Aug. 14, 1945. C. D. KNOWLTON 2,381,961

BOX-MAKING APPARATUS

Original Filed Sept. 10, 1941 3 Sheets-Sheet 1

Fig. 1.

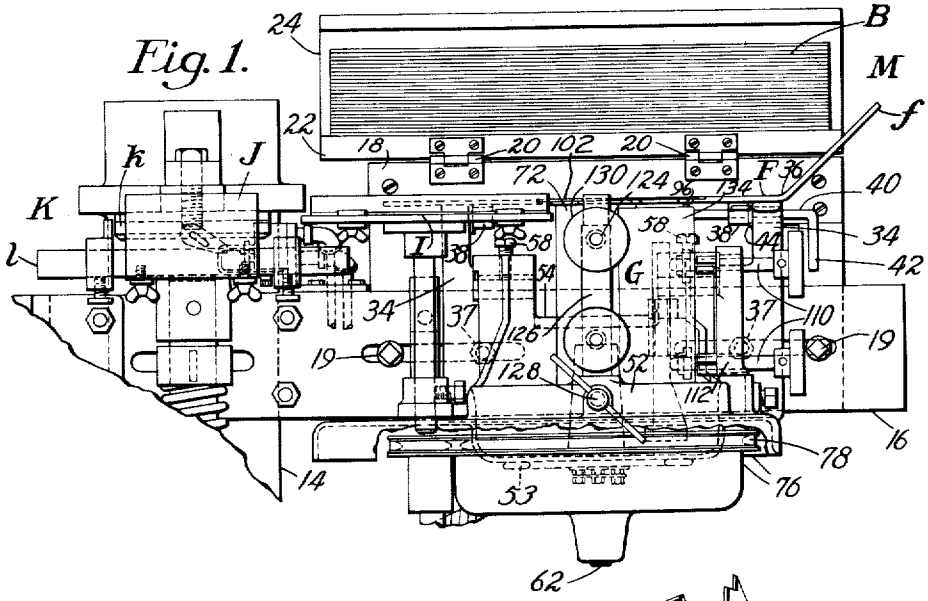


Fig. 7.

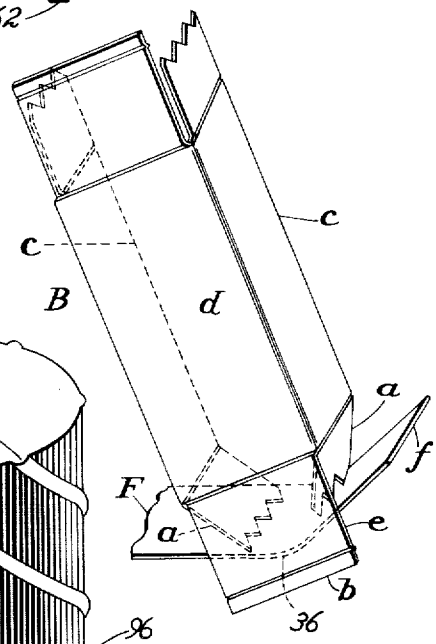
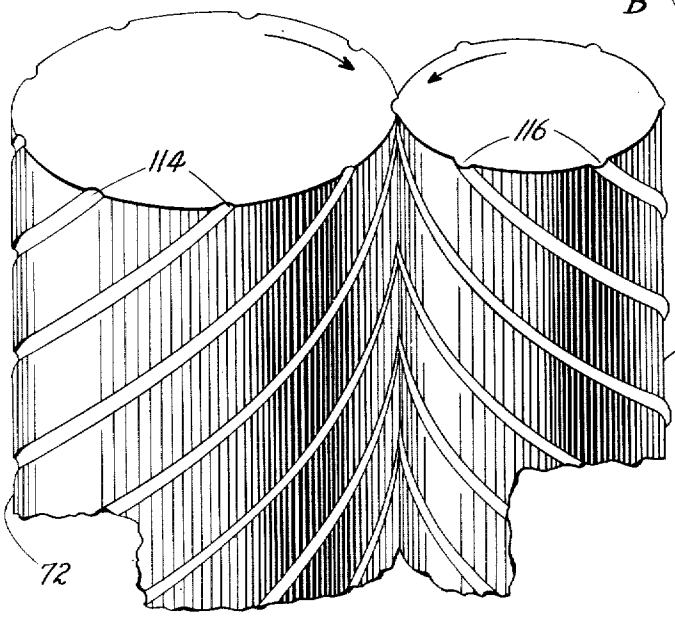


Fig. 6.



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BOX-MAKING APPARATUS

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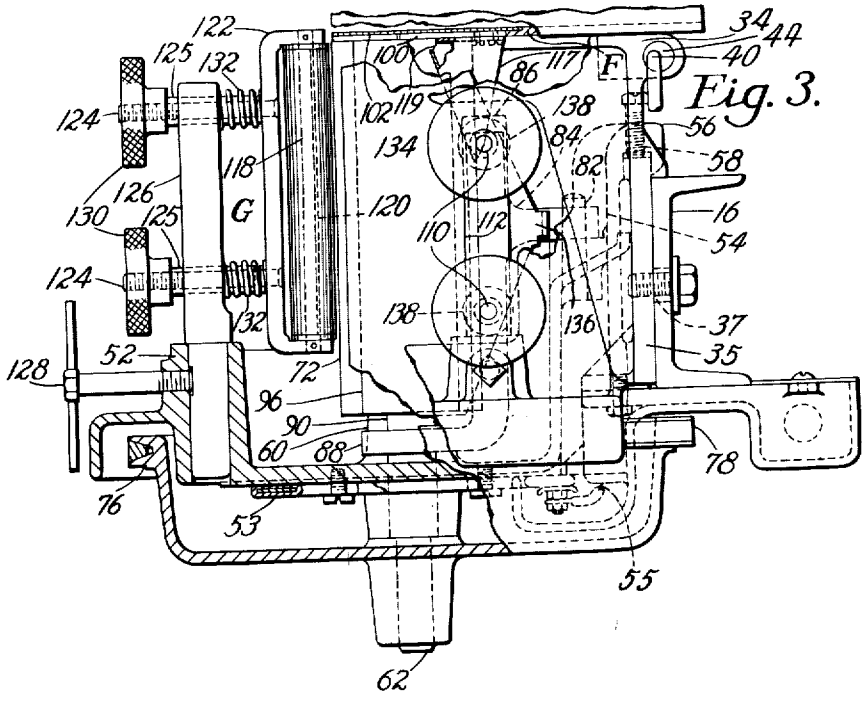


Fig. 3.

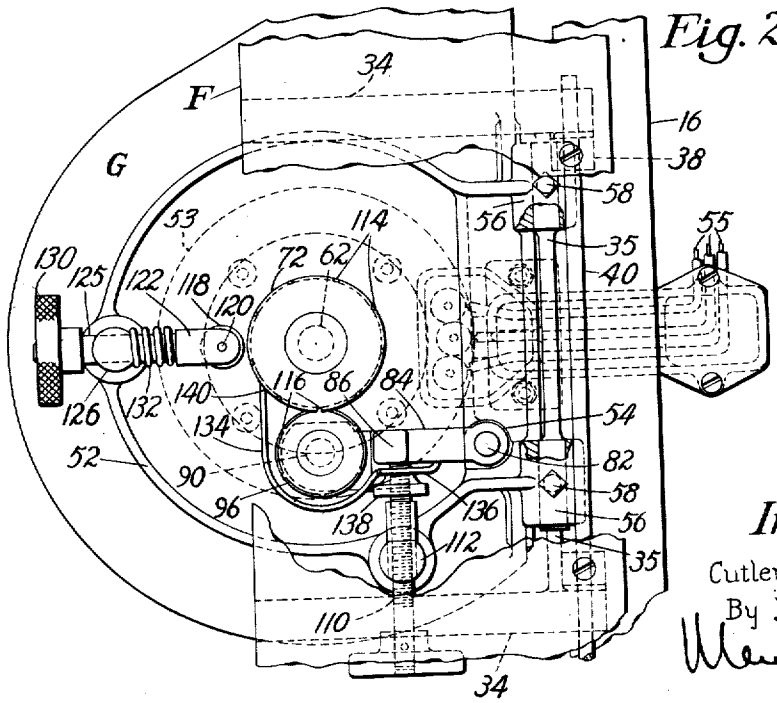


Fig. 2.

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BOX-MAKING APPARATUS

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Fig. 4.

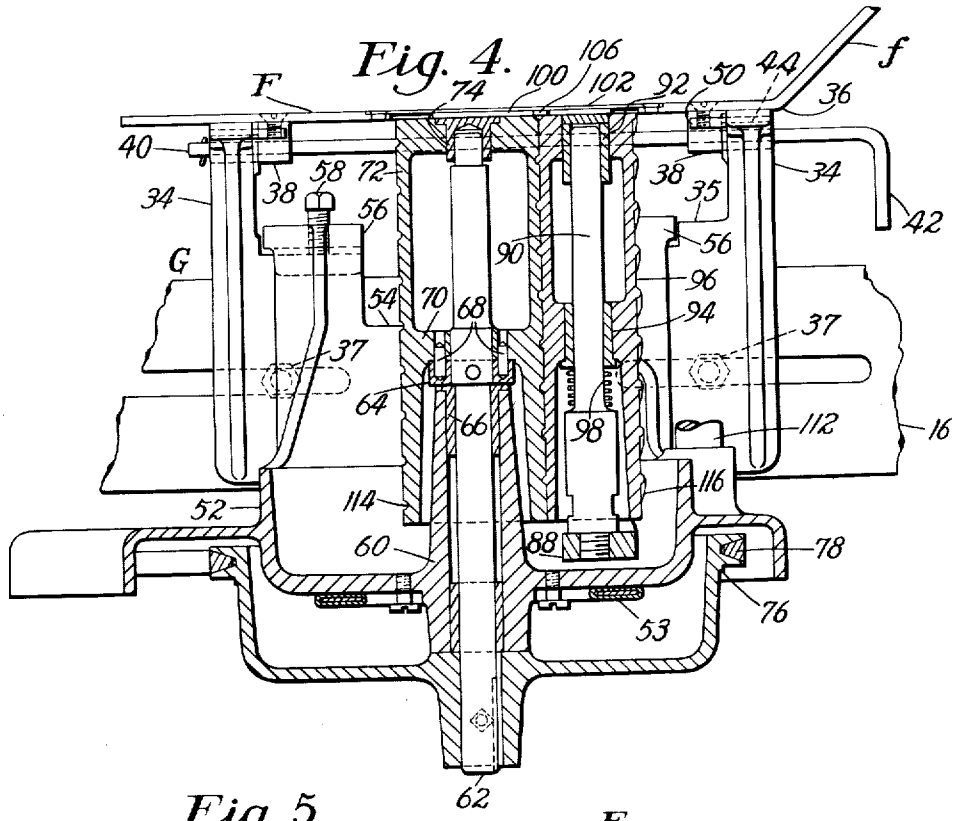
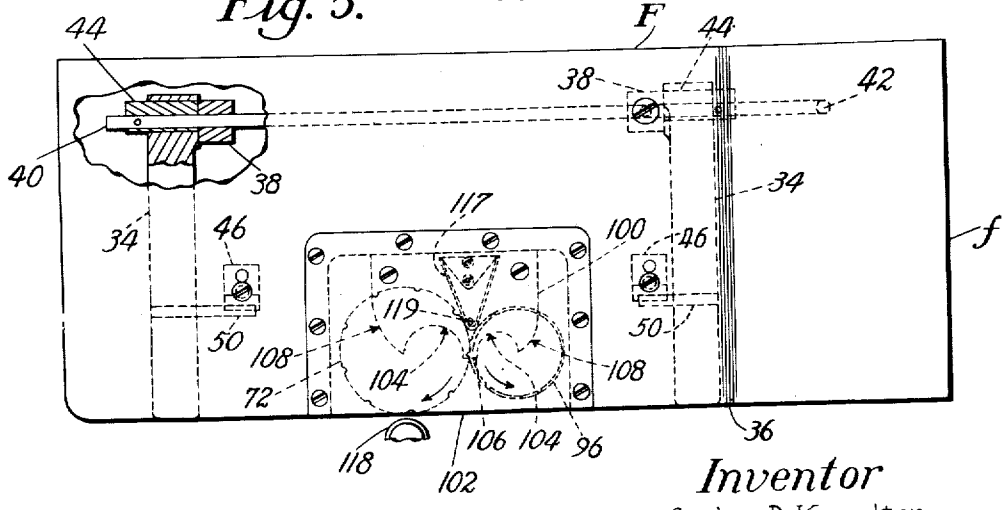


Fig. 5.



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Patented Aug. 14, 1945 2,381,961

UNITED STATES PATENT OFFICE

2,381,961

BOX-MAKING APPARATUS

Cutler D. Knowlton, Rockport, Mass., assignor, by mesne assignments, to Hoague-Sprague Corporation, Lynn, Mass., a corporation of Massachusetts

Original application September 10, 1941, Serial No. 410,274. Divided and this application September 21, 1943, Serial No. 503,180

34 Claims. (Cl. 91—48)

This invention relates to apparatus for forming such articles as boxes, it being especially applicable to the setting up of box-blanks of the type in which the end-formation consists of opposite corner-laps, an end-wing and an infolded extension from said end-wing. It may, however, have utility in other connections. The present case is a division of the application filed in my name in the United States Patent Office on September 10, 1941, and bearing the Serial No. 410,274.

The invention has as an object the provision, in an apparatus of the above-described character and in which a blank is manipulated by the operator during its setting up, of efficient means by which glue or other adhesive is applied to the blank in preparation for its folding and the application of setting pressure, this applying means being so located and organized that it will not cause interference of the blank in its manipulation during the operating advance. For the attainment of this object, the apparatus has a guide, which may be in the form of a table, with a substantially horizontal surface along which a box-blank may be advanced by the operator with a portion depending below the table. This portion of the blank, as herein disclosed, consists of the end-wing and its extension, the corner-laps moving over the guiding surface. With the guide co-operates adhesive-applying mechanism, which acts upon the depending portion of the blank. This mechanism, situated below the table, preferably has a roll rotatable about a vertical axis and an opposed roll or other pressure member, which act to coat and press for coating opposite sides of the depending portion. The blank in its vertical position may be grasped readily and given its preliminary folding by the operator, and with elongated blanks, such as are used for the formation of boxes to contain pairs of shoes, and for the setting-up of which this apparatus is particularly adapted, the placing of the major dimension of the blank vertically enables the operator to stand close to the guide and the adhesive-applying and other operating mechanisms. Here, he can present and advance the blank to the best advantage, without danger of the outer extremity striking his body and interfering with manipulation. Because the adhesive-applying mechanism is beneath the table, the depth of the apparatus from front to rear is minimized. It is organized to operate correctly upon the vertically positioned blank, and its vertical rolls are so arranged that their bearings are protected against the entrance of the adhesive, are readily removable for cleaning, and are adjustable in their relation. Since the rolls are vertical, there is means for elevating the adhesive to the top of the applying roll and for disposing of the excess which reaches the upper extremity of said roll. Means is provided for shielding the work against reception of the adhesive from other than the applying roll.

In the accompanying drawings illustrating one of the several possible embodiments of the invention,

Fig. 1 shows my improved apparatus in front elevation with parts broken away;

Fig. 2 is a top plan view of the gluing mechanism, the table above it being broken away;

Fig. 3, a broken side elevation of said mechanism, looking from the right in Fig. 1;

Fig. 4, a vertical transverse section of the gluing mechanism;

Fig. 5, a detail plan view illustrating the mounting of the guide-table;

Fig. 6, an enlarged detail in perspective of the glue-supplying and applying rolls; and

Fig. 7, a fragmentary perspective view illustrating the first step of folding a box-blank.

The apparaus enables the operator, with either a box-blank B or a similar cover-blank, of the well known type having corner-laps *a* and end-wing-extensions *b* (Fig. 7) and held in the hands with the side-wings *c* folded substantially at right angles to the body *d*, to turn in the corner-laps at one extremity of the blank by the engagement of their ends with a horizontal guide-table F and its inclined terminal portion *f*. As the blank is advanced with the corner-laps resting upon the table, the inner faces of the end-wing *e* and its extension projecting downwardly receive the action of gluing mechanism G. It then passes from the table into engagement with an adjustable plate I, which folds the glued surface of the end-wing against the corner-laps, and there temporarily retains it in its advance above an adjustable downwardly and inwardly inclined guide-wall J, with which the juncture of the body *d* and the end-wing *e* contacts. As the blank is now lowered by the operator, this wall carries the edge of the end-wing-extension above the fixed abutment *k* of pressure mechanism K, and directs it beneath said abutment upon the movable pressure-table *l* of said mechanism. Abutments *k* of different dimensions may be used as the size of the blank changes. Over the table *l* the operator shifts the blank rearwardly into pressure-receiving position, and, in so doing, contact with the abutment partially folds the end-wing-extension

over the corner-laps. The table *l* is now raised to force for a predetermined time the elements of the end-formation together against the abutment *k*, until the glue is sufficiently set.

The apparatus has a tubular column **14**, closed at the top and having secured across its front, near the upper extremity, a horizontal bar **16**. Fastened to the bar, for adjustment longitudinally thereof by slot-and-screw-connections **19**, is an upright **18** to which is attached by hinges **20, 20** a support M for the blanks to be set up. By changing the position of the support along the bar, it may be located in the preferred relation to the associated elements, especially the pressure mechanism K, for blanks of different lengths. The support preferably consists of a table **22**, upon which a stack of blanks may rest, and a rear stack-positioning wall **24**. In front of the blank-support M to the frame-bar **16** are attached two brackets **34, 34** connected to each other by a web **35**. On these brackets, which may be considered as a portion of the frame, rests the table F with its terminal portion *f* inclined upwardly from the right-hand end merging into the table by a curved connecting portion **36**. The attachment of the web **35**, and therefore of the table F, to the frame is by slot-and-screw-connections **37**, which permit horizontal adjustment of the table with respect to the pressure mechanism K. As already indicated, the table and its extension aid the operator in partially folding the ends of the blanks, and then properly presenting them for gluing to the mechanism G. To give access to the gluing mechanism, the table F is hinged to the brackets so it may be turned back, it being releasably latched against displacement in its normal horizontal position. Attached to the table, just at the inner side of each bracket **34**, is a block **38** (Fig. 5) through which passes a rod **40**, having at its outer extremity a depending crankarm **42**. Fixed to the rod are two eccentrics **44, 44**, rotatable, respectively, in the two brackets **34**. Attached to the underside of the table are two latching projections **46, 46** having at their forward ends downwardly inclined surfaces. Each of these surfaces engages a pin **50**, extending horizontally from one of the brackets to hold the table against accidental upward displacement. When the crank is raised and the eccentrics thereby turned, the table is drawn sufficiently to the rear to remove the latching projections **46** from beneath the pins **50**. The table may then be swung to fully clear the gluing mechanism. With the crank again raised, the table may be restored to its horizontal relation, and, in lowering the crank, the latch-surfaces re-engage the pins to hold the table firmly in operating position.

The mechanism G has a pot or container **52** for glue or other adhesive, which may be warmed by an electrical heating unit **53** attached to the bottom of the pot and supplied through conductors **55**. At the rear of the pot is an upward extension **54**, which is divided to form arms hooked at **56** over the web **35**. Threaded through the tops of the hooks are screws **58** contacting with the edge of the web, and by turning down or backing-off these screws the pot may be leveled. From the center of the pot rises a tubular extension **60**, in which is journaled a shaft **62** having secured to it a collar **64** stepped on a bushing **66** resting on the top of the extension. Set in the top of the collar are a plurality of vertical pins **68**, which are received in openings in a central transverse wall **70** of an applying roll **72**. The upper end of the roll is closed and has a bushing **74** fitting the shaft, while the lower portion of said roll surrounds and is spaced from the extension **60** of the pot. The applying roll is rotated in the direction indicated by the arrows in Figs. 5 and 6, constantly during the operation of the apparatus, through a pulley **76**, fast upon the lower end of the shaft **62** and receiving power through belt-gearing **78** from an unillustrated motor mounted upon the column **14**.

Pivoted at **82** upon the pot-extension **54** is an arm **84** having a vertical portion **86**, from the bottom of which is a horizontal projection **88**. Fixed in the projection is a spindle **90** surrounded by upper and lower bushings **92** and **94**. A roll **96** for supplying and distributing the adhesive from the pot to the applying roll **72** is rotatable about the bushings, and is supported upon an expansion-spring **98** interposed between a shoulder upon the spindle and the bushing **94**. This spring urges the upper end of the roll against the horizontal lower surface of a scraper **100**, attached to the underside of a panel **102** recessed into the table F, the scraper also receiving contact of the end of the roll **72**. The manner of mounting the rolls upon the shaft **62** and spindle **90**, together with their being freed by the turning back of the guide-table and scraper upon it, permits said rolls to be removed conveniently for cleaning, while their closed tops and depending lower portions so cover the mounting elements that these are protected against access of glue to the bearings. The forward edge of the scraper **100** is cut away to form two depressions **104, 104** above the ends of the two rolls (Fig. 5), leaving a projection **106** extending over the bite of the rolls. From the depressions, the edges of the scraper are curved rearwardly and outwardly at **108**, so they diverge. The distributing roll is forced against the applying roll, to have a substantially uniform bearing thereon throughout its length, by two screws **110, 110** threaded horizontally through a post **112** rising from the side of the pot **52**, the inner ends of the screws engaging the arm-portion **86**. In the periphery of the applying roll **72** are a plurality of uniformly spaced helical grooves **114** (Fig. 6), with which mesh like projection **116** from the roll **96**. The positive rotation of the applying roll drives the distributing roll, and the helical grooves and projections upon the rolls, together with the intermediate spaces, have the effect of elevating the glue from the pot and spreading it over the periphery of the applying roll ready for application to the work. Some glue will rise to the upper ends of the rolls to be removed by the scraper, the curved edges **108** of which direct it outwardly to flow down the rear of the rolls and return to the pot. Some of its downward flow will be carried to the bite of the rolls at the rear, to be again elevated. This will be prevented from accumulating at the top and becoming thickened by a device which diverts it from the rolls and back to the pot. The device is preferably in the form of a generally V-shaped spout **117**, fitting between the rolls at the upper extremities and inclined downwardly and rearwardly (Figs. 3 and 5). At its upper end the spout is flanged and attached to the underside of the scraper **100**. At the apex of the V, near the top, is an opening **119**. Through this opening the gathering glue is forced and, flowing down the spout, is returned to the pot at a point somewhat removed from the rolls. Some of the glue may rise above the opening and reach the tops of the rolls to work under

the narrow portion 106 of the scraper, whence it will be carried to the edges 108 for removal.

As the corner-laps *a*, *a* of the blank B are advanced along the table F by the operator, to present the inner faces of the wing *e* and its extension *b* to the applying roll 72, these faces are held against said applying roll by a pressure-roll 118 with the meeting surfaces of which rolls the outer edge of the table is alined (Fig. 5). The pressure-roll is freely rotatable about an axis parallel to the applying roll, it turning upon a vertical spindle 120 fixed in a yoke 122. The yoke is supported by two horizontal rods 124, 124 passing through sleeves 125 fixed in a post 126 extending upwardly from the front of the pot 52. The post is secured to the pot by a screw 128 for ready removal to give access to the rolls 72 and 96. The outer ends of the rods have threaded upon them thumb-nuts 130, and expansion-springs 132 are interposed between the post and the yoke about the sleeves. By rotating the thumb-nuts in contact with the ends of the sleeves, the position of the roll 118 and the force with which it holds the blanks against the applying roll may be altered. In the travel of the blank, the end-wing and its extension are guided between the applying roll and pressure-roll by the outer edge of the table F, against which the operator forces the inner side of said end-wing, which is kept clear of the distributing roll by a shield 134. The shield may be of sheet-metal, curved about the outer side of the distributing roll (Fig. 2) and extending in front of it into proximity to the periphery of the applying roll. From the curved portion, it extends rearwardly at 136 into engagement with the arm 84, and has two openings through which pass the screws 110 to support it. It is positioned by nuts 138 upon the screws, and against which the angular end-portion 136 bears. In addition to directing the work in a proper path, the shield will guard said work against drops and strings of glue thrown outwardly from the rolls, and may further serve at its free end 140 as a scraper for the applying roll 72. This last-named function is attained by so setting the nuts 138, that the shield-edge 140 is held close to the applying roll, any excessive glue being removed by this edge and returned to the tank.

In the use of the improved apparatus, the table F and the folding members I and J will be adjusted, and an abutment *k* applied to the pressure mechanism K, to correspond to the character and size of the blanks to be operated upon. The operator, taking the top-blank B from the support M, folds up the side-wings *c* substantially at right angles to the body-portion *d*, and, with said blank lying in a substantially vertical plane, presses the ends of the lower corner-laps *e* against the terminal portion *f* of the guide-table F, at the same time shifting it to the left along the table and urging it against the outer table-edge. When thus held, even the largest blank will be well spaced from the body of the operator and will produce no interference, while, if positioned with its length along the horizontal plane, it might be awkward to manipulate. The end-wing *e* and its extension *b* are in vertical alinement with the blank-body *d*, and, protected by the shield 134 from the distributing roll 96 of the gluing mechanism G, passes the vertical periphery of the driven applying roll 72. Held against this by the pressure-roll 118, the inner faces of the end-wing and its extension receive a coating of the adhesive which is raised from the pot 52 by the meshing helical depressions 114 and projections 116 of the rolls 72 and 96. The action of the applying roll aids in the forward travel of the work. With the blank guided as described, all sizes may be coated without the necessity for adjusting the table vertically. This is because the table F presents the crease between the body *d* and the end-wing *e* in a constant relation to the upper extremities of the rolls, and these rolls are of sufficient height to act properly upon the end-wing and its extension of the longest blank to be operated on. Still advanced in a vertical position by the operator along the guide-table F, the forward edge of the end-wing encounters the edge of the plate I and in passing from the table to the plate is folded up, the outer face of the end-wing resting upon the top of the plate, while the inner coated face is forced against the corner-laps and there held as the blank is shifted outwardly upon the plate. As the advance to the left continues, the blank arrives above the wall J upon the table *l* of the pressure mechanism K. Without change in the vertical relation of the blank, and, therefore, without the delay which would be occasioned by repositioning it, it is lowered along the wall J. In this movement, the end-wing-extension strikes the horizontal surface of the fixed abutment *k* and is bent thereby substantially at right angles to the end-wing, and thus retained as the outer face of the end-wing reaches the pressure-table. The end of the extension is at this time just above the bottom of the abutment, and, as the operator carries the blank back, the extension is turned over the end-wing. Upon the arrival of the blank-body against the outer end of the abutment, the operation of the pressure mechanism K is initiated, the table *l* of which is elevated to urge the elements of the coated end-formation of the blank B against the abutment *k*. The folding of the end-wing-extension is thereby completed, and pressure is applied to the entire end-formation to set the glue which has been applied by the mechanism G.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In box-making apparatus, a guide having a substantially horizontal surface along which a box-blank may be advanced by the operator with a portion depending below the guide, said guide having an edge against which the operator forces the blank, and adhesive-applying mechanism arranged to coat the depending portion of the blank and into which the guide-edge directs said blank.

2. In an apparatus for making boxes of the end-wing and corner-lap type, a table having a substantially horizontal surface arranged to receive contact of the folded corner-laps of a blank as it is advanced manually, the end-wing of the blank projecting below the table and at its inner side engaging the table-edge, and adhesive-applying mechanism situated below the table and arranged to coat the inner face of the end-wing.

3. In box-making apparatus, a guide having a substantially horizontal surface along which a box-blank may be advanced by the operator with a portion depending below the guide, said guide having an edge against which the operator forces the blank, and adhesive-applying mechanism having a roll rotatable about a substantially vertical axis and an opposed pressure member, with the meeting surfaces of said roll and pressure member the guide-edge is alined, said roll and

pressure member acting upon opposite faces of the depending portion of the blank.

4. In box-making apparatus, a frame, a support variable in position upon the frame, a guide-table movably mounted upon the support and over which box-blanks may be advanced by the operator, a container for adhesive carried beneath the table and being variable in position upon its support, and an adhesive-applying roll rotatable in the container about a vertical axis.

5. In box-making apparatus, a frame, a support attached to the frame, a guide-table pivoted upon the support and over which box-blanks may be advanced by the operator, a glue-pot beneath the table and provided with spaced hooks engaging the support, and an applying roll rotatable in the pot about a vertical axis.

6. In box-making apparatus, a frame, a support variable in position upon the frame, a guide-table movably mounted upon the support and over which box-blanks may be advanced by the operator, a container for adhesive carried beneath the table upon its support, container-leveling means engaging the support, and an adhesive-applying roll rotatable in the container about a vertical axis.

7. In box-making apparatus, a frame, a support attached to the frame, a guide-table pivoted upon the support and over which box-blanks may be advanced by the operator, a glue-pot beneath the table and provided with spaced hooks engaging the support, screws threaded through the upper portions of the hooks and contacting with the support, and an applying roll rotatable in the pot about a vertical axis.

8. In box-making apparatus, a frame, a guide-table mounted upon the frame and movable into and out of active position, over which table box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll surrounding the shaft, and means for compelling the rotation of the roll with the shaft and permitting it to be lifted freely therefrom when access is given to it by movement of the table.

9. In box-making apparatus, a frame, a guide-table mounted upon the frame and movable into and out of active position, over which table box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll supported upon the table, said roll being closed at the top and extending below its support to protect it against the entrance of the adhesive, and means for compelling the rotation of the roll with the shaft.

10. In box-making apparatus, a frame, a guide-table mounted upon the frame and movable into and out of active position, over which table box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll surrounding the shaft, an arm pivoted upon the container, a spindle rising vertically from the arm, and a distributing roll rotatable about the spindle and cooperating with the applying roll.

11. In box-making apparatus, a frame, a guide-table mounted upon the frame and movable into and out of active position, over which table box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll surrounding the shaft, an arm pivoted upon the container, a spindle rising vertically from the arm, a distributing roll rotatable about the spindle and co-operating with the applying roll, and a screw rotatable upon the container and engaging the arm to force the distributing roll toward the applying roll.

12. In box-making apparatus, a frame, a guide mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, a roll rotatable in the container about a vertical axis, means for removing material from the top of the roll, and means for diverting such removed adhesive upon the periphery of the roll from the top of said roll.

13. In box-making apparatus, a frame, a guide mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, a roll rotatable in the container about a vertical axis, and a spout having its end in proximity to the upper extremity of the roll and inclined downwardly therefrom to receive adhesive and deliver it outwardly at a point removed from said roll.

14. In box-making apparatus, a frame, a guide mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, an applying roll and a distributing roll rotatable in the container about vertical axes, and a spout having its end extending in toward the bite of the rolls at their upper extremities and inclined downwardly therefrom, there being an adhesive-receiving opening through the wall of the spout in proximity to its upper end.

15. In box-making apparatus, a frame, a guide mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, a roll rotatable in the container about a vertical axis, a spout having its end in proximity to the upper extremity of the roll and inclined downwardly therefrom, and a scraper carried upon the guide and co-operating with the upper extremity of the roll.

16. In box-making apparatus, a frame, a guide mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, and a scraper carried upon the guide and co-operating with the upper extremity of the roll.

17. In box-making apparatus, a frame, a guide-table mounted upon the frame and movable into and out of active position, over which table box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, a distributing roll rotatable about a vertical axis and co-operating with the applying roll, and a scraper carried upon the table and in the active position of said table co-operating with the applying and distributing rolls.

18. In box-making apparatus, a frame, a guide-table mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, a distributing roll rotatable about a vertical axis and co-operating with the applying roll, a scraper carried upon the table and co-operating with the

applying and distributing rolls, and means for urging one of the rolls toward the scraper.

19. In box-making apparatus, a frame, a guide-table mounted upon the frame and movable into and out of active position, over which table box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, a distributing roll rotatable about a vertical axis and co-operating with the applying roll, a scraper carried upon the table and in the active position of said table co-operating with the applying and distributing rolls, and a spring by which the distributing roll is forced against the scraper.

20. In box-making apparatus, a frame, a guide-table mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, a distributing roll rotatable about a vertical axis and co-operating with the applying roll, and a scraper carried upon the table and having diverging edges which remove the adhesive from the upper ends of the rolls.

21. In box-making apparatus, a frame, a guide-table mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, a distributing roll rotatable about a vertical axis and co-operating with the applying roll, and a scraper carried upon the table and having a reduced portion extending over the bite of the rolls.

22. In box-making apparatus, a frame, a guide-table mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, a distributing roll rotatable about a vertical axis and co-operating with the applying roll, a scraper carried upon the table and having a reduced portion extending over the bite of the rolls, there being at each side of the reduced portion adhesive-removing edges diverging rearwardly.

23. In box-making apparatus, a guide over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, and an applying roll and a distributing roll rotatable in the container about vertical axes and having about their peripheries helices elevating the adhesive from the container toward the guide.

24. In box-making apparatus, a guide over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, an applying roll and a distributing roll rotatable in the container about vertical axes and having about their peripheries helices elevating the adhesive from the container toward the guide, and a spout having its end extending in toward the bite of the rolls at their upper extremities and inclined downwardly therefrom.

25. In box-making apparatus, a frame, a guide-table mounted upon the frame and movable into and out of active position, over which table box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, and a distributing roll rotatable about a vertical axis, said rolls having intermeshing helical projections and depressions elevating the adhesive from the container.

26. In box-making apparatus, a guide over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, a distributing roll rotatable about a vertical axis, said rolls having intermeshing helical projections and depressions elevating the adhesive from the container, and a scraper carried by the guide for removing the adhesive from the upper ends of the rolls.

27. In box-making apparatus, a guide over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, a distributing roll rotatable about a vertical axis, said rolls having intermeshing helical projections and depressions elevating the adhesive from the container, a spout having its end extending in toward the bite of the rolls at their upper extremities and inclined downwardly therefrom, and a scraper carried by the guide for removing the adhesive from the upper ends of the rolls.

28. In box-making apparatus, a frame, a guide-table mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a vertical shaft rotatable in the container, an adhesive-applying roll attached to the shaft, a distributing roll rotatable about a vertical axis, said rolls having intermeshing helical projections and depressions elevating the adhesive from the container, a scraper carried by the table for removing the adhesive from the upper ends of the rolls, and a spring for forcing the end of the distributing roll against the table.

29. In box-making apparatus, a frame, a guide-table mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a roll rotatable in the container about a vertical axis and arranged to apply adhesive to the inner face of a depending portion of a blank moving along the table, a post rising from the container, a rod movable through the post, a yoke carried by the rod, a spring interposed between the yoke and post, a spindle fixed in the yoke, and a pressure-roll rotatable about the spindle and engaging the outer face of the depending blank-portion.

30. In box-making apparatus, a frame, a guide-table mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a roll rotatable in the container about a vertical axis and arranged to apply adhesive to the inner face of a depending portion of a blank moving along the table, a post rising from the container, a rod movable through the post, a yoke carried by the rod, a spring interposed between the yoke and post, a nut threaded upon the rod outside the post and arranged to vary the force exerted by the spring, a spindle fixed in the yoke, and a pressure-roll rotatable about the spindle and engaging the outer face of the depending blank-portion.

31. In box-making apparatus, a guide over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, a roll rotatable in the container about a vertical axis and arranged to apply adhesive

to the inner face of a depending portion of a blank moving along the guide, a distributing roll rotatable about an axis parallel to that of the applying roll, and a shield extending outside the distributing roll and into proximity to the applying roll.

32. In box-making apparatus, a guide over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, a roll rotatable in the container about a vertical axis and arranged to apply adhesive to the inner face of a depending portion of a blank moving along the guide, an arm pivoted upon the container, a distributing roll rotatable upon the arm and co-operating with the applying roll, and a shield engaging the arm and extending outside the distributing roll.

33. In box-making apparatus, a guide over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the guide, a roll rotatable in the container about a vertical axis and arranged to apply adhesive to the inner face of a depending portion of a blank moving along the guide, an arm pivoted upon the container, a screw rotatable upon the container and engaging the arm, a distributing roll rotatable upon the arm and co-operating with the applying roll, and a shield supported upon the screw and extending outside the distributing roll.

34. In box-making apparatus, a frame, a guide-table mounted upon the frame and over which box-blanks may be advanced by the operator, a container for an adhesive carried beneath the table, a roll rotatable in the container about a vertical axis and arranged to apply adhesive to the inner face of a depending portion of a blank moving along the table, an arm pivoted upon the container, a screw rotatable upon the container and engaging the arm, a distributing roll rotatable upon the arm and co-operating with the applying roll, a nut threaded upon the screw, and a shield supported upon the screw and engaged by the nut, said shield extending outside the distributing roll.

CUTLER D. KNOWLTON.

CERTIFICATE OF CORRECTION.

Patent No. 2,381,961. August 14, 1945.

CUTLER D. KNOWLTON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 48, for "projection" read --projections--; page 4, first column, line 53, claim 9, for "table" read --shaft--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of December, A. D. 1945.

Leslie Frazer

(Seal) First Assistant Commissioner of Patents.

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