Oct. 22, 1963 D. B. KAUFFELD 3,107,839

BOX STRUCTURE

Filed Sept. 26, 1961

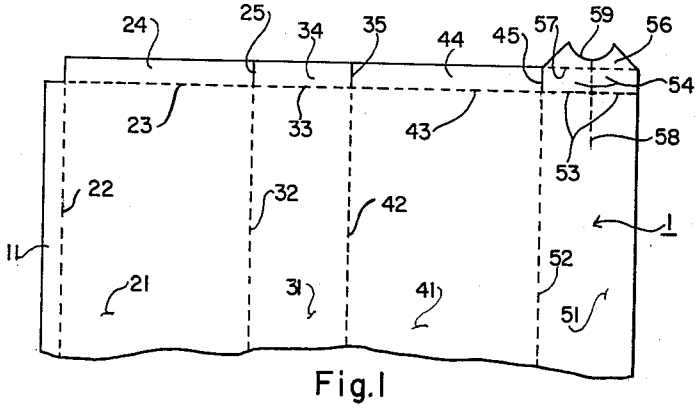



Fig.1

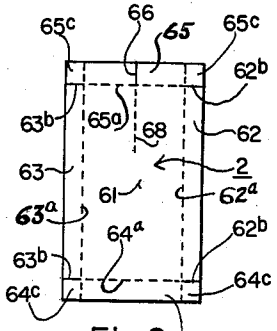



Fig.2

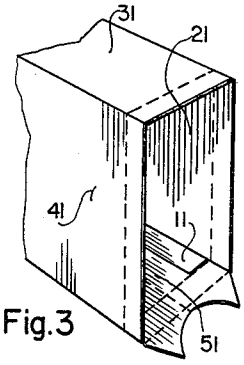



Fig.3

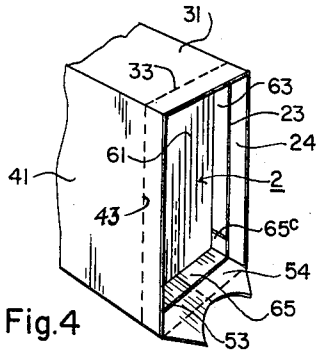



Fig.4

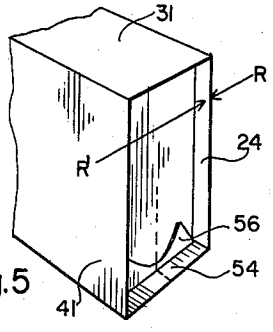



Fig.5

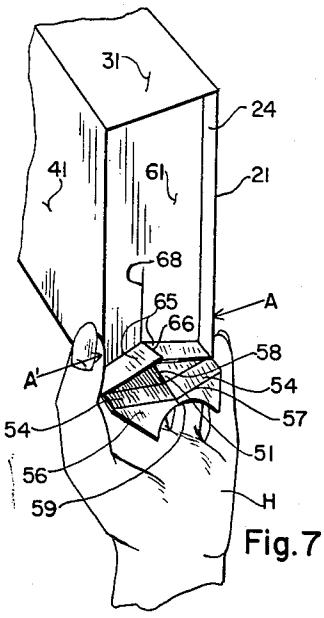



Fig.7

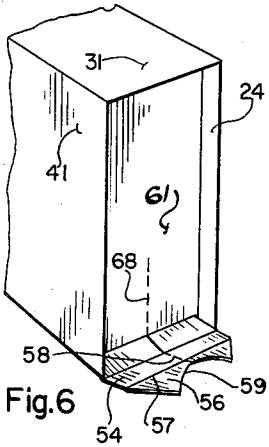



Fig.6

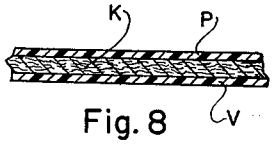



Fig. 8

INVENTOR

DON B. KAUFFELD

BY Alexander & Dowell

ATTORNEYS

United States Patent Office 3,107,839 Patented Oct. 22, 1963



3,107,839

# BOX STRUCTURE

Don B. Kauffeld, Lexington, Ky., assignor to Foils Packaging Corporation, a corporation of Ohio

Filed Sept. 26, 1961, Ser. No. 140,741
11 Claims. (Cl. 229—17)

This invention relates to the structure of paperboard blanks and to boxes made from said blanks, and more particularly relates to an improved box having a special top structure serving both as a closure and as a dispensing means for the contents of the box.

It is an important object of this invention to provide an improved box for packaging dry products, such as cereals, soap flakes, condiments, and other granular materials.

Another important object of the invention is to provide an improved box structure having a special pull-open tab enabling the box to be easily opened without the use of instruments, and to provide a convenient closure for reclosing the box to protect the contents thereof, the tab also serving as a pouring agent during dispensing of the contents of the box.

Still another important object of the invention is to provide in the vicinity of the pull tab a special box structure which, when the box is squeezed, forms a pouring spout and simultaneously opens the box to dispense its contents, the rate of dispensing being controlled by the degree of squeezing of the box, and said box at least partially reclosing when the squeezing pressure is released.

It is another object of the invention to provide a box made of material having thermoplastic surfaces which can be sealed together in order to close the box, and wherein the sealing is accomplished around a flange-like end structure which is disposed entirely externally of the box and relatively remote from the contents thereof, whereby the contents of the box are protected from damage by the heat applied to the end structure to accomplish the sealing thereof.

Still another object of the invention is to provide a novel end structure which is especially strong and has particular resistance to distortion or damage of the type which might result from dropping of the box during handling, the box also providing a seal serving to protect the contents from contamination and/or staleness during the shelf life of the product.

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

FIG. 1 is a plan view of a blank suitable for making the body portion of the box 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 closure blank for a box according to the present invention, the cut lines and embossed bend lines being shown similarly as in FIG. 1;

FIG. 3 is a perspective view of the body of a box formed by bending the blank of FIG. 1 about a plurality of longitudinal bend lines and sealing the adjacent side panels together along a longitudinal seam tab in order to provide a hollow polygonal body;

FIG. 4 is a perspective view of a box body similar to that shown in FIG. 3 but showing an end panel inserted in the body;

FIG. 5 is a perspective view of a finished container formed by bending the end flaps of the body over the flange flaps of the end panel and sealing the resulting structure together;

FIG. 6 is a perspective view of a box similar to that shown in FIG. 5, but showing the box partially opened



by pulling a pull tab away from the box to break its seal with a flange flap of the end panel;

FIG. 7 is a perspective view of a box similar to FIG. 6 but showing the sides of the box squeezed toward each other to effect opening of the box in the vicinity of the pull tab and to bend the pull tab to form a dispensing spout; and

FIG. 8 is an enlarged cross-sectional view showing one form of laminated material from which the blank and the box shown in the other figures may advantageously be made.

Referring now to FIG. 1, the top blank includes four side panels **21**, **31**, **41** and **51**, these panels being arranged side by side and mutually separated by four longitudinal embossed bend lines **22**, **32**, **42** and **52**, these bend lines extending the full length of the blank. To the left of the bend line **22** is a side seam tab **11**, this tab being bent at right angles to the side panel **21** along the bend line **22** and sealed to the inside surface of the rightmost side panel **51**, as illustrated in FIG. 3 wherein the blank of FIG. 1 has been set up and seamed to form a hollow polygonal box body.

This blank is further provided with a transverse embossed crease line which includes the crease lines **23**, **33**, **43** and **53**, and which crease lines divide the blank longitudinally into side panels **21**, **31**, **41** and **51** and into end flaps **24**, **34**, **44** and **54**. These end flaps are mutually separated by intervening slits **25**, **35** and **45** so that the end flaps may be bent about said crease lines separately from each other for the purpose hereinafter stated.

Referring to FIG. 2, this figure shows an end closure blank **2** having an end panel **61** which includes on its longer sides two flanges flaps **62** and **63** and on its shorter sides two flange flaps **64** and **65**, the latter flap being divided in half by a cut line **66**. These flange flaps are respectively joined to the end panel **61** by embossed crease lines **62***a*, **63***a*, **64***a* and **65***a*, and the ends of the longer flange flaps **62** and **63** are separated from the shorter flange flaps by slits **62***b* and **63***b* for the purpose to be hereinafter stated.

When the body blank shown in FIG. 1 has been set up to form a hollow polygonal body as shown in FIG. 3 in which the seam tab **11** has been secured to the inside surface of the panel **51**, an end closure means is then set in place as shown in FIG. 4 by bending the flange flaps **62**, **63**, **64** and **65** to face outwardly of the box and lapping the four small corner tabs **64***c* and **65***c* over the adjacent longer tabs **62** and **63**, the outermost edges of the flange flaps **62**, **63**, **64** and **65** lying substantially even with the position of the transverse crease lines **23**, **33**, **43** and **53** of the body blank **1**, as shown in FIG. 4. The box is then completed by bending the end flaps **24**, **34**, **44** and **54** through almost 180 degrees inwardly of the box so as to cover the flange flaps **62**, **63**, **64** and **65** of the end blank **2**.

In this position, if the container has thermoplastic surfaces, the side panel and the flange flap and the end flap are then clamped together and heated so as to fuse these plastic surfaces together. For example in FIG. 5, pressure would be applied outside of the container near the end thereof in the vicinity of the arrow R and pressure would also be applied from the inside in the vicinity of the arrow R′ thereby squeezing together the side panel **21**, the flange flap **63** and the end flap **24**, and sealing these portions together. This same procedure applies to the structure on the other three sides at the end of the box.

By reference to FIGS. 1 and 6 it will be seen that the end flap **54** is wider than the flange flap **65** which it is to cover and has an extension comprising a pull tab **56** separated from the inner portion of the end flap **54** by an embossed crease line **57**. In addition, a longitudinally

disposed embossed bend line 58 is provided which bisects the end portion of the side panel 51, the end flap 54 and the pull tab 56. This tab also includes a concave arcuate outer edge 59 which, as can be best seen in FIG. 7, provides an improved pouring spout when the box is squeezed as shown by the hand H gripping the end of the box and causing it to bend as shown in FIG. 7, the squeezing pressure being applied in the direction of the arrows A—A'.

When the closed box shown in FIG. 5 is to be opened, the consumer grasps the pull tab 56 and pulls it outwardly into the position shown in FIG. 6 until it lies substantially in the same plane as the side panel 51. Then, when the sides of the box are squeezed toward each other by application of pressure in the vicinity of the arrows A—A' the end panel 61 tends to break and warp inwardly about a longitudinal bend line 63, and the two halves of the flange flap 65 lap over each other thereby retracting the end panel inwardly of the box and permitting the two side panels 21 and 41 to approach each other. As these two panels approach each other, the body panel 52 bends along the bend line 58 and bends downwardly so as to form a trough-shaped pouring spout beneath an opening created by retreating of the body panel 51 away from the flange flap 65. The contents of the box can therefore pass between the panel 51 and the flange flap 65 at a rate controlled by the degree of squeezing pressure applied to the box, and the contents then pour outwardly along the trough-shaped spout including the end flap 54 and the pull tab 56.

When the squeezing pressure at the arrows A—A' is released, the box tends to resume its normal shape in which the panel 51 approaches the flange flaps 65 thereby tending to close the box. The end flap 54 and the pull tab 56 can also be bent back over the flange flap 65 to the position shown in FIG. 5 so as to again close the mouth of the box.

Referring to FIG. 8, this figure illustrates a preferred laminated material, of which the present box can be made, including a paperboard core K made of virgin or reclaimed kraft, or other suitable material, the core having plastic coatings on its surfaces. If the box is to be "welded" or heat-sealed at its various seams, at least one surface should be coated with a suitable thermoplastic having a melting point sufficiently low that the core material will not be damaged at the heat-sealing temperature. For instance, one or both surfaces can be coated with polyethylene P which is well adapted to heat-sealing purposes. Alternatively, as shown in FIG. 8, the kraft core K can be coated on one side with polyethylene P and on the other side with vinyl V to which the polyethylene P will bond but which has a higher melting point, the vinyl V being a cheaper coating material. It is not essential to the present disclosure that the box be heat-sealed, the present structure having utility in connection with boxes secured together by other means, such as by glue.

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 following claims.

I claim:

1. A box comprising body panels joined together along longitudinal edges to form a hollow polygonal body and having end flaps joining the body panels at transverse crease lines; and end closure means closing at least one end of said hollow body and each including an end panel having flange flaps therearound, the end closure means being fitted into the body with the flange flaps facing outwardly thereof and terminating at said transverse crease lines, and said end flaps being bent inwardly of the box to cover said flange flaps and being secured thereto, at least one end flap being wider than the flange flap which it covers and being divided by a crease line into an end flap portion of the same size as the latter flange flap and a pull-tab portion which lies against the end panel normal to said flap portion when the box is sealed.

2. In a box as set forth in claim 1, said pull-tab portion, said flap portion and the body panel thereadjacent having a longitudinally disposed bend line bisecting their transverse dimensions, and the end panel and flange flap being bisected along their intersection with the plane including the axis of the box and said last-mentioned bend line, whereby when the box is opened and squeezed at the sides adjacent the ends of said wider flap, the end panel will warp about said intersection, and the flap portion and pull-tab portion will bend about said bend line and away from the end panel to form a pouring aperture and spout.

3. In a box as set forth in claim 2, said intersection on the end panel comprising an embossed crease line and said intersection on said last-mentioned flange flap comprising a cut line across the flap.

4. In a box as set forth in claim 2, the outer edge of the pull-tab portion being arcuate and concave, whereby when the tab portion is bent about said bend line the concave arcuate edge will group the contents of the box being poured therepast.

5. A box comprising body panels joined together along longitudinal edges to form a hollow polygonal body and having end flaps joining the body panels at transverse crease lines; and end closure means closing at least one end of said hollow body and each including an end panel having flange flaps therearound, the end closure means being fitted into the body with the flange flaps facing outwardly thereof and terminating at said transverse crease lines and said end closure means having corner tabs lapping and joining said flange flaps together, and said end flaps being bent inwardly of the box to cover said flange flaps and being secured thereto, at least one end flap being wider than the flange flap which it covers and being divided by a crease line into an end flap portion of the same size as the latter flange flap and a pull-tab portion which lies against the end panel normal to said flap portion when the box is sealed.

6. A heat-sealed box made of sheet material having thermoplastic surfaces, comprising body panels joined together along longitudinal edges to form a hollow polygonal body and having end flaps joining the body panels at transverse crease lines; and end closure means closing at least one end of said hollow body and each including an end panel having flange flaps therearound, the end closure means being fitted into the body with the flange flaps facing outwardly thereof and terminating at said transverse crease lines, and said end flaps being bent inwardly of the box to cover said flange flaps and being heat-sealed thereto, at least one end flap being wider than the flange flap which it covers and being divided by a crease line into an end flap portion of the same size as the latter flange flap and sealed thereto and a pull-tab portion which lies against the end panel normal to said flap portion when the box is sealed.

7. In a box as set forth in claim 6, said pull-tab portion, said flap portion and the body panel thereadjacent having a longitudinally disposed bend line bisecting their transverse dimensions, and the end panel and flange flap being bisected along their intersection with the plane including the axis of the box and said last-mentioned bend line, whereby when the box is opened and squeezed at the sides adjacent the ends of said wider flap, the end panel will warp about said intersection, and the flap portion and pull-tab portion will bend about said bend line and away from the end panel to form a pouring aperture and spout.

8. In a box as set forth in claim 7, said intersection on the end panel comprising an embossed crease line and said intersection on said last-mentioned flange flap comprising a cut line across the flap.

9. In a box as set forth in claim 7, the outer edge of the pull-tab portion being arcuate and concave, where-

by when the tab portion is bent about said bend line the concave arcuate edge will group the contents of the box being poured therepast.

10. A blank for making a paperboard box body comprising more than two body panels mutually joined together along longitudinal bend lines; end flaps joined to said body panels at transverse crease lines, at least one of the end flaps being separated from the others by cuts extending inwardly to said crease lines and said one flap having a pull-tab portion joining the flap at an edge parallel with its crease line and having a concave arcuate outer edge, and said blank having a longitudinal crease crease line bisecting the pull tab and the associated end flap and extending part-way along the center of the associated body panel.

11. A paperboard blank for closing the end of a hollow polygonal body, comprising an end panel having flange flaps therearound and joining the body at embossed bend



lines, the flange flaps being mutually separated in the corners by slits which leave corner tabs each attached to one flange flap and adapted to overlie an adjacent flange flap when the flaps are bent at right angles to the panel, and one of the flange flaps being bisected by a slit thereacross joining an embossed crease line on the panel and disposed normal to the intersection bend line.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,323,505 | Wilcox | July 6, 1943 |
| 2,511,189 | Woodward | June 13, 1950 |
| 2,654,525 | Adorney et al. | Oct. 6, 1953 |
| 2,865,498 | Ringler | Dec. 23, 1958 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 472,474 | Great Britain | Sept. 20, 1937 |