Jan. 7, 1941. H. A. CARRUTH 2,227,439

METHOD AND APPARATUS FOR ASSEMBLING BOXES

Filed July 15, 1939 4 Sheets-Sheet 1

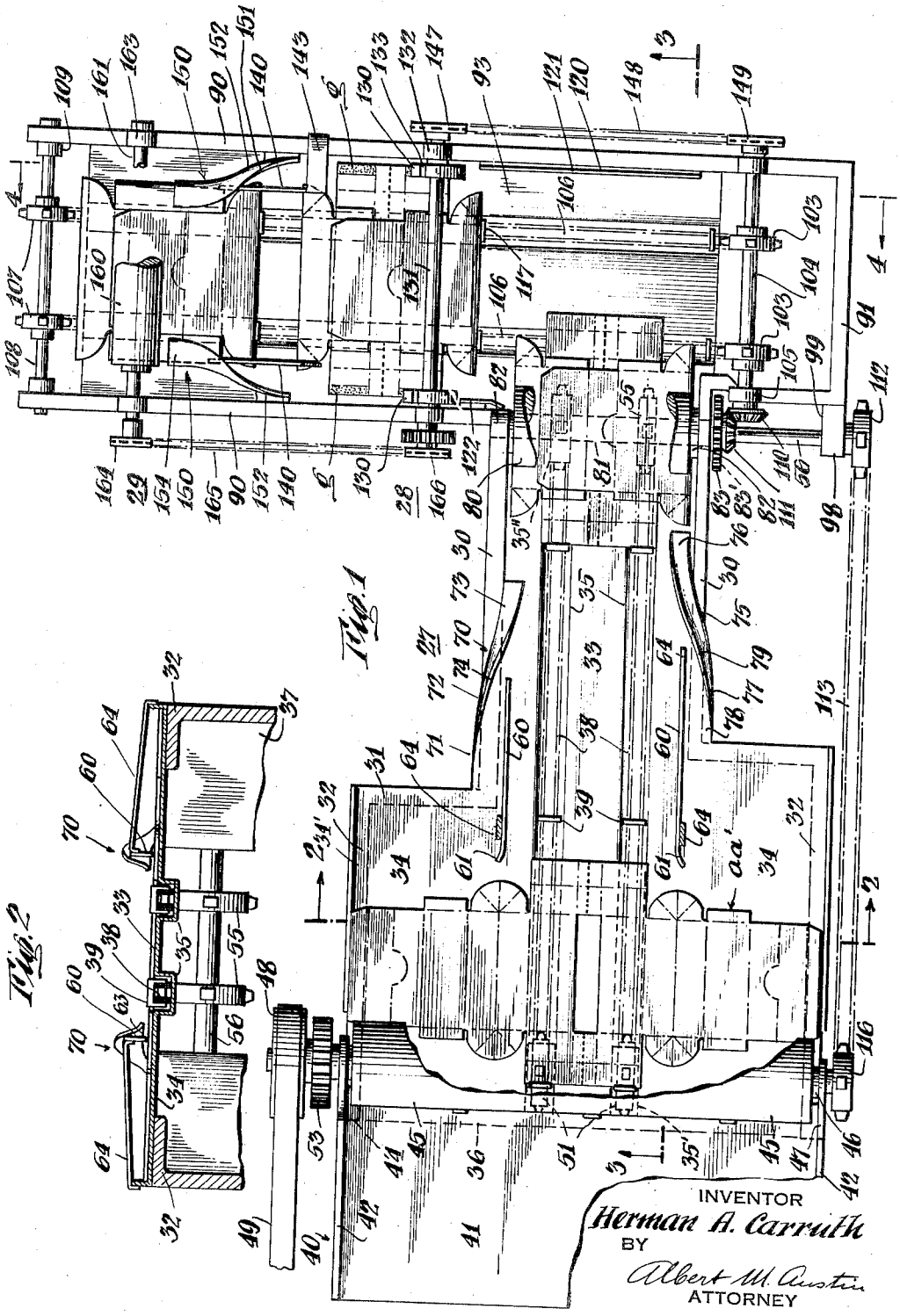


Fig. 1

Fig. 2

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METHOD AND APPARATUS FOR ASSEMBLING BOXES

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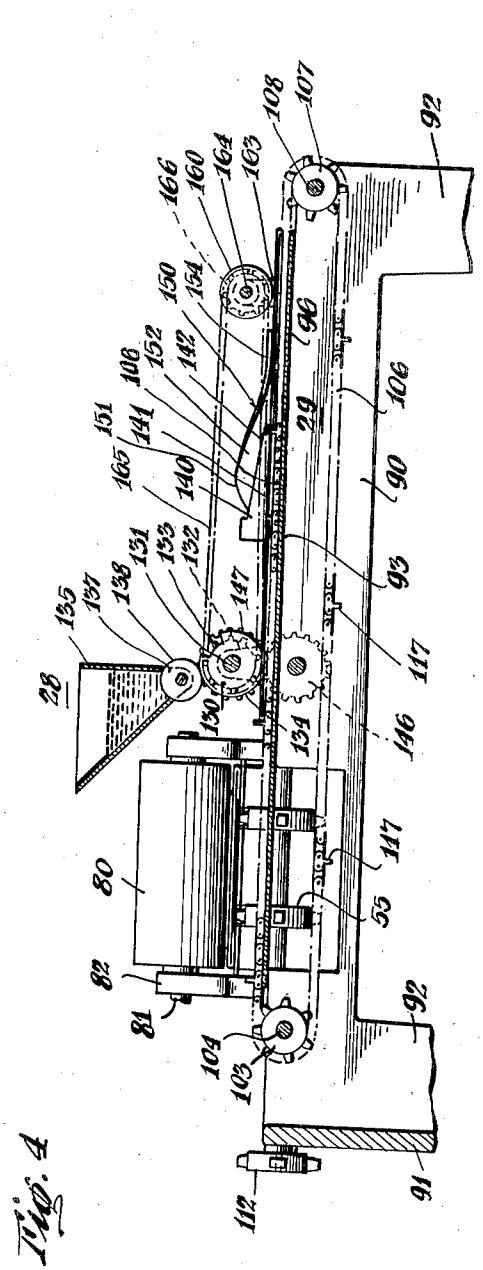


Fig. 4

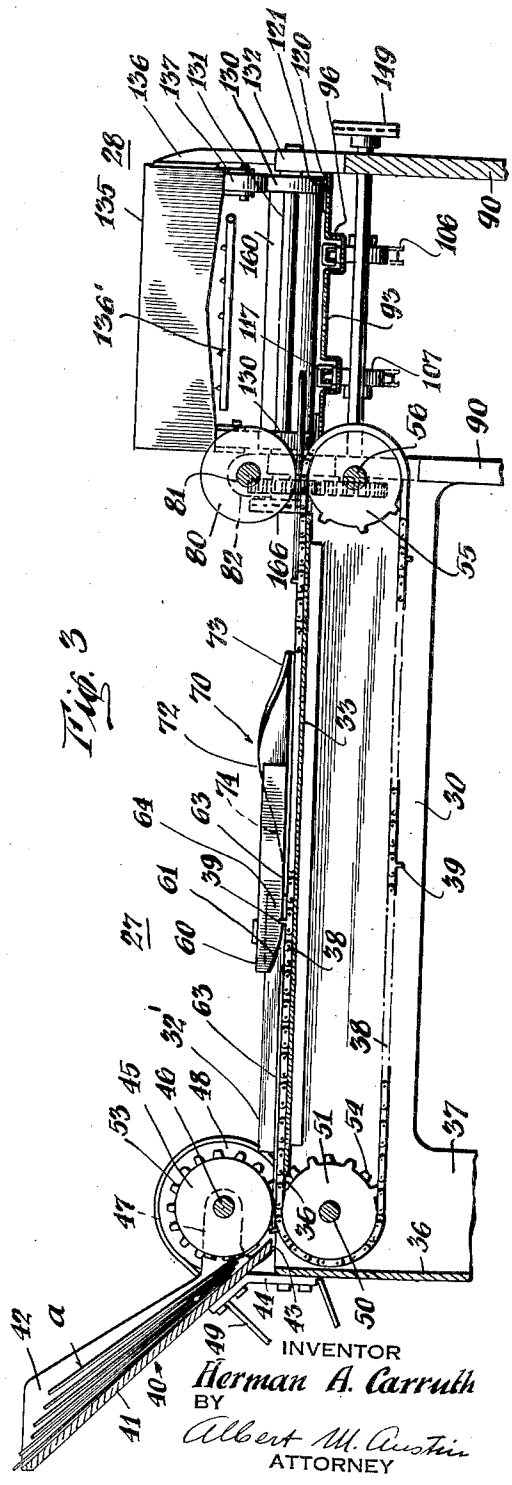


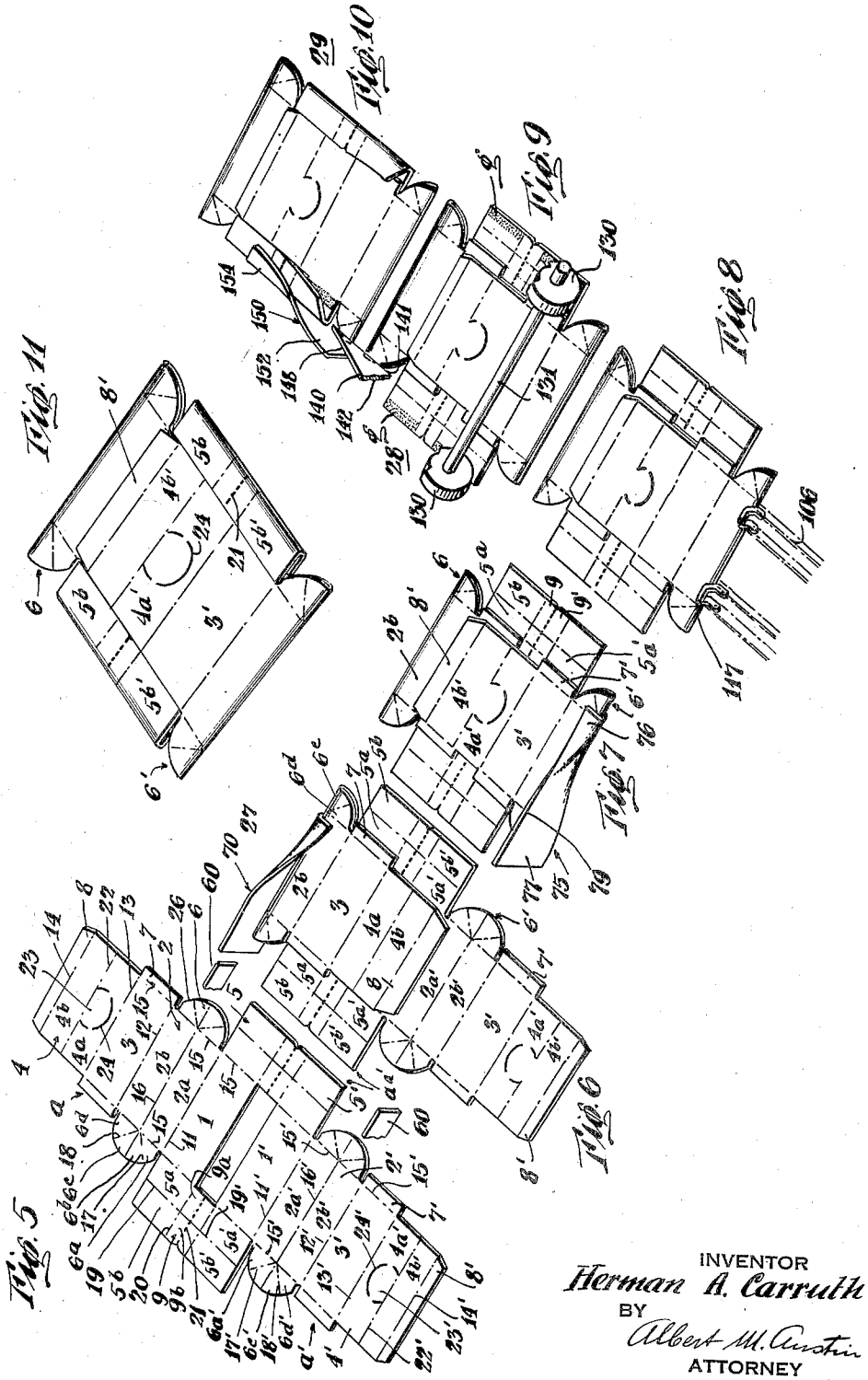
Fig. 5

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METHOD AND APPARATUS FOR ASSEMBLING BOXES

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METHOD AND APPARATUS FOR ASSEMBLING BOXES

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Fig. 12

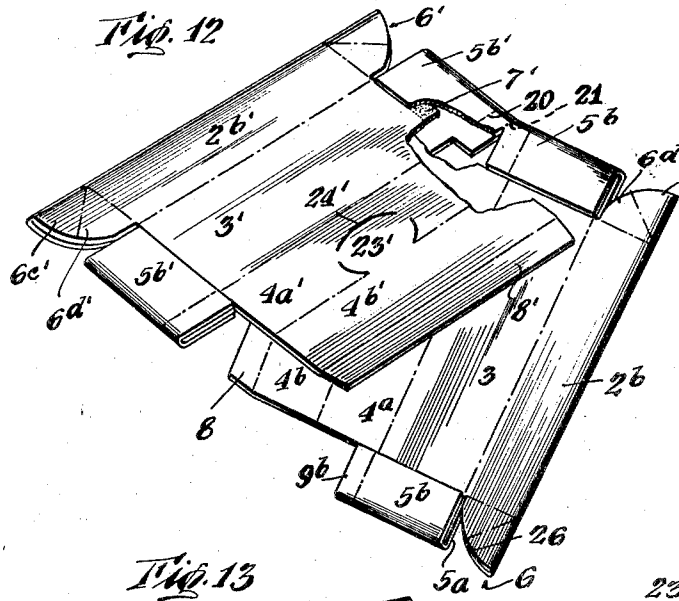


Fig. 14

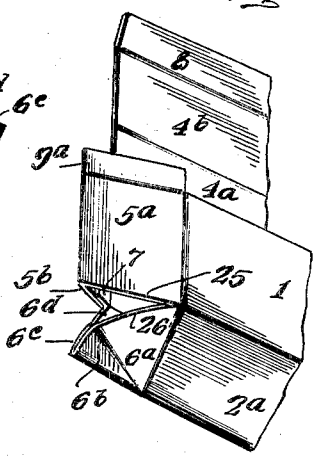


Fig. 13

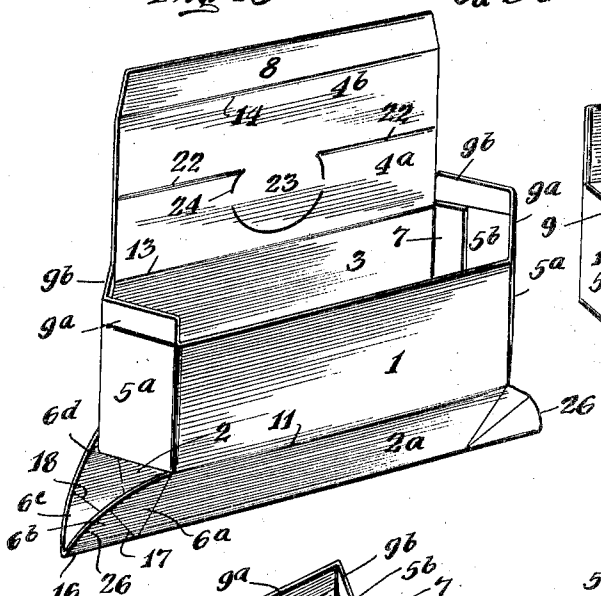


Fig. 17

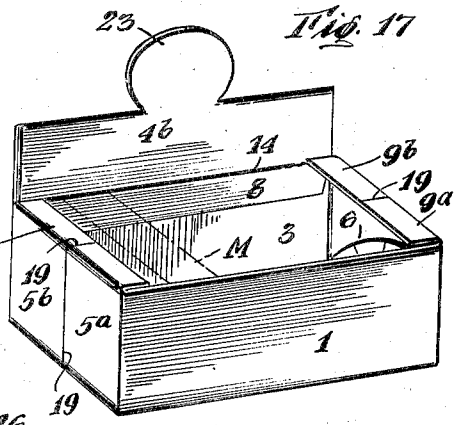


Fig. 15

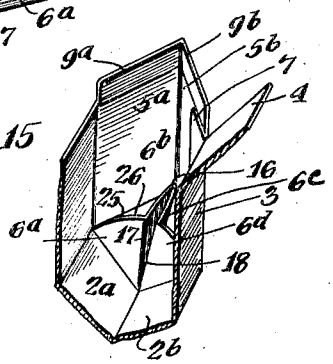
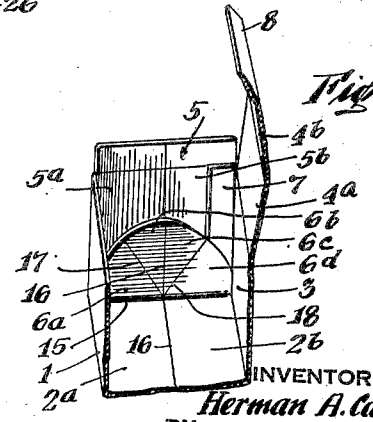


Fig. 16



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UNITED STATES PATENT OFFICE

2,227,439

METHOD AND APPARATUS FOR ASSEMBLING BOXES

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

Application July 15, 1939, Serial No. 284,643

17 Claims. (Cl. 93—49)

This invention relates to a method and apparatus for assembling boxes and more particularly to an improved method and apparatus for folding, gluing and assembling paperboard boxes of the collapsible type whereby such boxes may be manufactured and assembled automatically at a high production rate at a relatively low cost.

In accordance with this invention, an improved method of assembling boxes of the collapsible type is provided comprising a series of assembling steps which can be automatically performed in rapid succession so as to produce a highly serviceable box adapted to be shipped to the user in collapsed form and thereafter erected by the user as needed.

My improved method and apparatus is particularly adapted to the assembling of a highly serviceable merchandising box or carton which may be made from a single blank of paperboard material so cut and scored that two collapsible boxes may be formed therefrom simultaneously, and with the speed of production heretofore required in assembling a single collapsed box. The collapsed boxes assembled in accordance with this invention can be shipped and stored in flat, completely collapsed condition so that large numbers of collapsed boxes may be contained in a limited space and when thus collapsed are not subjected to damage and breakage during shipment and storage. These collapsed boxes can be quickly erected and expanded from collapsed form to merchandise-containing, expanded position quickly and expeditiously by the user as needed, the box having means associated therewith to maintain the bottom and the side wall panels in rigid, flat wall-forming position, and which has rigidity, strength, stiffness and serviceability when the merchandise is packed therein fully comparable to the set-up box.

Two boxes are assembled from a flat box-forming blank having the two box-forming sections thereof connected together by a line of perforation which may be easily severed by the user after each section has been assembled into a collapsed box. The method comprehends a folding operation in which the blank is folded along two parallel-extending bottom collapsing score lines, which folding operation may be automatically performed as the blank is moved along a continuous conveyor. Adhesive is then applied in strip form to the end wall-forming sections of the blank, the adhesive being advantageously applied by means of glue-applying devices which apply a strip of adhesive to each side edge of the blank as the blank continuously progresses thereunder. The end wall sections are then folded over into adhesive contact with end wall-securing flaps which folding operation may be accomplished by turning-in devices provided on the assembly machine. The assembled blank is ejected from the machine presenting two fully assembled collapsed boxes connected only by a severable line of perforation. Two collapsed boxes can thus be assembled from a single blank, requiring only three operations, all of which can be performed automatically as the blank progresses continuously through the machine. The machine is relatively simple in construction, substantially fool-proof in operation, requires little personal supervision when once placed in operation, and the successive assembly steps may be performed in synchronized relationship in rapid succession. The prepared box blanks are fed into the apparatus adjacent one end thereof and the finished collapsed boxes are ejected at the other end thereof, completely and fully assembled in collapsed form ready for shipment to the user.

An object of this invention is to provide an improved method of assembling paperboard boxes which permits of high speed, economical production.

Another object of this invention is to provide an improved method of assembling collapsible boxes from a prepared body blank wherein a plurality of boxes may be simultaneously formed and assembled in a series of steps which can be economically and speedily performed by automatic machinery.

Another object of this invention is to provide an improved apparatus for assembling two collapsible boxes at a time.

Another object of this invention is to provide an improved apparatus adapted to feed, fold, glue and assemble a prepared relatively stiff body blank at a production rate substantially greater than heretofore obtainable.

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

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 top plan view of the box-assembling apparatus which assembles the box blank to form two complete collapsed boxes simultaneously during a single passage of the blank through the apparatus, the severably connected collapsed boxes being ejected from the machine ready for shipment to the user;

Fig. 2 is a transverse cross-sectional view through the apparatus, this view being taken along line 2—2 of Fig. 1;

Fig. 3 is a longitudinal cross-sectional view through the apparatus, this view being taken along line 3—3 of Fig. 1;

Fig. 4 is another longitudinal cross-sectional view through the apparatus, this view being taken along line 4—4 of Fig. 1;

Fig. 5 is a perspective view of the prepared blank shown positioned on the blank advancing conveyor at the receiving end of the box-assembling apparatus;

Fig. 6 is a perspective view of the blank as it appears when moving into contact with turning-in devices of the apparatus, a turning-in device being shown in the process of folding one wing portion of the blank over a body portion thereof;

Fig. 7 is a perspective view of the blank at a further stage in the assembling operation in which a turning-in device operates to fold the opposite wing portion of the blank over the body portion and the wing portion first infolded;

Fig. 8 is a perspective view of the blank as it appears on the conveyor after the wing portions of the blank have been infolded;

Fig. 9 is a perspective view of the blank moving into contact with glue-applying devices which apply a strip of glue to the end wall-forming sections of the blank;

Fig. 10 is a perspective view of the blank moving into contact with further folding devices which fold the end wall sections into adhesive contact with the end wall-securing flaps;

Fig. 11 is a perspective view of the fully assembled blank which provides two completely assembled, collapsed boxes connected together by a severable line of perforations ready for packaging and shipment to the user;

Fig. 12 is a perspective view of a pair of complementary box structures as they appear in collapsed position in the process of being separated;

Fig. 13 is a perspective view of one of the assembled boxes in the process of erection;

Fig. 14 is an exterior fragmentary perspective view of the box in process of erection, this view showing the bottom flap partially collapsed and undergoing insertion into the box to overlie the inside face of the adjacent end wall panel;

Fig. 15 is an interior fragmentary perspective view of the partly erected box shown in Fig. 14;

Fig. 16 is a further fragmentary perspective view of the fully erected box as it appears when looking into the interior thereof; and

Fig. 17 is a perspective view of the fully assembled erected box as it appears when merchandise has been positioned therein and the box set up for display purposes, this view further showing in dotted lines the position of the cover section when placed in closed position.

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

In the manufacture of collapsible boxes by the method and apparatus comprising this invention, body-forming blanks which may be of the general type illustrated in Fig. 5 are first prepared. The body-forming blanks may be formed of relatively strong paperboard of the necessary strength and stiffness to properly support and retain the merchandise in the box. In order that the method and apparatus for forming collapsible boxes comprising this invention may be better understood, the general construction of the blank and the box formed therefrom will be first described.

Blank and box formed therefrom

Referring more particularly to Figs. 5 to 11 inclusive, each blank may be cut from a large sheet or roll of the selected paperboard material, the cutting of the blanks from the sheet or roll into proper shape and the scoring thereof being advantageously performed by an automatic cutting and scoring machine. As shown in Fig. 1, each blank comprises two half portions *a* and *a'* severably joined together by a perforated tear line 21, both half portions of which may be manipulated in unison to form two fully assembled collapsed boxes connected together only along the severable tear line 21. Since the half portion *a'* is a substantial duplicate of the half portion *a*, it will only be necessary to describe the construction of the half portion *a* in detail.

A side wall panel 1 is hinged to bottom panel 2 along the fold line 11, and side wall panel 3 is hinged to bottom panel 2 along the opposite fold line 12. A cover panel 4 may be provided which is hinged along fold line 13 to the top-forming edge of the side wall panel 3. An end wall panel 5 is hinged to each end of the side wall panel 1 along a fold line 15 and an end wall securing tab 7 is also hinged to each end of the side wall panel 3 along the fold line 15. A bottom-forming flap 6 is hinged to each end of the bottom panel 1 along the fold line 15.

In order that the box may be made collapsible, a fold line 16 extends longitudinally through the bottom panel 1 and bottom flaps 6, the fold line 16 extending generally parallel to and spaced substantially midway between the fold lines 11 and 12. Each bottom flap 6 is preferably provided with an arcuate shaped exterior edge 26 to facilitate insertion thereof into the box interior when the box is erected, as will be more fully explained hereinafter. Each bottom flap 6 is divided into four substantially equal sections 6*a*, 6*b*, 6*c* and 6*d*, which are defined between the adjacent fold lines 15 and 16 and the radiating fold lines 17 and 18 which radiate from the point of intersection of the fold lines 15 and 16. Thus each of the bottom flaps 6 may be partially collapsed to further facilitate insertion thereof into the interior of the box, as will be more fully described hereinafter.

Each end wall panel 5 is divided into two end sections 5*a* and 5*b* by a fold line 19 extending generally parallel to and equally spaced between the adjacent fold line 15 and the outer free edge of the end wall panel. Each end wall panel 5 has hinged thereto along the fold line 20 a top wall turn-in flap 9. The fold line 19 extends across the top wall turn-in flap 9 so as to divide the same into top wall turn-in sections 9*a* and 9*b*.

Cover panel 4 may be provided with a tuck-in flap 8 hinged thereto along the fold line 14 and may be further divided into two foldable sections 4*a* and 4*b* by the aligned fold lines 22 spaced intermediate and extending generally parallel to fold lines 13 and 14. Thus, the cover section

4 may be used as a display easel when the box is set up on the counter or the merchant's shelf. In order to attract attention to the box and its contents, a projecting advertising tab 23 may be provided which is formed by providing a cut line 24 of the desired configuration which extends into cover section 4*a* and which joins the ends of the inwardly extending fold lines 22. It will be appreciated, however, that the closure panel 4 may be completely eliminated or if desired, another type of convenient closure panel may be provided.

The various panels, sections, tabs and flaps above described in connection with half portion *a* are duplicated in half portion *a'*, and the equivalent parts shown in half portion *a'* have been given the same designating numerals except that each numeral has been primed to avoid confusion. It will be particularly noted that the two half portions *a* and *a'* of the blank have their top wall turn-in flaps 9 and 9' severably connected together by a tear or perforated line 21 which permits simultaneous gluing and assembly of both boxes at the same time and at the same speed with which one box could be assembled, thus effecting substantial economies in assembly cost. It will be further noted that the end walls 5 and 5' extend at each side edge of the blank beyond the bottom flap 6 and securing tab 7, which permits the blank to be fed into automatic strip gluing devices associated with the assembly apparatus whereby the strips of adhesive *g* may be applied to the end sections 5*b* and 5*b'* at both ends of the blank simultaneously at at a high production rate. In order that the inturned top wall sections 9*b* and 9*b'* receive no adhesive, a pair of notched glue-applying rollers may be used, synchronized with the advancing movement of the blank so that the peripheral surfaces of the glue rollers will fully contact and apply adhesive in strip form to the inside face of the end sections 5*b* and 5*b'* only and will not apply adhesive to the top wall turn-in sections 9*b* and 9*b'*.

It will be further noted that the cover panels 4 and 4' may be completely eliminated so as to provide two duplicate open top box structures. If desired, one of the box structures *a* can be used as the merchandise container and the other structure *a'* can be used as a telescoping cover for the merchandise container by displacing the fold lines 15' slightly out of alignment with the fold line 15 a distance approximately corresponding to the thickness of the paperboard. In this event the end wall sections 5' will be made longer in length than the end wall sections 5 by approximately two thicknesses of paperboard, fold lines 19' being correspondingly slightly offset with respect to the fold lines 19. Likewise, fold lines 11' and 12' will be spaced apart approximately the thickness of two layers of paperboard greater than the distance between the fold lines 11 and 12. The thus slightly disaligned fold lines can be pressed into the blank by suitable adjustment of the creasing elements and cutting knives on the automatic cutting and scoring machine. Likewise, the glue rollers of the automatic strip gluing devices may have arcuate peripheral sections thereof slightly displaced so as to apply the adhesive *g* to the end sections 5*b'* a greater distance from the centre of the blank than adhesive *g* applied to the end sections 5*b*. It will thus be appreciated that an integral blank can be formed having two joined but separable half portions, one to form the container structure of the box and the other to form a telescoping cover structure, both being presented in an integral assembly.

Method of assembly

After the blank has been fully prepared as shown in Fig. 5 and above described, the blank is assembled into two joined but severable collapsed boxes by folding the wing portions of the blank along the fold line 16 so that bottom section 2*b* will overlie bottom section 2*a*, side wall panel 3 will overlie side wall panel 1, and cover panel 4 will overlie side wall panel 1', as shown in Fig. 6. The other wing portion of the blank is then folded along the fold line 16' so that bottom section 2*b'* will overlie bottom section 2*a'* and the extended tuck-in tab 8, side wall panel 3' will overlie cover panel 4, and cover panel 4' will overlie cover panel 4 and side wall section 3, as fully illustrated in Figs. 7 and 8. As thus arranged, each end wall securing tab 7 at each end of the blank will overlie and align with the adjacent end wall section 5*a*, and each end wall securing tab 7' will overlie and align with the adjacent end wall section 5*a'*. Adhesive is applied in strip form to the inside face of side wall sections 5*b* and 5*b'* as illustrated in Fig. 9. Each of the end wall sections 5*b* and 5*b'* is then folded inwardly as illustrated in Fig. 10 so that the inside face thereof, to which adhesive *g* has been applied, will be brought into contact with the exterior face of the corresponding end wall securing tab 7 or 7'.

It will thus be noted that two fully assembled collapsed boxes are fully formed and assembled by a single pass through the automatic gluing and folding machine by three relatively simple operations, namely, folding the wing sections of the blank in superimposed relationship along the fold lines 16 and 16', applying the glue in strip form to the end wall sections 5*b* and 5*b'*, and finally, folding and pressing the end wall sections 5*b* and 5*b'* into adhesive contact with the aligned securing tabs 7 and 7'.

The connected but severable pairs of fully assembled collapsed boxes, as shown in Fig. 11, may be stacked in superimposed relationship so as to occupy a minimum of space during shipment and storage. When the boxes are to be packed with merchandise, a connected pair of boxes may be removed from the stack and separated by pulling the two boxes apart along the tear lines 21, as shown in Fig. 12. The tear lines 21 may be such as to permit easy and positive separation by grasping bottom sections 2*a* and 2*b* with one hand and bottom sections 2*a'* and 2*b'* with the other hand and pulling the collapsed boxes apart. Cover panel 4 easily withdraws from its housed position beneath the side wall panel 3'.

Each box may be expanded into merchandise-containing position by pinching bottom flap sectors 6*b* and 6*c* together at each end of the box, as shown more particularly in Fig. 14, which operation is permitted by reason of the fold lines 17 and 18. When the bottom flap sectors 9*b* and 9*c* have been thus pinched together, as by grasping the same with the fingers, pinching tool or other mechanism, each bottom flap 6 may be swung inwardly under the adjacent free edge 25 of the end wall panel, the arcuate edge 26 of each bottom flap being so shaped as to permit this operation. When each bottom flap 6 has been inserted into the box as shown in Fig. 15, the paired sectors 6*b* and 6*c* are

released and the end panel sections 5*a* and 5*b* are brought into alignment, thus forcing each bottom flap 6 to fan outwardly so as to lie substantially flat against the inside face of the adjacent end wall panel 5, as illustrated more particularly in Fig. 16.

Merchandise M is then placed within the expanded box, the merchandise being preferably so positioned and arranged as to occupy the full interior cubical area of the box. After packaging each top wall flap 9 is turned inwardly so as to extend generally perpendicular to its associated end wall panel 5, the cover panel 4 is then folded over the top of the packed box and the tuck-in flap 8 is inserted into the box so as to lie against the inside face of the side wall panel 1, as illustrated in dotted lines in Fig. 17. A suitable sealing strip may be provided, if desired, to seal the box and thus prevent unauthorized removal of the contents.

The box as thus assembled and packed provides a rigid, strong and highly serviceable container for numerous products. When the merchandise is packed in the expanded box and the top wall flaps 9 folded inwardly, it will be noted that the inwardly turned top wall flaps 9 act as stiffening struts to prevent either inward or outward collapse of end wall sections 6*a* and 6*b*, thus holding the hingedly connected end panel sections 5*a* and 5*b* in rigid and positive straight wall alignment. The hingedly connected end panel sections 5*a* and 5*b* are further held in rigid straight wall alignment by reason of the pressure of the merchandise against the inside faces of the side wall panels 1 and 3, and, finally, the cover panel 4, with the tuck-in flap 8 abutting the side wall 1, also acts as a shape-maintaining end panel strut. It will be further appreciated that when the hingedly connected end wall sections 5*a* and 5*b* are rigidly held and maintained in straight wall alignment by reason of the three forces above indicated, the fan-shaped bottom flaps 6 are also maintained in fully expanded form and in close abutting relationship with the inside face of the adjacent end wall panels 5 and, additionally, the bottom panel sections 2*a* and 2*b* are also maintained in straight wall alignment.

If desired, the cover panel 4 may be so formed as to provide an attractive display easel. When the box is opened to display the merchandise, the tuck-in flap 8 may be inserted between the free end of each infolded top flap section 9*b* and the inside face of side wall panel 3, as illustrated in Fig. 17, thus holding the cover sections 4*a* and 4*b* in erect overlying relationship with the easel tab 23 extending upwardly. It will be appreciated, however, that this cover panel construction may be of simple form without the display easel feature or, as above indicated, the cover panel may be completely eliminated. The cover panel above described has been illustrated in the drawings to indicate the ease with which a more complicated box structure may be made, formed and assembled.

Assembly apparatus

There is shown in Figs. 1 to 10, inclusive, the apparatus whereby the various steps of assembling the blanks into collapsed boxes may be performed. It is understood, however, that the apparatus shown in the drawings is presented for purposes of illustration only and that other types of apparatus may be employed to carry out the novel assembly steps of this invention.

Referring to the drawings, and particularly to Figs. 1 to 4 thereof, the apparatus may comprise suitable tables supporting the assembly apparatus comprising a series of operative mechanism each designed to perform defined operations upon the blank, which may be generally referred to as mechanism 27 for folding the wing portions of the blank over the body portion, mechanism 28 for applying strips of adhesive to the end panel sections of the blank, and mechanism 29 for folding and pressing the end panel sections into adhesive contact with the end panel securing flaps. For convenience in description, each of the mechanisms above referred to will be separately described and discussed.

Wing folding mechanism

Referring more particularly to Figs. 1, 2 and 3 of the drawings, the mechanism for folding the wing portions of the blank inwardly in superimposed relationship comprises a mechanism supporting structure or table comprising parallel extending frame members 30, laterally extending frame members 31, and parallel extending frame members 32 which are spaced a greater distance apart than the frame members 30. A table top is preferably provided comprising table portion 33 which extends between the frame members 30 and table portion 34 which extends between the frame members 32, table portion 34 being provided with blank guide flanges 34′ along the side edges thereof. The frame members and table top which support the operating mechanism may be suitably supported upon legs 37 which rest upon the floor, the legs 37 being of convenient height to permit easy feeding, inspection and repair of the machine.

The table top portions 33 and 34 may be provided with a pair of spaced parallel extending grooves or channels 35, each of which receives and supports the upper flight of a blank advancing belt or chain 38. The forward end of each of the grooves 35 may be cut away as at 35′ to provide room for the conveyor chain supporting sprocket 51, which will be presently described. The blank discharging end of the grooves or channels 35 may be also cut away as at 35″ to provide room for the chain supporting sprockets 55, presently to be described.

The blanks are supplied to the receiving end of table top portion 34 by means of a suitable chute 40 in which the blanks are positioned, as shown more particularly in Figs. 1 and 3. The chute may comprise an inclined bottom wall portion 41 having side flanges 42 for guiding the blanks in their downward sliding movement. The discharge end 43 of the chute 40 is positioned closely adjacent to the receiving end of the table top portion 34 and is so shaped as to permit each separate blank to slide smoothly onto the table top portion. The chute 40 may be supported by means of a suitable bracket 44 fixed to the end frame member 30 and to the bottom wall 41 of the chute.

Means are provided for individually removing the blanks *aa′* from their stacked position within the chute 40 onto the table portion 34 and into engagement with the advancing conveyor belts or chains 38. A feed roller 45, preferably formed of soft rubber or like soft resilient material, is positioned adjacent the discharge end 43 of the chute and closely adjacent the receiving end of the table portion 34. The roller 45

extends transversely of the table portion 34 and is approximately the full width thereof. The roller 45 may be fixed to a suitable shaft 46 rotatably mounted in suitable bearings provided on a supporting bracket 47 fixed to chute-supporting bracket 44. The projecting end of the shaft 45 may be provided with a suitable drive pulley 48 fixed thereto, which is driven by suitable belting 49 connected to a suitable power source such as an electric motor. The blank feeding roller 45 is operative to withdraw the top blanks *aa'* positioned within the chute 40 and to move it into feeding position upon the table portion 34. It will be appreciated that the width of the table portion 34 is substantially equal to or greater than the longitudinal length of the blanks to be operated upon.

Each blank advancing chain 38, the upper flight of which moves in one of the channel grooves 35, is supported upon a pair of sprockets, sprocket 51 being positioned adjacent the blank receiving end of the machine, and sprocket 55 being positioned adjacent the discharge end of the wing-folding mechanism. Each of the two sprockets 51 are fixed to a shaft 50 journaled in suitable bearings provided in the frame members 32 of the machine. Each sprocket wheel 51 is so arranged as to extend through one of the cut-out openings 35' in the table portion 34, permitting free rotative movement thereof. Each sprocket wheel 55 at the discharge end of the wing-folding mechanism is fixed to a suitable shaft 56 journaled in suitable bearings provided on the frame members 30 of the machine. The blank advancing chains 38 are advanced in unison and at the same speed by suitable driving mechanism which may comprise a gear 53 fixed to the projecting end of shaft 46 which meshes with gear 54 fixed to the projecting end of shaft 50. Thus the belt 49 which rotates the feed roller 45 may also be employed to drive the blank advancing conveyor chains 38. Each of the conveyor chains 38 may be provided with suitably spaced blank engaging lugs 39 fixed to the links thereof, the lugs 39 on each of the chains being arranged in pairs, as shown more particularly in Fig. 1. The paired aligned lugs 39 are so arranged as to engage the rear edge of a blank *aa'*, fed onto the table portion 34 by the feed roller 45. The paired lugs 39 are so spaced as to conveniently receive a blank therebetween.

The blank, pushed along the table portion 34 by the lugs 39 engaging the rear edge thereof, move under a pair of spaced blank retaining arms 60, the lower edge 63 of which is positioned to retain the blank in fixed engagement with the pushing lugs 39. The receiving end of the retaining arms 60 may be flared outwardly as at 61 to facilitate movement of the blanks under the blank retaining arms 60. As shown more particularly in Fig. 2, the retaining arms 60 may be held in suspended position by means of suitable brackets 64 which are fixed to each arm 60 and to the adjacent frame member 32 of the machine.

As each blank emerges from under the retaining arms 60, the blank moves into contact with an infolding device 70, which operates to fold one of the wing portions of the blank inwardly, as shown more particularly in Fig. 1. The stationary infolding device 70 may be arranged to fold the wing portion of box section *a* about its bottom collapsing score line 16, as shown more particularly in Figs. 1 and 6. The turning-in device 70 may be formed from a strip or sheet of metal fixed to the adjacent frame member 30 twisted to provide a vertical portion 72 which rises from a horizontal portion 71 in a smooth curve and an inturned portion 73 which turns inwardly from vertical portion 72 in a smooth curve to a position substantially parallel to the table portion 33.

It will be noted that the lower edge 63 of the adjacent blank retaining arm 60 holds the blank in constant advancing engagement against the advancing lugs 39 so that the wing portion of box section *a* will ride over the top edge 74 of the wing-folding device 70 and cause it to be folded inwardly over the body portion thereof. The discharge end 64 of the blank retaining arm 60 terminates at the point where the curved portion 72 of the folding device extends substantially vertically so that the adjacent retaining arm 60 cooperates with, but does not interfere with, the proper operation of the turning-in device 70. It will be noted by referring more particularly to Fig. 6 that the wing portion of blank section *a* is substantially completely folded over the body section of the blank by the turning-in device 70 before the wing portion of blank section *a'* moves into engagement with the opposite turning-in device 75.

The turning-in device 75 is substantially similar to the turning-in device 70 previously described, except that it is positioned to follow the turning-in device 70. The turning-in device 75 is fixed to the adjacent side frame 30 and comprises a member formed of twisted sheet metal and having a horizontal portion 78 which merges in a smooth curve into a vertically extending portion 77, which in turn merges in a smooth curve into horizontal portion 76. The wing portion of the blank section *a'* rides over the top edge 79 of the wing turning-in device so as to fold the wing portion inwardly to overlie the adjacent body portion of the blank and a portion of the opposite inturned wing portion. The discharge end 64 of the adjacent blank retaining arm 60 terminates substantially opposite the vertical portion 77 of the wing-folding device 75 so as not to interfere with the infolding movement by the wing portion of blank section *a'*.

The blank emerges from the turning-in devices 70 and 75 with the wing portions of blank sections *a* and *a'* folded over the body portion of the blank in superimposed relationship as the blank is continuously advanced by the conveyor chains 38. The blank then moves under and into engagement with a driven feed roller 80 extending transversely across the table portion 33 adjacent the discharge end of the wing folding mechanism 27. The feed roller 80 may be made of soft rubber or other soft resilient material so as to engage the successive advancing blanks as they are discharged from the conveyor chains 38 and advance the blanks successively onto a conveyor operative to move the blanks into position to be operated upon by the adhesive-applying mechanism 28 and the end wall section infolding mechanism 29, presently to be described. The feed roller 80 may be fixed to a suitable shaft 81 rotatably mounted in suitable bearings carried by brackets 82 supported upon the frame members 30. The feed roller 80 may be positively driven in synchronized relationship to the blank advancing belts or chains 38 by means of a gear 83 fixed to the shaft thereof which meshes with gear 83' fixed to the

adjacent positively driven sprocket supporting shaft 56.

Thus it will be appreciated that the mechanism 27 operates to fold the wing portions of blank sections *a* and *a'* inwardly in superimposed relationship while the blanks are successively and continuously advanced by the conveyor belts or chains 38. The blanks are maintained in uniform spaced relationship by the paired lugs 39 and the blanks are thus positively advanced under the blank retaining arms 60 into operative engagement with the turning-in devices 70 anad 75 and into engagement with the feed roller 80 which advances the successive blank onto a conveyor which moves the blanks into contact with adhesive-applying mechanism which will now be described.

Adhesive applying mechanism

Referring more particularly to Figs. 1, 3 and 4, the adhesive applying mechanism may be supported upon a suitable blank receiving table comprising spaced parallel extending side frames 90 and end frame 91 supported at a convenient elevation by supporting legs 92. A table top 93, which may be formed of sheet metal, is fixed to the side frames 90 at an elevation preferably slightly below the table top portion 33, as shown more particularly in Fig. 3. The blanks discharged from the wing folding mechanism 27 are pushed onto table top 93 by the feed roller 80 and are advanced along the table top 93 by a pair of spaced parallel extending conveyor belts or chains 106 which may extend generally at right angles to the conveyor chains 38. The blank advancing chains 106 may each be supported upon a pair of sprocket wheels 103 and 107. The two sprocket wheels 103 are fixed to a shaft 104 rotatably mounted in suitable journals 105 in the side frames 90 adjacent feed roller 80. The discharge end of the conveyor belts or chains 106 are each supported upon a sprocket wheel 107 which are fixed to shaft 108 rotatably mounted in suitable journals 109 provided in the frame members 90 of the machine. The blank advancing belts 105 are provided with paired blank engaging lugs 117 which are arranged in aligned relationship so as to engage the rear edge of the blank and advance the blank along the table top 93.

The table top 93 is provided with depressed grooves or channels 96 within which the upper flight of the blank advancing belts or chains 106 may move. The receiving end of the table top 93 terminates short of the chain supporting sprocket wheels 103 so as not to interfere with the proper operative rotation thereof.

As shown more particularly in Fig. 1, the blank discharged upon the table top 93 is advanced by the advancing chains 106 in a direction generally at right angles to its prior advancing movement along table top portion 33. Each blank is positively advanced by means of the aligned lugs 117 which engage the rear edge of the blank and advance it into operative relationship with the adhesive applying devices.

The blank advancing chains 106 are operated by suitable driving means in synchronism with blank advancing chains 38, which means may comprise a bevel gear 110 fixed to the projecting end of shaft 104 which meshes with bevel gear 111 fixed to a section of the sprocket shaft 56 which projects outwardly beyond the adjacent side frame member 30. The projecting end of sprocket shaft 56 is rotatably supported by means of a suitable bearing 98 provided in a bracket 99 fixed to the adjacent side frame member 90 of the machine. The end of sprocket shaft 56 is provided with a driving sprocket 112 fixed thereto which is driven by drive chain 113 trained over driving sprocket 116 fixed to the chain supporting sprocket shaft 50 which is driven by the belting 49 through the inter-meshing gears 53 and 54 previously described.

To assure of proper alignment of the blank fed onto the table top 93 by the feed roller 80, a suitable stop plate 120 is provided against which the advancing edge of the blank is adapted to abut so as to assure proper alignment of the blank on the table top 93 when engaged by the blank engaging lugs 117 of the blank advancing chains 106. The aligning plate 120 may be provided with a flange portion 121 by means of which it may be fixedly secured to the side frame member 90 of the machine. To further assure proper alignment of the blank on the table top 93, a further aligning plate 122 may be provided to guide the opposite edge of the blank so that when the blank is advanced by the advancing chains 106 it is properly aligned for the application of adhesive to the side edges thereof.

Referring again to Figs. 1, 3 and 4, a pair of glue applying rollers 130 are fixed to a shaft 131 rotatably mounted at each end thereof or a suitable bracket support 132 fixed to the adjacent side frame 90 of the machine. The glue applying rollers 130 are preferably positively driven in synchronism with the blank advancing belts 106 as by means of a gear 145 fixed to the projecting end of shaft 131 which meshes with gear 146 fixed to the projecting end of shaft 147 rotatably mounted in the side frame 90. Shaft 147 is provided with a sprocket wheel 147' driven by chain 148 trained around a sprocket wheel 149 fixed to driven sprocket shaft 104.

Adhesive *g* is supplied to the glue-applying rollers 130 from a suitable glue pot 135 supported by brackets 136 fixed to side frames 90 of the machine. The adhesive *g* in the glue pot 135 may be maintained in suitable liquid flowing condition by means of a steam coil or by means of a suitable gas burner 136'. A pair of glue transfer rollers 137 remove the glue from the glue pot 135 and apply it to each of the respective glue-applying rollers 130. It will be appreciated that each glue transfer roll 137 receives a film of adhesive on the periphery 138 thereof which contacts the peripheral edge 134 of the adjacent glue-applying roller 130 so as to transfer the film of glue to the peripheral surface thereof.

The glue rollers 130 are so arranged so that each roller applies a strip of adhesive *g* to the inside face of the end panel sections 5*b* and 5*b'*. It is desirable that no adhesive be applied to the inturned flap sections 9*b* and 9*b'* and to this end each of the glue rollers 130 are provided with a depressed portion 133 in the periphery thereof which does not receive the film of adhesive from the glue-transfer roller 137. It will be noted that the blanks are maintained in fixed, predetermined spaced relationship by the paired lugs 117 which lugs may be adjusted in position along the chains 106 to accommodate the blank. The glue-applying rollers 130 are of such diameter and so synchronized with respect to the advancing movement of the blank so that the adhesive *g* is applied in strip form to the full length of the end panel sections 5*b* and 5*b'* but no adhesive is applied to the inturned sections 9*b* and 9*b'* of the blank. To insure positive synchronism, the shaft

131 to which the glue applicator rolls 130 are fixed may be positively driven from the chain supporting shaft 104 by means of a train of intermeshing gears. The advancing blanks with the adhesive applied to the end panel sections 5b and 5b' thereof then advance into operative engagement with the end panel folding mechanism, which will now be described.

End panel infolding mechanism

Referring more particularly to Figs. 1, 4 and 10, as the blank shown in Fig. 9 emerges from beneath the glue applicator rolls 130, it moves under a pair of spaced blank retaining arms 140, which are suitably supported as by brackets 143 from the side frame 90 of the machine. The lower edge 141 of the retaining arms operates to hold the blanks upon the tabletop 93 with the rear edge thereof in positive engagement with the blank advancing lugs 117. The discharge end of the retaining arms 140 may be suitably tapered as at 142 so as not to interfere with the infolding of the end panel sections.

The end panel sections 5b and 5b' move into engagement with turning-in devices 150, each of which is suitably supported from the side frame 90 of the machine. The turning-in devices 150 fold the end panel sections 5b and 5b' about the adjacent score lines 19 and 19' so that end panel sections 5b of the blanks are folded over into adhesive contact with the adjacent end wall securing flaps 7, and the end panel sections 5b' are folded over into adhesive contact with the adjacent end wall securing flaps 7'.

Each of the turning-in devices 150 may be formed from a strip of bendable metal which is given a curved or twisted contour as shown in Figs. 1, 4 and 10 of the drawings. The end wall sections 5b and 5b' at each side of the blank advance over the rising edge 151 of the turning-in device, meanwhile being held in fixed engagement with the blank advancing lugs 117 by means of the retaining arms 140. The trailing ends of the retaining arms 140 terminate substantially opposite the vertically extending portion 152 of the adjacent turning-in device 150 so as not to interfere with the proper folding of the end panel sections of the blank. The trailing end 154 of the turning-in devices 150 extends substantially parallel to the table top 93 so as to insure positive infolding of the end panel sections 5b and 5b' as the blanks are successively advanced.

To insure that the end panel sections 5b and 5b' will be positively secured to the end wall securing flaps 7 and 7', a suitable pressure roller 160 is provided for positively pressing the end panel sections 5b and 5b', having the strip of adhesive *g* applied thereto, into firm adhesive contact with the adjacent end wall securing flaps 7 and 7'. The pressure roller 160 may be fixed to a suitable shaft 161 journaled in suitable bearings provided in brackets 163 supported by the side frame 90. The pressure roller 160 is preferably formed of a soft resilient material, such as soft rubber or similar composition, and may be freely rotated by frictional contact with the advancing blank although positive pressure roller rotating means may be provided, such as sprocket 164 fixed to roller shaft 161 driven by drive chain 165 trained over sprocket 166 fixed to the positively driven shaft 108. The pressure roller 160 insures positive adhesion of the end panel sections 5b and 5b' to the end wall securing flaps 7 and 7'.

The blank has thus been fully assembled to form two severably connected collapsed boxes, as shown in Fig. 11. The fully assembled blanks are ejected from the discharge end of the machine in rapid succession into a suitable hopper where they are stacked one upon the other. The completed paired collapsed boxes may then be packed in suitable packing cases and shipped to the user.

By employing my improved method of assembling collapsed boxes, a strong, rigid and highly serviceable box can be produced substantially entirely by automatic machinery at production rates running as high as twenty thousand paired boxes per hour. The paired collapsed boxes ejected from the machine are fully collapsed and a large number of paired collapsed boxes may be contained in a shipping box of limited cubicle content. In view of the fact that the wing-folding mechanism, the glue-applying mechanism and the side panel section infolding mechanism are all stationary relative to the advancing movement of the blank, almost any desired production speed can be attained by speeding up the blank advancing belts or chains. All driven parts of the apparatus are preferably connected together in synchronized relationship to a single power source so that complete synchronism of all moving parts of the apparatus is attained.

It will be appreciated that the various method steps of this invention can be performed by box assembly mechanism other than that particularly disclosed in this application and operative elements other than that specifically disclosed can be substituted by those skilled in the art without departing from the spirit and teaching of my invention, as more particularly defined by the sub-joined claims.

Collapsible boxes of a particular size and shape are used in large quantities for packaging of numerous articles of merchandise. A single machine may be used to manufacture and assemble boxes of a particular size and shape. If for production reasons it is desired to make a box of different size and shape on the same machine, the operating elements may be easily shifted or adjusted to effect proper assemblage of the collapsed boxes of different size and shape. Such necessary adjustments, shifting of parts or substitution of parts to assemble a particular box will be obvious to workmen in the art following the teachings of this invention.

While certain novel features of the invention have been disclosed herein, 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. The method of making paperboard boxes from severably connected paired blank sections wherein each section is provided with side wall panels, a bottom panel hingedly connected to said side wall panels, end wall panels and end wall panel securing flaps hingedly connected to the ends of said side wall panels, and wherein a side wall panel of one blank section is severably connected to an adjacent side wall panel of another blank section, which method includes assembling the two blank sections by successive folding, gluing and folding operations performed substantially simultaneously upon similar parts of both blank sections to provide a pair of severably connected boxes.

2. The method of making collapsible paperboard boxes from severably connected paired

blank sections wherein each section is provided with side wall panels, a bottom panel hingedly connected to the side wall panels, end wall panels and end wall panel securing flaps hingedly connected to the ends of said side wall panels, the bottom panel and end wall panels of said blank sections having box collapsing fold lines therein, and wherein a side wall panel of one blank section is severably connected to the adjacent side wall panel of another blank section, which method includes assembling the two blank sections by successive folding, gluing and folding operations performed substantially simultaneously upon similar parts of both blank sections to provide a pair of severably connected collapsed boxes.

3. The method of making a pair of collapsible paperboard boxes from a pair of severably connected blank sections wherein each section is provided with side wall panels, a bottom panel hingedly connected to the side wall panels, end wall panels and end wall panel securing flaps hingedly connected to the ends of said side wall panels, the bottom panel and end wall panels of each blank having a collapsing fold line therein, and wherein the paired blank sections are severably connected along adjacent side wall panels thereof, which method includes the steps of successively folding, glueing and assembling similar parts of the paired blank sections substantially simultaneously into a pair of severably connected collapsible boxes.

4. The method of making collapsible boxes from severably connected paired paperboard blank sections wherein each section is provided with a pair of side wall panels, a bottom panel hingedly connected to the side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projected from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, wherein the paired blank sections are severably connected along adjacent side wall panels thereof, which method includes the steps of substantially simultaneously folding a side wall panel of each blank section over the other side wall panel of the blank section, substantially simultaneously applying adhesive to each of said end wall panels, and substantially simuitaneously folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap to provide a pair of severably connected collapsible boxes.

5. The method of making collapsible boxes from severably connected paired paperboard blank sections wherein each section is provided with a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, and wherein the paired blank sections are severably connected along adjacent side wall panels thereof, which method includes the steps of substantially simultaneously folding the outer wing portion of each blank section inwardly along its bottom collapsing fold line, substantially simultaneously applying adhesive to each of said end wall panels, and substantially simultaneously folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap to provide a pair of severably connected collapsed boxes.

6. The method of making collapsible boxes from connected paired paperboard blank sections wherein each section is provided with a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, and wherein the paired blank sections are connected along adjacent side wall panels thereof, which method includes the steps of substantially simultaneously folding the outer wing portion of each blank section inwardly along its bottom collapsing fold line while the blank sections are being continuously advanced, substantially simultaneously applying adhesive to each of said end wall panels while the blanks are being continuously advanced, and substantially simultaneously folding each of said end wall panels into adhesive contact with adjacent end wall securing flap while the blanks are being continuously advanced.

7. The method of making collapsible boxes from severably connected paired paperboard blank sections wherein each section is provided with a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, and wherein the paired blank sections are severably connected along adjacent side wall panels thereof, which method includes the steps of folding the outer wing portion of one blank section inwardly along its bottom collapsing fold line, folding the outer wing portion of the opposite blank section inwardly along its bottom collapsing fold line, applying adhesive substantially simultaneously to each of said end wall panels, and folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap to provide a pair of severably connected collapsed boxes.

8. The method of making collapsible boxes from severably connected paired paperboard blank sections wherein each section is provided with a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, and wherein the paired blank sections are severably connected along adjacent side wall panels thereof, which method includes the steps of advancing the severably connected blank sections continuously along a predetermined path, and during its advancing movement folding the outer wing portion of each blank section inwardly along its box-collapsing fold line, applying adhesive to each of said end wall panels, and folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap to provide a pair of severably connected collapsed boxes.

9. The method of making collapsible boxes from connected paired paperboard blank sections wherein each section is provided with a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the

ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, and wherein the paired blank sections are connected along adjacent side wall panels thereof, which method includes the steps of folding the outer wing portion of each blank section inwardly along its box-collapsing fold line, applying a strip of adhesive to each of said end wall panels, folding each of said end wall panels along its collapsing fold line over the adjacent end wall securing flap, and pressing each of said end wall panels into firm adhesive contact with the adjacent end wall securing flap.

10. The method of making collapsible boxes from severably connected paired paperboard blank sections wherein each section is provided with a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, and wherein the paired blank sections are severably connected along adjacent side wall panels thereof, which method includes the steps of folding a side wall panel of each blank section over the other side wall panel of the blank section along its box-collapsing fold line, applying a strip of adhesive to the inside face of each of said end wall panels, folding each of said end wall panels along its collapsing fold line over the adjacent end wall securing flap, and pressing each end wall panel into firm adhesive contact with the underlying securing flap to provide a pair of severably connected collapsed boxes.

11. The method of making collapsible boxes from severably connected paired paperboard blank sections wherein each section is provided with a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, and wherein the paired blank sections are severably connected along adjacent side wall panels thereof, which method includes the steps of folding the outer wing portion of each blank section inwardly along its bottom collapsing fold line, applying adhesive to each of said end wall panels, folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap to provide a pair of severably connected, collapsed boxes, separating said connected collapsed boxes, and erecting each of said collapsed boxes into container form.

12. Apparatus for assembling paperboard boxes from paired connected blank sections each having a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, said apparatus including spaced means between which the paired blank sections advance for folding the outer wing portion of each blank section inwardly along its bottom collapsing fold line, spaced means between which the paired blank sections advance for applying adhesive to each of said end wall panels, and spaced means between which the paired blank sections advance for folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap to provide a pair of connected collapsible boxes.

13. Apparatus for assembling paperboard boxes from paired connected blank sections, each blank section having a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, said apparatus including conveyor means for continuously advancing paired blank sections in predetermined spaced relationship, spaced means between which the paired blank sections advance for folding the outer wing portion of each blank section inwardly along its bottom collapsing fold line during advancing movement of said paired blank sections along said conveyor means, spaced means between which the paired blank sections advance for applying adhesive to each of said end wall panels during advancing movement of said paired blank sections along said said conveyor means, and spaced means between which the paired blank sections advance for folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap during advancing movement of the paired blank sections along said conveyor means.

14. Apparatus for assembling paperboard boxes from paired severably connected blank sections, each blank section having a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, said apparatus including conveyor means for continuously advancing paired blank sections in predetermined spaced relationship, spaced normally stationary means between which the paired blank sections advance for folding the outer wing portion of each blank section inwardly along its bottom collapsing fold line during advancing movement of said paired blank sections along said conveyor means, spaced adhesive-applying means between which the paired blank sections advance relatively stationary to said conveyor means operative to apply adhesive to each of said end wall panels during advancing movement of said paired blank sections along said conveyor means, and spaced normally stationary means between which the paired blank sections advance for folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap during advancing movement of said paired blank sections along said conveyor means.

15. Apparatus for assembling paperboard boxes from paired severably connected blank sections, each blank section having a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, said apparatus including a supporting table, conveyor means supported on said table, means for driving said conveyor

means to continuously advance paired blank sections in predetermined spaced relationship along said table, a feed roller for feeding blanks successively to said conveyor means, a turning-in device positioned adjacent one side of said conveyor means for folding a side wall panel of one of said paired blank sections over the other side wall panel of the blank section along its bottom collapsing fold line, a turning-in device positioned adjacent the opposite side of said conveyor means for folding the side wall panel of the other blank section over the other side wall panel thereof along its bottom collapsing fold line, and means for retaining said paired blank sections in fixed position on said conveyor means during the side wall panel folding operation.

16. Apparatus for assembling paperboard boxes from paired, severably connected blank sections, each blank section having a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps, hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, said apparatus including, spaced means between which the paired blank sections advance for folding the outer wing portion of each blank section inwardly along its box-collapsing fold line, a supporting table, conveyor means supported on said table, means for driving said conveyor means to continuously advance the wing-folded, paired blank sections in predetermined spaced relationship along said table, spaced glue applicators between which the folded paired blank sections advance for applying a strip of adhesive to the inside face of each of said end wall panels during advancing movement of said paired blank sections along said conveyor means, spaced turning-in devices between which the paired blank sections advance for folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap during advancing movement of said paired blank sections along said conveyor means.

17. Apparatus for assembling paperboard boxes from paired severably connected blank sections, each blank section having a pair of side wall panels, a bottom panel hingedly connected to said side wall panels, a pair of end wall panels and a pair of end wall panel securing flaps hingedly connected to and projecting from the ends of said side wall panels, the bottom panel and end wall panels of each blank section having a box-collapsing fold line therein, said apparatus including a supporting table, a blank advancing conveyor supported on said table operative to continuously advance paired blank sections in predetermined spaced relationship along said table, spaced means between which the paired blank sections advance for folding the outer wing portion of each blank section inwardly along the bottom collapsing fold line during advancing movement of said paired blank sections along said conveyor, a second supporting table, a conveyor supported on said second table for advancing the wing folded paired blank sections in predetermined spaced relationship along said second table, spaced glue applicators between which the wing-folded paired blank sections advance for applying a strip of adhesive to each of said end wall panels during advancing movement of said paired wing folded blank sections along said second conveyor, spaced turning-in devices between which the paired blank sections advance for folding each of said end wall panels into adhesive contact with the adjacent end wall securing flap during advancing movement of said paired blank sections along said second conveyor, and means for driving said conveyors in synchronism.

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