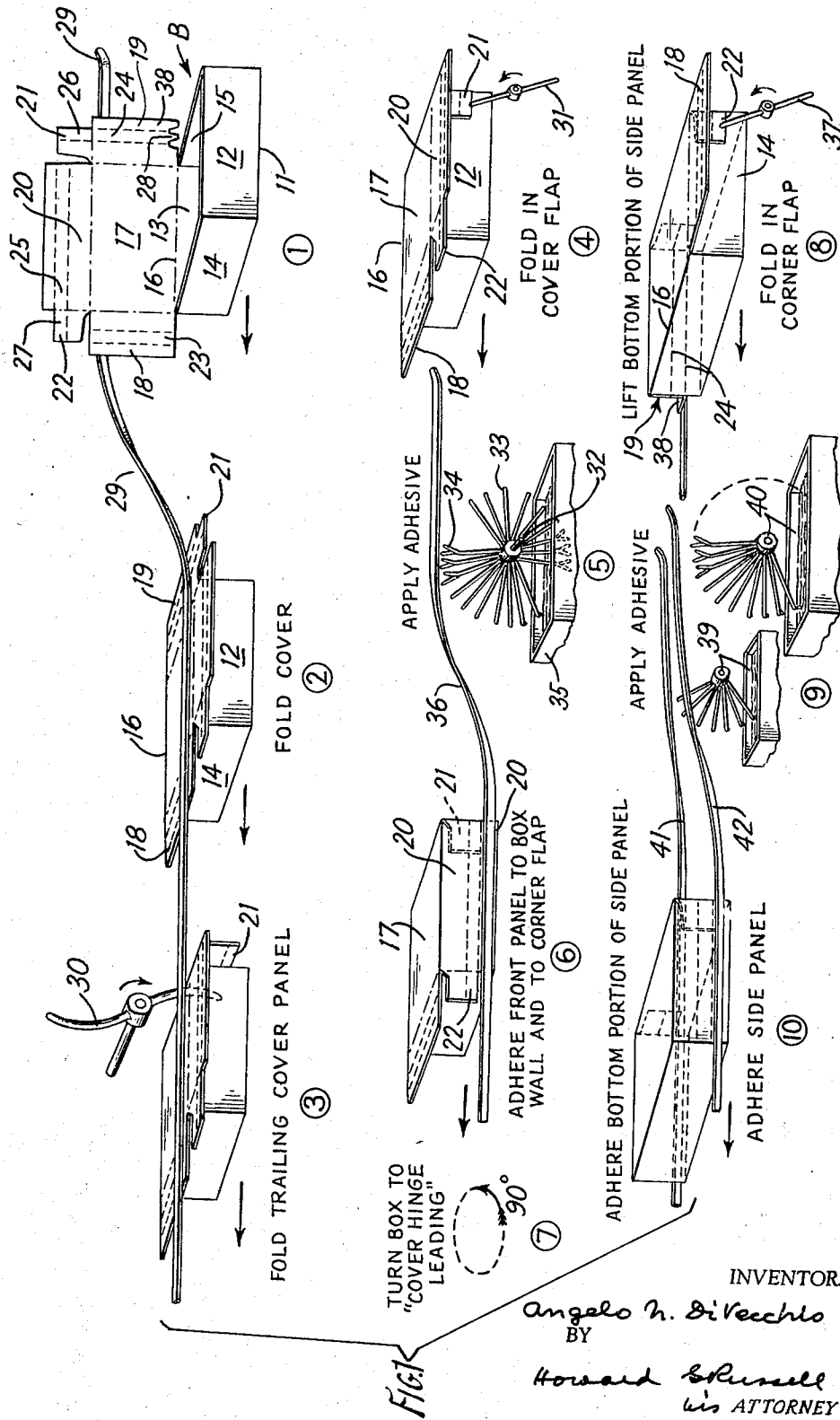


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A. N. DI VECCHIO
METHOD OF FORMING AND GLUING A FOLDING BOX COVER
COMPRISING A CONTINUOUS TEAR STRIP
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METHOD OF FORMING AND GLUING A FOLDING BOX COVER COMPRISING A CONTINUOUS TEAR STRIP

Angelo N. Di Vecchio, Menlo Park, Calif., assignor to Kliklok Corporation, New York, N.Y., a corporation of Delaware

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4 Claims

ABSTRACT OF THE DISCLOSURE

A method is provided for sealing the hinge cover assembly of a folding box in which the hinge cover comprises a front flap and two side flaps, each flap, in turn, comprising a tear strip portion. The three tear strips are interconnected at the box corners by glue tabs.

The disclosed method requires only one turning operation of the box and is characterized by (a) the downfolding, without gluing, of one cover side flap on one box end wall, (b) the subsequent downfolding and gluing of the cover front flap including the gluing of the glue tab of the tear strip of the one side flap to the tear strip of the front flap and further, after turning of the box, (c) the folding of the glue tab of the front tear strip over the other box end wall followed by (d₁) the downfolding and gluing of the other cover side flap over, and to, the other box end wall and the glue tab previously folded thereover, and (d₂) the partial upfolding of the first side flap along its tear strip to apply adhesive to the first side flap and adhere it to the first end wall, thus completing the sealing operation.

This invention relates to the forming and gluing in box closing position of the hinge cover of folding boxes of the type comprising a continuous tear strip in the front and side panels of the cover.

The forming and gluing of the box cover structure of boxes of the aforementioned type is complicated due to the fact that, firstly, the cover front and side panels must be adhered to the box body, that, secondly, the tear strip portions of these three panels must be adhered to one another in such a manner as to form a continuous tear strip and, more particularly, in such a way that a glue lap or portion of the strip in one panel must be adhered to the underside of the corresponding strip of the next panel and that, thirdly, all of the tear strips must remain unattached to the box body.

The prior Patent 3,318,508 of K. T. Buttery, applied for Feb. 1, 1965, issued May 9, 1967, discloses a representative form of box of the aforementioned type and describes a manner of forming, gluing and sealing of its cover structure, which, to the best of my knowledge, represents the present state of the art of forming, gluing and sealing.

The described forming, gluing and sealing method requires two turning operations of the box. "Turning" in box makers terminology is a generic term which includes "straight line turning," an operation in which the box is physically turned 90 degrees about a vertical axis, for example by the action of two chain conveyors running at different linear speeds, and further includes "right angle turning," an operation in which the box is first moved in one direction against a stop by one conveyor and is then carried away from the stop by a second conveyor disposed at right angles to the first.

Turning equipment of whatever construction lengthens the box closing line and requires extra floor space, quite apart from the complication of the box closing line.

The present invention provides an improved and simplified forming, gluing and sealing method which requires only one turning operation.

Its sequential steps are illustrated in the accompanying drawing showing in FIG. 1 positions or operations 1 to 10, and so much of the box construction as is necessary for an understanding of the present invention.

Referring to position 1, the box B comprises a box body composed of a bottom panel 11, a front wall 12, a rear wall 13, and side walls 14 and 15.

Articulated to the rear wall 13 along a cover hinge line 16 is a box cover structure.

The box cover structure comprises a top panel 17, two side panels 18 and 19 and a front panel 20. A corner flap 21 is laterally articulated to the side panel 19 and a further corner flap 22 is laterally articulated to the front panel 20.

Each of the side panels 18, 19, the front panel 20 and the corner flaps 21 and 22 is subdivided by two spaced parallel lines of weakness which define a central tear strip portion in each of them.

It is readily seen that in order to form a continuous tear strip 23, 24, 25 in the three panels 18, 19 and 20, it is necessary to glue the tear strip portion of each corner flap to the underside of the tear strip portion of the adjoining panel. This, however, must not cause the tear strip to be adhered to any portion of the box body.

A complete and secure glue seal of the box requires, on the other hand, that the panel portion below the tear strip in each of the panels 18, 19 and 20 is adhered to the respective box body wall 14, 15 and 12.

If then one end of the tear strip of the sealed box is grasped by the consumer, preferably the end 28 defined by two bordering V-notches extending into the lateral edge of the panel 19, the tear strip 24, 25, 23 is readily removed and the box is opened. There remain on the box body the outermost portions of the panels 18, 19 and 20 which are adhered to the box body walls, yet the box cover remains sufficiently intact to permit reclosing, as the cover front and side remain interconnected by portions of the corner flap.

The forming, gluing and sealing procedure provided by this invention is as follows:

In position 1 the box arrives from the right filled with merchandise and is ready to be closed. In order to facilitate the filling of the box it is preferred by the industry to have the box traveling in the direction of the cover hinge line 16. During the filling the box cover may be upright, as shown, or it may even be bent back temporarily to be returned to the vertical position prior to closing.

In position 1 the box cover moves into engagement with a downfolding rail 29 which plows the cover into the box closing position in which it is shown in position 2.

As soon as the cover panel assembly is in a horizontal position the box is acted upon by a suitable folding device which folds down the trailing side panel 19 against the box body wall 15.

Numerous devices are known for performing such an operation, one of the simplest being a rotating arm folder 30 shown at position 3, to which and beyond which the box is advanced by continuous motion by a suitable conveyor (not shown for the sake of simplicity of the drawings).

The arrows shown in each position indicate the direction in which the box is traveling.

Next, the corner flap 21 is folded against the box body front wall 12 by a suitable rotating or reciprocating folding device. Such devices are sometimes referred to in the box art as "kickers." In position 4 a rotating arm device 31 is shown to perform this operation.

As the next step, adhesive is applied to the underside

of the panel 20. Again, a plurality of different glue applicators are known which may be employed for applying adhesive to selected areas, such as embossed glue wheels, periodically operated glue spitters, and others.

In position 5 a transfer wheel 32 is shown comprising single ended spokes 33 and double ended spokes 34. The spokes dip into an adhesive-containing receptacle 35 and transfer with their ends spots of adhesive to the underside of the panel 20. The single spoke ends and one row of the double spoke ends apply a row of glue spots to the outermost or bottom portion of the panel 20, so as to cause the portion of the panel 20 below the tear strip 25 to adhere to the body wall 12. The remaining ends of the double spokes apply spots to that portion of the panel 20 which is to adhere to the portion of the corner flap 21 above its tear strip portion 26.

A folding rail 36 then folds the front panel 20 against the box body wall 12 to which it adheres, and also against the corner flap 21 to form a bond between the panels 19 and 20 (position 6).

It should be noted, however, that the adhesive applicator 33, 34, 35 skips the corner flap 22 to which no adhesive is applied.

The next operation involves a turn of the box, and it is immaterial whether this be brought about by a "straight line turner" or a "right angle turner," as mentioned above. For this reason, the operation is diagrammatically represented at position 7. Its result is that the box continues to travel with its cover hinge 16 leading, and it is so shown in position 8. The drawing further shows the performance of a folding operation performed by a folding device 37 on the corner flap 22, as a result of which the flap is folded against the body wall 14. The corner flap 22 is then held in the folded position by a suitable rail (not shown) so as not to be caught in an adhesive applicator towards which the box is moved by its conveyor (not shown) in the direction of the arrow.

Position 8 also shows the lifting or upfolding of that portion 38 of the panel 19 which lies below the tear strip 24. The lower of the two lines of weakness forms the hinge about which the panel portion 38 is upfolded.

In the condition illustrated at position 8 the box advances towards a pair of adhesive applicators 39 and 40.

Applicator 39 applies a single row of spots to the panel portion 38 and applicator 40 applies a single row of spots of adhesive to the portion of panel 18 below its tear strip and a lesser number of spots to the upper portion of the panel 18 where the panel is to be adhered to the corresponding portion of the corner flap 22 and its tear strip portion 27.

Rails 41 and 42 then plow panel portion 38 and panel 18 against the box body walls and the box appears fully sealed in position 10, which may be followed by a conventional compression section, a device for maintaining the freshly glued portions under compression for a period of time, if this be required.

What is claimed is:

1. The method of forming, gluing and sealing the hinge cover structure to the box body of a folding box in which the hinge cover structure comprises a top panel, two side panels and a front panel articulated to opposite sides and to the front of said top panel, respectively, a first corner flap articulated to a lateral front corner forming edge of one of the side panels, a second corner flap articulated to the lateral edge of the front panel which forms the other front corner, each of said side panels, front panel, and corner flaps being subdivided by lines of weakness into a respective upper portion, a central tear strip portion, and a bottom portion to be adhered to the box body, the method comprising the steps of

first folding the top panel over the box body while advancing the box in the direction of its cover hinge line;

then downfolding against the box body the trailing one side panel and folding said first corner flap over the front wall of the box body;

then applying adhesive to the underside of the front panel and adhering it to the front wall of the box body and to said first corner flap;

then advancing the box at right angles to the cover hinge line and folding said second corner flap over the respective box body side wall;

applying adhesive to the underside of the other side panel and adhering it to the side wall of the box body and to said second corner flap and, further, upfolding the bottom portion of said one side panel sufficiently to apply adhesive to its underside, applying such adhesive and then adhering said bottom portion to the box body.

2. The method as claimed in claim 1 in which the change in orientation of the box involves a right angular change in direction of box travel.

3. The method as claimed in claim 1 in which the change in orientation of the box involves a right angular turn about a vertical axis of the box.

4. The method as claimed in claim 1 in which the box is advanced in the direction at right angles to the cover hinge line with the cover hinge leading.

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WILLIAM S. LAWSON, *Primary Examiner*.

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