July 3, 1945. D. LEVKOFF 2,379,726

FOLDING BOX

Filed Dec. 22, 1942 2 Sheets-Sheet 1

FIG. 1.

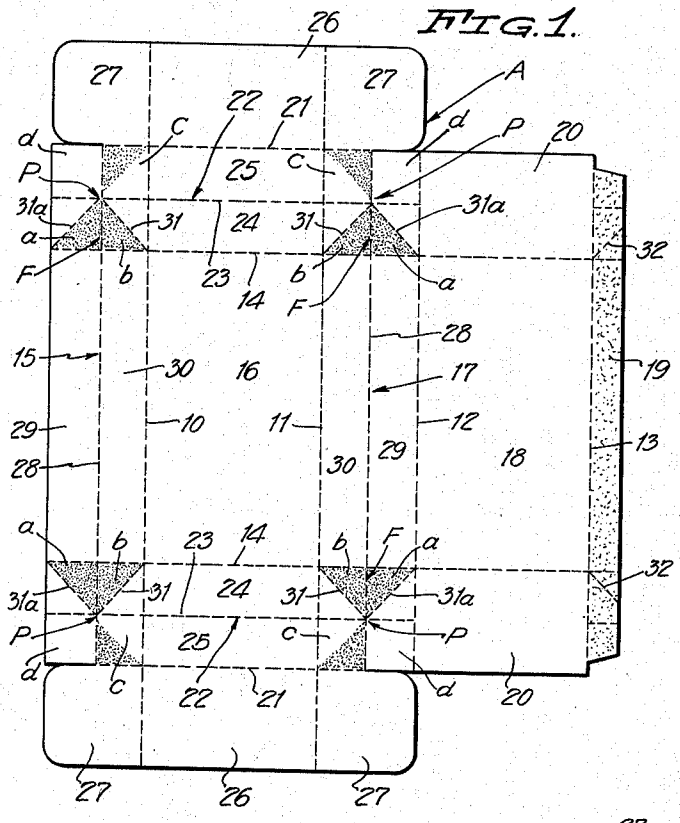


FIG. 2.

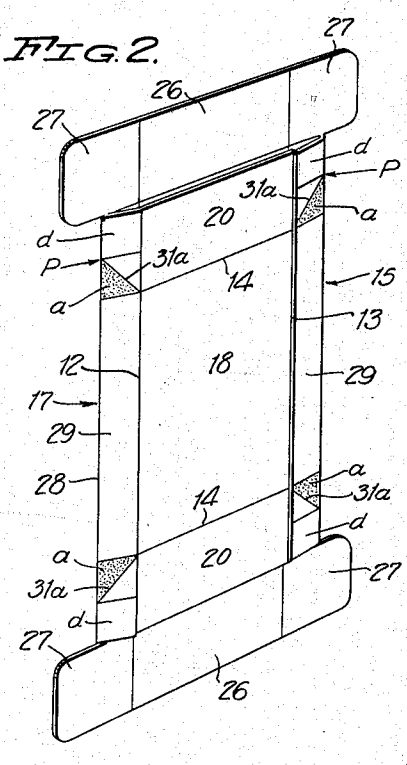


FIG. 3.

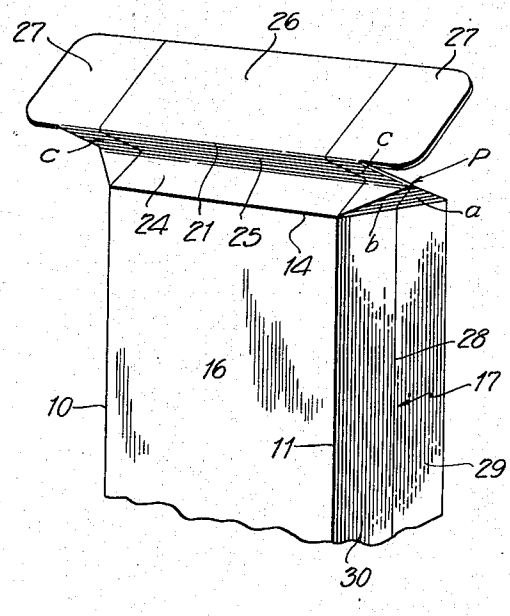
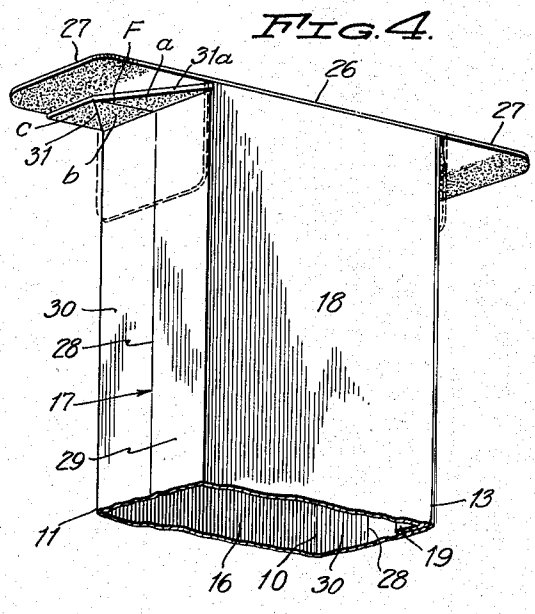


FIG. 4.



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FIG. 5.

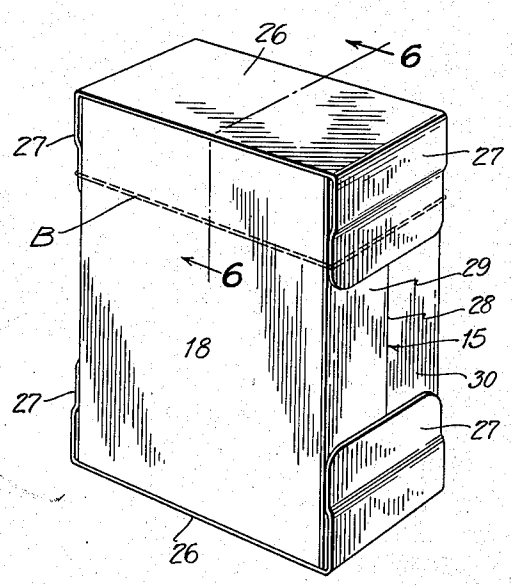


FIG. 6.

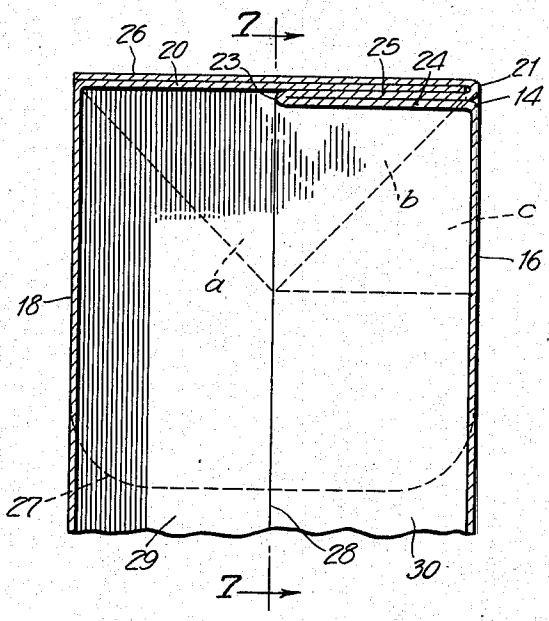
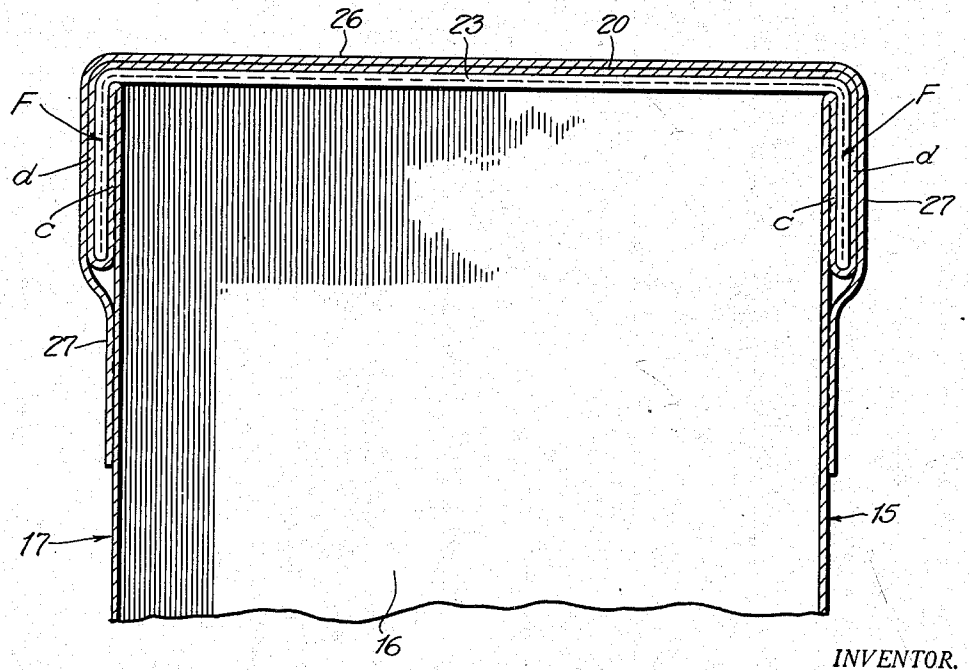


FIG. 7.



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FOLDING BOX

David Levkoff, Brooklyn, N. Y.

Application December 22, 1942, Serial No. 469,796

1 Claim. (Cl. 229—37)

This invention relates to improvements in folding cardboard boxes and more specifically to an end wall closure therefor.

One of the main features of the invention resides in a cardboard box which when in collapsed position consists of a flat tubular body to facilitate compact stacking and shipping, and which has integral end wall structures which are foldable in a novel manner and glued, to seal and secure the box in set up position for use.

Another feature of the invention is to provide an end closure for folding cardboard boxes in which all edges and corners between the side and end walls are closed by folds of the cardboard material to provide a seal to prevent leagake of the contents from the box and exclude moisture thereinto.

Another feature of the invention is to provide a folding end wall structure which reinforces the end walls and end corners of a carboard box to reduce the loss of contents caused by breakage during handling and shipment.

A further feature of the invention is the provision of a folding box having the aforementioned features which is formed from a single blank of cardboard of substantially rectangular configuration, and which may be cut from stock cardboard with a negligible amount of waste.

Other features of the invention will become apparent as the following specification is read in conjunction with the accompanying drawings, in which:

Figure 1 is an outside plan view of the blank of foldable material from which the box is constructed.

Figure 2 is a perspective view of the box in partially folded collapsed position.

Figure 3 is a detail perspective view of one end of the box in a partially folded set up position.

Figure 4 is a detail perspective view of one end of the box just prior to the final folding and gluing operation.

Figure 5 is a perspective view of the box in sealed set up position.

Figure 6 is an enlarged detailed vertical transverse sectional view on the line 6—6 of Figure 5.

Figure 7 is a vertical sectional view on the line 7—7 of Figure 6.

Referring to the drawings by reference characters, the letter A in Figure 1 designates a substantially rectangular shaped blank of cardboard, heavy paper, or other like foldable material which is scored and folded in a novel manner to form a complete box having sealed end closures. The blank A is scored vertically on the suitably spaced parallel scores 10, 11, 12, and 13. The blank is further scored on the horizontal lines 14—14 which extend entirely across the blank. One side edge of the blank A, the score 10 and scores 14—14 define a rectangular side wall panel 15. The scores 10, 11, and 14—14 define a larger rectangular side wall panel 16. The scores 11, 12, and 14—14 define a rectangular side wall panel 17 which is complementary to the panel 15. The scores 12, 13 and 14—14 define a rectangular panel 18 which is complementary to the panel 16. The scores 14—14, 13 and edge of the blank adjacent score 13 define a glue flap panel 19. Integrally connected to the ends of the panel 18 along the scores 14—14 are inner end wall panels 20—20, the same also being bounded by the scores 12 and 13. The blank A is further scored on the horizontal scores 21—21, which scores are in alinement with the free end edges of the inner end wall panels 20—20. The scores 14, 21, 10, and 11 at each end of the blank define a folding end wall panel 22 of a size substantially the same as the panels 20, however, each panel 22 is divided in halves by a horizontal score 23 into foldable end panel sections 24 and 25. The scores 23 extend from the vertical score 12, across the panels 22 to the free edge of the blank adjacent which the panel 15 is formed. Integrally connected to the panel sections 25 along the scores 21—21 are rectangular outer end wall panels 26—26 to which glue flaps 27—27 are connected along the end portions of the scores 10 and 11. The side wall panels 15 and 17 are divided in half in a lengthwise direction by vertical scores 28—28, which scores terminate at the ends of the scores 21—21. The scores 28 divide the narrow side wall panels 15 and 17 into like folding sections 29 and 30 to enable the flat folding of the sections one against the other when the box is in collapsed positions as shown in Figure 2. The crossing scores 10, 14, 21 and one edge of the blank form the boundary for a square shaped flap forming panel P and a similar flap forming panel P is bounded by the scores 11, 14, 12 and 21. Each of the panels P—P are divided by the crossing scores 28 and 25 into four square folding sections *a*, *b*, *c*, and *d*. The sections *a* and *b* are further divided by diagonal scores 31 and 31*a* respectively which scores meet at the intersection of the scores 23 and 28 to provide a trianguiar shaped glue flap F. Whereas glue is not applied to the flaps F until the blank has been folded to the position shown in Figure 4, I have stippled the drawing in Figure 1 to indicate those portions of the panel flaps P which receive glue prior to the final folding and sealing

operation. It will be noted that a triangular shaped area of the sections *c* also receive glue, due to the fact that they are exposed to a gluing roller when the roller applies the glue to the triangular shaped flaps F.

From the foregoing description of the blank A, it will be noted that the ends of all side wall panels have folding end closure panels integral with the ends thereof and that the end closure panels **22**, **20** and P—P at each end are integrally connected.

The initial folding of the blank A is upon the scores **28—28** to bring the complementary side wall panels **16** and **18** flat against each other, with the side wall panel section **29** of the panel **15** overlapping the glue side of the glue flap **19**. The glue flap **19** may receive its glue from a gluing machine prior to folding of the blank on the scores **28—28**. The glue flap **19** is diagonally scored adjacent its ends as at **32** for alinement with the scores **31** of the areas at the ends of the panel **15**. With the blank A folded and glued in the manner just described, the box assumes a flat tubular formation as illustrated in Figure 2, and which may be termed the collapsed position of the box, which must be subsequently folded and glued in a manner now to be described. When the box is in the position shown in Figure 2, the end wall forming panels are in the form of collars coextensive with the ends of the side wall forming panels. As will be clearly understood from the foregoing description, the panels **20** and **22** fold inwardly, while the panels P fold outwardly and upon themselves to compensate for the free infolding of the panels **22** and **20** to which they are hingedly connected.

Assume that the box is in the collapsed position shown in Figure 2, and it is desired to set up the same for use. An operator grasps the sides of the collapsed box and presses inwardly against the folds formed by the scores **28—28**. This effects a separation of the opposed side wall panels **16** and **18** and causes the folded panels **15** and **17** to spring into unfolded position at right angle to the panels **16** and **18**. The side wall panels **15**, **16**, **17** and **18** are now in position with the end wall panels and flaps coextensive therewith. It will be understood that the bottom end wall structure is first folded to provide a bottom before the contents are placed in the box, after which the top end wall structure is folded and sealed. However, the folding and sealing of both end wall structures are the same so that a description of one will suffice for the other. With the body of the box set up, the operator may now press inwardly upon the section **24** of the folding end wall panel **22** which causes the panel **22** to fold on the score **23**. During this operation, the glue flaps F are formed by the folding of the panel P on the diagonal scores **31—31***a* and that portion of the scores **28—28** dividing the sections *c* and *d*. Simultaneously the inner end wall panel **20** is drawn inwardly by hinging on the scores **14** and adjacent diagonal scores **21***a* as illustrated in Figure 3. The panel **20** is now pressed inwardly against the partially folded section **25** of the foldable end wall panel **22**, until both the panel **20** and the panel section **25** assume a position at right angle to the side walls, at which time the section **25** is folded back against the inner folded section **24**. The box now assumes the position shown in Figure 4 and is ready for its final gluing and subsequent folding and sealing operation. The pointed flaps F extend at right angle from the side panels **15** and **17** together with the sealing flaps **27**. Due to the novel folding of the end structure to form the folded pointed sealing flaps F, triangular portions of the sections *c* are exposed for receiving glue when the inner sides of the flaps **27** and flaps F are passed over a glue roller. Immediately after receiving glue, the flaps **27** and F are simultaneously folded inwardly against the side wall panels **15** and **17** and become adhered thereto as illustrated in Figure 5. When both end wall structures are folded to closed position, the box appears as shown in Figure 5. To open the box, the glued flaps **27** and triangular fold flaps F may be pulled loose from the side wall panels **15** and **17**, whereupon the outer and inner end wall panels **26** and **20** may be pulled loose from their glue connection with the side wall panels **15** and **17** which frees the flap **26** and panels **20** and **22** for subsequent unfolding to open position. After an initial opening of the end wall structure to remove part of the contents of the box, the structure may again be folded to closed position and held by passing a rubber band about the box to hold the flaps **27** close to the side walls **15** and **17** as illustrated at B in dotted lines in Figure 5.

By reference to Figure 1 of the drawings, it will be noted that all side walls are bounded at their ends by integral folding panel flaps, which when folded, provide a sealed box in which all edges and corners are closed by folds in the material from which the box is constructed.

While I have shown and described what I consider to be the prepared embodiment of my invention, I wish it to be understood that such changes in construction and design as come within the scope of the appended claim may be resorted to if desired without departing from the spirit of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

A folding box formed from a single blank of foldable material having four connected side walls, a folding end wall structure integral with the four side walls comprising a folding end panel integral with and connected along a hinge score to one of said side walls, said folding end panel being scored parallel to the hinge score to divide the same into inner and outer folding sections, the inner section being folded inwardly and the outer section being folded outwardly and disposed over the inner section, an inner end wall panel integral with and connected by a hinge score to the side wall opposite to that to which the folding end panel is connected and being folded over the outer section of the folded end panel, and an outer end wall panel integral with the outer section and connected thereto along a hinge score, said outer end wall panel bting folded over the inner end wall panel, foldable flap forming panels integral with the other two opposed side walls and with the ends of the folding end panel and with the inner end wall panel and respectively connected thereto along hinge scores, said foldable flap forming panels being respectively folded to provide foldable corner flaps, said corner flaps being folded against the last mentioned two opposed side walls and secured thereto by glueing, and side flaps connected to the ends of the outer end wall panel and being of a length greater than the folded corner flaps and respectively folded thereover with their end portions extending beyond the ends of the corner flaps and flatly engaging the last named side walls and being glued thereto.

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