Aug. 7, 1951 E. L. WINKLER 2,563,145

FOLDING TRAY

Filed Dec. 29, 1948 3 Sheets-Sheet 1

FIG. 1.

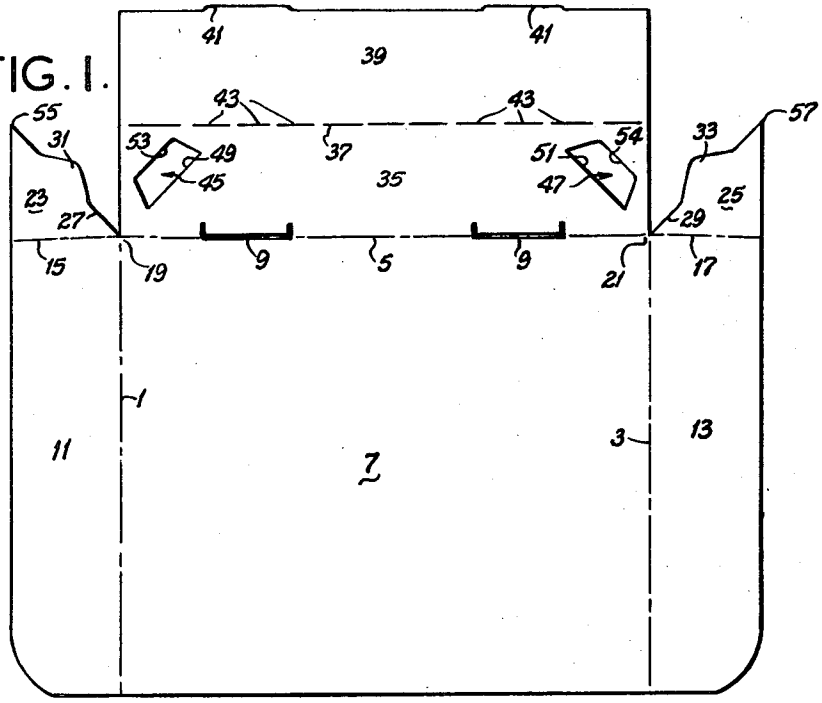
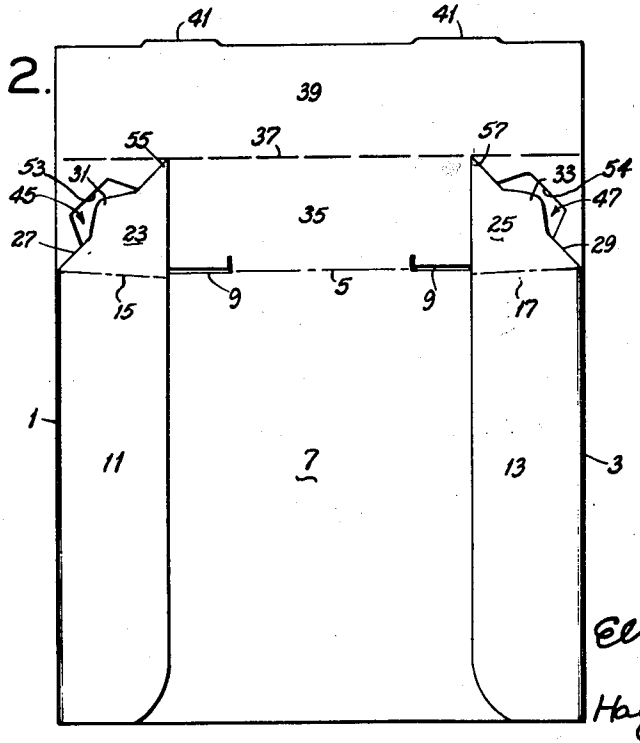


FIG. 2.



Elmer L. Winkler
Inventor.
Haynes and Koenig
Attorneys.

Aug. 7, 1951 E. L. WINKLER 2,563,145

FOLDING TRAY

Filed Dec. 29, 1948 3 Sheets-Sheet 2

FIG. 3.

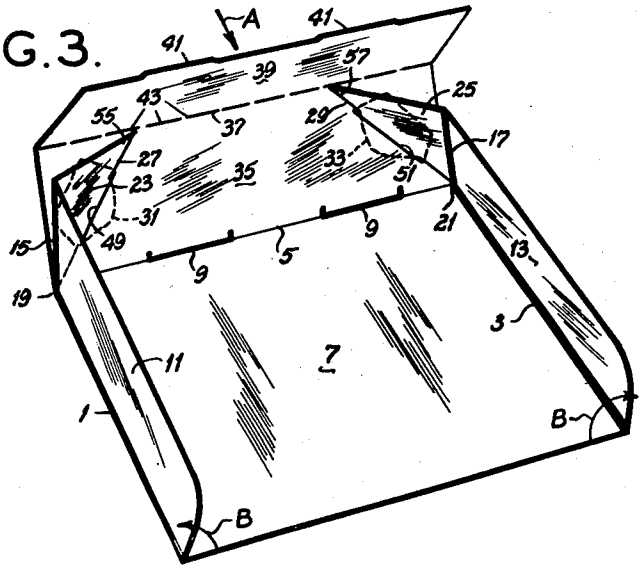


FIG. 4.

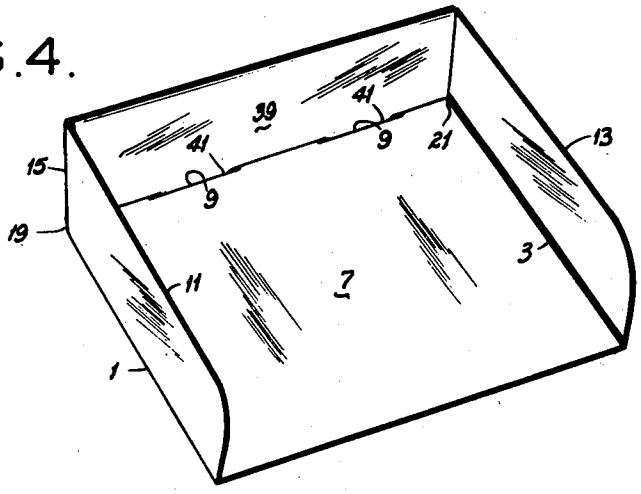
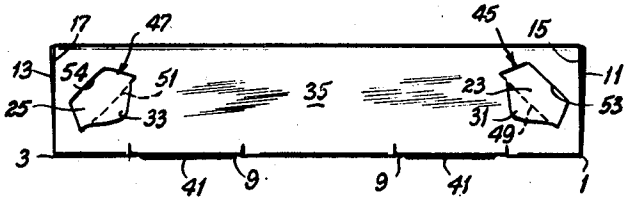


FIG. 5.



Elmer L. Winkler
Inventor.
Haynes and Koenig
Attorneys.

Aug. 7, 1951 E. L. WINKLER 2,563,145

FOLDING TRAY

Filed Dec. 29, 1948 3 Sheets-Sheet 3

FIG. 6.

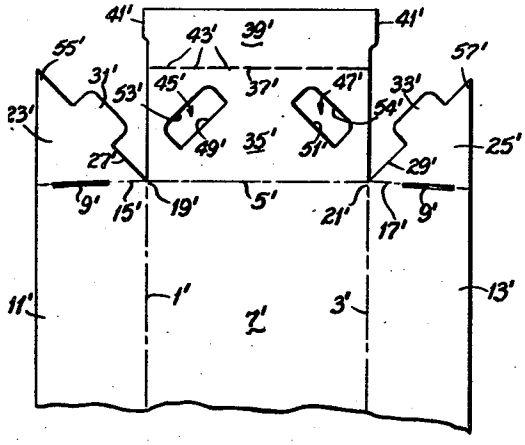


FIG. 7.

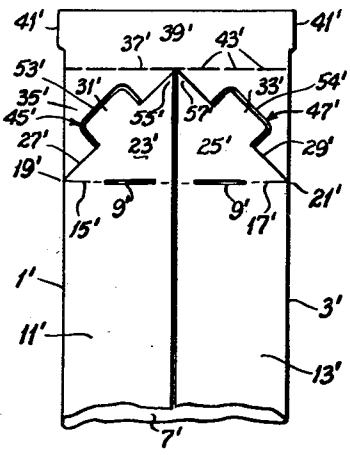


FIG. 8.

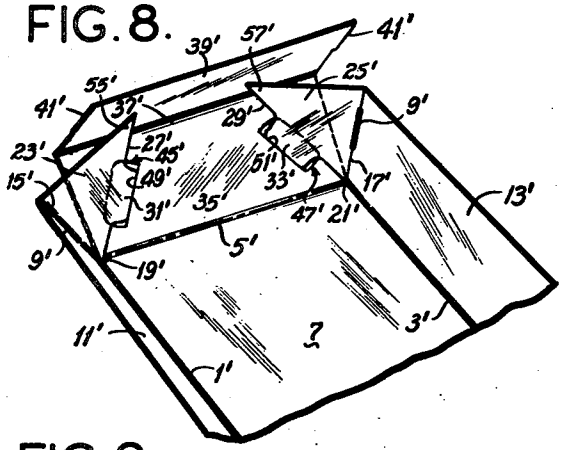


FIG. 10.

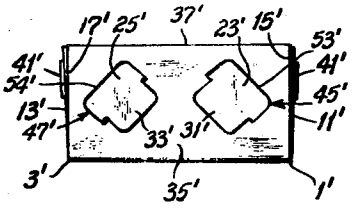
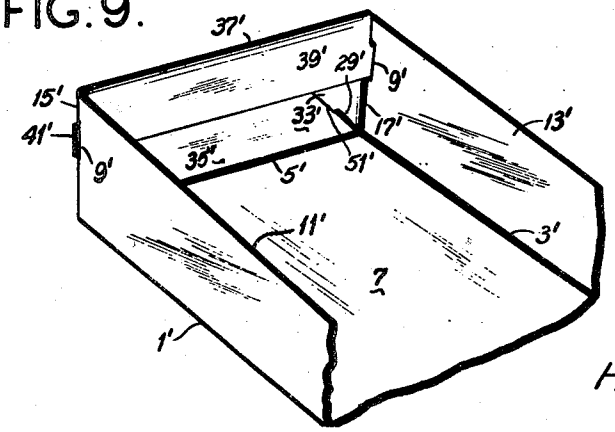


FIG. 9.



Elmer L. Winkler,
Inventor.
Haynes and Koenig,
Attorneys.

Patented Aug. 7, 1951

2,563,145

UNITED STATES PATENT OFFICE

2,563,145

FOLDING TRAY

Elmer L. Winkler, Collinsville, Ill., assignor to Mott Carton and Paper Company, St. Louis, Mo., a corporation of Missouri

Application December 29, 1948, Serial No. 67,895

5 Claims. (Cl. 229—34)

1

This invention relates to folding trays, boxes and the like, and with regard to certain more specific features, to folding articles of this class, generally made of cardboard or a similar material.

Among the several objects of the invention may be noted the provision of an economical folding tray or box which may be made from a single simple blank of minimum size requiring no paste in its make-up; the provision of an article of the class described which may be semi-folded and shipped flat prior to use; and the provision of an article of this class which may be rapidly and conveniently folded into final shape for acceptance of goods to be contained. Other objects will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which several of various possible embodiments of the invention are illustrated,

Fig. 1 is a plan view of a blank of one embodiment of the invention;

Fig. 2 is a plan view showing a prefolded blank for flat shipment;

Fig. 3 is a perspective view showing an intermediate step of a final folding operation;

Fig. 4 is a perspective view of the final product of the first form of the invention;

Fig. 5 is an end elevation of the final product;

Figs. 6 and 7 are fragmentary views corresponding respectively to Figs. 1 and 2, but showing an alternative embodiment of the invention;

Fig. 8 is a view similar to Fig. 3 but showing the alternative embodiment, except that certain side panels are shown somewhat spread apart in order to expose certain tongues;

Fig. 9 is a fragmentary view similar to Fig. 4, showing the alternative embodiment; and,

Fig. 10 is an end elevation of said alternative embodiment.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Many articles of merchandise such as bakery goods, fruits, vegetables, etc., are packaged by placing one or more of them in an open cardboard or similar tray and then wrapping the tray with a sheet of transparent or opaque material

2

such as cellophane or paper. The wrapping is done either manually or automatically. Trays for the purpose should preferably come to the wrapper in a knocked-down, flat, or semi-folded condition and be of such a character that only a simple operation is required to convert from a prefolded to a set-up condition. Moreover, the device should be as simple and economical as possible. The present invention provides a prefolded blank for such a tray or box. While the invention is shown as applied to an open type of tray or box which is subsequently to be wrapped, it is to be understood that it is applicable to similar articles having covers.

Referring now more particularly to Figs. 1–4, Fig. 1 shows a flat blank of suitable, substantially stiff sheet material such as cardboard, of a weight suitable for the size of tray to be made. This is rectangularly scored, as shown at numerals 1, 3 and 5, to outline a bottom 7. Adjacent the score line 5 are spaced strike-outs forming spaced slits 9 coaxial with the score line. As will appear, these slits are optional.

The score lines 1 and 3 determine bendable opposite side panels 11 and 13, respectively. The ends of the panels 11 and 13 are determined by score lines 15 and 17, respectively. It will be noted that the score lines 1, 5 and 15 have an origin at a point 19 which forms one corner of the finished tray. The score lines 3, 5 and 17 have an origin at a point 21 which forms another corner of the finished tray. The score lines 15 and 17 in the flat blank (Fig. 1) are angled slightly with respect to the score line 5. Preferably, the arrangement is such that the angles between score lines 1 and 15 on the one hand and between score lines 3 and 17 on the other hand are slightly less than 90°, although it is to be understood that these angles may be slightly more than 90°. The deviation from 90° is only slight, as pointed out. The purpose of this will appear.

Hinged to the panels 11 and 13 by means of the score lines 15 and 17, respectively, are flaps 23 and 25, respectively, of essentially right-triangular shapes as shown. One leg of each triangle is one of the score lines 15 or 17; the other leg is a continuation of the outer edge of the adjacent panel 11 or 13; and the third leg is substantially a hypotenuse having a central extension tongue. The hypotenuse of flap 23 is lettered 27; that of flap 25 is lettered 29. The tongue of flap 23 is lettered 31 and the tongue of flap 25 is lettered 33.

The score line 5 determines a crosswise end panel 35, of width equal to the widths of the panels 11 and 13, as determined by a score line 37. The length of 35 equals the width of 7. Beyond the score line 37 is provided a locking flap 39, also of width equal to the widths of panels 39, 11, and 13 and having shallow lips 41 which are opposite the slits 9. Preferably the character of the scoring 37 is such as to provide a very free hinge between the panel 35 and the flap 39. This can be accomplished by breaking through the scoring at intervals, as shown by the short slits at 43.

At the ends of the end panel 35 are punched out openings 45 and 47, having inner edges 49 and 51, respectively. These edges are so located that when the side panels 11 and 13, with their tongues 23 and 25, are folded in as shown in Fig. 2, the lines 27 and 49 on the one hand, and 29 and 51 on the other hand, will be substantially coincident forming a common hinge line, as will appear. At the same time, the tongues 31 and 33 will become positioned over the openings 45 and 47, respectively. The outer edges 53 and 54 of the openings 45 and 47, respectively, are distances away from the inner edges 49 and 51, such that the tongues 31 and 33 may turn through the openings 45 and 47, when during assembly the flaps 23 and 25 hinge on the coincident lines 27, 49 and 29, 51, respectively. This appears to best advantage in Fig. 3. It should be noted in this connection that the outer end points 55 and 57 of the flaps lie on the score line 37 when the side panels 11 and 13 are folded in, as shown in Fig. 2. These points retain their positions on this score line throughout the subsequent operations of forming the final tray of Fig. 4 from the partially formed tray illustrated in Fig. 3.

The manufacture of the blank, as shown in Fig. 1, is quite simple, requiring only simple stamping and scoring operations. The device is delivered to the user in a condition shown in Fig. 2, which involves only the folding inward of the side panels 11 and 13. The flat folded devices as shown in Fig. 2 are delivered in stacks for use by hand wrappers or automatic wrappers.

To form a tray from the prepared article shown in Fig. 2, it is necessary only to turn up the end panel 35. At the same time, the flap 39 is angled up (see arrow A in Fig. 3). This causes a pushing action between the score line 37 and points 55, 57 at the dihedral angle between panel 35 and flap 39. The dihedral angle serves to hold the points in position. Immediately, the flaps 23 and 25 buckle with respect to the panels 11 and 13, the buckling occurring on score lines 15 and 17. Since these score lines 15 and 17 are at an angle with respect to the score line 5, the buckling necessarily and positively takes place in such a direction that the side panels 11 and 13 rise. They never tend to buckle down toward the bottom 7. Hence the side panels 11 and 13 are angled up, as shown by arrows B, from the horizontal position of Fig. 2 to the final vertical position shown in Fig. 4. At the same time, the hinging action along lines 27, 49 and 29, 51 turns the tongues 31 and 33 into the openings 45 and 47. Finally, when the end panel 35 becomes vertical, the tongues 31 and 33 become hooked in behind the panel 35, the openings 45 and 47 being respectively blocked off by portions of the flaps 23 and 25, as shown in Fig. 5. This results in the side panels 11 and 13 assuming a final vertical position such as shown in Fig. 4.

The final part of the bending operation, when the end panel 35 is vertical, is to turn the flap 39 over and into the finished tray, bending it back against the end panel 35. This brings the lips 41 into position at the slits 9 with which they form a positive catch. If the slits 9 are eliminated, these lips 41 form a usually sufficient frictional engagement with the bottom 7. Even in the absence of the lips, the edge of the flap 39 may be made to perform a frictional locking function by making this panel 39 wide enough. After the locking flap has been folded down, it prevents the side panels 11 and 13 from angling out again because the triangular flaps 23 and 25 are locked under it. The upper edges of the flaps 23 and 25 are then coincident with the score line 43, the flaps 23 and 25 being sandwiched between end panel 35 and turned-down locking flap 39.

The finished tray of Figs. 4 and 5 has only one end, as is the custom for certain classes of trays, as for example those used to package bakery goods where a stiffening support for the goods is the primary consideration preliminary to wrapping. For goods such as fruits or vegetables, the tray may be provided with four sides, by providing at the open end a construction similar to that already described at the closed end. Further description in this connection is unnecessary, since it would involve a mere duplication of the description above given.

In Figs. 6–10 is shown another embodiment of the invention in which like numerals designate like parts to those already described, except that the numerals have been primed. In this form of the invention, the score line 5' does not have the slits 9. However, corresponding slits 9' may be carried in the score lines 15'. In this form of the invention the locking flap 39' is narrower than the corresponding locking flap 39 in the preferred form but its length equals the width of the bottom 7'. The lips 41', instead of being carried upon the lengthwise edge of the locking flap 39', are carried on its ends, as shown. Consequently, when in this form of the invention the flap 39' is turned down in between the side flaps 11' and 13', the lips 41' engage with the slits 9' which are at the proper location to permit this. As the slits 9 in the preferred form of the invention may be dispensed with, so may the slits 9' in the alternative embodiment be dispensed with, in which event the lips 41' hold by lateral frictional engagement with the raised side panels 11' and 13'. Since the essential differences between the two embodiments of the invention have been described in detail, further description of the alternative embodiment will be unnecessary in view of the obviously analogous functions of the similarly numbered parts. It should, however, be remarked in connection with Fig. 8 (the approximate analog of Fig. 3), that the parts have been allowed to spring out somewhat from the position in which automatic raising of the side panels 11' and 13' would occur upon lifting of the end panel 35' and the locking flap 39. This is to expose the tongues 31' and 33'. For the actual folding action, the points 55' and 57' will lie adjacent to the score line 37'; as in Fig. 3 the points 55 and 57 lie adjacent to the score line 37. Minor variations in the shapes of the various panels, tongues and lips are obvious from Figs. 6–10 and illustrate exemplary equivalents. If further description is desired, the description of the preferred embodiment may be applied to the alternative embodiment by substituting for the numerals therein the corresponding primed numerals shown in Figs. 6–10.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results obtained.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A sheet for forming a tray comprising a substantially stiff material which is cut and scored to provide a bottom with two opposite side panels integral therewith and hinged thereto on opposite score lines adapted preliminarily to be in-folded over said bottom and an end panel crosswise of said opposite panels and also integral with the bottom and hinged thereto along a score line having junctures with said opposite score lines the length of which end panel is substantially equal to the width of the bottom, said end panel having openings adjacent its ends which openings have angled inner edges, end flaps on the opposite panels of substantially right-triangular shapes respectively score-hinged with said side panels, each end flap having its hypotenuse extending from one of said junctures and arranged to lie substantially coincident along and over the angled inner edge of one of said openings when the side panels are preliminarily in-folded, extension tongues extending from the angled sides of said flaps adapted to extend over but not across said openings when the side panels are preliminarily in-folded, said openings being wider than the extension tongues, a locking flap hinged to said end panel on a score line passing adjacent to the outer corners of said triangular

end flaps when said opposite panels are in-folded so as automatically to hinge said flaps when the end panel is raised, said locking flap being bendable over the triangular end flaps to sandwich them between it and the end panel after the end panel is raised.

2. An article made according to claim 1 including at least one extension on an edge of the locking flap.

3. An article made according to claim 1 wherein the width of the locking flap substantially equals the width of the end panel, including at least one extension of an edge of the locking flap.

4. An article made according to claim 1 wherein the width of the locking flap substantially equals the width of the end panel, the scoring between the bottom and the end panel including at least one slit, and at least one extension on the long edge of the locking flap located opposite said slit.

5. An article made according to claim 1 wherein the scoring between at least one of said opposite panels and an end flap includes a slit, and at least one extension on an adjacent end of the locking flap.

ELMER L. WINKLER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
610,950	Smith	Sept. 20, 1898
2,005,131	DeLuce	June 18, 1935
2,218,360	Rokol	Oct. 15, 1940
2,274,714	Levkoff	Mar. 3, 1942