This invention relates to paperboard packaging containers. More particularly, it relates to a lightweight single ply container so constructed that a substantial part of its top can be removed to permit access to its contents, leaving an attractive traylike structure for holding and displaying the contents.

This application is a continuation-in-part of copending applications Serial No. 819,239 filed June 10, 1959, and Serial No. 16,386, filed March 21, 1960, both now abandoned.

In modern supermarkets, it is commonplace to mark the price on articles to be sold and then to store them before placing them on display shelves. However, it is often necessary to open the containers in which the articles arrive to reach the articles to be marked either by tearing off their tops or by ripping them apart. This operation may completely destroy such containers and render them useless for further storage of the contents or, at the least, unattractive in appearance for display purposes. This applies particularly with respect to lightweight shipping containers.

Even when the top of the shipping container may be conveniently opened or ripped off without entirely destroying it, as in the case of a heavy corrugated paperboard box, the article are often packed in such a way that they have to be removed to be price-marked then returned to the container for further storage and/or display. Such operations are time consuming and, therefore, expensive. They are also unsatisfactory, because many containers do not readily lend themselves to re-packing by hand.

It is, therefore, desirable and an object of the present invention to provide a container which has a top closure which is readily removable, leaving an attractive open container, and which can be readily shaped and packed in the first instance, so that the contents are exposed for price-marking and consumer inspection when it is opened by the removal of the top closure.

Paperboard containers are not always as rugged as corrugated containers and do not always stand up well against abuses of packing and handling. If, for instance, a paperboard container is not tightly packed, whether with cartons, tubes, or cans, rectangular, cylindrical, or otherwise, the movement of such cartons, tubes or cans relative to the container places undue stress upon it, particularly along the fold lines of the blank from which the container is fashioned. On the other hand, if a paperboard container is tightly packed with cartons, tubes or cans, the corners of such cartons, the edges of such tubes, or the chimes of such cans which constantly impinge against portions of the container and tend to cut into such portions, particularly during shipping and handling. And, when such portions are the major longitudinal and transverse fold lines of the blank from which the container is formed, the possibility that the container will be ruptured and its usefulness reduced or destroyed is greatly increased.

Hence, it is also an object of the present invention to afford containers having greater strength against or resistance to poor packing and mishandling. It is a further object to provide blanks made of sheet material, particularly single ply material, and containers made from the blanks with reinforcement against and resistance to tearing and rupturing which results from poor packing and mishandling and other causes. It is still another object of the invention to provide reinforcing means, at least along the major fold lines of blanks, particularly single ply material blanks, for paperboard containers and for the paperboard containers produced therefrom.

Accordingly, the invention comprehends a container having a readily removable top closure, the removal of which does not destroy the utility or the appearance of the container, or to use other words, which results from poor packing and mishandling. Such reinforcing means are, preferably, in the form of stripes centered over and extending a short distance beyond each side of the blank's longitudinal and transverse fold lines and such stripes are, preferably, constituted of natural rubber latexes, water-based emulsions, synthetic resins, or elastomers. By "synthetic resins" are meant olefinic resins such as polyethylene, nylons, vinyls, and copolymers of vinyls.

For a better understanding of the invention reference should be had to the drawings in which:

FIG. 1 is a plan view of a blank from which a container is made in accordance with the present invention;

FIG. 2 is a perspective view of the container of FIG. 1, bottom up, showing initial stages of folding;

FIGS. 3 and 4 are fragmentary perspective views of the container of FIG. 1 showing further stages of folding;

FIG. 5 is a plan view of a blank showing a modification of the container of FIG. 1;

FIGS. 6 and 7 are fragmentary views of further modifications of the container of FIG. 1;

FIGS. 8 and 9 are perspective views showing the container of FIG. 1, right side up, before and after opening; and

FIG. 10 is a fragmentary perspective view taken along the lines of perforation as shown in FIGS. 1 and 5.

Container 13 seen in FIG. 8 is formed from a one-piece blank 10 (FIG. 1) preferably of single ply, 47 pound kraft liner board. It can be constructed, however, from heavier or lighter weight boards, depending on the requirements of the container. The blank 10 has longitudinal fold lines 50 and transverse fold lines 50 which generally define and hingedly connect body parts including a top panel 2, side wall panels 6 and 8 and bottom panels 12a, 12b and end parts including outer flaps 62 and flap sections 62a, 62b, inner flaps 22 and intermediate flaps 32. Slits 83 extend inwardly from the edges 62a of the outer flaps 62 and flap sections 62a, 62b, and diagonal fold lines 94 connect the inner ends of the slits 82 to intersections of the fold lines 50 and 52, further defining the intermediate flaps 32. Means are provided to form spaced lines of weakness for the purpose further described, preferably in the form of lines of slits 55 and 69 extending from and connecting a pair of semicircular slits 74 to a pair of arcuate slits 75 formed in the top panel 2. The semi-circular slits 74 are connected to a pair of spaced lines of perforations 76 and the arcuate slits 75 are connected to a fold line 79. The semi-circular slits define a tab 78 at each end of the tear strip 77 defined by the lines of perforations 76. V-shaped slits 73 having their apaxes on the lines of slits 55 and 69 are connected at their apaxes to the ends of the slits that are furthest removed from the fold line 79.
Means are provided to reinforce the container for the purpose further described, preferably in the form of reinforced stripes 70 approximately one-half inch to two inches in width centered over both the longitudinal and transverse fold lines 50 and 90 or over the longitudinal fold lines only or over the transverse fold lines only.

To erect the container of the present invention, the parts are folded along the fold lines 50 so that the side wall panels 6, 7 and 8 are perpendicular to the top panel 2 and the bottom panels 12a and 12b as shown in FIG. 2.

The bottom panel 12b and the flap sections 62b partially overlap the bottom panel 12a and the flap sections 62a and the parts are secured together by glue applied to one of the abutting perpendicularly formed a completed bottom panel 4 with outer flaps 62 at its ends so that the structure of FIG. 2 is a four-sided tube or sleeve which is open at both ends.

The container is particularly well adapted for automatic end loading. In other words, the tube is first formed as shown in FIG. 2 and then the contents are inserted generally substantially en masse or according to a predetermined pattern or order from one or both of the open ends. It may be preferable in some applications to close one of the ends and then to load the container from the open end. Therefore, one of the ends may be closed before loading and the other after loading, or the tube may first be loaded and both ends closed simultaneously thereafter. In either event, the end closing operation for both ends is substantially identical. In closing the ends, the inner flaps 33 are folded perpendicularly to side walls 6 and 7 as shown in FIG. 3. This folds the intermediate flaps 32 along the diagonal fold lines 49 and over the parts of the outer flaps 62. The outer flaps 62 at the ends of the top panel 2 and associated parts are now folded over the outer flaps 62 formed of the sections 62a, 62b at the ends of the bottom panel 4 so that they are perpendicular to the body panels 2, 4, 5 and 6. Abutting surfaces of the end parts are secured in place by glue applied prior to or during formation of the container.

Having thus completed the formation of the container shown in FIG. 8 and generally described as 13, the lines of slits 58 and 60 provide lines of comparative weakness along which the top panel 23 may be torn to remove a top panel. To accomplish this, either of the tabs 78 is grasped and pulled upward as shown in FIG. 8. Continued pulling starts tears along the lines of perforations 76 which is continued until the tear strip 77 is completely removed from the top panel 2. To insure the easy removal of the tear strip 77, the lines of perforations 76 are formed in the machine direction of the paper and a pair of continuous slits 81 are formed in the underside of the top panel 2 directly underlying the line of perforations. The direction in which the paper tears most easily and in straight lines is the machine direction; that is, the direction of the paper parallel to its forward movement on the paper machine. Therefore, by forming the lines of perforations in this direction, the tear strip 77 is more easily torn from the top panel 2. As shown in FIG. 11, the slits 81 are cut approximately half way through the paper. For example, if the container is constructed from single ply 62 pound kraft liner board having a thickness of approximately .017 of an inch, a slit depth of .003 of an inch has proven effective. These slits further increase the ease with which the top panel is torn along the line of perforations.

After the tear strip 77 has been removed, the container may be opened to expose or remove its contents by inserting the fingers beneath the panel 9 and pulling upward. Continued pulling starts tears in the top panel 2 along the lines of slits 50 and 60 which can be continued as the arcuate slits 75 that are connected to the fold line 79, resulting in the structure of FIG. 9. It is important to note the portion of the top panel that remains intact form a deck 92 that completely surrounds the opening. The result is an open tote tray 15 or a traylike structure which is well adapted to contain its original contents for storage, movement from storage to display area and for display. The contents are readily exposed for price marking and storage or display thereafter.

The opening in the top panel is of sufficient size to permit ready access to the contents of the container and at the same time the portions of the top panel that remain intact considerably strengthen the top panel and hold it in proper shape, thereby making the container stronger and more rigid. For this reason, when the top panel is torn to remove the panel 9, it is important that the tears follow the lines of slits 58 and 60 and extend only to the fold line 79 so that the deck 92 remains intact. This latter objective is accomplished by the use of V-shaped slits 73 and the arcuate slits 75 or the like on the basis of the following considerations:

The lines of slits 58 and 60 are formed in the cross machine direction of the paper. This direction offers the greater resistance to tearing and the paper tears in rugged edges. Therefore, to insure that the top panel is torn only along the lines of slits, tear guide means in the form of V-shaped guide slits 73 are formed along the lines of slits with their apaxes connected to the ends of the slits. The apaxes of these guide slits point in the direction of tear or toward the fold line 79 and, as the top panel is torn, these guide slits 73 channel irregular tears and guide them along the lines of slits.

Further, it was found that if the lines of slits were connected directly to the fold line 79 that the person opening the container, often in great haste as in supermarkets, would continue the tears past the fold line for the full length of the top panel unless due care was exercised. This resulted in the arcing of the slits in the destruction of the deck 92.

Therefore, in order to assure that the tears extend only to the fold line, tear stop means are provided in the form of arcuate slits 75 connected to the fold line 79 and to the lines of slits 58 and 60. These arcuate slits ease the tears around corners to the fold line 79 and further tearing will only result by tearing the tearing force from its original direction toward a line along the fold line. The fold line thus serves as a hinge for the panel 9 which may be left attached for use as a temporary cover and then later entirely removed by tearing along the fold line.

Modifications of the container of the present inventions are shown in FIGS. 5, 6 and 7. The modified container is identical to the container 13 of FIG. 8, except that the means have been provided to reinforce the container.

Without provision of means to reinforce the container, the sharp corners of cartons, edges of tubes, and chimes of cans would tend to cut through the single ply container where they contact it at or in the proximity of the fold lines. Reinforcing means in the form of stripes 70 of material applied to the container blank surface have proven highly effective in eliminating this problem. Among the most effective and preferred reinforcing stripes are those of the synthetic resins and the vinyls, because of their inherent toughness and high puncture resistance. And even if by chance a can chime does cut into the container at or near a fold line, further tearing is impeded by the material of stripes.

What is claimed is:

A container formed from a one-piece blank of sheet material, the container comprising body parts including a top panel having spaced apart longitudinal and transverse fold lines of weakness and semi-circular slits therebetween, side wall panels, and bottom panels comprised of the following body parts including inner flaps, outer flaps and flap sections, and intermediate flaps substantially defined on the blank by means of longitudinal and transverse fold lines having reinforcing means therealong, the outer flaps and flap sections having slits extending inwardly from their edges and diagonal fold lines connecting the inner ends of the
slits with intersections of the longitudinal and transverse fold lines to define the intermediate flaps further.

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