(No Model.) 2 Sheets—Sheet 1.

J. MOHS.

BOX STAYING MACHINE.

No. 549,002. Patented Oct. 29, 1895.

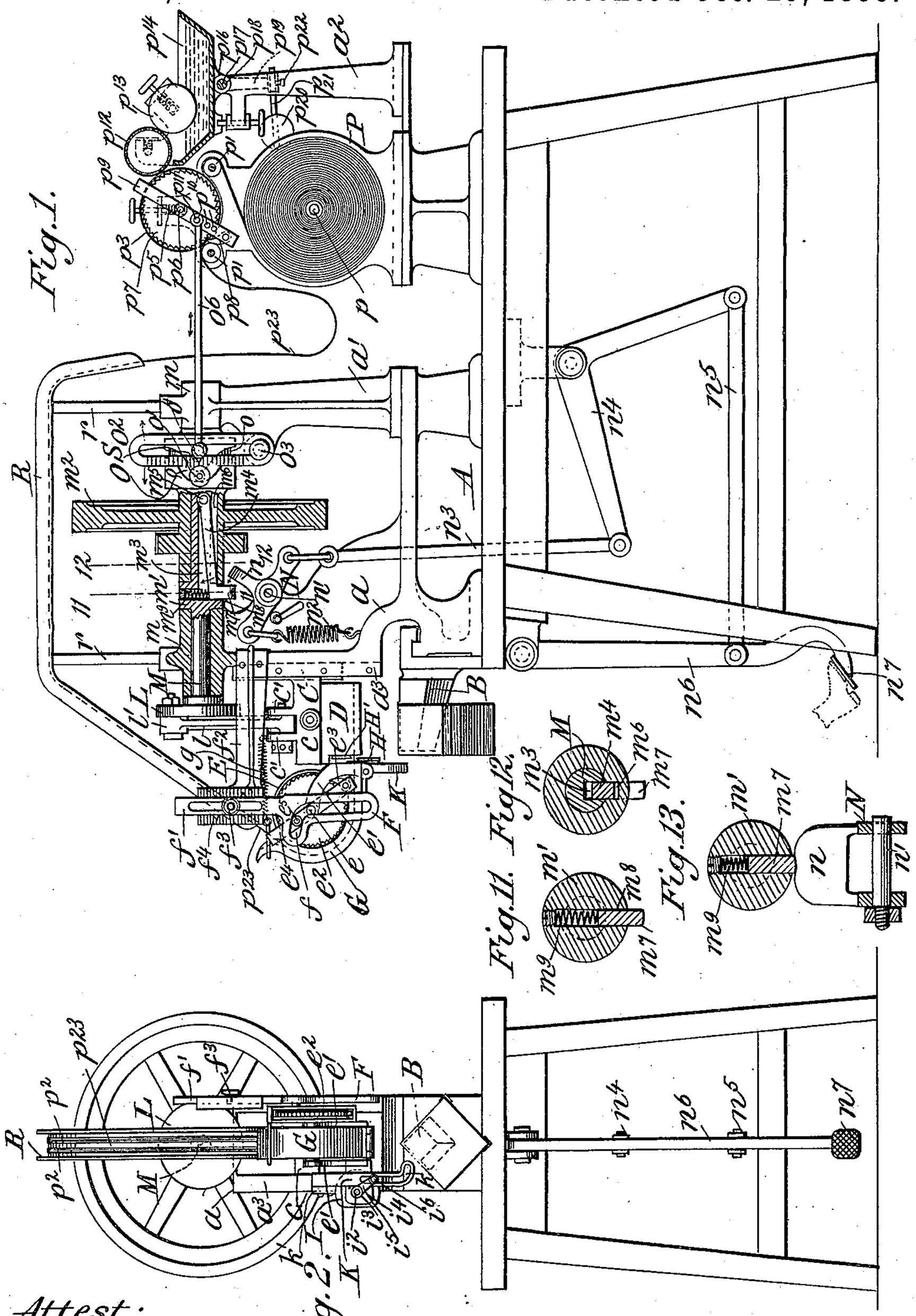

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Attest:

H. H. Schott

A. J. Birney.

Inventor:

Julius Mohs

by Mason Fenwick

His attorney.

(No Model.) 2 Sheets—Sheet 2.

J. MOHS.

BOX STAYING MACHINE.

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Fig. 3.

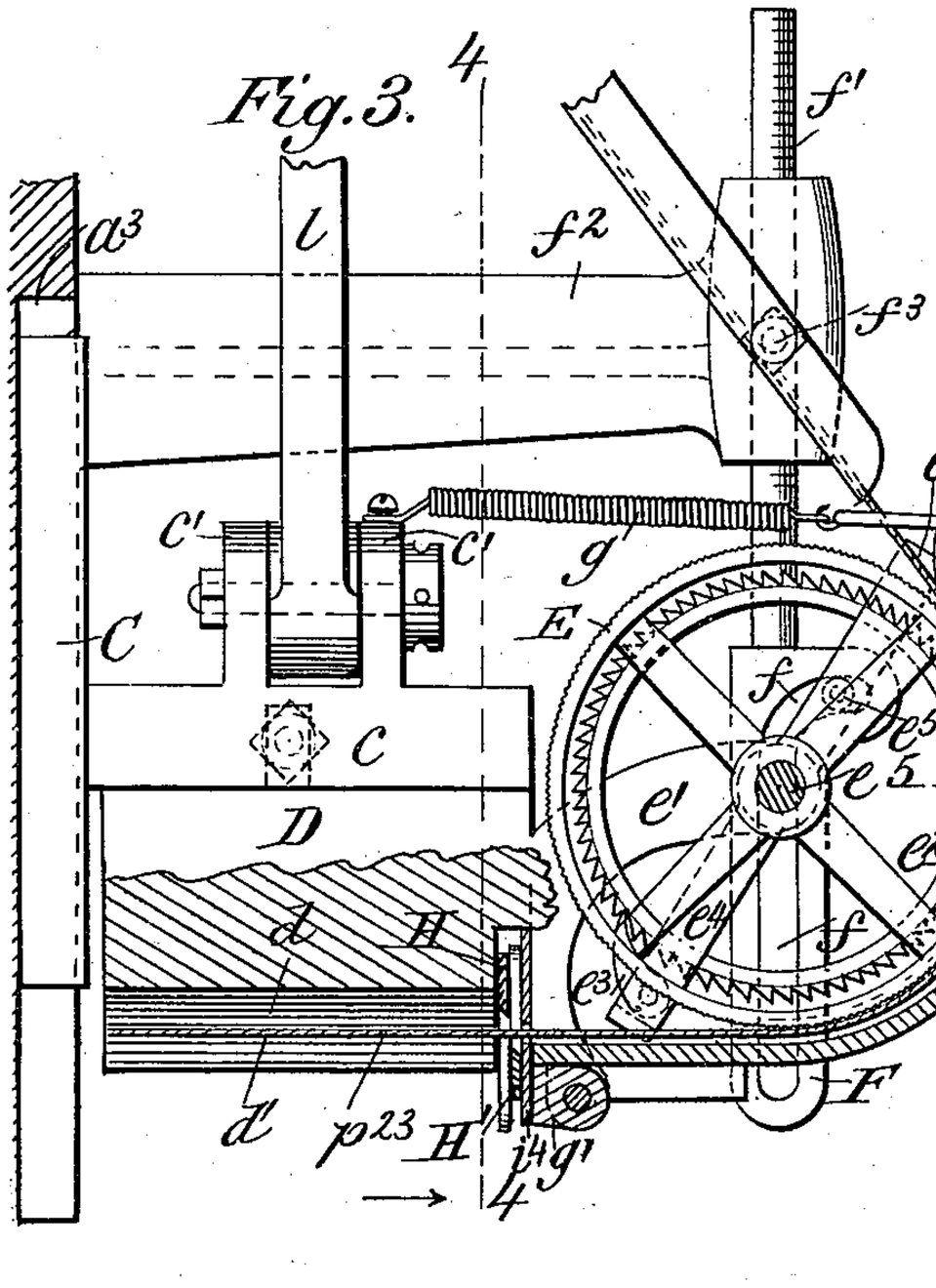

Fig. 4.

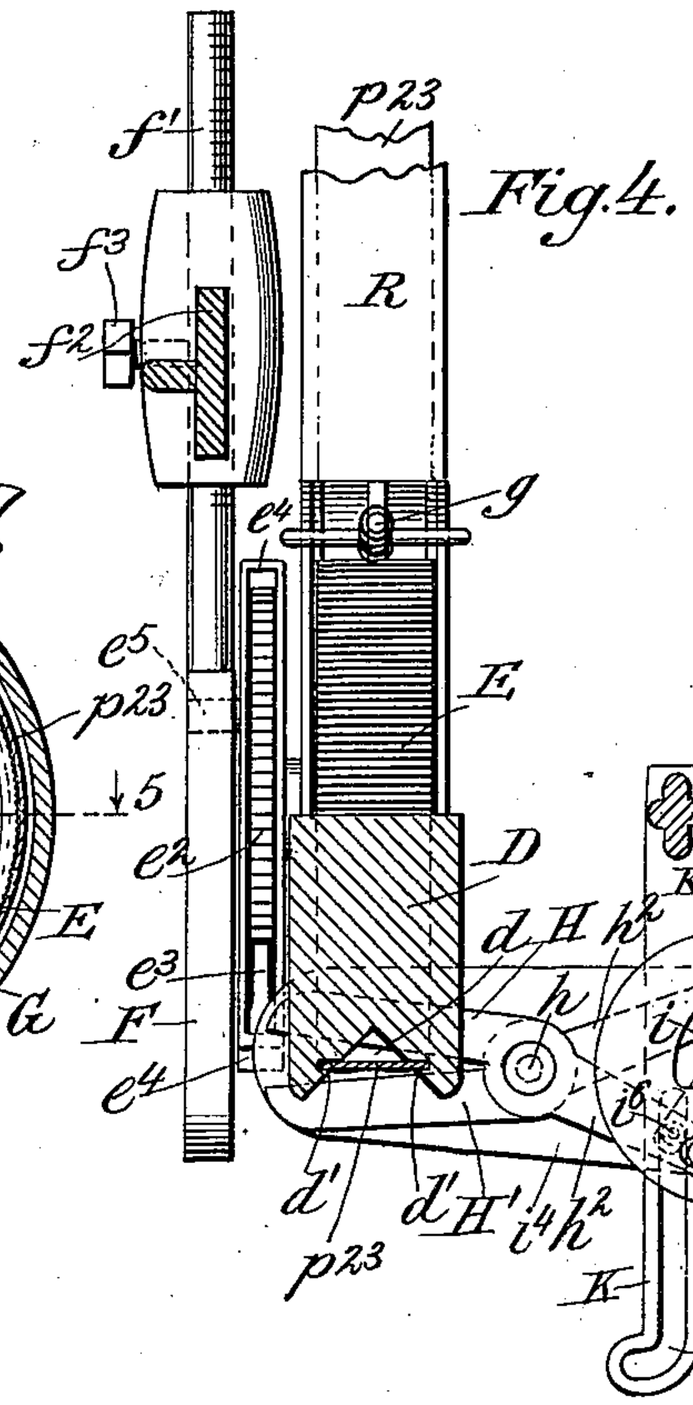

Fig. 6.

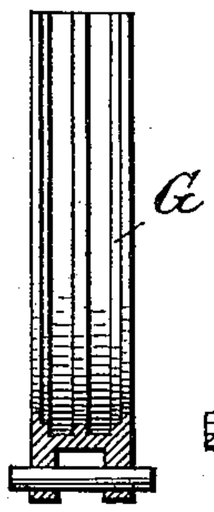

Fig. 7.

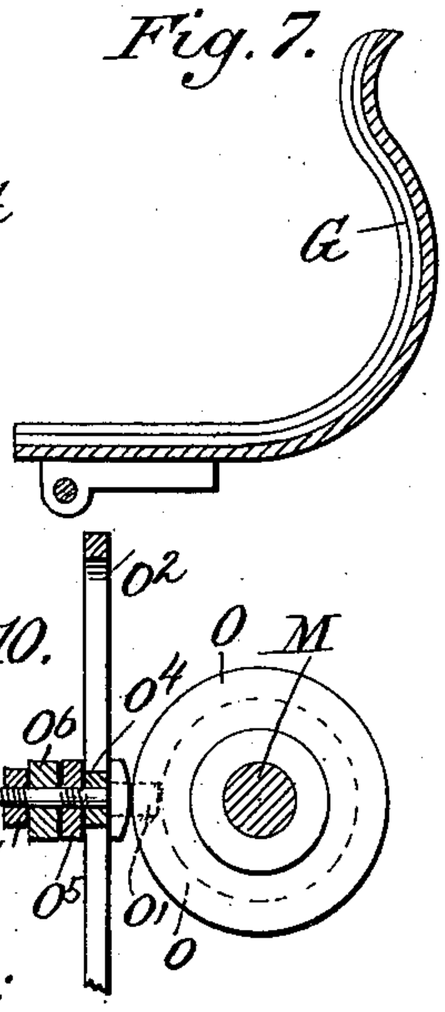

Fig. 5.

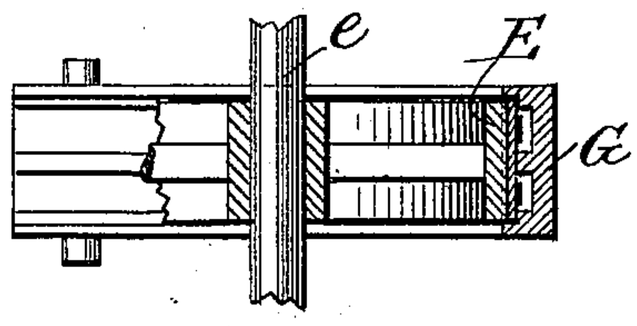

Fig. 8. Fig. 9.

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Atty.

UNITED STATES PATENT OFFICE.

JULIUS MOHS, OF DRESDEN, ASSIGNOR TO THE BERLINER KUNSTDRUCK UND VERLAGS-ANSTALT, VORMALS A. & C. KAUFMANN, OF BERLIN, GERMANY.

BOX-STAYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 549,002, dated October 29, 1895.

Application filed March 25, 1895. Serial No. 543,140. (No model.)

To all whom it may concern:

Be it known that I, JULIUS MOHS, a citizen of Germany, residing at Dresden, Germany, have invented certain new and useful Improvements in Box-Staying Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in box-staying machines, and particularly to that class of box-staying machines in which a strip of paper, linen, or similar sheet material is cut in suitable lengths and pasted on the corners of the box to be stayed, thereby strengthening the same at such corners.

The object of my invention, broadly considered, is first to insure a perfect and accurate feeding of the stay-strip to the point at which it is to be applied to the box, thereby avoiding any tendency of the said strip to arrive at the corners of the box out of alignment or in such a position that it would not be straight on the corners of the box.

A second object of my invention is to secure a positive feed of the strip or stay, and at the same time to avoid all strain on the said stay while being fed.

Still another object of my invention is to provide means for pressing the stay firmly and evenly onto the box-corner, thus avoiding the danger of the said stay coming loose after being applied.

With these objects in view a machine embodying my invention comprises an anvil, a reciprocating plunger or head carrying a recessed hammer into which the strips are fed as they are cut off, an intermittent strip-feeding device, and a cutting device.

It is to be observed that in the present invention the plunger moves in a straight line toward and from the anvil without any angular movement whatever, thereby insuring that the hammer will press evenly and firmly against the strip throughout the entire length of said strip.

The strip-feeding device employed by me embraces an intermittently-actuated mechanism for moving the strip and a spring-held presser-frame which serves to hold the strip against the feed-roller.

My invention also comprises such further features, details of construction, and combinations of parts as will first be described in connection with the accompanying drawings and then particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation, partly in section, of a machine embodying my invention and arranged to be driven by steam or similar power. Fig. 2 is a front view of the same. Fig. 3 is a detail side view, on an enlarged scale, of the feeding and cutting mechanism. Fig. 4 is a section on the line 4 4, Fig. 3. Fig. 5 is a detail section on the line 5 5, Fig. 3. Fig. 6 is a detail view of the presser-frame in section. Fig. 7 is a longitudinal sectional view of the presser-frame. Figs. 8 and 9 illustrate two forms of pasting-rollers, one of which, Fig. 8, applies two stripes of paste to the web, while the other, Fig. 9, can be used when it is desired to apply only one stripe of paste to the web. Fig. 10 is a detail view of the mechanism for operating the auxiliary feed device. Figs. 11, 12, and 13 are detail transverse sectional views of the driving-shaft, illustrating the automatic starting and stopping mechanism.

Referring to the drawings, A is a frame comprising a main standard a, a central post a', and a pair of supports a^2, the main standard being provided with slideways a^3, as shown.

To the frame A is secured a projecting anvil B in the shape of the corner of the box to be acted upon, as shown in Figs. 1 and 2. In the slideway is mounted a reciprocating head or plunger C, which carries an outward-extending arm c, having lugs c' for a purpose hereinafter described. To the arm c is secured a hammer or die D, provided with a recess d, Fig. 4, which conforms to the shape of the corner of the box and is adapted to fit evenly on the anvil when moved down into contact with it. In addition to this recess the plunger is provided with guide-grooves d', (best seen in Figs. 3 and 4,) which hold the strip in the proper position prior to its being applied to the corner of the box.

The strip-feeding device shown in Figs. 1, 3, 6, and 7 is attached to the head or plunger C, preferably by being secured to the hammer D. This strip-feeding device is preferably constructed as follows: A feeding-roller E, having a toothed, corrugated, or otherwise roughened periphery, is fixed on a shaft *e*, journaled in brackets *e'*, extending from the hammer, the said shaft *e* also carrying a ratchet-wheel e^2, also fixed to the shaft. This ratchet-wheel is engaged by a pawl e^3 on a pawl-lever e^4, which preferably straddles the ratchet-wheel and is journaled loosely on the shaft *e*. The pawl-lever is provided with a stud e^5, on which is preferably mounted a friction-roller, which is adapted to enter a slot *f* in a slotted cam-plate F, provided with a shank *f'*, adjustably held by the frame of the machine, preferably through the medium of an arm f^2, projecting from the frame, the shank *f'* passing through a bearing in the arm f^2 and being adjustably secured to the arm by a set-screw f^3.

A presser-frame G partly encircles the feed-roller E and is pressed against the same by a spring *g*, secured at one end to the plunger, as shown, the presser-frame being hinged or pivoted to an arm *g'*, secured to the hammer.

The cutting device, which is also carried by the reciprocating plunger, consists, preferably, of a pair of shear-blades H H', pivoted on a pin *h*, which is carried by the hammer. Between the two arms h^2 is mounted a cam I, provided with slots *i i'* and fixed on a spindle i^2, journaled in a bearing i^3, carried by an arm i^4, connected to the hammer. To the end of the spindle is fixed a crank i^5, provided with a stud i^6, which engages a cam-slot *k* in the cam-plate K, held by an arm *k'*, secured to the machine-frame A. The head C is reciprocated in any suitable manner, but preferably in the following way: Between the lugs *c'* is pivoted a pitman *l*, connected to a crank-pin *l'*, secured in a crank-disk L, fixed on a revoluble driving-shaft M, journaled in bearings *m* on the main standard *a* and central post *a'*, the driving-shaft M being provided with an enlarged portion *m'* and also carrying a fly-wheel m^2, which, in a machine operated by steam-power, is intermittently locked to and released from the driving-shaft at each revolution, the locking being controlled by the operator, while the releasing is preferably accomplished automatically. To accomplish this result, the following mechanism may be employed: The driving-shaft is slotted longitudinally, as at m^3, and in this slot is placed a detent-lever m^4, fulcrumed to the shaft at one end, as at m^5, this detent-lever being arranged to enter a slot or notch m^6, cut longitudinally in the inside of the fly-wheel hub, the free end of the detent-lever being provided with a tooth m^7, which projects through a slot or opening m^8 in the enlarged portion *m'* of the shaft, this tooth m^7 being sloped or inclined on its end and arranged to engage an oppositely-inclined tooth *n* on a double-armed bell-crank N, pivoted at *n'*. The bell-crank has one of its arms connected to a spring n^2, which is held at the opposite end by the frame, while the other arm of the bell-crank is operated by a treadle mechanism, in this case consisting of a rod n^3, attached to one arm of a bell-crank n^4, whose other arm is coupled by a rod n^5 to a lever n^6, having a foot-plate n^7. When the double bell-crank N is held in its normal position by the spring n^2, the tooth *n* is in the path of the tooth m^7 and forces the latter inward as the driving-shaft is rotated, the detent-lever m^4 being normally pressed outward by a spring m^9, in this case located in a socket in the enlarged portion *m'* of the driving-shaft. The driving-shaft also carries a cam O, having a peripheral cam-slot *o*, which engages a roller *o'*, journaled on a stud fixed to a link-lever o^2, fulcrumed at o^3 on the central post *a'*, in which link-lever slides a link-block o^4, adjustable at any point in the link-lever by means of a nut o^5, which also serves to pivotally hold one end of a connecting-rod o^6, which operates a roll-operating or auxiliary feed and pasting mechanism. The latter mechanism consists of a pair of roll-standards P, secured to the frame and provided with a central pin *p*, which is removable and serves as the axis on which the roll of staying material is mounted. Between the upper ends of the standards P are journaled two guide-rollers *p'*, over which the web of staying material is conducted, the adhesive material being applied to the strip in stripes, as shown at p^2, Figs. 8 and 9, by means of a paste-applying roller p^3, which has its periphery cut away, as at p^4, the said paste-applying roller being held in close contact with the rollers *p'* by means of spring-pressed journals p^5, as will be fully understood from the drawings. The said paste-applying roller is fixed on a spindle p^6, which also carries a ratchet-wheel p^7, secured to the shaft, said ratchet-wheel being engaged by a pawl p^8 on a pawl-lever p^9, loosely journaled on the spindle p^6, and in this case straddling the ratchet-wheel p^7. The ratchet-lever is provided with a series of holes p^{10}, into any one of which may be screwed a pin p^{11}, passing through the end of the connecting-rod o^6.

Paste is applied to the paste-applying roller by a doctor or transfer roller p^{12}, which contacts with the paste-applying roller, and also with a fountain-roller p^{13}, which dips into a paste-trough p^{14}, provided with arms p^{15}, which support the axes of the fountain and doctor rollers, the paste-trough being provided with a downward-extending arm p^{16}, which carries a stud p^{17}, journaled in a bearing p^{18} at the top of the support a^2, said stud being provided with a crank-arm p^{19}, which carries a weight p^{20}, adjustably secured to the crank-arm, preferably by means of a rod p^{21}, secured to the weight and inserted in a hole in the crank-arm, being held therein at any desired point by a thumb-screw p^{22}.

To the tops of the main standard and cen-

tral post are attached supports *r*, which carry a guideway R, through which the web of staying material is passed on its way from the paste-applying device to the reciprocating head.

The operation of the mechanism thus far described is as follows: The roll of staying material is mounted on its axis *p*, and its end is led over the guide-rollers *p'*, beneath the paste-applying rollers, through the guideway R, and down between the feed-roller E and presser G, paste being applied to the web in stripes p^2, as shown in Fig. 8, by the rotation of the paste-applying roller, which in turn rotates the doctor-roller and fountain-roller by friction, the fountain-roller dipping into the adhesive material in the trough p^{14}, which adhesive material is preferably in a liquid or semi-liquid state. The amount of friction between the doctor-roller and the paste-applying roller may be regulated by adjusting the weight p^{20} in or out by means of the thumb-screw p^{22}. Power being applied to the fly-wheel m^2, which has a turned periphery to permit its use as a band-wheel, the said fly-wheel is revolved, turning loosely on its shaft. The operator places the box to be stayed upon the anvil with its corner arranged so as to be engaged by the hammer, and then depresses the treadle-lever, which causes the double-armed bell-crank N to be swung so as to remove the tooth *n* from engagement with the tooth m^7 on the detent-lever m^4, the latter being then swung down by its spring m^9, whereby the continued revolution of the fly-wheel brings the slot m^6 in the interior of the hub of the said fly-wheel into line with the detent-lever, and the said lever springing into the slot locks the wheel to the driving-shaft M. The further revolution of the fly-wheel causes the driving-shaft to make one complete turn, it being understood that the treadle-lever is released immediately upon the starting of the driving-shaft, whereby the two teeth m^7 *n* are brought into contact and the detent-lever forced upward out of engagement with the slot in the fly-wheel hub, thus permitting said fly-wheel to rotate freely on the driving-shaft while the latter remains stationary. The rotation of the driving-shaft causes the head C to descend through the intervention of the crank-disk L, wrist-pin *l'*, and pitman *l*. The descent of the plunger or head C draws out the web p^{23}, because the presser G holds the web tightly against the roughened periphery of the feed-roller E, and the latter is held against backward rotation by the pawl e^3, acting on the ratchet-wheel e^2, which, as before described, is fixed to the same spindle *e* as that on which the feed-roller is fixed. During the first part of the descent of the head C the crank-arm i^5 is held stationary owing to the fact that the pin i^6 moves in the straight part of the cam-slot *k*; but when said pin enters the curved lower portion of said cam-slot the crank-arm is moved so as to give a partial rotation to the stud or shaft i^2, which moves the cam-disk I and operates the shear-blades H H'. The slots *i i'* in the cam-disk are so arranged that the lower blade is first moved until its cutting-edge is in line with the lower surface of the web and supports the latter, the upper blade being then operated to meet the lower blade and sever the strip of staying material, which is forced onto the corner of the box by the hammer acting against the anvil. It is one of the important features of the present invention that the plunger reciprocates so as to move in a straight line and without an angular movement, whereby the hammer moves with its recessed plate absolutely parallel to the face of the anvil, and hence the stay-strip is applied simultaneously to all parts of the box-corner, and the latter receives enough compression to make it straight and forcibly apply the stay-strip so as to hold said box-corner straight. On the upward movement of the head the shears are returned to their normal open position, and the ratchet-wheel e^2 is operated by the pawl-lever e^4, whose roller, mounted on the stud e^5, is engaged by the slot *f* in the cam-plate F, the ratchet-lever remaining stationary during the first part of the upward movement of the plunger owing to the fact that the roller travels in the straight path of the slot in the said cam-plate F. During the last portion of the upward movement the roller enters the curved part of the slot and the pawl-lever is swung so as to rotate the ratchet-wheel e^2, and with it the feed-roller E, which causes that portion of the web drawn out by the downward movement of the plunger to be forced into the grooves *d'* in the hammer, thus presenting a new portion for application to the next box-corner. At the next movement of the treadle-lever n^6 the operation described is repeated. During the rotation of the driving-shaft M, as just described, the cam O is rotated and the link-lever o^2 oscillated, thereby rocking the pawl-lever p^9 through the intervention of the connecting-rod o^6 and turning the ratchet-wheel p^7, which draws out another length of pasted web and allows it to hang loosely between the paste-applying mechanism and the rear end of the guideway R, so that at the next descent of the plunger the web may be drawn across the guideway R without straining it. The upward movement of the plunger, as before described, first causes the new length of pasted web to hang in a loop between the feed-roller E and the front end of the guideway R, and then takes up the slack of the web by feeding it into the groove in the hammer. By this arrangement the web is not strained and the feeding-roller is enabled to force the web into the recess in the hammer without any danger of its slipping or tearing, as might be the case if the feed roller E were compelled to pull the web from the roll through the paste-applying mechanism and through the guideway R.

As before stated, the cam-plate F may be adjusted by means of its shank f' and the set-screw f^3, so as to adjust the mechanism to feed any desired length of strip to the hammer, and as a convenience the shank f' of the cam-plate F is preferably graduated to indicate the lengths of strips fed.

As the length of the strip to be fed into the hammer is altered, so, also, the length of strip to be drawn from the roll p^{23} must be changed, and to do this the link-block o^4 is adjusted up or down in the link-lever o^2 to the desired position. To aid in thus adjusting said link-block, an index or pointer S is provided, being secured either to the link-block or, as in the present case, to the end of the connecting-rod o^6. Furthermore, the link-lever is graduated along that portion over which the index travels, as shown at s in Fig. 1, to indicate the amount of web withdrawn from the paste-applying device at each revolution of the driving-shaft.

While I have described the cam-plate F as provided with the shank f', adjustably held in the socket in the arm f^2 by means of the set-screw f^3, I may employ other means for adjusting the cam-plate—as, for example, the device shown in Fig. 2, in which the cam-plate F is provided with a flat slotted shank f', held by a set-screw f^3, threaded into the arm f^2, which in this case is flat instead of tubular, as before, the shank being provided with an index f^4 and the arm f^2, graduated as shown.

I have not claimed, broadly, in this application the novel features of the paste-applying mechanism, nor the combination of the reciprocating head with a strip feeding and a cutting device carried thereon, nor the recessed hammer and its corresponding anvil, since the same are claimed in my application, Serial No. 530,532, filed December 1, 1894.

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

1. The combination, with a reciprocating head, of a feeding device mounted thereon, a pawl lever arranged to operate the feeding device, and a cam plate arranged to actuate the pawl lever, whereby the latter is moved by the reciprocation of the head, substantially as set forth.

2. The combination, with a reciprocating head, and a feeding device mounted thereon, of a pawl lever arranged to operate the feeding device, and an adjustable cam-plate arranged to actuate the pawl lever, whereby the latter may be moved any desired distance by the reciprocation of the head.

3. The combination, with a reciprocating head, and a feeding device mounted thereon, of a pawl lever arranged to actuate the feeding device, a roller carried by the pawl lever, a cam plate provided with a slot in which the roller moves, and means for holding the cam plate stationary at any desired point, substantially as set forth.

4. The combination, with a reciprocating head, and a feeding device mounted thereon, of a ratchet wheel connected to the feeding device, a pawl lever, a pawl connected to the pawl lever and engaging the ratchet wheel, a roller carried by the pawl lever, a cam plate provided with a slot in which the roller moves, an arm to which the cam plate is adjustably secured, and a graduated scale and index indicating the position of the cam plate with relation to the arm, substantially as set forth.

5. The combination, with a reciprocating head, and a pair of shear blades pivoted to the head, of a cam disk arranged to engage the shear blades, and mechanism operated by the reciprocation of the head and arranged to actuate the cam disk, whereby the shear blades are moved, substantially as set forth.

6. The combination, with a head, and a pair of shear blades pivoted to the head, of a cam disk arranged to engage the shear blades, a spindle on which the cam disk is fixed, a crank secured to said spindle, and a cam plate arranged to actuate the crank, substantially as set forth.

7. The combination, with a reciprocating head, and a pair of shear blades pivoted to the head, each blade being provided with a pin, of a cam disk provided with slots into which said pins enter, a spindle on which the cam disk is mounted, a crank arranged to operate the cam disk and provided with a stud, and a cam plate provided with an opening into which said stud enters, substantially as set forth.

8. The combination, with a revoluble longitudinally-slotted driving shaft, and a wheel mounted thereon and provided with a radial slot in its hub, of a radially-swinging detent lever pivoted in the slot in the shaft and arranged to engage the slot in the hub, and mechanism for disengaging the detent lever from the slot in the hub, substantially as set forth.

9. The combination, with a revoluble longitudinally-slotted driving shaft, and a wheel mounted thereon and provided with a radial slot in its hub, of a radially-swinging detent lever pivoted in the slot in the hub, said lever having a projecting tooth, a spring-held bell crank provided with a tooth arranged in the path of the tooth on the detent lever, and means for throwing the bell crank with its tooth out of the path of travel of the tooth on the detent lever, substantially as set forth.

10. The combination, with a revoluble longitudinally-slotted driving shaft, and a wheel mounted thereon and provided with a radial slot in its hub, of a radially-swinging detent lever pivoted in the slot in the shaft and provided with a tooth, a spring normally tending to press the detent lever into the slot in the hub, a double bell crank provided with a tooth

adapted for engagement with the tooth on the detent lever, to force the same inward, a spring attached to one arm of the double bell crank, and a treadle mechanism attached to the other arm of the bell crank and arranged to throw the tooth on the bell crank out of the path of the tooth on the detent lever, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JULIUS MOHS

Witnesses:
HERMANN GANDSBERG,
BERNHARD BUCHLOHN.