Nov. 8, 1966 F. J. STEC 3,283,946

CAN END

Filed Jan. 19, 1965

FIG. 1

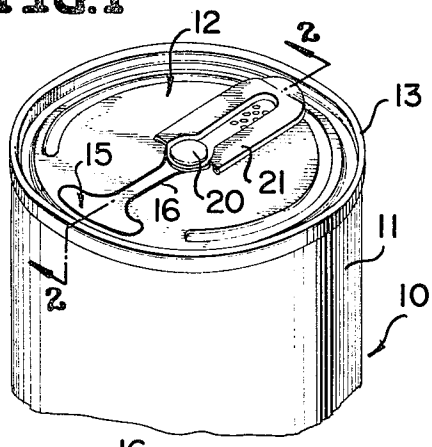


FIG. 3

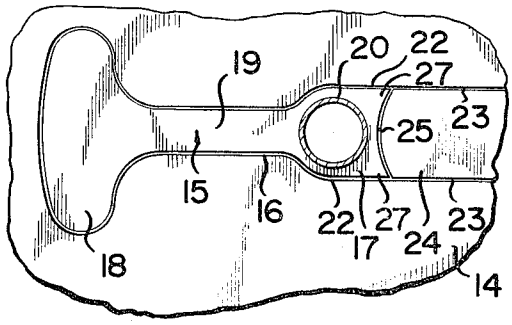


FIG. 2

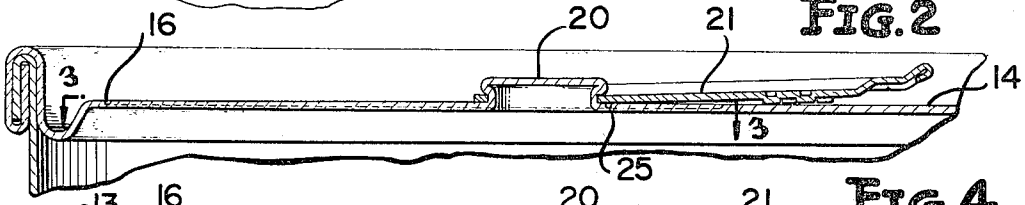
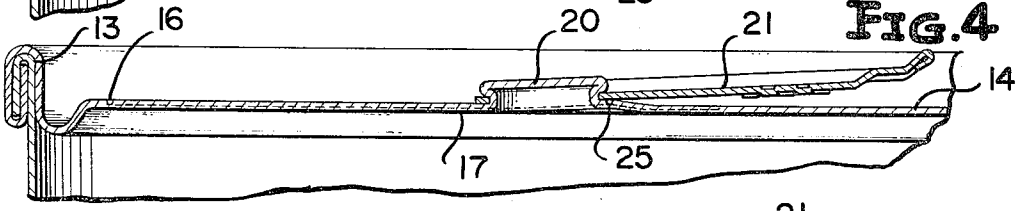


FIG. 4



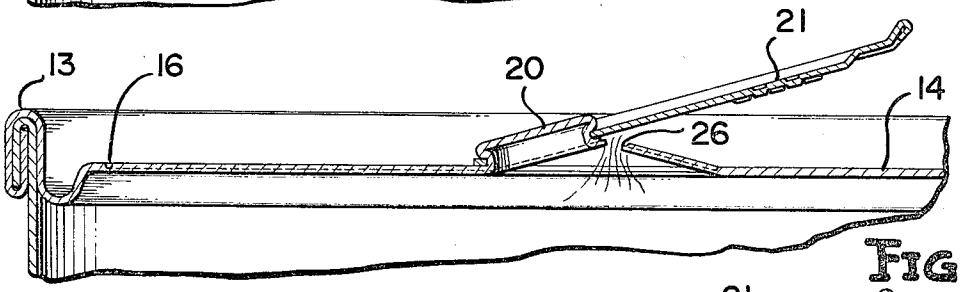
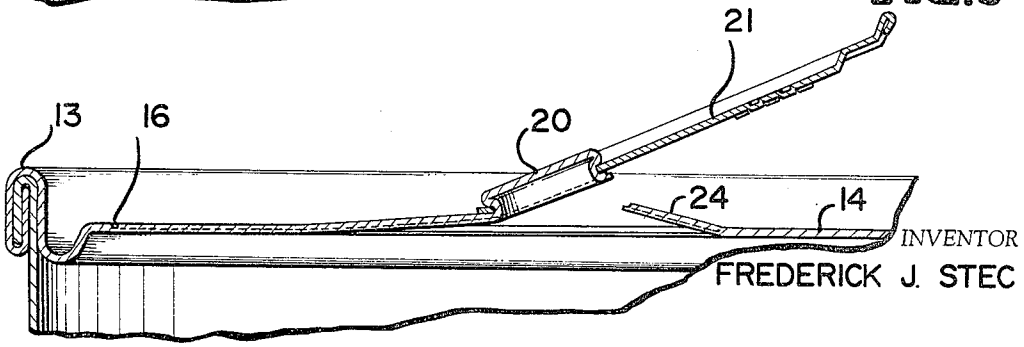


FIG. 5



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FIG. 6

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CAN END

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10 Claims. (Cl. 220—54)

This invention relates in general to new and useful improvements in the construction of containers and more specifically to a novel can end of the easy opening type.

This invention particularly relates to can ends intended to be utilized as closures for cans containing products packaged under pressure. It will be readily apparent that in order that the can ends may be of the easy opening type, once an initial rupture of such a can end has occurred, the pressure within the can, if not vented, will act upon the tear out portion of the can end and serve to automatically blow out the tear off portion of the can end in an uncontrolled manner. This invention proposes to eliminate the possibility of the tear out portion of the can end from being blown out in two ways. First, it is proposed to make the tear out portion of the can end very narrow so that the total force exerted thereon will be reduced accordingly. Secondly, it is proposed to provide the can end with a tab which is an extension of the tear strip and the tab being separated from the starting end portion of the tear strip by a transverse score line whereby when an upwardly directed force is exerted on the starting end portion of the tear strip, the tab will also be lifted and rupture of the can end will occur at the intersection between the tab and the tear strip so as to first form a vent opening in the can end in a manner whereby uncontrolled blow off of the tear strip is prevented.

Another object of this invention is to provide a can end of the type which includes a removable panel portion which is in the form of a tear strip, the removable panel portion being defined by a score line and having a starting end portion which is defined by a pair of score line portions, the score line portions having extensions which generally outline a tab disposed at the continuation of the starting end portion of the removable panel, and there being a transverse score line portion separating the tab from the starting end portion so that initial rupture occurs between the starting end portion and the tab and venting of the can end prior to the tearing away of the removable panel occurs.

Another object is to provide a novel can end in accordance with the foregoing wherein the transverse score line portion is arcuate and opens away from the starting end portion whereby there is a progressive rupture of the can end along the transverse score line portion and at the same time the tendency for the can end to rupture along those portions of the score line defining the removable panel is restricted.

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 claims and the several views illustrated in the accompanying drawing:

In the drawing:

FIGURE 1 is a fragmentary top perspective view of a can having the upper end thereof closed by a can end formed in accordance with this invention.

FIGURE 2 is an enlarged fragmentary vertical sectional view taken along the line 2—2 of FIGURE 1 and shows the specific constructional details of the can end.

FIGURE 3 is a fragmentary horizontal sectional view taken along the line 3—3 of FIGURE 2 and shows the specific outline of the removable panel portion of the can end and the tab aligned therewith.

FIGURE 4 is a fragmentary vertical sectional view similar to FIGURE 2 and shows the pull tab which is attached to the removable panel in an initially lifted position and the end panel of the can end partially distorted.

FIGURE 5 is another fragmentary vertical sectional view similar to FIGURE 2 and shows the can end after an initial rupture thereof has occurred with there being venting of the gases from within the can through the vent opening which is formed.

FIGURE 6 is still another enlarged fragmentary vertical sectional view similar to FIGURE 2 and shows the can end after the venting of the gas from within the can has been completed and the pull tab having been moved to a position whereby tearing of the removable panel from the can end has begun.

Referring now to the drawing in detail, it will be seen that there is illustrated in FIGURE 1 a can formed in accordance with this invention. The can is generally referred to by the numeral **10** and includes a conventional type of can body **11** which will have the lower end thereof (not shown) closed in a normal manner. The upper end of the can body **11** is closed by means of a can end, which is generally referred to by the numeral **12**. The can end **12** is formed in accordance with this invention and is secured to the can body **11** by means of a conventional double seam **13**.

The can end **12** with the exception of the easy opening feature thereof, may be of a conventional construction and includes a recessed end panel **14**. The end panel **14** is provided with a removable panel portion or tear strip **15** which, in the illustrated form of the invention, is specifically designed for the dispensing of liquids, but the invention is not so limited. The removable panel portion **15** is defined by a weakening line formed in the end panel **14**, the weakening line preferably being in the form of a score line **16**. The configuration of the removable panel portion **15** is such so as to define a starting end portion **17** and an enlarged terminal end portion **18** which are connected together by an intermediate connecting strap **19**. The starting end portion **17** is provided with an integral rivet **20** by means of which a pull tab **21** is rigidly secured to the starting end portion **17**. Inasmuch as the pull tab **21** in itself does not constitute a part of this invention, it will not be described in detail.

It is to be noted that the removable panel portion or tear strip **15** is so configurated wherein the connecting strap **19** thereof is narrower than either the starting end portion **17** or the terminal portion **18**. By making the connecting strap **19** as narrow as possible, yet retaining therein sufficient strength to facilitate the tearing out of the removable panel portion **15**, it will be seen that the effective area of the removable panel portion **15** in the vicinity of the connecting strap **19** is reduced to a minimum. Inasmuch as the total blow off force exerted on the removable panel portion **15** is directly proportional to the amount of area on which the pressure within the can **10** is effective, it will be seen that the blow off force exerted on the removable panel portion **15** is held to a minimum. Furthermore, by making the connecting strap **19** of a minimum width, it will be seen that after the initial rupture of the can end **14** occurs, and tearing away of the starting end portion **17** from the end panel **18** has been completed, the force per linear dimension of the connecting strap **19** is retained at a minimum and therefore, the resistance to uncontrolled tearing out of the removable panel portion **15** is greatly increased.

It is to be understood that normally the starting end portion of a removable panel or tear strip of an easy opening can is rounded and generally concentric with re-

spect to the integral rivet carried thereby. However, in the present instance the score line **16** has portions thereof, referred to by the numeral **22**, extending generally parallel on opposite sides of the integral rivet **20**. Furthermore, the portions **22** of the score line **16** have extensions **23** which extend beyond the removable panel portion **19** and generally define a tab **24**. The tab **24** is in the form of an extension of the removable panel portion **15** and is separated therefrom by a transverse score line **25** which extends between the score line portions **22** and intersects the same at the intersections of the extensions **23** therewith. It is to be noted that the transverse score line **25** is arcuate in outline and opens towards the tab **24**.

Referring now to FIGURE 2 in particular, it will be seen that the pull tab **21** normally overlies the transverse score line **25** and protects the end panel **14** against accidental rupture along the score line **25**. However, when the pull tab **21** is elevated in the normal manner for removing the removable panel portion **15**, it will be seen that an upwardly directed force is applied to the starting end portion **17** and there is an upward bowing of the end panel **14** in the vicinity of the transverse score line **25**. It will be readily apparent that the position of the transverse score line **25** is such that this is the portion of the end panel **14** which first ruptures. Inasmuch as the transverse score line **25** is arcuate, it will be seen that the rupture of the end panel **14** will normally start at the center of the score line **25** and progress towards the opposite ends thereof.

When the end panel **14** ruptures along the score line **25**, a vent opening is formed in the end panel **14**, as at **26** in FIGURE 5. It is to be noted that the vent opening **26** is still shielded by the pull tab **21**, but at the same time, the pull tab **21** is sufficiently spaced from the vent opening **26** to permit the escape of gases from the can **10** through the vent opening **26**. On the other hand, the position and size of the vent opening **26** is such that the product packaged within the can **10** does not escape with the gases as the gases are vented from within the can **10**.

It is also pointed out at this time that inasmuch as the transverse score line **25** is curved away from the starting end portion **17**, there is little tendency for the continued rupture of the end panel **14** along the score line portions **22** whereas the tendency for the end panel **14** to rupture is generally along the extensions **23**. Furthermore, the relationship of the transverse score line **25** to the score line portions **22** is such that relatively sharp corners **27** are formed at the opposite ends of the score line **25**.

After the initial rupture of the end panel **14** and the distortion thereof to the position shown in FIGURE 5, a further upwardly directed pull on the pull tab **21** and movement of the pull tab **21** generally to the left in FIGURE 6 will result in the tearing away of the removable panel portion **15** from the remainder of the end panel **14** along the score line **16**. Although the tab **24** will remain as a part of the end panel **14**, it will be readily apparent that it will in no way be disadvantageous to have it remain a part of the end panel.

It is also pointed out at this time that when certain beverages are packaged in cans, particularly soft drinks, the pressure within the can has a tendency to blow out the weakened portion of the can end. Should this accidentally occur with the can end **12**, it will be apparent that the blow out will occur along the transverse score line **25** with the result that the vent opening **26** will be formed and there will not be a blowing off of the removable panel **15**. Thus, the possibility of one becoming accidentally injured by the blowing off of the removable panel is eliminated.

Although only a preferred embodiment of the invention has been specifically illustrated and described herein, it is to be understood that minor variations may be made in the disclosed can end construction without departing from the spirit and scope of the invention, as defined in the appended claims.

I claim:

1. An easy opening can end particularly adapted for use as a closure for liquids packaged under pressure, said can end having a removable panel defined by a peripheral score line and including a starting end portion, a large terminal end portion and an elongated connecting strap between said end portions, and said connecting strap being materially narrower than each of said end portions whereby the force exerted on said connecting strap by pressure within an associated can is held to minimum thereby preventing the accidental blow out of said removable panel after the initial rupture of the can end along said score line.

2. The can end of claim **1** wherein a pull tab is secured to said starting end portion to facilitate the rupture of the can end.

3. The can end of claim **1** wherein said score line has extensions defining a tab forming an extension of said starting end portion with a portion of said score line separating said tab from said starting end portion whereby when a lifting force is exerted on said starting end portion said tab will lift therewith and initially rupture along said score line portion.

4. An easy opening can end particularly adapted for use as a closure for products packaged under pressure, said can end having a tear strip defined therein by a score line and said tear strip having a starting end portion, and said score line having extensions defining a tab forming an extension of said starting end portion with a portion of said score line separating said tab from said starting end portion whereby when a lifting force is exerted on said starting end portion said tab will lift therewith and initially rupture along said score line portion.

5. The can end of claim **4** wherein said score line portion is arcuate to provide for a progressive rupturing of said can end along said score line portion.

6. The can end of claim **4** wherein said score line portion is arcuate to provide for a progressive rupturing of said can end along said score line portion, said score line portion opening towards said tab.

7. An easy opening can end particularly adapted for use as a closure for products packaged under pressure, said can end having a tear strip defined therein by a pair of score line portions disposed generally in side-by-side spaced relation, said score line portions having terminal parts defining a tab forming an extension of said tear strip, and a transverse score line portion extending between the first mentioned score line portions separating said tab from a starting end portion of said tear strip whereby when a lifting force is exerted on said starting end portion said tab will lift therewith and initially rupture along said score line portion.

8. The can end of claim **7** wherein said score line portion is arcuate to provide for a progressive rupturing of said can end along said score line portion.

9. The can end of claim **7** wherein said score line portion is arcuate to provide for a progressive rupturing of said can end along said score line portion, said score line portion opening towards said tab.

10. The can end of claim **7** wherein a pull tab is secured to said starting end portion and projects therefrom as an extension of said tear strip, said pull tab overlying said transverse score line portion and protecting the can end against accidental rupture thereof along said transverse score line portion.

No references cited.

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