

April 7, 1953

W. R. WATSON
BOXMAKING MACHINE

2,633,780

Filed March 22, 1951

3 Sheets-Sheet 1

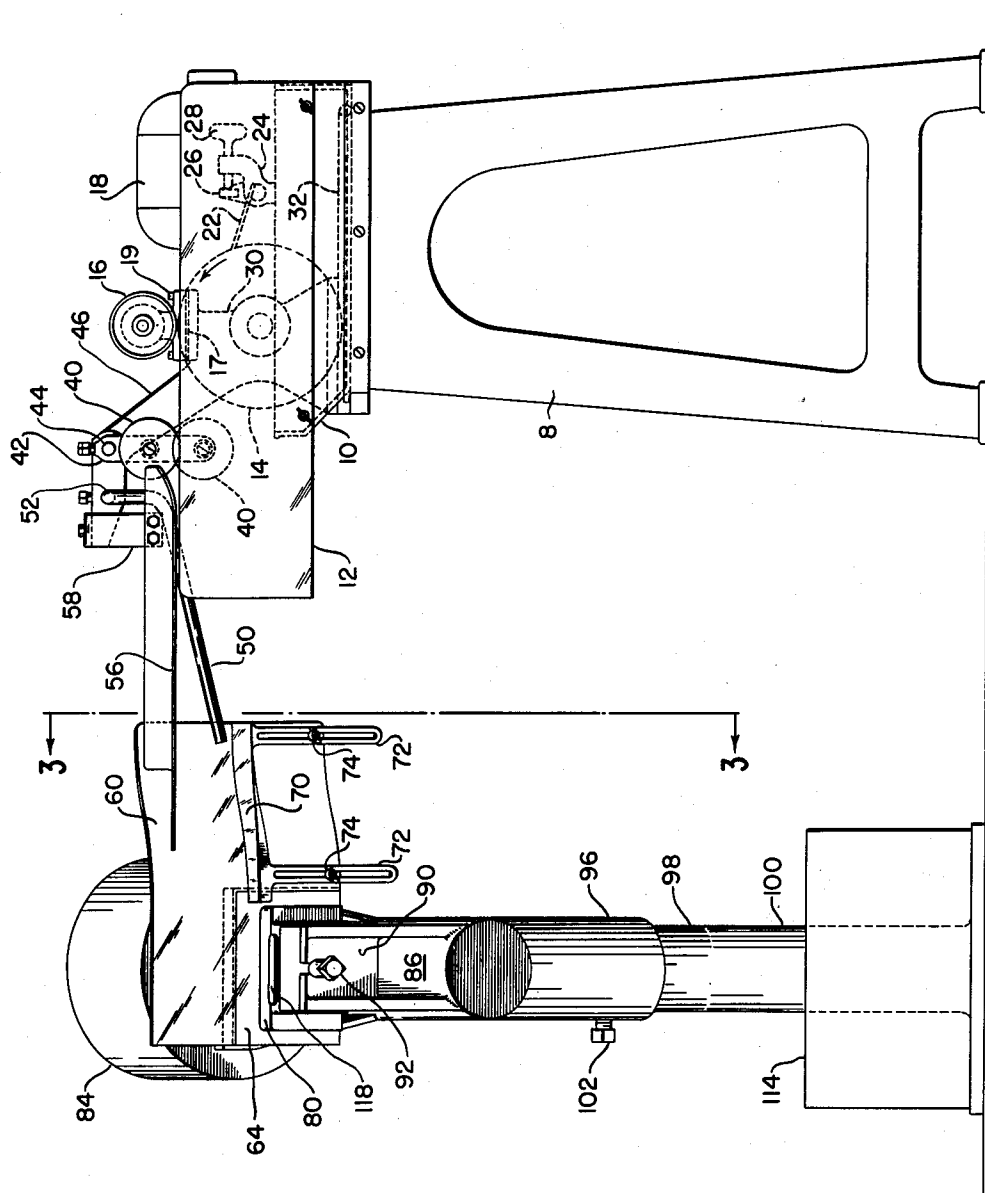


Fig. 1

INVENTOR.
WILLIAM RICHARD WATSON
BY Kenney, Jenney, Witter
& Hildebrath
ATTORNEYS

April 7, 1953

W. R. WATSON
BOXMAKING MACHINE

2,633,780

Filed March 22, 1951

3 Sheets-Sheet 2

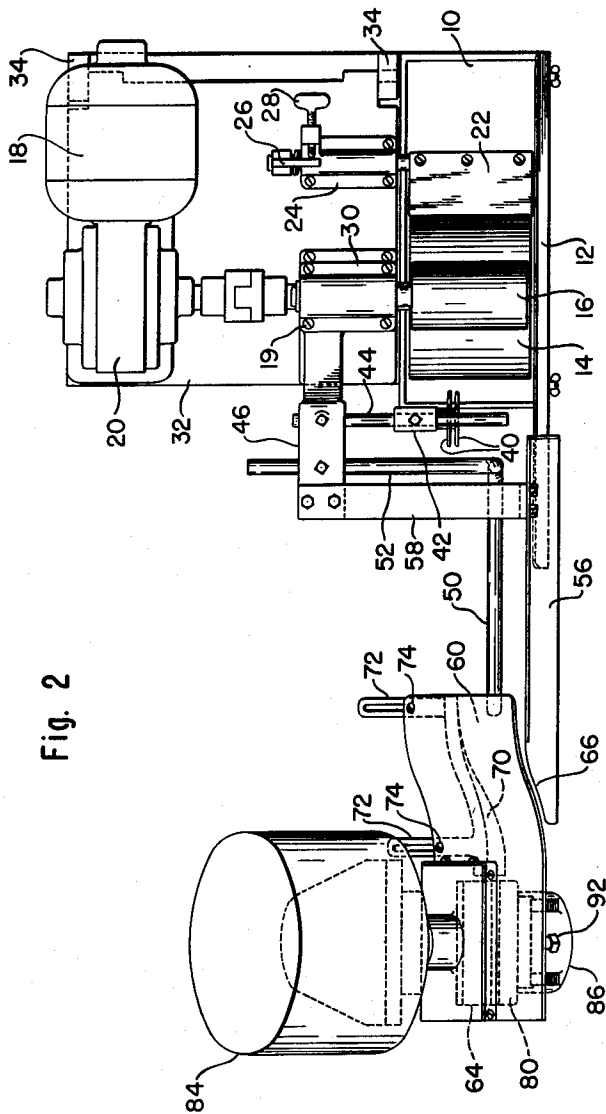


Fig. 2

INVENTOR.
WILLIAM RICHARD WATSON
BY *Kenway, Jernsey, Witter*
& Hildreth
ATTORNEYS

April 7, 1953

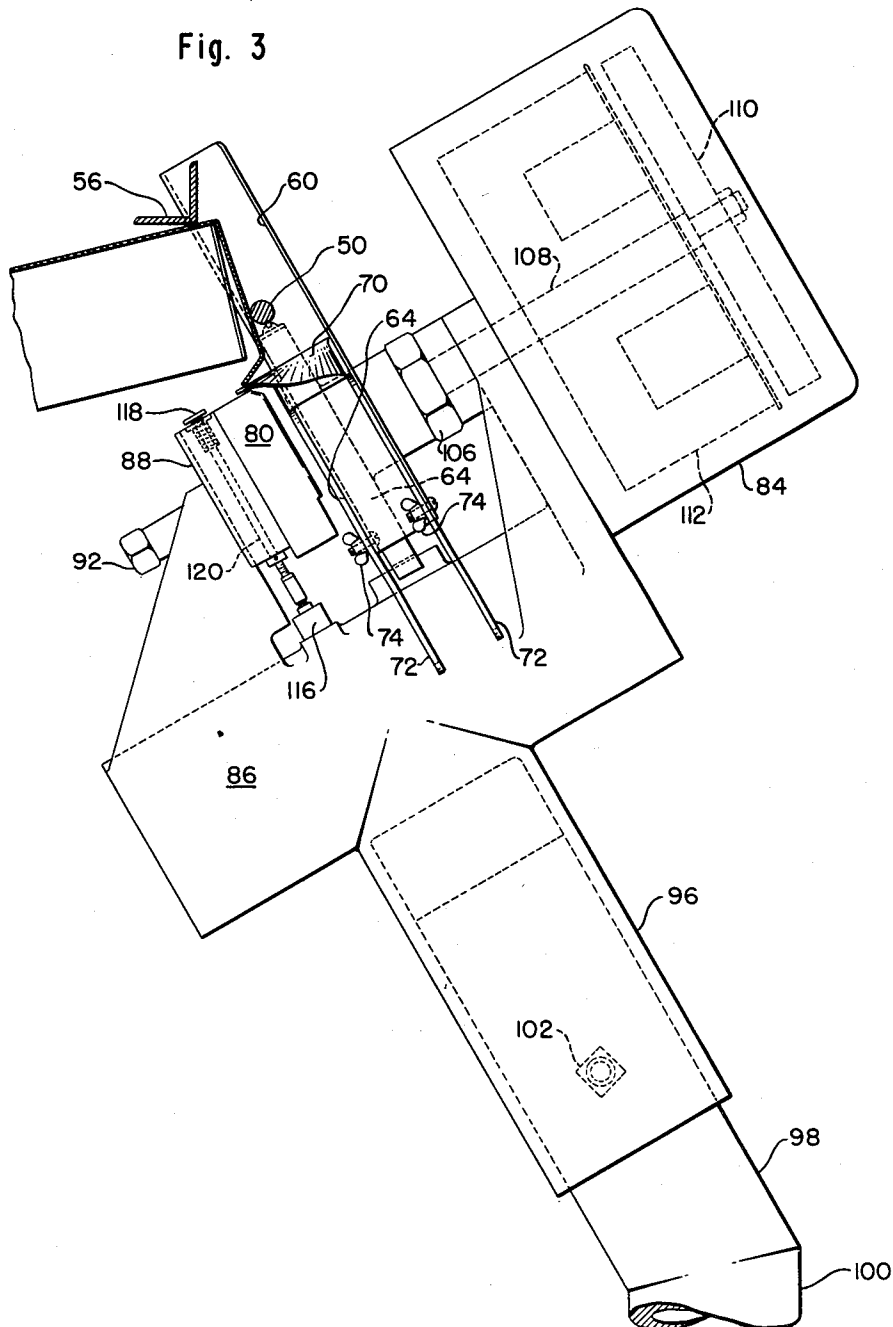
W. R. WATSON
BOXMAKING MACHINE

2,633,780

Filed March 22, 1951

3 Sheets-Sheet 3

Fig. 3



INVENTOR.
WILLIAM RICHARD WATSON
BY *Kennedy, Jenney, Witter*
& Hildreth
ATTORNEYS

UNITED STATES PATENT OFFICE

2,633,780

BOXMAKING MACHINE

William Richard Watson, East Walpole, Mass.,
 assignor to Bird & Son, Inc., East Walpole,
 Mass., a corporation of Massachusetts

Application March 22, 1951, Serial No. 216,867

9 Claims. (Cl. 93—49)

1

The present invention relates to box making machines and more particularly to machines of the type wherein an operator presents a flat blank to box making instrumentalities by which the boxes are glued, folded and pressed to form set-up boxes.

Machines of the general type in which an operator manipulates a box blank to present the end wings and corner laps to power-operated gluing and pressing mechanisms have been widely employed. In one embodiment of this type of machine, a vertical wall is employed as a guide, against which the operator presses the box end with the end wing and end wing extension overhanging the wall for the application of adhesive by the gluing mechanism. Following the gluing operation, the operator transfers the blank from the wall to a press which applies sealing pressure to the corner laps, end wing, and end wing extension to set the adhesive. The operations are then repeated on the other end of the blank to complete the box bottom or lid, as the case may be.

In carrying out the transfer of the box from the wall of the gluing section to the press, the operator of this type of machine has been required to swing the box from substantially a horizontal attitude to a position in which the box is vertical, in order that the end formations may pass between the horizontally disposed pressing surfaces. The turning or swinging of the box through approximately ninety degrees during the transfer is likewise relied upon to carry out the bending of the end wing extension, by contact with the front of the press, in order that the end wing extension may be carried around into the interior of the box when the end formation is urged into the space between the pressing members.

To improve the operation of machines of the general type indicated, and particularly to simplify the operation of transferring the blank from the gluing to the pressing mechanism, the present invention has as an object the provision of a box making machine in which the box need be tipped through only a small angle during the transfer, so that the position of the box during the gluing and the pressing operations may at each stage in the operation be such as will permit the most effective manipulation of the box by the operator.

More specifically, it is an object of the invention to provide a machine in which the gluing of the box end formation is carried out while the box is substantially horizontal, while the

2

pressing operation is performed with the box at an angle of about thirty degrees to the horizontal, a position which enables the operator to grasp the box at the most suitable angle for ready insertion and removal of the box relative to the press.

In accordance with these and other objects, one of the features of the invention involves a box making machine wherein the pressing surfaces of the press are disposed at an angle of about thirty degrees to the vertical and wherein the press is provided with box guiding means arranged to receive the glued and partially formed box and cause the end formation thereof readily to be guided into place between the pressing surfaces. Cooperating with said guiding means are other guiding members which extend toward the press from the glue section, so that the transfer may readily be made by gradually lowering the end of the box nearest the operator as the box is advanced, while the end being operated on, in the vicinity of the corner between the bottom and the end wing, remains in engagement with the guiding means during the advance and while the box is swung from its horizontal to its tilted position.

In the drawings, Fig. 1 is a view in front elevation of the box making machine; Fig. 2 is a top plan view thereof, and Fig. 3 is a view of the press section in right side elevation, taken on the line 3—3 of Fig. 1.

As in the prior machine, the machine of the present invention involves two main sections, a gluing section at the right-hand side and the press section at the left, with the box blank advanced from right to left in carrying out the box forming operation. The gluing section comprises a supporting pedestal 8 which carries the glue tank 10 having a substantially vertical guide surface or wall 12 secured to the front of the tank. A glue roll 14 and its cooperating idler roll 16 are mounted with their bite substantially even with the top edge of the guide wall 12. A rubber pad 17 beneath the journal block for the idler roll permits the clearance between idler and glue rolls to be adjusted by tightening or loosening the clamp bolts 19. The glue roll is driven at constant speed by a motor 18 through reduction gearing 20. A doctor blade 22 is arranged to control the amount of glue taken up by the glue roll, the blade being pivotally mounted in a support 24 with an arm 26 and adjusting screw 28 to control the clearance of the blade and consequently the thickness of the film of adhesive on the glue roll.

3

The bearing block 30 for the glue roll, the mounting 24 for the doctor blade, and the drive motor 18 with its reduction gearing are mounted on a supplementary base plate 32 hingedly connected to the top of the pedestal 8 at 34 in order that the entire assembly may be swung upwardly to lift the glue roll 14 out of the glue tank when the machine is stopped.

In carrying out the gluing operation, the operator grasps the box blank with the side walls of the blank folded down and with the corner laps tucked in and bearing against the outer face of the guide wall 12. The end wing and end wing extension project over the wall and are carried into the bite of the rolls so as to coat the underside of the end formation with a thin coating of adhesive, such operation being carried in the same manner as on prior machines of this general type.

Continuing advance of the box by the operator toward the left carries the end wing into the bite of over-lapping idler rolls 40 mounted on a bracket 42 adjustably secured to a supporting rod 44. A support 46 extending upwardly and to the left from the glue roll journal block 30 provides a mounting for the rod 44 as well as for the other instrumentalities to be described. These overlapping rolls 40 serve to bend the end wing extension downwardly relative to the end wing so as to weaken the material at the fold line in preparation for the subsequent bending of the end wing extension entirely around the end wing and corner laps into the box interior. Accordingly, the lateral position of the rolls 40 will be adjusted to cause the bottom roll to support the end wing close to the fold line formed in the blank between the end wing and end wing extension, while the upper roll engages the top of the end wing extension outwardly of the fold line in order to force the end wing extension downwardly.

As the blank continues to advance along the guide wall after leaving the rolls 40, the end wing is brought down toward the corner laps, in preparation for the transfer of the box to the press. This is accomplished by means of a diagonally disposed arm 50 having a transverse portion 52 adjustably secured in the bracket 46. In practice, this arm will be adjusted to lie a short distance to the rear of the guide wall 12, as shown in Fig. 2, so as to bring the end wing downward into proximity to the corner laps by the time the box end has advanced beyond the guide wall 12, thus retaining the corner laps in infolded position.

To aid in guiding the blank from the gluing section to the press section of the machine, a top guide rail 56 is provided. This rail may conveniently be in the form of an angle section for strength, and is supported by a forward extension 58 from the bracket 46, the rail being positioned just above and out of contact with the top edge of the guide wall 12 in order that the end wing may pass between the two parts.

During the transfer, after the box has moved to the left beyond the end of the guide wall 12, effective guiding is provided through the cooperation of the top rail 56 and the rearwardly disposed rod 50. As shown in Fig. 3, the top rail 56 engages the box bottom close to the corner formed by the bottom and the end wing, while the rod 50 supports the end wing against outward movement. By reason of this dual support, the box is capable of being rocked through an appreciable angle without losing proper contact with the guiding means, thus permitting the operator to carry out

4

the change of position of the box from its initial, substantially horizontal position to the tilted position for the pressing operation.

Upon completion of the traverse from the gluing section to the press section under the guidance of rail 56 and rod 50, the box comes into contact with a guiding surface 60 extending toward the glue section from the press. This guiding surface has an initial portion slightly off-set rearwardly with respect to the upper pressing surface of the press, in order that the rod 50 and the rail 56 may overlap the guide forwardly thereof. The guide plate 60 then curves forwardly into the plane of the upper press member 64 so as to lead the box end formation directly into the space between the pressing members. To aid the operator in guiding the box to the proper point, the rear margin 66 of the upper rail 56, where it overlaps the forwardly curving guide plate, may be cut away obliquely, so as to correspond in shape to the curvature of the guide surface 60.

In order that the end wing extension of the box blank may be brought into a position to insure that it will be carried into the interior of the box upon insertion of the box end between the pressing surfaces, a support 70 is positioned on the guide surface 60 so as to be engaged by the end wing extension when the box end reaches that point in the advance. As shown in Fig. 3, the member 70 is provided with a warped or twisted surface so as to turn or lift the end wing extension progressively as the box advances. The heightwise position of the member 70 may be adjusted through the provision of slotted mounting arms 72 and thumb screws 74 so as to bring the end wing extension on to the top surface of the former block 30 preparatory to insertion of the box end in the press.

The press section of the machine is preferably of the general type disclosed in my copending application Serial No. 99,810 filed June 17, 1949, wherein actuation of the movable pressing member 64 is effected by electromagnetic means mounted in the head 64. For a detailed description of the electromagnetic mechanism and its controls, reference may be had to said copending application. Alternatively, the actuating mechanism may be of any other type capable of being readily controlled and able to provide the very substantial pressure required for rapidly sealing the box end.

In the illustrative embodiment, the pressing members 64 and 80 are carried on a rigid bed such as tubular member 86, with the former block 30 and intermediate spacer 88 anchored to a slotted abutment 90 by stud 92. The bed member 86 is secured to the top of a sleeve 96 which telescopes over the forwardly inclined upper portion 98 of pedestal 100 to permit heightwise adjustment of the press. The parts are secured in adjusted position by set screw 102 or other suitably locking means. The upper portion 98 of the pedestal is disposed at an angle of approximately thirty degrees to the vertical, thus tilting the press toward the operator at an angle that permits the box to be held at the most convenient angle for carrying out the pressing operation.

To actuate the upper press member 64, with the guide surface 60 secured thereto, the member 64 is connected at 106 through plunger rod 108 to the armature 110 of the electromagnet 112. For a more detailed showing, reference may be had to my copending application above referred to. Upon the flow of direct current through the windings from a power supply 114 at the base of the

machine, the armature 110 is drawn toward the electromagnet 112 with great force, so as to apply very substantial sealing pressure to the box end between the pressing surfaces.

As in my prior application, control of energization of the magnet is by a switch, indicated at 116, which is actuated by the operator when the box is fully inserted in the press. This is accomplished by means of a platen 118 mounted at the top of a rod 120 sliding in spacer block 88 below the former block 80. The lower end of the rod engages the actuator of the switch, as shown in Fig. 3, the switch being of the type responsive to small movement so that slight downward movement of platen 118 causes the switch to close and thereby energize the electromagnet through suitable relay means associated with the power supply. Because of the disposition of the switch-actuating platen, the box must be fully inserted in the press before pressure on the box bottom by the operator will be transmitted through the box to the switch-actuating platen.

In carrying out the box forming operation on this machine, the operator performs the initial steps of folding down the side walls of a flat blank and presenting the end wing and end wing extension to the glue roll to receive the adhesive, using the wall 12 as a guide which likewise serves to retain the corner laps infolded. Continued advance of the box along the wall, with the box in conventional substantially horizontal position carries the end wing through the rolls 40 for bending the end wing extension along its fold line.

The blank, while still being carried along the wall by the operator, now has the end wing brought down toward the corner laps of the box, by operation of the oblique arm 50. With the end wing folded down, the wall 12 is no longer needed to retain the corner laps, and the transfer to the press section is effected while the box end is guided by the top guide rail 56, with the arm 50 as a back rest or guide. Because of this type of support, in effect along two lines adjacent the corner of the box between bottom and end wing, as shown in Fig. 3, the box position may readily be brought from its horizontal to its tilted position, corresponding to the angle of the box for insertion in the press.

Because of the overlapping relation of the rail 56 and arm 50 with the guide surface 60, the transition of the box to the press section is readily effected. At this point, the end wing extension comes into contact with the turning member 70, which likewise serves as a bottom guide to maintain the heightwise position of the box until the box end moves onto the top edge of the former block 80. At the same time, the forwardly curved guide surface 60 has brought the outer end of the box flush with the pressing surface of the upper press member 64, so that as soon as the box comes over the former block, a direct downward movement carries the box end into the gap. As the box moves into this opening, the end wing extension is bent around the corner laps into the interior of the box, ready for sealing. Upon full insertion of the box end in the press, the operator actuates the switch by pressure applied to the box bottom in the vicinity of the platen, where the thumbs normally rest, to energize the electromagnet and cause sealing pressure to be applied to the parts. By connections fully described in application Serial No. 99,810, the magnet remains energized for a predetermined brief interval and is then disconnected automatically to open the press and permit the work to be withdrawn.

The present invention makes it possible for the operator to carry out the several box making operations with the box substantially horizontal during the initial operations, and with the box tilted at the most suitable angle for the subsequent pressing operation. Through the provision of the cooperating guiding means, the transition of the box from horizontal to tilted position is readily effected, so that the operator can sweep the box through the machine and present the box to the press with a minimum of effort.

While the invention has been described in terms of a particular embodiment, and with one form of press actuating mechanism, it will be understood that the invention is not so limited and may be embodied in other forms and arrangements, and with other modes of actuating the press.

I claim as my invention:

1. A box making machine comprising gluing and pressing mechanisms to which the end formations of a box blank are presented as the box is advanced by the operator, guiding means associated with the gluing mechanism for guiding the box blank in substantially horizontal attitude past said gluing mechanism, and other guiding means associated with the press mechanism and in bridging relation to the first-mentioned guiding means for guiding the box blank to the press in a downwardly tilted position.

2. A box making machine comprising gluing and pressing mechanisms to which the end formations of a box blank are presented as the box is advanced by the operator, a substantially vertical guide wall for directing the box blank past the gluing mechanism with the end wing overhanging the wall, a guide plate associated with the pressing mechanism and having a portion coincident with a pressing surface of the said pressing mechanism, said guiding plate being positioned in tilted cooperating relation to the guide wall to receive the advancing box therefrom and guide the box end into the pressing mechanism in downwardly tilted position.

3. A box making machine comprising gluing mechanism and a press having pressing members inclined to the vertical to which the box blank is successively presented by the operator, a guide wall for directing the box past the gluing mechanism with the end wing overhanging the wall in substantially horizontal position, a guide plate associated with the pressing members and having a surface substantially coincident with the pressing surface of the rearwardly disposed press member, said plate and pressing members being tilted forwardly at an angle approximating thirty degrees to the vertical to receive the box in downwardly tilted position and means bridging the wall and plate for guiding the box from one to the other.

4. A box making machine comprising gluing and folding means and a press having pressing members to which the end formations of a box blank are successively presented as the box is advanced by an operator, a guide wall for directing the box blank past the gluing means with the end wing overhanging the wall, fold-down means rearwardly of said wall for folding down the end wing of the box, a top guide supported above the wall to permit the end wing to pass between said guide and the top of the wall, a guide plate disposed in tilted relation to the wall adjacent the wall end, said guide plate extending into coincident relation to one of the pressing members to guide the box end into the space therebetween, the top guide and fold-down

7

means being disposed in overlapping relation to the tilted guide surface to support and guide the box end during the transfer of the box from guide wall to guide surface.

5. A box making machine having gluing means, a guide wall for directing the box blank past the gluing means, a power-actuated press having pressing members between which the infolded end formation is received, the pressing members having pressing surfaces tilted at an angle of approximately thirty degrees to the vertical, a guide plate carried by the upper press member and having a portion coincident with the pressing surface of said member, said plate being disposed in tilted relation to the wall and having a portion adjacent said wall rearwardly offset with respect to said wall to receive the box from the wall as the box is advanced toward the press.

6. A box making machine having gluing means and a press having relatively movable press members to which the box is successively presented by the operator, a guide wall for directing the box past the gluing means, a guide plate carried by the movable member of the press and having a portion coincident with the pressing surface of said movable member for directing the infolded box end into the space between the pressing members, the guide plate being tilted forwardly with respect to the guide wall, means associated with the guide wall and extending into overlapping relation to the guide plate to guide the box in its transfer from wall to plate, the wall and plate having a passage therebetween to permit the end wing of the blank to pass out from behind the guide wall into contact with the tilted guide plate.

7. A box making machine having gluing means and a press having upper and lower pressing members, a guide wall for guiding the box blank past the gluing means with the end wing and end wing extension overhanging the wall, the pressing members being positioned to receive the box from the wall with the box in downwardly tilted position relative to its position while being glued, a guide plate having a surface substantially coincident with the pressing surface of the upper press member, said guide plate extending into proximity to the guide wall to receive the box end therefrom, and means on the guide plate to engage the end wing extension and direct the same onto the top edge of the lower press member.

8

8. A box making machine having gluing means and a press having relatively movable press members to which the box is successively presented by the operator, a guide wall for directing the box past the gluing means, a guide plate carried by the movable member of the press and having a portion coincident with the pressing surface of said movable member for directing the infolded box end into the space between the pressing members, the guide plate being tilted forwardly with respect to the guide wall, means associated with the guide wall and extending into overlapping relation to the guide plate to guide the box in its transfer from wall to plate, the wall and plate having a passage therebetween to permit the end wing of the blank to pass out from behind the guide wall into contact with the tilted guide plate, said means being adjustable relative to the plate to control the heightwise position of the box end in its advance to the press.

9. A box making machine comprising gluing means and a press having forwardly and rearwardly disposed press members to which the blank is successively presented by the operator, a guide wall for directing the blank past the gluing means, a top guide rail positioned above the wall and extending beyond the wall toward the press, a guide plate associated with the rearwardly disposed press member and having a surface substantially coincident with the pressing face thereof, the guide plate extending toward the guide wall in offset spaced relation thereto for receiving the advancing box from the wall, the top guide rail overlapping the guide plate forwardly thereof, and a support on the guide plate below the rail for engaging the end wing extension, whereby the box is guided to the press with the box end disposed between the top guide rail and the support for the end wing extension.

WILLIAM RICHARD WATSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,236,835	Pope	Apr. 1, 1941
2,499,461	Christiansen	Mar. 7, 1950