

[54] **EASY OPENING CONTAINER HAVING SHOULDERS TO SAFEGUARD ALL SEVERED EDGES**

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[58] Field of Search **220/54, 90.6**

[56] **References Cited**

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[57]

ABSTRACT

The sheet material of the container wall is offset to form a channel that conforms to the periphery of the tear portion of the wall. The channel has longitudinal side walls connected by a transverse web and a score groove defining the tear portion is formed in the web centrally thereof. The two longitudinal walls of the channel are in the form of two rounded shoulders to safeguard respectively the sharp edge of the severed tear portion of the container and the corresponding sharp severed edge of the remaining fixed portion of the container wall.

18 Claims, 6 Drawing Figures

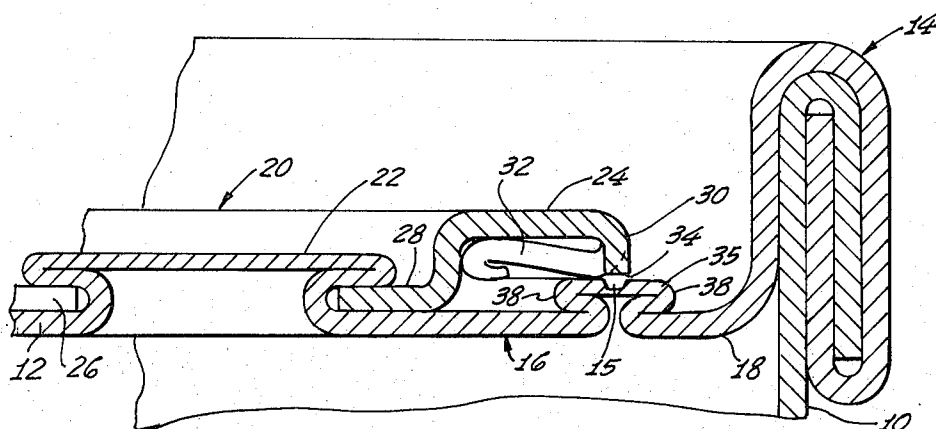


Fig. 1

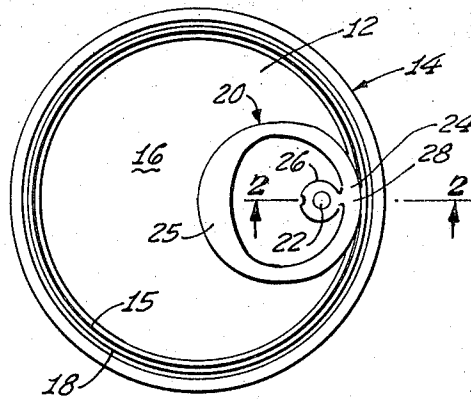


Fig. 2

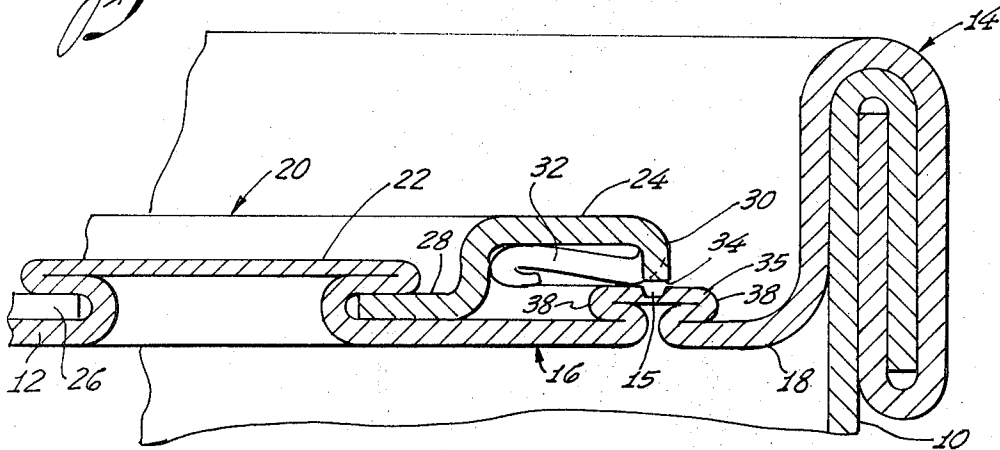


Fig. 2a

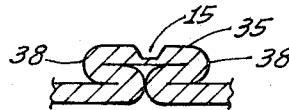


Fig. 3

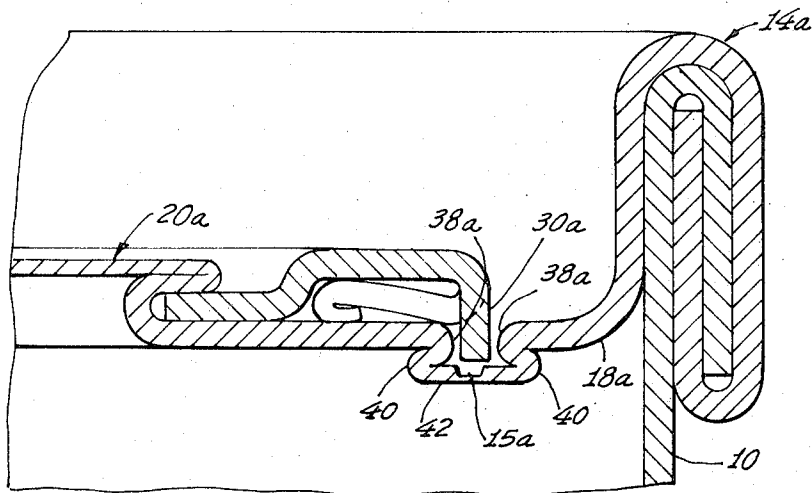


Fig. 4

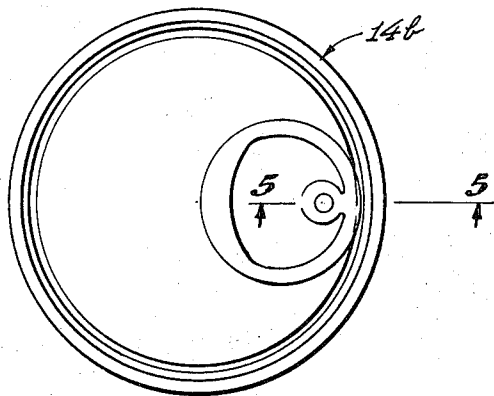
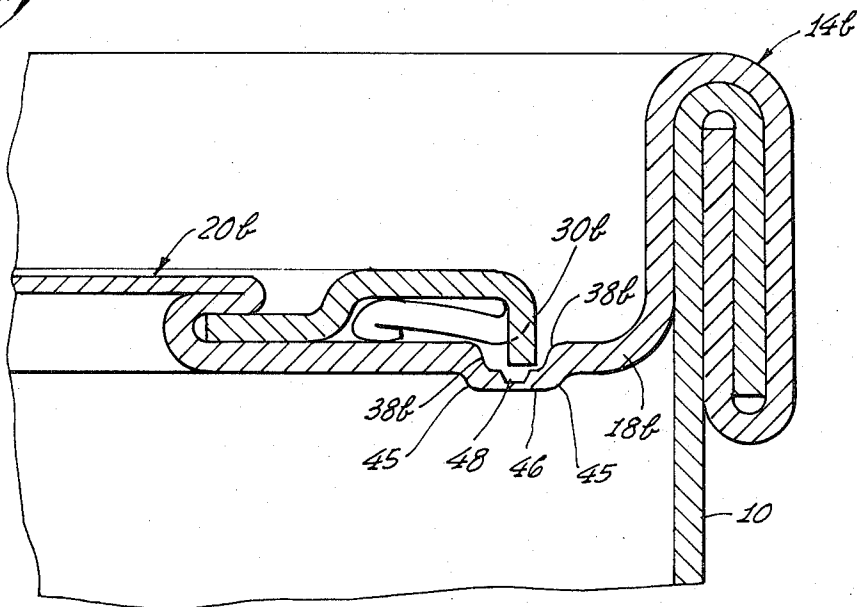


Fig. 5



EASY OPENING CONTAINER HAVING SHOULDERS TO SAFEGUARD ALL SEVERED EDGES

BACKGROUND OF THE INVENTION

In the construction of a prevalent type of easy opening container made of sheet material, a tear portion of an end wall of the container is defined by a scored groove and a pull tab attached to the tear portion is manually operable to cause severance of the sheet material along the line of scoring. The severance of the sheet material produces a hazardous sharp edge along the periphery of the displaced tear portion and a corresponding hazardous sharp edge is produced along the inner periphery of the remaining adjacent fixed portion of the end wall. These sharp edges are extensive and, therefore, especially hazardous when the tear portion is nearly as large in area as the end wall of the container and is completely severed from the end wall as in a so-called full panel pullout.

A large number of easy opening containers with full panel pullout ends is used for soft sweet fruit products, such as puddings which tend to cling to the inner surface of the pullout panel and tend to cling to the inner surface of the remaining fixed portion of the end wall of the container. Commonly, a consumer is tempted to recover the adhering material by licking the inner surface with his tongue, or by running a finger over the inner surfaces and too often such acts result in injury to the consumer.

SUMMARY OF THE INVENTION

The primary object of the invention is to minimize the hazard represented not only by the sharp edge of the severed tear portion of a container wall, but also by the corresponding sharp edge of the remaining fixed portion of the container wall.

In all embodiments of the invention disclosed herein, the attainment of this basic object involves offsetting the container wall in a pattern that conforms to the periphery of the tear portion of the wall. Preferably the offset is in the form of a channel that has opposite side walls interconnected by a transverse web and the tear portion of the container is defined by a line of scoring extending longitudinally of the channel and located substantially centrally of the transverse web. The longitudinal side walls of the channel form two confronting blunt shoulders coextensive with a score line on opposite sides of the score line, which shoulders are of rounded cross section and are so positioned relative to the scoring as to provide effective safeguards for the two sharp edges that are created by severance of the tear portion. Thus, one extensive blunt shoulder safeguards the full length of the sharp edge of the severed tear portion of the container wall and a similar blunt shoulder is left with the remaining fixed portion of the container wall to safeguard the full length of the corresponding fixed sharp edge of the sheet material.

In a simplified practice of the invention, the channel walls are flared outward with the minimum width dimension of the channel at the bottom of the channel; i.e., at the scored web that interconnects the two side walls, the two side walls being suitably rounded in cross-sectional configuration.

In other practices of the invention, double folds are formed in each of the opposite side walls to result in

rounded overhanging confronting side walls that are reentrant to result in a channel configuration wherein the maximum width of the channel is at the scored interconnecting web and the minimum width of the channel is at the gap between the two confronting rounded side walls. Thus, each side wall of the channel forms a rounded longitudinal shoulder that is relatively thick because the shoulder is made of two thicknesses of the sheet material and the thick rounded shoulders are especially effective as safeguards since they overhang the scored web.

In one embodiment of the invention wherein the channel is formed with double layer rounded shoulders, the channel opens inwardly to the inner face of the container wall. In an alternate embodiment of the invention, the channel with the confronting double thickness shoulders is open outwardly to the outer face of the container wall. Each of these alternate embodiments has its own particular advantages.

If the channel with the double layer rounded shoulders faces inwardly of the container, the scored web is elevated above the plane of the container wall and is therefore fully accessible to the leading edge of the manually operable tab that severs the sheet material at the score line. Since the severing leading edge of the tab does not reach the score line through the gap of the confronting double layer shoulders, the confronting shoulders may be very close together and may actually touch each other so that the two shoulders overhang the channel web to maximum extent and thus effectively overhang the two sharp severed edges when the tear portion of the container wall is displaced.

An advantage of the inwardly facing channel with double layer rounded shoulders is that the medial plane of the thinned material at the bottom of the score groove is spaced outward from the inner surface of the container wall by more than twice the thickness of the sheet material. Thus the sharp severed edges are correspondingly remote from the inner surfaces that tempt the user.

On the other hand, if the channel with the double layer shoulders is open to the exterior of the container, the medial plane of the coined sheet material at the bottom of the score groove in the interconnecting web of the channel is offset inwardly from the outer face of the container wall by more than two thicknesses of the sheet material. There is an advantage in this substantial inward spacing of the medial plane of the sharp edge of the severed full pull out panel from the outer face of the panel to which the manually operable pull tab is attached and there is also an advantage in the fact that the medial plane of the sharp severed edge of the fixed portion of the container wall is also offset inwardly from the outer face of the container wall by more than two thicknesses of the sheet material. The confronting reentrant shoulders of the outwardly facing channel must be spaced apart sufficiently to admit the severing leading edge of the pull tab, but the clearance may be relatively close. There is also an advantage in the outwardly open channel configuration in that the leading edge of the tab tends to bow the channel web inwardly when it is initially swung inward to sever the metal along the score groove. The initial bowing of the web increases the transverse tension stress across the web and, accordingly, facilitates initial severance of the sheet material at the score line.

A further feature of the invention is in the discovery of the reason that in many instances, the leading severing edge of the pull tab fails to make optimum pressure contact with the sheet material in the region of the score groove. It has been found that with the leading end of the actuated pull tab swinging towards the scored metal in a somewhat arcuate path, the leading end is displaced horizontally from its initial position relative to the score groove. Thus, the angular leading edge of the pull tab may appear to be initially positioned for positive engagement with the score groove but actually the horizontal shift of the angular edge inherent in its arcuate movement may cause failure of the angular edge to make optimum pressure contact with the scored metal. Based on this discovery the leading edge of the pull tab in the preferred practices of the invention is slightly offset from the score groove in the direction to compensate for the slight horizontal shift of the leading edge.

The various features and advantages of the invention may be understood from the following detailed description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the full panel pull out end of a container embodying one practice of the invention;

FIG. 2 is a greatly enlarged fragmentary cross section along the line 2 — 2 of FIG. 1 showing how an offset channel in the container wall forming confronting blunt double layer shoulders may be open to the interior of the container with the scored web of the channel elevated above the plane of the container wall for ready access by the overhanging leading end of the pull tab that is attached to the pull out panel;

FIG. 2a is a fragmentary sectional view similar to FIG. 2 showing how the two confronting blunt double layer shoulders may be in mutual abutment;

FIG. 3 is a similar fragmentary sectional view showing how the offset channel with confronting blunt double thickness shoulders may be open to the exterior of the container with the leading end of the pull tab extending through the gap between the two confronting shoulders of the channel;

FIG. 4 is a plan view similar to FIG. 1 wherein the channel that is formed in the end wall of the container faces outwardly of the container and the confronting blunt shoulders of the channel are of single layer thickness; and

FIG. 5 is an enlarged fragmentary section taken along the line 5 — 5 of FIG. 4.

DESCRIPTION OF THE SELECTED EMBODIMENTS OF THE INVENTION

FIGS. 1 and 2 indicate the construction of an easy opening container that embodies one practice of the invention. The container has the usual cylindrical wall 10 which is closed at its upper end by a transverse end wall 12 of ductile sheet material such as aluminum or aluminum alloy. The end wall 12 is attached to the cylindrical wall 10 in the usual manner by an upstanding seam 14 that is formed by interlocking flanges of the sheet material in a well known manner.

The transverse end wall 12 of the container has a line of weakness in the form of a scored groove 15 which divides the end wall of the container into two portions, namely, a tear portion in the form of a full pull out

panel 16 and a surrounding narrow fixed portion 18 that remains behind when the panel is completely severed from the can end.

In a well known manner a pull tab, generally designated 20, is attached to the panel 16 by suitable means such as a hollow rivet 22, the pull tab being of well known type which functions as a lever, the tab having a relatively short leading end portion 24 and a relatively long handle portion 25. The pull tab is formed with an ear 26 which is engaged by the hollow rivet 22 and is connected to the leading end portion of the tab by a tongue 28. The tongue 28 is flexible to hingedly connect the tab to the container wall and to serve as a fulcrum when the handle portion 25 of the tab is lifted to swing the leading end portion 24 of the tab downward for severance of the scored sheet material.

As may be seen in FIG. 4, the tab 20 is of generally ring-shaped configuration in plan and in a well known manner the sheet material of the tab is curled for stiffness along the inner and outer circumferences of the ring-shaped configuration. By virtue of the curling of the metal, the tab 20 is hollow from below as may be seen in FIG. 2 and the leading end portion of the tab has a leading end or piercing nose 30 which makes pressure contact with the scored sheet material to initiate the severance of the panel 16. The outer circumferential reinforcing curl of the tab has curled extensions 32 on opposite sides of the piercing nose 30 and these two extensions are turned into the hollow interior of the leading end portion 24 of the tab to serve as interior reinforcements for the leading end of the tab.

It is to be noted that the piercing nose 30 of the leading end portion 24 of the tab has an outer angular edge 34 and when the handle portion 25 of the tab is lifted to initiate severance of the scored sheet material, this leading angular edge swings in an arc into positive engagement with the scored groove 15 for highly effective initial severance of the scored metal. In accord with the teaching of the invention, the piercing nose 30 of the tab is initially offset slightly radially outwardly relative to the scored groove 15 instead of being positioned substantially symmetrically of the scored groove. This outward offset compensates for the inward horizontal shift of the piercing nose 30 to cause the angular edge 34 of the piercing nose to enter into positive engagement with the scored groove 15 in the desired manner for a highly effective severance action on the scored sheet metal.

The scored groove 15 which defines the pull out panel 16 is in the transverse web 35 of a channel that is formed in the end wall of the container by suitable dies, the channel following the periphery of the panel with the scored groove centrally of the width of the transverse web of the channel. The channel opens onto the interior of the container; i.e., onto the inner face of the end wall 12 of the container and has two opposite longitudinal side walls which as may be seen in FIG. 2 are formed with double bends to result in two confronting blunt longitudinal shoulders 38 which are of curved cross section configuration and are of a thickness provided by two layers of the sheet material. By virtue of the double bends of the sheet material, the longitudinal side walls of the channel are reentrant, the width of the transverse web 35 inside the channel being substantially greater than the entrance to the channel; i.e., greater than the gap between the two confronting longitudinal shoulders 38. Also by virtue of the double

folding of the sheet material the medial plane of the coined material at the bottom of the score groove 15 is offset outwardly from the inner surface of the end wall of the container by more than twice the thickness of the sheet material. The gap between the two confronting longitudinal rounded shoulders 38 of the channel should be quite small to cause the two longitudinal shoulders to extend relatively close to the sharp edges that are produced by severance of the sheet material along the score groove. In fact, the two longitudinal shoulders 38 may be in mutual abutment as shown in FIG. 2a to provide maximum safeguard for the sharp severed edges of the sheet material. The forming of the channel by offsetting the sheet material lends stiffness to the end wall of the container and the double fold of the metal that is integral with the fixed portion 18 of the end wall of the container provides substantial resistance to inward despression of the end wall by the piercing nose 30 of the pull tab and thus facilitates initial severance of the scored sheet material by the pull tab.

In the second embodiment shown in FIG. 3, the channel that is formed in the end wall of the container is reversed; i.e., opens outwardly onto the outer face of the end wall. The channel has two side walls interconnected by a transverse web 42 and the side walls are double folded to provide two confronting blunt longitudinal shoulders 44 with a gap between the confronting shoulders sufficient for admittance of the piercing nose 30 of the pull tab. Thus, the medial plane of the coined material at the bottom of the scored groove 15 is offset inwardly from the outer face of the container wall by more than twice the thickness of the sheet material and accordingly the piercing nose 30a of the tab 20a is made relatively long to reach the transverse web of the channel. Here again the piercing nose 30a is initially slightly offset radially outwardly relative to the score groove 15a to compensate for the radially inward shift of the piercing nose when the handle of the tab is elevated to initiate severance of the sheet material.

One advantage of the structure shown in FIG. 3, is that the medial plane of the sharp edge of the pull out panel that is produced by severance of the scored sheet material is offset inwardly from the outer face of the panel by more than twice the thickness of the sheet material. In like manner, the medial plane of the sharp severed edge of the fixed portion 18a of the container end wall is offset inwardly from the medial plane of the end wall by more than twice the thickness of the sheet material. The inward offsetting of the two sharp severed edges increases the safeguard effectiveness of the two rounded shoulders 38a.

The third embodiment of the invention shown in FIGS. 4 and 5 is a simplified version in that the double folding of the side walls of the channel is omitted. As shown in FIG. 5, the sheet material of the container end wall is offset in a simple manner to form a channel having two longitudinal side walls 45 interconnected by a transverse web 46. The channel faces outwardly; i.e., opens onto the outer face of the end wall of the container so that the transverse web 46 of the channel is offset inwardly from the medial plane of the end wall. The piercing nose 30b of the pull tab 20b extends through the medial plane of the end wall into the channel and is slightly offset radially outwardly relative to the scored groove 48 in the transverse web. The medial plane of the sharp edge of the severed portion of the

can end is offset inwardly from the outer face of the severed portion by at least $1\frac{1}{2}$ times the thickness of the sheet material and the sharp severed edge of the fixed portion 18b of the end wall that is left behind is offset inwardly by the same distance. The rounded confronting shoulders 38b are close to the second groove to serve as effective safeguards for the sharp edges.

The description in specific detail of the selected embodiments of the invention will suggest various changes, substitutions and other departures from the disclosure within the spirit and scope of the appended claims.

We claim:

1. In an easy opening container, the combination of:

a container wall of sheet material;

a line of weakness in the container wall defining a tear portion of the container wall inwardly of the line of weakness that is at least partially removable from the remaining fixed portion of the container wall that lies outwardly of the line of weakness; means attached to said tear portion to sever the sheet material generally along said line of weakness to at least partially sever the tear portion from the remaining fixed portion of the container wall, the container wall being formed with offsets spaced from the two opposite sides respectively of the line of weakness with the two offsets forming two blunt shoulders in the container wall to safeguard the two sharp edges that are produced by severance of the sheet material along the line of weakness.

2. A combination as set forth in claim 1 in which said line of weakness is a scored groove in the outer surface of the container wall;

and in which said severing means is a tab attached to the outer face of the tear portion in a hinged manner to permit one end of the tab to serve as a handle to swing the other end of the tab in a short arc towards the scored groove for severance of the sheet material,

said other end of the tab being formed with a leading edge to move along said arc, said leading edge being initially slightly offset relative to the scored groove outward towards said remaining fixed portion of the container wall, so that the arcuate movement of said leading edge causes the leading edge to shift towards the scored groove to stress the sheet material at the scored groove.

3. A combination as set forth in claim 2 in which the initial outward offset of the leading edge of the tab relative to the scored groove is of such magnitude as to cause the leading edge to enter the scored groove into positive engagement therewith to facilitate the severance of the sheet material at the scored groove.

4. A combination as set forth in claim 1 in which said transverse web is thinner than the rest of the sheet material of the container wall.

5. A combination as set forth in claim 1 in which the two offsets form a channel having opposite side walls that form the two blunt shoulders in confronting relationship with each other.

6. A combination as set forth in claim 5 in which the scored groove is positioned substantially midway between the two blunt shoulders.

7. A combination as set forth in claim 5 in which said channel is open to the outer face of the container wall

and said severing means initially extends between said confronting longitudinal shoulders in a position intersecting the medial plane of the container wall.

8. A combination as set forth in claim 5 in which the channel opens onto the inner face of the end wall of the container so that the blunt safeguard shoulder of the tear portion lies axially inwardly of the sharp edge of the severed tear section and the blunt safeguard shoulder of said remaining fixed portion of the container wall lies axially outward of the sharp edge of the fixed portion that is produced by severance of the sheet material along the line of weakness so that the two blunt shoulders reduce the hazard to the user of wiping contents of the container from the inner faces of said two portions of the container wall.

9. A combination as set forth in claim 5 in which said channel opens onto the outer face of the end wall of the container so that the sharp edge of the tear portion produced by severance of the sheet material along the scored groove lies inwardly of the medial plane of the tear section and the sharp edge of said remaining portion of the container wall that is produced by the severance of the sheet material lies inwardly of the medial plane of said remaining portion of the container wall.

10. A combination as set forth in claim 9 in which the two channel walls flare outwardly with the minimum width of the channel at said transverse web.

11. A combination as set forth in claim 5 in which the sheet material that forms each of the two side walls of the channel is formed with two bends with the sheet material bent back towards itself twice, one of said two bends forming a blunt safeguard shoulder on the periphery of the tear portion of the container wall, the other of said two bends forming a blunt safeguard

shoulder on the inner margin of said remaining fixed outer portion of the container wall.

12. A combination as set forth in claim 11 in which said channel opens towards the outer face of the container wall, so that initial inward pressure of said depressing means against the transverse web of the channel tends to bow the web to place the web under transverse tension to facilitate initial severance of the sheet material along the line of weakness.

13. A combination as set forth in claim 11 in which the two opposite side walls of the channel are reentrant with a maximum width of the channel at said transverse web.

14. A combination as set forth in claim 13 in which said channel is open to the inner face of the container wall.

15. A combination as set forth in claim 13 in which the channel is open to the outer face of the container wall.

16. A combination as set forth in claim 11 in which the line of weakness is formed by a scored groove in said web so that by virtue of said double bends the medial plane of the material at the bottom of the scored groove is spaced by more than twice the thickness of the sheet material both from a face of said tear portion of the container wall and from a face of said remaining fixed portion of the container wall.

17. A combination as set forth in claim 16 in which said face of the two portions of the container wall are the inner faces thereof.

18. A combination as set forth in claim 16 in which said faces of the two portions of the container wall are the outer faces thereof.

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