(No Model.) 4 Sheets—Sheet 1.

M. D. KNOWLTON.

MACHINE FOR ATTACHING STAYS TO CORNERS OF BOXES.

No. 557,401. Patented Mar. 31, 1896.

Fig. 1.

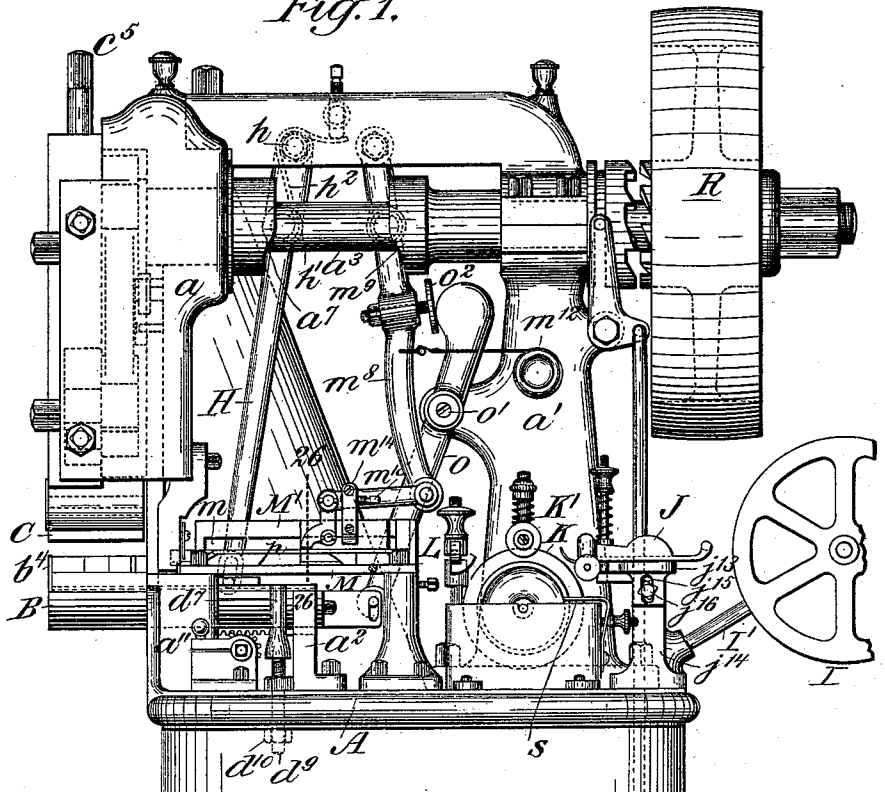


Fig. 22.

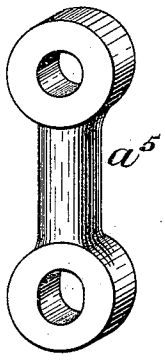
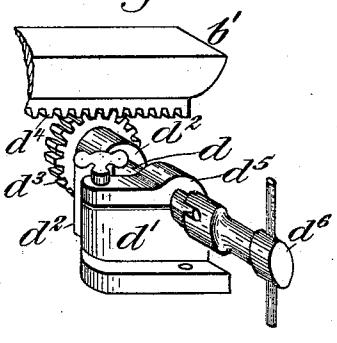


Fig. 21.



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(No Model.) 4 Sheets—Sheet 2.

M. D. KNOWLTON.

MACHINE FOR ATTACHING STAYS TO CORNERS OF BOXES.

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Fig. 2.

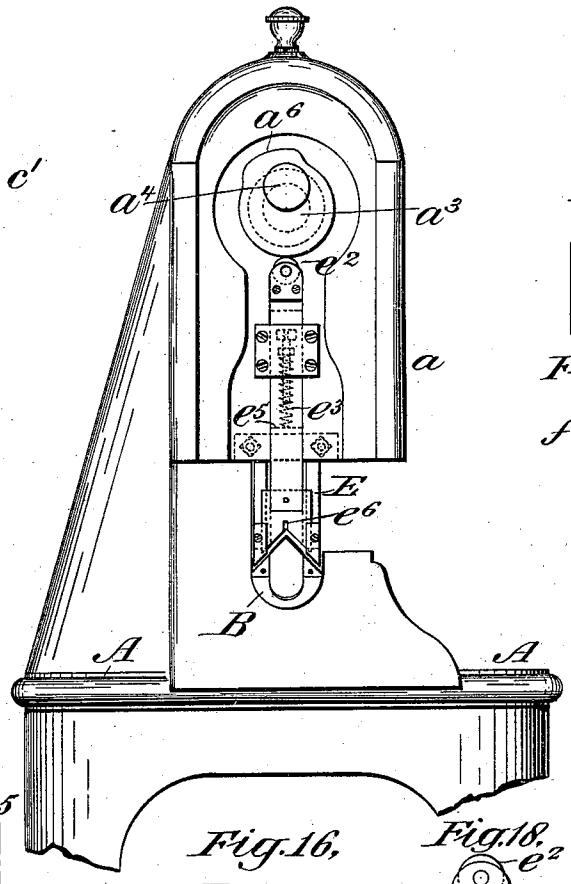

Fig. 28.

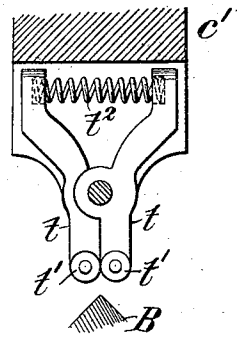

Fig. 25

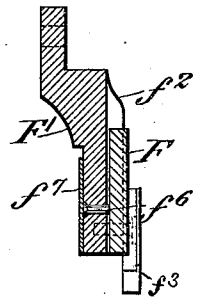

Fig. 15.

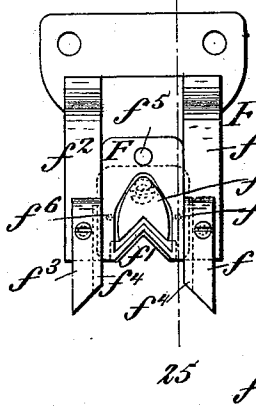

Fig. 16.

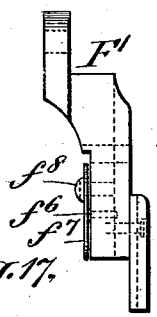

Fig. 17.

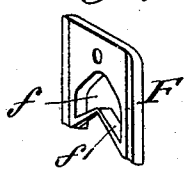

Fig. 20.

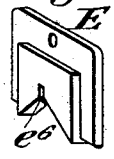

Fig. 18.

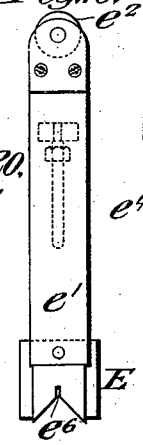

Fig. 19.

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(No Model.) 4 Sheets—Sheet 3.

M. D. KNOWLTON.

MACHINE FOR ATTACHING STAYS TO CORNERS OF BOXES.

No. 557,401. Patented Mar. 31, 1896.

Fig. 3.

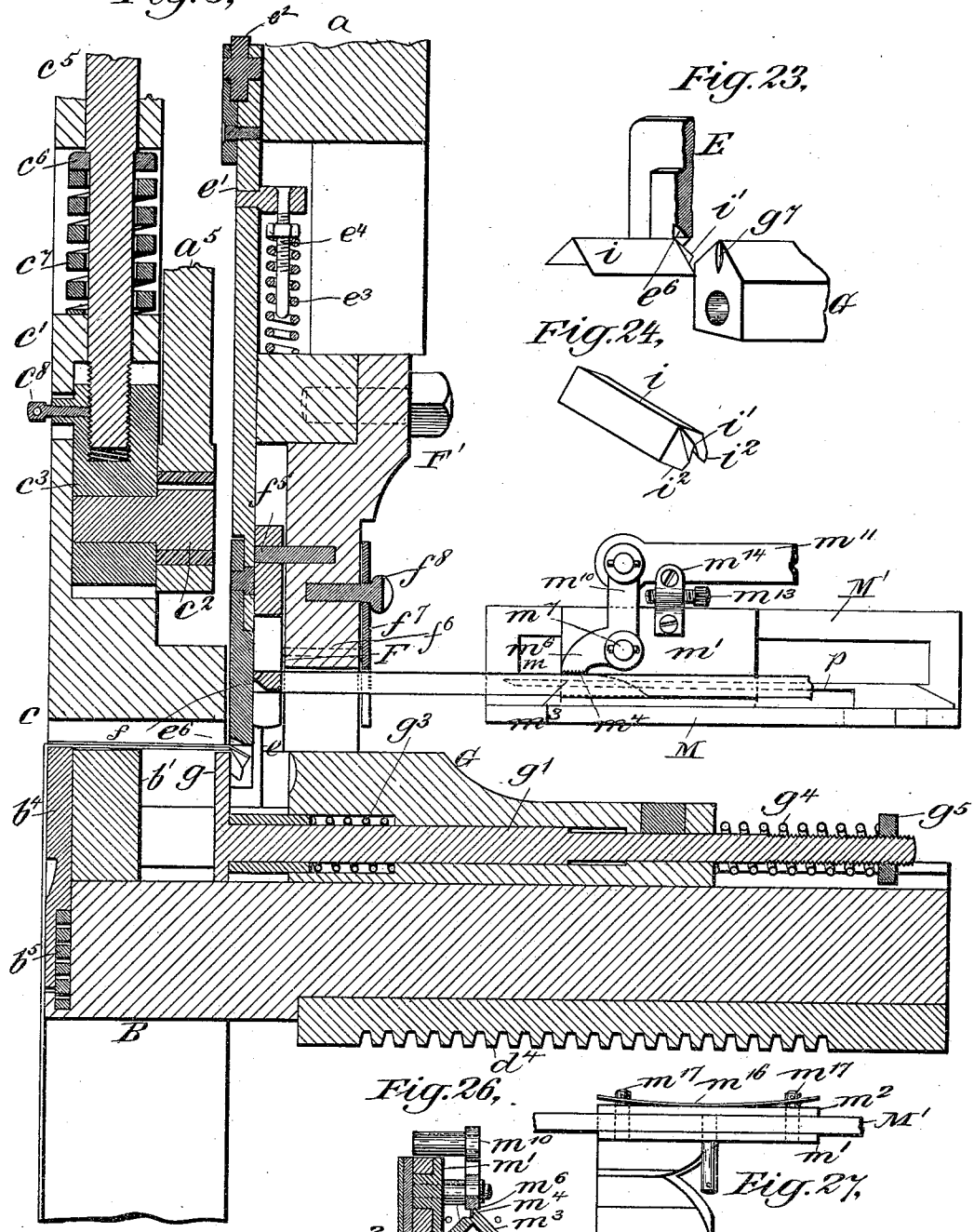

Fig. 23.

Fig. 24.

Fig. 26.

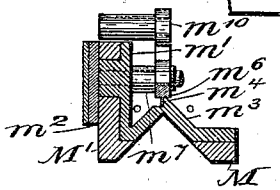

Fig. 27.

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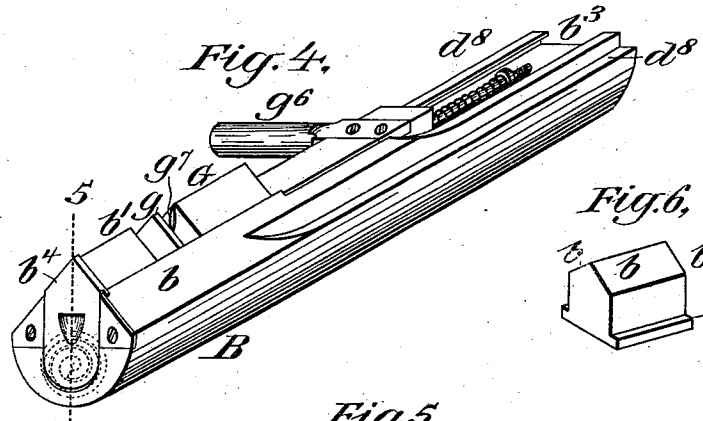
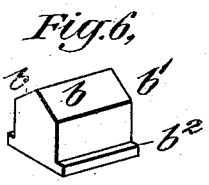
(No Model.) 4 Sheets—Sheet 4.

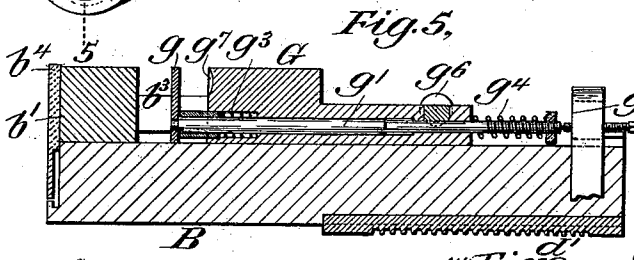
M. D. KNOWLTON.

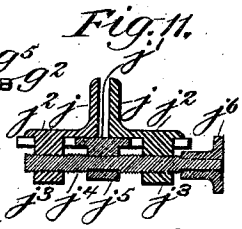
MACHINE FOR ATTACHING STAYS TO CORNERS OF BOXES.

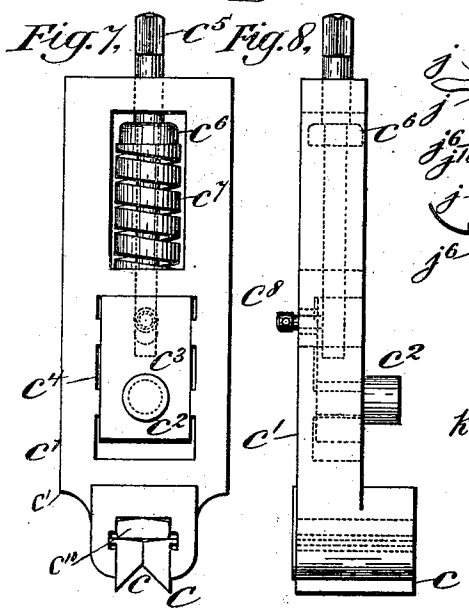
No. 557,401. Patented Mar. 31, 1896.

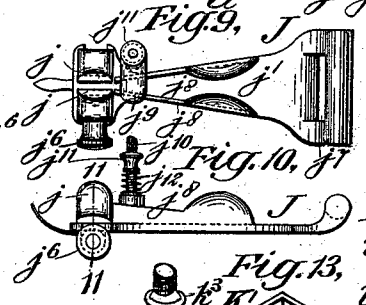


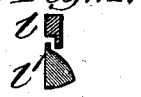


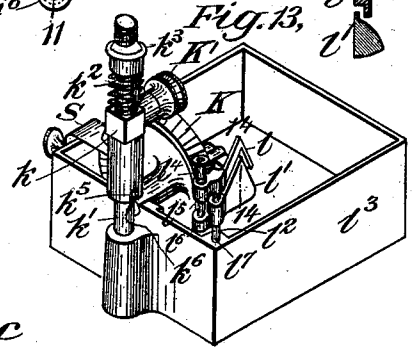


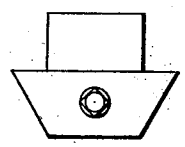












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UNITED STATES PATENT OFFICE.

MARK D. KNOWLTON, OF ROCHESTER, NEW YORK.

MACHINE FOR ATTACHING STAYS TO CORNERS OF BOXES.

SPECIFICATION forming part of Letters Patent No. 557,401, dated March 31, 1896.

Application filed December 19, 1894. Serial No. 532,384. (No model.)

To all whom it may concern:

Be it known that I, MARK D. KNOWLTON, of Rochester, in the county of Monroe and State of New York, have invented new and useful Improvements in Machines for Attaching Stays to the Corners of Boxes, of which the following description, taken in connection with the drawings herewith accompanying, is a specification.

My invention relates to machines for securing the joints in the manufacture of boxes of paper, strawboard, or other similar material, and more particularly to a machine constructed for applying a single stay or fastening strip of suitable material over the joint, at a point both outside and inside of the corner, which is caused to adhere to the parts by paste or other suitable adhesive material.

The invention consists in the construction, arrangement, and combination of parts forming a machine for applying stay or fastening strips upon box-corners in the manner above referred to, as will hereinafter be described in detail, and pointed out in the claims.

A machine embodying my invention embraces as its main features clamping-dies or means for pressing stay-strips in contact with the margins of the corners or parts to be joined and secured, means for guiding between the clamping-dies and lengthwise over the corner of the inserted box the strip from which the individual stay-strips are severed, means for severing the individual stay-strips from the continuous strip of a length greater than fed forward for location on the outer corner of the box to form a loose or projecting end beyond the inner edge of the latter, and means directing and carrying such loose or projecting portion of the stay-strip beneath or against the inner corners of the box.

The machine herein shown also embraces other further and additional improvements than above referred to, all of which will hereinafter be described in detail.

Referring to the accompanying drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a front elevation, with the upper reciprocating die and its carrier-slide removed. Fig. 3 is an enlarged vertical section through the center of the clamping-dies and strip-severing and turn-in devices, with the several connecting and supporting parts, also showing a part of the strip guiding and feeding devices, and a box in position to be operated upon with a severed stay-strip over its corner. Fig. 4 is a perspective view of the sliding anvil-block with the several parts supported thereby removed from the machine. Fig. 5 is a longitudinal vertical section through line 5 5 of Fig. 4. Fig. 6 is a perspective view of the non-reciprocating die-block removed from the anvil-block. Fig. 7 is a rear elevation of movable die and its carrier-slide removed from the machine. Fig. 8 is a side elevation of the same. Fig. 9 is a plan view of the strip-folder; Fig. 10, a side elevation of the same; Fig. 11, an enlarged cross-section through line 11 11 of Fig. 10; Fig. 12, an enlarged view of one of the folding-jaws; Fig. 13, a perspective view of the paste-tank with the paste-roll and scraper supported thereby; Fig. 14, an enlarged vertical section through line 14 14 of the scraper shown in Fig. 13; Fig. 15, a rear elevation of stationary cutter and its supporting-plate; Fig. 16, a side elevation of the same; Fig. 17, an enlarged perspective view of the stationary cutter detached from the machine. Fig. 18 is a front elevation of the movable cutter and tucker and its carrier-slide removed from the machine. Fig. 19 is a side elevation of the same. Fig. 20 is an enlarged rear view in perspective of the cutter and tucker detached from its carrier-slide. Fig. 21 is an enlarged detail view in perspective of the anvil-block-adjusting device. Fig. 22 is an enlarged perspective view of a link for communicating motion from the driving-shaft to the movable die. Fig. 23 is an enlarged perspective view showing a severed stay-strip, the turn-in device, and the tucker in section in a position about to engage the loose or projecting end of said stay-strip. Fig. 24 illustrates a severed stay-strip, showing the form its loose end takes when pressed or forced partly below the edge of the box by the tucker. Fig. 25 is a sectional view through line 25 25 of Fig. 15. Fig. 26 is a sectional view through line 26 26 of Fig. 1. Fig. 27 is a detail plan view of some of the parts forming the paper-feeding device; and Fig. 28, a device for coöperating with the lower stationary die to form a clamping or pressing device, as will hereinafter be referred to.

To explain in detail, the main frame of the machine is formed with a horizontally-arranged bed-plate A and two vertical parts or standards a and a' upon which the several parts forming the machine are supported.

B is a non-reciprocating die or anvil-block arranged horizontally with one end projecting the front of the frame, which projecting end forms the working surface of the die or anvil upon which the box or blank is placed and supported to be operated upon, as shown in Fig. 3. This die or anvil-block, which, in the present instance shown, is formed with flat working faces $b\,b$ upon its upper side arranged at right angles to each other, as shown, is supported within seats or bearings located in studs a'' and a^2 projecting from the bed-plate of the frame in a manner to be movable longitudinally whereby its projecting end may be moved a greater or less distance from the face of the frame to be adjusted for boxes of different depths, as will be described.

The anvil-block, as herein illustrated, is provided with a central longitudinal groove or recess b^3 for the support and operation of a reciprocating die, as will hereinafter be described, which said groove, for convenience in construction and assembling of the parts, extends to the front end of the anvil-block, and a block b', having oblique faces coinciding with the working face of the anvil-block, is removably fitted into the said groove b^3 at the front end thereof and forms part of the anvil-block or die in operation. Such block may, however, be formed integral with the anvil-block.

The anvil-block, as herein illustrated, is arranged to be adjusted longitudinally in its bearings and set in a desired position by means of a shaft d, which is mounted to turn or rotate in suitable bearings in studs d' and d^2 on the bed-plate of the frame and is provided with a pinion d^3 thereon, which meshes with a rack d^4 on the under side of the anvil-block b' to form connection with the latter. This shaft d, as herein illustrated, is constructed for the detachable connection therewith of a key d^6, as a convenient means by which it may be operated, and is also arranged to be locked from movement to hold the anvil-block in a stationary position by means of a clamping-arm d^5 on the stud d'. Any suitable means other than above described may, however, be employed for adjusting the position of the anvil-block without departing from the spirit of my invention.

d^7, Fig. 1, is a yoke which engages with the anvil-block in seats d^8, formed upon opposite sides thereof, as shown in Fig. 4, and is provided with a threaded stem d^9, having connection with the bed-plate of the supporting-frame by means of a nut d^{10}, in order to hold the anvil-block from vertical movement and prevent its tipping forward when pressure is brought to bear upon its front end in operation.

C is a reciprocating die for operating in combination with the non-reciprocating die B to form the clamping or pressing device and is formed with a notch or recess c, Fig. 7, in its under surface, forming a working face to coact with the face $b\,b$ of the die B. The said die C, in the present instance shown, is constructed and mounted in its carrier c' in the same manner as shown and described in Letters Patent No. 442,792, dated December 16, 1890, the same consisting, in general, of two sections movably supported in the carrier and a rocking-support c^{10}, against which said sections have a bearing, as shown. The carrier c', in which the die C is seated, is mounted in suitable ways upon the face of the standard a, and may be operated by any suitable means, the same being operated in the present instance shown from a rotating driving-shaft a^3, mounted in bearings in the standards a and a', through the medium of a crank-pin a^4, carried at the end thereof, and a link a^5 connecting said crank-pin with a pin c^2 on a part of the slide, as will be described.

The movable die C is supported to coact with the non-reciprocating die B with a yielding or elastic pressure to conform to material or stock of varied thickness and also prevent jar or breakage to any of the connecting parts, such movement or action being secured as follows: A block c^3 is seated within an opening c^4 in the slide c of somewhat greater length than the block to have a longitudinal movement therein and is connected with a rod or stem c^5, which is loosely seated in said slide with one end having a screw-threaded connection with the block c^3 and its opposite end projecting the upper end of the slide. This stem has a flange or collar c^6 thereon, which, in the instance shown, is located at a point within an opening in the slide against which one end of a spring c^7, having its opposite end bearing against the slide c', acts to hold the block c^3 toward the upper end of its seat or opening c^4 in a position as shown in Fig. 7, and cause the slide with its die C to coact with the stationary die B with a yielding pressure, as described, when the block c^3 is carried or forced downward by its operating means, such means as herein shown being the connecting-link a^5 and its driving mechanism.

The tension of the spring c^7 may be regulated to adjust the pressure of the upper die more or less, as required to properly fasten the stay-strip, by turning the stem c^5 to adjust the position of the flange or collar thereon in its relation to the opposing bearing-surface of the spring on the frame. The stem is held stationary in its relation to the connecting-block by a set-screw c^8.

E is a vertically-movable part or plunger arranged to operate at the rear of the die C and is formed with a cutting edge e at its rear side to act in conjunction with a stationary cutter F to sever the stay-strip at the proper point from the continuous strip fed to the machine. Said plunger is attached to a slide

e', which is mounted in a suitable guide in the standard a, and, as herein illustrated, is arranged at its upper end to engage with a cam a^6 on the driving-shaft a^3, by which it is operated to act in combination with the several other coacting parts for securing the stay-strip on the blank, as will hereinafter be more fully set forth. The slide e' is provided with an antifriction-roll e^2, supported thereon for engagement with its operating-cam, and is held in operative contact with the latter by means of a spring e^3, which, as shown in the drawings, is supported on a pin or bolt e^4, attached to the rear side of the slide, with one end having a bearing on the frame at e^5, as shown in Fig. 2.

Any suitable mechanism for operating the plunger E other than as above described may be employed without departing from the spirit of my invention.

The stationary cutter F (shown in detail in Fig. 17) is supported by a plate F′ in a position above the line of the stationary die B and is formed with an opening f for the passage of the stay-strip, the lower wall of which opening at its forward edge f' forms the cutting edge with which the movable cutter E coacts. The plate F′, which is removably attached to the standard a and is provided, as shown in Figs. 15 and 16, with ribs f^2 f^2 on its face, between which the said stationary cutter F is supported with its face in line with the rear surface of the plunger E, and said plate F′ is also provided with plates f^3 f^3 secured on the ribs f^2 f^2 having undercut sides at their inner edges forming guideways f^4 f^4 in which the projecting sides of the plunger extend and move to guide the latter. Said stationary cutter (see Figs. 3, 15, and 25) is movably supported on the plate F′ by means of a pin f^5 projecting therefrom, and is rendered adjustable in its relation to the movable cutter by means of pins f^6 f^6, which are loosely supported in the plate F′ with one end projecting, the latter in contact with the cutter F at or near the line of its cutting edge, and their opposite end in position for engagement with an adjusting-plate f^7 secured on the outer face of the plate F′ by means of an adjusting-screw f^8. By means of this adjusting-plate the said pins may be moved to adjust the cutter F in its relation to the reciprocating cutter to insure proper coöperation therewith and also take up for wear of the engaging parts.

In operation the upper end of the cutter F tilts slightly backward on the pins f^6 f^6 when the movable cutter is above the latter, thus allowing free and easy movement of said movable cutter, and is moved or tilted forward in close contact with the movable cutter as the latter moves over said bearing-pins and the cutting edges coact with each other.

f^9, as more clearly shown in Fig. 15, represents a projection on the face of the plate F′ termed the "stripper," which projects within the opening in the stationary cutter-plate over its cutting edge and is formed with a V-shaped depression in its lower edge slightly above the edge of the cutter to engage with and prevent the end of the continuous strip from being drawn upward from position over the cutting edge on the return upward throw of the movable cutter.

The non-reciprocating die B is adjusted to support the box thereon with its inner edge in a line with the front face of the plunger E, as shown in Fig. 3, and the latter having its cutting edge at the rear side thereof, as described, severs the stay or jointing strips from the continuous strip, of a length equal to the width of the plunger, greater than the length fed between the clamping-dies for location on the outer margin of the box sides, which additional length projects beyond the inner edge of the box and is forced below the inner edge of the box by the continued downward movement of the plunger E, which latter for this purpose is termed the "tucker," into a position to be engaged by a horizontally-moving plunger or die G termed the "turn-in device," and carried inside the box to be pressed against its inner margins by the pressure of the movable die C, as will hereinafter be described.

g is a horizontally-movable plate which, like the plunger G, is supported to slide in the anvil-block B′ and formed with a working face corresponding with the die B, as shown. The plate g in the present instance and as more clearly shown in Figs. 3 and 5, is attached at one end of a rod g', which extends loosely through the plunger G with its rear end in contact with an adjustable stop g^2 to hold said plate g in its normal position just forward of the path of the tucker E and in a position to support or hold up the inner edge of the box, as shown in Fig. 3, in order to prevent its being turned or bent down below the line of the turn-in device by the tucker E on its downward movement to bend or tuck down the loose end of the stay-strip, as before described. This plate g is also operated to remain stationary, or nearly so, to support the end of the box until the turn-in G has moved forward in close proximity thereto and serves as a guide to insure the free and unobstructed entrance of said turn-in beneath the corners of the box. Such movement or operation of the plate g is secured by a spring g^4, having its opposing bearings on the turn-in G and on a collar or flange g^5 on the rod g', as shown in Fig. 5, which expands and serves to hold the rod g' stationary, or nearly so, while the turn-in is being moved forward in close position to said plate g, as described, at which time a second and lighter spring g^3, located between the plate g and turn-in G or connecting bearings, is sufficiently compressed to move the plate g forward with the turn-in. This spring g^3 also serves as a cushion against which the turn-in acts when the plate g comes in contact with the stationary block or die B and serves to prevent any undue jar or breakage of parts.

The vertically-movable plate b^4 at the forward end of the stationary die B is yieldingly held or supported by a spring b^5 in a normal position with its upper edge slightly above the working faces of said stationary die in order to hold the box corners or sides above the latter and the line of the faces of the turn-in G to insure the free passage of the plunger beneath the sides of said box, and is also adapted to act in conjunction with the upper die C to support the box and hold the severed stay-strip in position thereon to prevent its being drawn forward and into the box when its loose end is carried therein by the turn-in G, as follows:

The upper die C is arranged to have a certain amount of lost motion in relation to its connecting driving-link a^5 through the medium of the elongated opening in the latter at its point of connection with the pin or stud on the vertical slide carrying said die C, whereby the latter when it first contacts with the end of the projecting plate b^4 or with the sides of an interposed box and the stay-strip thereon, may only engage therewith with a pressure equal to its own weight and not sufficient to lower said projecting plate to hold the box and stay-strip in position while the tucker E descends to press down the loose or projecting end of the latter and the turn-in G moves forward to carry said end against the inner margins of the box. At this time the lost motion between the upper movable die and its connecting-link is taken up and the pressure brought to bear upon the former so that it may coact with the faces of the lower die and the turn-in G, which latter is within the box at this time, to clamp or press the stay-strip upon the opposite margins of the box.

The tucker E on its downstroke only moves across the edge of the box a distance equal to the thickness of the latter, (which is sufficient to turn the loose end of the stay-strip down the proper distance,) and not below the line of the faces of the turn-in device, thus preventing any liability of being struck by the latter in its forward movement. The tucker E is also provided with a centrally-arranged groove or notch e^6 in its forward face and at the lower edge thereof, which is arranged at an angle, as more clearly shown in Figs. 3 and 23, and is adapted to take up or receive the rib i' formed at the center or apex of the loose or projecting end of the stay-strip when the sides i^2 i^2 of the same are turned downward and necessarily toward each other by reason of their oblique position, as clearly shown in Fig. 24, and the turn-in G is also provided with a centrally-arranged curved guide-groove g^7 in its front face, which is adapted to receive the end of the rib i' taken up by the notch in the tucker and guide or turn the same under the box-corner with the sides of the stay-strip. By this construction for handling the rib formed at the center of the loose end of the stay-strip when the same is turned down and carried beneath the box-corner the said end is located smoothly against the inner margins of the box, and all liability of breaking or wrinkling the paper, as would occur if not thus provided for, is obviated.

The turn-in device G and connecting parts may be operated by any suitable means to act in unison with the several coacting parts in the operation of securing the stay-strip upon box-corners, as described, the means, as herein shown, consisting of a lever H, which is pivoted at one end upon the supporting-frame at h, and at its opposite end connects with an arm or part g^6 of the plunger G, said lever being provided with an anti-friction-roll h' secured thereto, which is held in operative contact with a cam a^7 on the driving-shaft, from which the lever is operated, by a spring h^2.

The continuous strip of paper or other material to be fed to the machine for staying box-corners is carried upon a reel I, which is supported by an arm I′ attached to the machine.

The stay-strip after leaving the reel is first passed through a foider J, which acts upon the strip to double and fold the same at its center, so that it will take and maintain a V shape to conform to the box-corner when it is fed over the latter between the clamping-dies.

K is a pasting-roller, the periphery of which is made V-shaped to fit within the increased lower surface of the strip, and K′ is a presser-roll for holding the strip in contact with the said pasting-roll.

L is a scraper located forward of the pasting-roller, through which the strip i passes to have the superfluous glue or other adhesive material removed therefrom.

The strip i is fed forward over a suitable guide M to the clamping-dies, after leaving the device L, by a suitable feeding device which operates to give intermittent forward movement to the strip, whereby the end of the latter is fed forward between the clamping-dies and over the margin of the box sides located on the stationary die, and remains immovable while the jointing-strip to be attached to the box is being severed from the continuous strip and secured upon the outer and inner margins of the box-corner in a manner as described.

A device or mechanism of any suitable construction may be employed for thus feeding and guiding the stay-strip i, a simple and convenient means, as herein illustrated, consisting of a reciprocating gripping device, which operates to engage and carry forward the paper strip in its forward movement and becomes released from the strip at the limit of its forward throw, so as to move backwardly without producing any corresponding movement in the strip, the several parts of such gripping device, and the means for guiding the strip to the same and from said feeding device to the clamping-dies being as follows:

M, Fig. 1, is a guide-plate upon which the

main operative parts of the feeding device are supported, provided with a vertical flange M′ at one side thereof having a longitudinal guide-slot *m* in which the gripping and carrying device is held and guided. The said gripping device comprises a sliding plate *m′*, arranged vertically against the flange M′, and held in place by means of a plate or piece m^2, located at the opposite or exterior face of said flange M′ and connected with the plate *m′* through the guide-slot *m*, as more clearly shown in Fig. 26.

m^3 is the lower jaw of the gripping device, the same being arranged centrally beneath the path of the stay-strip and provided with a sharp or narrow bearing edge m^4 to engage the inner surface of the strip in the center or crease of the same. This jaw m^3 is connected with and operated by the sliding plate *m′*.

m^6 is the upper or movable jaw of the gripping device, which is arranged above the lower jaw and made vertically movable, so that it may be either engaged with or lifted free from the lower jaw. Said movable jaw is mounted upon a pivot-pin m^7 projecting from the sliding plate *m′* in a position to overhang the path of the stay-strip.

As herein illustrated, the sliding plate *m′* and the gripping-jaws carried thereby are driven by operating mechanism engaging with the movable jaw m^6 alone, such mechanism, in the present instance shown, consisting of a pivoted lever m^8, which is operated by a cam or eccentric m^9 on the driving-shaft a^3 and connected with an arm or part m^{10} of the gripper-jaw m^6 through the medium of a connecting-link m^{11}. Said lever m^8 is held in operative contact with the cam m^9 by a spring m^{12}. The gripping device being thus operated I provide frictional engagement between the sliding plate *m′* and its guide-plate, tending to retard the movement of the plate, so that when pressure is applied to the upper end of the gripper-jaw m^6 in a direction to carry the said upper end of the arm forward, the gripper-jaw will first be depressed, after which a continued forward pressure upon the end of its arm will carry the sliding plate and gripping-jaws bodily forward. Likewise when the pressure is applied to the arm of the movable jaw m^6 to move the same backwardly, the jaws will first be opened and the entire gripping device be then moved bodily backward. Any suitable means may be employed for producing such frictional engagement between the sliding plate *m′* and its guide-plate. The means employed, as herein shown, (see Fig. 27,) comprises a flat spring m^{16} which bears at its center against the plate m^2, and two screws or pins m^{17}, which extend loosely through said plate m^2 and have screw-threaded engagement with the plate *m′*, whereby the spring may be caused to hold the plates *m′* and m^2 in contact with the opposite sides of the plate M′ with more or less pressure, as may be desired.

In applying the jointing-strips upon the corners of boxes of different sizes it is desirable that the distance to which the strip is fed forward past the cutting or severing device at each advance movement of the feeding device should be capable of variation, in order that the length of the strip used upon the box may correspond with the depth of the same. In connection with the stationary die or anvil-block, which is adjustable to afford a greater or less distance between the end of the same and the cutting mechanism, as hereinbefore described, I have provided a connecting mechanism between such movable anvil-block and the feeding-device-actuating mechanism, whereby the movement of the block a certain distance will produce a corresponding change in the throw of the gripping-jaws, whereby the length of the strip fed at each reciprocation of the feeding-jaws will correspond with the length of the exposed part of the anvil-block and the joint to be made. The means as herein illustrated for securing such connection consists of a lever *o*, which is pivoted upon the frame at *o′*, with one end connecting with the anvil-block to be moved thereby and its opposite end extending in a position to be engaged by the feed-operating lever or part thereof at the limit of its backward throw and form a stop for the same. By this arrangement of parts, when the anvil-block is moved outwardly, the upper end of the lever *o* is thrown backward and allows a correspondingly greater backward throw to the feed-operating lever m^8, and consequently a greater movement to the gripping-jaw. When, on the contrary, the anvil-block is moved inwardly, the upper end of the lever *o* is thrown forward and limits the throw of the feed-lever m^8 accordingly to decrease the distance at which the stay-strip is fed forward at each action of the feeding device.

An adjusting-screw o^2 is supported by the lever m^8 with one end in position to be engaged by the lever *o* and forms an adjusting medium between said parts, whereby the throw of the feeding device may have an adjustment independent of the automatic adjustment secured by its connection with the anvil-block, as described, in order to be regulated for any desired length of stay-strip regardless of the depth of the box operated upon, and also to take up for wear of the parts.

A further adjustment of the feeding device is secured by locating an adjusting-screw m^{13} in an arm or extension m^{14} of the sliding plate *m′* at a point to engage the arm of the movable gripping-jaw m^6 and regulate the vertical or upward movement of its working face or end to conform to stay-strips of different thickness. By such adjustment of the movable gripping-jaw it may also be made to bite or engage the strip sooner or later at the beginning of its forward movement, and consequently regulate the length of strip fed forward, as will be readily understood.

Any suitable means may be employed for guiding the stay-strip from the scraper L to

the gripping-jaws and from the latter to the clamping-dies, a simple and convenient construction for such purpose, as herein illustrated, consisting of a longitudinal guide-bar p, which is arranged in line with the center of the stay-strip and with its upper and guiding surface in approximately the same horizontal plane as the working face of the lower gripping-jaw m^3 and in position to engage the under surface of the stay-strip at a point within the seam or crease thereof. This guide-strip, which is supported at each end upon the guide-plate M in the position described, serves to guide the strip and hold the same in proper position with relation to the gripping-jaws to prevent an undue bending or twisting of the strip when the same is engaged by and between the said jaws.

The folder J, through which the stay-strip is passed to be folded and take a **V** shape, as and for the purpose hereinbefore described, consists of two vertically-arranged plates or jaws $j\,j$, between which the stay-strip is passed to be creased, which are supported upon a stationary plate j' in a manner to be adjusted in their relation to each other according to the thickness of the material forming the stay-strip, and also for the purpose of producing a crease of more or less sharpness, as may be required in material of different kinds. Both of said creasing-jaws, as more clearly shown in Fig. 11, are carried by plates $j^2\,j^2$, which are arranged to slide on the plate j' and are provided with lugs $j^3\,j^3$ on their under side, having screw-threaded openings therein to receive a threaded stem j^4, by means of which the creasing-jaws are adjusted. This said stem j^4 is centrally mounted to turn or rotate in a suitable bearing in a lug j^5 on the under side of the supporting-plate j', and is formed with a right and left hand screw-thread at opposite sides of its bearing for engaging with the lugs $j^5\,j^5$, whereby the creasing-jaws may be moved to and from each other by a single operating-stem, as described. The latter is provided with a knob j^6, as a convenient means by which it may be operated.

The plate j' is provided with an upturned flange at one end thereof, having a guide-opening j^7 through which the strip is entered, and with side walls $j^8\,j^8$ arranged at some distance apart at their rear ends, but brought closer together at their forward ends, so as to gradually bring together the margins of the strip and guide the same in a folded position between the creasing-jaws $j\,j$.

The folder J (see Fig. 1) is supported on a vertically-adjustable holder or support j^{13}, whereby it may be adjusted, according to the width of stay-strip being used, so as to bring the upper edge of the folded stay-strip in line with the top of the paste-wheel and secure a uniform line of travel for the same. Said holder j^{13} is supported on a stud j^{14} on the bed-plate H, and is adjustable thereon, in the present instance shown, by means of an elongated opening j^{15} located therein and a set-screw j^{16}, which engages with said holder and extends through the opening therein into engagement with the stud j^{14}.

A guide-plate j^9 is adjustably supported in a position above the guiding-walls $j^8\,j^8$ at the rear of the creasing-jaws $j\,j$, in order to engage the upper edge or fold of the stay-strip and hold both lower edges against the plate j' to insure the folding of the strip at its center as it is passed between the jaws $j\,j$. Said guide-plate j^9 is supported in a vertically-movable position on a threaded post j^{10} located on the plate j, and is movably held in its said position above the guide-walls $j^8\,j^8$ by means of a spring j^{12}, which is supported on said post with one end bearing against the plate j^9 and its opposite end against an adjusting-screw j^{11}, which latter is also located on the post j^{10}, and by means of which the tension of the spring on the guide-plate is regulated. Such adjustment of the guide-plate j^9 is necessary to allow for different widths of stay-strips.

The presser-roll K′, supported above the paste-roll K, is carried by an arm extending from a block or collar k, which latter is supported on a post or standard k' in a manner to rotate and be vertically movable thereon, whereby the roll may be adjusted to bear with more or less pressure on the pasting-roll, according to the thickness of the stay-strip, and also be removable from its position over said pasting-roll to allow for the ready placing of the stay-strip thereon when the latter is first placed on or through the several parts from the roll preparatory to using the machine. The presser-roll is held in yielding contact with the pasting-roll to be self-adjusted to material of different thickness, and also to any irregularities in the same, by means of a spring k^2, which is supported on the post k', with one end having a bearing against the block k and its opposite end bearing against an adjusting-screw k^3 located on said post, the latter being threaded part way of its length for the operation of said adjusting-screw. The tension of said spring upon the block k to cause the presser-roll to bear with more or less pressure upon the pasting-roll is regulated by the adjusting-screw k^3, as will be obvious.

The presser-roll is movably locked from rotary movement in a horizontal plane by means of a pin k^5 on the post k', which is adapted to be received in a slot or opening k^6 located in the lower edge of the block or collar k, as more clearly shown in Fig. 13. In order to move the presser-roll from above the paste-roll, the collar k is simply raised from connection with said pin k^5 and is then free to be turned as desired.

S, Figs. 1 and 13, is a scraper adapted for removing the superfluous adhesive material from the paste-wheel before reaching the stay-strip and regulate the quantity to be placed on the latter.

The scraper L, hereinbefore referred to, is

more particularly adapted to spread the adhesive material uniformly upon the stay-strip after passing over the paste-roll and also remove the superfluous material therefrom. This device consists of two plates l and l', which are supported one above the other on a post or rod l^2 projecting from the tank or receptacle l^3, and are formed to present a V-shaped opening between their adjacent faces to receive the stay-strip, which is fed to the same in such form. One of said plates is adjustable in its relation to the other, in order to vary the space between the same for different thickness of stay-strip, by means of an adjusting-screw l^4, which, in the present instance shown, is supported in a vertically stationary position on an arm l^5 of the post l^2, with its threaded end in engagement with an arm or part l^6 of the plate l' to move the latter vertically and adjust the same.

The adjacent edges of the plates l and l' are constructed to be movable, one past the other, in a manner as clearly shown in Fig. 14, which represents a vertical section through said plates, whereby they may be regulated to remove more or less of the adhesive material from the stay-strip without liability of tearing or otherwise damaging the latter, as might be caused if the strip-engaging surfaces were arranged to move in the same line to or from each other and thereby be liable to pinch or bite said strip between the same.

The scraper L, as herein shown, is detachably supported on the tank l^3, its supporting-post being seated within a suitable socket or seat l^7 at one side of said tank, as it is obvious that when a previously-prepared gummed strip is used such scraper is not necessary, and therefore it is desirable to have the same removable from the path of said strip.

Referring to Fig. 28, I have shown the carrier c' provided with a somewhat different form of device or means for coöperating with the lower stationary die B in lieu of the die c, as hereinbefore described. This device consists of two pivoted levers $t\,t$, which in the present instance shown are centrally pivoted upon the carrier c' and supported with their lower ends, which are preferably provided with rollers $t'\,t'$, in a normal close position to each other by means of a spring t^2 acting upon their opposite ends. In operation, and upon the descent of the carrier c', the lower end of these levers or the rollers carried thereby engage with the die B at or adjacent to its point or angle and move upon the opposite angular faces of the same to press a stay-strip upon the corners of an interposed box, or perform such other operation for which the machine may be used. The particular arrangement of the several parts as described may be modified more or less, however, and be within the scope of my invention, the essential feature of which is two movable arms or levers arranged to coact with the opposite angular faces of the die B with a yielding pressure.

The machine herein shown is arranged to be operated by power, the same being provided with a belt-wheel R on the driving-shaft, although it is obvious that the same may be arranged to be actuated by a foot-lever or other convenient means.

Having thus set forth my invention and illustrated the same in one practical form, it will be obvious that the machine shown may be more or less modified as to the various details of construction and arrangement of the parts, and certain features be entirely omitted, without departing from the spirit of my invention.

By arranging the pressure means (the spring) above the lever pivot or pivots—that is to say, on the opposite side of the pivots from the pressure-rollers or operative lever ends—I give a greater range of movement to the levers, may correspondingly shorten the latter, and may also place the pressure means at any desired distance from said pivots with corresponding increase of the pressing force. In the construction illustrated this is accomplished by forming the levers with upwardly-extending arms and applying a spring between the latter.

Having thus set forth my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A machine for the purpose described, comprising opposing clamping dies or devices, a movable plunger constructed to operate in conjunction with a cutting edge to sever the stay-strip, and move the end of the same below the edge of the box, and means for locating said turned-down end of the stay-strip against the inner wall or corner of said box, substantially as described and for the purpose set forth.

2. A machine for the purpose described, comprising opposing clamping dies or devices, means for guiding a stay or fastening strip to and between said clamping-dies over an interposed box, a movable plunger constructed to operate in conjunction with a cutting edge to sever the stay-strip, and move the end of the same below the edge of the box, and means for locating said turned-down end of the stay-strip against the inner wall or corner of said box, substantially as described and for the purpose set forth.

3. A machine for the purpose described, comprising opposing clamping dies or devices constructed to coöperate in pressing an adhesive stay-strip upon an interposed box-corner, means for guiding the stay-strip to and between said dies over the box-corner, a movable plunger constructed to sever the stay-strip and bend the end downwardly, and a reciprocating die or plunger for engaging with and locating said end against the inside of the box-corner, substantially as described.

4. The combination with a stationary die or block, of a reciprocating die supported and guided thereon, a movable die or device constructed to coöperate with said reciprocating die, a movable plunger or tucker operated to bend downwardly the loose or projecting end of the stay-strip into position to be engaged by said reciprocating die, and a second reciprocating die located and operating on said stationary die or block within the inner edge of a supported box, substantially as described.

5. The combination with a movable die or device and a reciprocating die operating at right angles and constructed to coact with each other in pressing an adhesive fastening-strip upon an interposed box-corner, of a movable plunger operated to bend downwardly the loose or projecting end of the fastening-strip into the path of said reciprocating plunger, and a second reciprocating die having working faces corresponding with the former and arranged to be movable inside or beneath the box-corner, substantially as described.

6. The combination with a movable die or device and a reciprocating die constructed to coact with each other in pressing an adhesive stay-strip upon the corner or joint of an interposed box, of a movable plunger operated to bend downwardly the loose or projecting end of the stay-strip into the path of said reciprocating die to be engaged thereby, and a second reciprocating die having working faces corresponding with those of the former and operated thereby inside of the box-corner, substantially as described.

7. The combination with a stationary die or block having a groove or recess therein, and a reciprocating die or turn-in device supported in said groove or recess, of a movable die or device constructed to coact with said reciprocating die, means for bending the loose or projecting end of the stay-strip into position to be engaged by said reciprocating die, a second reciprocating die located forward of the latter with its working face in line therewith, and a spring interposed between said reciprocating dies, substantially as described.

8. The combination with a movable die or device and a reciprocating die operating at an angle to each other and constructed to coact, of a yieldingly-supported plate or die arranged to coact with said movable die to movably support an interposed box-corner above the line of the working face of the reciprocating die, substantially as described.

9. The combination with a movable die or device and a reciprocating die operating at right angles to each other and constructed to coact, of a movably-supported plate or device projecting above the line of the working face of said reciprocating die and in the path of the movable die, substantially as described.

10. The combination with a stationary die or anvil-block, and a movable die or device constructed to coact with each other, of a reciprocating die having a working face constructed to coact with said movable die, and a movably-supported plate projecting above the line of the working face of said reciprocating die and in the path of the movable die, substantially as described.

11. The combination with a stationary die or anvil-block, and a movable die and a reciprocating die or device constructed to coact with each other, of a movable plunger or tucker operated to bend the projecting end of the stay-strip into position to be caught or engaged by said reciprocating die, and a movably-supported plate or die projecting above the line of the working face of said reciprocating die and in position to coact with the movable die, substantially as described.

12. The combination with opposing clamping dies or devices, and means for guiding a stay-strip between said dies, of a movable plunger or tucker and a reciprocating die or turn-in device, each having diverging working faces and provided with a notch or recess at or adjacent to their point of angle; the tucker being operated to engage and bend downwardly a projecting angular end of the stay-strip into position to be engaged by said reciprocating die or turn-in device, substantially as described.

13. The combination with opposing clamping dies or devices constructed to coact with each other, of a movable plunger or tucker and a reciprocating die or turn-in device provided with angular working faces and having a groove or guideway at or adjacent to their point of angle, said tucker and turn-in device being operated to coact so as to direct and carry inside the box-corner a projecting end of the stay-strip, substantially as described.

14. The combination with opposing clamping dies or devices constructed to coact with each other, and a folder or creasing device operating to fold or crease longitudinally a stay-strip, of a movable plunger or tucker and a reciprocating turn-in device provided with angular working faces and having a groove or guideway at or adjacent to their point of angle, said tucker and turn-in device being operated to coact so as to direct and carry inside the box-corner a projecting end of the stay-strip, substantially as described.

15. The combination with opposing clamping dies or devices, of a reciprocating plunger having a cutting edge and a non-reciprocating plate having a cutting edge constructed to coact with the former, said non-reciprocating plate being movably supported with relation to the reciprocating plunger on an adjustable pivotal bearing, substantially as described.

16. The combination with opposing clamping dies or devices, of a reciprocating plun-

ger having a cutting edge and a non-reciprocating plate having a cutting edge constructed to coact with the former, said non-reciprocating plate being movably supported with relation to the reciprocating plunger on a pivotal bearing, substantially as described.

17. A tucker, consisting of a plate provided with a V-shaped opening having flat faces arranged at an angle to each other and a groove or guideway at its point of angle, substantially as described and for the purpose set forth.

18. The combination of an anvil-block or die adjustably supported upon the machine-frame, an opposing movable die or device, a cutting device, a feeding device operated by a pivoted vibrating lever, and a pivoted lever having connection at one end with said anvil-block to be moved thereby, and at its opposite end extending in a position to engage with the feed-device-operating lever or part thereof, substantially as described.

19. The combination of an anvil-block or die adjustably supported upon the machine-frame, an opposing movable die or device, a cutting device for severing the stay-strip, a feeding device for the stay-strip operated by a pivoted vibrating lever, a pivoted lever having connection at one end with said anvil-block to be moved thereby, and at its opposite end extending in a position to engage with said vibrating lever, and an adjusting medium between said pivoted lever and the feed-device-operating lever, substantially as described.

20. The combination of an anvil-block or die and an opposing movable die, said anvil-block being movable on the machine-frame, a feeding mechanism for feeding a stay-strip between said opposing dies, an operative connection between said anvil-block and feeding mechanism whereby the feed of the latter is regulated by the shifting of the anvil-block, and means for shifting the anvil, embracing a rotating shaft having a rack-and-pinion connection with the anvil and a friction device for locking said shaft from movement, substantially as described.

21. A scraper, comprising a supporting-post having a stationary part and a movable part supported thereon one above the other, with the working face or edge of one movable past the other, and an adjusting-screw supported by an arm or part of said post and engaging with said movable part or scraper to adjust the same in its relation to the other, substantially as described.

22. The combination with a paste or dampening roll, of a presser-roll arranged to coact with said paste-roll, and means for supporting the same in a vertically and horizontally movable position in relation thereto, embracing a supporting-post, a block or collar, to which the presser-roll is connected, supported to slide and rotate on said post, and means for acting on said collar with an adjustable yielding pressure, substantially as described.

23. The combination with a paste or dampening roll, of a presser-roll arranged to coact therewith, and means for movably supporting the same, embracing a supporting-post, a block or collar, to which the presser-roll is connected, supported to slide and rotate on said post, and means for locking said collar from rotary movement, substantially as described.

24. In combination with a die having angular working faces, a movable carrier supporting a device adapted to coact with said die, said device consisting of two pivoted levers arranged to act at one end with yielding pressure upon the opposite angular faces of said die, and means for producing such yielding pressure of the levers situated above the pivot or pivots of the levers, substantially as described and for the purpose set forth.

25. A folder or creasing device, consisting of a supporting and guide plate provided with creasing-jaws adjustably supported thereon and in their relation to each other, and a vertically-adjustable guide-plate supported above said supporting-plate, substantially as described.

26. A folder or creasing device, consisting of a supporting-plate provided with guide-walls, and a vertically-adjustable plate or guide supported above the way between said guide-walls, substantially as described.

27. The combination with a stationary die or block, of a movable die or device constructed and supported to coöperate with said stationary die with an elastic or yielding pressure, the said movable die being provided with a block movably supported thereby having an adjustably-connected rod or stem provided with a bearing-surface thereon, and a spring bearing at its opposite ends against a bearing on the movable die and the bearing on said rod or stem, respectively, the said block being adapted for connection with the mechanism for reciprocating the movable die, substantially as described and for the purpose set forth.

28. In combination with a die having angular working faces, a movable carrier supporting a device adapted to coact with said die, consisting of two pivoted levers which are arranged to act with a yielding pressure upon the opposite angular faces of said die, arms extending above the pivot or pivots of the levers, and means for acting upon said arms so as to cause such yielding pressure of the operative ends of the levers, substantially as described and for the purpose set forth.

29. A folding and creasing device, consisting of a supporting-plate provided with guide-walls forming a converging channel-way, creasing-jaws supported at one end of said channel-way and in an adjustable position with relation to each other, and a vertically-

adjustable guide-plate supported above the way between said guide-walls, substantially as described.

30. A folder or creasing device, consisting of a supporting-plate, two creasing-jaws supported to be adjustable thereon with relation to each other, an adjusting rod or stem having a right and left hand screw-thread engaging with said creasing-jaws to move the same, and a vertically-adjustable guide-plate supported above said supporting-plate, substantially as described.

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