No. 681,652. Patented Aug. 27, 1901.

C. W. GAY.

PAPER BOX MACHINE.

(Application filed Dec. 26, 1900.)

(No Model.) 3 Sheets—Sheet 1.

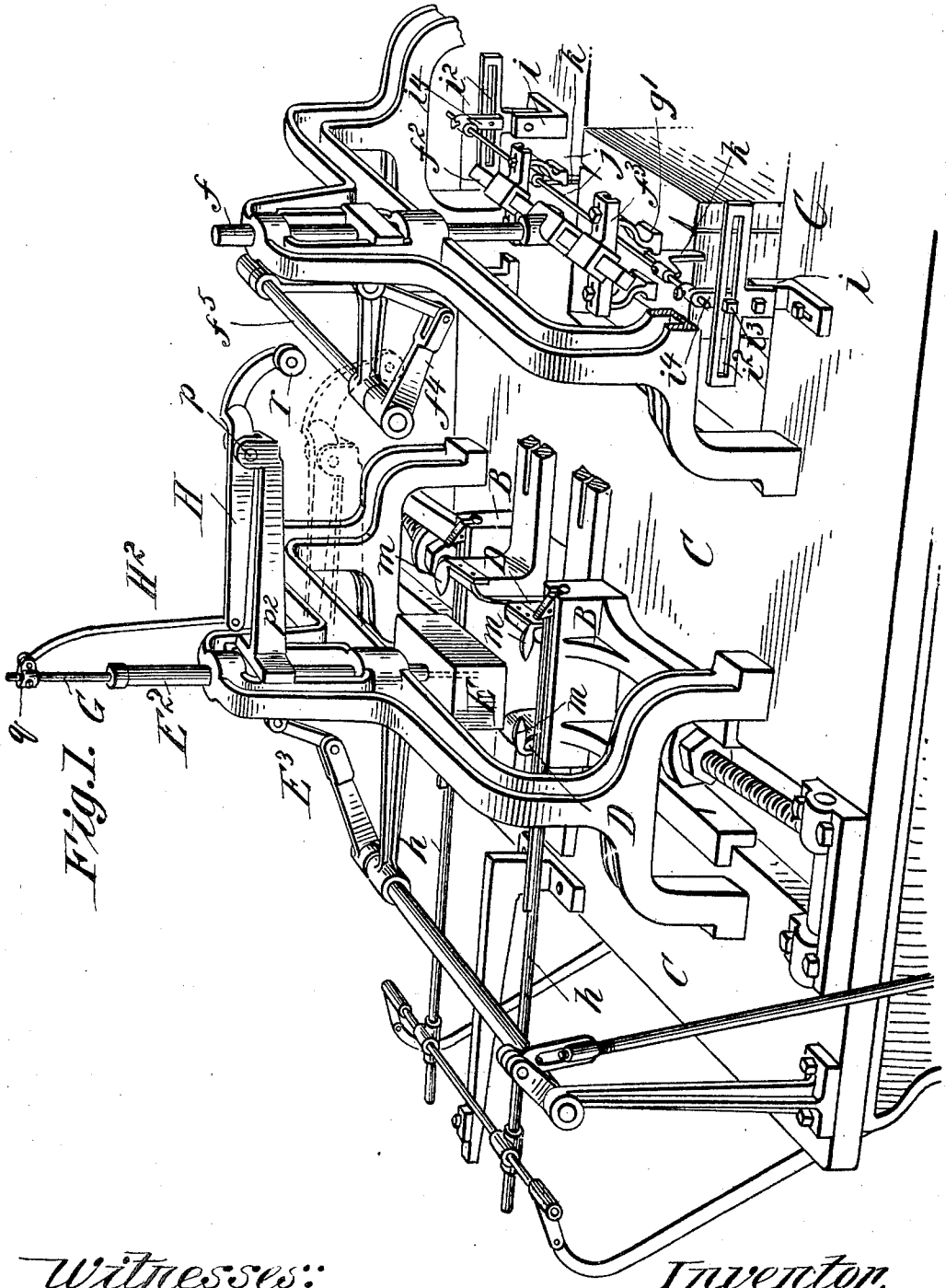


Fig. 1.

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Fig. 2.

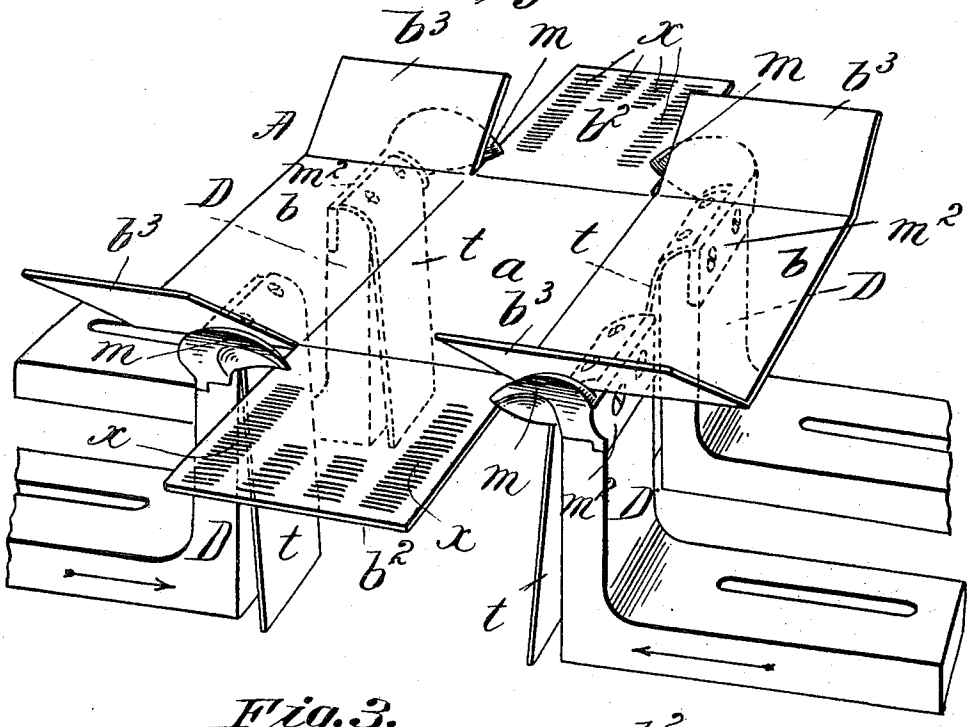
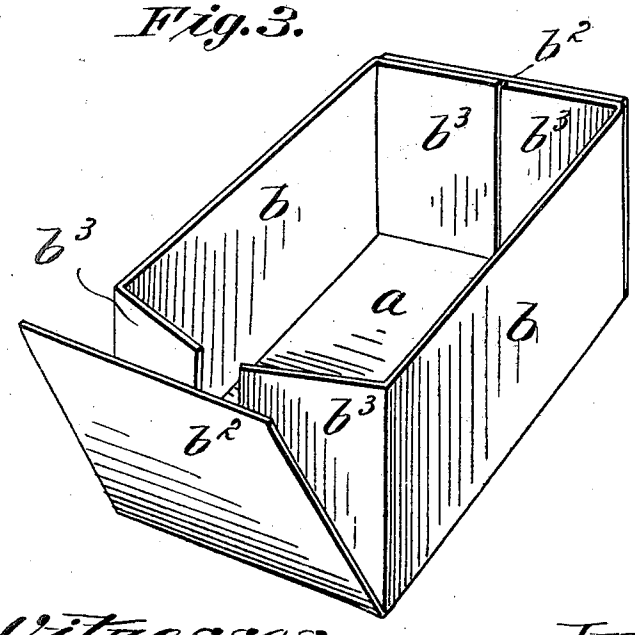


Fig. 3.



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Fig. 4.

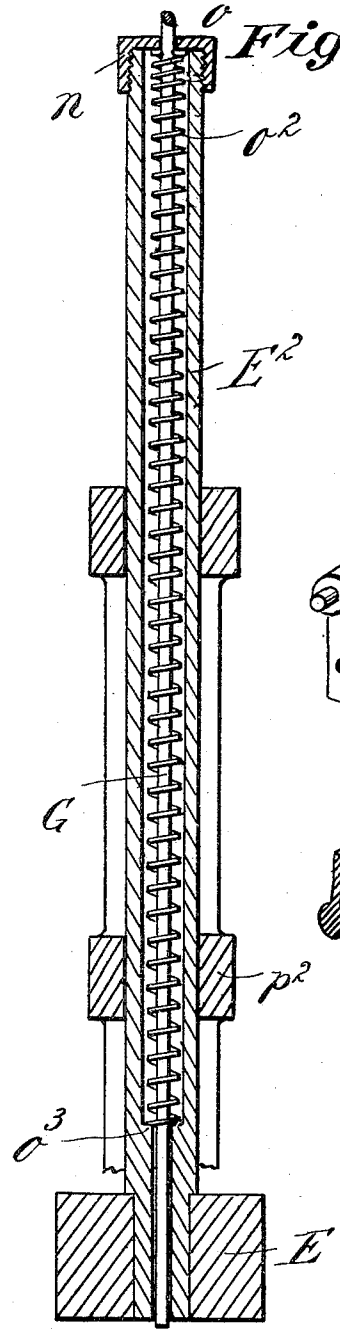


Fig. 5.

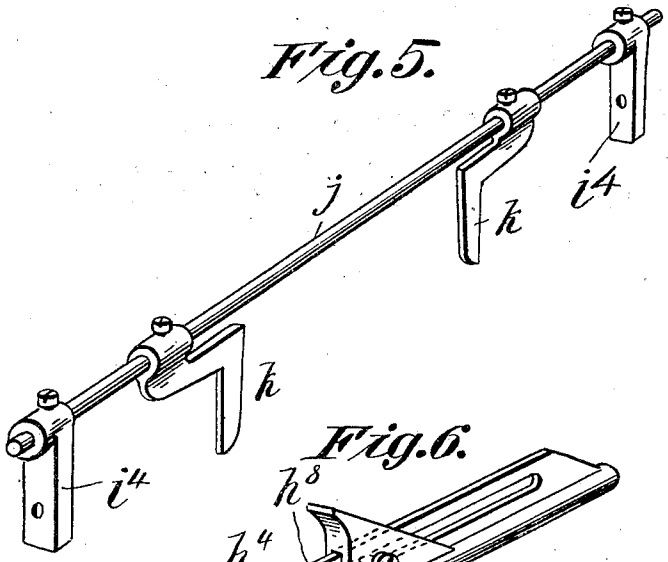


Fig. 6.

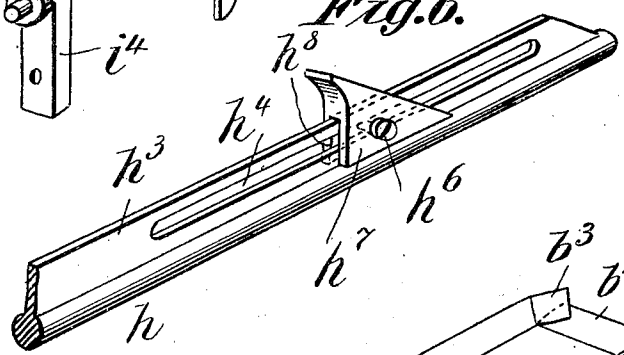
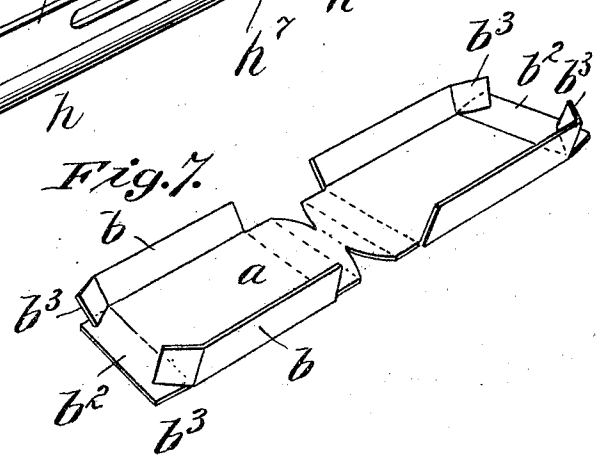


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHAUNCEY W. GAY, OF WEST SPRINGFIELD, MASSACHUSETTS.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 681,652, dated August 27, 1901.

Application filed December 26, 1900. Serial No. 41,115. (No model.)

To all whom it may concern:

Be it known that I, CHAUNCEY W. GAY, a citizen of the United States of America, and a resident of West Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Paper-Box Machines, of which the following is a full, clear, and exact description.

This invention relates to improvements in the box-making machine for which a patent in the United States was issued to me May 8, 1894, No. 519,531.

One object of this invention is to render the machine capable of making boxes of different forms of pasteboard blanks from those which are made into boxes by said patented machine and yet to leave the machine capable of the same uses as originally described for it.

Another object is to provide improved devices in combination with the gummer-picker for stripping the blanks lifted one at a time from the supply pile of blanks from the picker to which it adheres while being lifted, so that it will rest upon the conveyer, which has a forward and backward motion, to be carried thereby to a position over the folding-throat and under the former or plunger, and to provide with the stripper-gage guides for the blanks being lifted adjustable to correspond to blanks of whatever size they may be, said devices serving in the action of stripping the blank from the gummed picker to bear centrally across the blank and along the line between the gummed places thereon, so that the blank will not adhere to the stripper and so that the contact by the stripper on the blank will not tip the blank out of its horizontal position.

Another object is to provide improved adjustable abutments or hooks on the conveyer, so that by setting their positions along the length of the conveyer they will serve to always bring the blanks, whether wide or narrow, by a given traverse of the conveyer to the right position under the descending former.

Another object is to provide new devices adapted to be adjusted and to regulate the extent of operative motion, as desired, for stripping or shedding the completed boxes from the former, whether such boxes are comparatively shallow or deep.

To the attainment of these objects the invention consists in the new constructions and combinations or arrangements of parts and devices, which are hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the upper part of the box-machine of the same general character as that shown and described in my aforesaid patent of 1894, and showing the present new and improved devices applied thereon. Fig. 2 is a perspective view showing the effect on the blank of the novel devices for turning several sections, which form the sides and ends and stay-sections of the blank to form the box. Fig. 3 is a perspective view of the box, showing the way the different sections of the blank are disposed to make the completed article. Fig. 4 is a sectional view centrally through the former and its vertical shaft. Fig. 5 is a perspective view of the stripper and gage-guiding device for the blanks. Fig. 6 is a perspective view of the improved adjustable conveyer-abutment. Fig. 7 is a perspective view of a modified form of the box or cigarette-case for the making of which this improved machine is adapted.

The general organization of the machine, the upper portion of which is shown in Fig. 1, is the same as that of my original machine patented in the United States May 8, 1894, No. 519,531.

A represents the blanks understood as piled on an automatic elevator, the same as common in envelop and box machines, over which plays the gummer-picker comprising vertical reciprocating shaft f, horizontal angularly-arranged bars f^2 f^3, and the depending gummer members g'. (The gum-supplying roll is not shown.) The up-and-down motion to the picker-shaft f is imparted by the swinging lever f^4 on the usual rock-shaft f^5, to which the rocking motion is periodically imparted in the way common for such shafts in this kind of machines. The folding box or throat, the sides of which are movable, is constituted by the end followers B B and the vertical plates D D, front and rear pairs of which are movably mounted and operated to approach and recede. These parts have at proper times and when the former or plunger

E has descended considerably their closing movements; but they stand when the plunger is up at the boundaries of a rectangle somewhat larger than the box-bottom.

h h represent the horizontal conveyer-rods playing through guides in the followers B and having at their forward ends the abutment-hooks to engage the front edges of the blank lifted by the picker and under which the conveyer-rods are thrust, and the conveyer carries the blank to a position under the former E and over the folding-throat within parts B D.

The portions of the machine above pointed out are generally the same as those in the original machine, and the references made to them will show the connection which the improvements have to the already-old mechanism. The old machine, as well as the machine in its improved form, has the parts thereof adjustable and the plunger-former interchangeable, so that many different sizes of paper boxes may be made.

Fig. 2 shows the form of the blank for a deep box, (which the improved machine will make and which cannot be readily made on the original machine,) *a* representing the bottom section, *b b* the opposite side sections, b^2 b^2 the end sections, and b^3 the four stay-sections.

Fig. 3 shows how the parts of the blank are folded to make the box. In this box the stay-sections b^3 completely cover and are stuck to the end sections b^2, which by the pickers have the gum applied thereon in stripes, (shown at *x*.)

The improved stripper and gage guides seen in Figs. 1 and 5 consist of the upstanding brackets *i*, secured on the table C of the machine at opposite ends of the blank pile A, having the horizontal slots i^2, through which pass the confining-bolts i^3, confining the adjustable brackets i^4, supporting between them the rod *j*, which serves as the stripper, and which rod has the down-hanging gage-guides *k k* adjustable along the length of the stripper-rod *j*. The rod *j* has its position across the top of the blank-pile above the level of the top of the conveyers *h h* and centrally between front and rear pairs of the gummer-pickers g^4, all so that when the blank is lifted the conveyer moves under it, and thereafter the final and further lifting movement of the blank brings its central part in contact against the rod *j*, which detaches it from the gummers. The line of contact of the blank against the rod *j* is on an ungummed part of the blank. The stripper-rod adjusted to have its position across the middle of the blank serves to detach the lifted blank from the gummer without tilting the blank, and the gage-guides prevent a shifting of the blank when detached and brought to rest upon the conveyer *h*, so that when the blank is carried over the folding-throat and under the descending former E the middle section *a* of the blank, which makes the bottom of the box, will match squarely under the plunger. The position to which the blank is brought relatively to the folding-throat is illustrated in Fig. 2, the end followers B not being shown in this figure, and the blank arrives at this place perfectly flat, and said Fig. 2 represents the relations of the parts after the former E has forced the blank downwardly a slight distance and the upright plates D D have commenced their approaching movements in the direction of the arrows, Fig. 2, in the same manner as described for the original machine.

It is to be pointed out new and as an improvement that the plates D have at their outer ends the lips or ears *m*, which project above the upper ends of the upright plate D and higher than the top of the conveyer *h h* and also extend in horizontal directions beyond the inner faces of said plates D and have their inner surfaces sloped or inclined from their upper edges downwardly and inwardly, and said lips or ears *a* are almond-shaped or pointed. (See Fig. 2.)

When the blank is brought by the conveyer in a flat condition under the former E, it rides up over the curved tops of the said parts and the side flaps *b b* of the blank have positions over upper ends of parts D, inside of the ears *m*, the four stay-sections b^3 resting on the upper rounded edges of said ears, while the end sections b^2 b^3 have their positions above the end followers B and parts *h*. Now, the action by the former E of pressing downwardly against the blank causes the stay-sections b^3 to be inclined upwardly and angularly to the position seen in Fig. 2, and now the opposite pairs of plates D D, having imparted thereto their approaching movements toward the former while the latter is descending, bring the points of the approaching lips *m* beyond the inner edges of the stay-sections b^3 and across the outer edges of the end section b^2, so that they may serve as separators to prevent, in the folding-up action (as further continued and completed by the descending former within the plates D D and end followers B B, which later are given movements gradually toward and against the former) the gummed inner faces of the end sections b^2 from coming in contact with and sticking against the outer faces of the stay-sections b^3. It will be further explained that as the former moves to a position below the tops of the plates D the side sections *b b* are turned angularly toward the sides of the plunger, and with them the stay-sections b^3, which have already been bodily swung or tipped to have their positions with their edges approached or meeting and their surfaces against or near the ends of the former. The continued descent of the former, which carries the blank farther downwardly, causes the end sections b^2 to be tipped toward the ends of the former to overlap the stay-sections, because the descending blank brings the flaps or sections b^2 in rubbing contact against the top of the end

followers B, or against the upper edges of the conveyer-rods h, which play in ways through the upper edge of the follower and in some cases project therefrom. By the time the parts D D and B B have approached to their position against the former to give final shape and setting to the box being formed the former has so far descended as to carry what are now the upper edges of the sections b^2 b^3, and which correspond to the upper edge of the box, as shown in Fig. 3, below the tops of the parts D, whereby the entire box is below the lips m, and such lips do not at the time of the final squeezing of the end and stay sections together constitute any impediment to the said parts coming into intimate contact to be stuck together. If it were not for the provision of the said ears m having the positions upstanding and the rounded shapes and inclinations, as described, the natural spring of the cardboard would cause, when the sections b^3 are moving across the face of the gummed end sections, the premature contact of the stay-sections on the gummed sections and the adhesion of these parts to result in defeating the box-making operation. The said almond-shaped lips are carried by lugs m^2, which are detachably held in place at the upper ends of the plates D by screws, so that they may be taken off and other forms of appliances substituted therefor, whereby the same machine may be used for making boxes from blanks having different forms from those here shown.

The flat springs t t, Fig. 2, having curved tops secured to tops of plates D and downwardly inclined to narrow the folding-throat, are especially useful in the making of double trays or cigarette-cases from a single blank, Fig. 7. This blank is fed and folded the same as the one A; but as its sides b b are divided and its bottom is intermediately recessed it is not self-supporting like the blank A, and hence the springs t keep the bottom level and both end portions of the divided sides even and from collapsing, while the plunger forces it downward subject to the action of the folding parts.

The shaft E^2, carrying the former, has its vertical reciprocatory motion imparted thereto by connections E^2 in the usual way. The said shaft is formed tubular, (see Fig. 4,) and centrally through it and through the former E the shedder-rod G plays. This rod extends upwardly through the cap m at the top of the tubular shaft, and next below said cap the rod has a shoulder c, against which the upper end of the spring o^2 bears, the lower end of the spring resting against the shoulder o^3, formed within the tubular shaft. The spring is in compression and always exerts an upward reaction against the shedder-rod. The means for operating the shedder-rod are the lever H, intermediately pivotally hung at p in the bracket p^2, secured to and extending forward of the former-shaft E^2 and the link H^2, which has a connection with the rear end of the lever H and an adjustable connection at q with the upper extremity of rod G. The forward arm of the lever H has a roller r, which is directly over the swinging lever f^4, comprised in the operating motion for the picker-shaft. When the former descends, carrying bodily with it the bracket p^2 and the lever H as it reaches the limit of its downward movement and when the box is completed about the former, the roller r of the lever H assumes a position upon or near the lever f^4, comprised in the operating mechanism for the picker-shaft, and now such lever f^4, having its usual upward swing, swings lever H and thrusts down shedder-rod G, which pushes the box by pressure against the inner surface of the bottom downwardly off from the former. By changing the point of adjustable connection q the length of the thrust of the shedder-rod may be varied as desired for deeper or shallower boxes. It will be explained that if the adjustable box-making machine were set or prepared for making shallow boxes the shedder could not be given its maximum throw without being obstructed by the appliances within the folding-throat.

In Fig. 6 the adjustable hook or abutment for the conveyer-rods h is shown. The rod has the upstanding rib h^3, provided with longitudinal slot h^4, on which straddles the grooved base of the abutment h^5. The headed screw h^6 passes loosely through the part h^7 at one side of the groove, through the slot and with a screw-thread engagement in the part h^3 at the other side of the groove. By loosening the screw the abutment may have its position changed to adapt the conveyer for moving blanks of any desired width without adjustment of the rods h, as heretofore done.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a paper-box machine the combination of the blank-pile support, the gummer-picker and the stripper-rod, adjustably supported over the center of the blanks, between the lines of gumming, of the gage-guides k k adjustable along and depending below the stripper-rod.

2. In a paper-box machine the combination of the blank-pile support, and the picker-gummer of the stripper-rod located horizontally over the middle of the blank-support, and the gage-guides k k, adjustable along the length of, and depending below the stripper-rod.

3. In a paper-box machine the combination with a blank-pile support, and the gummer-picker, of the brackets i, opposite sides of the pile and adjustable toward and from each other, the brackets i^4 adjustable on the brackets i parallel with each other, and the stripper-rod supported by and extended between the brackets i^4, substantially as described.

4. In a paper-box machine the combination with the gummer-picker of the brackets i i

adjustable toward and from each other, and having the slotted portions i^2, of the brackets i^4 adjustably engaged and supported by said portions i^2 and the stripper-rod j extended between and supported by the said brackets i^4, substantially as described.

5. In a paper-box machine the combination with the horizontal picker carrier-bar f^2 and the pickers g' secured thereon and depending therebelow at opposite sides of said bar, of the stripper-rod, adjustably supported horizontally under said bar f^2 and between the said depending pickers, substantially as described.

6. In a paper-box machine the combination with the horizontal picker-bar f^2 and the pickers g' secured thereon and depending therebelow at opposite sides of said bar and said pickers being individually adjustable transversely relatively to the bar of the stripper-rod, located under the bar f^2 and supported for adjustment horizontally and transversely relatively to said bar, substantially as described.

7. In a paper-box machine, in combination, picker-shaft f carrying horizontal transverse bar f^2 provided with horizontal bars f^3 right angular thereto, the pickers g' supported by and depending below said bars f^3, at points forward and rearward of said bar f^2, and which are individually adjustable on the said bars f^3, and the horizontal stripper-rod j and adjustable bodily forwardly and rearwardly, substantially as described.

8. In a paper-box machine the combination with the horizontal picker-bar f^2 and the pickers g' secured thereon and depending therebelow at opposite sides of said bar and said pickers being individually adjustable transversely relatively to the bar, of the horizontal stripper-rod j, located under and parallel with the bar f, the brackets i^4 by which the end portions of said rod are supported, and the supports having horizontal longitudinal slots i^2 with which the brackets i^4 have adjustable supporting engagements, substantially as described.

9. In a paper-box machine in which it is required to make boxes from blanks having end-forming sections and stay-sections constituted by the corner portions of the blank, a box-forming mechanism comprising a throat the walls of which are contractible and expansible, and which have at their corners, and outside of the planes of the inner walls of the throat, members which project upwardly above the upper edges of the throat-walls, means for conveying the blanks over the throat leaving them to receive support by the corner-sections thereof on said upwardly-extended projections, a former or plunger, and means for causing relatively a telescopic action of the former within the folding-throat, for the purpose set forth.

10. In a paper-box machine in which it is required to make boxes from blanks having end-forming sections, and stay-sections constituted by the corner portions of the blank, a box-forming mechanism comprising a throat the walls of which are contractible and expansible, and which have at their corners, and outside of the planes of the inner walls of the throat, members which project upwardly above the upper edges of the throat-walls and which have the tops thereof concaved or rounded, a reciprocatory conveyer for the blanks comprising rods or bars $h\,h$ supported by and guided through ways therefor in the end walls or members of the said throat and which in the action of conveying the blanks over the throat bring the corner-sections against said elevated and upwardly-rounded projections whereby the blank is caused to ride up on said projections and to attain supporting positions thereon above the tops of said conveyer-bars and the upper edges of the throat or former and means for causing relatively telescopic action of the former within the throat substantially as and for the purposes set forth.

11. In a machine for making paper boxes from blanks of the character substantially as described, the combination with the reciprocatory former, and a horizontally-movable blank-conveyer, of vertical opposing throat-boundary walls which are movable to have approaching and receding motions, and which are provided with upwardly-extending projections located adjacent the corners, and outside of the area, of the throat and the throat-inclosing walls, whereby, as the blank is conveyed over the throat, such blank is, by the corner-wings thereof supported by said projections above the top edges of the throat-walls, and the descending former insures initially in the folding operations, upturned inclinations of said corner-wings relatively to the box-bottom and box-end sections, substantially as described.

12. In a paper-box machine the combination of the former, conveyer h and folding-throat comprising the end followers B B and the approaching and receding plates D D which have the ears m, at the corners of the throat, extending above the tops of said plates, and outside of their outer vertical edges, for the purposes set forth.

13. In a paper-box machine in combination the reciprocating former, the folding-throat comprising the end followers B B and the approaching and receding plates D D which have upwardly-extending projections at their outer portions, and the reciprocating conveyer, having its top lower than said projections, whereby as the blank is by the conveyer carried under the former, it will ride up on said upwardly-extended projections, and be by its corner wings or sections supported on said projections above the top edges of the folding-throat and said conveyer, for the purpose explained.

14. The combination of the former, conveyer h, and folding-throat comprising the end followers B B and the approaching and

receding plates D D which have the ears *m*, at the corners of the throat, extending above the tops of said plates, and outside of their vertical edges, and which ears have their upper edges convex or rounded.

15. In a paper-box machine the combination of the former, conveyer *h* and folding-throat comprising the end followers B B and the approaching and receding plates D D which have the ears *m*, at the corners of the throat, extending above the tops of said plates, and outside of their vertical edges, and having their approached inner ends pointed.

16. The combination of the former, conveyer *h*, and folding-throat comprising the end followers B B and the approaching and receding plates D D which have the ears *m*, at the corners of the throat, extending above the tops of said plates, and outside of their outer vertical edges, and which ears have their upper edges convex or rounded and their approached ends pointed.

17. In a paper-box machine the combination of the former, conveyer *h* and folding-throat comprising the end followers B B and the approaching and receding plates D D which have the ears *m*, at the corners of the throat, extending above the tops of said plates, and outside of their vertical edges, having their inner faces downwardly inclined.

18. In a paper-box machine the blank-folding mechanism comprising the folding-throat constructed outside of its corners with the members *m* of almond shape, their faces downwardly and inwardly inclined, their upper edges rounded and having the attachment parts m^2 secured to the upper portion of the plates D which are comprised in the walls of the folding-throat.

19. In a paper-box machine the combination of the former, conveyer, and folding-throat comprising end followers and approaching and receding upstanding opposite side plates having at their tops outside of their outer vertical edges ears or projections *m* which have their upper edges higher at their middle portions, inclining forwardly and rearwardly downwardly, and having their inner faces downwardly and inwardly inclined.

20. In a paper-box machine the combination of the former, conveyer *h*, and folding-throat comprising the end followers B B and the approaching and receding plates D D provided with the flat springs extending from the upper inner edges of the receding plates downwardly and inwardly inclined and said plates D D having the ears *m*, at the corners of the throat, extending above the tops of said plates, and outside of their outer vertical edges, for the purposes set forth.

21. In a paper-box machine, the combination with the folding plunger or former E having a tubular shaft E^2, of a central shedder-rod G playing through said tubular shaft, adjustable means for imparting at pleasure a longer or shorter downward thrust movement to the rod through and below the bottom of the former, and a retracting-spring located within the tubular shaft and reacting against the said shedder-rod.

22. In a paper-box machine, the combination with the picker-actuating mechanism, the former-shaft, and the shedder-rod, of the shedder-rod-operating lever arranged relatively to the picker-actuating mechanism, to be periodically operated thereby.

23. In a paper-box machine, the combination with the picker-actuating mechanism, the tubular former-shaft, and the shedder-rod, of the shedder-rod-operating lever linked to the rod and arranged relatively to the picker-actuating mechanism to be periodically operated thereby.

24. In a paper-box machine, the combination with the picker-actuating mechanism, the former or plunger having a shedder, of parts interposed between the shedder and picker to be actuated by the picker, and in turn actuating the shedder.

25. In a paper-box machine, the combination with the former having a tubular shaft and the shedder-rod, of the shedder-rod-operating lever, supported by, and bodily movable in unison with the former-shaft, and linked to the shedder-rod, and means for periodically swinging the said lever.

26. In a paper-box machine having a reciprocatory picker mechanism the combination of tubular former-shaft, shedder-rod, bracket p^2 carried by the shaft, lever H pivoted in the bracket, link H^2 pivoted to the lever and adjustably connected to the shedder-rod, a part of said lever H being in coöperative relation to the picker mechanism, to be operated thereby.

27. In a paper-box machine, the combination of the picker mechanism and the box-forming mechanism comprising the former and the shedder, working therethrough, shedder-operating devices arranged relatively to the picker mechanism to be periodically operated thereby.

28. In a paper-box machine the conveyer-rods having the slotted rib and the abutment-hooks each having a grooved base to straddle over the slotted rib, and the screws h^6 for confining the abutment-hooks in their adjusted position along the conveyer-rods, substantially as described.

29. In a paper-box machine, the combination with the former and conveyer of the folding-throat comprising the end followers and the upright members D opposite pairs of which are movable toward and from each other, and which members have the flat spring-plates extending from their upper inner edges in downwardly-inclining directions, for the purpose set forth.

30. In a paper-box machine in which it is required to make boxes from blanks having end-forming sections, and stay-sections constituted by corner wings or flaps of the blank: a box-forming mechanism comprising a throat, within which the blank is to be fold-

ed, means for conveying the blank across the mouth of the throat, and supports located at the corners of the throat, onto which the blank is brought and which sustain the blank by the corner-wings thereof preparatory to the folding operation, a former or plunger, and means for causing, relatively, a telescopic action of the former within the folding-throat, whereby there is initially a deflecting impingement between said corner-supports and the corner-flaps, so that the latter are angularly turned before the end-forming sections are turned.

Signed by me at Springfield, Massachusetts, this 10th day of December, 1900.

CHAUNCEY W. GAY.

Witnesses:
WM. S. BELLOWS,
C. F. WHITE.