

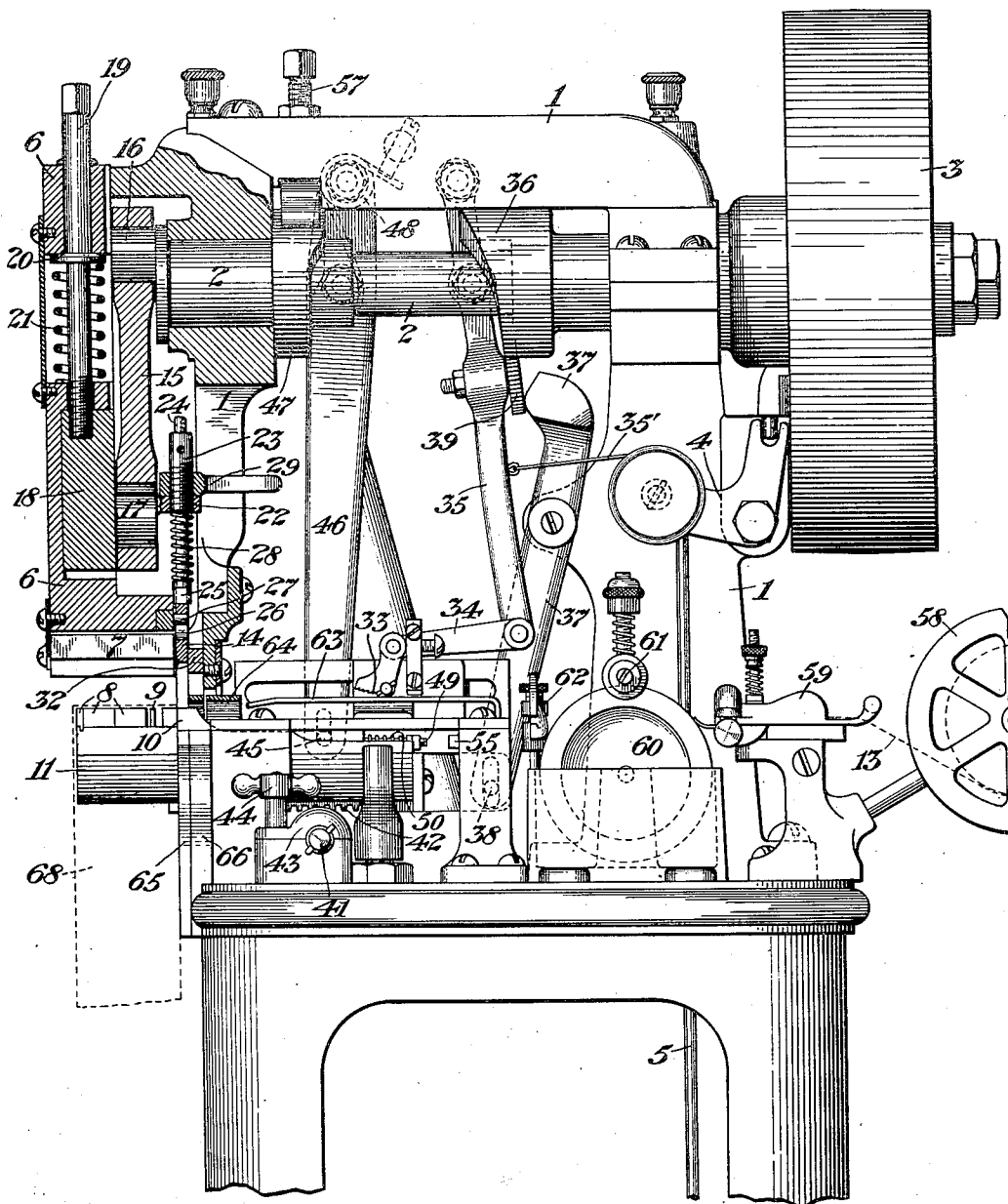
M. D. KNOWLTON, DEC'D.
A. D. & F. K. KNOWLTON, ADMINISTRATORS.
MACHINE FOR ATTACHING BOX CORNER STAYS.
APPLICATION FILED APR. 27, 1906.

1,061,084.

Patented May 6, 1913.

3 SHEETS—SHEET 1.

Fig. 1



WITNESSES:

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May E. Stanton

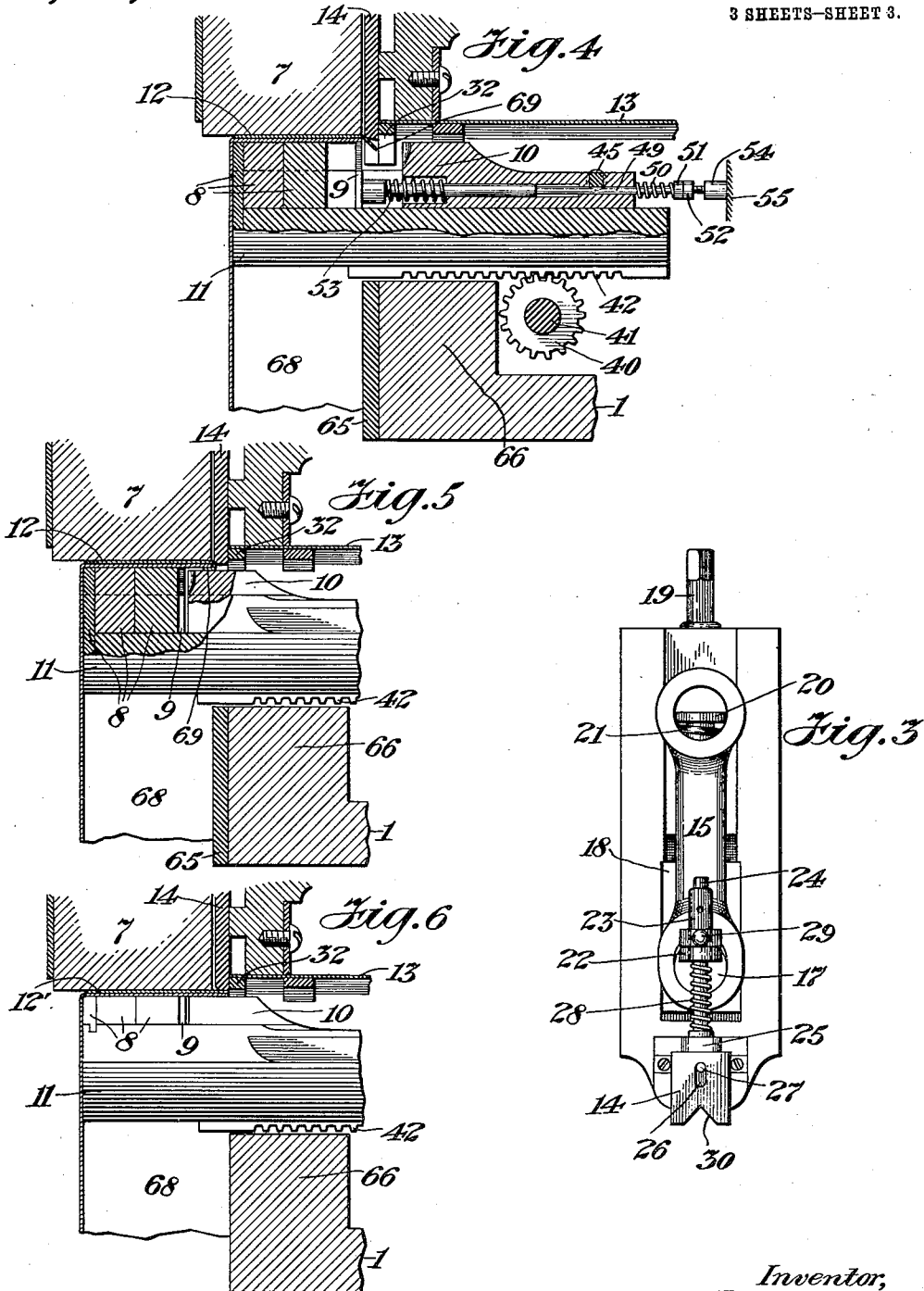
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ANNIE D. KNOWLTON AND FREDERIC K. KNOWLTON, OF ROCHESTER, NEW YORK,
ADMINISTRATORS OF MARK D. KNOWLTON, DECEASED.

MACHINE FOR ATTACHING BOX-CORNER STAYS.

1,061,084.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed April 27, 1906. Serial No. 314,106.

To all whom it may concern:

Be it known that MARK D. KNOWLTON, late a citizen of the United States, and resident of Rochester, Monroe county, State of New York, now deceased, invented certain new and useful Improvements in Machines for Attaching Box-Corner Stays, of which the following is a specification.

This invention relates to an improved machine for attaching stays or reinforcing strips to the corner joints of boxes made of paper, paper-board or like material; and the invention has for its object to permit use of the same machine, adjusted by application or removal of a readily accessible part, for applying a "turned-in" stay at the outside and inside of a box-corner, or to apply a "plain" stay at the outside only of a box-corner.

The invention mainly consists in providing a detachable gage operative relatively to the box-corner and to the stay severing and affixing means in manner assuring that when the gage is adjusted for use, a turned-in stay will be applied to a box-corner, and when the gage is removed, a plain stay will be applied to a box-corner. In applying a turned-in stay, a plunger-operated device acts as a cutter, severing a proper length of material from a strip to form the stay, and acts also as a tucker which partially bends or tucks under a protruding end of the cut stay into position to be acted upon by a right-angularly disposed turn-in die which lays this end of the stay smoothly against the inner face of a box-corner. When applying a plain stay this plunger device acts as a cutter, severing a proper length of stay from a strip, and then serves as a presser or auxiliary die coacting with other die surfaces to closely press the stay to the outer face of the box-corner; all as hereinafter described and particularly pointed out in the appended claims.

Reference is made to the accompanying drawings forming part of this specification, and in which—

Figure 1 is a side elevation of the upper parts of a box-corner stay-attaching machine embodying this invention, and with its upper front movable die and plunger portions in central vertical section, and with the gage applied as when attaching a "turned-

in" box-corner stay. Fig. 2 is a front view of the machine so adjusted. Fig. 3 is a rear elevation of the upper movable die-stock, its operating link, and the stay severing, tucking and pressing device; all removed from the machine. Figs. 4 and 5 are detail longitudinal sectional views illustrating application of a "turned-in" box-corner stay when the gage is applied; and Fig. 6 illustrates application of a "plain" stay when the gage is removed.

In the drawings, the numeral 1 indicates the head-frame of the machine in which is journaled a main driving shaft 2 having a pulley 3 provided with a clutch controlled by an elbow-lever 4 and a connected foot-operated rod 5 for throwing the driving shaft into gear with the pulley to operate the machine. At the front of the frame 1 is fitted a vertically reciprocating die-stock 6 carrying a die 7 notched upward angularly at its working face and coöperating with the bed-dies 8, 9, 10, having corresponding right-angularly disposed upper faces. These bed-dies are held to a horizontally adjustable stock 11 which resists pressure of the opposing dies on a box-corner while affixing thereto a stay which had been severed from a forwardly advanced stay-strip 13 by the combination stay severing, tucking and pressing device 14. This device is preferably held to and operated by the same link 15 which operates the die 7 and is reciprocated vertically by an eccentrically set wrist-pin 16 on the driving shaft 2. A vertically elongated or eccentric slot at the lower end of the link 15 receives a round stud 17 which is fixed to a block 18 having limited independent movement vertically in a recess of the die-stock 6 which normally provides a clearance space at the bottom of the block. A vertically adjustable rod 19 fitted loosely in the die-stock 6, has a shoulder or collar 20 resting on a spring 21 placed in a recess of the stock. This rod is screwed into the block 18 so that by turning the rod said spring 21 may be compressed more or less between the rod collar 20 and the bottom wall of the spring receiving recess to regulate pressure of the upper die 7 upon the stay while finally pressing it to a box-corner in manner hereinafter more fully explained.

To accommodate varying operations of the device 14 during application of "turned-in" and "plain" box-corner stays, said device is elastically supported, as best shown in Figs. 1 and 3 of the drawings. To the stud 17 of the die-stock block 18 is fixed a lug 22 which has an internal screw-thread engaging an external thread upon a collar or sleeve 23 through which loosely passes a rod or stem 24 having a foot-block 25 which squarely bears upon the top of the device 14, and this device has a vertical slot 26 receiving a steadying pin 27 fixed in the die-stock 6. This connection of the device 14 permits it to be readily removed at any time for sharpening or renewal. On the stem 24 is placed a spring 28 which expands between the lower end of the collar 23 and the block 25, thereby forcing the device 14 normally downward until stopped by the pin 27, while allowing upward yielding of the device against the tension of the spring. The collar 23 may be turned in the lug 22 for regulating the tension of the spring 28, by a pin or spanner applied at upper holes in the collar, and after being so adjusted a lock-nut lever 29 threaded to the collar is turned down against the lug 22 to maintain the desired spring tension.

The device 14 has an angular inner lower cutting edge 30 coacting with a reverse angular outer cutting edge 31 of a hollow stationary cutter 32 suitably held to the frame 1 to allow the angularly-folded stay-strip 13 to be fed between the edges of the two cutters 30, 32, any necessary distance to cause the cutters to sever a box-corner stay 12 of proper length from said strip. This forward feeding of the stay-strip 13 may be effected in any approved manner and preferably by opposing bodily reciprocating clamping jaws 33 guided on the frame and operated by a link 34 coupled to a lever 35 hung upon the frame 1 and moved forward by a face cam 36 on the driving shaft 2, and retracted by a spring 35' which thus also moves the clamping jaws rearward in readiness to again seize and clamp the stay-strip prior to the next forward feed of the strip to the cutters.

When the horizontal die-stock or anvil-block 11 is adjusted backward or forward to accommodate a lower or higher box to be corner-stayed, the position of the stay-strip feeding devices on their guide is simultaneously changed for assuring feeding and severing of a correspondingly shorter or longer stay 12 from said strip. This adjustment of the stay feeding devices is caused primarily by a lever 37 fulcrumed on the frame and having at its lower end a slot receiving a pin 38 fixed to the stock 11, while the upper end of said lever 37 acts upon an adjustable plate 39, held to the lever 35. When the stock 11 is moved rearward to ac-

commodate a lower box the lever 37 positively swings the lever 35 forward to move the feeding devices 33 bodily forward and thus correspondingly shorten the length of stay-strip fed to the cutters 30, 32; and when the stock 11 is moved forward to accommodate a higher box the head of lever 37 is moved rearward and permits the spring 35' to draw the lever 35 and feeding devices 33 rearward to provide for feeding and cutting a correspondingly longer stay-strip for the corner of a higher box.

The stock 11 carrying the bed-die 8, 9, 10, may be adjusted forward or backward in any manner, but preferably by a pinion 40 fixed to a shaft 41 journaled on the frame 1 and adapted to be turned by an applied key. This pinion engages a rack 42 on the stock 11, and when the stock is properly adjusted it is locked by a suitable clamp 43 forced to the pinion shaft by a hand-screw 44. During the box-joint-staying operation the bed-die 8, here shown made in three pieces, is immovable endwise in the stock 11, but the other two dies 9, 10 are moved forward and backward but are so guided in the stock that they do not have either lateral or vertical movement. As more clearly shown in Figs. 1 and 4 of the drawings, the die 10 has a rearward extension carrying a laterally projecting pin 45 which enters a slot in the lower free end of a lever 46 fulcrumed on the frame 1. This lever is movable rearward by a face cam 47 on the driving shaft 2 and is retracted forwardly by a spring 48. Within the die 10 is loosely fitted a rod 49 on the rear end of which is placed a spring 50 which normally expands between the rear end of the die 10 and an adjustable nut 51 threaded on the rod and locked by a nut 52 behind it. At its forward end the die 10 is counterbored to form a recess accommodating on the rod 49 another spiral spring 53 located between shoulders on the rod and die. The rear end of the rod 49, or an adjustable head 54 thereon, is adapted to strike a relatively fixed stop 55 held to the frame 1.

The stay-strip 13 is preferably sustained by a reel 58 from which the strip passes to and through folder devices 59 which bend the strip transversely downward each way from the center to about the right-angular or V-form of the stay 12 when applied to a box-corner. From the folder 59 the strip passes between a paste or water applying wheel 60 rotating in a supply tank, and a superposed pressing roller 61, and then passes between guiding parts of suitable scraper devices 62 which remove surplus paste or water from the strip. From the scraper the strip passes between a pair of rails 63 which properly guide it as it is being seized by the feeding devices 33 and is by them carried forward to and over a final

guide 64 which leads the strip directly to the cutters 30, 32, which sever from it the needed corner-stay for the box.

The stay-strip folding, pasting and guiding appliances may have any approved construction capable of their herein described functions.

The detachable gage which qualifies operation of the entire machine to provide for attachment of either "turned-in" or "plain" stays to the box-corners, may have any desired form or arrangement provided its construction in one or more parts will permit adjustment of the box-corner to the stay-affixing dies with its top or inner edge about in line with the front face of the device 14 when turned-in stays are used, and will allow the box-corner to be adjusted farther inward at the dies with its inner edge about in line with the rear face or line of action of the device 14 when plain stays are used. A preferred and simple form of gage comprises a plate 65 which is readily attachable to and removable from the front plate 66 of the machine by the use of screws or otherwise.

In explaining the operation of this invention, the stay-strip 13 will be referred to only in its folded and adhesively-coated condition.

In Figs. 1, 2, 4, 5, of the drawings, the gage 65 is adjusted to the machine for applying "turned-in" box-corner stays in the following manner: When the head-die 7 is raised the feeding devices 33 move the end of the stay-strip 13 forward over a box-corner 68, now applied over the bed-dies with its inner or top edge resting against the gage 65, as shown by dotted lines in Figs. 1 and 2 of the drawings. While the strip 13 thus is being fed forward, the inner or "turn-in" die 10 is drawn backward by the lever 46, and the stop 55 and springs 50, 53 coact to locate the thin intermediate die 9 directly in front of the line of movement of the front face of the device 14, as shown in Fig. 4 of the drawings. As the dies 9, 10, take these rearward positions the head-die 7 and device 14 descend and the cutter 30 of said device severs the stay 12 from the strip 13, and the device 14 also moves downward a little past the outer surface of the box-corner and, in the performance of its function as a tucker, thereby turns partly down, or partially tucks-in between the two dies 9, 10, that portion 69 of the stay 12 which projects rearward beyond the inner edge of the box, as shown in Fig. 4 of the drawings. During this cutting and partial turning-in of the stay by the device 14, the die 9 remains stationary to sustain the box-corner at the inside and prevent crushing or bending down of it. The die 10 now is moved forward by the lever 46 and fully turns inside of the box the partly tucked-in end 69

of the stay and lays it smoothly against the inner walls of the box-corner, as shown in Fig. 5 of the drawings. The same forward movement of the die 10 had also moved the die 9 forward until all three dies 8, 9, 10, were grouped together as in Fig. 5, to form a practically continuous bed-die surface, and as was permitted by yielding of the spring 53. Just before the stay end 69 was turned fully into the box-corner by the forwardly moving die 10, the head-die 7, because of the clearance at the block-pin 17, had descended upon the stay 12 with but the pressure of its own weight and thus had clamped the stay to the box-corner with sufficient force to prevent said stay-turning-in action of the die 10 from pulling the freshly pasted or moistened stay 12 rearward upon the box-corner. Toward completion of the downstroke of the die-stock 6 the clearance or play at its link-coupled block 18 is taken up and the spring 21 then yields to effect final heavier but yielding pressure of the head-die 7 upon the stay 12 over the bed-dies to cause effective adhesion of the stay to both outer and inner faces or walls of the box-corner, while at the same time accommodating variable thicknesses of the box side walls and preventing shocks to and breakage of the dies or their operating mechanism. During final pressing of the applied stay 12 between the opposing dies the device 14 may yield upwardly a little against the tension of its spring 28. As the die 7 rises the lever 46 moves the die 10 rearward again, and the springs 50, 53, reset the box-corner supporting die 9 as shown in Fig. 4 of the drawings, ready for cutting of the next stay from the strip 13, and for application of it as a turned-in stay to another box-corner in manner above described.

To apply "plain" stays 12' to the outer faces only of box-corners by this same machine, it only is necessary to remove the gage plate 65, or its equivalent, which may quickly and easily be done. The outer face of the front plate 66 of the machine frame then serves as a gage stopping the inner or top edge of a box-corner about in line vertically with the inner or rear face of the device 14, or about in line with the place of severance of the strip 13 to provide the corner stay 12'. These plain stays thus are cut only about as long as the height of the box. After the box-corner 68 is laid upon the bed-dies and against the frame gage plate 66, the cutter 30 of the device 14 severs the strip 13 to furnish a stay 12' of proper length, and any continued movement of the device which could indent or injure the inner end portion of the applied stay or injure the box-corner itself, is prevented by upward bodily yielding of the device 14 against resistance of its spring 28, and while the device itself serves as an auxiliary head-die

acting with the main head-die 7, to closely press the adhesive plain stay to the outer face of the box-corner and against the resistance of the grouped bed-dies 8, 9, 10; all as will be understood by inspection of Fig. 6 of the drawings.

Various modifications of this invention may be made within the scope of any one or more of the appended claims.

What I claim as my invention is:

1. In a machine for attaching box corner stays, the combination of a plunger, operating means yieldingly connected thereto, a stay cutter serving also as an auxiliary stay pressing means, yieldingly actuating means between the stay cutter and the plunger, a box support, and a combined tucker and presser device carried upon said box support and movable independently thereof.

2. In a machine for attaching box corner stays, the combination of a box support, a plunger, a stay cutter adjacent the inner end of said plunger and adapted to cooperate with the same as a stay-pressing means, an arm projecting from the plunger, a yielding connection between the arm and the stay-cutter for actuating the latter; a combined tucker and presser device carried by the box support and adapted to turn in the end of a stay and assist in sustaining a box to be stayed, said tucker being movable on said box support, and a removable gage plate to regulate the position of the box when turned-in stays are to be applied thereto, said plate being of a thickness equal to the length of the turned-in stay.

3. In a machine for attaching box-corner stays, the combination with stay affixing means including a yielding stay cutter adapted to serve as a folder for turned-in stays and as a presser for plain stays, and a sliding bed die also serving as a tucker for turned-in stays, of a removable gage plate to be fastened on the frame of the machine for regulating the position of a box when turned-in stays are to be applied, said gage plate being of a thickness equal to the length of the turn-in stay end.

4. A machine for attaching box-corner stays, comprising a yielding stay-cutting means adapted to serve also as an auxiliary stay-pressing means, and stay-affixing means including opposing pressing dies and a movable stay turn-in die having its operative portion of a substantially right-angled shape, said parts being adapted to apply "turned-in" and "plain" stays to the box-corners; and an outer box-gage detachable from an inner box gaging wall or part of the machine and when in operative position arranged relatively to said stay-cutting and stay-affixing means to limit the position of the box when attaching "turned-in" stays to the box-corners.

5. A machine for attaching box-corner

stays, comprising a yielding stay-cutting means adapted to serve also as an auxiliary stay-pressing means, and stay-affixing means including opposing pressing dies and a movable stay turn-in die having its operative portion of a substantially right-angled shape, said parts being adapted to apply "turned-in" and "plain" stays to the box-corners; and an outer box-gage comprising a plate detachable from an inner box gaging wall or part of the machine and when in operative position arranged relatively to said stay-cutting and stay-affixing means to limit the position of the box when attaching "turned-in" stays to the box-corners, and when removed enabling the box to be fed farther in so that "plain" stays may be applied to the box-corners.

6. A machine for attaching box-corner stays, comprising means for folding a stay-strip to approximately right-angular cross-sectional form, means for rendering said stay-strip adhesive, means for intermittently feeding the adhesive strip over a box-corner, a yielding stay-cutting means adapted to serve also as an auxiliary stay-pressing means, and stay-affixing means including opposing pressing dies and a movable stay turn-in die having its operative portion of a substantially right-angled shape, said parts being adapted to apply "turned-in" and "plain" stays to the box-corners; and an outer box-gage detachable from an inner box gaging wall or part of the machine and when in operative position arranged relatively to said stay folding, pasting, cutting and affixing means to limit the position of the box when attaching "turned-in" stays to the box-corners when the outer gage is applied in use, and permitting attachment of "plain" stays to the box-corners when the outer gate is removed.

7. A machine for attaching box-corner stays, comprising means for folding a stay-strip to approximately right-angular cross-sectional form, means for rendering said stay-strip adhesive, means for intermittently feeding the adhesive strip over a box-corner, a yielding stay-cutting means adapted to serve also as an auxiliary stay-pressing means, and stay-affixing means including opposing pressing dies and a movable stay turn-in die having its operative portion of a substantially right-angled shape, said parts being adapted to apply "turned-in" and "plain" stays to the box-corners; and an outer box-gage comprising a plate detachable from an inner box gaging wall or part of the machine and when in operative position arranged relatively to said stay folding, pasting, cutting and affixing means to limit the position of the box when attaching of "turned-in" stays to the box-corners.

8. In a machine for attaching box-corner stays, the combination of a plunger, operat-

ing means yieldingly held connected thereto,
a stay-cutter serving also as an auxiliary
stay pressing means, yieldingly actuating
means between the stay-cutter and the plun-
5 ger, a box support, a combined tucker and
presser device carried upon said box support
and movable independently thereof, and a
removable gage plate adapted to be secured
to the frame to regulate the position of the
10 box when turned-in stays are to be applied
thereto.

Signed at Rochester, in the county of
Monroe and State of New York this 16th
day of April, 1906.

ANNIE D. KNOWLTON,
FREDERIC K. KNOWLTON,
*Administrators of the estate of Mark D.
Knowlton, deceased.*

Witnesses:

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JAMES W. ALLIS.