

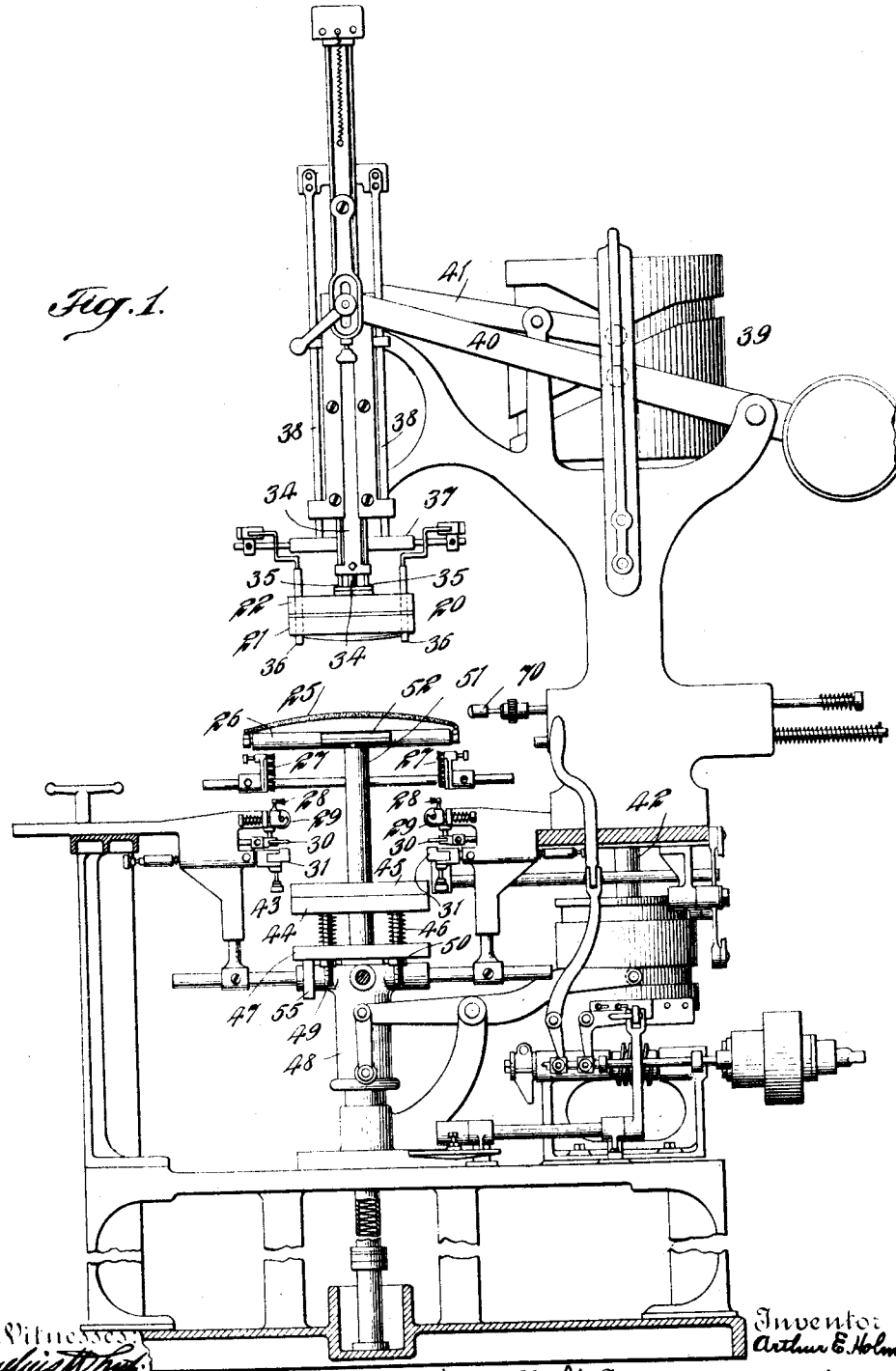
A. E. HOLMES.
BOX MAKING MACHINE.
APPLICATION FILED SEPT. 30, 1910.

Patented Dec. 31, 1912.

4 SHEETS-SHEET 1.

1,048,534.

Fig. 1.



Witnesses
Arthur Marion

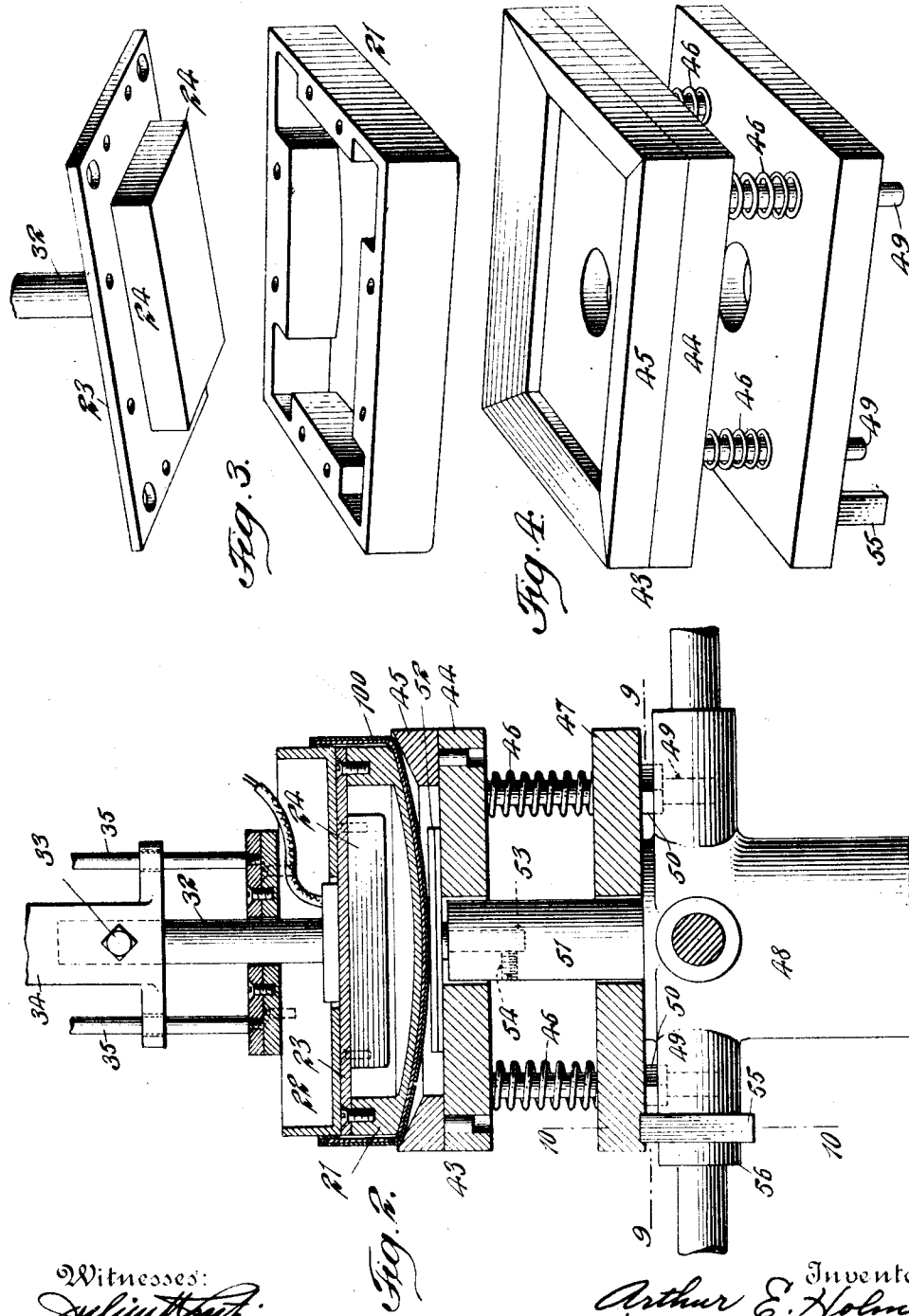
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 5.

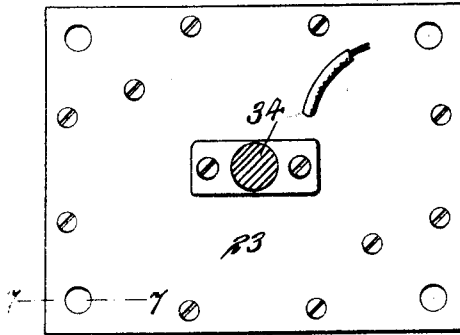


Fig. 6.

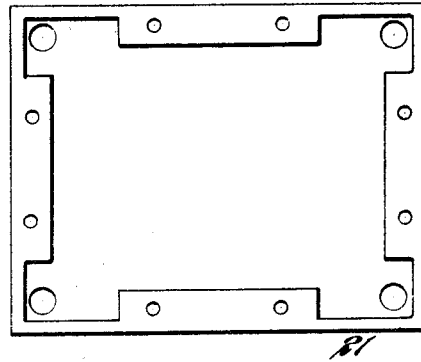


Fig. 7.

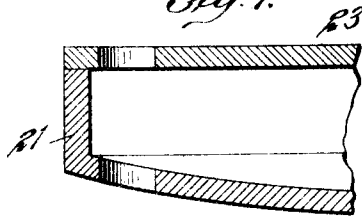


Fig. 8.

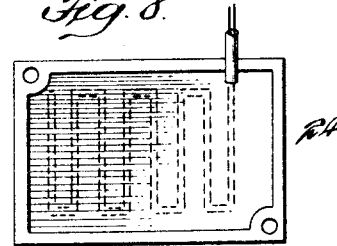


Fig. 9.

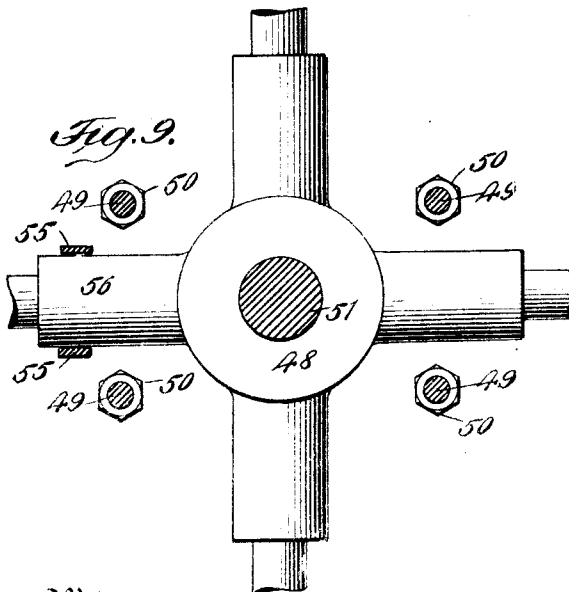
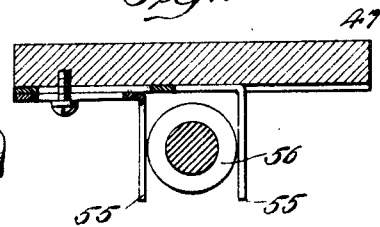


Fig. 10.



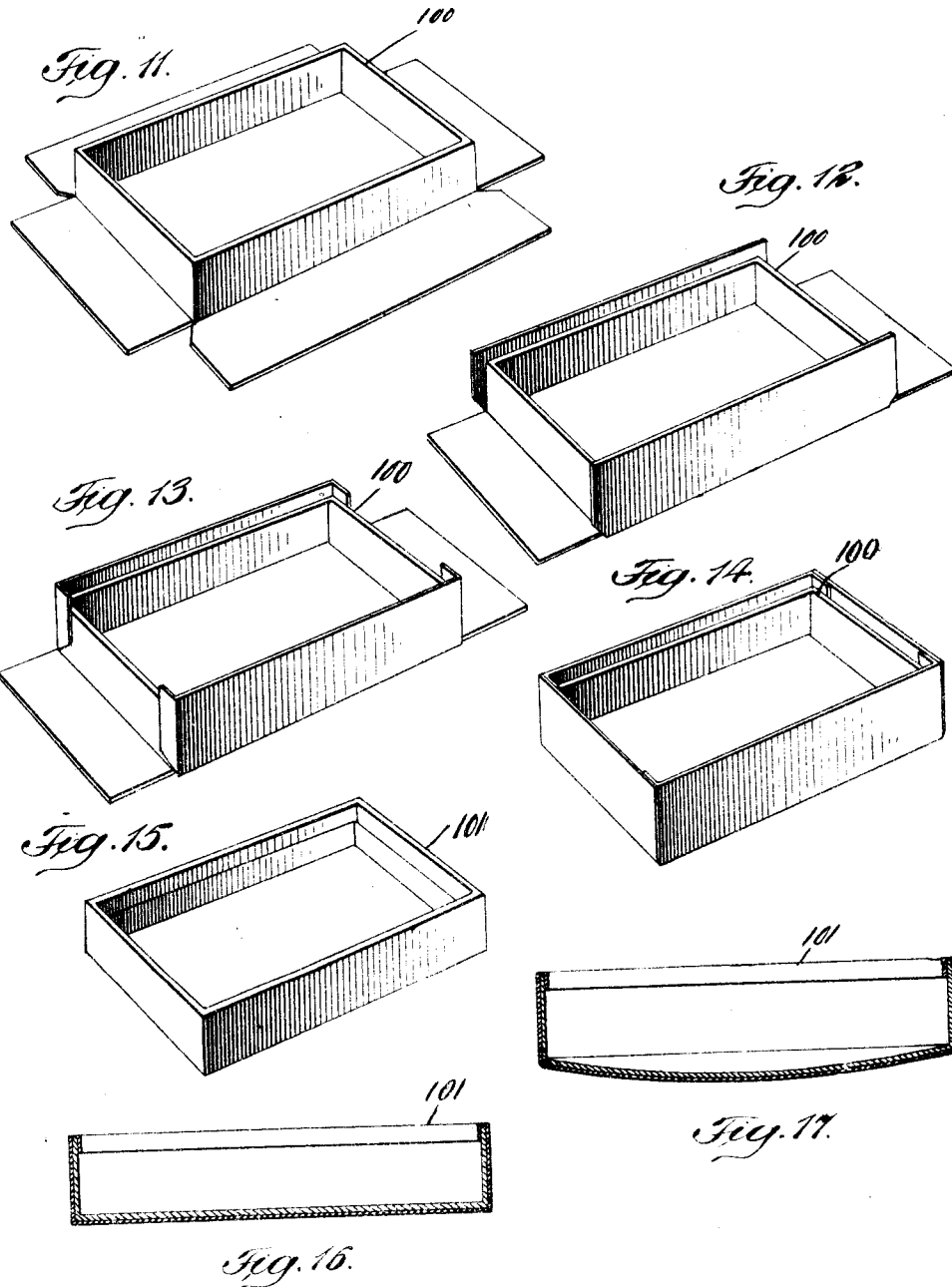
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

ARTHUR E. HOLMES, OF PITTSFIELD, MASSACHUSETTS.

BOX-MAKING MACHINE.

1,048,534.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed September 30, 1910. Serial No. 584,617.

To all whom it may concern:

Be it known that I, ARTHUR E. HOLMES, a citizen of the United States, and a resident of Pittsfield, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Box-Making Machines, of which the following is a specification.

The invention relates to improvements in box-making machines, having particular reference to machines for covering paper boxes of the character used for holding writing paper and envelopes, or other articles of merchandise, and said invention consists in the novel features and combinations of parts hereinafter described, and particularly pointed out in the claims.

Machines have heretofore been constructed for applying the tinted or ornamental or plain covering paper to paper-boxes, but one material objection to these machines, or their product, has been that in the drying of the adhesive substance securing the covering on the box, the top of the box has had an almost irresistible tendency to concave or warp inwardly, thus disfiguring the box and rendering it unfit for use. This objection to box-covering machines has been so well recognized, that separate machines or devices have been provided in an attempt to remedy the same and to dome the top of the box or convex the same outwardly.

The object of my invention is to provide a machine which will both apply the covering paper to the box and dome the top of the box at one operation, thus completing the manufacture on one machine and in one operation thereof and avoiding the concaving of the tops of the boxes or the employment of separate machines or devices for correcting the boxes or doming the tops thereof.

In accordance with my invention, the box and its covering-blank are introduced to the machine, and the product discharged from the machine is a box properly covered and domed and requiring no further treatment either to make it presentable or capable of use.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Figure 1 is a front elevation, partly broken away and partly in section, of a machine constructed in accordance with and embodying the invention, the parts of the

machine being shown in their initial relation to each other ready to receive a box and its covering-blank; Fig. 2 is a vertical section on a larger scale of the form-plunger-blocks and platen, with the box shown as having the covering thereon and in process of being domed, said form-blocks being shown in their lower position against the platen with the top of the inverted box against the platen; Fig. 3 is a perspective view showing the two parts of the lower form-block separated from each other, Fig. 3 being presented to clearly illustrate the interior construction of said block, which is one of the features of my invention; Fig. 4 is a detached perspective view of the platen against which the top of the inverted box is pressed by the form-block shown in Fig. 3; Fig. 5 is a top view of the lower form-block; Fig. 6 is a top view of the lower section of the lower form-block; Fig. 7 is a sectional view through a portion of the lower form-block taken on the dotted line 7—7 of Fig. 5; Fig. 8 is a detached top view of an electric heater which in practice is secured to the lower surface of the upper section of the lower form-block, as shown in Fig. 3; Fig. 9 is a sectional view, partly broken away, through a lower part of the machine taken on the dotted line 9—9 of Fig. 2; Fig. 10 is a vertical section on the dotted line 10—10 of Fig. 2; Fig. 11 is a perspective view of the inverted box to be covered and domed, the box being shown as centered on the covering blank; Fig. 12 is a like view of the same, showing the sides of the blank as having been folded upwardly against the sides of the box and extending slightly beyond the horizontal and vertical edges of the same; Fig. 13 is a like view of the same, showing the vertical end-edges of the sides of the blanks as folded in against the ends of the box; Fig. 14 is a like view of the same, showing the ends of the blank as folded up against the ends of the box; Fig. 15 is a like view of the same, showing the edges of sides and ends of the covering-blank as folded over the edges of and within the inverted box; Fig. 16 is a vertical longitudinal section of the covered inverted box prior to the doming of the top of the same, and Fig. 17 is a like section of the same after the doming operation has been completed, Fig. 17 showing the finished box as completed in one operation of the machine of my invention.

The machine shown in the drawings of

this application, except for the features of my invention having to do with the doming of the top of the box, is substantially the machine shown and described in detail in several Letters Patent heretofore granted to Philip S. Smith, to-wit: No. 691,329 granted January 14, 1902, No. 744,122 granted November 17, 1903, and No. 778,805 granted December 27, 1904. The method and means employed by me for folding the side and end flaps of the covering blank against the sides and ends of the box and folding the outer edges of the said flaps inwardly upon the edges of and into the box are substantially the same as those disclosed in the aforesaid patents and therefore will require no special description herein. I have herein shown my invention as embodied in the machine of the aforesaid patents. In the use of the machine shown in said patents the covering blank is efficiently applied to the box but the box leaves the machine with a flat top, which on the drying of the adhesive substance by which the covering is attached to the box, very frequently concaves, thus destroying the appearance of the box and rendering it unfit for commercial uses in which a handsome box is essential. The covering blanks applied to the boxes are of artistic character and their effect is destroyed when on boxes having sunken or warped in tops. My invention while utilizing the covering mechanism of the aforesaid patents, comprises means for doming and drying the box, so that when it leaves the machine it is a finished box of permanently good appearance and requiring no further treatment.

My invention, therefore, resides more particularly in the combination with the cover-blank folding mechanisms, of a novel form-block and a novel platen for coöperation therewith, the box being inverted and placed on the form-block and with the cover-blank adhering thereto moved downwardly between the said folding mechanisms and against said platen, whereby the box becomes covered and domed, as will be more fully understood from a consideration of the special construction of the said novel form-block and platen. The form-block is designated by the numeral 20 and comprises a lower member or block 21 and an upper member or block 22, both of which are preferably hollow and the upper block preferably being a rectangular shell open at its top. The lower block 21 has a downwardly convexed lower surface and an upper covering section 23 to the lower side of which is secured an electric heater 24 which is confined within the chamber formed in said block 21. I utilize the lower convex surface of the block 21 for doming the box and the heater 24 for drying the adhesive substance by which the covering is secured to the box and to "set" the dome of the box. The box

and covering blank are centered one against the other and the box is applied on the form-block 20, as set forth in the aforesaid Letters-Patent, and thereupon the form-block, with the box and covering blank, are caused to descend against a presser-plate (52) and thence to the platen (43) and on its descent to pass between the means for closing the side and end flaps of the blank against the box, which means comprise two parallel brushes 25 and rollers 26 which fold the side flaps of the blank upwardly against and cause them to become affixed to the sides of the box, brushes 27 for engaging and folding in the ends of the side flaps of the covering-blank, and end brushes 28 and rollers 29 for folding upwardly the end flaps of the covering blank and causing them to adhere to the ends of the box, all as fully described in said Patent 778,805. After the side and end flaps of the cover-blank have been applied to the box, the box reaches a position at which the upper projecting portions of said flaps are forced inwardly by the edge-tuck-in-fingers 30, while at the same time yielding presser-blocks 31 engage and aid in sustaining the rigidity of the box, all as described in detail in said Patent 778,805 and in Patent 744,122. It should be stated that during the descent of the form-blocks 21, 22, they move together until the lower surface of the upper block is near to the tuck-in-fingers 30, at which time the upper block 22 becomes arrested and the block 21 continues to descend, whereby said blocks become sufficiently separated to enable said tuck-in-fingers to perform their work, as illustrated by dotted lines in Fig. 1 of said Patent 744,122. After the tuck-in-fingers have folded or tucked in the projecting edges of the blank horizontally over the edges of the box, the upper block 22 is released to drop and rest on said tuck-in-fingers, whereupon the latter are retracted and the block 22 moves down onto the block 21 and within the box, numbered 100 in Fig. 2, and folds down the previously tucked-in edges of the blank against the interior of the sides and ends of the box, thus completing the covering of the box.

I do not deem it necessary to describe in detail the construction and operation of the several devices for applying the side and end flaps of the cover-blank to the box, since these features and their operative connections are in themselves well-known to the art and described at considerable length in the patents to which I have referred.

The two parts of my form-block 20 are connected up and operated by substantially the same means fully described in the aforesaid patents for imparting a reciprocating movement to the two-part form block set forth therein, such movement being relative to the covering devices. The lower

part 21 of my form-block is connected by a rod 32 and set-screw 33 to the plunger 34, and the upper part 22 of said block is secured on the lower ends of the vertical parallel rods 35. The center of the upper part 22 is open and free of the rod 32. The rods 35 are movable vertically in and independently of the plunger 34. The rods 36 are the customary stripper rods connected to a yoke 37 secured to the lower ends of the usual vertically movable rods 38. The rod 32, plunger 34, rods 35, rods 36, yoke 37 and rods 38 are shown and described in said Patent 744,122 and, as explained in said patent, receive their movements from a cam 39 and pivoted levers 40, 41, said cam being on a vertical shaft 42.

The novel features of the form-block 21 reside in said block being hollow and containing an electric heater 24 and in the lower end or surface of the block being convexed downwardly, so as to effect the proper doming of the box.

The platen with which the form-block 21 coöperates is numbered 43 and shown more clearly in Figs. 2 and 4. The platen 43 comprises a plate 44 upon which is mounted a rectangular frame 45 having downwardly and inwardly beveled upper surfaces and which plate 44 is mounted on springs 46 which have a bearing at their lower ends on a plate 47, which has its bearing on the standard-sleeve 48. Bolts 49 are secured to and extend downwardly from the plate 44 and pass loosely through the plate 47, at the lower side of which the bolts are provided with nuts 50. The springs 46 are on the bolts 49 and confined between the plates 44, 47 and they yieldingly support the plate 44 and resist the downward pressure of the form-block 21 against the platen structure. The lower downwardly yielding plunger 51 extends upwardly through the sleeve 48, plate 47 and plate 44 and has on its upper end a presser plate 52 thereto fastened by a stud 53 and screw 54. After the completion of the box the lower plunger 51 moves upwardly a proper distance with the upper plunger 34 or until the box 100 has passed substantially beyond the cover-blank applying devices, and then the upper plunger 34 continues its upward movement to the initial or box-receiving and ejecting position, the form-block 21 finally leaving the finished box and the latter, remaining on the platen, from which it is removed automatically, or otherwise. The plate 47 is centered with the plate 44 by means of the bolts 49, and the plate 47 is definitely positioned on the sleeve 48 by means of the downwardly extending fingers or bars 55 which are adjustably secured to said plate 47 and straddle the branch 56 of the said sleeve 48.

One of the desirable features of the platen

43 is the frame 45, which, as shown in Fig. 2, by being beveled downwardly and inwardly, is engaged by the box 100 only at the extreme outer edges of the latter, whereby the form-block 21 is enabled to successfully dome the box and the cover thereon is prevented from becoming disfigured by the platen. The upper part of the platen 43 is hollow or open to receive the lower plunger or presser-plate 52 and the lower convex portion of the lower form-block 21.

The operation of the machine embodying my invention will be understood by those familiar with the art without extended additional description. A box 100 to be covered is centered as usual upon the cover-blank 101 upon which the adhesive substance has been applied, and the box is then inserted upon the form-block 20. The plunger 34 and form-block then descend, the center of the box meeting the then elevated plunger-plate or auxiliary presser 52, whereupon the form-block, plunger 34 and lower plunger-rod 51 all descend together to carry the box and its cover-blank between the devices which effect the application of the side and end flaps of the blank to the box, as hereinbefore explained. Upon the form-block nearly reaching the platen 43, the outer portions of the then flat end of the box will engage the platen-frame 45 and become arrested thereby and thereon, and the form-block continuing its downward movement carries its lower convex portion into the open center of said frame and below the edges of the frame engaged by the outer portions of the box, with the result, as shown in Fig. 2, that the top of the inverted box is forced downwardly within the platen 43 and compelled to take the shape of the convex end of the form-block, which is the purpose I desire to accomplish. The box is pressed between the form-block and platen, with the line of contact pressure being along the outer edges of the box and the lower end of the form-block, due to its convexity, forcing the end of the box to dome or convex outwardly. In order to perfect the doming operation and to dry the adhesive substance used to secure the covering-blank and to "set" the convex outline imparted to the box by the form-block, so that the same may be uniform and permanent, I make use of the electric heater 24 to heat the form-block and enable it to heat the box thereon. After the box has been completed the lower plunger 51, auxiliary presser 52 and form-block all ascend together to their initial positions shown in Fig. 1, upon arriving at which the box will have been stripped from the form-block and left to be ejected from the plate or presser 52 in a manner well understood in this art, as by an ejector rod 70.

My invention provides a machine of the

class described in which the covering and doming of a box may be accomplished at each operation of the machine, whereas heretofore so far as I have been able to ascertain, there has been no machine for attaining this result.

My invention is not necessarily limited to the use of a two-part form-block, since in this art a one-part form-block may be used when the covering-blank is not to be folded against the interior surfaces of the box.

What I claim as my invention and desire to secure by Letters-Patent, is:

1. In a box-covering and doming machine of the character described, the combination with a reciprocating plunger having a form-block on its end to receive a box to be covered by an adhesive blank partly attached thereto and extending laterally at its sides and ends therefrom, of covering devices between which said block and blank move for folding and pressing the projecting sides and ends of said blank against the sides and ends of the box, and a platen independent thereof against which the covered box is pressed and which platen is concaved to engage the box only at its outer edge portions for doming the same without disfiguring said cover, said form-block having a convex face for aiding in doming the box and heating means for drying the adhesive substance carried by the covering-blank.

2. In a box-covering and doming machine of the character described, the combination with a reciprocating plunger having a form block on its end to receive a box to be covered by an adhesive blank extending laterally at its sides and ends therefrom, of covering devices between which said block, box and blank move for folding and pressing the projecting sides and ends of said blank against the sides and ends of said box, a yielding presser-plate (52) separate from said covering devices in the path of said form-block for keeping the said blank centered against the box, and a platen below said covering devices and said presser-plate against which said covered box is pressed and which is open at its center to receive said presser-plate and concaved to engage the box only at its outer edge portions for doming the same without disfiguring said cover, said form-block having a convex face for aiding in doming the box and heating means for drying the adhesive substance carried by the covering-blank.

Signed at Pittsfield, in the county of Berkshire and State of Massachusetts, this 26th day of September A. D. 1910.

ARTHUR E. HOLMES.

Witnesses:

E. L. LIPSEY,
P. H. MUGLER.