Nov. 5, 1940. H. A. CARRUTH 2,220,076

COLLAPSIBLE BOX AND METHOD OF MAKING SAME

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Fig. 1

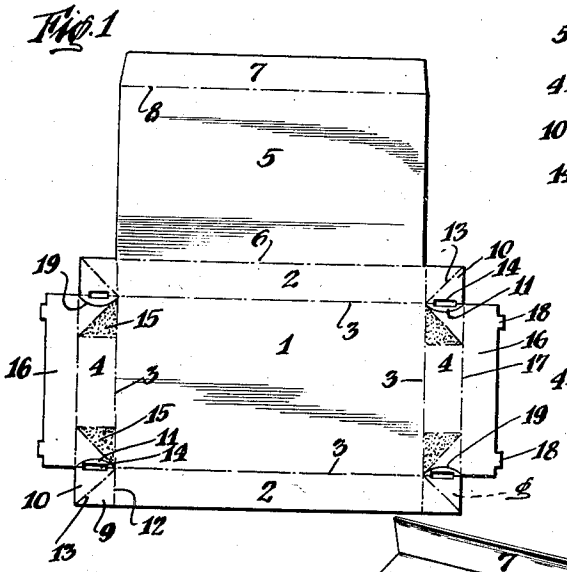


Fig. 5

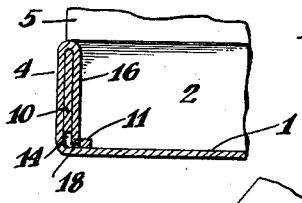


Fig. 4

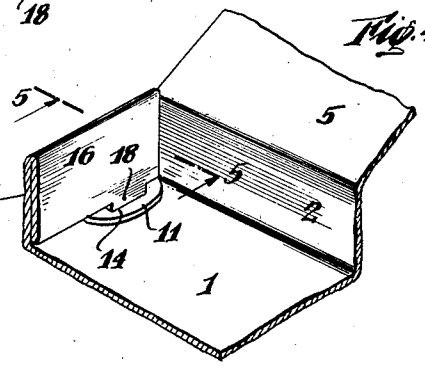


Fig. 2

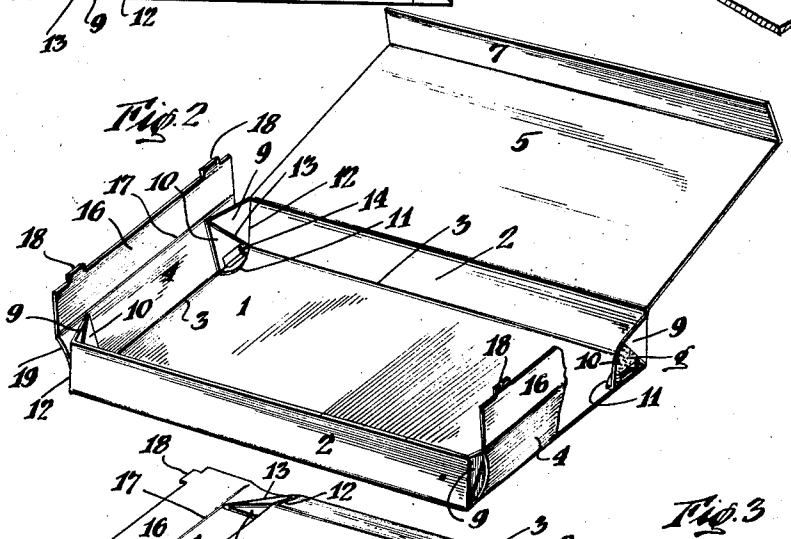
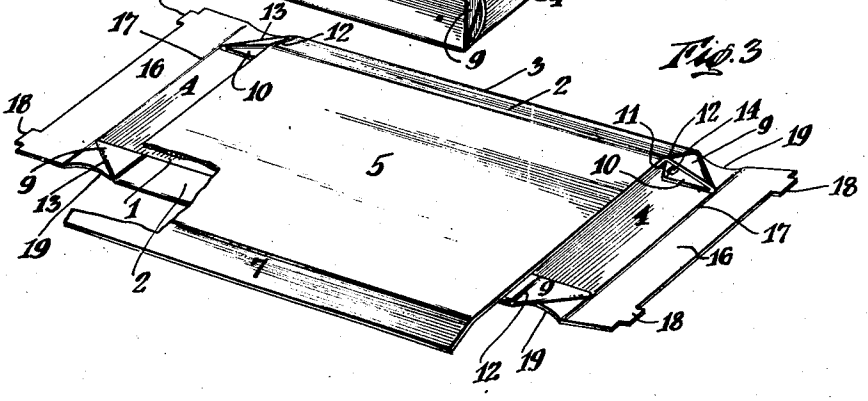


Fig. 3



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Fig. 6

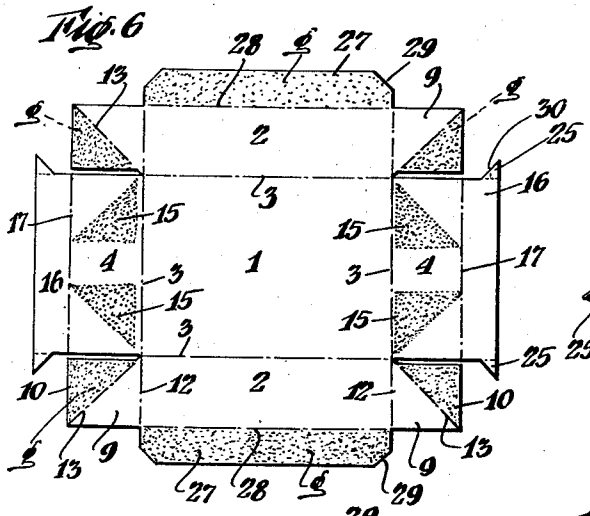


Fig. 7

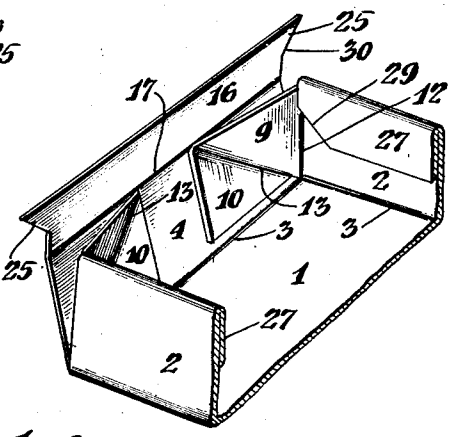


Fig. 9

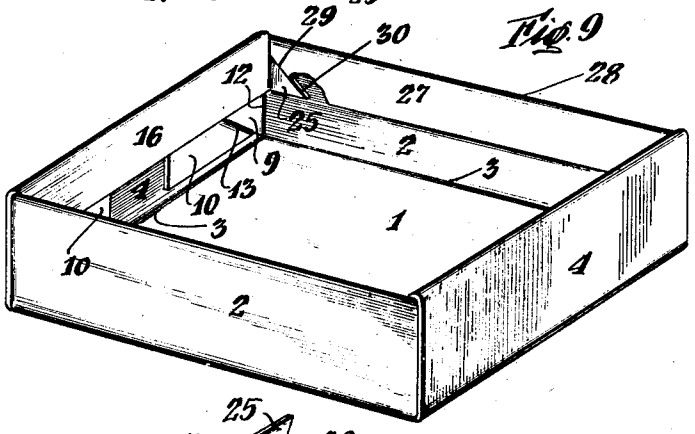
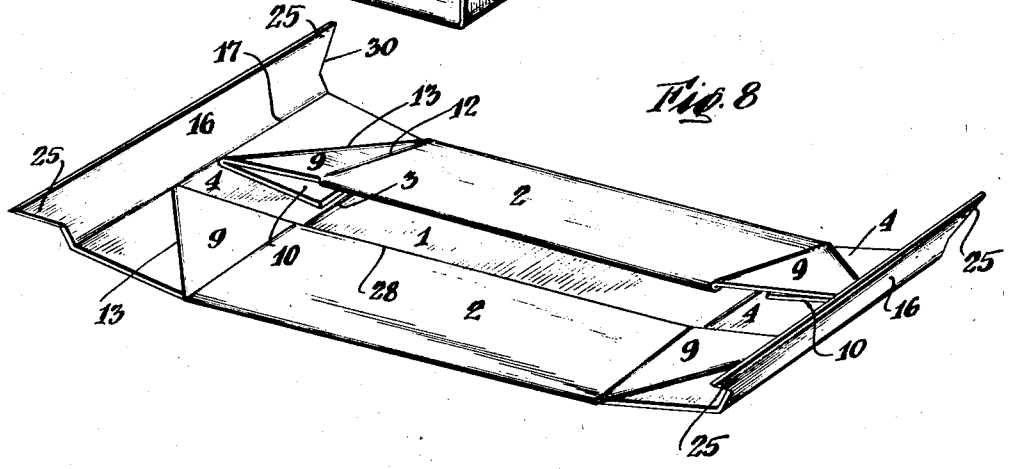


Fig. 8



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Fig. 10

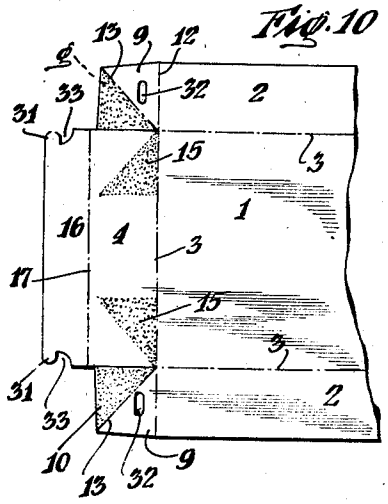


Fig. 11

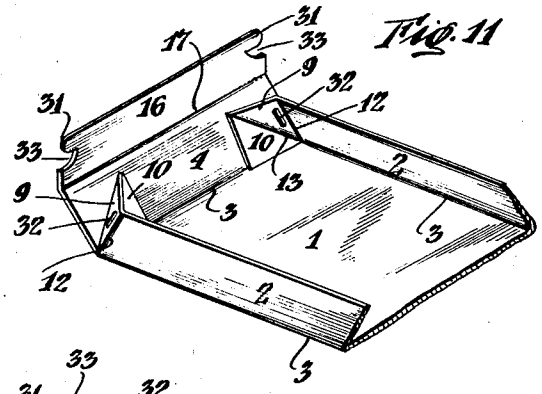


Fig. 13

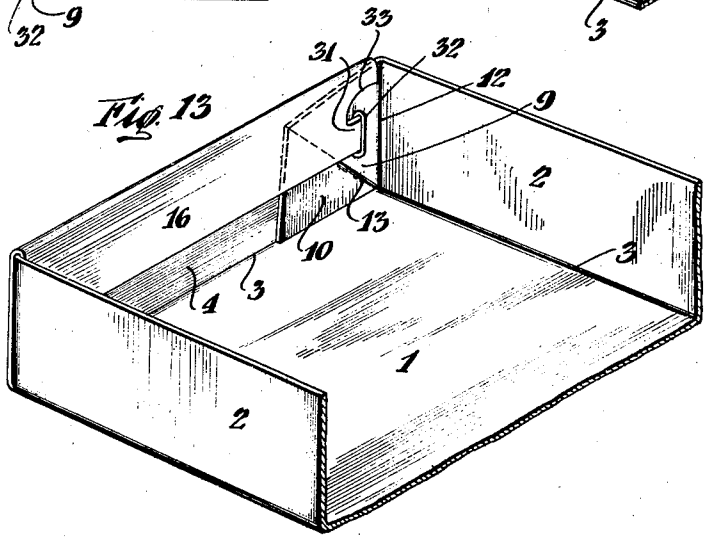
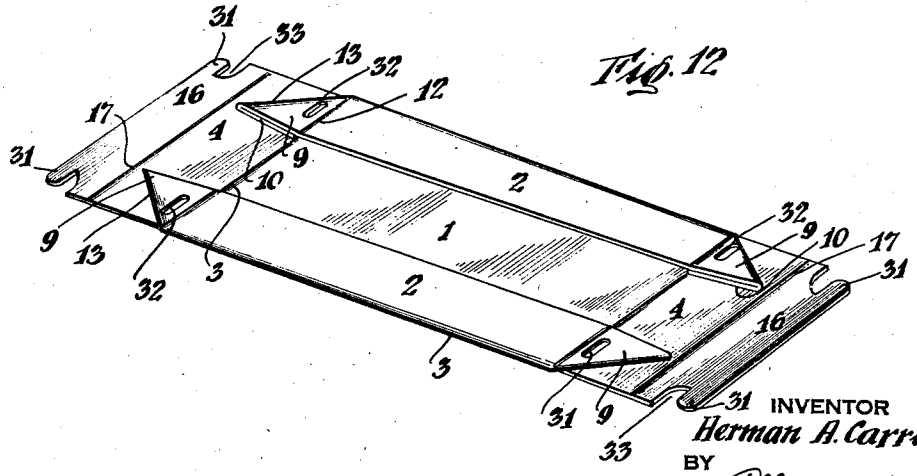


Fig. 12



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Fig. 14

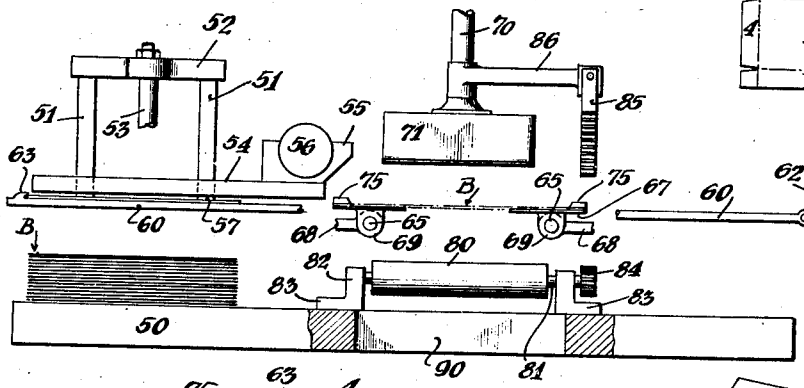


Fig. 19

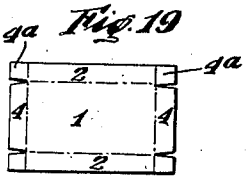


Fig. 15

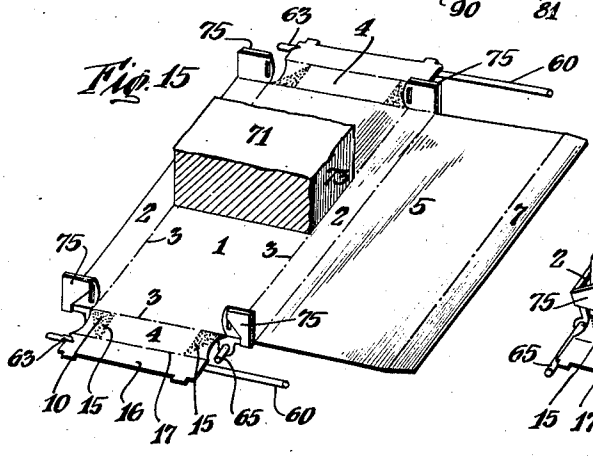


Fig. 16

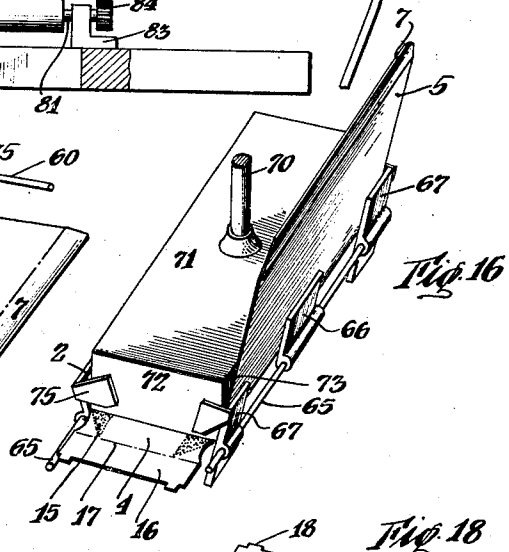


Fig. 17

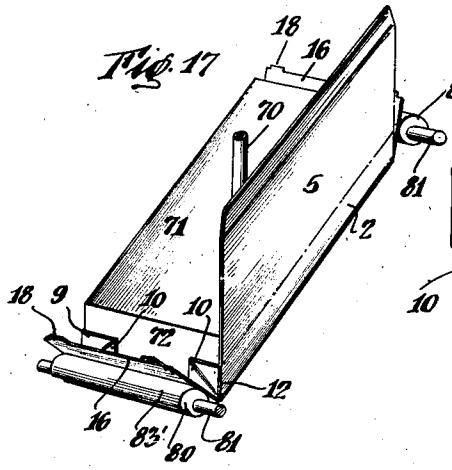
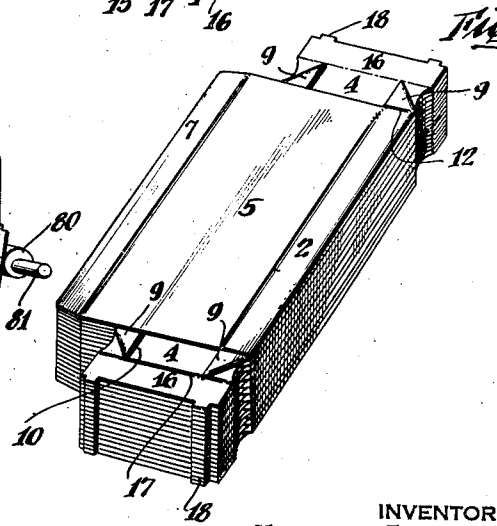


Fig. 18



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UNITED STATES PATENT OFFICE

2,220,076

COLLAPSIBLE BOX AND METHOD OF MAKING SAME

Herman A. Carruth, Mount Carmel, Conn., assignor to National Folding Box Company, New Haven, Conn., a corporation of New Jersey

Application August 13, 1936, Serial No. 95,784

3 Claims. (Cl. 229—34)

This invention relates to collapsible boxes and method of making same, and more particularly to a box which can be shipped and stored in substantially flat collapsed position and thereafter set up by the user as needed.

The improved collapsible box forming the subject of this invention may be formed from a single blank of paperboard material comprising side and end wall panels hinged to the bottom wall panel, free end-securing tabs being provided which extend from the ends of the side wall panels and which have a portion thereof only secured to the inside face of the adjacent end wall panel. Collapsing of the box is attained by the provision of fold lines which extend diagonally across the securing tabs, thereby defining a side wall panel attached section and a free end section, the free end sections only being secured to the inside face of the adjacent end wall panels. The side and end wall panels as thus constructed are free of fold lines which is a common feature of collapsible boxes as heretofore constructed. Thus it will be noted that when my improved box has been assembled and erected the full ultimate rigidity and strength of the material forming the side and end wall panels is retained, resulting in a box which is as strong and as rigid and serviceable as set-up boxes heretofore constructed which do not have the collapsible feature.

In my improved box construction as erected, the free end-securing tabs extend inwardly in flat, unfolded position against the inside face of the adjacent end wall panels. An inwardly foldable flap is provided on each of the end wall panels to fold inwardly against the inside face of the securing tabs. Thus it will be noted that there is only a single layer of paperboard material between the end wall panels and the end wall flaps, so that the box as assembled and erected has smooth and neat side and end wall sections and is fully as attractive as a rigid set-up box which does not possess the collapsing feature. Collapsible boxes as heretofore constructed are generally provided with a diagonally creased web portion which is integrally formed with the adjacent side and end wall panels, fold lines only defining the web portion from the adjacent side and end wall panels, which permit folding of the web. When collapsible boxes of such construction are assembled and erected, it will be seen that the web sections defined by the diagonally extending fold lines must be folded one upon the other, providing a double layer of paperboard at the corners of the box between the end wall panels and the end wall flaps. End wall sections as thus constructed are heavy and bulky and possess bulged portions at the corners of the box which greatly detract from its appearance and which contribute nothing to the strength of the construction. Such collapsible boxes as are in common use also generally require fold lines which extend diagonally across the side wall panels which greatly weakens the erected construction and causes the side wall panels to buckle, presenting a box which is bulky but possesses little strength and is inherently sloppy in appearance.

Collapsible boxes as heretofore constructed also require special and complicated apparatus and equipment to assemble the same and also require a number of hand operations, which adds considerable to the cost. Even when collapsed these boxes are bulky due to the many superimposed layers of paperboard which form the same. My improved box can be assembled by means of box-assembling machines normally used to assemble the ordinary set-up non-collapsible box and with the same speed and efficiency. Consequently, my improved box can be made at a cost substantially equal to that of the ordinary rigid set-up box, and at considerably less cost than collapsible boxes as heretofore constructed. The box maker is able to manufacture my improved collapsible box by means of the standard equipment which he uses in the manufacture of his non-collapsible rigid boxes, no further or special attention or expense being required. My improved collapsible box also occupies less space since it is more compact and when in collapsed position possesses fewer superimposed paperboard layers, thus further economizing in shipping and storage costs. Cooperating means are provided to lock the side and end wall sections in rigid, upstanding container-forming position. The box can be quickly and easily set up without tools by a relatively unskilled worker. Boxes of any desired shape and size can be formed by following the teachings of my invention.

An object of this invention is to provide an improved box formed from paperboard material, which can be shipped and stored in collapsed substantially flat compact position, which thereafter can be quickly and easily set up into erect container-forming position by the user as needed and which can be made at low cost.

Another object of my invention is to provide an improved collapsible box which is strong and sturdy in construction, whose side and end panels

are not weakened by box-collapsing fold lines, which is formed from a minimum of paperboard material, which is provided with side and end wall sections which are neat and strong and substantially uniform in thickness.

Another object of my invention is to provide an improved collapsible box which can be assembled by means of standard box-assembling equipment used in the assembly of the ordinary non-collapsible set-up boxes without the use of special equipment and substantially without hand operation.

Still another object of this invention is to provide a one-piece blank from which a collapsible box can be formed, which blank can be cut and scored substantially and entirely by automatic machinery in large volume and at low cost, and which can be gummed or glued by automatic machinery in common use.

A further object of my invention is to provide an improved method for assembling my improved collapsible box which requires a minimum number of steps to effect complete assembly and collapse of the box, which steps can be formed substantially entirely by automatic machinery quickly, expeditiously and economically.

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

The invention further consists in the new and novel features of operation and the new and original arrangements and combinations of steps in the process hereinafter described and more particularly set forth in the claims.

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 drawings forming a part thereof, in which:

Fig. 1 is a face view of a paperboard blank suitably cut and scored and ready to be assembled into my improved collapsible box;

Fig. 2 is a perspective view of the blank showing particularly the triangular portions of the free end tabs extending from the side wall panel glued to the inside face of the end wall panel, certain parts being broken away to illustrate certain features of the construction;

Fig. 3 is a perspective view of the assembled blank in which the free end tabs extending from the side wall panels are secured to the end wall panels as shown in Fig. 2, this view showing the assembled blank collapsed in substantially flat position with the side wall panels overlying the bottom wall section and in which collapsed position the assembled box is shipped and stored;

Fig. 4 is a fragmentary perspective view of the box as it appears when set up by the user and ready for use;

Fig. 5 is a fragmentary cross-sectional view of the box showing an end wall and a portion of the bottom in cross-section, this view being taken along line 5—5 of Fig. 4;

Fig. 6 is an inside face view of the blank from which a collapsible box of somewhat modified construction may be made;

Fig. 7 is a fragmentary perspective view of the assembled box in which the triangular portions of the free end tabs extending from the side wall panels are secured to the inside face of the end wall panels;

Fig. 8 is a perspective view of the blank assembled as shown in Fig. 7 as it appears when collapsed in substantially flat position and in which position it is shipped and stored until ready for use;

Fig. 9 is a perspective view of the box as it appears when erected by the user from the collapsed assembled blank shown in Fig. 8;

Fig. 10 is a fragmentary face view of a paperboard blank suitably cut and scored and ready for assembly into a collapsible box of further modified construction;

Fig. 11 is a fragmentary perspective view of the box assembled from the blank shown in Fig. 10;

Fig. 12 is a perspective view of the assembled box shown in Fig. 11 as it appears when collapsed in substantially flat form ready for shipment and storage;

Fig. 13 is an enlarged fragmentary perspective view of the box erected by the user from the assembled blank as shown in Fig. 12;

Fig. 14 is a diagrammatic view of the apparatus which may be used to assemble the various blanks into the form shown in Figs. 2, 7 and 11, respectively;

Fig. 15 is a fragmentary perspective view of the apparatus illustrating one step in the assembled operation;

Fig. 16 is a fragmentary perspective view illustrating a further advance step in the assembly operation and in which the side wall panels of the blank are folded upwardly and the free end tabs extending therefrom are folded inwardly;

Fig. 17 is a perspective view of a portion of the apparatus illustrating a further advanced step in the assembly of the blank, this view particularly illustrating the end wall panels in the process of being turned upwardly to be pressed into adhesive contact with the inturned tabs extending from the side wall panel;

Fig. 18 is a perspective view of a series of collapsed assembled blanks arranged in superimposed stacked relationship ready for shipment and storage; and

Fig. 19 is a face view of a blank of common form which is used in assembling set up boxes in common use.

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

There is shown in Figs. 1 to 5, inclusive, a collapsible box made in accordance with my invention. The box may be formed from a single blank of paperboard material as shown in Fig. 1 comprising, a bottom panel 1, side wall panels 2 hinged thereto along the score lines 3 and end wall panels 4 hinged to the bottom panel along the score lines 3. Securing tabs extend from each end of the side wall panels 2 being hinged thereto along the score lines 12. Each securing tab is bisected by a diagonally extending score line 13 so as to define a triangular tab section 9 hinged to the side wall panels 2 and a free end triangular section 10. The free end triangular sections 10 may be provided with a foot portion 11 which may be formed by cutting out the adjacent end of the end wall panel 4 along an arcuate line 19, as shown in Figs. 1, 2 and 3. A flap 16 is hinged to each of the end wall panels 4 along the score lines 17 and is adapted to be inturned when the box is erected so as to lie against the inside face of the end wall panel 4 to which it is hinged. Lugs 18 may be provided

which extend from each of the flaps 16 and are adapted to be inserted in a corresponding opening 14 cut in the adjacent foot portion 11 which seats against the bottom panel 1 when the box is erected. The lugs 18 cooperate with the openings 14 to maintain the side and end wall panels in rigid erect position, as will be hereinafter described.

A cover panel 5 hinged to one of the side wall panels 2 along the score line 6 may be provided, if desired. A tuck-in flap 7 hinged to the top wall panel 5 along the score line 8 may also be provided, if desired, to retain the cover panel in closed position.

In assembling the box from the blank shown in Fig. 1, a layer of adhesive is first applied either to the outside face of the free end triangular sections 10 of the tabs or a triangular area of adhesive may be applied to the inside face of the end wall panels 4, as shown in Fig. 1, as may be found to be the most convenient. These triangular areas of adhesive may be quickly applied automatically by a spot-gluing machine well known to the art. Where the usual glue adhesive is used, then either the triangular tab portions 10 or the inside face of the end wall panels 4 only receive the glue, but if latex adhesive is applied then both the outside face of the triangular portions 10 and the inside face of the end wall panels 4 are coated with a layer of the latex adhesive.

The box is preferably assembled automatically on an assembling machine, the operative parts of which will be more particularly described hereinafter. In assembling the box the side wall panels 2 are turned upwardly substantially at right angles to the bottom wall panel 1, the tab portions extending from the side wall panels are turned inwardly, the end wall panels 4 turned upwardly substantially at right angles to the bottom wall panel 1, and finally the triangular sections 10 of the securing tabs are pressed into adhering contact with the inside face of the end wall panels, as shown in Fig. 2. It will be noted particularly that the triangular sections 9 are not glued or secured to the end wall panels 4, and that the triangular sections 10 of the tabs only are secured to the inside face of the end wall panels 4.

The blank as thus assembled may then be collapsed in substantially flat position, as shown in Fig. 4, with the side wall panels 2 overlying the inside face of the bottom wall panel 1 and the triangular portions 9 overlying the triangular sections 10 fixed to the end wall panels 4. If a cover panel 5 is provided, the cover panel will overlie the bottom wall panel 1 and the opposite collapsed side wall panel 2. The assembled box thus collapsed may be stacked one upon the other, as shown in Fig. 18, and bound together into a convenient package for shipment to the user, in which condition it may be stored until ready for use.

When the box is to be packed with merchandise, the user applies inward pressure to the end wall panels 4 of the collapsed assembled blank which causes the side wall panels to assume an erect position as the end wall panels 4 are erected. The side and end wall panels when completely erected will stand substantially perpendicular to the bottom wall panel 1. The end wall flaps 16 are then turned inwardly against the inside face of the end wall panels 4 and the lugs 18 provided thereon are inserted into the corresponding openings 14 provided in the foot portions 19 of the adjacent securing tabs, thus securely locking the side and end wall panels in fixed erect box-forming position. The box-erecting operation can be quickly performed by an operator without the use of any erecting tool or machine. The box, when erected, appears as shown in Fig. 4 and is ready to receive the merchandise. When the box has been packed with merchandise the cover panel can be folded in position and the tuck-in flap 7 inserted into the box and, if desired, suitably sealed in position.

There is shown in Figs. 6 to 9, inclusive, a collapsible box of somewhat modified form assembled from the blank shown in Fig. 6. The blank here shown is provided with ear portions 25 preferably triangular in form which extend laterally from each end of the respective end wall flaps 16. Side wall flaps 27 hinged to the side wall panels 2 along the score lines 28 are provided which may be turned inwardly against the inside face of the side wall panels and secured in position, as by a suitable adhesive *g*.

In assembling the box from the blank shown in Fig. 6, the side wall flaps are first coated with a layer of adhesive *g* on the inside face thereof and the outside face of the triangular portions 10 of the securing tabs are also coated with a triangular area of adhesive. If preferred, triangular areas of adhesive may be applied to the inside face of the end wall panels 4 to cement the unglued triangular portions 10 thereto, in the manner heretofore described. The side wall flaps 27 are then folded inwardly and secured to the inside face of the side wall panels 2.

The glued blank is then inserted into a box-assembling machine which first erects the side wall panels 2, then turns the securing tabs inwardly, then erects the end wall panels 4, and finally presses the triangular sections 10 into adhesive contact with the inside face of the end wall panels 4. The box thus assembled is ejected from the machine and will of itself collapse into substantially flat condition, as shown in Fig. 8, in which position the side wall panels 2 will overlie the inside face of the bottom wall panel 1 and the triangular sections 9 will overlie the triangular sections 10 secured to the end wall panels 4. The collapsed assembled blanks are then stacked one upon the other, shipped to the user, and stored by the user until needed.

In erecting my improved box, an operator applies inward erecting pressure on the end wall panels 4, which operates to automatically erect the side wall panels 2 into a position substantially perpendicular to the bottom panel 1. The end wall flaps 16 are then turned inwardly and downwardly so as to overlie the inside face of the adjacent end wall panel 4 to which it is attached. The ear portions 25, extending laterally from the end wall flaps 16, are folded so as to lie against the inside face of the adjacent side wall panels 2, as shown in Fig. 9. The ear portions 25 are preferably provided with a mitered edge 30 which abuts against the mitered edge 29 of the side wall flaps 27, thus securely locking the end wall flaps 16 in fixed box-assembled position. The erected box is now ready to receive the merchandise.

There is shown in Figs. 10 to 13, inclusive, a collapsible box of further modified form, which may be assembled from the blank shown in Fig. 10. The blank shown in Fig. 10 is generally similar to the blank shown in Figs. 1 and 6 except that the end wall flaps 16 are provided with ear portions 31 which are formed by cutting notches 33 in the ends of the flaps 16. Corresponding

openings 32 are cut in the triangular sections 9 of the securing tabs extending from the end wall panels. The openings 32 are adapted to receive the adjacent ear portions 31 associated with the end wall flaps 16 when the box has been erected as hereinafter described.

In assembling the box from the blank shown in Fig. 10 adhesive is first applied to the outside face of the triangular tab sections 10. The blank is then inserted in a box-assembling machine which operates to erect the side wall panels 2 and thereafter or substantially simultaneously therewith turn the securing tabs extending from the side wall panels inwardly. The end wall panels 4 are then erected and finally pressure is applied to the end wall panels 4 and the adjacent triangular tab sections 10 to adhesively secure the parts in assembled relationship. The assembled box is then removed from the machine and the side wall panels 2 permitted to collapse inwardly so as to overlie the bottom wall panel 1, as shown in Fig. 12.

In erecting the box the operator applies inward pressure to the end wall panels 4 so as to bring the end wall panels 4 into erect position, which operation causes the erection of the side wall panels 2 to a position substantially at right angles to the bottom wall panel 1. The end wall flaps 16 are then turned inwardly so as to overlie the inside face of the end wall panels 4 and finally the operator inserts the ear portion 31 into the adjacent openings 32 provided in the triangular tab sections 9. The ear portions 31 are frictionally held and clamped in position between the outside face of the triangular sections 9 and the inside face of the end wall panels 4, as indicated in Fig. 13. The erected box is now ready to receive the merchandise.

There is shown in Figs. 14 to 17, inclusive, certain apparatus by which the box-assembling operation may be automatically performed. The apparatus is shown diagrammatically only, for the purpose of illustrating the various steps followed in assembling the box and it is understood that other means and apparatus may be used to assemble my improved box within the purview of this invention.

For the purpose of illustration only, therefore, there is shown in Fig. 14 a diagrammatic view of a glue applicator and a box-assembling device. Both the glue applicator and the box-assembling device may be supported upon a suitable table 50. The unglued blanks B, such as shown in Fig. 1, are arranged in superimposed stacked relationship upon the table 50 beneath the gummer or glue applicator. Gumming members 51 adjustably connected to a suitable frame 52 are reciprocated along a vertical path by suitable driving mechanism which reciprocates the bar 53 attached to the frame 52. The gumming members 51 are supplied with adhesive from a suitable fountain 55 connected to the gumming members 51 by the adhesive supply conduits 54. The fountain 55 may be provided with a suitable agitator 56.

In operation, the gumming members 51 are moved downwardly until the foot portions 57 thereof contact the uppermost blank B. The foot portions 57 of the gumming members each apply a spot of glue 15 to the inside face of the end wall panels 4, as shown in Fig. 15. It is evident that four gumming members 51 are provided each having a foot portion 57 so shaped and constructed as to apply a triangular area of glue 15 adjacent each end of the end panels 4, the size and shape of the glued area 15 corresponding to the size and shape of the triangular portions 10 of the securing tabs. The application of the triangular areas of glue to the inside face of the end wall panels 4 by the gumming members 51 is effected almost instantaneously when the foot portions 57 of the gumming members are pressed into contact with the end wall panels 4. As soon as the contact has been made the gumming members 51 are lifted upwardly, carrying a blank B with them. The blank is now ready to be moved into the assembling machine.

The assembling machine as shown in Figs. 14 and 15, is provided with a pair of parallel conveyor bars 60, which reciprocate horizontally to transport the blanks successively from the glue applicator to the assembling machine. The conveyor bars 60 are connected through a suitable link connection 62 to a reciprocating arm 61 driven by suitable reciprocating mechanism. The conveyor bars 60 are provided with hooked ends 63 which are adapted to engage the blank, as shown in Fig. 15, and carry it away from the glue applicator to a position beneath the box-forming block 71 and into resting position upon the side panel-turning plates 66 and 67.

As shown more particularly in Figs. 14 and 16 side panel-turning plates 66 and 67 are fixed to a shaft 65 pivotally mounted in the bearings 69 carried by the supporting brackets 68. Each of the side panel-turning plates 66 and 67 are of such size and shape as to accommodate a side wall panel 2 of the box blank. To accommodate the assembling of boxes of different sizes the turning plates 66 and 67 are adjustably mounted on the shaft 65, and if desired shaft 65 may be made removable from the bearings 69 to permit replacement thereof with side panel-turning devices of different shapes and sizes. The turning plates 66 and 67, positioned along each side edge of the blank, normally rest in a substantially horizontal position, as shown in Fig. 14, in which position the turning plates 66 and 67 support the blank in horizontal position until the blank B is contacted by the descending forming block 71.

The forming block 71 is removably and replaceably attached to reciprocating plunger 70, suitable mechanism being provided to reciprocate the plunger 70 in synchronism with other operative elements of the machine. On the down stroke the forming block 71 contacts the bottom wall panel 1 of the blank, as shown in Fig. 15, the forming block 71 conforming in shape, size and dimensions to the inside dimensions of the box. As the forming block 71 continues its down stroke the bottom wall panel 1 is forced downwardly causing the side panel-turning plates 66 and 67 to pivot into a substantially vertical position, which pivoting movement is preferably resisted by suitable spring devices. The pivoting of the turning plates 66 and 67 causes the side wall panels 2 to be folded up against the side wall surfaces 73 of the forming block 71, as illustrated more particularly in Fig. 16.

It will be noted, by referring to Figs. 14, 15 and 16, that the turning plates 66 and 67 are provided with wing or lap portions 75 extending laterally therefrom. These lap portions operate to fold the securing tabs inwardly against the vertical ends 72 of the forming block 71.

As the forming block 71 continues its downward movement the end wall panels 4 of the blank come into contact with the rolls 80 provided at each end of the blank. Each of the rollers 80 are fixed to a shaft 81 rotatably mounted in

bearings 82 carried by the brackets 83. The rollers 80 are preferably made of resilient material, such as rubber, and are generally cam shaped in cross section, providing a cam surface 83', as shown particularly in Fig. 17. The cam surface 83' of the rollers serves to first wipe the end wall panel 4 upwardly and thereafter to firmly press the triangular sections 10 of the securing tabs against the inside face of the adjacent end wall panel 4, during which operation the end face 72 of the forming block 71 serves as an anvil. The triangular section 10 thus becomes firmly secured by means of the glue area 15, which it overlies, to the end wall panel 4.

To obtain the desired cam surface pressure of the rollers 80 against the end wall panels 4 it is preferable to provide means to rotate the rollers 80 in synchronism with the downward movement of the forming block 71. This may be effected by providing a pinion gear 84 fixed to the end of each shaft 81, which is engaged by a ratchet bar 85 attached to the plunger 70 by means of a suitable bracket 86. The ratchet bar 85 comes into engagement with the pinion 84 to rotate the rollers 80 when the forming block 71 has carried the box downwardly to a point adjacent the rollers 80.

When the end wall panels 4 have been secured to the triangular sections 10, the plunger continues its downward movement beyond the rollers 80, the assembled box is then removed from the forming block 71, the assembled box drops through the opening 90 in the platform 50, and the plunger 70 with its associated operating mechanism is returned to its uppermost position ready to assemble another box. The assembled blanks are stacked in collapsed position, as indicated in Fig. 18 and thereafter packaged for shipment to the user.

If latex adhesive, rather than the usual adhesive glue, is used to secure the box in assembled position, the adhesive may be applied as a separate operation while the latex adhesive is in a substantially liquid condition, and thereafter the adhesive is permitted to dry and the blanks suitably stacked and stored until they are to be assembled. The glue applicator shown in Fig. 14 can then be built as a separate machine and the latex adhesive applied separately thereby. Latex adhesive is applied to the outside face of the triangular sections 10 of the securing tabs and also to the inside face of the end wall panels 4, to which it is applied in the form of a triangular area similar in shape and size to the triangular sections 10. The latex adhesive when dry will not adhere to the paperboard not theretofore coated with latex adhesive, but the dry latex adhesive on the outside face of the triangular sections 10 will firmly adhere and become bonded to the end panels 4 when the same comes in contact with the triangular areas 15 of latex adhesive applied to the inside face of the end wall panels. Thus it is seen that either ordinary animal glue or latex adhesive can be used in assembling my improved box as desired. Where a machine as illustrated in Figs. 14 and 17 is used for the assembling operations, it is preferable to apply the animal glue to the inside face of the panels 4, rather than to the outside face of the triangular sections 10 so that the turn-in lap portions 75 will not come into contact with the adhesive. Where the latex adhesive is used, however, the box is not assembled until the latex adhesive is dry and the dry latex adhesive layer on the outside face of the triangular sections 10 will not interfere with the operation of the turn-in lap portions 75.

The box-assembling operation above described can be performed entirely automatically without hand operation. Paper box manufacturers are generally equipped with box-assembling machines now in common use, which operate to assemble the usual form of box formed from a blank such as shown in Fig. 19, which comprises a bottom wall panel 1, side wall panels 2, end wall panels 4, and securing tabs 4a extending from and hinged to the ends of the side wall panels 2. Such machines generally operate in a manner similar to the assembling machine shown in Figs. 14 and 17, inclusive, by which the side wall panels 2 are turned upwardly, securing tabs 4a turned inwardly, the end wall panels 4 then turned upwardly and finally pressed into adhering contacts with the securing tabs 4a.

My improved collapsible box constructed as above described can be assembled by the box maker by the same standard equipment with which he assembles the common everyday form of box from blanks similar to the blank shown in Fig. 19, which is considered the simplest and most inexpensive box assembling operation known to the art. Collapsible boxes as heretofore constructed are assembled in the flat collapsed position, which requires numerous and difficult operations, some of which must be performed by hand. My improved box is so constructed as to permit the assembly thereof expeditiously and economically on standard box-assembling equipment at reduced cost as compared with the methods employed in assembling collapsible boxes now on the market.

It will be noted that when my improved box is erected in the position shown in Figs. 4, 9 and 13, the side wall panels 2 and the end wall panels 4 are not creased or provided with any collapsing score lines, which is necessarily provided on collapsible boxes as heretofore constructed. The maximum rigidity inherent in the material which forms the side and end wall panels of my improved box is thus preserved so that an unusually strong and rigid box results which is clearly superior in strength and wearing qualities to collapsible boxes as heretofore constructed. It will also be noted that the securing tabs extending from the side wall panels 2 are provided with free ends and are not integrally connected by a fold line to the end wall panels 4, which is characteristic of collapsible boxes as heretofore constructed. As a result there is only one layer of paperboard interposed between the end wall panels 4 and the end wall flaps 16, providing an erected box having smooth and uniform end wall sections which are neat and attractive, the bulkiness and bulging quality of the end walls of collapsible boxes heretofore made (caused by the plurality of layers of overlapping paperboard interposed between the end panels 4 and the turned-in flaps 16) being thus avoided. Thus a more uniform, as well as a more attractive and serviceable collapsible box, is provided. The assembled box can be easily and quickly erected by the user immediately prior to packing of the merchandise therein. The collapsed assembled blanks permit close stacking, greatly economizing in shipping and storage space. The erecting operation can be quickly performed by a relatively unskilled worker in a relatively few seconds.

It is understood that where the word "box" is used either the merchandise-containing section or the telescoping cover section is intended to be

designated, since it is understood that a containing section and a cover section similarly constructed and telescoping over the containing section, may comprise the complete container. It is also understood that the term "bottom wall panel", as herein used is also intended to connote what may be termed the top wall panel of a cover section.

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 is claimed is:

1. A collapsible box formed of paperboard material including, a bottom wall panel, side and end wall panels, free end tabs extending from the ends of said side wall panels, means securing a portion only of said tabs to the inside face of said end wall panels, inwardly foldable flaps extending from said end wall panels, and cooperating means associated with said tabs and said flaps for securing said flaps in assembled position, said means including relatively stiff lug portions projecting downwardly from and in the plane of each of said flaps, and a foot portion extending inwardly from each of said securing tabs, each of said foot portions having an opening therein adapted to receive one of said lug portions to retain said flap and the erected box in fixed container-forming position.

2. A collapsible box including, a bottom wall panel, a side wall panel and an end wall panel, a free end tab extending from one end of said side wall panel directed inwardly and overlapping said end wall panel, means securing a portion only of said tab to the inside face of said end wall panel, an inwardly foldable flap extending from said end wall panel, and cooperating means for securing said flap in assembled position, said means including a foot portion cut out from said end panel and extending inwardly from said securing tab and seated against the inside face of said bottom wall panel, a lug portion extending from said flap, said foot portion having an opening therein extending upwardly into the tab and adapted to receive and retain said lug portion projecting from said flap, the inside edge of the opening in said foot portion extending substantially flush with the inside face of said end wall flap.

3. A collapsible box including, a bottom wall panel, a side wall panel and an end wall panel, a free end tab extending from one end of said side wall panel directed inwardly and overlapping said end wall panel, means securing a portion only of said tab to the inside face of said end wall panel, an inwardly foldable flap extending from said end wall panel, and cooperating means for securing said flap in assembled position, said means including relatively stiff unscored lug portion projecting downwardly from and in the plane of said flap, a foot portion cut out from said end panel and extending inwardly from said securing tab, said foot portion having an opening therein adapted to receive said lug portion to retain said flap and the erected box in fixed container-forming position.

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