

Nov. 17, 1959

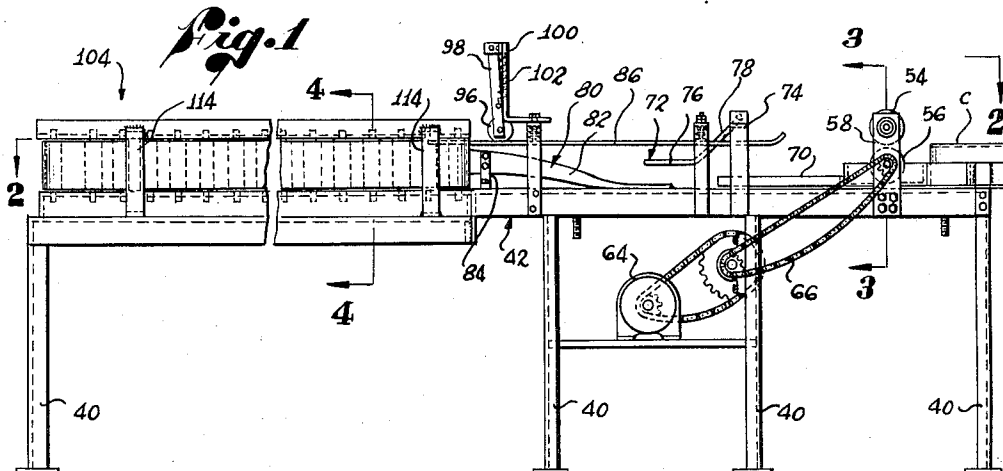
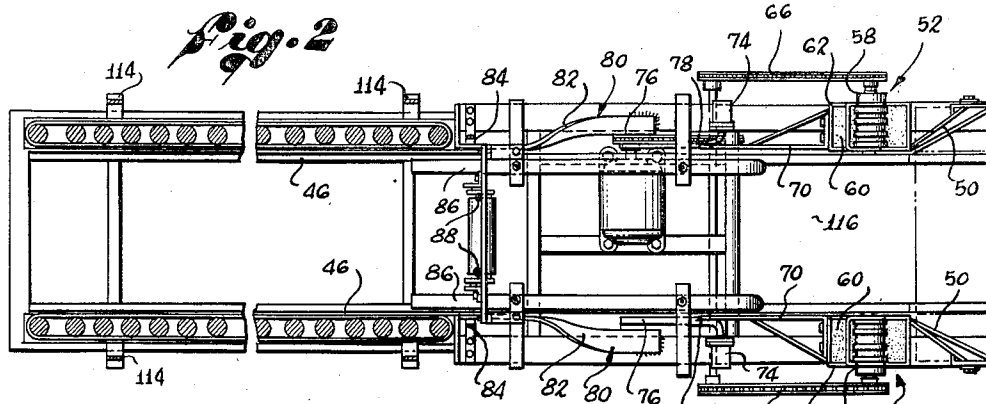
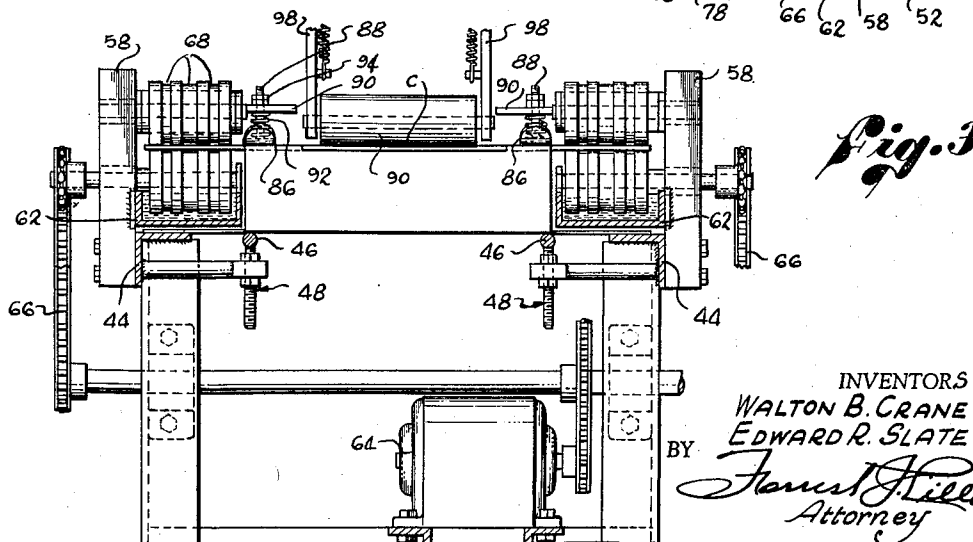
W. B. CRANE ET AL

2,912,908

BOX GLUING MACHINE

Filed July 18, 1957

2 Sheets-Sheet 1



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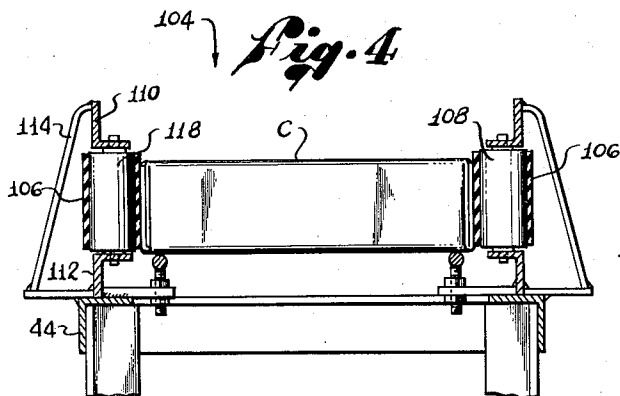
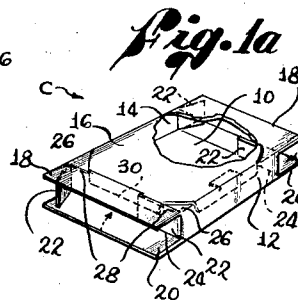
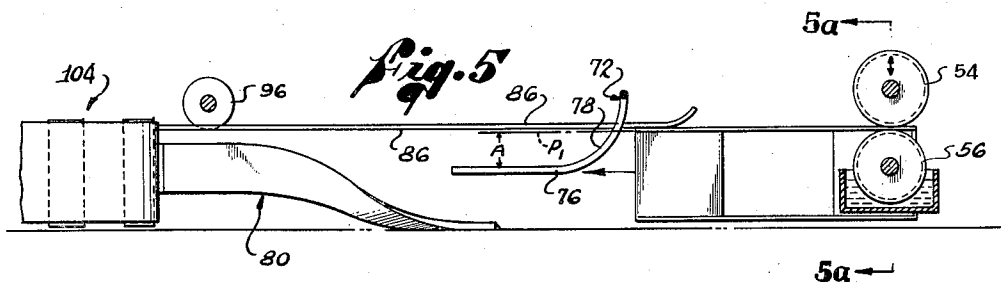
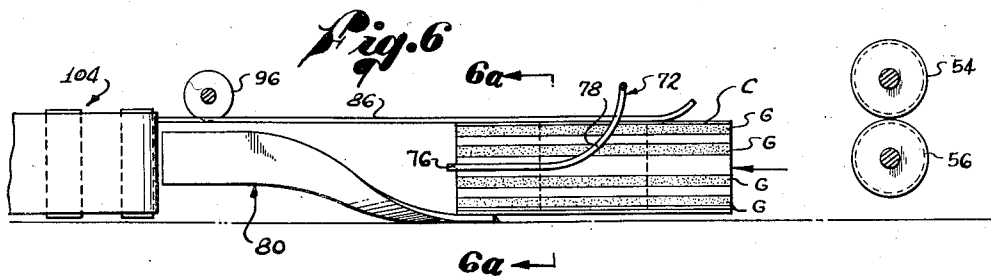
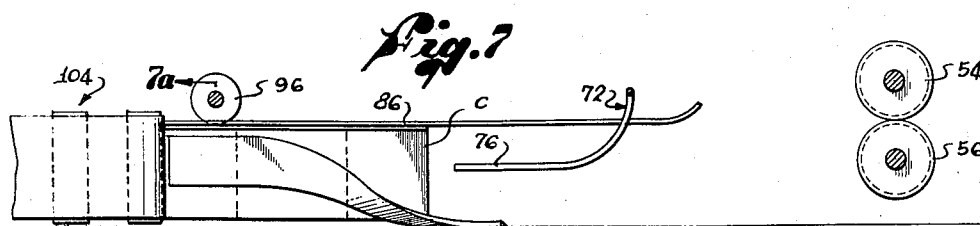
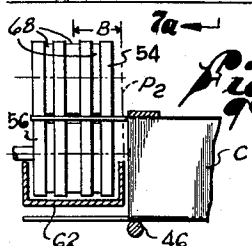
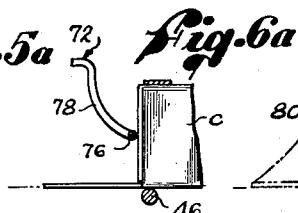
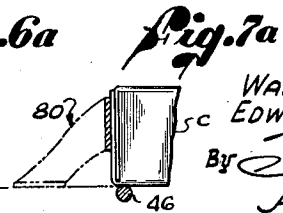
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2 Sheets-Sheet 2



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2,912,908

BOX GLUING MACHINE

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6 Claims. (Cl. 93—52)

This invention relates to a box forming machine, and more particularly to a machine for adhesively sealing end flaps of a partially folded, cardboard box structure to form a completed cardboard container.

The machine of this invention is designed for use in forming cardboard containers of the type having adhesively bonded end flaps which form the end walls of the completed container. Briefly, the following sequential operations are performed by the present machine during movement of the container structure therethrough: First, glue is applied to certain of the end flaps of the container structure; secondly, the end flaps are folded to the proper position wherein the end flaps bearing the glue contact others of the end flaps; and, finally, the end flaps are forceably retained in folded condition for a length of time sufficient to permit setting of the glue and firm adhesive bonding of the end flaps together.

Box gluing and forming machines of this general type have, of course, been devised. Such prior machines, however, were excessively complex and costly due primarily to the fact that a completely unfolded blank was initially fed into the machine, the latter being operative to perform all the folding and gluing operations necessary to the completed container. Intricate mechanisms were, therefore, required in these machines to assure accurate positioning of the container structure during the several folding operations and especially during passage of the container structure through the gluing apparatus.

The cost and complexity of these prior machines were further increased owing to the necessary inclusion therein, of relatively complicated blank folding means and powered conveyer means for moving the container structure through the machines. Such powered conveyer means were, of course, required because all practical designs of such machines precluded manual feeding of the container being formed through the machine.

A broad object of the present invention is the provision of a box forming machine of the character described which avoids the above-noted and other deficiencies of prior box forming machines.

A more specific object of the invention is the provision of a box forming machine of the character described which is designed to permit manual feeding therethrough of the container being formed so as to avoid the necessity of providing complex and costly powered conveyer means.

Another object of the invention is the provision of a box forming machine of the character described which is operative to complete the formation of a partially folded container structure which is manually fed through the machine so as to avoid the necessity of providing complicated and costly blank flowing means and mechanical aligning means for the container structure as are required in existing machines of this type.

A further object of the invention is the provision of a box forming machine of the character described which

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is specially designed for forming a cardboard container of maximum strength and rigidity.

Yet a further object of the invention is the provision of a box forming machine of the character described which is so constructed as to enable the operator to "walk through" the forming section of the machine with the container being formed so as to feed and guide the latter through this section, with the resultant elimination of many of the intricate and costly mechanisms generally required in machines of this type.

A still further object of the invention is the provision of a box forming machine of the character described which is extremely simple in construction, relatively inexpensive to manufacture, small in size, and otherwise especially well suited to its intended function.

Other objects, advantages and features of the invention will become apparent as the description proceeds.

The invention may be best understood by referring to the following detailed description thereof, taken in connection with the annexed drawings, wherein:

Figure 1 is a side elevation of the present box forming machine;

Figure 1A is a perspective view on reduced scale of the form of container structure with which the illustrative machine is used, the container structure being illustrated in the partially folded condition it occupies when initially fed into the machine;

Figure 2 is a view looking in the direction of the arrows on the line 2—2 in Figure 1;

Figure 3 is an enlarged section taken along line 3—3 of Figure 1;

Figure 4 is an enlarged section taken along line 4—4 of Figure 1;

Figures 5, 6 and 7 are enlarged elevational views of a portion of the present box forming machine illustrating the sequential flap gluing and folding operations which are performed on the container structure of Figure 1A during movement of the latter through the machine;

Figure 5A is a section taken along line 5A—5A of Figure 5;

Figure 6A is a section taken along line 6A—6A of Figure 6; and

Figure 7A is a section taken along line 7A—7A of Figure 7.

Referring first to Figure 1A of these drawings, the container structure C for use with the illustrative machine will be seen to be of relatively flat, rectangular configuration. This container structure comprises a bottom panel 10, front and rear walls 12 and 14, respectively, along opposite edges of the bottom panel 10, and a top panel 16 which is hinged along one edge to the upper edge of the rear wall 14.

Formed at each end of the container structure are an upper end flap 18 and a lower end flap 20 which extend the entire width of the bottom panel 10 and the pair of short end flaps 22 joined to the front and rear walls 12 and 14. The bottom end flaps 20 are joined to the bottom panel 10 along a score line 24 so that the end flaps 20 may be hinged upwardly as indicated by the dotted line arrow at the left-hand end of Figure 1A. The upper end flaps 18 are hinged, adjacent opposite ends, to corner portions 26 of the container structure along a score line 28 to enable the end flaps 18 to be hinged downwardly as indicated by the dotted line arrow at the right-hand end of Figure 1A.

In the completed container, cover panel 16 is adapted to be hinged downwardly to close the open top of the container as shown in Figure 1A and is formed at opposite sides with a pair of right angle flaps 30 (only one shown) engageable behind the short end flaps 22. As previously mentioned, the present box forming machine is adapted to have a partially folded container structure fed there-

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into. This partially folded condition of the container structure is illustrated in Figure 1A wherein the cover panel 16 occupies its closed position, mentioned above, with the cover flaps 30 engaging behind the short end flaps 22 to restrain the latter against inward bending about their score line junctures to the front and rear walls 12 and 14, for reasons to be seen.

When the container structure is in the partially folded condition it occupies when fed into the present box forming machine, then, it will be observed that the upper and lower end flaps 18 and 20 occupy their unfolded positions of extension in the planes of the top and bottom panels of the container, the forward short end flaps 22 occupy their folded positions in the planes of the ends of the container, and the rear, short end flaps 22 occupy their unfolded positions. As will become clear as the description proceeds, the present box forming machine is operative to perform the following sequential operations on the container structure of Figure 1A: Fold the rear, short end flaps 22 into coplanar relationship with the front end flaps 22, apply stripes of adhesive to opposite sides of the upper end flaps 18, fold the upper end flaps downwardly against the front and rear end flaps 22, fold the lower end flaps upwardly against the outer surface of the now folded upper end flaps 18, and finally to apply pressure to opposite ends of the folded container to forceably retain the end flaps in their folded positions sufficiently long to allow the adhesive to set.

Referring now to Figures 1 through 7A illustrating the present box forming machine, the latter will be seen to comprise a stationary framework including supporting legs 40 and an upper horizontal table portion generally indicated at 42, which is supported in an elevated position on the legs 40. As may be seen most clearly in Figures 1 through 4, this elevated table portion 42 comprises a pair of spaced parallel channels 44 which are welded or otherwise rigidly secured to the upper ends of the supporting legs 40 and extend lengthwise of the machine. Fixed to and paralleling the angles 44 so as to also extend lengthwise of the machine are a pair of spaced, parallel rails 46.

As will be presently seen, these rails 46 slideably support the container structure C for movement through the machine. Through this end, the rails 46 are mounted on the angles 44 for vertical adjustment to permit leveling of the rails and vertical positioning thereof in the proper spaced relationship to the other hereinafter described components of the machine. Such vertical adjustment of the rails 46 may be accomplished in any suitable manner, such as by means of the adjusting screw and lock nut arrangement 48 illustrated in Figure 3.

Fixed to the angles 44 at the right-hand or entrance end of the machine are a pair of first flap-folding guides 50 for folding the rear end flaps 22 of the container structure C into coplanar relationship with the forward end flaps 22. As shown, guides 50 comprise flat metal straps which are spaced a distance above the angles 44 and diverge toward the entrance end of the machine.

Generally indicated at 52 are a pair of glue applicators for applying stripes of glue to opposite sides of the upper end flaps 18 of the container structure C. These applicators 52 each comprise an upper applicator roller 54 and a lower applicator roller 56 between which the upper end flaps 18 move when the container structure C is fed through the machine. Applicator rollers 54 and 56 are rotatably mounted on a pair of upstanding brackets 58 rigidly affixed to the angles 44. To enable the upper end flaps 18 of the container structure to move between the applicator rollers 54 and 56, the latter rollers 56 are so vertically located above the rails 46 as to be substantially tangent to the plane of the unfolded upper end flaps 18 when the container structure C is supported on the rails, as may be observed most readily in Figure 1. The upper applicator rollers 54 are mounted for limited vertical movement on the brackets 58 so as to normally rest in

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peripheral contact with the lower rollers. The upper rollers are moved upwardly slightly when the end flaps 18 are fed between the upper and lower rollers.

The lower applicator rollers 56 turn in baths 60 of glue contained within rectangular glue pots 62. As shown most clearly in Figure 3, glue pots 62 are rigidly mounted on the roller supporting brackets 58 and have their bottom walls spaced a slight distance above the horizontal flanges of the angles 44 so as to accommodate movement of the unfolded, lower end flaps 20 of the container structure C between the glue pots and angle flanges.

The upper applicator rollers 54 in each of the applicator assemblies 52 are freely rotatable. The lower applicator rollers 56, on the other hand, are driven in a counterclockwise direction of rotation, as viewed in Figure 1, from a common drive motor 64 through the chain drives 66. As shown most clearly in Figure 3, the several applicator rollers are formed with peripheral grooves 68, illustrated as being three in number. The grooves in the upper applicator rollers 54 are aligned with those in the lower applicator rollers 56.

During operation of the machine, the lower applicator rollers are driven from the motor 64 so as to continuously turn in the glue baths 60. During periods when the upper end flaps of a container structure C are not passing between the upper and lower applicator rollers, glue is deposited on the raised portion of the lower rollers, as the latter turn in the glue baths and is transformed to the raised portions of the upper applicator rollers which turn with the lower rollers at this time due to the peripheral contact therebetween. Thus, the raised portion of both the upper and lower applicator rollers acquire a layer of glue in readiness for applying glue to the upper end flaps of a following container structure as hereinafter described. The applicator rollers are proportioned to have a circumferential dimension approximately equal to the length of the end flaps 18, measured in the direction of movement thereof between the rollers, so that the latter rotate approximately one revolution during movement of the end flaps therebetween. Spaced stripes of glue are thereby deposited on both the upper and lower surfaces of the upper end flaps 18.

As may be observed most clearly in Figure 3, the inner side walls of the glue pots 62 are spaced a distance substantially equal to the spacing between the end flaps 22 when the latter are in their folded condition of Figure 1A. Also, as shown in Figure 2, the inner ends of the first flap folding guides 50 terminate at the inner right-hand corners of their adjacent glue pots 62.

Thus, when a container structure in its folded condition of Figure 1A is fed into the entrance end of the machine with the rear wall 14 of the container leading, the guides 50 engage the unfolded, rear end flaps 22 and gradually fold the latter to the aforesaid coplanar relationship with the forward end flaps 22. Upon movement of the container to a position between the glue pots 62, the inner walls of the latter retain the rear end flaps and subsequently the forward end flaps 22, in their folded positions. The forward end flaps 22 are initially retained in folded condition by the operator.

Fixed to the rear walls of the glue pots 62 are a pair of flat, parallel guide extensions 70 having their inner parallel surfaces flush with the inner walls of their adjacent glue pots 62. These guide extensions serve to hold the forward and rear end flaps 22 in their folded positions until the container structure has been fed through the machine to a position whereat the leading edges of the yet unfolded upper end flaps 18 engage a pair of second flap-folding guides 72. Guides 72, which serve to fold the upper end flaps 18 downwardly against the folded front and rear end flaps 22, are mounted on a pair of upstanding brackets 74 fixed to the angles 44 at positions spaced somewhat toward the entrance end of the machine from the ends of the guide extensions 70.

Each of the guides 72 comprises a cylindric rod, one

end of which is rigidly secured to its respective bracket 74 at a point a distance above the aforementioned plane of the upper panel 16 of the container structure C when the latter is supported on the rails 46. The free end portions of the guides 72 comprise straight, substantially parallel sections 76 which extend parallel to the length of the machine and are spaced transversely of the latter, a distance approximately equal to the dimension of the container structure C measured between the end flaps 18 when the latter are in their folded positions against the forward and rear end flaps 22.

Intermediate the straight section 76 of each guide 72 and the end of the latter attached to its respective bracket 74 is an inclined section 78. As will presently be more fully described, when the container C is fed through the machine, the unfolded end flaps 18, upon emerging from the applicator rollers 54 and 56, engage the inclined sections 78 of the guides 72. Continued movement of the container through the machine after this initial engagement of the guides 72 with the end flaps 18 effects folding of the latter downwardly against the now folded front and rear end flaps 22. The straight sections 76 of the guides 72 serve to hold the flaps 18 in these folded positions until the container has been advanced to a position wherein the yet unfolded lower end flaps 20 engage a third set of flap-folding guides 80 which serve to fold the latter flaps upwardly against the now folded upper end flap 18.

To enable the straight sections 76 of the guides 72 to thus retain the upper end flaps 18 in their folded positions, the latter sections are located in a plane spaced a distance below the aforementioned plane of the upper panel of the container C when the latter is supported on the rails 46, as may be observed most clearly in Figure 1. The straight guided sections 76, therefore, engage the folded end flaps 18 along lines intermediate the scored hinge lines of those end flaps and the opposite edges of the flaps.

As previously mentioned, the end flaps 18 have glue stripes applied to both sides thereof by the applicator rollers 54 and 56. In order to avoid contaminating the straight sections 76 of the guides with the glue contained on the side of the flaps 18 against which these sections bear, the latter are so vertically located as to engage the end flaps 18 intermediate a pair of adjacent glue stripes, as illustrated in Figure 6.

This is accomplished by making the vertical spacing A in Figure 5, between the flap engaging sections 76 of the flap folding guides and the horizontal plane P1, passing tangentially between the applicator rollers 54, 56 approximately equal to the spacing B in Figure 5a, between the center lines of each center applicator roller groove 68 and the vertical plane P2 of the inner wall of the adjacent glue pot 62 and guide extension 70. Also, the width of the flap engaging sections 76 is less than the width of the roller groove 68, as may be readily observed in the drawings. The glue stripes G applied to the container flaps 18 are thereby spaced to straddle the guide sections 76 in the manner illustrated in Figure 6. It will be noted that the extensions 70 and inner walls of the glue pots provide vertical guide surfaces for slideably guiding a container structure during movement of the latter past the applicator rollers.

Each of the pair of final flap folding guides 80 comprises a metal strap which extends generally lengthwise of the machine. The end of this strap proximate to the entrance, or right-hand end of the machine, parallels and is welded or otherwise rigidly fixed to the upper horizontal flange of its adjacent angle 44. The opposite end of the strap comprising each of the guides 80 is disposed in a vertical plane and is fixedly attached to the upper horizontal flange of the adjacent angle 44 by a bracket 84. Intermediate these opposite ends, each strap 82 is generally helically twisted so as to provide a relatively

smooth, though curved, transitional surface from the horizontally disposed end of the strap 82 and its left-hand, vertically disposed end.

Upon feeding of a container C through the machine to a position just beyond the position of initial contact of the straight sections 76 of the guides 72 with the folded end flaps 18, the yet unfolded lower end flaps 20 engage the guides 80. Continued movement of the container through the machine after this initial engagement of the lower end flaps 20 with the guides 80 effects folding of the latter flaps upwardly against the folded flaps 18. The horizontal spacing, measured transversely of the machine, between the inner surfaces of the left-hand vertical ends of the straps 82 is substantially equal to the dimension of the container C measured between the folded flaps 20. The vertical ends of the straps 82, therefore, retain the flaps 20 in their folded position against the glue bearing flaps 18.

Overlying the rails 46 adjacent the guides 72 and 80 are a pair of pressure strips 86 which extend a substantial distance lengthwise of the machine. These pressure strips 86 mount upstanding threaded shafts 88 which are slideably received in openings in horizontal bracket arms 90 fixedly attached to the angles 44 in spaced overlying relationship to the rails 46. Springs 92, encircling the shafts 88 between the bracket arms 90 and the respective pressure strips 86, serve to bias the latter in a downward direction. Lock nuts 94 on the upper ends of the threaded shafts 88 limit such downward movement of the pressure strips.

The lock nuts 94 are so adjusted that in the normal positions of the pressure strips 86, their lower surfaces are spaced slightly below the aforementioned plane of the upper panel of the container C when the latter is supported on the rails 46. During feeding of a container through the machine, it passes between the rails 46 and the pressure strips 86, the latter being resiliently urged against the folded top panel 16 of the container to retain the latter in its folded, closed position wherein its side flaps 30 reinforce the end flaps 18, 20 and 22 against inward bending during movement of the container past the guides 72 and 80.

A weighted roller 96, journaled on the lower end of a pair of arms 98, which, in turn, are pivoted at their upper ends to a bracket 100 fixed to the adjacent pair of bracket arms 90, serves to apply additional concentrated pressure on the top panel 16 during passage of the container between the vertically disposed ends of the guide straps 80. A spring 102 biases the roller 96 to the position shown in Figure 1 wherein its lower periphery is substantially coplanar with the lower surfaces of the guide strips 86 in their normal positions.

This pressure roller 96 is relatively short as compared with dimension of the upper container panel 16 taken normal to the end flaps thereof. Accordingly, when the container C is fed below the roller 96, the latter swings upwardly slightly in a clockwise direction, as viewed in Figure 1, so that the weight of the roller is supported by the upper panel 16 of the container. The weight of this roller tends to bow the upper panel 16 of the container slightly in a downward direction to a position wherein opposite edges of the container are located between the folded end flaps.

The pressure applied on the folded end flaps by the vertically disposed ends of the guide straps 82 urges the flaps against the edges of the bowed top panel to frictionally retain the latter in its bowed condition. This abutment of the end flaps with the edges of the bowed top panel provides additional reinforcement resisting inward bending of the end flaps under the pressure applied to them by the vertical ends of the guide straps 82, as well as in a final pressure assembly 104. Also, the front overhanging flap 16' (Figure 1A) of the container is tilted up slightly so that the back of the next box may slide under it to permit contact of the front and rear panels of ad-

jacent containers as the latter are pushed through the machine.

This latter pressure assembly 104 comprises, as shown most clearly in Figure 4, a pair of endless belts 106 which are trained around a series of vertical rollers 108. Rollers 108 are journaled at opposite ends in a pair of angles 110 and 112, the latter angles being welded directly to the previously mentioned angles 44 comprising a part of the supporting frame 42. The upper angles 110, which journal the upper ends of the rollers 108, are rigidly attached to the angles 44 by means of upstanding braces 114 welded, as shown, to the angles 110 and 44.

The arrangement of the final pressure assembly 104 is such that as the container feeds thereinto, it engages between the opposing runs of the endless belts 106. The spacing between these opposing runs of the belts is such as to apply a given amount of pressure to opposite ends of the container during movement of the latter to the left-hand or exit end of the machine. This pressure on the ends of the container retains the folded, upper end flaps 18 in intimate contact with the folded, lower end flaps 20 and the folded forward and rear end flaps 22 so as to assure efficient adhesive bonding of these several flaps.

Owing to the pressured contact between the ends of the container and the opposing runs of the belts 106, the latter move with the container as it feeds through the machine, the rotatable mounting of the rollers 108, of course, accommodating such movement of the belts 106.

The length of the final pressure assembly 104 is made such that the average transit time of the container there-through is sufficient to assure the proper degree of setting of the particular glue employed so that upon emergence of the now completed container from the exit end of the machine, the end flaps of the container will not tend to return to their unfolded positions. During passage of the container through the final pressure assembly 104, the upper panel of the container will be frictionally retained in the aforementioned bowed condition, owing to the pressure applied to the ends of the container. The end flaps of the container are, therefore, reinforced against inward bending so as to assure the proper degree of pressure between the several end flaps necessary to efficient adhesive bonding thereof.

Operation of the present box forming machine is believed to be apparent in the light of the foregoing description. Thus, the operator of the machine will be supplied either with a quantity of container structures in their partially folded condition of Figure 1A or with a quantity of unfolded blanks which he will grasp individually and fold to the condition of Figure 1A.

This partially folded container is then fed into the entrance end of the machine, with the rear wall 14 of the container leading, in such manner that the upper end flaps 18 pass between the applicator rollers 54 and 56 and the lower end flaps 20 pass below the initial flap folding guides 50 and the glue pots 62 of the applicator assemblies. During initial insertion of the container into the machine, of course, the first flap-folding guides 50 engage the rear end flaps 22 and fold the latter into the plane of the forward end flaps 22. These forward end flaps will be retained in their folded position by the operator during this initial insertion of the container into the machine.

During passage of the upper end flaps 18 between the applicator rollers, stripes of glue are applied to both sides of the flaps in the manner illustrated in Figure 6, wherein the letter G indicates the several glue stripes. Just prior to emergence of the upper end flaps 18 from the applicator rollers, the leading side of the box engages below the elongate pressure strips 86, as illustrated in Figure 5, so that the upper panel 16 of the container is firmly retained in its folded, closed position prior to engagement of the glue bearing, upper end flaps 18 with the second set of flap-folding guides 72.

Movement of the container past the second guides 72 effects downward folding of the glued, upper end flaps 18 against the front and rear end flaps 22 which are, at this time, retained in their folded condition by the guide extensions 70. As previously described, and as shown in Figure 6, the straight sections 76 of the guides 72 are so vertically located as to engage the end flaps 18 between adjacent glue stripes. Thus, as the container moves past the guides 72, the glue on the flaps does not contaminate the straight sections of the guides.

Immediately after this downward folding of the upper end flaps, the lower, yet unfolded end flaps 20 engage the third set of guides 80 and are folded upwardly thereby against the now folded end flaps 18, as shown in Figures 7 and 7A. This action, of course, presses the lower end flaps against the folded upper end flaps and the latter flaps against the forward and rear end flaps 22 so that the glued surfaces of the upper end flaps contact the lower end flaps and the front and rear end flaps to permit adhesive bonding thereof together.

During passage of the container between the guides 80, the roller 96 bears on the upper panel 16 of the container and bows the latter slightly to reinforce the end flaps against inward bending, as previously mentioned.

Upon emerging from the guides 80, the container passes into the final pressure assembly 104 wherein the belts 106 apply pressure to opposite ends of the container to hold the flaps in intimate contact sufficiently long to enable the glue to set. Upon emergence of the container from the exit end of the machine, therefore, the end flaps are firmly bonded and the container completely formed.

The above feeding of the container through the machine is effected by the operator rather than by any powered conveyer means. This elimination of powered conveyer means, of course, substantially reduces the cost and complexity of the machine. Further, the operator manually positions the container flaps for proper entrance between the glue applicator rollers. Accordingly, no mechanical registry mechanism is required, as in existing machines of this character, with the result that the cost and complexity of the machine are further reduced.

These advantages are achieved in the present machine by virtue of the novel construction thereof, which enables the operator to walk into the entrance end of the machine to effect the aforementioned feeding of the container past the applicator assemblies 52, the guides 72 and 80 and finally to feed the container into the final pressure assembly 104. Thus, as may be observed most readily in Figure 2, an unrestricted aisle 116 is provided between opposite sides of the machine in the zone of the guides 50, the applicator assemblies 52, and the guide extensions 70. This aisle opens through the entrance end of the machine and enables the operator to walk into the machine to push the container therealong as just mentioned.

Upon reaching the forward end of the aisle, the operator continues to feed the container through the machine by extending his arms. The operator then repeats this operation with successive, partially folded containers until the machine contains a series of the containers in end-to-end relationship. Each container, therefore, pushes the container ahead of it along as a new container is inserted in the machine. A suitable table extension mounting guide rails, not shown, is preferably attached to the exit end of the machine to receive the completed containers as they emerge from the final pressure assembly 104.

It will be apparent, therefore, that there has been described and illustrated a box forming machine which is fully capable of attaining the several objects and advantages preliminarily set forth. While a preferred embodiment of the invention has been disclosed, it is purely

illustrative in nature since numerous modifications in design, arrangement of parts and instrumentalities are possible within the scope of the following claims.

We claim:

1. In a box forming machine for applying adhesive to and folding end flaps at opposite ends of a container structure of the character described including a hingeable top panel, the combination of an elongate frame including a horizontal table portion adapted to slideably support a container structure for movement in a given lengthwise direction of the frame, glue applicator means along said frame for applying glue to the end flaps of a container structure including two pairs of glue applicator rollers at opposite sides of the frame tangent to a common horizontal plane spaced a predetermined distance above said table portion, a pair of laterally spaced flap folding guides on said frame spaced in said direction from said applicator means between which a container structure is adapted to be fed after emerging from said applicator means, said guides including leading portions for folding the end flaps of a container structure against the ends of the latter and terminal portions for exerting inward forces on the folded flaps to retain the latter in folded position, and vertically acting pressure applying means between said guides having undersurfaces located approximately in said plane and spaced above said table portion for engaging and exerting a downward pressure on the top panel of a container structure during movement of the latter between said guides to retain the panel in closed position wherein it reinforces the end flaps against inward deflection by said terminal portions of the guides.

2. The subject matter of claim 1 wherein said pressure applying means comprises a pair of horizontal strips extending lengthwise of the frame, and yieldable means biasing said strips toward said table portion.

3. The subject matter of claim 1 wherein said pressure applying means comprises a weighted horizontal roller vertically movable on and extending laterally of said frame.

4. The subject matter of claim 1 wherein said pressure applying means comprises a weighted, horizontal roller extending laterally of said frame, and means hingeably supporting said weighted roller on said frame above said table portion for swinging of the latter roller about a horizontal axis spaced above and extending laterally of said table portion.

5. In a box gluing machine for applying glue to and folding an end flap of a container structure of the character described, the combination of an elongate frame including support means in a given plane of the frame for slidably supporting a container structure for movement along the frame, a pair of glue applicator rollers mounted on said frame for rotation on parallel axes located in a transverse plane of the frame perpendicular to said given plane, a guide surface on said frame at one end of the rollers, said guide surface extending lengthwise of the frame in a third plane perpendicular to said transverse plane and given plane for positioning a container

structure endwise of said rollers during movement of the structure past the rollers, said rollers being tangent to a common plane and adapted to have an end flap of the container structure fed therebetween to apply glue to the flap, one roller having a peripheral groove spaced a given distance, measured axially of the rollers in said plane of tangency, from said third plane, a flap folding guide spaced along said frame from said rollers including a relatively straight terminal section located approximately in said third plane and extending parallel to said given plane and plane of tangency for engaging the end flap to fold the latter against the container structure, said terminal section being spaced said given distance in said third plane from said plane of tangency so as to be located to engage the portion of the end flap which is aligned with the roller groove during passage of the flap between the rollers, and the width of the flap engaging portion of said terminal section being less than the width of the roller groove.

6. In a box gluing machine for applying glue to and folding end flaps at opposite ends of a container structure of the character described, the combination of an elongate frame including horizontal container support means for slidably supporting a container structure for movement along the frame, two pairs of glue applicator rollers mounted at opposite sides of the frame for rotation of each pair of rollers on horizontal axes located in a common vertical plane extending transversely of the frame, a pair of transversely spaced vertical guide surfaces on and extending lengthwise of the frame between said pairs of rollers for positioning a container structure endwise of the rollers during movement of the structure between the rollers, said pairs of rollers being tangent to a common horizontal plane and adapted to have end flaps of the container structure fed therebetween to apply glue to the flaps, two corresponding rollers of the pairs of rollers each having a peripheral groove spaced a given distance axially of the rollers from the vertical plane of the adjacent guide surface, a pair of flap folding guides at opposite sides of and spaced along the frame from said rollers, each folding guide including a horizontal, relatively straight terminal section located approximately in the vertical plane of the adjacent guide surface for engaging an end flap of the container structure to fold the flap against the end of the structure, said terminal sections being vertically spaced said given distance from said plane of tangency so as to be located to engage the portions of the respective end flaps which are aligned with the roller grooves during passage of the end flaps between the rollers, and the width of the flap engaging portions of said terminal sections being less than the width of said roller grooves.

References Cited in the file of this patent

UNITED STATES PATENTS

992,112	Clarke	May 9, 1911
1,947,561	Marcalus	Feb. 20, 1934