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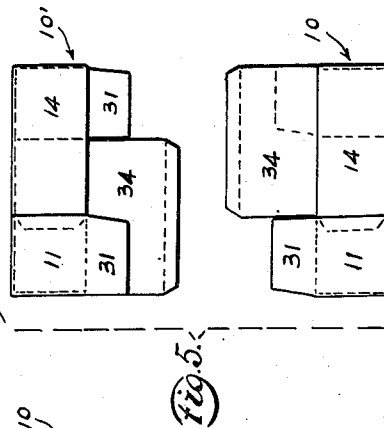
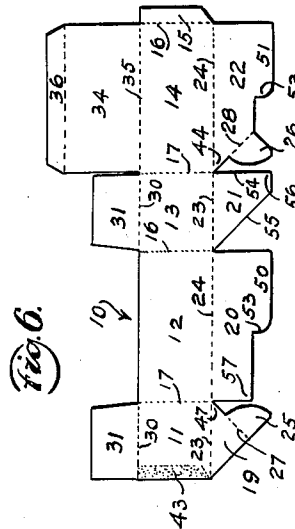
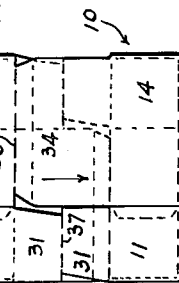
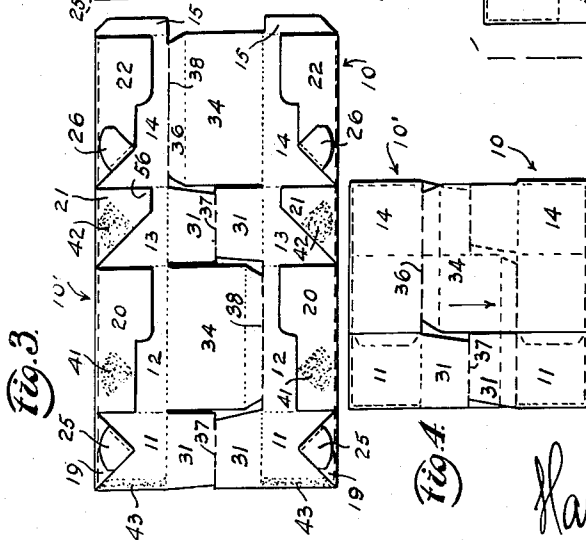
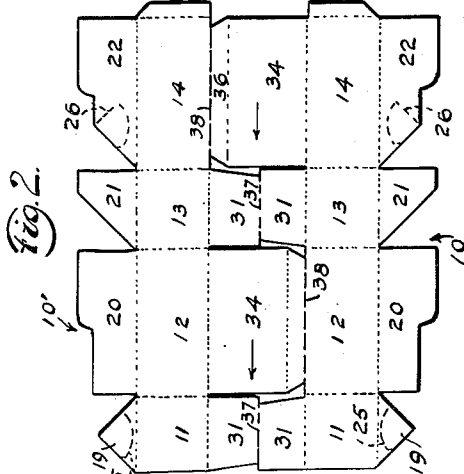
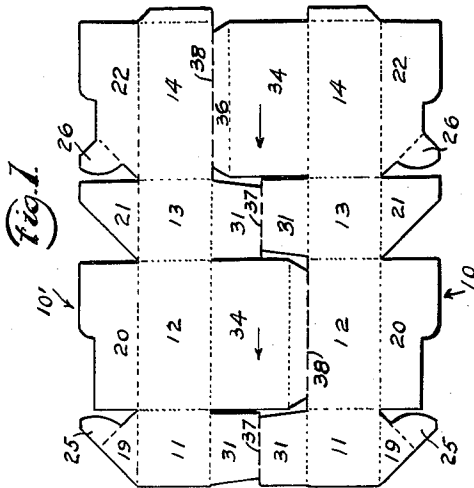
R. A. HIMES

2,284,283

MAKING PAPER BOXES

Filed April 18, 1939

2 Sheets-Sheet 1



INVENTOR;
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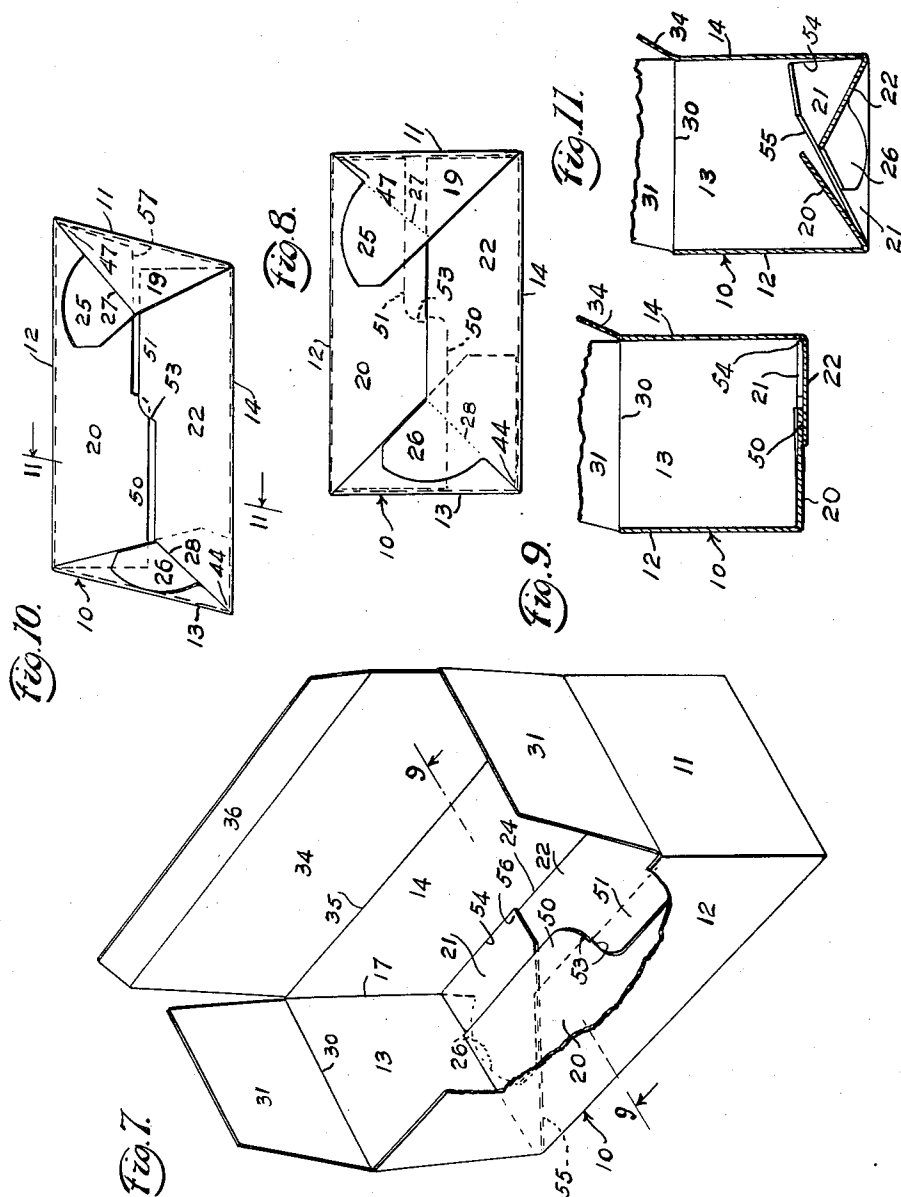
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,284,283

MAKING PAPER BOXES

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Application April 18, 1939, Serial No. 268,453

3 Claims. (Cl. 229—16)

This invention relates to paper or cardboard boxes, containers and the like, and methods and blanks for making them, and more particularly to flat folded boxes which are easily and quickly erected, though it is noted that in some of the claims the invention is not limited to flat folded or quickly erected boxes.

One object of the invention is to provide an improved means for locking bottom sections of boxes of the above mentioned type and for boxes generally.

Other objects of the invention are to provide an improved locking means for bottom sections of boxes such as are disclosed in my copending application Serial No. 258,156, and to provide a bottom-locking container which may be manufactured in accordance with the methods claimed in such application.

Additional objects of the invention are to improve generally the simplicity and efficiency of self-locking and other locking means for boxes and to provide an extremely simple box of this kind which is durable, and reliable in use, and economical to manufacture and erect.

Still other objects of the invention will appear as the description proceeds; and while herein details of the invention are described in the specification and some of the claims, the invention as described in the broader claims is not limited to these, and many and various changes may be made without departing from the scope of the invention as claimed in the broader claims.

The inventive features for the accomplishment of these and other objects are shown herein in connection with an improved box or container which briefly stated, includes foldably joined side and end walls disposable flat against each other, to which are foldably joined side bottom sections and end bottom sections joining the bottom edges of the respective walls, and adapted to lie against their associated walls when the container is in collapsed condition and disposable in the bottom plane of the container when the container is erected. The free margins of said side bottom sections are provided at respectively opposite end portions with laterally extended portions, each disposable over an underlying end part of the free margin of the other side bottom sections when in said plane; and a hinge connection is provided between each end section and the adjacent underlying part, of the side bottom section, along a diagonal hinge line extending toward the adjacent corner of the bottom, whereby when the container is moved from collapsed to erected condition, each extended portion will overlie the adja-

cent side bottom section and cooperate therewith to hold the bottom in said plane.

Said boxes may be made from double or multiple blanks or from single blanks, the multiple blanks comprising single box blanks joined by a weakened line. The box blanks are cut and creased to form series-connected box walls, and cooperative and complementary sections foldably joining the respective walls at a side or opposite sides of the single or double blank, the free margin of each cooperative section being provided with laterally widened portions extended from the middle of the margin in the same longitudinal direction of the series.

The flat folded boxes may be made by folding said sections upon the walls to form folded assemblies, folding the folded assemblies upon each other and hingedly joining adjacent sections and certain of the walls to form a collapsed pair of boxes from the double blanks or single boxes from the single blanks.

The blanks may be shipped in flat condition, and the double blanks may be later separated at the weakened line when the boxes are to be erected.

In the accompanying drawings showing, by way of example, one of many possible embodiments of the invention,

Figs. 1 to 4 are plans respectively showing the double blank in successive different conditions as it is being formed into flat folded boxes;

Fig. 5 is a plan showing the two flat folded boxes of a double blank after separating the boxes;

Fig. 6 is a plan showing the single blank unattached to another blank and may be an initially made single blank or may be a detached blank of an initial double blank;

Fig. 7 is a perspective view showing an erected box;

Fig. 8 is a bottom view of the erected box;

Fig. 9 shows a section taken on the line 9—9 of Fig. 7, looking in the direction of the arrows of said line;

Fig. 10 is a bottom plan showing the box partially erected; and

Fig. 11 is a transverse sectional view, partly in elevation, taken substantially on the line 11—11 of Fig. 10, looking in the direction of the arrows of said line.

The boxes may be made from a single blank as in Fig. 6 or a double blank as in Fig. 1. In the latter method the boxes may be made two at a time from double blanks 10, 10' cut and creased to form two box blanks 10 and 10' joined by a

weakened connection and having their box-bottom forming parts at opposite sides of the double blank as in Fig. 1.

Each box blank 10 or 10' is cut and creased to form hingedly connected end walls 11, 13 and side walls 12, 14, the free side wall 14 having an end lap extension 15 at its free edge; the walls and laps being hingedly connected in series by creases 16, 17 as shown. The bottom-forming sections 19, 20, 21, 22 foldably join the respective walls at longitudinal creases 23, 24, two of the bottom sections 19, 22 respectively having flap extensions 25, 26 connected thereto by diagonal creases 27, 28 extending in directions at right angles to each other and towards inner corners of such sections, such corners being non-adjacent.

The walls of each box blank of the double blank are opposite corresponding walls of the other box blank of the double blank; and the inner edge 30 of each end wall is provided with a closing flap 31 foldably joined thereto by a crease at said edge and extending to a corresponding similar flap 31 of the other box blank of the double blank. But one side wall only of each box blank the wall 14 of the blank 10, the wall 12 of the blank 10' has a lid section 34 hingedly joining the wall at a crease 35, and having a tuck flap 36 opposite, and extending to, the other box-blank side wall. This arrangement of the box blanks avoids waste of material for a box having a lid as in Fig. 7, and renders compact the blank and the completed flat-folded pairs of boxes before separation of the boxes.

The blanks 10, 10' are joined by weakened lines 37, 38, formed of separated cuts, at the outer edges of the flaps 31 and 36. If no lid or closing flaps are provided, the box blanks are joined at a similar weakened line at the edges 30, 35 and 38.

For clearness of illustration and to show clearly that the flaps 31 and section 34 are not joined to each other, a slight space is shown between them, but in actual practice these parts, though separate, are preferably in contact in the blank. For convenience of description each wall 11, 12, 13, 14 and its associated sections, flaps and extensions are referred to as constituting a wall assembly.

The operation of folding blanks and making the boxes may be conveniently effected by hand, but the double blank is particularly suited for making the boxes by machine, and the operation suitable for making boxes from double blanks by machine will first be described, after which hand operation and operation on single box blanks will be obvious.

The operation on double blanks is easily effected, after suitable adjustments, by machines such as that shown in the Sidebotham Patent No. 2,112,121, issued March 22, 1938.

In such operation the method comprises automatically feeding the double blank as from a hopper in the direction of the arrows of Fig. 1, to a position of rest, said blanks, being as in Fig. 1 with said sections 19, 20, 21, 22 at the sides of the path of travel. At said position said extensions 25, 26 at said opposite sides are approximately simultaneously folded downwardly and then upwardly onto the lower face of the section to which they are respectively joined, as in Fig. 2. Then the double blank is caused to travel from said position with the series of walls still longitudinal to the path of travel to maintain said sections at the side of the path, pressure being applied to the folded extensions during said travel to maintain the extensions against said faces. As

the blank travels the respective bottom sections 19, 20, 21, 22 are folded upwardly and downwardly flat upon the upper faces of the walls to which they are respectively connected, thereby to provide upwardly exposed areas on the flap extensions 25, 26, as in Fig. 3, adapted to engage later cooperating areas 41, 42, later to be mentioned, of adjacent assemblies as will be explained. If desired the flap extensions 25, 26 may be folded upon the sections 19, 22 after such sections have been folded against their respective walls 11, 14. Pressure is applied to the fold lines 23, 24 between the sections and walls to maintain the sections flat against their walls. The double blank as in Fig. 3 is brought to rest and then the path of travel of the double blank is changed by approximately ninety degrees as the blank moves from the position of Fig. 3 to that of Fig. 4 so as to maintain said series of walls transverse to said path. At the same time adhesive is applied to the areas 41, 42; or if preferred the adhesive may be applied to the exposed faces of the extensions 25, 26. Adhesive is also applied to the end margin 43 of the wall 11 remote from the end lap 15.

As the double blank thus travels with the series of walls transverse to the path of travel, the folded assembly 11, 19, 25, 31 and the folded assembly 14, 22, 26 are approximately at the same time folded, at the creases 17, upwardly and then downwardly respectively upon assembly 12, 20, 34, 36 and assembly 13, 21, 31, and part of the assembly 12, 20, 34, 36, to cause said flaps 25 and 26 to adhere to the areas 41 and 42 respectively, said lap 15 being folded first to cause it to adhere to said end margin 43, thus leaving the blank as in Fig. 4.

Another method of making the boxes from double blanks, on machines already on the market but originally intended for other uses, comprises automatically feeding the double blank as from a hopper in the direction of the arrows of Fig. 1, with said sections 19, 20, 21, 22, at the sides of the path of travel, causing the blank to travel continuously in the direction indicated by the arrows in Fig. 1, meanwhile causing the respective bottom sections 19, 20, 21, 22 with the unfolded extensions 25, 26 to fold upwardly and downwardly flat upon the upper faces of the walls to which they are respectively connected, without having folded the extensions 25, 26 in relation to the sections to which they are respectively joined as was previously described. Then the direction of travel is changed, as before described by approximately ninety degrees, causing the blank to travel continuously in the new direction, meanwhile applying adhesive to areas on the upward facing surfaces of bottom sections 20, 21 and to the end margins 43 of the walls 11 remote from the end laps 15, as shown in Fig. 3, and folding the assembly 11, 19, 31 with the still unfolded extensions 25, and the assembly 14, 22 with the still unfolded extensions 26, at the crease 17, upwardly and then downwardly respectively upon assembly 12, 20, 34, 36 and assembly 13, 21, 31 and part of the assembly 12, 20, 34, 36 to cause said unfolded flaps 25 and 26 to adhere to the adhesively treated cooperating areas on the upwardly exposed faces of sections 20, 21, the assembly carrying lap 15 being folded first to cause it to adhere to said end margins 43, thus leaving the blank as in Fig. 4 except that extensions 25, 26 will not have been folded in relation to their respective attached sections, and will thus adhere to a different portion of the area of sections 20,

22 than if the previously outlined method were used.

The blanks are usually shipped or stored in the condition as shown in Fig. 4 and kept in this condition until ready for use, when the opposite box blanks are separated at said weakened connections 37, 38, thus to provide separate folded boxes as in Fig. 5, which may be erected to form boxes as in Fig. 7, which is formed of the blank 10', since as shown, the lid section joins the wall 14.

Whether the travel of the blank as above described, is effected by hand or machine the parts to be folded are disposed at the sides of the path of travel in convenient position for convenient folding by hand or machine; but as stated this particularly adapts the method for machine operation. Folding without said travel is obvious.

Either blank, as in Fig. 5 made by either of said methods may be practically instantaneously erected into a carton, merely by inward pressure at the folds at the creases 17, whereupon the erected carton is formed, Fig. 7 showing the carton erected from the blank 10.

The carton thus erected comprises foldably joined end walls 11, 13 and side walls 12, 14 adapted to collapse flat against each other. The end bottom sections 19, 21 and the side bottom sections 22, 22 foldably joining the bottom edges of the respective walls become disposed in the bottom plane of the container when the container is erected, and are adapted to rise against their associated walls if the container is collapsed.

The free margins of said side bottom-sections are provided with the laterally widened or extended portions 50, 51, which are in the erected box at respectively opposite ends of the margin, so that each portion 50 or 51 becomes disposed over the other side section 22 or 20 when the sections move to the bottom plane of the box. Each extended portion 50 or 51 when in said plane extends longitudinally of said margin from the adjacent end wall 13 or 11 to the other extended portion, and it is provided at the center of the bottom with a transverse edge 53 substantially engaging the corresponding transverse edge 53 of such other portion 51 or 50, when the sections are in said bottom plane.

One end section 21, when in said bottom plane, lies between the adjacent laterally extended portion 50 of the side section 20 and the adjacent underlying end part of the other side section 22, and has one edge 54 extended a distance along the hinged edge 24 of such underlying portion, and a diagonal edge 55 extending toward or to the opposite end of the hinged edge 23 of such end section 21.

Said underlying end part of the section 50 is provided with the diagonal crease 28 extending toward the adjacent corner 44 of the bottom, and the flap extension 26 joining said crease and adhered to the bottom of the adjacent end section 21 at the area 42 if the extension was folded as in the first described method, or nearer the outer corner 56 if the flap was left unfolded in before erection as in the last described method.

The other end section 19 becomes disposed under both side sections 20 and 22 and is provided with at the end under the adjacent underlying end of the side-section 20 with the diagonal crease 27 extending toward the bottom corner 47 of the erected box diagonally opposite to the corner 44 toward which the crease 28 extends. This crease 27 joins the flap 25 to the section 19 and

is adhered to the bottom face of adjacent end of the section 20. If the flap 25 is folded as in the first described method it is adhered to the area 41 of the blank 20; but if it is left unfolded before box-erection as in the second described method, it is adhered nearer the corner 57 of the section 20, the end of section 20 at said corner extending substantially to the adjacent end wall 11.

I claim as my invention:

1. A box blank cut and creased to form a pair of side walls and a pair of end walls, the side and end walls being alternately foldably connected in end-to-end series, a side bottom section foldably connected to each side wall, each side bottom through a portion of its length having a width of substantially one-half of the width of a box formed by the blank and the other part of its length having a greater width to form a wide and a narrow end and a shoulder intermediate said ends, an end bottom section foldably connected to each end wall section, one of said end bottom sections having a foldable glue flap forming an extension of one side thereof, and one of said side bottom sections having a foldable glue flap forming an extension of one end thereof, said glue flaps being joined to their respective sections by crease lines extending on an angle of substantially 45° in opposite directions, said sections having the glue flaps thereon being non-alternately arranged in said end-to-end series of said blank and said other end bottom section having one side cut away on an angle and its other side disposed at an angle of 90° with relation to the fold line connecting it with the adjacent end wall section and the side bottom section having no glue flap having its narrowest end disposed on an angle of 90° with relation to the fold line connecting said side bottom section with the adjacent side wall.

2. A box blank cut and creased to form a pair of side walls and a pair of end walls, the side and end walls being alternately foldably connected in end-to-end series, a side bottom section foldably connected to each side wall, each side bottom through a portion of its length having a width of substantially one-half of the width of a box formed by the blank and the other part of its length having a greater width to form a wide and a narrow end and a shoulder intermediate said ends, an end bottom section foldably connected to each end wall section, one of said end bottom sections having a foldable glue flap forming an extension of one side thereof, and one of said side bottom sections having a foldable glue flap forming an extension of one end thereof, said glue flaps being joined to their respective sections by crease lines extending on an angle of substantially 45° in opposite directions, said sections having the glue flaps thereon being non-alternately arranged in said end-to-end series of said blank and said other end bottom section having one side cut away on an angle and its other side disposed at an angle of 90° with relation to the fold line connecting it with the adjacent end wall section, and the side bottom section having the glue flap having its widest end disposed on an angle of 90° with relation to the adjacent fold line and said other side bottom section having both ends disposed on an angle of 90° with relation to the adjacent fold line.

3. A folding box formed from a single blank, said blank being cut and creased to form a pair of side walls and a pair of end walls and bottom sections foldably connected to each wall, one of

said bottom sections being an end bottom section and having a glue flap forming an extension of one side thereof, another of said bottom sections being a side bottom section and having a glue flap thereon forming an extension of one end thereof, the other end bottom section having one side disposed on an angle of 90° with relation to the fold line connecting it to the adjacent end wall; said box when formed having one end bottom section glued to an adjacent side bottom section by the glue flap carried thereby and having the other side bottom section glued to the other end bottom section by the glue flap on the last mentioned side bottom section, said first named glue flap being disposed below the side bottom section to which it is glued and said second named glue flap being disposed below the end bottom section to which it is glued, a lateral extension on the free side of each side bottom section, each extension overlaying an opposite side bottom section and forming a pair of interlocking shoulders substantially midway of the length of the box, and both ends of the side bottom section having no glue flap being disposed at 90° with relation to the fold line connecting it to the side wall, said ends and the 90° end of the side bottom section having the glue flap engaging the end walls of the box to maintain the interlock between the shoulders formed on the side bottom sections and to prevent collapse of the box when unfolded.

ROSS A. HIMES.