

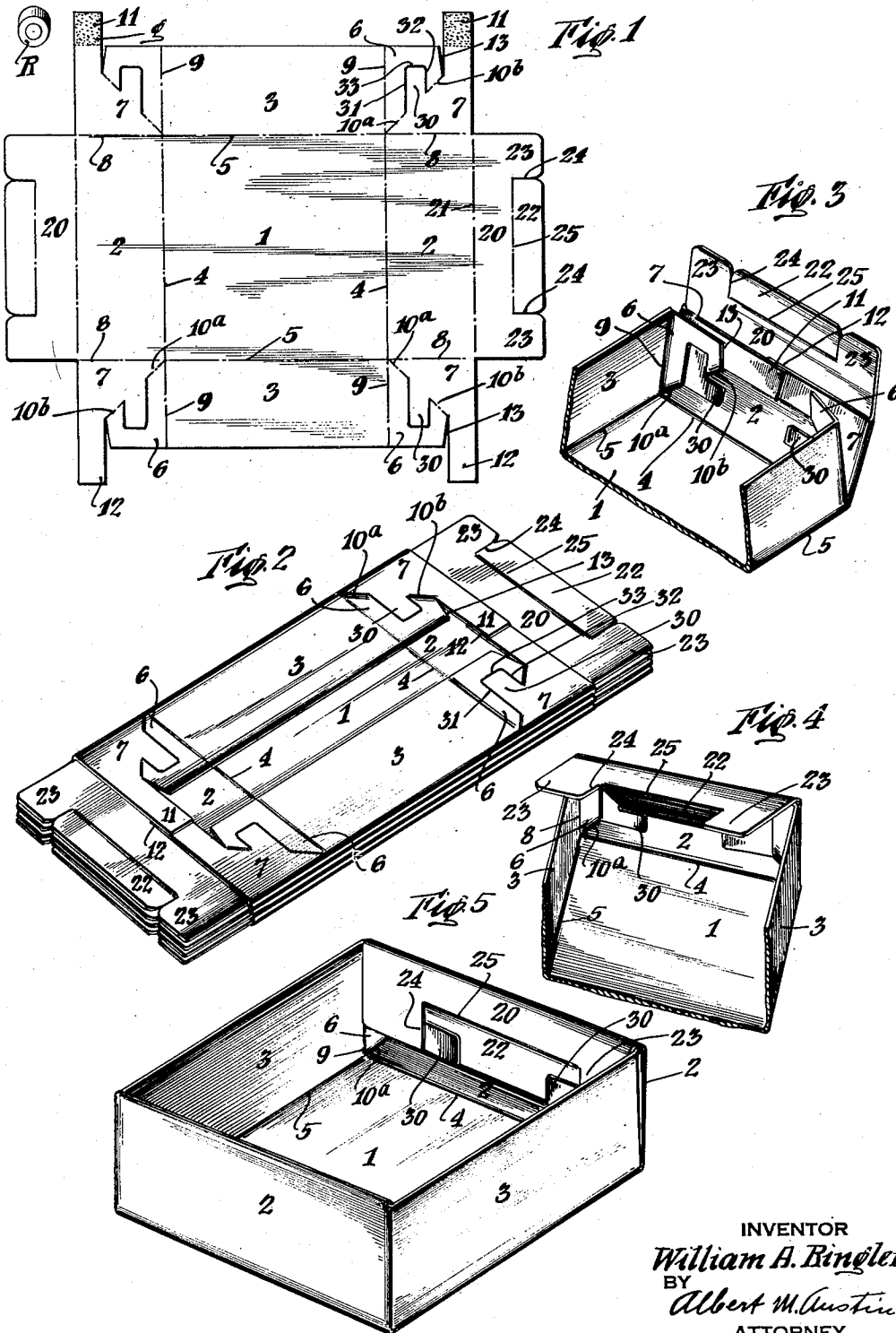
Nov. 5, 1940.

W. A. RINGLER

2,220,121

COLLAPSIBLE BOX

Filed Nov. 13, 1936



INVENTOR
William A. Ringler
BY
Albert M. Austin
ATTORNEY

UNITED STATES PATENT OFFICE

2,220,121

COLLAPSIBLE BOX

William A. Ringler, Wayne, Pa., assignor to National Folding Box Company, New Haven, Conn., a corporation of New Jersey

Application November 13, 1936, Serial No. 110,587

6 Claims. (Cl. 229—34)

This invention relates to collapsible boxes, and more particularly to boxes adapted to be shipped and stored in collapsed condition and thereafter to be manipulated into set-up position by the user as needed.

Collapsible boxes heretofore provided have required special equipment and machinery to glue and assemble the same. They have also been difficult and time-consuming to erect by the user, requiring extensive interconnection and manipulation of various parts to erect the same. Many collapsible boxes heretofore provided have also been weak at the corners and have presented side and end walls of cumbersome appearance and inferior strength.

An object of this invention is to provide a strong and sturdy box of the collapsible type which can be manufactured and assembled on automatic machinery commonly used in the assembly of the usual four-sided boxes manufactured at paper box manufacturing plants.

Another object of this invention is to provide a collapsible box formed from a single blank of paperboard material, which can be shipped and stored in collapsed knockdown condition and thereafter quickly manipulated into sturdy set-up condition by the user as needed.

A further object of this invention is to provide an improved method of assembling collapsible boxes quickly and expeditiously and at low cost.

Another object of this invention is to provide a box of the collapsible type which can be made from a single blank of paperboard material entirely by automatic machinery in common use, which is strong and sturdy in construction, which is less expensive to manufacture and assemble than collapsible boxes heretofore provided, which can be made in any variety of different designs and patterns, and which is highly adapted for the packing and display of merchandise of all kinds.

Various other features and advantages of the invention will be apparent from the following particular description and from an inspection of the accompanying drawing.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawing forming a part thereof, in which:

Fig. 1 shows a blank of paperboard which has been suitably cut, scored and glued, ready for assembly into my improved collapsible box;

Fig. 2 is a perspective view of a plurality of assembled blanks arranged in stacked relationship, in which condition they are shipped and stored;

Fig. 3 is a fragmentary perspective view of the box in the process of assembly and erection from its collapsed condition;

Fig. 4 is a fragmentary perspective view of the box as it appears at a further stage of the assembly operation; and

Fig. 5 is a perspective view of the box as it appears when fully assembled.

Similar reference characters refer to similar parts throughout the specification and the several views of the drawing.

According to this invention, my improved collapsible box is preferably formed from a single blank of paperboard material which is cut and scored on an automatic cutting and scoring machine. The separate blanks are cut by the machine from large sheets of paperboard, the entire operation being performed automatically. Each box-forming blank comprises a bottom wall 1, end walls 2 hingedly connected to the bottom wall 1 along the score lines 4, and side walls 3 hingedly connected to the bottom wall 1 along the score lines 5.

As shown more particularly in Fig. 1, the side walls 3 and end walls 2 are connected at the ends thereof by a corner portion, each corner portion comprising a triangular shaped section 6 hinged to one end of the side wall 3 along the score line 9 and a triangular shaped section 7 hinged to the adjacent end of the end wall 2 along the score line 8. The triangular sections 6 and 7 are in part separated and defined by the score line portions 10a and 10b which extend substantially transversely across the corner portion. A finger portion 30 forming a part of the triangular section 7, is cut out from the triangular section 6 by the parallel extending cut lines 31 and 32 and the cut line 33 joining the cut lines 31 and 32. Each triangular section 7 is also provided with a tab extension 11 which extends outwardly along the side edges of the blank, each tab 11 being defined from the triangular section 6 by the cut line 13. The purpose of the finger portions 30 and the tab extensions 11 will become evident as the disclosure proceeds.

Each of the end walls 2 is provided with a flap 20 hinged thereto along the score line 21. The flaps 20 are adapted to be folded inwardly adja-

cent the inside face of the end walls 2 when the box is assembled. The end wall flaps 20 are preferably substantially the same width as the end walls 2 with which they are associated, so that when the end wall flaps 20 are turned inwardly, the ends thereof will abut against the inside face of the side walls 3 and thus serve as compression elements preventing inward collapse of the side wall. Each end wall flap 20 is provided with a tuck-in portion 22 defined by the score line 25 extending substantially parallel to the score line 21 and the transverse cuts 24 which intersect and meet the score line 25. The cut lines 24 define an ear portion 23 at each end of each end wall flap 20.

When the blank has been cut and scored, as shown in Fig. 1, which operation can be performed on an automatic cutting and scoring machine, the blanks are successively run through a strip gluer which is provided with a glue-applying roll R, illustrated diagrammatically in Fig. 1. The glue-applying roll R contacts the outer portions of the tab extensions 11 at one side edge of the blank only, depositing a layer of glue g on the outer ends thereof, as shown in Fig. 1. This operation can be performed on an automatic strip gluer at a very rapid rate. These strip gluers are also provided with mechanism for folding the side walls 3 and the corner portions comprising the triangular sections 6 and 7 inwardly. It will be evident by referring to Fig. 2 that the side walls 3 fold inwardly along the score line 5 so as to overlie the bottom wall 1, and the corner portions comprising the triangular sections 6 and 7 fold inwardly along the score lines 8 so as to lie over the extended end walls 2. The tab extensions 11 at the opposite sides of the blank are of such length that they will assume an overlapped relationship, as shown in Fig. 2, when the corner portions are folded inwardly. The overlapped tab extensions 11 are then pressed into adhesive contact, the glue g applied to one pair of tab extensions firmly to secure the same to the unglued tab extensions.

The side walls 3 and corner portions comprising the triangular sections 6 and 7 may be folded inwardly and the tab extensions 11 may be pressed into adhesive contact by well-known mechanism which forms a part of the strip gluer, producing the folded and assembled blanks, as shown in Fig. 2. The blanks may be glued and assembled in the form shown in Fig. 2 on an automatic strip gluer at the rate of 20,000 assembled blanks per hour or higher. The blanks as shown in Fig. 1 may be cut and scored from large rolls of paperboard by an automatic cutting and scoring machine at an even faster rate. Thus it is seen that my improved assembled blanks may be produced entirely by automatic machinery at a very high production rate and consequently at very low cost. The box blanks may be cut from the paperboard roll in such a manner as to result in little or substantially no paperboard waste. The assembled blanks are arranged in stacked relationship as shown in Fig. 2, in which condition they are shipped and stored occupying a minimum amount of space.

The user erects the assembled blanks into box formation as needed and preferably just prior to the packaging of merchandise therein. The assembled blank is erected into box formation by lifting the end walls 2 upwardly substantially at right angles to the bottom wall 1, which operation automatically raises the side walls 3 into erect position, as illustrated in Fig. 3. This operation

also raises the tab extensions 11 into substantially erect position and causes the triangular sections 6 to fold over and overlie the triangular sections 7 with which they are respectively associated. The finger portions 30 will then project inwardly and lie adjacent the inside face of the adjacent end wall 2.

In the second assembly operation the end wall flaps 20 are turned inwardly so as to overlie the inside face of the tab extensions 11, concealing the same from view, as illustrated in Fig. 4.

The third and final assembly operation consists in the insertion of the tuck-in portion 22 associated with each end wall flap 20 between the finger portions 30 and the adjacent end wall 2, as illustrated in Fig. 4, the tuck-in portion 22 being pushed downwardly so as to lie substantially flat against the inside face of the tab extensions 11 and the inside face of the adjacent end wall 2, as shown in Fig. 5. The ear portions 23 will then overlie the inside face of the adjacent finger portions 30, serving to stiffen and reenforce the box corners and prevent the finger portions 30 from being bent inwardly so as to release the tuck-in portion 22 associated therewith. As thus assembled it will be noted that the end edges of each inturned end wall flap 20 abuts the inside face of the side walls 3, serving as a compression element which prevents inward collapse of the box. The connected tab extensions 11 associated with the triangular sections 7 respectively serve as tension elements which prevent outward collapse or expansion of the side walls 3 when merchandise is packed in the box. A box having unusually strong corners and possessing great sturdiness and strength throughout is thus provided.

For the sake of convenience in describing the box, the vertical walls 2 provided with inturned flaps 20 and associated tuck-in portions 22, have been referred to as end walls, while the vertical walls 3 braced by the inturned flaps 20 have been referred to as side walls. It is understood, however, that the designations "side walls" and "end walls" are used herein to simplify description only, it being understood that all are vertical enclosing walls and might be interchangeably described as side walls, end walls, or enclosing walls. The side walls designated 3 may also be provided, if desired, with inturned flaps so as to present side walls of substantially the same thickness and strength as the end walls of the box. It will be noted that by extending the tuck-in portion 22 to the bottom wall 1 of the box, end walls of double-ply thickness throughout may be provided.

My improved collapsible box can be manufactured and assembled substantially entirely on automatic machinery in common use at a rapid rate of production. No special equipment to make my improved box is required. The box can be made at a higher rate of production and more cheaply and economically than collapsible boxes heretofore produced. The assembled blanks may be shipped and stored in substantially flat collapsed or knockdown condition, permitting of substantial economies in shipping and storage costs. The assembled blanks may be erected into box formation by the user as needed by three simple manipulations by the operator, comprising erecting the end walls 2 into vertical position, folding the end wall flaps 20 inwardly, and finally tucking in the tuck-in portions 22 behind the inwardly projecting finger portions 30. With a few minutes practice an operator can become sufficiently skilled to erect the boxes

from the collapsed assembled blanks at the rate of several hundred an hour. A convenient and economical merchandise box which is unusually strong and sturdy when erected is thus provided.

While certain novel features of the invention have been disclosed and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What I claim is:

1. A box adapted to be shipped and stored in collapsed knockdown condition and set up by the user including, a bottom wall, an inwardly collapsible side wall hinged to said bottom wall, and an outwardly collapsible end wall hinged to said bottom wall, a corner portion hinged to the adjacent ends of each of said side and end walls, a flap extending from said end wall, a finger portion adapted to lie against the inside face of said end wall cut out from said corner portion, said flap having an ear portion associated therewith adapted to be inserted under and engage said finger portion to maintain said side wall and said end wall in rigid erect container-forming position.

2. A collapsible box adapted to be shipped and stored in collapsed knockdown condition and set up by the user including, a bottom wall, an inwardly collapsible side wall and an outwardly collapsible end wall hinged to said bottom wall, a corner portion hinged to the adjacent ends of said side and end walls, a transversely extending box-collapsing score line intersecting said corner portion, a finger portion adapted to lie against the inside face of said end wall cut out from said corner portion, a flap extending from said end wall adapted to be turned inwardly, and an ear portion associated with said flap adapted to be inserted under and interlockably engage said finger portion associated with said corner portion to retain said side and end walls in rigid erect container-forming position.

3. A collapsible box formed from a single blank of paperboard material including, a bottom wall, a pair of side walls and a pair of end walls hinged to said bottom wall, corner portions hinged to the adjacent ends of said side and end walls, a score line extending diagonally across said corner portions dividing each of said portions into bellows fold sections with one section hinged to the side wall and the other section hinged to and overlying the adjacent end wall, means for connecting those sections which are hinged to the adjacent end wall, an inwardly turned flap extending from each of said end walls, a finger portion cut out from the sections of the corner portions which are hinged to the side walls, and an ear portion associated with each of said end wall flaps adapted to be inserted under and engage said fingers to retain the box in assembled set-up position.

4. A blank of paperboard material adapted to

form a collapsible box including, a bottom wall panel, opposite side wall panels and opposite end wall panels hinged to said bottom wall panel, corner portions connecting the adjacent ends of said side and end wall panels, a score line extending diagonally across each of said corner portions dividing said corner portions into hinged sections, tabs extending from those sections of the corner portions which are hinged to the end wall panels with the tabs connected to the same end wall panel extending in opposite directions and beyond the line forming the top edge of the adjacent side wall panel, adhesive applied to those areas of certain of said tabs which extend beyond and substantially outside of a line defining the top edge of the adjacent side wall panel, said tabs being foldable over the end wall from which they extend when the box is assembled.

5. A paperboard blank adapted to form a collapsible box including, a bottom wall panel, a pair of opposite side wall panels and an end wall panel hinged to said bottom wall panel, a corner portion connecting each of the adjacent ends of said side and end wall panels, a score line extending diagonally across each of said corner portions to form a bellows fold and dividing said corner portions into hinged sections one of which is hingedly connected to the side wall panel and the other section being hingedly connected to the end wall panel, a tab extending laterally from each section hinged to the end wall panel, said tabs extending in opposite directions laterally beyond and outside the outer side edge of the adjacent side wall panel, and adhesive applied to the inside face of that portion of the tab which extends beyond the outer edge of said side wall panel.

6. A paperboard blank for forming collapsible boxes including, a bottom wall panel, opposite side wall panels and opposite end wall panels hinged to said bottom wall panel, corner portions hinged to and connecting the adjacent ends of said side and end wall panels, a score line extending diagonally across each of said corner portions to form a bellows fold and dividing said corner portions into hinged sections with one section connected to a side wall panel and the other section connected to the adjacent end wall panel, tabs extending laterally from those corner sections which are hinged to the end wall panels with the tabs connected to the same end wall panel extending in opposite directions and in general alignment, each of said tabs having a portion extending laterally beyond the top edge of the adjacent side wall panel and at a distance from the adjacent edge of the bottom panel equal to more than half the width of the bottom wall panel, certain of said tabs having adhesive means on the inside face thereof for securing the same to the corresponding tab which extends from the section connected to the same end wall panel in fixed overlap relationship when the box is folded in collapsed position.

WILLIAM A. RINGLER.