March 5, 1946. H. W. FINN 2,396,168

COLLAPSIBLE BOX

Filed Nov. 25, 1943

FIG. 1

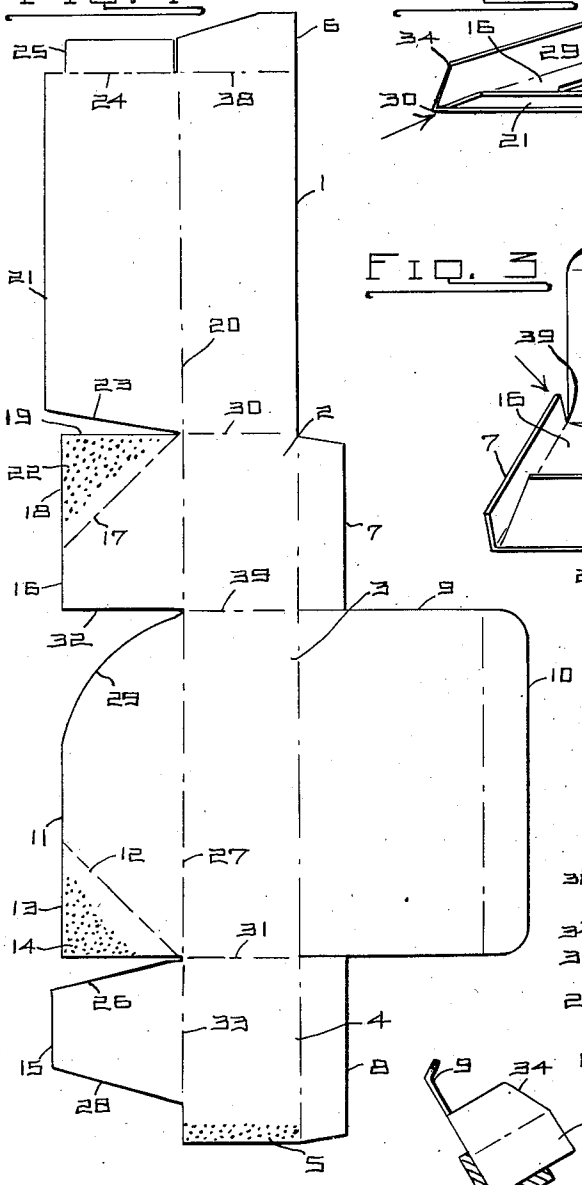


FIG. 2

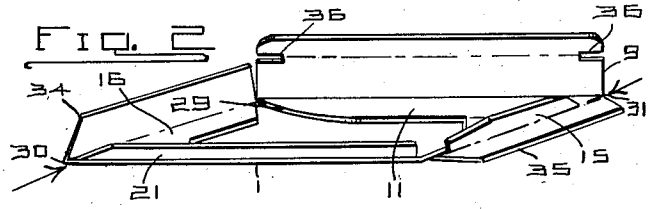


FIG. 3

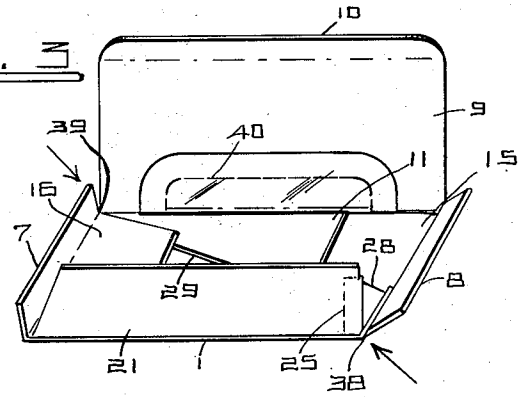


FIG. 4

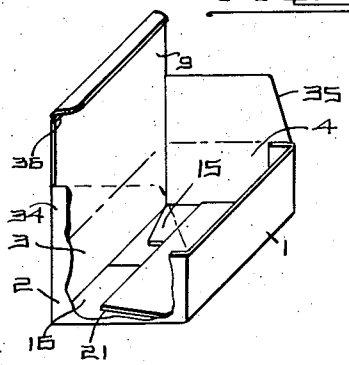


FIG. 6

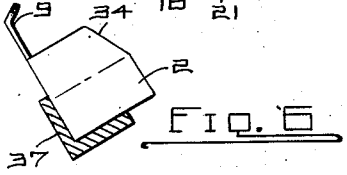
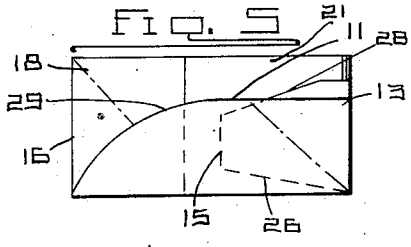


FIG. 5



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UNITED STATES PATENT OFFICE

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COLLAPSIBLE BOX

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Application November 25, 1943, Serial No. 511,652

1 Claim. (Cl. 229—39)

This invention relates to set-up and knockdown features in boxes or containers.

This invention has utility when incorporated in heavy paper and fiberboard boxes which may be compact in the flat for shipment, and readily, by a single pressure direction, opened for charging, and when emptied, readily collapsed, by a different direction pressure, to be stored for reuse.

Referring to the drawing:

Fig. 1 is a view of a blank for the box or container of the invention herein;

Fig. 2 is a plan view looking into a collapsed box as given the initial pressure for setting up or opening from the flat;

Fig. 3 is a plan view looking into a set-up or opened box from the blank of Fig. 1, as the initial pressure is applied for recollapsing into a flat;

Fig. 4 is a perspective view, with parts broken away of the set up box of Fig. 3;

Fig. 5 is a bottom plan view of the box of Fig. 4; and

Fig. 6 is an end view of the box of Fig. 4 as opened up and deposited in a trough or conveyor to be charged.

The blank has a front side 1 one end of which is hinged to a box end portion 2 extending to a back 3 of similar extent to the front 1. The back 3, remote from the end 2 has similar extent end 4. Upon the free end region adhesive 5 may anchor hinged extension or overlap 6 from the free end of the side or front 1, thereby forming the blank into a tube. The ends 2, 4, have top fold-over or flange portions 7, 8, while therebetween, the back 3 has box cover or top 9 with a relatively foldable tongue extension 10 adapted to be inserted back of the top of the front side 1 as the top 9 is downward to hold the portions 7, 8, toward each other in a plane.

The box blank, in practice is not set up in open-ended tube form, but simultaneously with the gluing or side wall assembly, two sealing or bonding connections are performed for the bottom. The back 3 has opposite from the top 9, an extension 11 having a hinge 12 to a triangular portion 13 adapted to have adhesive 14 anchor extension 15 therewith. The extension 15 is from the side of the end 4 remote from the flange 8. The opposite end 2 has an extension 16 of more full extent than the extension 15. The extension 16, opposite the flange 7, has a fold or hinge portion 17 to define triangular portion 18 to have its edge 19 anchored at hinge 20 of major bottom portion or extension 21 from the front 1, by adhesive 22. The bottom 21 has end narrowing edge 23 and remote therefrom a scoring or hinge line 24 in line with the end of the side 1 carrying the extension 6. A flap 25 short of the extent of the bottom 21 from the front 1, is connected to the bottom 21 by the hinge 24. The end 15 narrowing edge 26 extends away from scoring 27 hinge connecting the bottom portion or back extension 11 from the back 3. The end 15 has edge 28 opposite the edge 26 of somewhat greater taper or narrowing direction. The bottom portion 11, remote from the triangular portion 13, has a curved edge 29.

In the blank folding for adhesive action or the gluing, there is thruout each adhesive area a common number of plies of the stock of the blank, which means that the box making machine in its application of pressure to render the adhesive effective, has such squeeze or pressure action uniform thruout the extent to be bonded. To this end, the flap 25 is against the extension 6 for the latter to adhere thru the bonding agent 5 with the end 4.

To set up the flat blank of the box thus in sealed assembly in the flat, longer diagonal corners 30, 31, may be thrust toward each other. In this operation, the incline 26 veers away from the back 3 as the edge 23 moves away from the end 2. The curved edge 29 moves under the end 16. This locates edge 32 of the extension 16 at the hinge or scoring 27 and the scoring 24 at a hinge line 33 for the extension 15 from the end 4. These registering lines at the bottom box corners have a self-locking set-up trait for retaining the box in open position. In this setting up or opening of the box, the flap 25 rides over the edge 28. This flap 25 is of advantage in the more shallow boxes, and is omitted in the box of Fig. 2.

The less shallow or larger capacity box, besides omitting the flap 25, may have flanges 34, 35, of greater extent than the flanges 7, 8. Notches 36 the better to define the fold tongue extension 10, may also engage the portions of the flanges 34, 35, adjacent their connections with the ends, as an aid to retain the cover of the box closed to conceal the contents.

A practical consideration herein is the ready opening-up of the boxes, which may be deposited in line at an angle on a trough or conveyor 37 to pass along for packers to place the charge thereinto. An instance of acceptable use is for doughnuts. When the contents have been removed, the box is as readily collapsed as opened, but diagonal corners 38, 39, are thrust toward each other, being the opposite diagonal corners from those effective for the box opening. The used, or previously set up box, is now in the flat for compact

storage, or return, say to the bakery for refill. In some instances a window 40 may be provided and the container thereby may function to display the contents.

The assembly is of the adhesive flap 13 engaging the bottom section end 15. The remote regions 28, 29, as of less extent readily cam or guide under the complementary pair of bottom sections 21, 16, having the engaging flap 22. The cam action to set up by thrusting the corners 30, 31, toward each other, brings the section 21 down over the sections 15, 11, in a stabilized set up for placing contents in the box. Thrusting the corners 38, 39, toward each other, is converse, or collapse. There is five ply 1, 21, 22, 16, 2, for the adhesive machine in manufacture at one end; while at the other end the five ply 46—15, 25—13, 11, 1. While there is not adhesive at the flap 25, it serves as a ply in the box manufacturing operation to hold the ply 6 at the adhesive 5.

What is claimed and it is desired to secure by Letters Patent is:

A collapsible box comprising in a single strip four directly-hinged-together side portions for a front and back alternated with two end portions with a connecting flap on the free end of one of the portions adhesively secured to the adjacent free end of the strip to provide an overlapping portion to form bounds for a box top and bottom, each end portion and one adjacent side at the region of the box bottom having extension flaps with adhesive connection therebetween, thereby assembling the side and end flaps into a two section bottom for the box with each flap of said bottom directly hinged to one of said four portions, the bottom sections being independent at the corner having the overlap, the bottom extension flap on the end thereof adjacent the said end connecting flap which, in the assembly of the box in the collapsed position, overlies in face contacting relation said end connecting flap to fill out the plies of the strip at the overlapping portion to seat the overlap under pressure with the adhesive.

HARRY W. FINN.