July 4, 1944. C. D. KNOWLTON 2,352,720

GLUING MECHANISM FOR BOX-MAKING MACHINES

Filed June 20, 1942 4 Sheets-Sheet 1

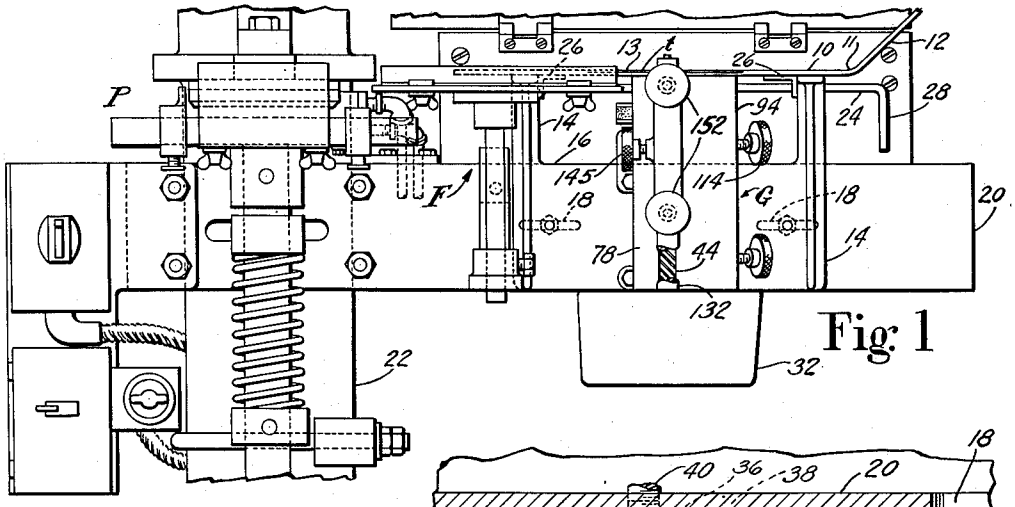


Fig. 1

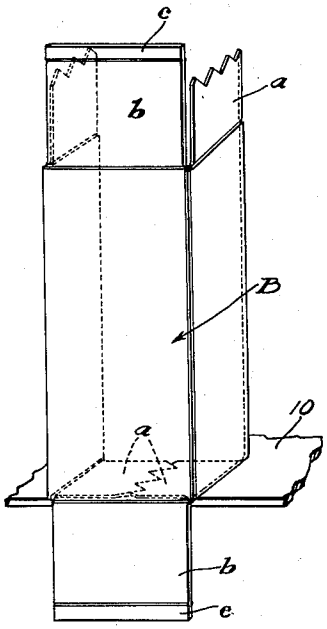


Fig. 2

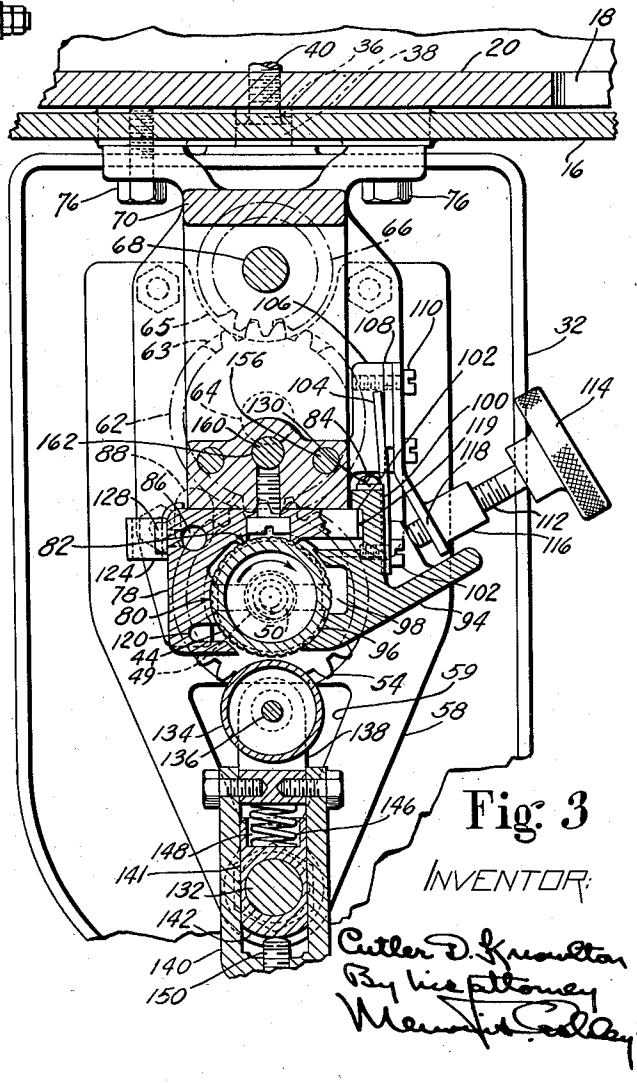


Fig. 3

INVENTOR:

Cutler D. Knowlton

By his attorney

Merwin Coolidge

July 4, 1944. C. D. KNOWLTON 2,352.720

GLUING MECHANISM FOR BOX-MAKING MACHINES

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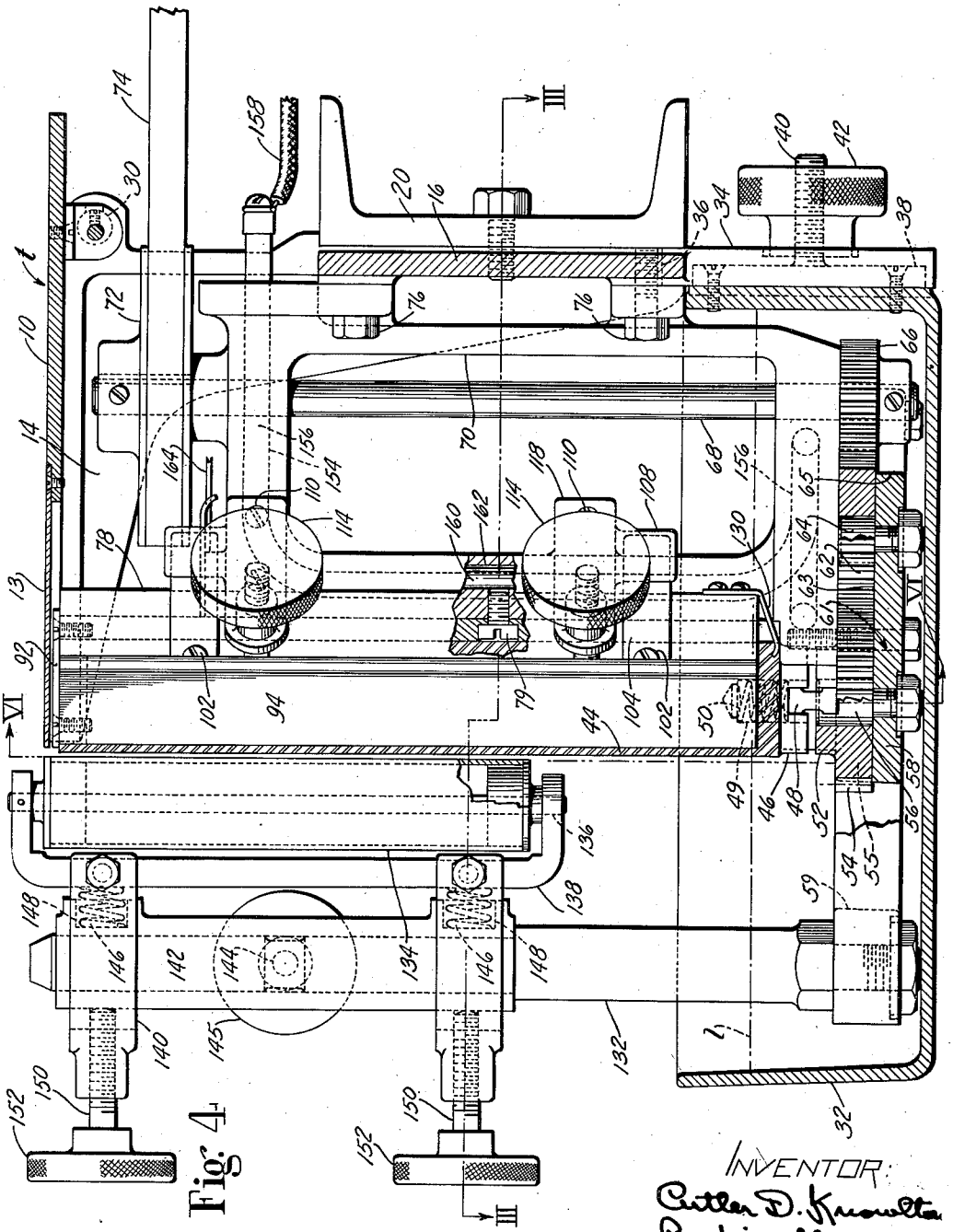


Fig. 4

INVENTOR:
Cutler D. Knowlton
By his attorney

July 4, 1944. C. D. KNOWLTON 2,352,720

GLUING MECHANISM FOR BOX-MAKING MACHINES

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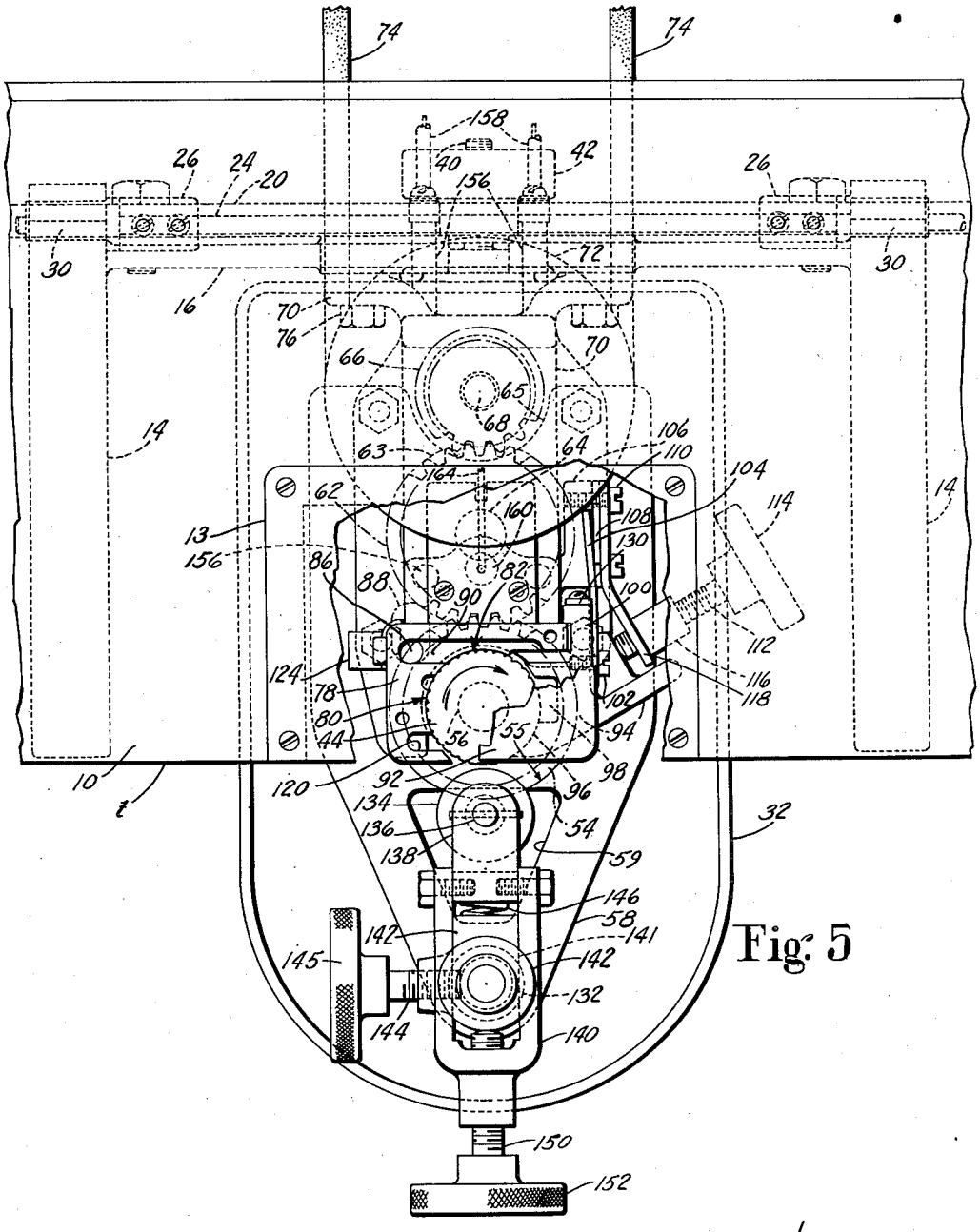


Fig. 5

INVENTOR:
Cutler D. Knowlton
By his attorney
Merwin A. Colley

July 4, 1944. C. D. KNOWLTON 2,352,720

GLUING MECHANISM FOR BOX-MAKING MACHINES

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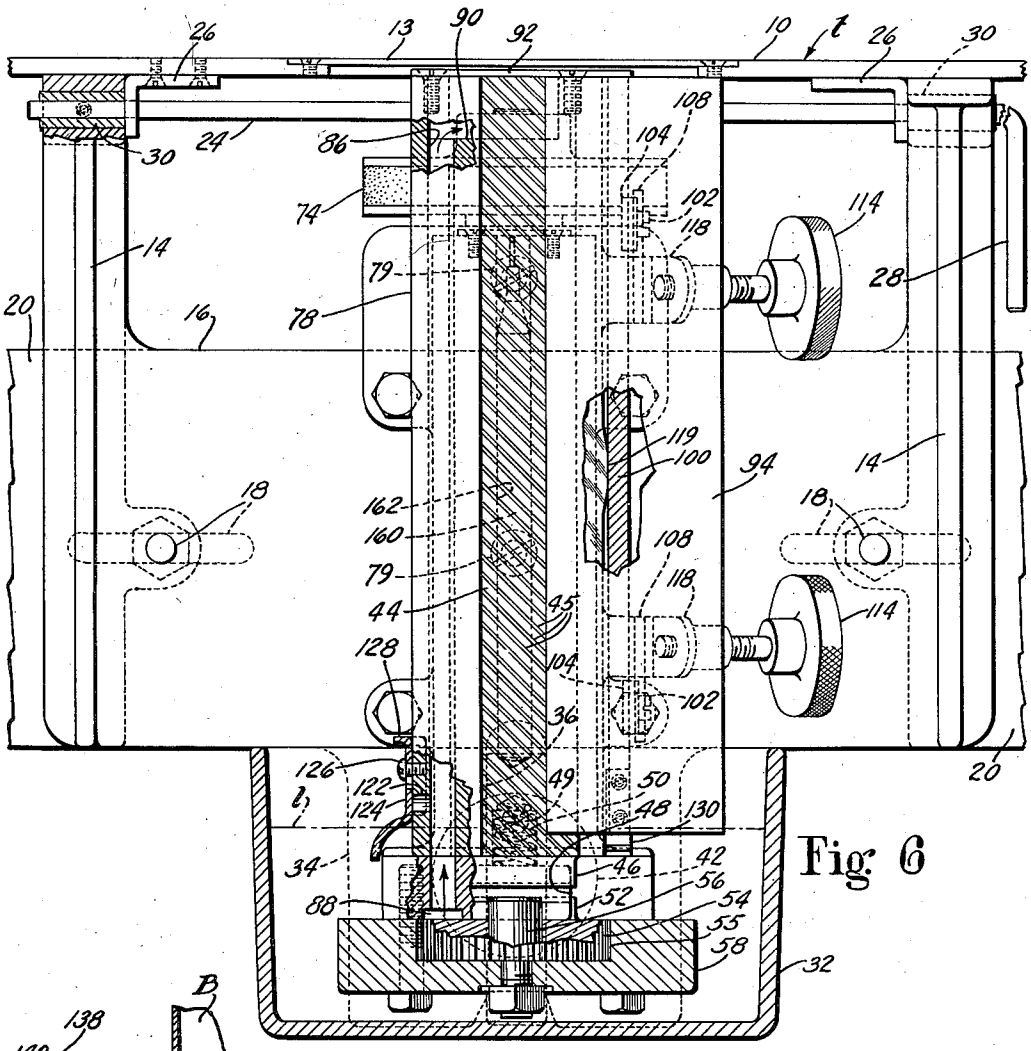


Fig. 6

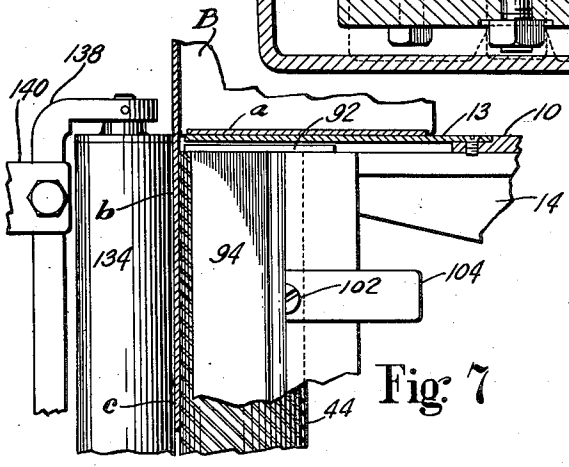


Fig. 7

INVENTOR:
Cutler D. Knowlton
By his attorney
Clarence A. O'Brien

Patented July 4, 1944

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UNITED STATES PATENT OFFICE

2,352,720

GLUING MECHANISM FOR BOX-MAKING MACHINES

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

Application June 20, 1942, Serial No. 447,843

18 Claims. (Cl. 91—49)

This invention relates to a machine for the forming and pressing of such articles as paper boxes and is directed especially to adhesive-applying mechanism for such machines.

In my prior machine, as disclosed in my application for United States Letters Patent Serial No. 410,274, filed September 10, 1941, box-blanks of the type in which the end formation consists of corner-laps, an end-wing, and an infolded extension for the end-wing are operated upon by a series of mechanisms designed to apply adhesive to the inner face of an end-wing and its extension, thereafter to fold the end-wing into engagement with the corner-laps and the extension over the edges of the corner-laps so that it adheres to the inside surfaces, and, finally, to apply pressure to the superposed parts to cause permanent adhesion. As shown herein, the corner-laps are partially folded inwardly by the operator and the box is placed end down, that is, with its long dimension in a substantially vertical position, upon a table or guide having an upwardly directed terminal extension which completes the folding of the corner-laps. In this vertical position the blank is advanced along the table, with the end-wing extending downwardly in a vertical plane, to adhesive-applying mechanism which consists of a vertically disposed adhesive-applying roll and a co-operating pressure-applying roll for holding the end-wing in contact with the adhesive-applying roll.

It is an object of the present invention to provide an improved support for the adhesive-applying roll employed in the aforesaid machine, to provide for more accurate control of the adhesive on the applying roll, to eliminate spatter, and to simplify the construction and arrangement of the mechanism in order to minimize manufacturing costs.

In the accomplishment of these objects, the adhesive-applying roll is supported at its lower end in an adhesive receptacle for rotation about a vertical axis and is partially surrounded along one side and the back by a block having a substantially cylindrical recess conforming to the surface of the roll. As illustrated, the block supports the roll against lateral pressure applied thereto by a pressure-applying roll which is arranged to press the end-wing against the adhesive-applying roll and constitutes means for supplying adhesive to the top of the roll. This latter function is accomplished by providing a vertical passage in the block the lower end of which terminates in the receptacle and the upper end of which terminates adjacent to the top of the roll and pumping adhesive through the passage by means of a pair of meshing gears submerged in the receptacle adjacent to the lower end of the passage, one of the gears being adapted to rotate the applying roll. To provide accurate control of the adhesive, a doctor blade is held in contact with the surface of the applying roll, between the point on its surface to which the adhesive is supplied and the point of contact with the work, to spread the adhesive in a uniform film for application to the inner face of the end-wing of a box. Means is also provided for adjusting the position of the doctor blade to regulate the thickness of the film, and valve means is provided for by-passing a portion of the adhesive which is elevated through the passage in order to regulate the amount of adhesive delivered to the top of the applying roll. It is to be observed that by using a doctor blade instead of a doctor roll for controlling and governing the thickness of the film of adhesive on the surface of the applying roll, the spatter which accompanies the breaking of threads of adhesive formed between the retreating surfaces of the applying roll and the doctor roll is eliminated. This is due to the fact that the threads which are produced by the movement of the applying roll away from the doctor blade are drawn out so nearly tangent to the surface of the applying roll that they coalesce with the adhesive on the surface of the roll before they have an opportunity to break and thus spatter over the work and onto parts of the machine.

The details of the improved construction of the aforesaid machine will now be described with reference to the accompanying drawings, in which

Fig. 1 is a side elevation of my prior machine, showing the disposition of my improved adhesive-applying mechanism;

Fig. 2 is an angular view of a box-blank of the type operated upon, with the corner-laps folded and resting upon the table of the machine;

Fig. 3 is a section taken on the line III—III of Fig. 4;

Fig. 4 is a side elevation as seen from the right side of Fig. 1, partly in section;

Fig. 5 is a plan view of a portion of the machine with the support for the work broken away in part to show the adhesive-applying mechanism;

Fig. 6 is a section taken on the line VI—VI of Fig. 4; and

Fig. 7 is a fragmentary view, showing the position of the end-wing between the adhesive-applying roll and the pressure-applying roll.

The work for which the present machine is particularly suited is illustrated in Fig. 2 as a box-blank which, when set up, is of the type customarily employed for packing shoes. The blank B has an end formation consisting of corner-laps *a*, and an end-wing *b* having an extension *c*, the corner-laps being folded into a position at right angles to the sides of the box, the end-wing

being folded so that it overlies the corner-laps, and the extension being folded over the top edges of the corner-laps and secured to the inside to provide a finished box. Tops for boxes of this type are correspondingly formed and set up and may be operated upon in the same manner without modification of the machine. As illustrated and described in my application referred to above, the operator sets up each end of the box as a separate operation, and to do this, he preliminarily bends the corner-laps inwardly to a position substantially at right angles to the body of the box and places the box with its long dimension in substantially a vertical position with its infolded corner-laps in contact with a table or guide *t* (Fig. 1) having a horizontal portion 10 and an inclined terminal portion 12 which merges into the horizontal portion 10 by a curved connecting portion 11. The curved portion 11 between the horizontal portion 10 of the table and the upwardly inclined terminal portion 12 thereof receives the inwardly partially folded corner-laps and, when the operator presses the box downwardly, completes the folding thereof. The box is then advanced along the horizontal portion 10 of the table with its end-wing extending downwardly in a position to be presented to the adhesive-applying mechanism G which, as illustrated in my prior application, consists of an adhesive-applying roll and a pressure-applying roll between which the end-wing is passed. After the adhesive has been applied, the box is moved farther along the table to a folding mechanism, indicated generally by the reference character F, which engages the now coated end-wing and brings it into a position overlying the corner-laps. Finally, the box passes to the pressure-applying means P which infolds the extension *c* of the end-wing over the edges of the corner-laps and presses the superposed parts firmly into engagement to cause permanent adhesion between the parts of the set-up end structure of the box or of its cover. The folding mechanism F and the pressure-applying mechanism P are identical with that shown and described in my prior application and need not be further referred to in the present application.

The adhesive-applying mechanism G which forms the novel subject matter of the present invention is disposed below the table *t*, as is the adhesive-applying mechanism in my prior machine, and to permit ready access thereto the table *t* is mounted so that it may be tipped upwardly to expose the adhesive-applying mechanism. This is accomplished by hinging the rear edge of the table upon spaced brackets 14 (Figs. 1 and 4), the latter being connected by a web 16 which, in turn, is fastened to a horizontal bar 20 by slot-and-screw connections 18. Attached to the underside of the table just inside of each of the brackets 14 is an angle 26 through which passes a rod 24 having at its outer extremity a crank arm 28 (Fig. 6). Fixed to the rod are two eccentrics 30 rotatable respectively in the two brackets 14. When the crank arm 28 is raised, the eccentrics are turned, thereby to draw the table sufficiently to the rear to disengage latching mechanism (not shown herein) so that the table may be swung up and back about the axis of the rod 24 fully to clear the adhesive-applying mechanism. It is to be observed that a panel 13 is recessed into the table *t* above the adhesive-applying mechanism and is removably fastened in place. This permits access to the adhesive-applying mechanism without lifting the table as a whole, if that is undesirable under operating conditions.

A horizontal bar 20 fastened to a vertical tubular column 22 (Fig. 1) supports the table *t*, the adhesive-applying mechanism G, and the folding mechanism F. The pressure-applying mechanism P is mounted on top of the column. The column, in turn, rises from a base which houses the driving means for the aforesaid mechanisms, the base not being shown herein since it is fully illustrated in my prior application.

As illustrated herein, the adhesive-applying mechanism consists, in general, of an adhesive-applying roll 44 mounted in an adhesive container 32 for rotation about a vertical axis and is supported in this position by a block 78 mounted adjacent thereto which serves as a bearing for the adhesive-applying roll. It is to be observed that the block 78 also constitutes a part of the means for supplying adhesive to the surface of the applying roll, pumping means 61 (Fig. 4) being provided in the container for lifting adhesive from the container through a passage 86 formed in the block 78 to the top of the applying roll where it is discharged upon the surface of the adhesive-applying roll and allowed to descend by gravity over the surface thereof. A doctor block 94 is provided for spreading the adhesive delivered to the surface of the applying roll and a pressure-applying roll 134 is provided for pressing the end-wing against the adhesive-applying roll.

The adhesive container 32 (Fig. 4) is fastened to a projection 34 extending downwardly from the web 16. To this end, a slot 36 (Fig. 6) is formed in the projection 34 for the reception of a key 38 (Fig. 4) which is screwed to one end of the container. A threaded stud 40 is formed integral with the key and extends outwardly through the slot 36 for the reception of a knurled nut 42 which, when brought up against the projection by rotation on the stud, clamps the container to the extension. The container may, therefore, readily be attached to or removed from the projection 34 in case it is necessary to replenish the supply of adhesive or to clean the container.

The adhesive-applying roll 44 (Figs. 4 and 7) is vertically positioned so that a portion of its surface lies substantially in the plane of the depending end-wing (Fig. 7) as it is moved along the table or guide *t*, the upper end of the applying roll terminating close to the underside of the table and the lower end being submerged in the adhesive in the container, the level of the adhesive being maintained at about the height indicated by the dot-and-dash line *l* (Fig. 6). A hub 46 is provided at the lower end of the roll and is drivably connected to a hub 52 formed on a driven gear 54, submerged in the container, by a key 48 which fits into corresponding diametrical slots formed in the respective hubs. An axial bore 49 is provided at the bottom of the slot in the hub of the applying roll, in which there is seated behind the key a compression spring 50 which forces the upper end of the roll against a plate 92 adjacent to the upper end of the roll, thus preventing endwise movement of the roll. As shown herein, the upper end of the adhesive-applying roll 44 is so close to the table or guide *t* that the customary bearing support has been omitted at that end of the roll because of the lack of space. Consequently, the roll may readily be removed from the container by depressing it against the compression spring so as to clear

the plate 92 and then sliding the roll sidewise from the key 48.

During the application of the adhesive to the inside face of the end-wing, considerable lateral pressure is brought to bear upon the adhesive-applying roll by the pressure-applying roll 134 which, as will appear hereinafter, is urged toward the surface of the applying roll by relatively stiff compression springs and is adjustable with respect thereto to vary the pressure in accordance with the nature of the work. As shown herein, the bearing block 78 takes up the thrust produced by the pressure-applying roll, the bearing block 78 being fixed to supporting means, as will appear hereinafter, and having a concave bearing surface consisting of spaced lands 80, 82 arranged to engage the surface of the adhesive-applying roll at one side and the back thereof (Fig. 5). As thus supported, the adhesive-applying roll is held against the rearwardly directed pressure of the pressure-applying roll and the sidewise pressure produced in the direction of the movement of the work by its passage between the pressure-applying and adhesive-applying rolls.

The delivery of the adhesive to the surface of the adhesive-applying roll may conveniently be accomplished by providing a vertical passage 86 in the bearing block 78, the lower end of the passage terminating in the container and the upper end terminating at the top of the applying roll, and by pumping or lifting the adhesive from the container through the passage 86 to the top of the adhesive-applying roll where it is discharged onto the surface of the roll and allowed to descend to the bottom thereof by gravity. A cross passage 90 (Fig. 5) is provided at the top of the bearing block 78 extending from the upper end of the passage 86 along the back of the bearing block to a point in advance of the bearing surface 82 to deliver the adhesive to the advancing surface of the adhesive-applying roll 44. The plate 92 is fastened by screws to the top of the bearing block 78 and serves not only as an abutment to support the upper end of the adhesive-applying roll but also to close the upper end of the passage 86 and the cross passage 90.

The circulation of the adhesive from the container through the passages 86 and 90 is accomplished by the gear pump 61, comprising the gear 54 which rotates the adhesive-applying roll 44, and a co-operating meshing gear 62, which drives the gear 54. The two gears are submerged in the container and during their rotation they pick up adhesive from the container and displace it at their point of mesh in a direction laterally of their width. Advantage is taken of this by partially enclosing the gears, particularly adjacent to their meshing point, and terminating the lower end of the passage 86 directly above the point of mesh of the gears so that the displaced adhesive is forced upwardly through the passage. To this end, the gears are seated in connected recesses 55, 63 formed in the upper surface of a horizontal plate 58, the recesses being of a diameter closely to embrace the peripheries of the gears and of such depth that the upper surfaces of the gears are flush with the surface of the plate. It is to be observed that openings 59 and 65 are provided in the plate 58 to permit free access of the adhesive in the container to the recesses 55 and 63, these openings being formed at points remote from the point of mesh of the gears. To facilitate circulation, the lower end of the passage 86 is enlarged at 88 (Fig. 5) so that it overlies a substantial portion of the gears near their point of mesh.

The gears 54 and 62, which constitute the pump for circulating the adhesive and also the drive for the adhesive-applying roll 44, are supported for rotation on upright studs 56 and 64 fastened to the bottoms of the recesses 55 and 63 in the plate 58. These gears are driven by a gear 66 which meshes with the gear 62 and occupies the opening 65. This latter gear is pinned to the end of a vertical shaft 68 (Fig. 4) to the opposite end of which is fastened a pulley 72, the latter being driven from an outside source of power by a belt 74.

The plate 58 which houses the gears and supports the lower end of the applying roll 44 is bolted to a vertically disposed, forwardly extending D-shaped frame 70 which, in turn, is bolted to the web 16. The D-shaped frame also provides the support for the bearing block 78 which is attached to its forward portion by screws 79 (Fig. 4) and is provided in its horizontal arms with bearings for rotatively supporting the vertical shaft 68.

To spread the adhesive after it has been supplied to the upper end of the roll, there is provided a doctor block 94 which, as shown in Figs. 3 and 5, is held against the side of the adhesive-applying roll 44 substantially opposite to the bearing surface 80 of the bearing block 78. It is to be observed that the doctor portion 96 of the doctor block is an arcuate surface which engages the surface of the adhesive-applying roll and serves not only as a means for governing the thickness of the adhesive on the roll but also as an additional bearing support for the adhesive-applying roll. The doctor block 94 engages the adhesive-applying roll only at the doctor surface 96 and has a rearwardly extending notched web 100 which is hooked over the vertical rear corner 102 of the bearing block 78 and may be tilted about this corner as a fulcrum to and from the surface of the applying roll. Thus, the combined bearing block 78 and doctor block 94 substantially enclose the adhesive-applying roll except for a small portion at the front (Figs. 3 and 6) which is sufficient for applying adhesive to the inner surface of the end-wing. As indicated, there is a clearance 98 between the adhesive-applying roll and the doctor block back of the doctor surface 96 which permits the adhesive supplied to the top of the adhesive-applying roll from the end of the cross passage 90 to run freely down the surface of the roll. It is to be observed here that a helical thread 45 (Fig. 6) is cut on the surface of the adhesive-applying roll in such a direction that it tends to retard the flow of the adhesive downwardly over the surface of the roll. A pair of spring fingers 104 (Figs. 3 and 5) are fastened to the web 100 of the doctor block 94, the free ends of the spring fingers being held against abutments 106 formed on the D-shaped frame 70 by plates 108 overlying the fingers, the plates 108 being secured to the abutments 106 by screws 110. This construction affords means for yieldably holding the doctor block 94 away from the surface of the adhesive-applying roll, the spring fingers being flexed so that they tend to spring outwardly. In order to force the doctor block 94 toward the adhesive-applying roll and to adjust its position with respect thereto, a pair of screws 112 having knurled heads 114 are threaded through bosses 116 formed at the ends of angle pieces 118 in such a

position that the ends of the screws bear against the doctor block 94 in a direction substantially along a diameter of the adhesive-applying roll 44. The angle pieces 118 are fastened to the abutments 106 by the screws 110. It is evident that by rotation of the screws 112 the doctor block may be moved about its fulcrum 102 against the opposition of the spring fingers 104. The doctor block 94 is also adjustable about a fulcrum 119 (Fig. 6) which comprises a high point formed on the edge of the bearing block 78 midway between the ends so that the doctor block 94 may be tipped in a vertical plane to and from the adhesive-applying roll. This permits alinement of the longitudinal surfaces of the roll and the doctor surface 96.

While the doctor surface 96 provides for a uniform distribution of the adhesive over the surface of the adhesive-applying roll, not all the adhesive is picked up by the work as it is moved in contact therewith and some of this remaining adhesive tends to pile up as the surface of the roll moves toward the bearing surface 80 of the bearing block 78. Accordingly, a clearance is provided at the ingoing side of the bearing block which permits the adhesive to pass inwardly to a return recess 120 formed in the bearing block 78 close to the bearing surface 80 (Fig. 5). The surplus adhesive that piles up as the surface of the roll advances toward the edge of the bearing surface 80 will fill the recess 120 and descend therein by gravity to the bottom of the roll and into the adhesive container. The recess 120 not only carries away the excess adhesive but tends to make the film of adhesive on the surface of the roll more uniform, since there is no backing up of the adhesive. Moreover, the recess encloses the adhesive while it runs back to the container so that there is little danger of the work coming into contact with it. The amount of adhesive delivered to the surface of the applying roll may also be controlled and regulated by a by-pass 122 provided in the passage 86 adjacent to the bottom thereof. As disclosed in Fig. 6, this by-pass 122 is formed in the bearing block 78 just above the level of the adhesive in the container and may be closed or opened by a slide plate 124 which is secured to the side of the bearing block by a screw-and-slot connection 126. A horizontal tab 128 provides means for lifting or depressing the slide plate 124 to open or close the by-pass 122. It is to be observed that the lower portion of the slide plate 124 is curved outwardly and downwardly so that the gush of adhesive from the by-pass 122 will not spatter and will be directed into the adhesive container.

The doctor block 94, which carries the doctor surface 96, as heretofore described, is not fastened against vertical movement, and to prevent such movement, it is held against the cover plate 92, a portion of which projects over the end of the doctor block, by a spring finger 130 fastened to the bottom end of the doctor block. As seen in Fig. 4, the end of the spring finger rests against a portion of the D-shaped frame and forces the doctor block upwardly.

The pressure-applying roll 134 for holding the end-wing *b* against the exposed surface of the adhesive-applying roll is supported by a vertical post 132, the latter being fixed at its lower end to the horizontal plate 58 (Fig. 4). The upper portion of the post is reduced in cross section and has telescopically mounted thereon a sleeve 142. At the upper and lower ends of the sleeve parallel slots 141 (Fig. 5) are cut in the surface thereof at opposite sides for the reception of the arms of a pair of U-shaped clamps 140 which straddle the sleeve. Between the ends of the arms a yoke 138 is fastened. The yoke, in turn, supports the ends of a spindle 136 upon which is mounted for free rotation the roll 134. The sleeve 142 is retained heightwise with respect to the adhesive-applying roll by a screw 144 having a knurled head 145. A pair of compression springs 146 are interposed between the sleeve 142 and the yoke 138 between the arms of the U-shaped clamps 140, the springs being seated in recesses 148 formed in the wall of the sleeve 142. By this means the yoke 138, and consequently the pressure-applying roll 134, is yieldably urged toward the adhesive-applying roll. A pair of screws 150 having knurled heads 152 are threaded through the rear portion of the U-shaped clamps 140 so that their ends bear against the sleeve 142, thereby providing means for adjusting the position of the clamps relative to the sleeve 142. It is evident that by this construction the pressure-applying roll 134 may be adjusted to and from the surface of the adhesive-applying roll and that in its adjusted position it is yieldable with respect to the adhesive-applying roll so that in case of an unusual thickness of material or the presence of some foreign matter the respective rolls will not be damaged. The provision of the sleeve 142 and the clamp screw 145 permits the vertical position of the pressure-applying roll to be varied and also permits the pressure-applying roll readily to be swung about the post 132 so that access may be had to the surface of each of the rolls if it is necessary to examine them or to clean them.

Heretofore, it has been customary to incorporate a heating element in the adhesive-container or the adhesive-applying roll so that the adhesive could be maintained in a fluid condition during its application to the work. As illustrated herein, the heating is accomplished by forming a circuitous passage 154 through the D-shaped frame 76, as shown in Fig. 4, through which a heating element 156 passes and to the terminal ends of which are connected lead wires 158. The heating element in its passage through the D-shaped frame runs along close to the bearing block 78 and thereby heats the block. The block 78, in turn, heats the adhesive-applying roll. Since the lower portion of the D-shaped frame is submerged in the adhesive, the adhesive in the container 32 is also heated. To control the heat supplied to the adhesive-applying roll, a thermostat 160 (Fig. 6) is inserted in a bore 162 formed in the D-shaped frame, appropriate leads 164 being provided for connecting the thermostat to the switch (not shown) controlling the passage of current from the power lines to the lead wires 158.

In using the machine, comparatively few adjustments are necessary. The adhesive-applying roll and the adhesive container should first be brought to a constant temperature by supplying current to the heating means. Thereafter, the belt 74 may be shifted onto a driven pulley (not shown) to rotate the gears and the adhesive-applying roll, and when the flow of adhesive becomes steady, it may then be increased or decreased by adjustment of the by-pass valve plate 124. The thickness of the coating carried by the surface of the roll into contact with the end-wing may then be regulated by moving the doctor surface to or from the surface of the adhesive-applying roll, this being accomplished

by rotation of the screws 112. Rotation of both the screws 112 an equal amount will move the doctor surface 96 radially to and from the adhesive-applying roll while rotation of one or the other will control the parallelism of the surfaces of the doctor and the roll so that the film of adhesive will be uniform from top to bottom. The amount of adhesive received by the inner surface of the end-wing will also depend upon the pressure applied by the pressure-applying roll 44, and the position of this roll with respect to the adhesive-applying roll is readily adjustable by the screws 150. When the proper adjustments have been made, the operator picks up a box-blank *b*, folds the sides into parallelism, partially folds the corner-laps, places the folded corner-laps against the curved portion 11 of the table *t*, with the longitudinal axis of the box in a substantially vertical position, and advances the blank while held against the table toward the adhesive-applying mechanism, the end-wing extending vertically downward. During the passage of the end-wing between the adhesive-applying roll and the pressure-applying roll, adhesive is applied to the inner surface thereof, the thickness being determined by the previous adjustments. From the adhesive-applying mechanism the box is advanced to the folding and pressure-applying mechanism.

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

1. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, the upper end of said roll being unsupported, and a block having an arcuate surface engaging the surface of the roll and providing a support for the roll against laterally applied pressure, said block having a passage therein through which adhesive is delivered to the surface of the roll at its upper end.

2. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, the upper end of said roll being unsupported, a block adjacent to the roll, said block having an arcuate surface, and lands formed on said surface adapted to engage the surface of the roll and providing a support for the roll against laterally applied pressure, said block having a passage therein through which adhesive is delivered from the container to the surface of the roll at its upper end.

3. In a machine for applying adhesive to a box-blank, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a block having an arcuate surface engaging the surface of the roll and providing a support for the roll against laterally applied pressure, said block having a passage therein through which adhesive is delivered to the surface of the roll at its upper end, and means for continually elevating glue through said passage.

4. In a machine for applying adhesive to a box-blank, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a block having an arcuate surface engaging the surface of the roll and providing a support for the roll against laterally applied pressure, said block having a passage therein through which adhesive is delivered to the surface of the roll at its upper end, and means for continually elevating glue through said passage, said means simultaneously rotating the adhesive-applying roll.

5. In a machine for applying adhesive to a box-blank, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a gear pump in said container, one of the gears of said pump being arranged to rotate the adhesive-applying roll, a block having an arcuate surface engaging the surface of the roll and providing a support for the roll against laterally applied pressure, and a passage in the block through which adhesive is delivered to the surface of the adhesive-applying roll at its upper end, said gear pump being associated with said passage in a manner to lift adhesive through the passage to the top of the adhesive-applying roll.

6. In a machine for applying adhesive to a box-blank, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a gear pump in said container and including a pair of meshing gears, one of which is driven, means drivably connecting one of said gears to the applying roll, and a block having an arcuate surface engaging the surface of the roll and providing a support for the roll against laterally applied pressure, said block having a passage therein through which adhesive is delivered to the surface of the roll at its upper end, the lower end of the passage terminating adjacent to the delivery side of said pump whereby the adhesive displaced by the meshing gears is lifted through said passage.

7. In a machine for applying adhesive to a box-blank, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a block arranged to engage the surface of the roll, said block having a passage therein through which adhesive is delivered to the surface of the roll at its upper end, means fastened to the block and overlying the upper end of the roll, and yieldable means bearing against the lower end of the roll to hold the upper end of the roll in engagement with the last-named means to prevent endwise movement thereof.

8. In a machine for applying adhesive to a box-blank, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a block arranged to engage the surface of the roll and providing a support for the roll against laterally applied pressure, said block having a passage therein through which adhesive is delivered to the surface of the roll at its upper end, there being a by-pass in said passage, and an adjustable valve member operable to vary the flow of the adhesive through the by-pass.

9. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, and a block having an arcuate surface engaging the surface of the roll and providing a support for the roll against laterally applied pressure, said block having a passage therein through which adhesive is delivered to the surface of the roll at its upper end and a recess in its arcuate surface adjacent to the edge thereof toward which the surface of the roll advances, said recess running from top to bottom of the block.

10. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, and a block having an arcuate surface engaging the surface of the roll and providing a support for the roll against laterally applied pressure, said block having a passage therein through which adhesive is delivered to the surface of the roll at its upper end and a recess in its arcuate surface adjacent to the edge thereof toward which the surface of the roll advances, said arcuate surface being relieved from said edge inwardly to said recess and said recess running from top to bottom of the block.

11. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, and a block having an arcuate surface engaging the surface of the roll and providing a support for the roll against laterally applied pressure, said block having passages therein, one of said passages terminating at one end in the container and at its other end adjacent to the upper end of the roll, said other passage being connected at one end to the upper end of the first passage and terminating at its other end adjacent to a portion of the surface of the roll moving away from the block.

12. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a block partially surrounding the roll, said block having a surface engaging the roll at spaced points and providing a support for the roll against laterally applied pressure and having a passage therein through which adhesive is delivered to the surface of the roll at its upper end, and a doctor mounted adjacent to the roll between the point at which the adhesive is delivered to the surface of the roll and the edge of the block toward which the surface of the roll advances.

13. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a block partially surrounding the roll, said block having a surface engaging the roll and providing a support for the roll against laterally applied pressure, there being a passage in the block through which adhesive is delivered to the surface of the roll at its upper end, a second block movably mounted upon the first block, said second block having a surface arranged to bear against the surface of the roll at a point in advance of the point of delivery of adhesive to the surface of the roll in the direction of rotation of the roll, and means arranged to vary the proximity of the surface of the block to the surface of the roll.

14. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a block partially surrounding the roll, said block providing a support for the roll against laterally applied pressure, there being a passage in the block through which adhesive is delivered to the surface of the roll at its upper end, a second block movably mounted upon the first block, said second block having a surface arranged to bear against the surface of the roll at a point in advance of the point of delivery of adhesive to the surface of the roll in the direction of rotation of the roll, means for bodily moving the surface of the second block to and from the surface of the roll, and means for tilting the surface of the second block with respect to the surface of the roll about a horizontal axis midway between its ends.

15. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a block partially surrounding the roll, said block having a surface engaging the roll and providing a support for the roll against laterally applied pressure, there being a passage in the block through which adhesive is delivered to the surface of the roll at its upper end, a second block fulcrumed on an edge of the first block, yieldable means arranged to tilt the second block on its fulcrum away from the surface of the roll, and means for holding the second block in a predetermined position with respect to the surface of the roll.

16. In a machine for applying adhesive to box-blanks, a container for an adhesive, an adhesive-applying roll supported at its lower end in the container for rotation about a vertical axis, a block partially surrounding the roll, said block having a surface engaging the roll and providing a support for the roll against laterally applied pressure, there being a passage in the block through which adhesive is delivered to the surface of the roll at its upper end, a second block supported upon an edge of the first block, said edge having a high point thereon, and means for tilting the second block about the high point on the edge of the first block to bring the surfaces of the second block and the roll into parallelism.

17. In a machine for applying adhesive to box-blanks, a container for an adhesive, a vertical adhesive-applying roll one end of which dips into the container, a support submerged in the container, a recess in the support, a pair of meshing gears mounted for rotation in said recess, means drivably connecting one of said gears to the lower end of the roll, a block engaging the surface of the roll and providing a support for the roll against laterally applied pressure, there being openings in the recess exposing a portion of the teeth of each gear to the adhesive in the container, and means for rotating the gears whereby adhesive picked up by the exposed teeth is carried to their point of mesh and displaced laterally, there being a passage in the block the lower end of which terminates close to the point of mesh of the gears and the upper end of which terminates at the upper end of the roll, said laterally displaced adhesive being elevated through said passage by the rotation of the gears.

18. In a machine for applying adhesive to box-blanks, a container for adhesive, an adhesive applying roll rotatable in the container about a vertical axis, and a block having an arcuate surface engaging the surface of the roll and providing a support for said roll against laterally applied pressure, the block having a passage through which adhesive is delivered to the roll.

CUTLER D. KNOWLTON.

CERTIFICATE OF CORRECTION.

Patent No. 2,352,720. July 4, 1944.

CUTLER D. KNOWLTON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 18, for the word "herein" read --therein--; 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 22nd day of August, A. D. 1944.

Leslie Frazer

(Seal) Acting Commissioner of Patents.