

May 23, 1933.

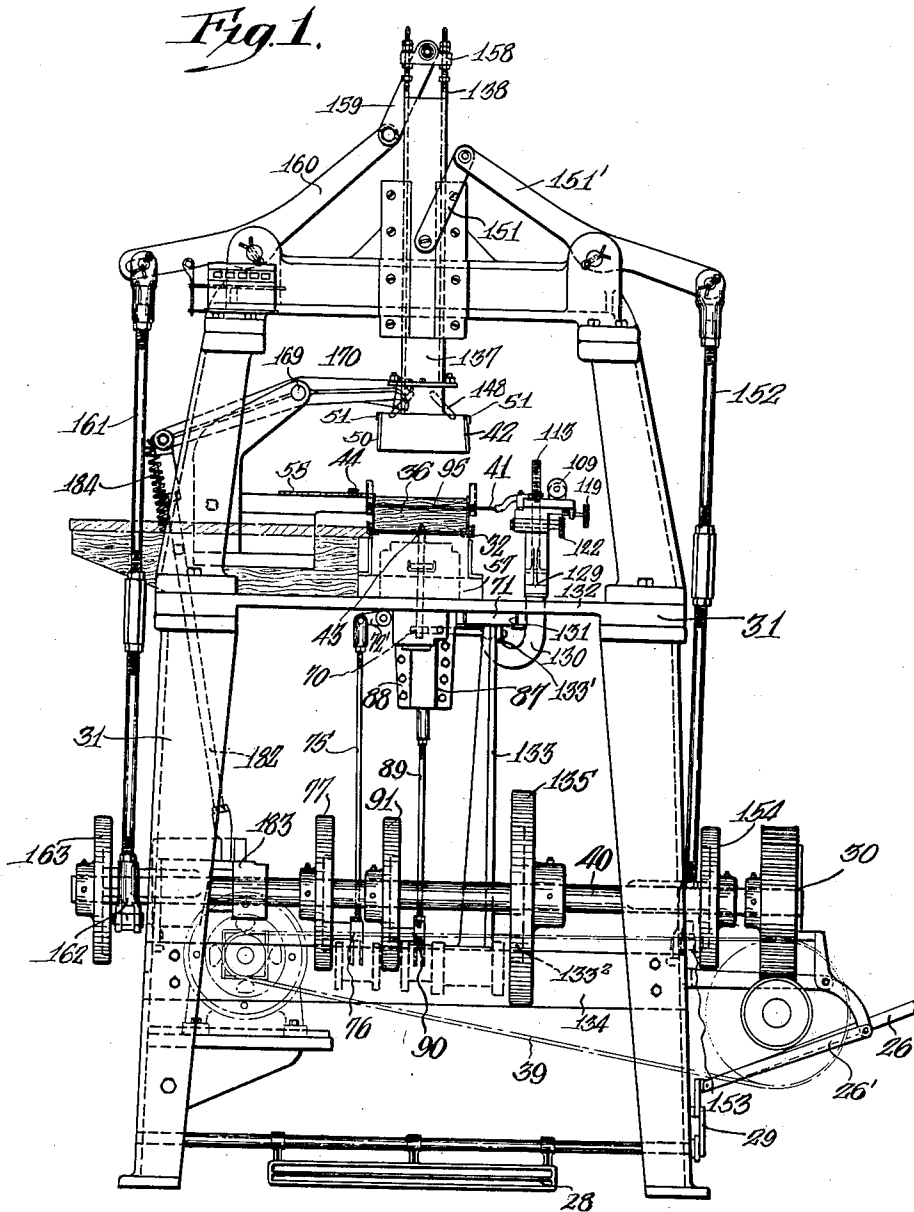
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1,910,171

BOX LINING MACHINE

Filed July 15, 1930

6 Sheets-Sheet 1



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BOX LINING MACHINE

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6 Sheets-Sheet 2

Fig. 2.

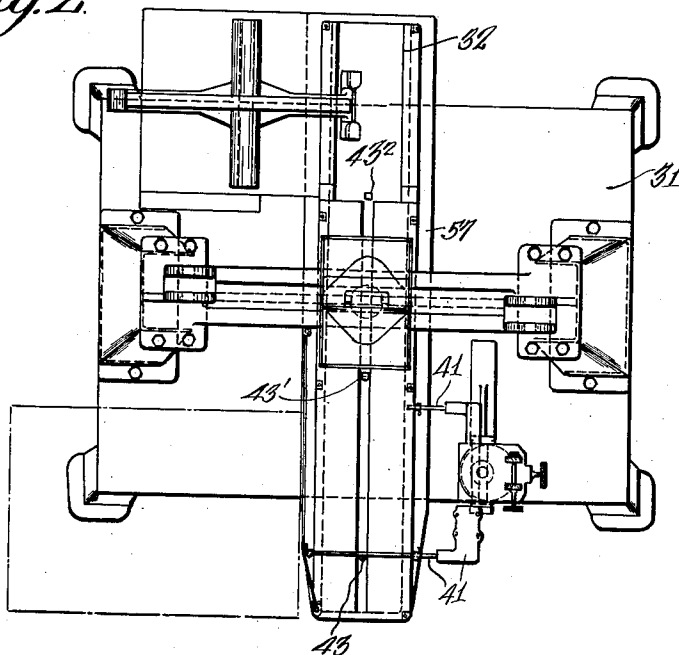
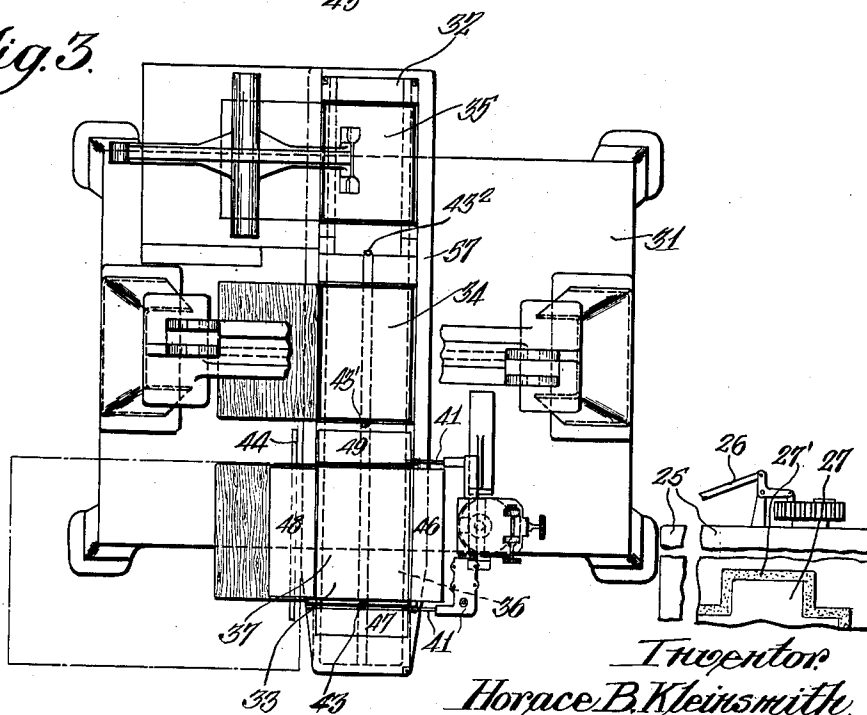


Fig. 3.



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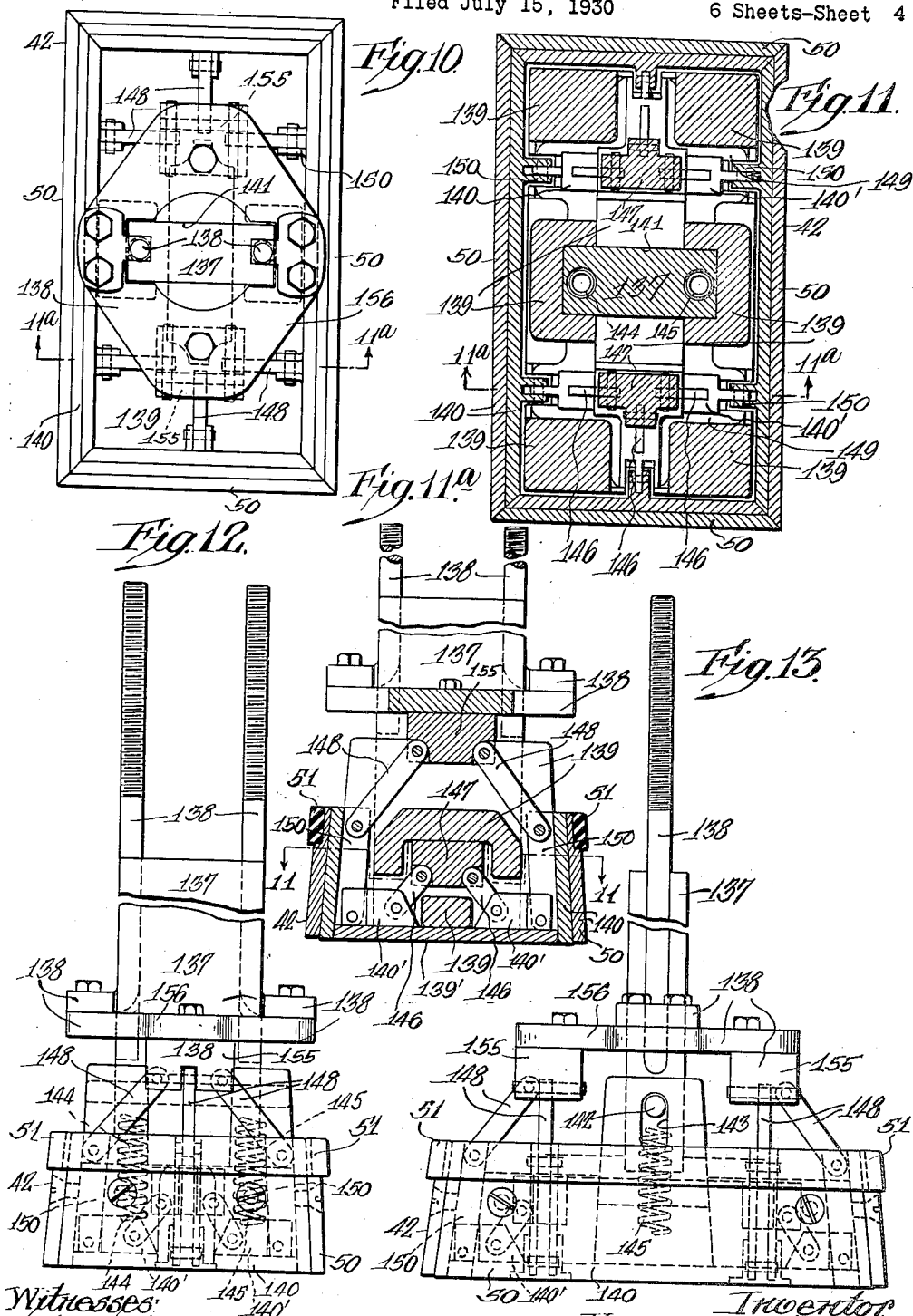
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BOX LINING MACHINE

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6 Sheets-Sheet 4



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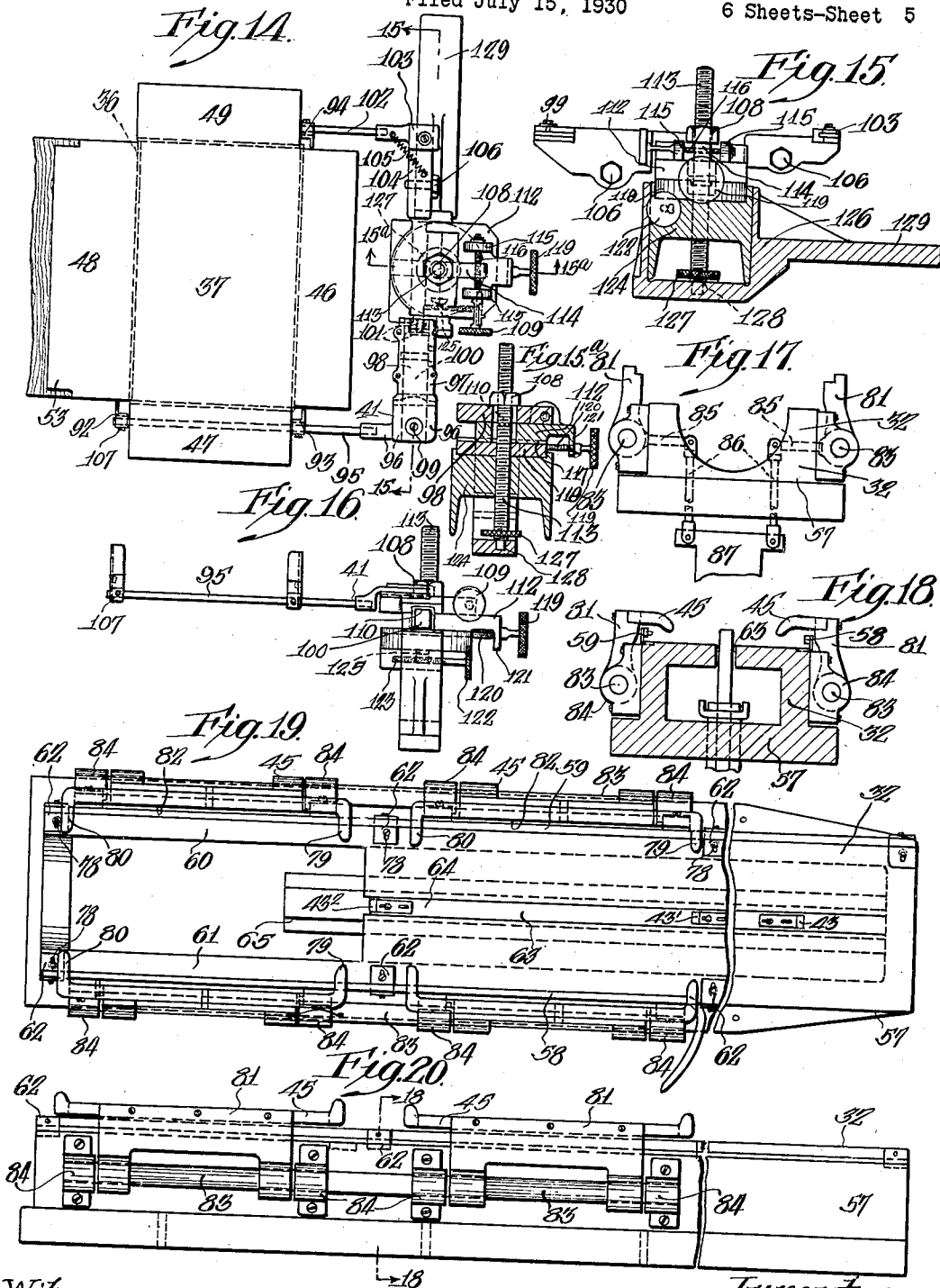
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BOX LINING MACHINE

Filed July 15, 1930

6 Sheets-Sheet 5



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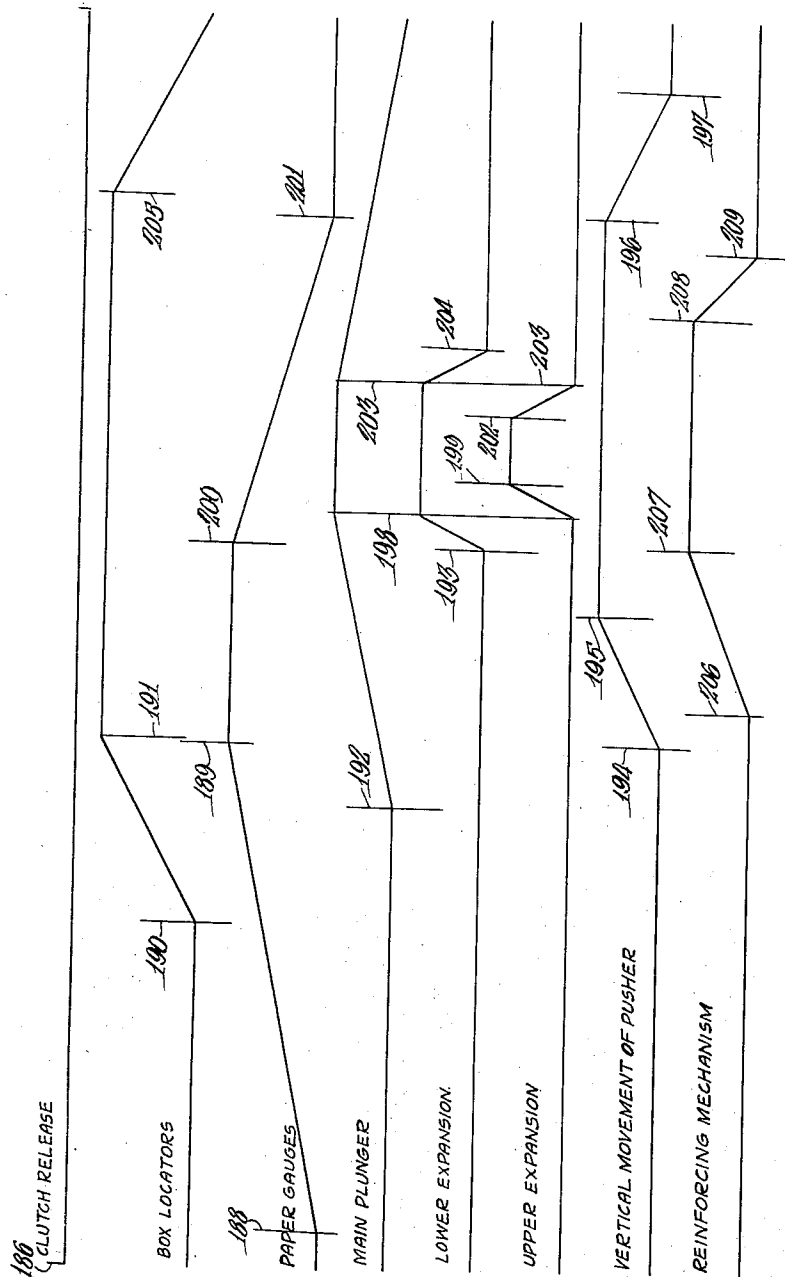
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BOX LINING MACHINE

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6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

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BOX LINING MACHINE

Application filed July 15, 1930. Serial No. 468,103.

My invention relates to a box lining machine for use in inserting linings in cigar boxes or the like.

A purpose of my invention is to provide a machine of the character indicated, easy and inexpensive to manufacture and well adapted to the intended use.

A further purpose is to provide a desirable form of mechanism for use in lining boxes with cruciform lining blanks.

A further purpose is to provide a desirable form of mechanism for exactly registering the cruciform lining blanks with a forming block.

A further purpose is to register a cruciform lining blank in exact position for insertion into a cigar box or the like by means of a gauge engaging the sides of the blank in three of the four corners thereof and to provide the gauge with an easy universal adjustment,—vertical, angular and rectilinear in forward and lateral directions respectively thereby adapting the gauge to use with blanks and boxes of different dimensions.

A further purpose is to register a cruciform lining directly above a box at one station and to use common mechanism for transferring the box and its lining blank to a lining station.

A further purpose is to load boxes and linings at one station and to line them at another, thereby avoiding any danger of an operator having an accident with mechanism used in the lining of the boxes.

A further purpose is to provide rocker locator members with interchangeable heads adapted to fit boxes of different dimensions, the variant widths of the different boxes being taken care of by varying the width of the heads and the variant lengths of different boxes being taken care of by varying the spacing between locators that respectively engage different ends of the box at front and rear.

A further purpose is to arrange locators in pairs upon opposite sides of a lining station, and optionally also upon opposite sides of a reinforcing station, each locator fitting one end and partly overlapping the front and rear sides at that end.

A further purpose is to taper off the end lugs of a box locator for more easy entry of the box to the space between the lugs and to extend the lug on the advancing side of the box further inward than the lug on the rearward side thereof to permit the lug that is at said advancing side to overlap and stop the box at the moment a push rod progressing the box forwardly from a loading station to a charging station comes to rest.

A further purpose is to firmly clamp a box to a definite position during the lining operation by locator members that hold the box sufficiently for supporting the outward pressure exerted by a lining member.

A further purpose is to line a box right side up by means of a plunger that pushes a lining blank downwardly against the bottom of the box, that thereafter expands the bottom lining into the bottom corners of the box and then turns the side flaps outwardly about the bottom corner edges into firm engagement with the interior of the box sides.

A further purpose is to provide mechanism adapted to closely fit the lining into the bottom corners of a box.

A further purpose is to provide mechanism for applying an extension of a back flap over the hinge of a box lid in order to reinforce the hinge after placing the lining upon the bottom and sides of the box.

A further purpose is to provide a roller that is to be used in turning a reinforcement flap from a box lining over the hinge of the box lid with desirable guide mechanism.

A further purpose is to provide a roller that rolls a reinforcement flap on to the back of a box and on to the lid, mounting the roller upon a member carrying a right angle cushion for pressing the flap to place upon the corner.

Further purposes will appear in the specification and in the claims.

I have elected to illustrate one only of the many different forms of my invention, selecting a form that is practical and efficient in operation and which well illustrates the principles involved.

Figure 1 is a full elevation of the machine, from the front, or operator's side.

Figure 2 is a top plan view of Figure 1.

Figure 3 is a view similar to Figure 2 but with some parts broken away to show the arrangement of the three boxes on the track.

5 Figure 4 is a fragment of Figure 1 to enlarged scale and showing some details of mechanism at the third or reinforcing station not shown in Figure 1.

Figure 5 is a right side elevation of Figure 10 4, showing the reinforcing mechanism from the track side.

Figure 6 is a front elevation of Figure 4 from the operator's side of the machine.

Figure 7 is a fragment of Figure 6 but 15 with operating parts in a different position from that of Figure 6.

Figure 8 is a side elevation, showing detail mechanism for advancing the boxes.

Figure 9 is a left end elevation of Figure 8. 20 Figure 10 is a top plan view of the box form.

Figure 11 is a horizontal section upon the line 11—11 of Figure 11a.

Figure 11a is a vertical section upon the 25 line 11a—11a of Figure 11 or the line 11a—11a of Figure 10.

Figure 12 is a front end elevation of Figure 10.

Figure 13 is a right side elevation of Figures 10 and 12. 30

Figure 14 is a top plan view of mechanism for registering a lining blank above a box.

Figures 15 and 15a are vertical sections taken upon the lines 15—15 and 15a—15a 35 respectively of Figure 14 in the direction of the arrows.

Figure 16 is a front elevation of Figure 14.

Figure 17 is a rear end elevation of box locator mechanism.

40 Figure 18 is a vertical section through the track upon the line 18—18 of Figure 20 and illustrates box locating mechanism.

Figure 19 is a top plan of Figure 20, illustrating the track, box locating devices, 45 and box advancing means.

Figure 20 is a side elevation of Figure 19.

Figure 21 is a graph showing the timing of the various parts of the machine.

Like numerals refer to like parts in all 50 figures.

Describing in illustration and not in limitation and referring to the drawings:—

My semi-automatic box lining machine inserts into cigar boxes or the like cruciform-shaped lining blanks of paper, which have 55 been previously suitably glued, preferably stencil glued in any suitable way, by any standard gluing machine, such as a Stokes & Smith, at present in use for gluing wraps 60 on paper boxes.

I have indicated diagrammatically any suitable gluing machine 25 having starting mechanism 26 operatively connected to the starting treadle of the lining machine so that 65 the glue machine and lining machine operate

in synchronization, indicating a wrap 27 on the glue machine carrying a stencil coating of glue 27'.

I connect the clutch mechanism of the stencil gluer to a treadle 28 (Figure 1) of my lining machine in such a manner as to release 70 the glue machine for one cycle of operation each time a box is lined by my lining machine.

With this exception, no connection need exist between the two machines, and since 75 the stencil gluing machine is well known in the art of covering paper boxes, it is believed neither necessary nor desirable to show it nor to describe it in greater detail.

As best seen in Figures 1 to 3 the illustrated embodiment of my invention includes 80 a supporting framework 31 which carries a three station track 32, the different operations of the machine taking place sequentially at the loading station 33, the lining station 34 and the reinforcing station 35, operations at the latter station however being 85 omitted if the back flap of the lining is not to be extended up over the edge of the lid to reinforce the hinge. 90

An operator places a box 36 and a lining blank 27 from the glue machine in the position 37, glue side down, in vertical registry at the loading station 33 and depresses the 95 treadle 28 which through intermediate lever mechanism 29 and starting rod 26' operates the clutch 30 to cause rotation of main cam shaft 40 through suitable belt and gearing 39. It also normally operates the glue machine to deliver glued blanks as needed. 100

The track 32 provides a horizontal straight guideway for the boxes, each of which is placed on the guideway at the feeding station 33, its lining blank placed on the top 105 of the open box between the arms of a movable gauge 41, the blank registering vertically above the open box and the box, blank and gauge being then progressed as a unit to position beneath a form 42.

When the box, blank and gauge have come 110 to rest, the form 42 moves down between spaced arms of the gauge 41 into the box applying the lining to the box, then moves up out of the way, the carrier and transfer mechanism returning to the feeding station 115 for another box and blank and the lined box being progressed forwardly from beneath the form during the advance of the next box and blank, either for applying an extension of the rearward flap over on to the edge of 120 the lid for hinge reinforcement or, where this feature is not desired, discharging the lined box to a suitable conveyor or piling mechanism, not shown.

An essential feature of my box lining machine includes the vertically reciprocating 125 form 42 which carries the lining downwardly into the box, and then expands outwardly against the box sides, pressing the lining into place. 130

Other features include means for feeding both the box and the lining into position beneath the form, for locating both the box and the lining in a predetermined position there, and for expelling the lined box.

I may or may not extend the lining up to reinforce the lid hinge and my machine includes mechanism for accomplishing this that is not used when the reinforcement feature is not desired.

An operator picks up a glued lining blank 29 with one hand and an unlined box 36 with the other and inserts the box on to the track 32 at the feeding station 33 with the rearward end of the box against the forward side of an upwardly projecting lug 43 of the box transfer mechanism.

As soon as the box is in place the operator drops the cruciform lining blank on top of it between upwardly extending arms of the paper gauges 41, the lining blank, glue side down, being then supported on three sides by the box edges, and on the fourth side by a stationary bar 44 that is optionally omitted if there be not a box lid. This bar functions to prevent the downwardly directed glued surface of the fourth side of the lining from engaging and adhering to the inside of the lid.

The bar 44 may be supported in any suitable way, not shown, from the stationary structure, as from a bracket in front of the first or feed position of the box, or from any bracket at the side or front out of the path of travel of the box lid and locating the rod a little above the line of travel of the lid.

When both the box and its lining blank are in proper position at the feeding station, the machine is started for one complete cycle of operation. The gluer is also started at the same time.

The box, lining and gauge advance along the track to the lining station 34 beneath the form, where the box is stopped and held by locators 45, the lining blank still being held in registry with the open box by the paper gauges 41.

The form 42 with parts contracted, descends into the box, carrying the lining blank down against the box bottom, and causing the four wings or flaps 46, 47, 48 and 49 of the lining blank to stand upright inside the box adjacent the vertical box walls.

The function of the paper gauges has been fulfilled at the lining station as soon as the lining blank is carried downwardly clear of the gauges and the gauges return to the feeding station, to permit the insertion and location of the next box and lining, even before the form has completed the lining of the first box.

The four sides of the box form are provided with plates 50 which expand at their bottom edges into the bottom corners of the

box after the body of the lining has been pressed down to the bottom of the box.

This carries the paper outwardly into the four bottom corners of the box creasing the paper into the bottom corners.

Immediately afterwards, the upper edges of the four plates 50 move outwardly, compressing outwardly directed sponge rubber pads 51 along the upper edges of the plates against the box sides, through the paper blank causing the glued edges thereof to adhere to the box.

The lining is then completed, and the form, after releasing and contracting to its former position, withdraws upwardly, as the locators 45 release the box.

The lined box stands at the lining station 34 under the form until the advance of the next box and its blank when the lined box is advanced to the third, or reinforcing station 35 of the track, simultaneously as a new and unlined box is being advanced from the feeding station to the lining station, as described above.

After the lined box has come to rest at the reinforcing station, an upwardly projecting reinforcing flap 53 of the lining is turned over on to the edge of the lid 55 by a small roller 54, the flap 53 immediately thereafter being firmly pressed into place by a right angle shaped sponge rubber pad 56.

The lined and reinforced box remains standing at the reinforcing station until the beginning of the third cycle of operation, when it is expelled from the machine at the end of the track.

The track 32, best seen in Figures 1, 2, 3 and 17 to 20 consists of a long rectangular casting 57 mounted upon the frame structure 31, with guides 58 and 59 along the sides, the boxes being slid along the top of the track from station to station between the guides.

The upwardly directed surface of the track is level for the full length of the track along the sides at 60 and 61 except for recesses that seat brackets 62 that support the guides 58 and 59.

The top surface of the track is closed between side runway portions 60 and 61 for about two thirds of the track length, with the exception of a central slot opening 63 that passes the transfer lugs 43, 43' and 43² to engage the box ends.

The casting 57 is left open intermediate the runway portions 60 and 61 at the reinforcing station since no strain is given the box bottoms during the reinforcing operation, and except for the slot 63 closed at the lining station to support the downward thrust of the form, and also closed, except for the slot 63, at the feeding station, where an open track would make insertion of the boxes less easy.

Three lugs 43, 43' and 43² respectively advance the boxes from the feeding station 33

to the lining station 34, from the lining station 34 to the reinforcing station 35, and from the reinforcing station 35 off the end of the track.

5 The three lugs 43, 43' and 43² are adjustably mounted on a rectangular bar 64, (Figures 8, 9 and 19) which reciprocates horizontally in a sleeve 65.

10 The sleeve 65 is provided with two downwardly projecting slides 66 which vertically reciprocate in two bearings 67.

Horizontal reciprocation of the bar 64 is effected by a stud 68 which extends downwardly from the lower side of the bar through a suitable slot in the bottom of the sleeve 65 to engagement with a forked projection 70 of a horizontal slide 71 (Figure 1) the details of which will be explained later.

20 Vertical reciprocation of the bar 64 is obtained by the movement of the sleeve 65 driven up and down by the levers 72 attached to the rocker shaft 73.

The downwardly extending slides 66 from the sleeve 65 carry small studs 74 which engage the rocker levers 72 in suitable slots.

25 The rocker 72 toward the discharge side of the machine carries an operating arm 72' in operative connection with a connecting rod 75, a lever 76, (Figure 1) and a cam 77 located on the cam shaft 40.

30 The lugs 43, 43' and 43² are carried forward by the bar 64 while in their raised position each lug pushing a box ahead of it along the track.

35 When the bar 64 has reached the end of its forward stroke, each lug has advanced its box one station, and the bar and lugs then descend far enough for the lugs to clear the box bottoms, the bar then retracting to its initial position where it rises presenting the lugs in their previous stations in position to advance the next boxes.

40 While on the track, the boxes are guided laterally by the two side members 58 and 59 one of which extends the full length of the track, the other extending only the length of the lining and reinforcing stations, being cut off at the feeding station 33 to permit more easy entry of the boxes.

50 The side guides 58 and 59 are adjustably mounted on the casting 57 by means of the angle brackets 62, the horizontal parts of which are recessed into the casting and slotted in a direction transverse to the track to pass the screws 78, this arrangement permitting lateral adjustment of the side rails to suit the width of the box intended to be lined.

60 The side guides 58 and 59 are set to allow free and easy passage of the boxes, and are intended to guide the boxes while in motion, other means being provided to locate the boxes in exact registry at the operating stations.

65 Four box locators 45 are usually provided,

one pair at the lining station 34 and one pair at the reinforcing station 35.

The box locators 45 are suitably of cast brass, with the distance between the projecting lugs 79 and 80 governed by the length of the box for which they are intended to be used. 70

I prefer to use a separate set of locators for each size box to be lined in the machine, in that I find locators with the length adjustable less satisfactory. 75

One of the outstanding features of my machine is the ease and quickness with which it can be changed from adaptation to operate on boxes of one size to adaptation to operate on boxes of another size. 80

For this purpose I supply the fixed locators 45 with spaced dowel pin connections with main rocker castings 81, with the result that locators of one size can be exchanged for others of another size very quickly and easily with an assurance of an exact registry of the new locators with respect to the lining form, reinforcing mechanism, etc., without further adjustment. 90

I provide means for preventing the boxes when advancing from one station to another from continuing to move, after the box transfer mechanism 43, 43' and 43² comes to rest, that is from running past the proper station and do this by continuing the lugs 80 at the ends of the locators 45 farthest away from the feed station to extend inwardly beyond the inward ends of the lugs 79 at the locator ends nearer the feed station. 100

The locators 45 being to close toward the box before the latter has quite reached its station, the inward extensions of the lugs 80 forming a positive stop for the box, while the shorter lugs 79 permit the box to move to its proper station at which point the transfer lugs 43, 43' and 43² come to rest. 105

The inward extensions of the lugs 80 keep the boxes from travelling onward after the transfer lugs 43, 43' and 43² come to rest. 110

If the lugs 79 were as long as the lugs 80, the lugs 79 nearer the feed station would gouge the front and back of the box by their premature closing.

The locators completely close and clamp the box just as the box has fully reached its position in the station. 115

The castings 81 to which the locators are fixed, close and open to the same limits regardless of the dimensions of the box to be lined, such differences in box dimensions being taken care of by corresponding differences in the dimensions of the locators. 120

For narrow boxes, the locators are made correspondingly thicker at the point 82 and for wide boxes they are correspondingly thinner. 125

When the locators are completely closed, they should clamp the box between them because any variance in box location would 130

cause a corresponding mislocation of the lining blank in the box.

The locators, positioned on the castings 81 by the dowel pins mentioned above, are secured there by two screws.

The castings 81, of which there are four, are fixed on two rock shafts 83, mounted in suitable bearings 84 which are secured to the outer sides of the casting 57.

The two castings 81 toward the discharge side of the machine are each provided with an inwardly projecting arm 85. (Figure 17), these arms passing inwardly through the sides of the casting 57 in slots for that purpose.

Two short connecting rods 86, adjustable in length, extend from these levers to the slide 87 which is vertically movable and in a stationary vertical guide 88, Figure 1, downwardly directed from the table casting.

A connecting rod 89 extends from the bottom of the slide 87 to a lever 90 which is driven by a cam 91 on the main cam shaft.

The paper gauges and lining locating mechanism, Figures 1 to 3 and 14 to 16 are important features.

The linings are located under the head by mechanism independent of the box locating means.

Boxes of various sizes can always be located under the head properly by the means described above, but devices for adjustment of the lining blank location are necessary, due to varying conditions in the paper itself, as well as to possible differences in the cutting of the cruciform lining blanks.

I show three paper gauges 92, 93 and 94 for registering in three of the four corners of the cruciform blanks, each adapted to engage one side of each wing adjacent the corner. I have found it unnecessary, and from the standpoint of quick adjustments, undesirable, to use a paper gauge at the fourth corner of the lining blank.

The two paper gauges 92 and 93 at the receiving end of the track are adjustably mounted on a horizontal non-circular bar 95, Figures 14 to 16, which is rigidly held in a lateral arm from a hinged head 96 of a holder 97 that is adjustably mounted on a horizontal transverse bar 98.

The head 96 pivots horizontally at 99 on the forward end of the holder 97, being adapted to be swung on its pivot in either direction away from its normal position by rearwardly deflecting a spring plunger 100 that normally holds the head in such position as to present the rod 95 in a position ninety degrees from the holder.

This hinge feature is provided to prevent danger of damage to the bar 95, should a box be inserted of a different size than that for which the track is set, or if for any reason the box-advancing means should fail, and the bar should come in contact with the box. In

such an event, the bar would swing open with the head 96 rearwardly compressing the plunger 100 against the springs 101.

With the track again clear of boxes, an operator has merely to turn the bar back into proper position.

The bar 102, on which the gauge 94 is adjustably mounted, is held in the hinged head 103 of the holder 104 which allows the bar 102 to swing open as the carriage 41 returns from the lining to the feeding station, causing the gauge 94 to run along the laterally directed front of the box.

As soon as the gauge 94 clears the box, a spring 105 pulls the bar 102 back into position, a suitable inward limit of the hinge causing the bar again to project at a ninety degree angle.

Both the holders 97 and 104 are adjustably mounted on square portions of the bar 98 toward opposite ends thereof making a split-clamp fit with the bar 98, along which they are adapted to slide. They are clamped in place by screws 106.

By adjusting the holders in this manner, the space between the bar 95 and the bar 102 can be changed until the space between the gauges 93 and 94 is correct for the corner edges at opposite ends of the lining blank wing 46 to fit over the laterally directed front of the box, so that the gauges may fit against and register with these edges.

The gauge 92 is then loosened at the headless set screw 107 and is slipped in or out along the bar 95 until the space between this gauge and the gauge 93 is such that the gauges 92 and 93 correctly fit opposite ends of the end wing 47 of the lining blank.

Ordinarily the gauges 93 and 94 do not have to be moved along bars 95 and 102 respectively, but are left in the same position for all sizes of boxes, such variations as are necessary being provided for by other means of adjustment.

When the lining blank properly fits the paper gauges, any further adjustments will be for the purpose of registering the lining with a box located in its fixed position at the lining station.

For this purpose all three gauges are adjusted as a unit to change the relative location of the whole lining blank with respect to the box, four adjustments being provided, respectively moving the three gauge unit horizontally parallel to the track, horizontally at right angles to the track, angularly in a horizontal plane about a vertical axis, and vertically up and down.

By means of these four adjustments, cruciform lining blanks for any standard box can be brought into register with the box quickly and easily and when that result has been achieved all four of the above adjusting mechanisms are locked in place simultaneously by the tightening of a single nut 108.

The adjustment horizontally parallel to the track is effected by an adjustment wheel 109.

The bar 98, parallel to the track, has longitudinal sliding connection at 110 with the plate 112 adapting the bar to move horizontally in either direction parallel to the track along a short range of movement limited by the oversize of a vertical hole through the middle of the bar passing the vertical screw 113 that carries the nut 108.

An arm 114, rigidly connected at one end to the bar 98, presents its other end between two lugs 115 that project upwardly from the plate 112.

The adjustment wheel 109 is attached to a screw 116 which journals freely in the lug bearings 115 and screw-threads through the end of the arm 114 from the bar 98.

Turning of the wheel 109 can thus move the bar 98 carrying the gauge unit to a limited extent to and fro parallel to the track guided by its tongue and groove connection with the plate 112 beneath it.

To secure the second adjustment the plate 112 is provided with a tongue and groove connection 117 with the upper side of a circular plate 118 directly beneath the plate 112, the tongue and groove connection 117 between the plates 112 and 118 extending at right angles to the track, thereby permitting the plate 112 slidably guided by its connection with the circular plate 118 to move at right angles to the track, to the limits allowed by the oversize hole through which passes the screw 113.

The plate 112 is adjusted in a direction at right angles to the track by rotating a wheel 119 which carries a screw 120 that journals at 121 in a downwardly projecting lug of the plate 112 and at its inner end threads into a tapped hole in the circular plate 118.

It will be evident that as the screw 120 is revolved, the plate 112 will be driven towards or away from the track.

The third or angular adjustment is secured by angular movement of the circular plate 118 about the vertical screw 113.

The circular plate 118 has an axial bore snugly fitting the vertical screw 113 and when the nut 108 is released, the circular plate 118 is free to turn about the screw 113, causing a similar angular movement in all the parts above it which are mounted on it. The angular movement is supplied by a wheel 122 and a screw 123, the screw carrying the wheel and journaling freely in bearings in a casting 124.

The circular plate 118 carries an arcuate threaded block 125 which projects downwardly into an upwardly directed arcuate groove in the top of the casting 124, where it makes threaded engagement with the screw

122, thereby adapting rotation of the screw to angularly turn the circular plate.

The principal purpose of the angular adjustment is to bring the wing 48 of the lining blank into registry with the box.

For the vertical adjustment, I provide the casting 124 carrying the screw 123 for angular adjustment with a vertical tongue and groove connection with a main casting 126, adapting the casting 124 to a slidably guided vertical movement in the main casting 126.

The vertical screw 113 carrying a wheel 127 journals in a bearing 128 in the casting 126 and threads in a tapped hole in the casting 124.

It is obvious that when the wheel 127 is rotated, the casting 124 and all parts mounted on it are moved up or down.

A projection 129 of the casting 126 is screwed fast to an upwardly extending wing 130 (Figure 1) of the slide 71, slidably guided in a suitable recess 131 cut in the under side of the table 132.

The upwardly extending wing 130 passes through the table in a long slot provided for that purpose.

As already explained, the box-advancing mechanism is also reciprocated by the slide 71 through its connection with the fork 70.

The slide 71 itself is reciprocated by a connecting rod 133' (Figure 1) attached to the lever 133, mounted in a suitable bearing carried by a cross member 134 of the frame.

The lever 133 is provided with a roller 133^a to engage a groove in the cam 135, mounted on the main cam shaft.

The composite box form 42 (Figures 1 and 10 to 13) that places the linings in the boxes is reciprocated vertically by cooperating plungers 137 and 138, downwardly into and upwardly out of the successive boxes when they are located at the lining station.

The form includes a central casting 139 and composite plate members 140, the plate members moving outwardly against the box sides after the block 139 has come to rest upon the bottom of a box, having carried the lining blank ahead of it to the bottom of the box.

The block 139 is carried upon the lower end of the plunger 137 with which it makes a vertical slidable connection, the lower end of the plunger making a sliding fit in a central vertical recess 141 of the block and normally supporting the block upon opposite ends of a horizontal pin 142. Vertical slots 143 in vertical guideway portions of the block permit downward movement of the lower end of the plunger into the recess of the block after the block comes to rest on the bottom of a box.

The block is spring pressed downwardly with respect to the plunger by springs 144 and 145 which are compressed between opposing upwardly and downwardly directed

surfaces of the block and plunger respectively.

The composite plates are supported near their lower edges by shoes 140' which are adapted to slide inwardly and outwardly upon suitable plate bearings 139' fastened to the bottom of the block 139, being positioned at the bottom inwardly and outwardly by diagonal upwardly and inwardly sloping links 146 to a bar 147 that is rigidly fastened to the bottom of the plunger 137, and positioned at the top inwardly and outwardly by diagonal upwardly and inwardly sloping links 148 to the plunger 138.

Each of the four composite plates includes an inner and an outer plate, the outer plate 50 being recessed to receive a narrow pad 51 of sponge rubber, the pad normally protruding beyond the face of the plate.

When the plates 50 are expanded against the box sides, the sponge rubber pad 51 is compressed until its outer face coincides with the plane of the outer plates, offering resilient outward pressure against the box sides.

Only narrow rubber pads at the top edges of the outer plates 50 are required, to correspond with the stencil glued area of the lining blank.

The same box form can be used for all ordinary boxes, the differences in box sizes being taken care of by furnishing sets of outer plates 50 of varying thicknesses.

Longer boxes require thicker end plates, and wider boxes require thicker side plates.

The inner plate members include inwardly extending lugs 150 that pivotally connect at the bottom to the shoes 140' and at the top to the lower ends of the links 148, the shoes and links operating in suitable slots of the central casting 139.

The form enters the box in contracted position, and upon reaching the box bottom, the lower edges of the outer plates 50 are expanded into the four lower corners of the box by the continued downward movement of the plunger 137 after the central block 139 comes to rest on the bottom of the box.

During this operation, the upper edges of the outer plates carrying the sponge rubber pads, are kept in contracted position, leaving the four upwardly projecting wings of the lining blank adjacent the box walls free to yield downwardly as the lower edges of the plates 50 expand into the lower corners of the box, until the lining blank has been folded sharply into the corners by the bottom edges of the expanded plates.

Sharp corners are desirable, since boxes are generally made closely to fit the articles they are intended to contain.

With the lower edges of the outer plates 50 remaining in expanded position, holding the blank in the box corners, the upper edges of the plates are then expanded, that is

moved outwardly, into engagement with the inside walls of the box, the sponge rubber pads furnishing resilient outward pressure against the box walls and causing adherence of the stencil glued portions of the lining blank to the box sides.

Subsequently the upper edges of the plates are contracted first, and then the lower edges, leaving the box free to stand on the track as the form is upwardly withdrawn from it. It will be seen that two separate and distinct expanding motions are provided, first the lower, and then the upper.

It is evident that when the plunger 137 and the casting 139 are reciprocated as a unit, the six shoes 140' remain stationary with respect to the plunger and central casting until the casting 139 comes to rest on a box bottom, after which further downward movement of the plunger 137 causes the plunger to enter further into the recess 141 of the casting 139 and thereby driving the six slides 140' outwardly through the connections outlined above, expanding the lower edges of the four plates 50.

Subsequent upward movement of the plunger at first serves to retract the six shoes to their former inward position, the casting 139 being prevented from following the initial upward movement of the plunger by the action of the springs 144 and 145 as well as by its own weight.

When the slides are completely retracted and the pin 142 has reached the upward limit of the slots 143, continued upward movement of the plunger 137 raises the casting 139 and all dependent parts.

Two purposes are thus served by the plunger 137, that of reciprocating the form, and that of expanding and contracting the lower edges of the plates.

The plunger 137 is reciprocated by a link 151 (Figure 1) a lever 151' and an adjustable connecting rod 152 attached to a cam lever 153, one end of which is mounted by means of a stud to the frame of the machine and the center portion of which is provided with a roller to engage a suitable groove in a cam 154 located on the main cam shaft 40.

The top edges of the plates 50 carrying the sponge rubber pads 51 are driven inward and outward by the six links 148.

Three of the links 148 are mounted in each of the two connecting blocks 155 rigidly attached to opposite ends of a plate 156 which comprises a head portion of the plunger 138. This includes rods 38 adapted to slide in recesses in opposite sides of the main plunger 137.

The rods 138 extend somewhat above the upper end of the main plunger 137 (Figure 1) where they are connected together, and are driven by a connecting block 158, link 159, lever 160, connecting rod 161, cam lever

162 and cam 163 located on the main cam shaft 40.

The plungers 137 and 138 reciprocate as a unit during the greater part of each cycle.

5 The reinforcing mechanism operative at station 35 is used when it is desired to reinforce the box hinges by extending the rearward wing 48 of the lining up on to the edge of the lid and then only. The rearward wing 10 is then made about an inch longer than when the hinge reinforcement is not desired.

When the form has completed its lining operation at the lining station 34, (Figures 3 and 4) the upward extension 53 of the wing 15 48 of a lining is left standing upright from the inside of the rear box wall.

The subsequent cycle of the machine advances the box to the reinforcing station 35 where the upstanding projection 53 of the paper blank is turned over the top of the 20 rear box wall on to the inside of the box lid.

The frame 165 (Figures 4 to 6) is attached to the table and is horizontally inwardly flanged at 166 to support the box lids as the 25 boxes are advanced along the track.

Two upstanding arms 167 support aligned bearings 168 to carry a cross hub and shaft portion 169 of a rocker 170, at one end of which is cast a block 171.

30 The opposite ends of the block 171 are provided with grooves diagonally upward to receive two upwardly projecting supporting lugs 172 of a member 173 that carries the ninety degree angle pad 56 that is in position 35 to engage the turned flap and is desirably faced with sponge rubber.

The member 173 carrying the angle pad is fastened adjustably to the block 171 of the 40 rocker by means of the lugs 172 that fit adjustably in side grooves of the block where they are fastened in any suitable way.

I pivotally support similar levers 175 in bracket bearings 176 at the ends of the member 173 and mount a rubber covered roller 54 45 between bearings on the lower ends of the levers 175.

During a reciprocation of the rocker 170 the roller 54 and angle pad 56 move arcuately 50 downwardly to successively engage the flap, the roller coming down on the inner corner 178 of the box on the unglued side of the flap. The box is located in its proper position by the box locators 45.

55 I guide the roller 54 outwardly over the top of the rear box wall by means of outwardly extending arms 179 from the levers 175 and by cooperating stationary pins 180 in suitable brackets 181.

60 As the roller descends, the arms 179 maintain contact with the pins 180 until the roller begins to roll outwardly from the corner 178 after which during the remainder of the down stroke of the pad member the arms 65 travel upwardly from the pins.

The arms 179 and pins 180 cooperate in registering the roller with the inner corner of the box and in then insuring that the roller move upwardly and outwardly rather 70 than inwardly and downwardly.

The roller 54 having creased the paper over the top edge of the rear box wall, rolls the paper outwardly on to the lid and continues 75 outwardly to a position well beyond the paper reinforcing wing in order to be out of the way of the rubber-faced angle pad, which registers with the corner 178 pressing the turned flap to place.

The rubber pad furnishes resilient pressure outward against the rear box wall, and 80 resilient pressure downward against the top of the rear box wall and the adjacent inner face of the open lid, pressing the paper, previously glued, firmly into place there.

The rocker 170 is reciprocated, through the 85 connecting rod 182 (Figure 1) by the cam 183 on the main cam shaft.

A spring 184 is provided to insure the return of the lever to its initial position, permitting the boxes to move without interfer- 90 ence along the track.

The movements of the different parts may be best understood by reference to Figure 21, in which the different curves show the positions 95 of the different parts with respect to the angular position of the main cam shaft, the length of the abscissae corresponding to one complete revolution, 360°, of the shaft.

The cycle begins with the clutch release which takes place at the point 186 by the 100 depression of the treadle 28 after the box has been placed in position upon the track back of the transfer lug 43 and the paper has been placed upon the gauges above the box. The 105 lining blank rests on the top of the box with the gauges fitting in three of the corner spaces between the four flaps and the lid flap 48 is supported upon a bar 44 just above the lid.

This bar is necessary if there is a lid but may optionally be omitted if the box has no 110 lid.

The paper gauges and transfer lugs move inwardly between the points 188 and 189, the box lining blank and gauges moving as a unit 115 from the feed position to the lining position.

Before the box has reached the lining position the box locator has made a major portion of its closure stroke, beginning to close at the point 190 and having inwardly advanced the rearward lugs 80 before the 120 gauges and transfer mechanism come to rest at the lining position to overlap the forward end of the box so that the box is unable to over-run the point at which the transfer lugs come to rest, the box engaging the lugs 80 125 of the locators.

Desirably the complete closure of the box locators which takes place at the point 191 should be a little later than that at which the 130 gauges come to rest in order to provide time 135

for exactly registering the box with respect to the locators before the locators clamp the box.

5 The main plunger begins to move downwardly at the point 192 before the box and lining blank have been positioned beneath the plunger and engages the paper blank, pushing it down into the box between the points 189 and 193.

10 The lugs 43, 43' and 43² that have simultaneously advanced three boxes, an unlined box from the position to lining position, a lined box from the lining position to the reinforcing position and a finished box from the reinforcing position to discharge, move downward between the points 194 and 195 starting downward as soon as the box locators have properly taken hold of the box and after having moved downward far enough to clear the bottoms of advanced boxes return respectively to the positions 33, 34 and 35, moving upward at these positions between the points 196 and 197.

25 The main block 139 at the lower end of the plunger 137 of the form 42 comes to rest upon the bottom of a box, pressing a blank down on the bottom at the point 193 and the plunger 137 continues downwardly between the points 193 and 198 to expand the lower edges of the plates 50 into the bottom corners of the box. The plunger 137 comes to rest at the point 198 and the plunger 138 continues downwardly to the point 199, the outward expansion of the upper edges of the plates 50 taking place between the points 198 and 199 during which the plunger 137 is at rest at its low position. The plunger 138, continues to move downwardly to force the upper edges of the plates outwardly, the plunger 138 coming to rest at the point 199.

The paper gauges start back toward the feed position at the point 200 having returned to their initial position at the feeding station at the point 201.

45 The plunger 138 begins to move upwardly at the point 202 and has completed the contracting movement of the plates 50 at the point 203 at which point the plunger 137 begins to move up as a unit with the plunger 138.

50 The contraction of the bottom of the edges of the plates 50 take place between the points 203 and 204 after which the casting 139 and plungers 137 and 138 continue to move upwardly to the end of the cycle.

55 The box locators begin to open at the point 205 after the main plunger has lifted the form 42 clear of the boxes, continuing to open to the end of the cycle and leaving the box standing free on the track, with a transfer lug 43' now positioned back of the box ready to carry the box onward to the reinforcing mechanism.

60 The box is carried to the reinforcing mechanism, that is from the station 34 to the station 35 between the points 188 and 189

of the next cycle during which a new box is brought to the lining station.

The rocker 170 carrying the roller 177 and angle pad 174 moves the roller and pad downwardly between the points 206 and 207, the roller engaging the inner edge of the box back of the upward extension of the blank, creasing the blank over the edge and being guided inwardly over the top of the box and the edge of the lid by cooperating action of the arms 179 and pins 180, the angle pad engaging the turned down reinforcement flap after the roller is out of the way as seen in Figure 7.

The return movement of the reinforcement rocker takes place between the points 208 and 209 of the next cycle, the lug 43² being again positioned back of the reinforced box at the point 197 ready to expel the box in the next cycle between the points 188 and 189.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such in so far as they fall within the reasonable spirit and scope of my invention.

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

1. In mechanism for lining a box with a cruciform lining, a registry gauge for definitely positioning a box, a second gauge fitting against adjacent sides at three corners of a cruciform blank when the blank is registering with an open box and resting on the sides thereof, a form laterally spaced from the box when in the said definite position and when the box and blank are in proper registry therewith adapted to carry the blank downwardly into the box and to apply it to the bottom and sides thereof, in combination with means for moving the box, the second gauge and the blank as a unit from the said definite position into the said proper registry with the form.

2. In mechanism for lining a box with a paper lining, a box track, means for registering an upwardly directed box at one point thereof and for registering a blank with the box across the top of the box, means for moving the box and blank as a unit along the track to another point thereof and a vertically reciprocating form adapted to move downwardly into and up out of the box at the said other point to apply the blank to the bottom and sides of the box.

3. In mechanism for lining a box with a lining blank, means for registering an upwardly directed open box in a definite position, a horizontal bar along and parallel to

one side of the positioned box and laterally spaced therefrom, a gauge mounted near one end of the bar adapted to engage and register one corner of a blank registering with a box
 5 across the open top thereof, and a second gauge mounted adjustably on the bar near the other end thereof adapted to engage and position surfaces of the blank at two other corners thereof.

10 4. In mechanism for lining a box with a cruciform lining blank, a box track having a feed station and a lining station spaced therefrom, means for registering an upwardly directed open box on the track at the feed station, a mount alongside the track at the feed
 15 station, a gauge horizontally hinging on the mount near one end thereof spring pressed to a normal position at which it forwardly overlaps the forward end of a box at the feed station and adapted to engage and position
 20 one corner of a blank registering with the box across the open top thereof, a second gauge carried by the mount at the rearward end of the box and adapted to engage and position
 25 surfaces of the blank corners at the rearward end of the box, in combination with means for transferring the box, the mount and the blank as a unit from the feed station to the lining station and the mount then back to the feed
 30 station, the hinge opening to permit the first gauge to swing out to pass the box.

5. In mechanism for lining a box with a lining blank, a box track having a feed station and a lining station spaced therefrom,
 35 means for registering an upwardly directed open box at the feed station, a mount alongside the track spaced from the box at the feed station, a gauge mounted on the forward end of the mount adapted to engage and register
 40 the near forward corner of a lining blank registering with the box upon the top thereof, a gauge across the rearward end of the box in position to engage and register the rearward corners of the blank, a horizontal spring
 45 hinge connection between the mount and gauge adapting the gauge to normally maintain its position for registering a blank and to yield outwardly when subjected to an engagement with a misplaced box or the like
 50 and to resiliently return to its gauging position when free to do so, and means for transferring the box, mount and blank as a unit from the feed position to the lining position.

6. In mechanism for lining a box with a
 55 lining blank, a box track having a feed station and a lining station spaced therefrom, means for registering an upwardly directed open box at the feed station, a mount alongside the track spaced from the box at the feed station,
 60 a gauge mounted on the forward end of the mount adapted to engage and register the near forward corner of a lining blank registering with the box upon the top thereof, a gauge across the rearward end of the box in
 65 position to engage and register the rearward

corners of the blank, a horizontal spring hinge connection between the mount and gauge adapting the gauge to normally maintain its position for registering a blank and to yield outwardly when subjected to an engagement with a misplaced box or the like
 70 and to resiliently return to its gauging position when free to do so, and means for transferring the box, mount and blank as a unit from the feed position to the lining position,
 75 said hinge connection including a spring plunger pressing the gauge to its position of normal closure when the gauge is at or near its said closure position and pressing the gauge to an open position when the gauge is
 80 at or near the said open position.

7. In mechanism for lining a box with a cruciform lining blank, a registry gauge for definitely positioning the box, a second gauge fitting against adjacent sides of a blank at
 85 three corners thereof when the blank is registering with the box across the open top thereof and relative independent adjustments for the second gauge respectively operative horizontally parallel to the track and horizontally transverse to the track.

8. In mechanism for lining a box with a cruciform lining blank, a registry gauge for definitely positioning the box, a second gauge fitting against adjacent sides of a blank at
 95 three corners thereof when the blank is registering with the box across the open top thereof and relatively independent adjustments for the second gauge respectively operative horizontally parallel to the track, horizontally transverse to the track and angularly with respect to the track in a horizontal plane.

9. In mechanism for lining a box with a cruciform lining blank, a registry gauge for definitely positioning the box, a second gauge fitting against adjacent sides of a blank at
 105 three corners thereof when the blank is registering with the box across the open top thereof and relatively independent adjustments for the second gauge respectively operative horizontally parallel to the track, horizontally transverse to the track, angularly with respect to the track in a horizontal plane, and vertically.

10. In mechanism for lining a box with a
 115 cruciform lining blank, a registry gauge for definitely positioning the box, a second gauge fitting against adjacent sides of a blank at three corners thereof when the blank is registering with the box across the open top thereof and relatively independent adjustments for the second gauge respectively operative horizontally parallel to the track, horizontally transverse to the track and angularly with respect to the track in a horizontal plane
 120 vertically, in combination with a nut simultaneously locking all of the adjustments when tight and freeing them when loose.

11. In mechanism for lining a box with a lining blank, a box track having a feed station
 130

and a lining station spaced therefrom, a transfer carriage having a range of movement alongside of the track between the two stations and a normal position alongside of the feed station, means for definitely positioning a box at the feed station, a gauge in position to register three corners of the blank resting upon the box in registry therewith, said three corners including the corners toward the carriage and at the rearward end of the box, in combination with a supporting connection between the carriage and gauge including a vertical adjustment bolt journaling in the carriage, a vertical slide having a vertical guide connection with the carriage, a turntable having an angular adjustment with respect to the slide, a plate having rectilinear adjustment with respect to the turntable and a second plate carrying the gauges having rectilinear adjustment with respect to the first plate at right angles with respect to the first rectilinear adjustment, and connections for transferring the box and carriage as a unit to the lining position and then returning the carriage without the box to the feed station.

12. Mechanism in accord with claim 11 characterized by a laterally extending arm on the said second plate, lugs from the first plate spaced from and on opposite sides of the arm, a horizontal screw threading through the arm and journalling in the lugs, a downward extension from the first plate and a second horizontal screw longitudinally transverse to the first screw making adjustable screw connection between the first plate and turntable.

13. Mechanism in accord with claim 11 characterized by a screw journalling in the slide and threaded connection between the screw and table adapting rotation of the screw to angularly turn the table.

14. Mechanism in accord with claim 11 characterized by the vertical adjustment bolt threading the vertical slide, journalling the table, loosely passing through the first and second plates and carrying a nut above the second plate normally clamping the plates and table between the slide and nut.

15. In mechanism for lining a box with a lining blank, a box track having a feed station and a lining station spaced therefrom, means for registering an upwardly directed open box on the track at the feed station, means for registering a blank with the box across the top thereof, means for moving the box and blank as a unit from the feed station to the lining station, locators along opposite sides of the track at the lining stations normally spaced outwardly from the track, means for moving the locators inwardly into engagement with the box when the box reaches the lining position thereby exactly registering the box and blank at the lining station, and a vertically reciprocating form adapted to move downwardly into and up

out of the box to apply the blank to the bottom and sides of the box.

16. In mechanism for lining a box with a lining blank, a box track having a feed station and a lining station spaced therefrom, means for registering an upwardly directed open box on the track at the feed station, means for registering a blank with the box across the top thereof, means for moving the box and blank as a unit from the feed station to the lining station, locators along opposite sides of the track at the lining stations normally spaced outwardly from the track, each locator being formed with an inwardly projecting lug at its forward end adapted to overlap and register the forward end of a box at lining position when the locator is at its box registry position, means for moving the locators inwardly into engagement with the box as the box reaches the lining position thereby exactly registering the box and blank at the lining station, and a vertically reciprocating form adapted to move downwardly into and up out of the box to apply the blank to the bottom and sides of the box.

17. In mechanism for lining a box with a lining blank, a box track having a feed station and a lining station spaced therefrom, means for registering an upwardly directed open box on the track at the feed station, means for registering a blank with the box across the top thereof, means for moving the box and blank as a unit from the feed station to the lining station, locators along opposite sides of the track at the lining stations normally spaced outwardly from the track, each locator being formed with an inwardly projecting lug at its forward end and an inwardly projecting lug at its rearward end, said lugs being adapted to overlap and register the forward end and the rearward end of a box at lining position when the locator is at its box registry position, means for moving the locators inwardly into engagement with the box when the box reaches the lining position thereby exactly registering the box and blank at the lining station, and a vertically reciprocating form adapted to move downwardly into and up out of the box to apply the blank to the bottom and sides of the box, the outward pressure exerted upon the interior of the box by the form in applying the blank to the box sides being supported wholly or partially by the said locators.

18. Mechanism in accord with claim 17 characterized by the lugs at the forward ends of the locators being somewhat longer than those at the rearward ends thereof and the inward movement of the locators positioning the inward ends of the forward lugs in position to be engaged by and stop the forward movement of the box while the inner ends of the forward lugs are yet sufficiently outward to pass the box.

19. Mechanism in accord with claim 15

characterized by the locators including horizontally pivoted rockers and locator heads interchangeably mounted thereon variably dimensioned to accommodate variant box dimensions.

20. In mechanism for lining a box with a lining blank, a box track having a feed station and a lining station spaced therefrom; means for registering an upwardly directed open box on the track at the feed station, a gauge carriage alongside the track at the feed station, a gauge on the carriage for registering a blank with the box across the top thereof, a slide adapted to engage the rearward end of a box at the feed station and means for intermittently and simultaneously reciprocating the carriage and slide from the feed station to the lining station and return.

21. In mechanism for lining a box with a lining blank, a box track having successively a feed station, a lining station and a reinforcement station, the spacing between the feed and lining stations being substantially that between the lining and reinforcement stations, a horizontal slide under the track, a vertical slide providing a horizontal slide-way support for the first slide, a plurality of forwardly directed upward abutments on the slide adapted in rearwardly retracted position of the first slide and upwardly retracted position of the second slide to register their respective forwardly directed faces against rearward ends of boxes at successive stations of the track, a carriage alongside the track at the feed station during said retracted positions of the slides, a gauge on the carriage for registering a blank across the top of an open box at the feed station, a vertically sliding horizontally locking connection between the carriage and first slide and mechanism for intermittently reciprocating the slides from their said retracted positions, moving the first slide horizontally forward with the second slide in its raised position, moving the second slide downwardly, at the end of said forward stroke, retracting the first slide rearwardly and then the second slide upwardly.

22. In mechanism for lining a box with a lining blank, a vertically reciprocating forming die including side plates, means for registering an open box and a blank across the top thereof beneath the die, means for moving the die downwardly into the box and when pressing the blank against the bottom of the box for moving the bottoms of the side plates outwardly pressing the blank into the bottom corners of the box and then outwardly at the top pressing the blank outwardly against the interior of the box sides.

23. Mechanism in accord with claim 22 characterized by the means for registering the box and blank with the die including locators supporting the outward pressure of the plates against the interior of the box,

said locators clamping opposite sides of the box and overlapping the ends thereof.

24. In mechanism for lining a box with a lining blank, a forming die including side plates and end plates, a vertical plunger, inwardly and upwardly extending links from the inner sides of the individual plates near the bottoms thereof to the plunger, a second vertical plunger, other inwardly and upwardly extending links from the inner sides of the individual plates near the tops thereof to the said second plunger, a downwardly directed head on the first plunger adapted to upward yielding with respect to the first plunger, means for registering a box and blank across the top thereof beneath the die, and means for vertically reciprocating the plungers.

25. In mechanism for lining a box with a lining blank, a forming die including side plates and end plates, a vertical plunger, inwardly and upwardly extending links from the inner sides of the individual plates near the bottoms thereof to the plunger, a second vertical plunger, other inwardly and upwardly extending links from the inner sides of the individual plates near the tops thereof to the said second plunger, a downwardly directed head on the first plunger adapted to upward yielding with respect to the first plunger, means for registering a box and blank across the top thereof beneath the die, and means for vertically reciprocating the plungers, moving the plungers simultaneously downwardly until the said head presents the blank against the bottom of the box and the first links have expanded the bottoms of the plates outwardly to press the blank to the interior of the box, continuing the downward movement of the second plunger a short distance after the first plunger comes to rest to move the tops of the plates outwardly and in the upward strokes of the plungers retracting the second plunger for the said short distance before starting the retraction of the first plunger.

26. The mechanism of claim 24 characterized by the head comprising a metal block having a vertical range of movement with respect to the first plunger, spring pressed downwardly with respect to the said first plunger and vertically slotted at the sides to house the links.

27. The mechanism of claim 24 characterized by the side plates each including an inner plate having inner diagonally upward link connection at bottom and top to the respective plungers and an outer plate of thickness determined by the size of box with which the die is to be used and interchangeable with one or more other plates of different thickness to accommodate the die to use with boxes of variant dimensions.

28. The mechanism of claim 24 characterized by the plates having outside recesses

along their upper edges and soft rubber outwardly extending pads seating in the recesses adapted to contract into the recesses when the tops of the plates are expanded into engagement with the blank against the interior of the box.

29. Mechanism for definitely positioning a box having a horizontally open lid hinged to the box and an inside flap along the hinge extending upwardly out of the box, a roller, an angle pad, means for applying the roller against the flap along the upper inner corner edge of the hinge side of the box rolling the flap outwardly and downwardly over the side of the box on to the lid, and means for applying the angle pad over the rolled down flap by pressing the angle of the pad downwardly and outwardly upon the said upper inner corner edge.

30. Mechanism in accord with claim 29 characterized by a rocker, a horizontal pivot support therefor upwardly and outwardly from the said upper inner corner edge and parallel thereto, supporting connections between the rocker and roller and rocker and pad and means for angularly reciprocating the rocker to operate the roller and pad.

31. Mechanism for definitely positioning a box having a horizontally open lid hinged to the box and an inside flap along the hinge extending upwardly out of the box, a roller, an angle pad, means for applying the roller against the flap along the upper inner corner edge of the hinge side of the box rolling the flap outwardly and downwardly over the side of the box on to the lid, means for applying the angle pad over the rolled down flap by pressing the angle of the pad downwardly and outwardly upon the said upper inner corner edge, a rocker, a horizontal pivot support therefor upwardly and outwardly from the said upper inner corner edge and parallel thereto, supporting connections between the rocker and roller and rocker and pad and means for angularly reciprocating the rocker to operate the roller and pad, said mechanism being characterized by the supporting connection between the rocker and roller including spaced levers having axially aligned horizontal pivot support at the top near the pad, giving journal support at their lower ends to opposite ends of the roller and stationary guides engaging the levers to register the roller with the said corner edge and thereafter to limit the roller to outward movement as the rocker moves the pad arcuately downward toward the said corner edge.

32. Mechanism in accord with claim 11 characterized by a laterally extending arm on the said second plate, lugs from the first plate spaced from and on opposite sides of the arm, a horizontal screw threading through the arm and journalling in the lugs, a downward extension from the first plate, a second horizontal screw longitudinal trans-

verse to the first screw making adjustable screw connection between the first plate and turntable, a screw journalling in the slide and threaded connection between the screw and table adapting rotation of the screw to angularly turn the table.

33. Mechanism in accord with claim 11 characterized by a laterally extending arm on the said second plate, lugs from the first plate spaced from and on opposite sides of the arm, a horizontal screw threading through the arm and journalling in the lugs, a downward extension from the first plate, a second horizontal screw longitudinally transverse to the first screw making adjustable screw connection between the first plate and turntable, the vertical adjustment bolt threading the vertical slide, journalling the table, loosely passing through the first and second plates and carrying a nut above the second plate normally clamping the plates and table between the slide and nut.

34. Mechanism in accord with claim 11 characterized by a screw journalling in the slide, threaded connection between the screw and table adapting rotation of the screw to angularly turn the table, the vertical adjustment bolt threading the vertical slide, journalling the table, loosely passing through the first and second plates and carrying a nut above the second plate normally clamping the plates and table between the slide and nut.

35. Mechanism in accord with claim 16 characterized by the locators including horizontally pivoted rockers and locator heads interchangeably mounted thereon variantly dimensioned to accommodate variant box dimensions.

36. Mechanism in accord with claim 17 characterized by the locators including horizontally pivoted rockers and locator heads interchangeably mounted thereon variantly dimensioned to accommodate variant box dimensions.

37. Mechanism in accord with claim 17 characterized by the lugs at the forward ends of the locators being somewhat longer than those at the rearward ends thereof, the inward movement of the locators positioning the inward ends of the forward lugs in position to be engaged by and stop the forward movement of the box while the inner ends of the forward lugs are yet sufficiently outward to pass the box and the locators including horizontally pivoted rockers and locator heads interchangeably mounted thereon variantly dimensioned to accommodate variant box dimensions.

38. The mechanism of claim 25 characterized by the head comprising a metal block having a vertical range of movement with respect to the first plunger, spring pressed downwardly with respect to the said first

plunger and vertically slotted at the sides to house the links.

39. The mechanism of claim 25 characterized by the side plates each including an inner plate having inner diagonally upward link connection at bottom and top to the respective plungers and an outer plate of thickness determined by the size of box with which the die is to be used and interchangeable with one or more other plates of different thickness to accommodate the die to use with boxes of variant dimensions.

40. The mechanism of claim 24 characterized by the head comprising a metal block having a vertical range of movement with respect to the first plunger, spring pressed downwardly with respect to the said first plunger, vertically slotted at the sides to house the links, the side plates each including an inner plate having inner diagonally upward link connection at bottom and top to the respective plungers and an outer plate of thickness determined by the size of box with which the die is to be used and interchangeable with one or more other plates of different thickness to accommodate the die to use with boxes of variant dimensions.

41. The mechanism of claim 25 characterized by the plates having outside recesses along their upper edges and soft rubber outwardly extending pads seating in the recesses adapted to contract into the recesses when the tops of the plates are expanded into engagement with the blank against the interior of the box.

42. The mechanism of claim 24 characterized by the head comprising a metal block having a vertical range of movement with respect to the first plunger, spring pressed downwardly with respect to the said first plunger and vertically slotted at the sides to house the links, the plates having outside recesses along their upper edges and soft rubber outwardly extending pads seating in the recesses adapted to contract into the recesses when the tops of the plates are expanded into engagement with the blank against the interior of the box.

43. The mechanism of claim 24 characterized by the side plates each including an inner plate having inner diagonally upward link connection at bottom and top to the respective plungers, an outer plate of thickness determined by the size of box with which the die is to be used and interchangeable with one or more other plates of different thickness to accommodate the die to use with boxes of variant dimensions, the plates having outside recesses along their upper edges and soft rubber outwardly extending pads seating in the recesses adapted to contract into the recesses when the tops of the plates are expanded into engagement with the blank against the interior of the box.

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