Feb. 19, 1963 D. B. KAUFFELD 3,077,709

FILLING AND SEALING METHOD

Original Filed April 22, 1960 2 Sheets-Sheet 1

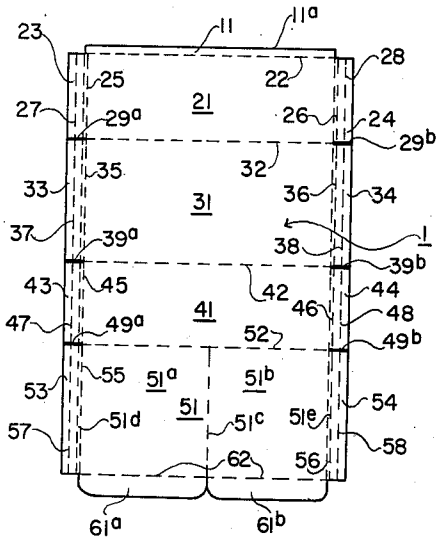


Fig. 1

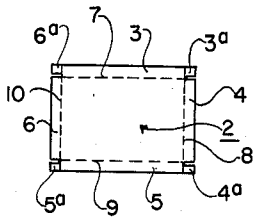


Fig. 2

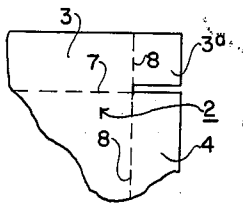


Fig. 3

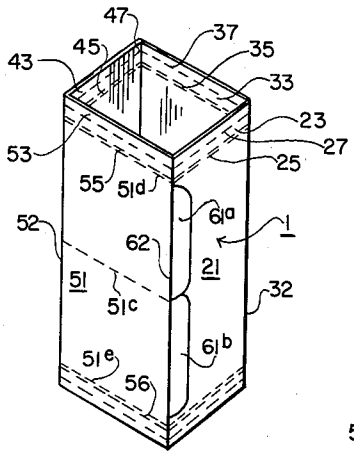


Fig. 4

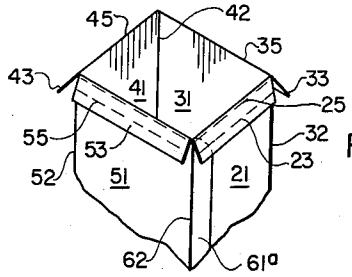


Fig. 5

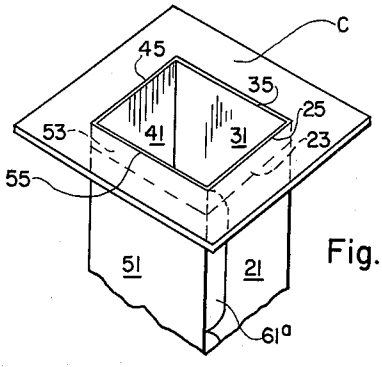


Fig. 6

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FILLING AND SEALING METHOD

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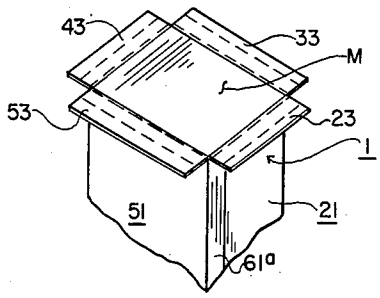


Fig. 7

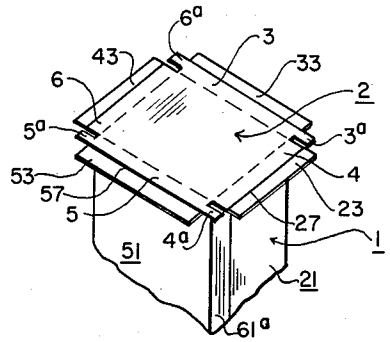


Fig. 8

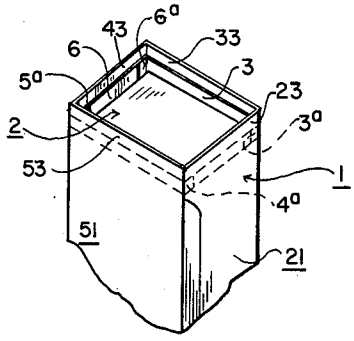


Fig. 9

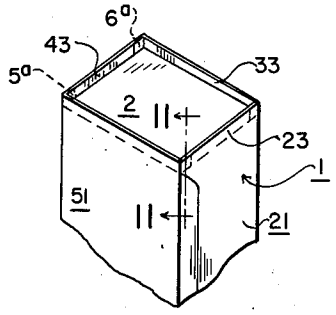


Fig. 10

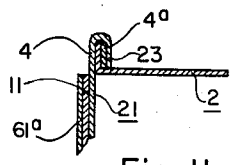


Fig. 11

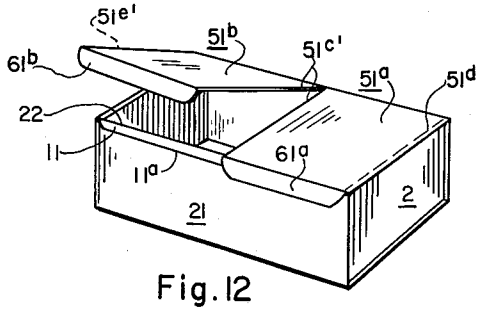


Fig. 12

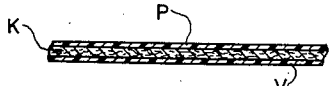


Fig. 13

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3,077,709
FILLING AND SEALING METHOD

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Original application Apr. 22, 1960, Ser. No. 24,028. Divided and this application Apr. 28, 1961, Ser. No. 109,477
3 Claims. (Cl. 53—37)

This is a division of application Serial Number 24,028, filed April 22, 1960, now abandoned.

This invention relates to end-closure structures for paperboard containers and to a method of protecting the end surfaces to be sealed together from wetting while filling and closing the container at that end.

When a container having one of its ends already closed is filled through its other end with a moist product, such as ice cream, it is very difficult to fill the container full without smearing the product on the end surfaces which must then be glued or heat-sealed to close the container. On the one hand if the container is not completely filled, an air space will be left when the end panel is sealed in place with the result that the purchasing consumer will feel that he has received a short-measure; but, on the other hand, if the surfaces to be glued or heat-sealed are smeared, complete sealing will be impossible unless special attention is given to wiping off such smears prior to sealing. On a mass-production basis, such special attention would unduly impair the efficiency and speed of production.

It is a principal object of the present invention to provide a method and suitable container-end structure by which the containers can be completely filled without risk of smearing the surfaces which are to be sealed or glued together during subsequent closing of the container.

It is another important object of this invention to provide an improved container structure which is leakproof, and preferably made from paperboard blanks having plastic-coated surfaces suitable for the application of heat-sealing techniques wherein the plastic surfaces are welded as distinguished from glued, although the present structure can be glued, if desired, or assembled by using any other adhesive.

Still another important object of the invention is to provide an improved end closure structure for a container which can then be made from laminated blanks having a liquid-absorbent core, the structure of the container being such that all of the cut edges of the blank face outwardly of the finished container or are otherwise protected to prevent wetting of the core by the contents of the container, known in the art as wicking.

It is another very important object of the invention to provide an inexpensive and easily set-up container and end closure which is especially adapted for packaging moist or liquid food products, the container being designed to meet the requirements of government food packaging regulations. However, the present container is also suitable for the packaging of other products such as oils, jellies, syrups, acids, alkalies, detergents, bleaches and other solid or liquid products whether hot, cold, or frozen.

Still another major object of the invention is to provide a novel container having heat-sealed seam closures adapted especially for use in packaging frozen foods, such as ice cream, wherein the sealing of the carton after filling with a perishable frozen food is accomplished externally of the carton at positions relatively remote from the contents thereof so as to avoid melting down of said contents during sealing. The present invention also provides a carton structure which lends itself especially well to the reduction to a minimum of the transfer of heat into the contents of the carton during sealing thereof by employing layers of metal foil laminated to the surfaces of the blanks of which the container is made, said metal foil conducting the heat away from the vicinity of heat application so that it may be quickly dissipated instead of remaining in the area of the seal to penetrate the container and cause localized melt-down.

Other objects and advantages will become apparent during the following discussion of the drawing, wherein:

FIG. 1 is a plan view of a blank suitable for making the body portion of a container according to the present invention, cut-lines being shown in this figure as solid lines, and embossed bend lines being shown as dashed lines;

FIG. 2 is a plan view of an end blank for a container according to the present invention, the dashed lines indicating embossed bend lines;

FIG. 3 is an enlarged partial plan view corresponding with the upper righthand corner area of the blank shown in FIG. 2;

FIG. 4 is a perspective view of a partially completed container comprising the blank of FIG. 1 set-up and joined at a longitudinal seam to form a hollow polygonal body portion;

FIG. 5 is a perspective view of the upper portion of the container of FIG. 4 wherein the end-flaps of the upper end of the container have been folded downwardly;

FIG. 6 is a view similar to FIG. 5 but showing the end-flaps held flat against the outer surface of the container and showing clincher means holding the end-flaps in this position;

FIG. 7 is a view of the container similar to FIG. 5, but showing the container filled with a product, such as ice cream, the flaps having been released from the clincher means and standing outwardly at an angle of about 90° with respect to the body panel;

FIG. 8 is a perspective view similar to FIG. 7 but showing the end closure blank of FIG. 2 set in place over the end of the container;

FIG. 9 is a perspective view similar to FIG. 8 but showing the end-flaps and the flange flaps of the end blank bent upwardly and lying substantially in the plane of the respective side panels;

FIG. 10 is a perspective view similar to FIG. 9 but showing the outermost portions of the end-flaps bent inwardly to overlie the flanges of the end panel and thereby form a finished end structure for the container;

FIG. 11 is an enlarged partial sectional view taken along line **11—11** of FIG. 10;

FIG. 12 is a perspective view showing the container construction according to the assembly procedure shown in FIGS. 5, 6, 7, 8, 9 and 10, and further showing one side of the container opened for access to the contents thereof; and

FIG. 13 is an enlarged cross-sectional view showing one form of laminated material from which the blanks and the container shown in the other figures may be made.

Referring now to FIG. 1, the body blank **1** comprises four main body panels **21**, **31**, **41** and **51**, the lower panel being divided into two sections **51***a* and **51***b* by a transverse line of perforations **51***c*, the purpose of this line being hereinafter set forth. The main body panels **21**, **31**, **41** and **51** have their longitudinal edges defined by crease lines **22**, **32**, **42**, **52** and **62**, the latter crease line separating the flaps **61***a* and **61***b* from the main panel sections **51***a* and **51***b*, respectively. At the other end of the blank, the longitudinal bend line **22** separates the panel **21** from an auxiliary tab **11** which can be seen in FIGS. 1 and 11.

Along the sides of the body blank **1** are located a plurality of end-flaps **23—24**, **33—34**, **43—44**, and **53—54** attached respectively to the main panels **21**, **31**, **41** and **51** at transverse crease lines **25—26**, **35—36**, **45—46**,

and 55—56. All of these transverse crease lines at the junctions of the flaps and the main body panels are double crease lines, which crease lines are sometimes referred to in the packaging art as "railroad tracks." More will be said later concerning the reason for double crease lines at these junctions. In addition, each of these end-flaps is further provided with an additional transverse crease line, respectively labeled 27—28, 37—38, 47—48, and 57—58. Finally, each of the end-flaps is separated from the end-flap immediately thereadjacent by a slit which extends into the double embossed crease line, these slits respectively bearing the reference characters 29*a*—29*b*, 39*a*—39*b*, and 49*a*—49*b*.

Referring now to FIGS. 2 and 3, these figures show one of the end-blanks, of which two may be employed to provide a fully closed container. However, it is to be noted that one end of the container may be closed in any other desired manner, and that the present structure is provided specifically for use at the end of the container which is to be filled with a food product, although it is to be understood that this end structure is also satisfactory for use at the other end of the container. The end blank shown in FIGS. 2 and 3 is referred to generally by the reference character 2, and further includes four flange flaps 3, 4, 5 and 6, all of which are joined with the main panel of the end blank by embossed crease lines labeled 7, 8, 9 and 10. At each of the corners, a cut is made along and just outside of one of the crossed creased lines so as to leave a closure tab which serves the purpose to be hereinafter discussed, the tabs being labeled 3*a*, 4*a*, 5*a* and 6*a* in FIG. 2.

Referring now to FIGS. 4 and 12, it will be seen that the body blank 1 has been bent around the respective crease lines 32, 42, 52 and 62, and that the flange 11 has been bent outwardly around the crease line 22 so that it can be sealed against the inner surface of the flaps 61*a* and 61*b* to enclose a hollow polygonal body. The means for closing the lower end of the body in FIG. 4 is not further illustrated, since the present specification is concerned mainly with closing the upper end of the container through which the container is filled.

Referring now to FIG. 5, this figure is similar to the upper portion of FIG. 4 except for the fact that the end-flaps 23, 33, 43 and 53 have been turned down and reversed around the double crease lines 25, 35, 45 and 55. After the flaps have been reversed as shown in FIG. 5, a clincher frame C, which per se forms no part of the present invention, is placed over the upper end of the container, and masks the flaps which are indicated by the dashed lines in FIG. 6, the clincher frame protecting the flaps against contamination by the product which is being inserted in the container during the filling thereof.

When the container has been filled level with said product, generally designated by the reference character M in FIG. 7, the clincher frame C is removed and set aside and the flaps 23, 33, 43 and 53 are then released so that they return approximately halfway to their initial position to lie in a plane which is disposed transversely across the end of the container.

At this time, the end panel 2 is laid over the open end of the container as shown in FIG. 8 and it will be noted that this end panel 2 substantially covers that portion of the end of the container and the end-flaps 23, 33, 43 and 53 which is within the crease lines 27, 37, 47 and 57, as shown in FIG. 8. At this point, it is probably desirable to initially secure portions of the flange flaps 3, 4, 5 and 6 to the end-flaps 33, 23, 53 and 43. This can be done either by gluing or heat-sealing. When the end panel is thus secured in place against slipping, the end-flaps and the flange flaps are then bent upwardly to the position shown in FIG. 9 so that they lie substantially in the same plane as the four panels of the polygonal body. In addition, the small closure tabs 3*a*, 4*a*, 5*a* and 6*a* are bent inwardly to lie along and seal against the adjacent flange flaps. If desired, these closure tabs can be heat-sealed against the inner surfaces of the adjoining flange flaps 4 and 6 at this stage in the proceedings.

Finally, the outermost portions of the end-flaps beyond the crease lines 27, 37, 47 and 57 are bent through 180° inwardly of the container so that they respectively cover the inner surfaces of the flange flaps 4, 3, 6 and 5, respectively. Thus, it will be seen that the end-flap 43 covers the inner surface of the flange flap 6 and also covers the tabs 5*a* and 6*a* so as to form a neatly finished product with no raw edges of the cut blanks showing. Likewise, the portion of the end-flap 23 which bends inwardly overlies the flange-flap 4, and the closure tabs 4*a* and 3*a*, see FIGURE 11.

The finished container is shown in FIG. 12, and it will be noted that the line of perforations 51*c* mentioned above now forms the center break line 51*c'* where the lid is torn open. It is also desirable that two other lines of perforations be furnished, one of these lines being the line 51*d* which corresponds substantially to the position of the double crease line 55, and the other line of perforations lying along the line 51*e* and corresponding substantially to the position of the double crease line 56, this latter row of perforations having been torn when opening the container along the line 51*e* as shown in FIG. 12.

It is important to note that the cut edges of the body blank 1 along the end-flaps 23–53, inclusive, now abut against the flat surface of the main end-panel 2 and are protected thereby. Also, the cut outer edges of the flange-flaps 3, 4, 5 and 6 are entirely covered by the end-flaps which are bent along the crease lines 27, 37, 47 and 57, and are protected thereby.

When all of the end-flaps have been folded inwardly to hide the flange-flaps and tabs, the peripheral portions of the container including the flaps are then subjected to heat-sealing pressure so as to seal all of the flaps and tabs together to form a firm bond therebetween.

As stated in the objects of this invention, the joints need not be heat-sealed joints but may be held together by other adhesive means if so desired.

The main means which forms the hollow polygonal body prior to insertion of the end panel can be sealed at any stage in the proceeding. On a practical basis, however, it is probably desirable that the longitudinal seam forming the hollow body be sealed prior to sealing of the end panels in order to hold the shape of the container. With particular reference to FIGS. 1 and 12, it will be seen that the auxilairy flap 11 which is joined to the body panel 21 along the longitudinal bend line 22 is bent outwardly so that its cut edge 11*a*, FIGS. 1 and 11, faces outwardly of the container and is therefore not wetted by the contents thereof. The closure flaps 61*a* and 61*b* extend downwardly and cover the entire auxiliary flap 11 and are sealed against the body panel 21 of the container below the edge 11*a* of the auxiliary flap. This structure and the lines of perforations labeled 51*c*, 51*d* and 51*e* provide means whereby the container need not be opened on both sides simultaneously, for instance where two flavors of ice cream are packed, side-by-side, in the same container. Instead, the panel 51*b* can remain closed while panel 51*a* is open or vice versa, as shown in FIG. 12. The transverse line of perforations 51*c* provides a weakened junction between the panels 51*a* and 51*b* along which the container may be conveniently torn during during opening.

Referring now to FIG. 13, this figure shows on an enlarged scale a laminated material suitable for making the present blanks and containers. This laminate comprises a core of virgin kraft K coated on both sides with a plastic. The plastic should be a heat-sealable material such as polyethylene P, at least on the inner surface of the container, and the outer surface of the container should also be coated with a plastic material which may also be polyethylene, or which may alternatively comprise some other coating such as vinyl V. It is only necessary that the outer coating V will bond to the polyethylene P of the inner coating when heat is applied thereto so that the car-

ton may be heat-sealed by the above-mentioned steps which closely resemble welding. In another embodiment of the laminate, it is contemplated that a metal foil be secured to at least one side of the kraft core beneath the plastic coating for the purpose of dissipating heat coming to the carton either during its use as a container, or else during heat-sealing of the carton, so as to protect its contents. Also, the core of the laminate need not be kraft, but can be any other semirigid container material.

I do not limit my invention to the exact form shown in the drawing, for obviously changes may be made therein within the scope of the claims.

I claim:

1. The method of filling and closing a paperboard container having a hollow polygonal body with end-flaps around an open end of the body and mutually separated by cuts extending to a predetermined depth along each of the longitudinal bend lines of the body and said container having an end panel of the same shape and size as the cross-section of the body and further including flange flaps extending outwardly therefrom around its periphery by a distance less than the depth of said cuts, the method including the following steps: bending each end-flap outwardly through at least 90 degrees with respect to the side of the body to which it is attached; filling the body up even with the plane of its end opening, placing the end panel over the open end of the body and securing the flange flaps to the end flaps in that plane; folding the end-flaps and flange flaps to lie normal to said plane and extend away from the body; securing the mutually adjacent flange flaps together; folding each end flap inwardly through 180 degrees to cover the associated flange flap; and securing the end-flaps and flange flaps together.

2. The method of filling a paperboard container with a moist bulk material and closing the container without wetting the surfaces to be sealed, said container having a hollow polygonal body with end-flaps around an open end of the body and mutually separated by cuts extending to a predetermined depth along each of the longitudinal bend lines of the body and said container having an end panel of the same shape and size as the cross-section of the body and further including flange flaps extending outwardly therefrom around its periphery by a distance less than the depth of the cuts, the method including the following steps: bending each end-flap outwardly and downwardly to lie substantially against the side of the body to which it is attached; masking the end-flaps to prevent wetting thereof while filling the body up even with the plane of its end opening; placing the end panel over the open end of the body and securing the flange flaps to the end-flaps in that plane; folding the end-flaps and flange flaps to lie normal to said plane and extend away from the body; securing the mutually adjacent flange flaps together; folding each end-flap inwardly through 180 degrees to cover the associated flange flap; and securing the end flaps and flange flaps together.

3. The method of filling and closing a container made of sheet material having heat-sealable plastic surfaces, the container having a hollow polygonal body with end-flaps around an open end of the body and mutually separated by cuts extending to a predetermined depth along each of the longitudinal bend lines of the body and said container having an end panel of the same shape and size as the cross-section of the body and further including flange flaps extending outwardly therefrom around its periphery by a distance less than the depth of said cuts, the method including the following steps: bending each end-flap outwardly through at least 90 degrees with respect to the side of the body to which it is attached; filling the body up even with the plane of its end opening; placing the end panel over the open end of the body and sealing the flange flaps to the end-flaps in that plane; folding the end-flaps and flange flaps to lie normal to said plane and extend away from the body; sealing the mutually adjacent flange flaps together; folding a portion of each end-flap inwardly through 180 degrees to cover the associated flange flap; and sealing the folded portions of the end-flaps and flange-flaps together.

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