Aug. 12, 1958 F. C. GROSS 2,846,930

METHOD OF AND APPARATUS FOR MAKING A CARTON

Filed May 28, 1952

Fig. 1.

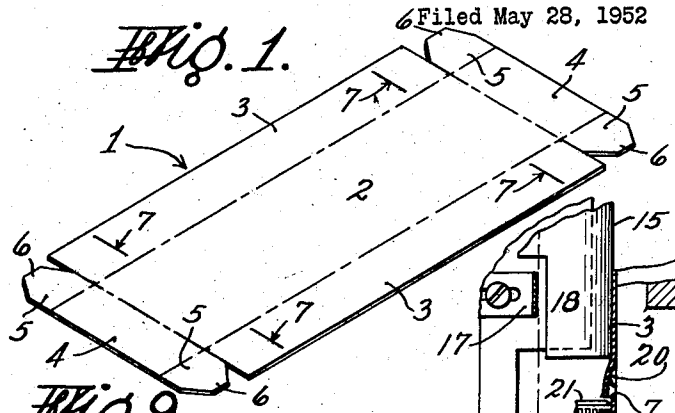


Fig. 4.

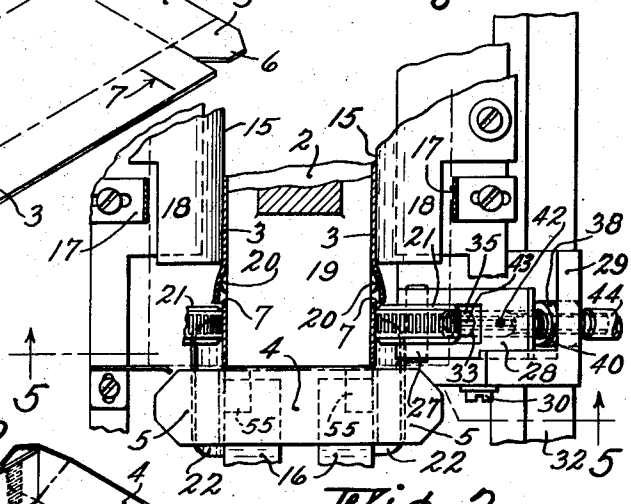


Fig. 9.

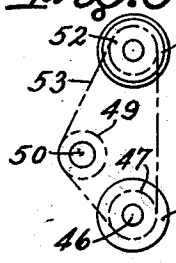


Fig. 2.

Fig. 3.

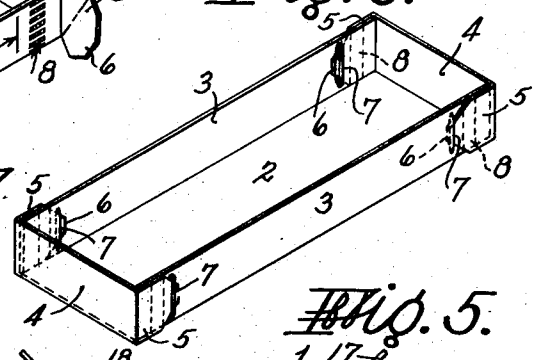


Fig. 7.

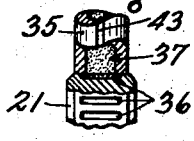


Fig. 5.

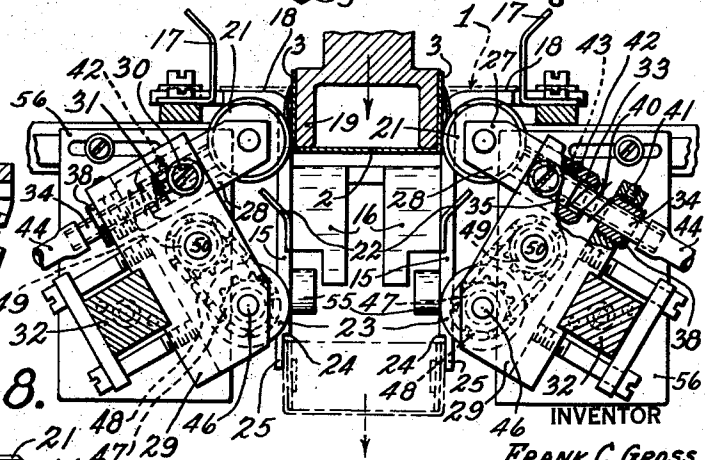


Fig. 6.

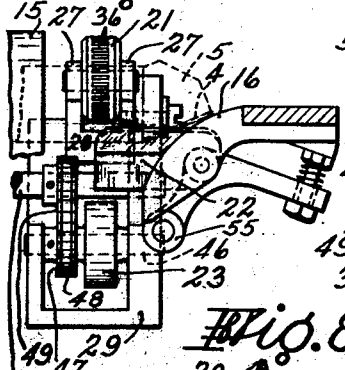
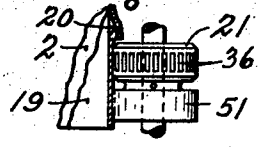


Fig. 8.



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METHOD OF AND APPARATUS FOR MAKING A CARTON

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4 Claims. (Cl. 93—51)

This invention relates to an improved carton construction and a method of making cartons from cut blanks. More particularly it relates to cartons of the tray type.

Cartons of the above type are commonly made from blanks having bottom, side and end wall portions, the side and end walls being bent at right angles to the bottom wall to form a tray. The adjacent ends of the end and side walls have been connected together at the corners of the tray by corner stay pieces or by providing the side or end wall members with a flap which extends over the adjacent member and securing the flap by stapling or gluing it to the adjacent member or by interlocking the end of the flap in a slit formed in the adjacent wall member.

The so-called glued cartons or trays, that is the type in which the flaps are glued in place have certain advantages in cheapness because of the simplicity of the blank used and in the rigidity of the tray. These advantages have been offset, however, by the fact that more time is required in setting up and gluing the blanks in tray form as compared with the interlocked type. In the interlocked type high speed machine operation is possible but the cutting of the blank, with respect to the shape and position of the interlocking portions, is critical and the completed tray lacks rigidity at the corners.

One object of the present invention is the provision of a glued tray construction which has the advantages of blank simplicity and corner rigidity but which can be set up and glued on high speed machines.

A second object is to provide a method by which the novel construction can be set up using the high speed interlocking machines now available, and a further object is the provision of a gluing device which can operate with and be attached to a high speed setting up machine of the interlocking type.

Other and further objects will be made apparent in the following specification and claims and in the accompanying drawing.

In general the above objectives are obtained by providing the end wall members with sidewise extending tongues preferably having bluntly pointed free ends, the tongues being folded over the outer surface of the adjacent end portions of the side wall members with the bluntly pointed ends freely inserted through slits formed in the side wall members, each tongue and adjacent side wall being glued together intermediate the slit and the corner of the tray along a zone extending from the upper to the lower edge of the side wall. Specific relationships and relative positioning of the parts which further characterize the construction will be hereinafter pointed out.

In the accompanying drawing which illustrates one embodiment of the invention,

Fig. 1 is a generally perspective view of a blank from which the tray is made;

Fig. 2 is a similar view illustrating an intermediate position of the parts in making or setting up the tray;

Fig. 3 is a similar view of the finished tray;

Fig. 4 is a fragmentary plan view partly in section of the folding channel of a tray forming machine embodying the invention;

Fig. 5 is a sectional view substantially on line 5—5 of Fig. 4;

Fig. 6 is a fragmentary view looking from the left of Fig. 5;

Fig. 7 is a detail view, on a larger scale, showing the glue feed and glue applying roll; and

Figs. 8 and 9 are detail views showing modified structures.

Referring to the drawing, 1 generally indicates the blank from which the tray is formed. As shown this blank comprises a bottom forming portion 2, side wall forming portions 3, end wall forming portions 4 and tongues 5 extending from the sides of the end wall portions 4. The blank is scored as shown by broken lines to hinge the side and end wall members to the bottom of the tray and to hinge the tongues 5 to the end wall members. The corners of the tongues 5 are cut away to bluntly point the free end portions of the tongues as indicated at 6. The end portions of side wall members 3 are provided with cuts 7, the cuts 7 being spaced a distance from the ends of wall members 3 slightly less than the overall length of the tongues 5. The length of cuts 7 is such that the blunted end portions 6 of the tongues are freely engageable in the slits as shown in Fig. 3, the tongues making a spatulate engagement in the slits as distinguished from the barbed engagement of the locking tongues of the locked type of tray.

As shown the cuts 7 extend at substantially right angles to the longitudinal axis of the tongues 5 so that the edges of the cut exert a direct, substantially uniform and maximum pressure on the tongues transversely of the latter.

In setting up or forming the tray from the blank of Fig. 1 the side walls 3 are swung to a position at right angles to the bottom 2 as shown in Fig. 2 and glue is applied to the outer face of each side wall along a zone extending from the upper edge to the lower edge thereof as indicated at 8. The glued zones 8 are positioned intermediate the ends of the side walls and the cuts 7, closely adjacent the latter, the glue employed, as later more fully discussed is of a fast or quick drying type. As the glue is being applied the end walls 4 and tongues 5 are being bent to substantially the position shown in Fig. 2. As the application of the glue is completed the tongues 5 are swung inwardly towards and against the outer faces of the side walls 3 and end walls 4 are almost simultaneously swung to a position at right angles to the bottom 2. In the meantime the portions of the side walls 3 inwardly of the cuts 7 have been pressed slightly outwardly—enough to open the cuts—with the result that the blunt end portions 6 of the tongues enter the slits as the end walls 4 move to vertical position bringing the members to the completely set up position of Fig. 3. Momentary pressure is applied to the surface of the tongues over the glued zones and a continuing pressure is applied by the portion of the side walls inwardly of the cuts due to the spatulate engagement of the end portions of the tongues in the cuts.

The wall folding and tongue inserting movements above described are substantially the gross movements imparted by the instrumentalities of a high speed lock type tray forming machine. Such instrumentalities are shown in Figs. 4, 5 and 6 insofar as they pertain to the present invention, together with additional structural features required for the practice of the present invention.

As shown the machine comprises a vertical folding die generally defined by side folding members 15 and end folding members 16. The carton or tray blanks 1 are fed to the dotted line position of Fig. 5 where the blank rests, between guides 17 on shoulders 18 extending outwardly

from the top of folding members **15**. In this position the blank is engaged by a reciprocating mandrel plunger **19** and carried downwardly past the folding and gluing instrumentalities. In the initial movement of the blank by the mandrel the side walls **3** of the blank are folded upwardly against the sides of the mandrel as shown in Figs. 4 and 5. The sides of the mandrel carry projections **20** positioned to engage the sides of the tray inwardly of the cuts **7** and spread or open the latter as shown in Figs. 4 and 5.

Continued downward movement of the mandrel carries the partially folded tray into contact with, and past, opposed pairs of glue applying rolls **21** later more fully described, located adjacent each end of the mandrel, which apply glue to the zones **8**, outwardly of, and closely adjacent, the cuts **7**, as best shown in Fig. 4. As the tray is being carried past the glue rolls **21** end folders **16** are swinging the end walls **4** upwardly and folders **22** are swinging the tongues **5** inwardly as indicated in dotted lines in Fig. 6. As the tray leaves the glue rolls the tongues **5** are brought against the outer face of the side walls **3** in position to enter the opened cuts **7** and upon further downward movement of the mandrel folders **16** bring the end walls **4** into vertical position inserting the end portions **6** of the tongues **5** through the opened cuts **7**, bringing the tray members to the position of Fig. 3. Yieldably mounted end rollers **55** serve to square up the carton by further pressing end wall portions **4** against the ends of the side wall portions **3** as the carton and mandrel pass by during their downward travel.

The final portion of the downward movement of mandrel **19** carries the tray between pairs of opposed presser rolls **23** which are in vertical alignment with the rolls **21** and which engage the tongues **5** over the glue zones **8** to press the tongues firmly against the glue zones. As the mandrel reaches the end of its downward stroke the upper side edges of the tray spring outwardly to be engaged by shoulders **24** at the lower stripper portions **25** of members **15** to be thereby stripped from the mandrel as the latter moves upwardly. The tray remains between the strippers **25** until forced from the machine by the next tray. During this period and subsequently the glued portions of the walls **3** and tongues **5** are pressed or held firmly in engagement by the pressure resulting from the spatulate engagement of the tongue portions **6** in the slots **7**, the setting of the glue or other adhesive resulting in a corner construction at least equal in rigidity to conventional glued corner constructions and superior in these respects to the interlocked tray.

The glue rolls **21** are each rotatably mounted between fork arms **27** of a member **28** adjustably secured to a bracket **29** by a screw **30** extending through a slot **31** in the wall of the bracket. The bracket **29** is mounted on a frame member **32** for adjustment longitudinally of the die. Frame members **32** are mounted adjacent their ends to a pair of supporting plates **56**, one of each pair being shown in Fig. 5, adjustably secured to the machine end frames (not shown) for adjustment transversely of the die. The members **28** are each formed with a bore **33** opening through the base of the forks **27**, and through which a tubular glue supply plunger **34** slidably extends. Plunger **34** includes a head **35** which makes an arcuate concentric engagement (Fig. 5) with the peripheral surface of the glue roll. As best shown in Fig. 7, the peripheral surface of the glue roll is formed with transverse grooves or other suitably shaped depressions **36**. The grooves **36** are preferably slightly longer than the diameter of the glue passage **37** in the head **35** but are shorter than the outside diameter of the head so that, as the rolls rotate over the glue supply opening, the grooves **36** are filled with glue. The opposite end of plunger **34** extends through and is slidably supported by a bushing **38** threaded in a wall of bracket **29**. A compression spring **40** surrounding the plunger **34**, with its opposite ends engaging head **35** and bushing **38**, urges

the head of the plunger into contact with the glue roll with a pressure which is controlled by adjusting the position of bushing **38** in the bracket, the bushing being held in adjusted position by a set screw **41**. Plunger **34** is prevented from rotation in bore **33** by a screw **42** which engages in a keyway **43** formed in the plunger head **35**.

The free end of plunger **34** is connected by a flexible tube **44** or other suitable conduit, to source of glue, not shown, from which glue is supplied under gravity pressure to the glue rolls. As will be apparent, a closed glue system is thus provided which prevents undesirable escape of glue over adjacent parts of the machine, and confines the glue supply to the grooves **36**. Evaporation and setting of the glue is confined to the surface of the glue rolls. The small body of glue in each of the grooves is sufficient to withstand objectionable hardening or setting during a momentary stoppage and in the event of a prolonged stoppage only the surface of the roll requires cleaning with a suitable glue solvent to prepare the machine for continued operation. The quantity of glue applied can be controlled by the depth and width of the grooves, the length of the grooves being held to a dimension such that the ends of the grooves are closed by the walls of the head **35**, as shown in Fig. 7.

Following the insertion of the portions **6** of the tongues **5** through cuts **7**, as above described by the folders **16** and **22**, the portions of the tongues **5** overlying the glue zones **8** are engaged by the pressure rolls **23** journaled in the bracket **29**. The shafts **46** of the rolls **23** carry sprockets **47** driven by a sprocket chain **48** from sprockets **49** fixed to shafts **50**. The shafts **50** are driven either continuously or intermittently in any suitable manner from the power shaft of the machine, not shown. As previously described, the rolls **23** press the tongues **5** against the glued zones **8**, distributing the ridges of glue deposited from the grooves **36** of the glue rolls and pressing the tongues **5** into adhering contact with the sides of the box, the pressure being thereafter maintained by the engagement of the ends of the tongue in the cuts **7**.

If found desirable, and as shown in Fig. 8, the shafts of the respective glue rolls **21** may be provided with rubber friction rolls **51** which engage the sides of the box over the plunger **19** to assist in the rotation of the glue rolls. Alternatively and as shown in Fig. 9, the shaft of the glue rolls **21** may be provided sprockets **52** which are driven, in common with pressure rolls **23**, from sprockets **49** by a chain **53** which replaces chain **48**.

What is claimed is:

1. The method of making cartons which comprises forming a blank having a bottom wall and opposed side and end walls extending therefrom, providing the side walls with straight line, closed end cuts adjacent but spaced from and substantially parallel to the ends of the side walls, providing the ends of the end walls with straight sided, blunt ended, spatulate tongues of a width and length to freely enter said cuts, folding the side walls to a position at right angles to the bottom wall, applying a fast setting adhesive to the outer face of the so-folded side walls intermediate the cuts and the ends of the side walls while substantially simultaneously folding the end walls toward and to a position at right angles to the bottom wall and the tongues against the side walls and inserting the ends of the tongues inwardly through said cuts to place the tongues in spatulate engagement with the adjacent face of the side walls, momentarily pressing the tongues into adhering engagement with the underlying adhesively coated portions of the side walls and thereafter permitting the adhesive to set solely under the pressure exerted by the spatulate engagement of the tongues and side walls at opposite sides of the cuts.

2. In a carton forming machine for forming cartons from pre-cut blanks having bottom, side and end walls, the side walls being provided with straight line, closed end cuts adjacent but spaced from and substantially

parallel to the ends of the side walls and the ends of the end walls having straight sided, blunt ended, spatulate tongues of a width and length to freely enter said cuts, said machine having a mandrel plunger and a cooperating folding die through which said blank is carried by the plunger to fold the side walls of the blank against the sides of the plunger at right angles to the bottom wall of the blank; projections carried by the plunger and engaging the side walls at points outwardly of and intermediate the closed ends of the cuts to open the cuts without substantial distortion of the portions of the side walls between the cuts and the ends of the side wall, rolls mounted at the sides of the path of the plunger and positioned to make peripheral engagement with the side walls of the carton intermediate the cuts and the ends of the side walls, means to supply fast setting adhesive in fresh, unset condition directly to the peripheries of the rolls, means positioned below said rolls to substantially simultaneously fold the end walls against the plunger and the tongues against the side walls with the ends of the tongues extending inwardly of the adjacent slots as the carton is moved out of contact with the said rolls by the plunger, and presser rolls positioned below

the said end wall and tongue folding means and making peripheral engagement with the carton in alignment with said first-named rolls to press the portions of the tongues intermediate the cuts and ends of the side wall into engagement with the underlying adhesively coated portions of the side walls.

3. In a carton forming machine as recited in claim 2, means to drive the presser rolls in timed relation with the plunger.

4. In a carton forming machine as recited in claim 2, means to drive said first-named rolls and said presser rolls in timed relation with each other and the plunger.

References Cited in the file of this patent

UNITED STATES PATENTS

374,886	Brown	Dec. 13, 1887
523,155	Stone et al.	July 17, 1894
738,516	Beers	Sept. 8, 1903
1,868,567	Cunningham	July 26, 1932
2,549,579	Dearsley	Apr. 17, 1951
2,553,592	Kucklinsky	May 22, 1951
2,580,189	Pagendarm	Dec. 25, 1951
2,604,827	Hickin	July 29, 1952