the need for initially fracturing the scoring residual. Only sufficient force to break the adhesive seal need be applied.

A general object of this invention is to provide a container having a pull tab opening device which requires only a minimum amount of force to initiate opening.

Another object of this invention is to provide a container having an improved pull-tab opening device which may be manufactured simply, economically, and without substantial modification to existing equipment.

Yet another object of this invention is to provide an improved pull-tab opening device, the improvement being one which necessitates no change in scoring dies and may be made subsequent to the affixation of the pull tab.

Other objects and advantages of the invention will be understood from the following description of the invention, on reference to the drawings appended hereto, in which:

FIG. 1 is a perspective view of the upper portion of a sealed container having a pull-tab opening device;

FIG. 2 is a sectional view of a container showing the underside of an end having a pull-tab opening device with a relatively small score line hole closed by a tape seal;

FIG. 3 is an enlarged vertical section taken on line 3—3 of FIG. 2, except that it shows a container end having a relatively small score line hole adjacent the tab affixing means which is sealed by an adhesive patch;

FIG. 4 is similar to FIG. 1, but shows a modified form of tear strip adapted to remove substantially the entire end panel;

FIG. 5 is similar to FIG. 4, but shows the modified form of tear strip employed in a closure for a jar-type container.

Referring now more particularly to the drawings, a container **1** has a metal end or closure **2**, the panel portion of which is provided with an elongated tear strip **5** defined by scoring **6**. A pull-tab **3** is affixed to the tear strip **5** by fastening means **4**. For purposes of illustration, an integral rivet formed from the end or closure panel has been illustrated as the fastening means **4**, although the invention is not limited thereto. In opening the container

1, the gripping portion **12** of the tab is grasped and pulled upward to cause initial severance of the tear strip **5**. A mechanical advantage is obtained when the pull tab **3** is initially raised as the fulcrum portion **11** of the tab bears on the end **2** and a second class lever is established. After initial score line severance, the direction of pull becomes more horizontal and pulling is continued until the rest of the lines of scoring **6** are fractured and the tear strip is removed.

Initial severance will occur in the end of the tear strip adjacent the integral rivet **4**. The precise point of initial severance will be a function of the angle at which the pull-tab **3** is placed with respect to the tear strip center line **13**. It is this point at which the relatively small score line hole **15**, penetrating through the panel, should be placed. FIGURE 2 shows a line **17** constructed perpendicular to the tear strip center line **13** and tangent to the rivet **4**. This line **17** intersects the score lines **6** at points **18**, **19**. The sector of initial severance **7**, in which the point of initial severance **8** will lie, will be the shorter score line path joining points **18**, **19**. The score line hole **15** is placed at the point of initial severance **8**, the location of which is readily determined by the intersection of the pull-tab center line **14** with the sector of initial severance **7**.

The score line hole **15** eliminates the need for fracturing a metal score residual at the point of initial severance **8** on raising the tab. Only a minimum amount of force, sufficient to sever the seal, is required.

Any sealing material which will be compatible with the container contents, will be substantially impervious to the contents, and in the case of pressurized or vacuum packages will withstand the pressure differential across the container end, may be used to seal the hole **15**. An adhesive compound **9**, particularly a thermosetting adhesive, may be advantageously employed, for example. In lieu of placing a material within the hole, a patch adhered to the underside of the end may be employed. This may conveniently be a piece of tape **10**, metallic foil or other relatively thin sheet-like material which is substantially impervious to the container contents.

The size of the score line hole **15** may vary. There is no required minimum size, and some improvement in opening characteristics is generally obtained as the hole is enlarged beyond the width of the scoring. The desired size may be readily chosen, and it should be relatively small as an overly large hole would substantially weaken the container end without proportionately benefiting initial severance characteristics.

In the embodiment shown in FIG. 2, the tape may remain substantially intact on opening the container, as the pour opening is covered to only a very small extent by this sectional patch. This is the preferred means of sealing. Although a full panel tape would produce the same beneficial sealing, the uneconomical use of more tape would be required, and such a tape might have to be severed on opening the container in order to uncover the pour opening, thereby either increasing the force required to effect initial severance or requiring piercing of the tape.

In FIGURE 3 an adhesive material **9** is employed to fill the hole. It is preferable to select a material such that the adhesive bond to the metal will sever before the material itself will fracture. This allows the pull-tab to be removed from the seal on opening without fracturing the adhesive material and causing particles thereof to drop into the container.

FIGURE 4 illustrates a can having a form of pull-tab opening device having an elongated peripheral tear strip. This type of device is employed primarily where the contents of the container are non-liquids; it is adapted to remove substantially the entire end panel. FIGURE 5

shows such a peripheral tear strip device employed in a closure for a jar-type container which may be made from glass, plastic or other suitable material. The beneficial results of the invention are equally obtainable with this type of opening device, whether employed in a can or jar-type container.

Although the pull-tabs as shown in the drawings are reinforced by ribs **16**, it will be appreciated that as this invention results in an opening device with substantially reduced resistance to initial severance, more flexible pull tabs may be utilized successfully.

It has been found that the opening device is sufficiently strong that it may be employed with pressure packages such as carbonated beverages or beer as well as atmospheric or vacuum packaged containers.

It will be appreciated that the machinery presently employed to produce pull-tab opening devices may be simply, economically modified to produce the device of the invention. The only alterations needed are the provision of a device to place the hole in the score line and a sealing device. The hole is preferably drilled, but may be punched, and may even be made after the tab is affixed when access may be had to the side opposite the tab.

Whereas particular embodiments of the invention have been described above for purposes of illustration, it will be apparent to those skilled in the art that numerous variations of the details may be made without departing from the appended claims.

What is claimed is:

1. A metal can end having an elongated removable tear strip defined by scoring, a pull-tab affixed to an end of said tear strip by means of a rivet formed integrally with said tear strip, a portion of said scoring disposed adjacent said rivet having a relatively small hole penetrating through said end, and sealing material filling said hole.

2. A sealed container having a metal panel provided with

an elongated removable tear strip defined by scored lines;

a lever pull-tab;

a fastening means affixing said pull tab to an end portion of said tear strip;

a sector of initial severance on said scored lines defined by a tangent to said fastening means on the side thereof adjacent the major portion of said tear strip, said tangent being perpendicular to a line parallel to said scoring lines adjacent said fastening means and intersecting said fastening means, and said tangent intersecting said scoring at two points with said sector being the shorter score line path connecting said two points;

a point of initial severance disposed on said sector of initial severance;

a relatively small hole penetrating through said score line at the point of initial severance, and sealing material closing said hole.

3. The sealed container of claim **2** wherein said fastening means is an integral rivet.

4. The sealed container of claim **3** wherein said point of initial severance is located at the point of intersection of the longitudinal centerline of said pull-tab with said sector of initial severance.

5. The sealed container of claim **3** wherein said hole is substantially circular.

6. The sealed container of claim **3** wherein the sealing material is an adhesive compound.

7. The sealed container of claim **3** wherein the sealing material is a piece of adhered tape.

8. The sealed container of claim **3** wherein the sealing material is a thermosetting adhesive.

9. The sealed container of claim **3** wherein the sealing material is at least partially disposed within said hole.

References Cited by the Examiner

UNITED STATES PATENTS

D. 195,604	7/1963	Fraze	220—54
2,870,935	1/1959	Houghtelling	220—53
3,151,766	10/1964	Henchert	220—54
3,182,852	5/1965	Wilkinson	220—54

References Cited by the Applicant

UNITED STATES PATENTS

209,009	10/1878	Broughton.
2,772,808	12/1956	Fried.
3,089,609	5/1963	D'Andrea.
3,089,610	5/1963	Walsh.
3,151,766	10/1964	Henchert.

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