

June 20, 1944.

C. DESCH ET AL

2,351,670

FOLDING AND GLUING APPARATUS

Filed Aug. 12, 1942

4 Sheets-Sheet 1

Fig. 1

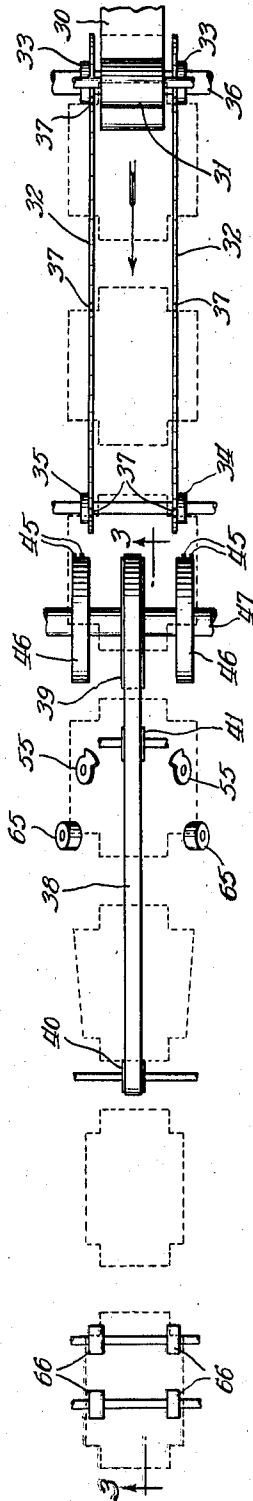
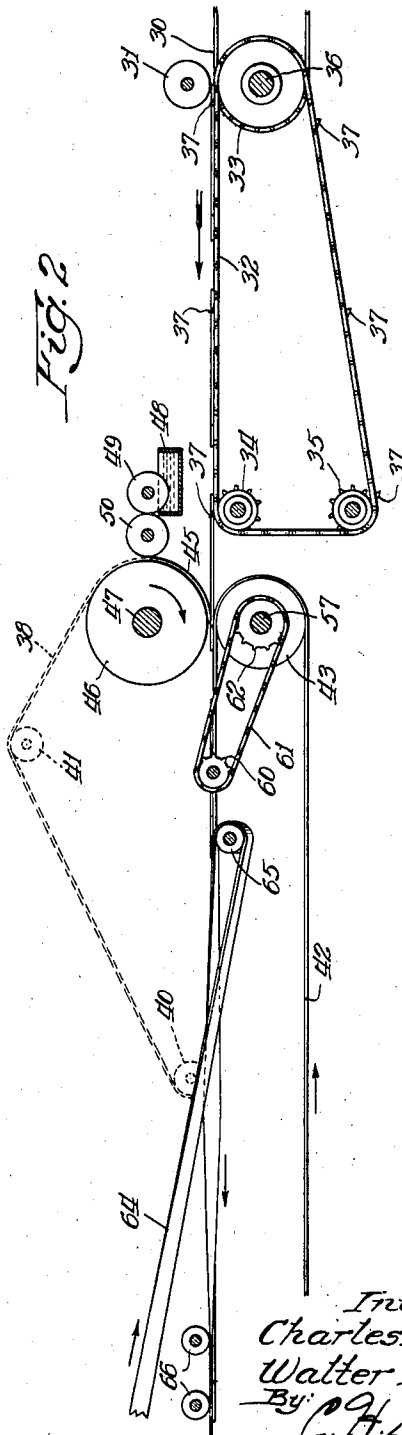


Fig. 2



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4 Sheets-Sheet 2

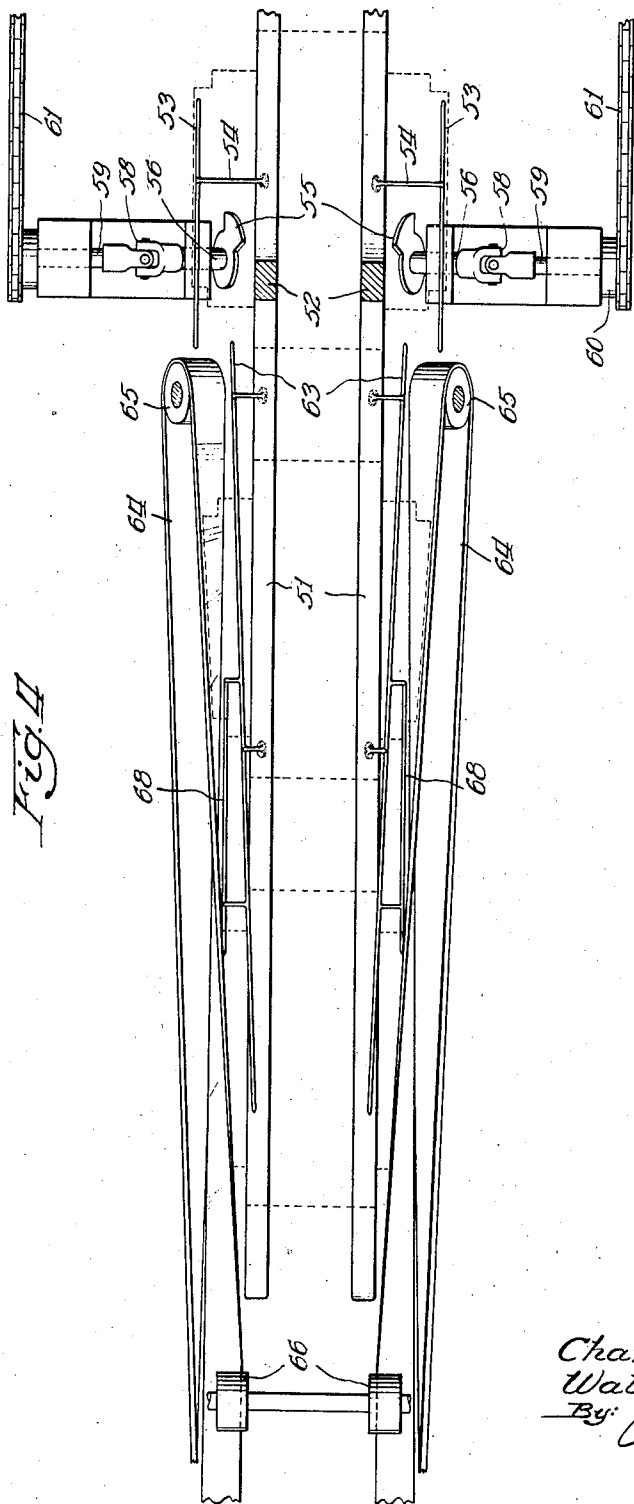


Fig. 2

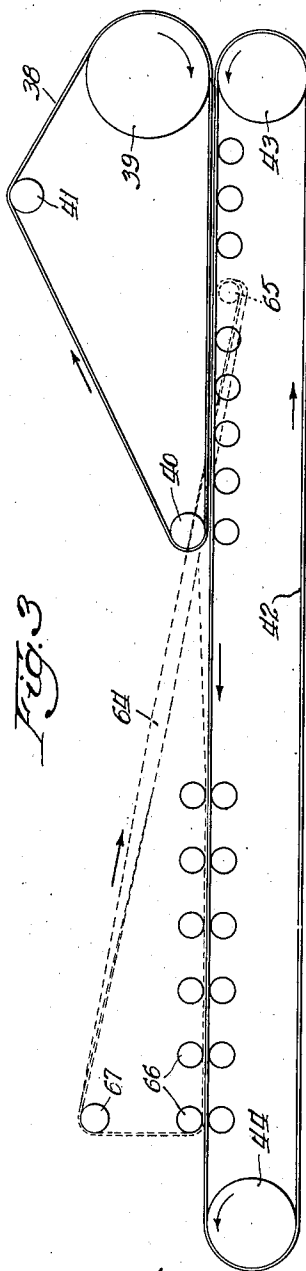


Fig. 3

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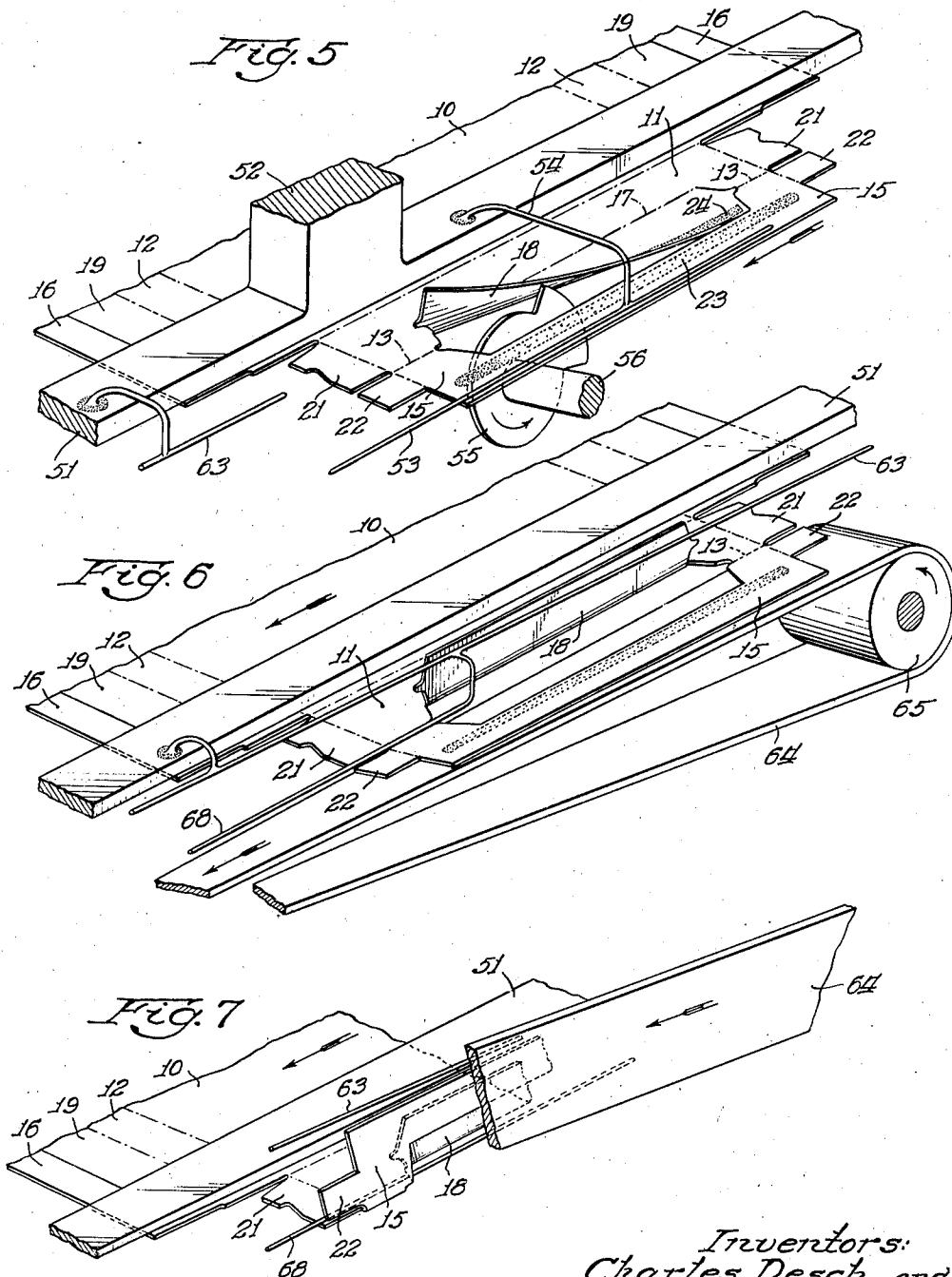
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4 Sheets-Sheet 3



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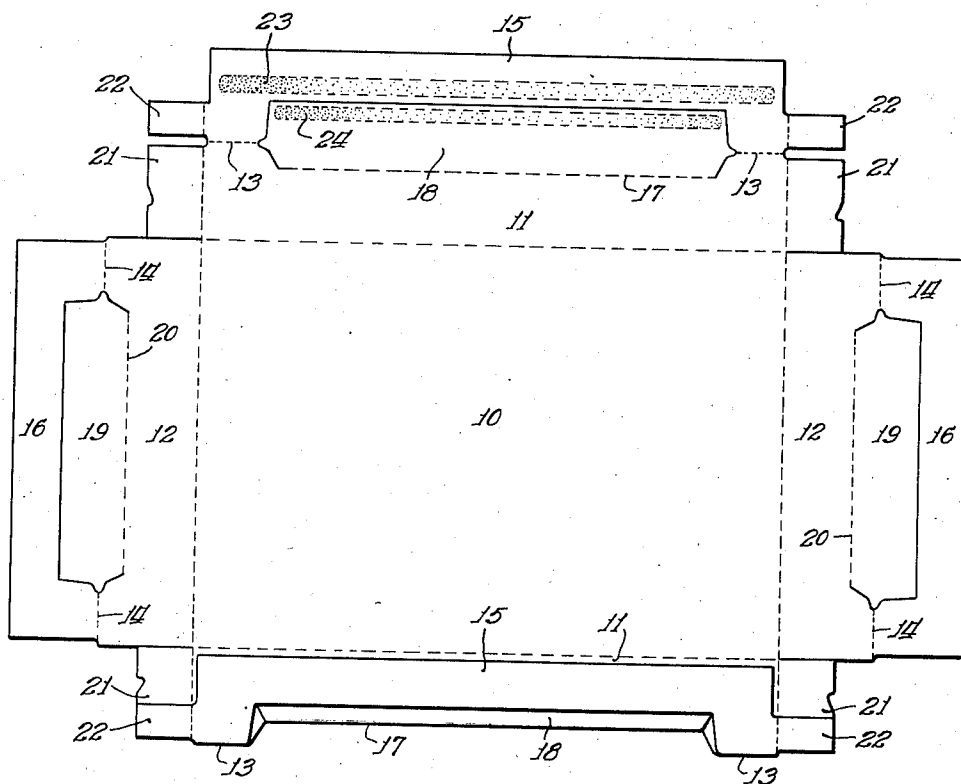
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4 Sheets-Sheet 4

Fig. 8



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UNITED STATES PATENT OFFICE

2,351,670

FOLDING AND GLUING APPARATUS

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poration of Delaware

Application August 12, 1942, Serial No. 454,540

5 Claims. (Cl. 93—49)

This invention relates to apparatus for folding and gluing paperboard cartons and the like, and more particularly to machines of the type adapted to infold extensions on the side walls of tray blanks of folding boxboard and to secure the same with adhesive while the blanks move continuously in series through the machine.

In some cases, however, each side wall is of such structure that more than one folding and gluing operation is required, and this would normally require the use of two such machines and thereby increase the cost of the whole operation beyond the economical limit. Furthermore, the blank may be so arranged that one of the folding operations cannot be performed on such a machine of the usual type. The arrangement of the present invention, on the other hand, is adapted to handle jobs of this sort in a single operation, and to do so by means of a novel, but nevertheless simple, modification of existing machines.

It is an object of the invention to provide a folding and gluing machine adapted to carry out a plurality of such operations upon the side wall portions of a series of paperboard blanks within the space and using the equipment usually occupied in handling a single such operation. Another object is to provide a novel and efficient glue machine especially adapted to infold and glue in a single operation a plurality of flaps or extensions on the side walls of paperboard blanks in which such flaps or extensions overlap when so infolded. Other objects, uses and advantages of the invention will be apparent from the following detailed description thereof and the drawings forming a part of this specification. In the drawings:

Fig. 1 is a simplified plan view of a folding and gluing machine according to the invention showing the arrangement of some of the operative parts and, in dotted lines, the positions of a succession of blanks similar to that of Fig. 8 passing therethrough;

Fig. 2 is a side view of the machine of Fig. 1, showing in addition the glue pot, the folding belt and the driving mechanism for the special folding cams;

Fig. 3 is a simplified sectional view along line 3—3 of Fig. 1;

Fig. 4 is a top view, omitting the glue rolls and hold-down belt, showing the folding apparatus in detail;

Fig. 5 is an enlarged fragmentary view in perspective illustrating the first step in folding a side wall extension of a blank like that of Fig. 8;

Fig. 6 is a view similar to that of Fig. 5, but illustrating the next folding step;

Fig. 7 illustrates the next stage in the folding operation; and

Fig. 8 shows a typical blank adapted to be handled in accordance with the invention with one multi-ply side wall folded and glued as desired.

In order to bring out the various features of the invention in the clearest manner, it will be described in connection with a particular form of paperboard blank, although it is also applicable to those having different configurations. This blank, as shown in Fig. 8, is adapted to be set up into a tray, and is fully described in the co-pending application of Lloyd Wynne and Earl C. Potter S. N. 381,504 filed March 3, 1941.

The bottom panel 10 is provided with side walls 11 and end walls 12 and to these adjacent their ends along score lines 13 and 14, respectively, are hinged joined side wall extensions 15 and end wall extensions 16. Side walls 11 also have hinged joined to them along score lines 17, which are parallel to but closer to panel 10 than are score lines 13, reinforcing flaps 18 formed from the material which would otherwise be incorporated in side walls 11 and their extensions 15. Similarly, reinforcing flaps 19 are hinged joined to end walls 12 along score lines 20.

In setting up this blank into the form of a tray, the first operation is to fold inwardly and glue flaps 18 to side walls 11 and to fold and glue extensions 15 in position overlying both of them. The lower of the side walls illustrated in Fig. 8 shows the structure as it then appears, and it will be seen that the side wall has a finished edge and a depressed intermediate portion thereof which enhances the display value of the finished tray. This is the operation which is adapted to be carried out on the machine of the present invention, and it is normally performed in the plant of the container manufacturer.

The remainder of the setting-up operations normally take place in the plant of the user, and consist in gluing flaps 19 to the inner surfaces of end walls 12, raising walls 11 and 12 to upright position with the securing flaps 21 and 22 on side walls 11 and extensions 15, respectively, folded behind end walls 12 with their ends adjacent the ends of flaps 19. Then extensions 16 are infolded and glued to flaps 19, 21 and 22 to hold the tray in set up condition. While these operations form no part of the present invention, the above brief description will serve to point out the utility of the machine in performing some of the essential steps in connection with this specific example.

In the embodiment of the invention herein described, the operations of folding and gluing are simultaneously carried out on both side walls, and the mechanism for carrying forward a series of these particular blanks is entirely conventional, so that it has not been shown in great detail. Referring to Figs. 1 and 2, it will be seen that a succession of tray blanks, which have been placed thereon by hand or preferably by well-known automatic means, are carried by belt 30 under roller 31, which is synchronized therewith, so that the side walls 11 of the blanks rest successively on the endless conveyor chains 32 traveling on sprockets 33, 34 and 35. Since sprockets 33 and the pulley over which belt 30 runs are on a common shaft 36 and are of the same effective radius, belt 30 and chains 32 have the same linear velocity. In order to insure accurate spacing of the blanks for the following so-called "timed gluing" step, chains 32 are provided at regular intervals with lugs 37 which, as they advance, come in contact with the trailing securing flaps 21 of the successive blanks and cause them to advance toward the glue-applying rolls in regular spaced relation.

When each blank has proceeded to the point at which the lugs 37 propelling it are about to pass downwardly over sprockets 34, the leading portion thereof is gripped between an upper belt 38 traveling on pulleys 39, 40 and 41 and a lower belt 42 on pulleys 43 and 44. These belts are likewise driven by well-known means (not shown) so that the blanks continue to move in a linear path at the same speed. This arrangement is best seen in Fig. 3. As the blanks pass under pulley 39, two bands of adhesive 23 and 24 are applied to the side wall extensions 15 and the reinforcing flaps 18, respectively, and as shown in Fig. 8, on both sides of each blank. The adhesive is accurately placed by reason of the synchronized relation of the parts as above described, and by means of a die 45 on each of the glue rolls 46, which are in turn mounted on the same shaft 47 as is the pulley 39. The dies 45 are supplied with glue from glue pot 48 by means of rollers 49 and 50 (Fig. 2) in the conventional manner.

The advancing blanks are then automatically folded in the desired manner. It will be observed that they pass immediately from the glue rolls 46 beneath a pair of bars 51 (Fig. 4) supported from above by brackets 52 which taper in the direction of the blank motion and are spaced so that their outer edges substantially overlie the side edges of the bottom panel 10. Then the extensions 15 pass beneath the guides 53, which are supported by means of bars 51 and supports 54, and which act to hold side walls 11 and side wall extensions 15 in horizontal position while the reinforcing flaps 18 are being raised from the plane of the blank by rotating cams 55. The cams 55 are also synchronized to the blank motion and are mounted on shafts 56 and driven from the shaft 57 carrying pulley 43 through universal joints 58, shaft 59, sprockets 60, chains 61 and sprockets 62 (Fig. 2). From Fig. 5, which best illustrates this stage, it will be seen that cam 55 raises the leading edge of flap 18 so that upon continued motion of the blank, each flap 18 passes behind a guide 63 and is thereby maintained in partially folded position.

Guides 63 are also supported on bars 51 and converge slightly as shown in Fig. 4 so that flaps 18 are further folded to a position preferably somewhat beyond the vertical as the blank progresses through the machine. In the meantime,

folding of side wall extensions 15 by means of the usual folding belts 64 begins. It will be observed from Figs. 2, 3 and 4 that these folding belts are arranged to travel up around the pulleys 65 which are angularly disposed on each side of the machine, and to turn over before passing under rollers 66 and around pulleys 67. As belts 64 turn over they also fold side wall extensions 15, side walls 11 being held in the plane of the blank by means of guides 68 under which the outer portions of walls 11 pass and which are attached to guides 63. This is best seen in Figs. 4 and 6. Fig. 7 illustrates the appearance of an extension 15 when the folding is somewhat more than half complete and shows how the flap 18 has been released from behind guide 63 and lies behind extension 15, so that it is thereafter completely folded with the latter under the action of belt 64. The rest of the machine is conventional, and the side wall structure of the trays is held in place by the spring-loaded rollers 66 under which belt 64 travels as the blanks progress. Thereafter the blanks pass under a pressure receiving arrangement which holds them until the adhesive has set.

It will be noted that the drawings show few machine parts not absolutely necessary to an understanding of the invention and little supporting structure, but these can readily be supplied by one skilled in the art and have been omitted in the interest of clarity. Many modifications and alternative arrangements will likewise occur to those skilled in the art in the light of this disclosure.

While the invention has been described in connection with a specific embodiment thereof, it is not limited thereto, but only by the scope of the following claims.

We claim:

1. In a machine of the class described including means for continuously moving a series of paper board blanks in a linear path, means for applying adhesive to selected lateral edge portions of each blank, and means for folding said lateral edge portions along fold lines parallel to said linear path over upon said blank, the improvement which comprises means for partially folding flaps defined by cuts in said blanks spaced from said lateral edge and additional fold lines parallel to said linear path prior to the folding of said edge portions, and means for retaining said flaps in partially folded condition until said edge portions have been folded sufficiently to overlie said flaps, whereby both of said folding operations are completed simultaneously and said flaps and edge portions are caused to adhere in position overlying said blank and each other.

2. In a machine for producing a multi-ply side wall on a plurality of paperboard blanks each having a side wall panel, a side wall extension joined thereto along a hinge line and a flap formed from the material of said panel and said extension joined to said panel along a score line parallel to said hinge line including means for continuously moving said blanks successively in a linear path, means for applying an adhesive to a predetermined portion of said extensions and means for folding said extensions along said hinge lines over upon said side wall panels, the combination which comprises means acting on said blanks immediately following said adhesive-applying means for partially folding said flaps along said fold lines, and means for retaining said flaps in partially folded condition until said extensions

have been folded sufficiently to overlie said flaps, whereby both of said folding operations are completed simultaneously.

3. The combination of claim 2 wherein said partial folding means includes a rotating cam synchronized to raise the leading edge of said flaps as the blanks pass successively thereover and means for retaining said extensions in the plane of said blank during the partial folding operation.

4. In a machine for producing a multi-ply side wall on a plurality of paperboard tray blanks each having a side wall panel, a side wall extension joined thereto along a pair of hinge lines adjacent the ends of said panel and a flap formed from the material of said panel and said extension joined to said panel along a score line parallel to said hinge lines and adapted to be folded over against the inner surface of said panel and in that position to underlie said extension when the latter is also infolded, said machine including means for continuously moving an equally

spaced series of said blanks along a path parallel to said hinge lines, means for applying an adhesive to a predetermined portion of the extension and flap associated with each blank moving in said path and means for infolding said extensions along said hinge lines upon said panels as said blanks continue to move along said path, the improvement which comprises means acting on said blanks immediately following said adhesive-applying means and while said blanks are in motion for at least partially infolding said flaps along said fold lines prior to the infolding of said extensions.

5. The improvement according to claim 4 including synchronized means for moving said flaps from the plane of said blanks, means for holding said extensions in the plane of said blanks during the action of said synchronized means, and subsequent guide means to continue the folding of said flaps.

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