United States Patent [19]

Slade

[11] **3,752,353**

[45] **Aug. 14, 1973**

[54] **CAN END**

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[73] Assignee: **Campbell Soup Company,** Camden, N.J.

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[21] Appl. No.: **220,359**

[52] **U.S. Cl.** **220/54**

[51] **Int. Cl.** **B65d 17/24**

[58] **Field of Search** 220/54, 48, 27, 53

[56] **References Cited**

UNITED STATES PATENTS

3,662,916	5/1972	Holk	220/54
3,653,536	4/1972	Schrecker	220/54

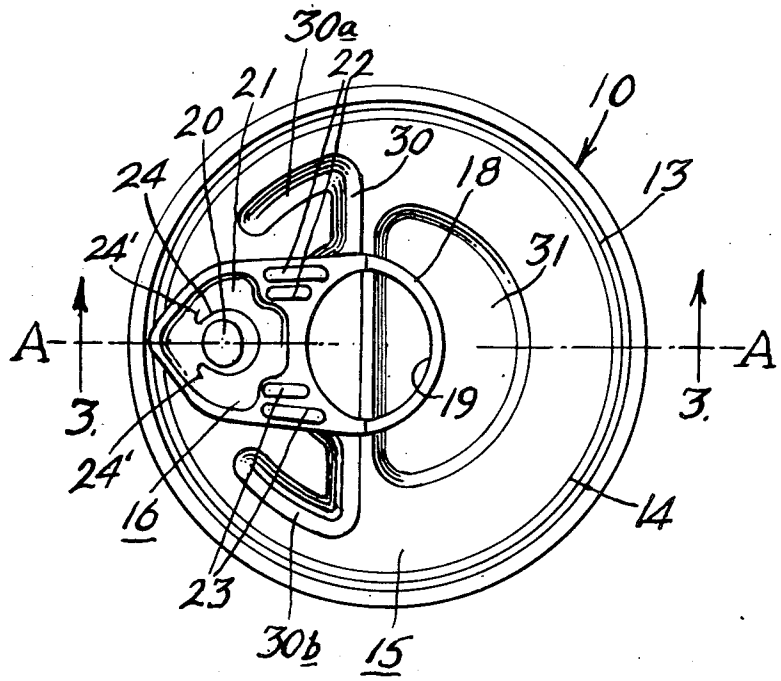
Primary Examiner—George T. Hall

Attorney—John W. Logan, Jr., Esq.

[57] **ABSTRACT**

A can end having a score line defining a removable panel and a lanced pull tab mounted by means of a rivet on the panel for use in rupturing the score line and removing the panel is provided with shaped embossments in the panel for providing first and second bend lines in the panel transverse to the tab to cause the panel to bend readily during separation without requiring thumb pressure on the panel. The first bend line extends along a chordal line located rearwardly adjacent the rivet and tangent to the terminii of two arcuate extensions of one of the embossments, which extensions extend peripherally from their terminii to locations adjacent the diameter of the panel and are there linked together by a depressed region which is located under the pull tab and which cooperates with another semicircular embossment on the other half of the panel to provide the second bend line when the tab is pulled after being pivoted upwardly to rupture the score line and to bend the panel along the first bend line.

2 Claims, 8 Drawing Figures



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2 Sheets-Sheet 1

FIG. 1.

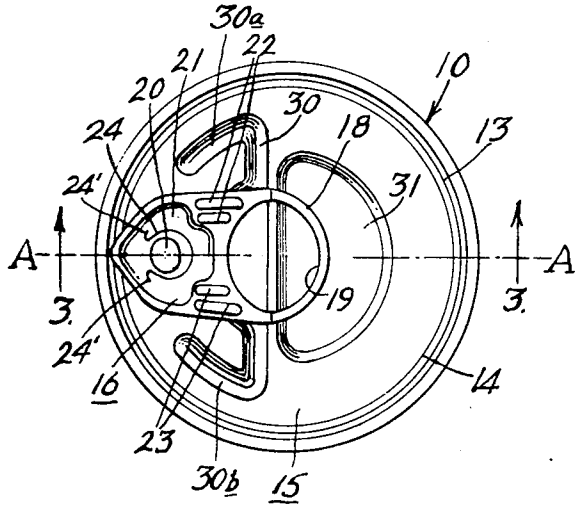


FIG. 2

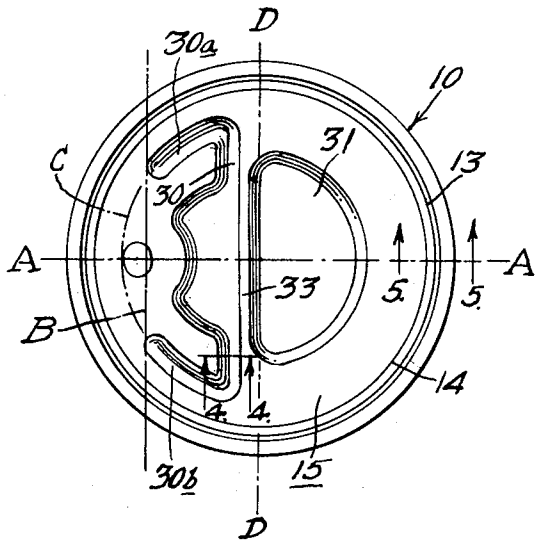


FIG. 3.

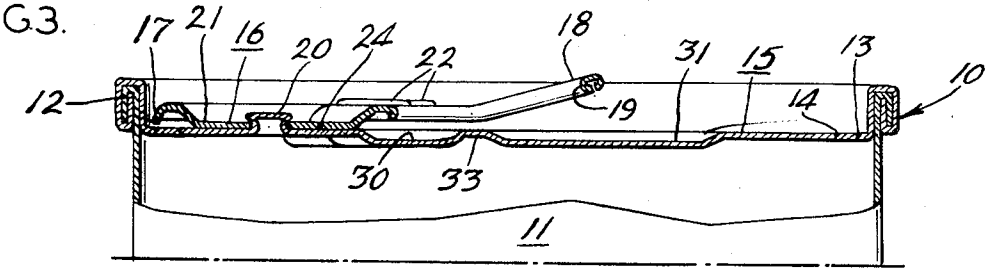


FIG. 4.

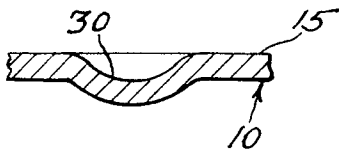


FIG. 5.

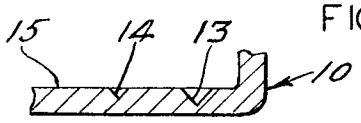


FIG. 6.

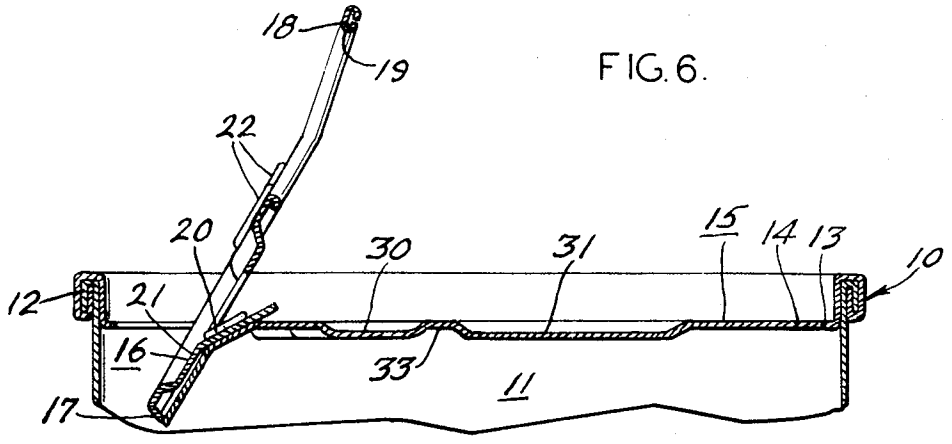


FIG. 7.

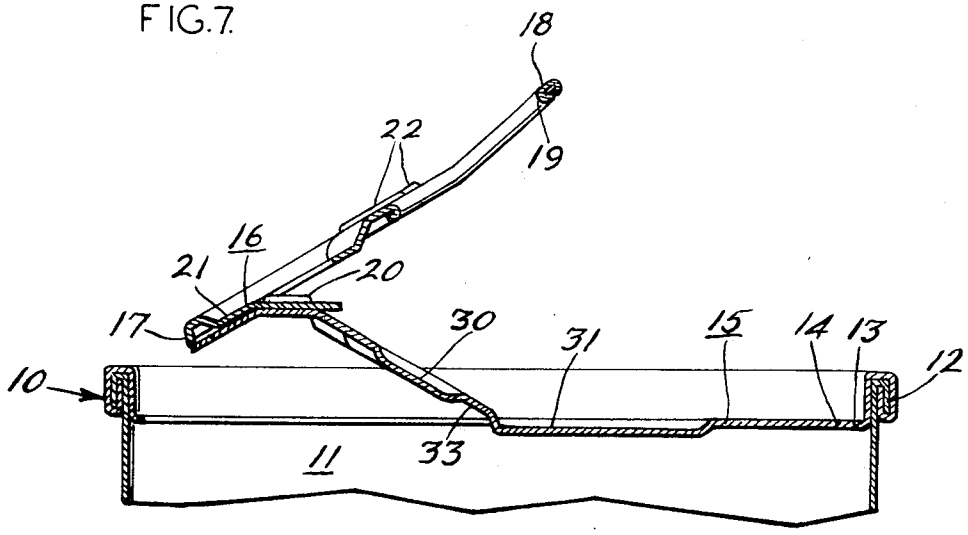
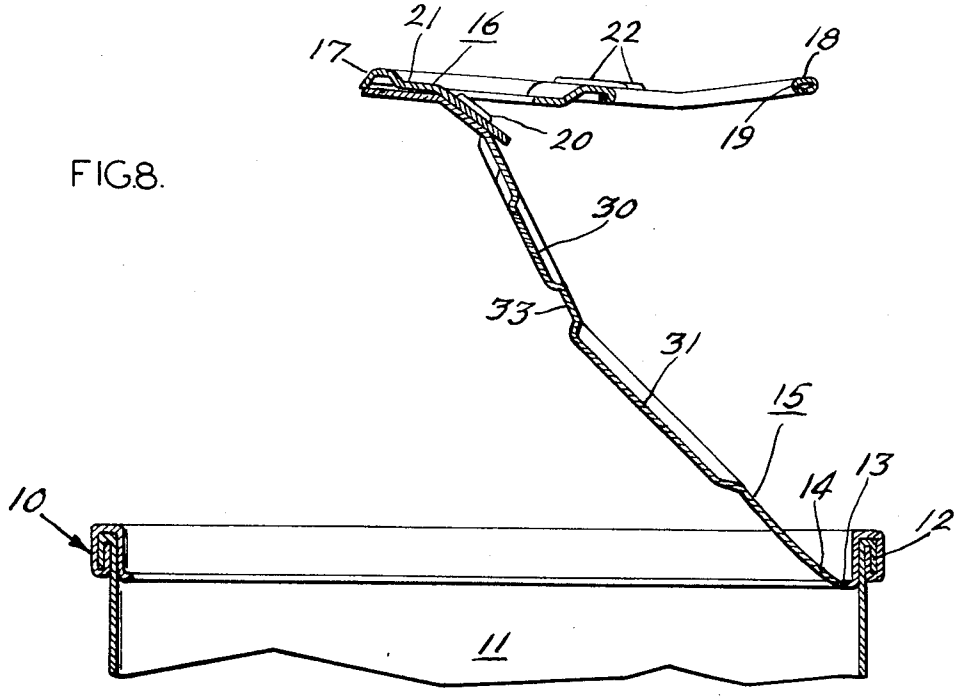

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FIG. 8.


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CAN END

The present invention relates to can ends of the type having tear panels which are fully removable by means of attached pull tabs to permit the contents of the cans to be poured through relatively large openings.

At present, there are available cans having ends with relatively large removable center panels which are capable of being completely separated by means of attached pull tabs. An example of a can end of this type is disclosed in U.S. Pat. No. 3,478,918. Although the patented can end may operate satisfactorily, as with most can ends of this type, thumb pressure should be applied to the removable panel opening. Unless adequate thumb pressure is applied to initiate bending of the panel at the proper location, there is a tendency for the panel to remain in a substantially planar configuration during removal. Thus, a greater pulling force is required than when thumb pressure is applied, and there exists the possibility that the contents of the can may be spilled when such force is applied.

Many consumers are unaware of the desirability of applying thumb pressure to the removable panel to reduce opening forces. As a result, some consumers tend to exert a greater force on the pull tab than would otherwise be necessary, causing the pull tab or rivet or both to fail. The problem is particularly acute with respect to can ends of steel construction because conventional steel can ends normally require more opening force than aluminum can ends.

With the foregoing in mind, it is the primary object of the prevent invention to provide an improved steel can end having a removable panel which is relatively easy to separate from the can end without requiring the application of thumb pressure to the panel.

It is another object of the present invention to provide a novel can end having a removable panel with shaped embossments which cause the panel to bend at two locations during removal to reduce the effort required to remove the panel, and thereby reducing the possibility of spillage of the contents of the can during opening.

More specifically, in the present invention a can end having a peripheral score line defining a removable panel and a pull tab fastened to the panel by means of a rivet is provided with embossments on the panel for causing the panel to bend sequentially at two locations transverse to the tab when the tab is first pivoted to rupture part of the score line and then pulled to rupture the rest of the score line. One embossment is located on one-half of the panel and has a pair of arcuate extensions which are located outboard of the pull tab and which terminate at locations rearwardly of the rivet to cause the panel to bend along a chord extending transversely of the pull tab and adjacent the rivet when the tab is pivoted upwardly. The extensions are connected centrally of the panel by a shaped depression which has a major portion underlying the pull tab and which cooperates with another semi-circular embossment on the other half of the panel to provide a second bend line which extends along substantially the diameter of the panel. The rivet is elongated in the direction of the first bend line to prevent pivotal movement of the tab in the plane of the panel and to facilitate bending of the panel along the first bend line and initial rupture of the score line to locations adjacent the terminii of the extensions.

These and other objects, features and advantages of the present invention should become apparent from the following description when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a plan view of a can end embodying the present invention;

FIG. 2 is a view similar to FIG. 1 but without a pull tab;

FIG. 3 is an enlarged sectional view taken along line 3—3 of FIG. 1;

FIGS. 4 and 5 are greatly enlarged sectional views taken along lines 4—4 and 5—5 of FIG. 2;

FIG. 6 is a sectional view similar to FIG. 3 but illustrating the tab in its upwardly-pivoted position for initially rupturing the score line of the can end bending its removable panel;

FIG. 7 is a view similar to FIG. 6 but illustrating the pull tab being pulled rearwardly to effect further rupture of the score line and bending of the removable panel; nd

FIG. 8 is a view similar to FIGS. 6 and 7 but illustrating the removable panel substantially completely removed from the can end.

Referring now to the drawings, there is illustrated in FIG. 1 a can end **10** embodying the present invention. As seen therein, the can end **10** is circular in outline and is fastened onto a can **11** by means of a continuous peripheral flange along its rim **12** (FIG. 3). The can end **10** has a pair of concentric score lines **13** and **14** located inwardly of the rim **12** with the outer score lines **13** defining a circular removable panel **15.** As best seen in FIG. **5,** the outer score line **13** is of greater depth than the inner line **14,** with the inner line providing a stress relief function which enhances complete removal of the panel **15.**

In order to separate the panel **15** from the can end **10,** a pull tab **16** is provided. In the illustrated embodiment, as best seen in FIG. **3,** the pull tab **16** is elongated diametrically of the can end **10,** and the tab **16** has a downturned nose **17** overlying the outer score **13** and an upturned finger grip **18** located substantially centrally of the panel **15.** A finger-receiving aperture **19** is provided in the finger grip **18.** The pull tab **16** is secured to the panel **15** by means of a rivet **20** with the tab **16** being depressed in a zone **21** surrounding the rivet so that it lays flush against the upper surface of the panel **15.** The tab **16** is reinforced against transverse bending by means of two pairs of longitudinally-extending, upwardly-formed ribs **22** and **23** provided on opposite sides of the longitudinal axis A of the tab **16.** The tab has an arcuate lance **24** which surrounds a major portion of the rivet **20** in the depressed portion **21** of the tab **16** and which forms a hinge line extending transversely of the tab **16** between the out-turned terminii **24', 24'** of the lance **24.** The hinge line in the tab **16** permits the tab **16** to be lifted away from the panel **15** a sufficnet distance to permit a person to insert his finger in the finger-receiving aperture **19** for pivoting the tab **16** further upwardly to initiate rupture of the scope line **13** (see FIG. **6**).

As noted heretofore, removal of a panel in a can end is readily effected when thumb pressure is applied to the center of the panel while pulling on the pull tab. However, since many consumers are unaware of the desirability of applying thumb pressure, they tend to apply more pulling force than otherwise would be required. As a result, the tab-mounting rivet or the tab itself may fail or the contents of the can may be spilled.

In accordance with the present invention, the aforementioned disadvantages of conventional can ends are eliminated. To accomplish this, the can end **10** is provided with shaped embossments **30** and **31** on its removable panel **15** to enable the panel **15** to be separated readily without requiring the application of thumb pressure. As best seen in FIG. **2**, one embossment **30** is located to one side of a diametrically-extending line D and is symmetrical with respect to the longitudinal axis A of the tab **16**. The embossment **30** has a pair of arcuate extensions **30***a* and **30***b* located outboard of the pull tab **16** and extending parallel to the score line **13**. The extensions **30***a* and **30***b* terminate at locations substantially tangent to a chordal line B located inwardly of the rivet **20**, and the extensions **30***a* and **30***b* merge into the major portion of the embossment **30** in a zone adjacent the finger-grip **18**. In the present instance, the rivet **20** is elongated in the direction normal to the longitudinal axis of the pull tab to prevent pivotal movement of the tab in the plane of the panel **15**. In addition, the rivet **20** is spaced inwardly of an arcuate line C which, in the present instance, has a constant radius of curvature and which extends medially of the extensions **30***a* and **30***b* of the embossment **30**. Thus, when the pull tab **16** is pivoted upwardly through the position illustrated in FIG. **6**, the rivet **20** inclines with respect to the normally flat plane of the panel **15** to facilitate rupture of the score line **13** to locations adjacent the terminii of the extensions **30***a* and **30***b*. By virtue of this structure, the score line **13** is ruptured to a greater extent by the pull tab **16** than heretofore possible wtih conventional easy open can ends.

In order to initiate proper bending of the panel **15**, the other embossment **31** is provided on the other half of the panel **15**. As best seen in FIG. **2**, the embossment **31** is semicircular in outline and is located in the panel **15** on the other side of the line D. The embossments **30** and **31** are separated by means of a rib **33** which extend in chordal fashion across the panel **15** on the side of line D toward the embossment **30**. The rib **33** provides a degree of transverse reinforcement to the panel **15**. In the illustrated embodiment, the portion of the embossment **31** adjacent the line D extends beyond the sides of the pull tab **16** and terminates inwardly of the arc C of the extensions **30***a* and **30***b*. The embossment **31** also provides a clearance below the finger grip **18** to facilitate initial gripping of the pull tab **16**. With this structure, the extensions **30***a* and **30***b* cooperate to reinforce the panel **15** in the zone of the pull tab **16**, so that when the pull tab **16** is pulled as illustrated in FIG. **7**, the reinforced zone remains substantially planar to shear the panel along the score line **13**. Moreover, the other embossment **31** causes the panel **15** to bend substantially along the diameter D of the panel **15** (FIG. **2**) without requiring thumb pressure on the panel **15**. The panel **15** is completely removed when the pull tab **16** is pulled further to cause the panel **15** to traverse the position illustrated in FIG. **9**.

The structure of the present invention is particularly suited for use with steel can ends; however, if desired, the structure may be used with can ends of other materials such as aluminum.

In view of the foregoing, it should be apparent that a can end has now been provided with an improved structure which enables its removable panel to be separated readily without requiring thumb pressure to initiate bending of the panel at the proper location and with a minimum pull force.

While a preferred embodiment of the present invention has been described in detail, various modifications, alterations or changes may be made without departing from the spirit and scope of the present invention as defined in the appended claims.

I claim:

1. In a can end having a score line defining a removable panel, an elongated opening tab overlying the panel for use in rupturing the panel along the score line to separate the panel from the container ends, said tab having a rupturing nose located adjacent said score line and a finger grip spaced inwardly from said nose, rivet means securing the tab to the panel inside said score line, and an arcuate lance in said tab surrounding a major portion of said rivet to define a tab hinge intermediate said nose and said rivet, the improvement comprising: an embossment on said panel having a pair of arcuate extensions inset from said score line and extending substantially parallel therewith, said extensions being located outboard of the tab and terminating in spaced relation inwardly of said nose for defining a first bend line in said panel transverse to said tab when said tab is pivoted inwardly, said embossment including a portion extending transversely to said tab for linking said pair of extensions at locations remote from their terminii, said rivet being located outwardly adjacent said first bend line so that when the tab is lifted and pivoted about its hinge to engage its nose against the score line, the panel bends along the first bend line and the rivet inclines to cause the score line to rupture initially in opposite directions from the nose to locations adjacent the terminii of the extensions, and a second embossment in said panel having a portion underlying the finger grip and extending beyond the outline thereof, said second embossment terminating inwardly of an arcuate line extending medially of said extensions to cooperate with said first-mentioned embossment to define a second bend line substantially transversely to the tab when the tab is pulled to remove the panel, whereby the panel bends readily during removal and the panel is completely removed when the finger grip is pulled upwardly.

2. A can end according to claim **1** wherein said rivet is elongated in the direction of said first bend line and is located inwardly of said arcuate line.

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