(No Model.) 5 Sheets—Sheet 1.

A. A. WOOD.

BOX BINDING MACHINE.

No. 527,574. Patented Oct. 16, 1894.

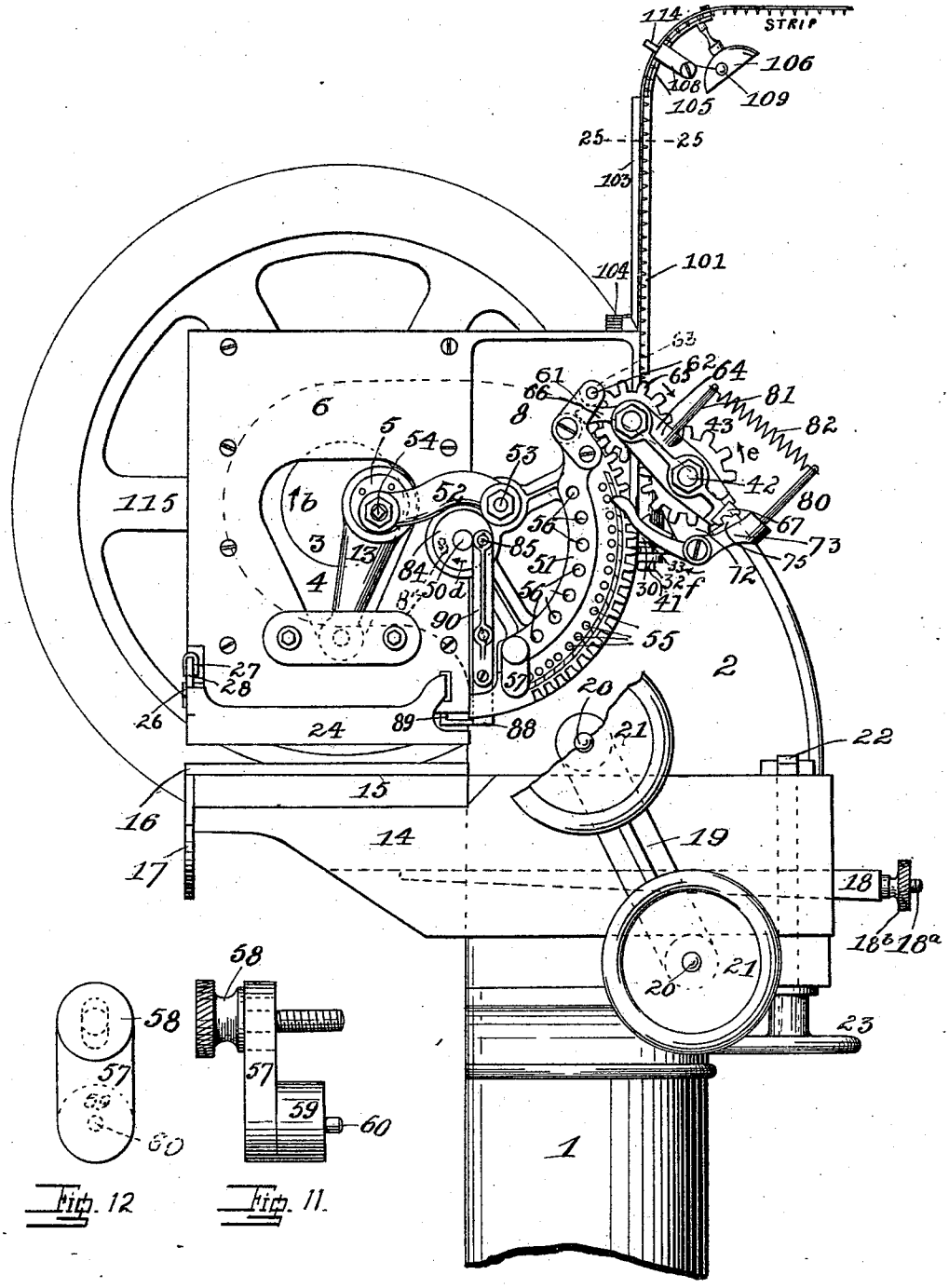

Fig. 12. Fig. 11.

Fig. 1.

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BOX BINDING MACHINE.

No. 527,574. Patented Oct. 16, 1894.

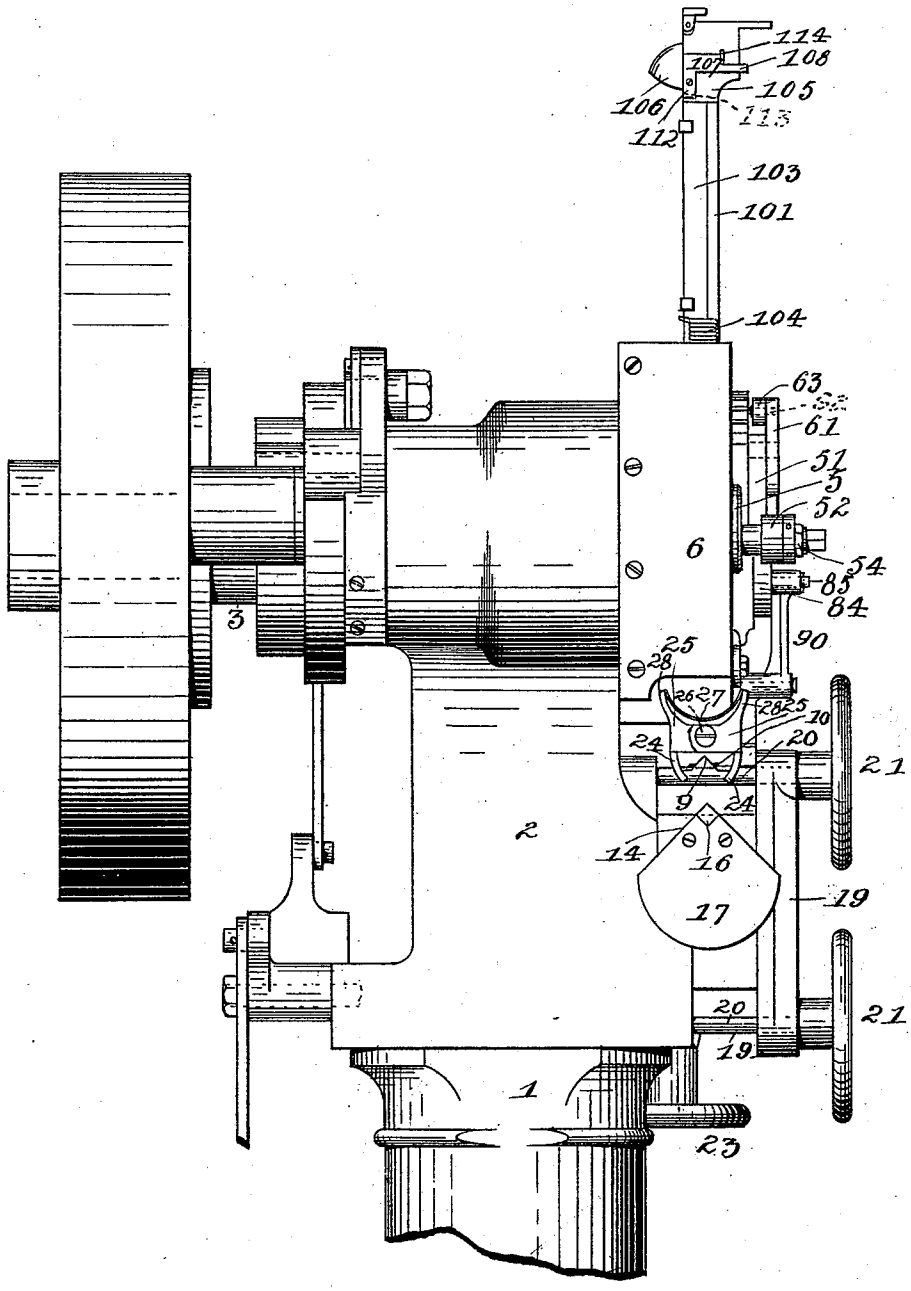

Fig. 2.

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Att'ys.

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A. A. WOOD.

BOX BINDING MACHINE.

No. 527,574. Patented Oct. 16, 1894.

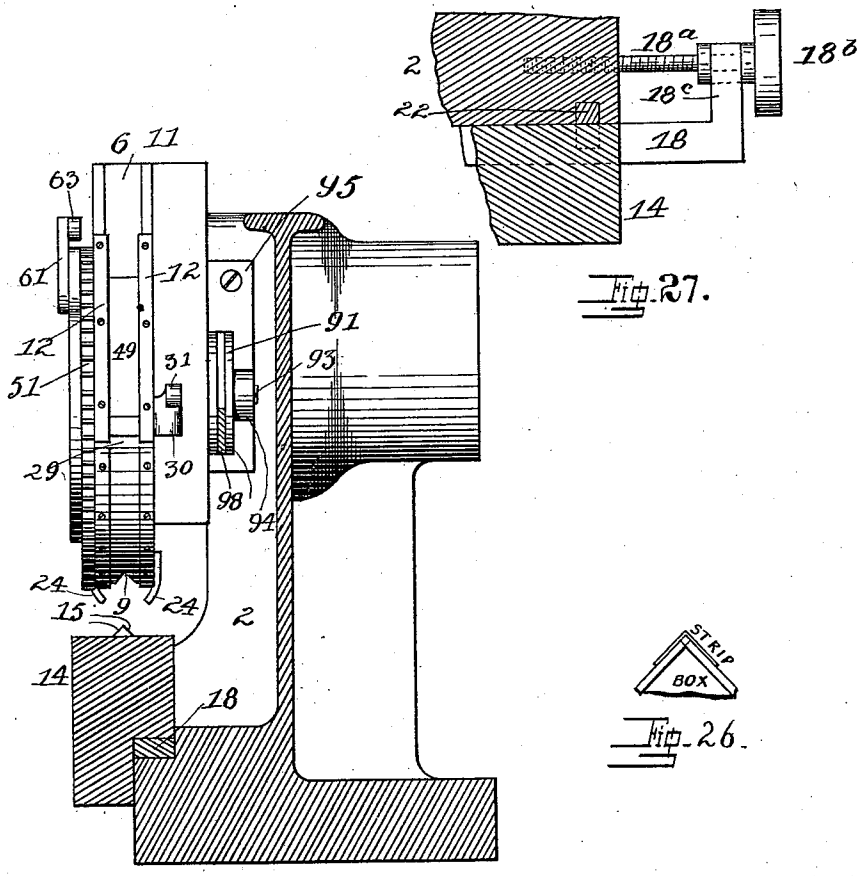

Fig. 27.

Fig. 26.

Fig. 3

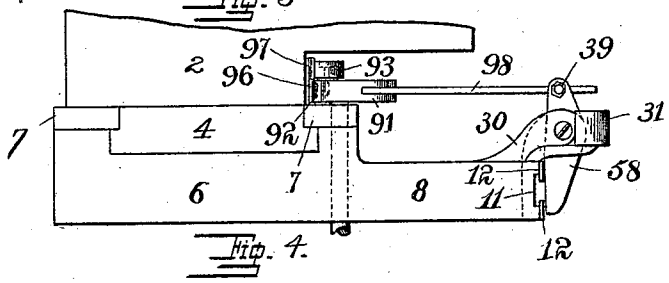

Fig. 4.

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BOX BINDING MACHINE.

No. 527,574. Patented Oct. 16, 1894.

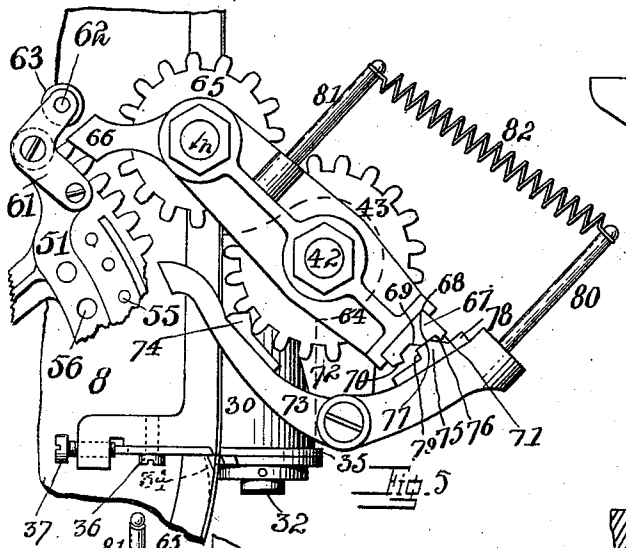

Fig. 5

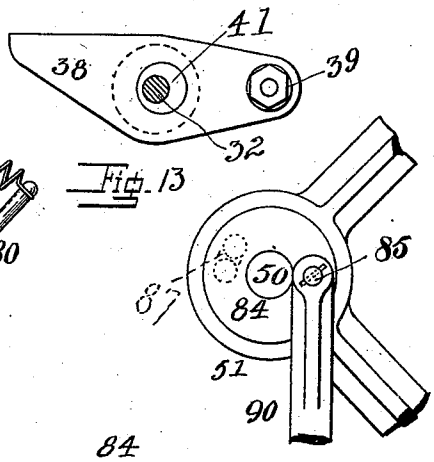

Fig. 13

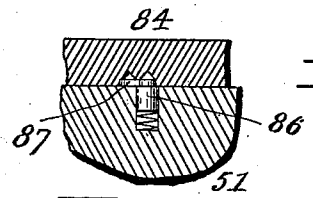

Fig. 14

Fig. 15

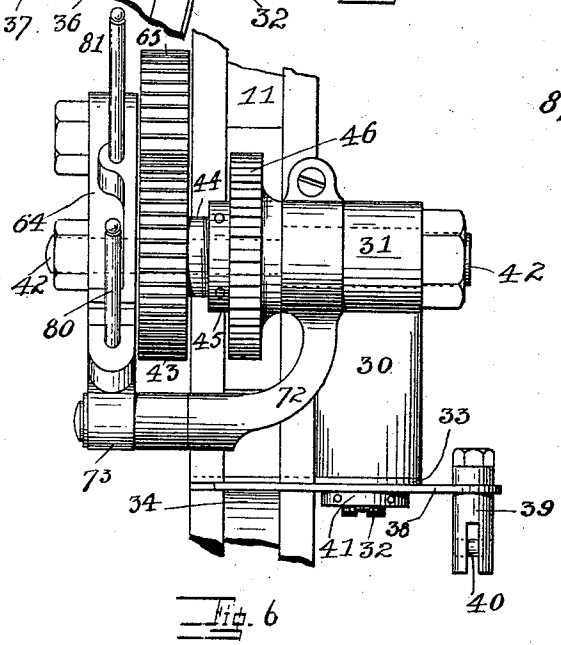

Fig. 6

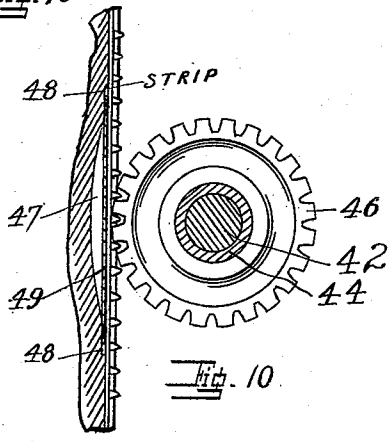

Fig. 10

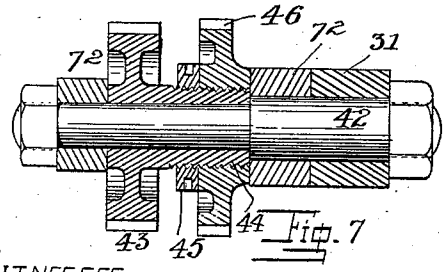

Fig. 7

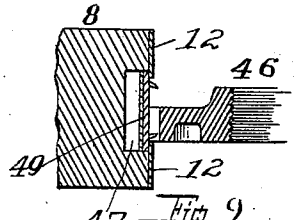

Fig. 9.

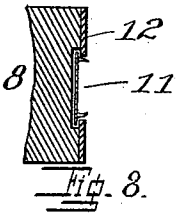

Fig. 8.

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A. A. WOOD.

BOX BINDING MACHINE.

No. 527,574. Patented Oct. 16, 1894.

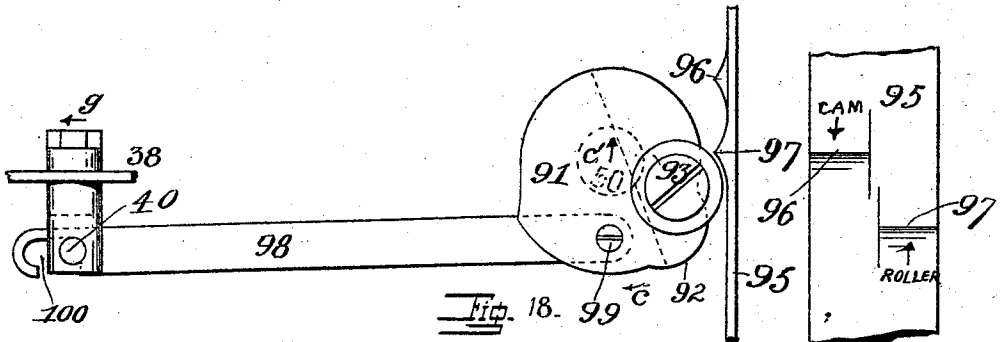

Fig. 18. Fig. 19.

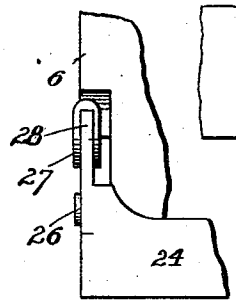

Fig. 20.

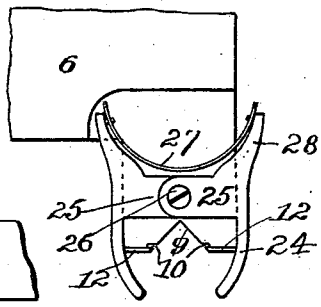

Fig. 22.

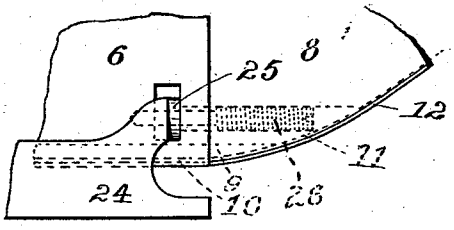

Fig. 21

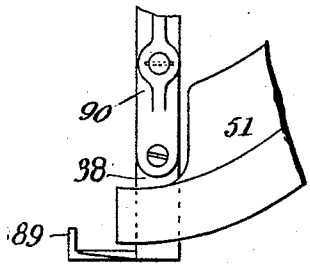

Fig. 16.

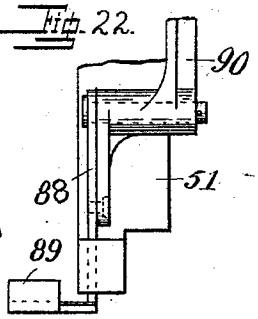

Fig. 17.

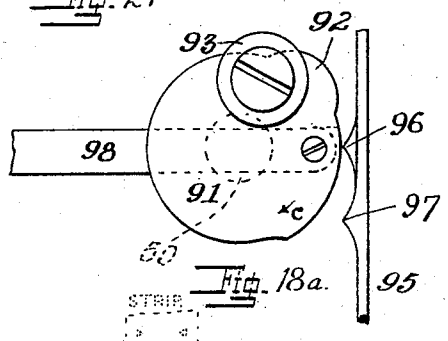

Fig. 18a.

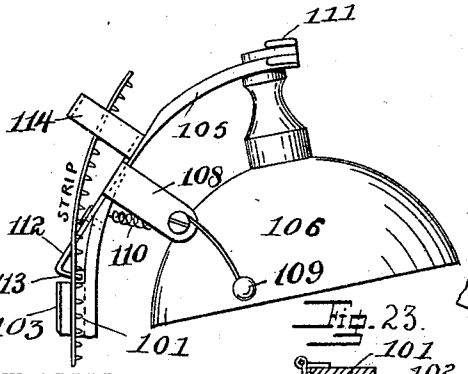

Fig. 23.

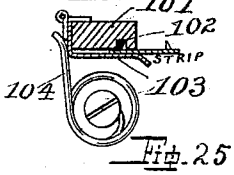

Fig. 25.

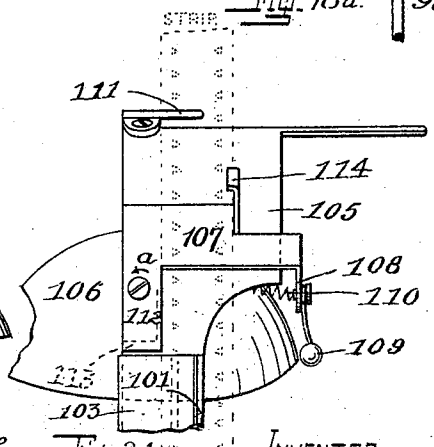

Fig. 24.

WITNESSES.

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INVENTOR.

Albert A. Wood.

by Allwood & Co. Att'ys.

UNITED STATES PATENT OFFICE.

ALBERT A. WOOD, OF ATLANTA, GEORGIA.

BOX-BINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 527,574, dated October 16, 1894.

Application filed February 2, 1894. Serial No. 498,906. (No model.)

To all whom it may concern:

Be it known that I, ALBERT A. WOOD, a citizen of the United States, and a resident of Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Box-Binding Machines; and I do hereby declare the following to be a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

The device is illustrated in the accompanying drawings, in which—

Figure 1, (Sheet 1) is a side-elevation of the device with the parts in their normal position, the normal position of the piston being on the middle of the down stroke. Fig. 2, (Sheet 2) is a front elevation of the device, as seen from the position of the operator. Fig. 3, (Sheet 3) is a section vertically through the frame, showing a back view of the several parts, notably the piston. Fig. 4 is a view of the upper end of the piston and the guide whereon it has movement vertically, also showing the feeding mechanism. Fig. 5, (Sheet 4) is a face-view of the intermittent feed mechanism, showing a portion of the piston and segment. Fig. 6 is an edge view thereof. Fig. 7 is a section longitudinally of the feed-wheel shaft, showing the construction of the parts thereon. Fig. 8 is a section across the strip-way in the piston, showing the strip therein. Fig. 9 is also a section on said strip-way, showing the feed-wheel, the strip and spring bearing plate thereunder. Fig. 10 is a side elevation of the feed-wheel and a vertical longitudinal section of the strip-way and spring-bearing plate therein. Fig. 11, (Sheet 1) shows a side elevation of the adjustable strap, on the segmental rack, and Fig. 12, (Sheet 1) is a front view of the face thereof. Fig. 13 shows the movable blade of the shear, and its adjustable pivot. Fig. 14 is a face view of the hub of the segmental rack, and the disk thereon, and the pitman which carries the feed pawl. Fig. 15 is a detail showing the catch-pin which limits the motion of the disk. Fig. 16, (Sheet 5) is a detail showing a side elevation of a portion of the segmental rack, and a feed pawl sliding therein, and Fig. 17 is a view of the left-hand side of Fig. 16. Fig. 18 shows the cam on the end of the rock-shaft, opposite that shown in Fig. 14, the tappet actuating same, and the means for operating the movable shear-blade. Fig. 18ª shows the cam-wheel in the opposite position relatively to the tappets. Fig. 19 is a face-view of said tappets, showing their relative arrangements. Figs. 20 and 21 show respectively, the front and back ends of the lower end of the piston, and the pivoted plates thereon. Fig. 22 is an elevation of the front end of the same. Figs. 23 and 24 are, respectively, a side and front elevation of the bell and ringing mechanism, showing the upper end of the strip-clamping plate. Fig. 25 is a cross-section on the line 25—25, Fig. 1. Fig. 26, (Sheet 3) is a detail showing a box-corner, with a strip bent thereover, and affixed. Fig. 27 (Sheet 3) shows construction whereby the wedge is adjusted under the anvil in horizontal section.

In the figures, like reference marks indicate corresponding parts in all the views.

1 is the base, and 2 the main frame.

3 is a shaft mounted transversely of the main frame which carries the fly-wheel and clutch mechanism on one end, and projects through the frame stopping even with the face of the guide 4, Figs. 1 and 4, and carries a wrist-pin 5. The piston 6 slides vertically on the guide 4, gibs 7 serving to hold same in place thereon. This piston 6 is rectangular in form and has an extension 8, which will be presently described. On the lower end of the piston as shown in Figs. 2, 3 and 22, is a V-shaped groove 9, which for affixing corner-strips to a square box would have its sides slope to a right angle to each other. Grooves 10 best shown in Fig. 22, and adapted to grasp the edges of a strip are formed in the sides of the groove 9 and extend its entire length. The lower back corner of extension 8 is rounded as shown in Figs. 1 and 3, and extending along the edge thereof is a shallow channel 11 as wide as the strip to be affixed to the box corner in which one of said strips may lie, and be forced forward. Narrow strips 12 of thin metal are laid upon the remaining portion of the edge so as to overhang the channel 11 and form a guide preventing

displacement of the strip, which will be understood on reference to Fig. 8. These strips 12 extend as shown in Figs. 21 and 22 along the under side of the piston 6, overhanging there what is virtually an extension of the channel 11 coextensively with the groove 9, and so forming the aforesaid grooves 10. Thus it is seen that a strip inserted in the upper end of the groove in the extension 8, may be passed around and into the grooves 10 in the piston.

As shown in Fig. 1 a triangular hole is cut through the piston 6 so as to register with the end of the shaft 3, and into this projects the wrist 5 on said shaft, the pitman 13 being pivoted on said wrist and extending to the lower angle of the triangular hole which is rounded to receive it and there being pivotally secured to the piston.

The anvil 14 consists of a block of iron seated on a ledge on the side of the frame 2, and carrying on its upper side near its front end flat inclined faces 15 at an angle to each other equal to that of the sides of the groove 9 of the piston. If desired a bar of hard steel 16 may be inserted at the apex for better wearing properties. A plate 17, conforming on its top edge to the angle of the faces 15 of the anvil is secured to the end of the anvil to serve as a guide for holding the box on said anvil, the bottom of the box being pressed against the face of the said plate whereby the edges of the sides of the box which are to be joined and stayed are held parallel along the apex of the anvil. The lower edge of this plate 17 is rounded to facilitate turning the box upon as large a plate as can be used. The vertical and horizontal diameter of the plate being the same, and several plates of different sizes and interchangeable being provided it is obvious that a plate of the greatest area of face may be obtained for each size of box and better results be thereby secured.

Vertical adjustment of the anvil 14 to provide for various thicknesses of box-material is provided for in the use of a wedge 18 which is inserted upon the correspondingly inclined ledge of the frame 2 hereinbefore mentioned, and so lies between said ledge and the under side of the anvil, longitudinal movement of said wedge obviously raising and lowering the anvil. This movement of the wedge is conveniently obtained in the construction shown in Fig. 27, in which figure the back edge of the wedge is shown bent at right-angles and bifurcated. A stud 18^a is set in the frame, parallel to the wedge, so that it lies within the said bifurcation, and a thumb-nut 18^b screwed thereon, which has a neck engaging the bifurcated end of the arm 18^c. This anvil is held in place by a strap 19 which lies upon same, having its ends fitted over studs 20 set in the frame 2 above and below the said anvil, and held firmly pressed against the said anvil by means of band-wheels 21 screw-threaded onto said studs and bearing on the outer side of the said strap 19. In order to resist the downward thrust of the piston upon the front end of the anvil, a hook-bolt 22 is set in a hole through the frame behind and near the back-end of the anvil, its hook bearing upon the top of the anvil, and a wheel 23 being screw-threaded upon its lower end whereby it is drawn forcibly forward.

As shown in Figs. 1, 20, 21 and 22 presser-plates 24 are pivoted by their arms 25 on screws 26 in each edge of the piston 6, said plates projecting below the face of the piston and a sufficient distance to press the paper firmly against the faces of the anvil before the piston brings the strip to be affixed into contact therewith, and may be if desired slightly rounded so that, as they contact with the box sides and press downwardly, moving outwardly thereon, they will press the box sides firmly against the anvil at the proper relative position to each other and have no tendency to dislocate or abrade the said box sides. In the construction shown in Fig 22 these plates are pressed normally against the sides of the piston by means of a bow-spring 27 operating to diverge the arms 28 projecting upwardly from one end of each plate. A saw-cut or slot 29, Figs. 3, 5 and 6 is made crosswise of the groove 11 on the back edge of the extension 8 of the piston and near said slot with its lower face on a level therewith is a lug 30, which has another lug 31 on its upper end, the use of which will hereinafter be described. A screw 32 is set in the under side of the lower end of the lug 30, and the stationary jaw 33 of the shears is placed upon said screw, being perforated for that purpose, and extends into the slot 29, a set-screw 36 serving to secure its free end and a set-screw 37 bearing against its back edge serving to adjust the blade and hold it in its adjustment, the hole through which the screw 36 passes being slotted to allow a movement when said screw 36 is loosened. The movable blade 38 (also shown in Fig. 13) is also pivotally mounted on the screw 32, an eccentric bushing 41 intervening whereby said shears are adjusted, and enter the recess 29 below the blade 38 as best shown in Fig. 6. The said blade 38 is extended on the side of the screw 32 opposite the cutting end of said blade to form an arm wherein is set a stud 39 which is, in the construction shown, bifurcated in its lower end, and provided with a pin 40 for a purpose hereinafter more fully set forth.

The bottom of the channel 11 as shown in Fig. 6 and by broken lines in Fig. 5, is rounded as shown at 34 so as to prevent the shears blade from bending the end of the strip, with a short bend near the cut.

Mounted in the lug 31 is a stud 42 which carries thereon, a gear 43, so as to revolve freely and which is provided in the construction shown in Figs. 6 and 7 with a long hub 44 which is exteriorly screw-threaded with a

"left-hand" thread of fine pitch. A nut 45 is first screwed on said hub after which the dentated feed-wheel 46 (further shown in Figs. 9 and 10) is screwed thereon, the nut 45 serving to hold the wheel 46 in any set position on the said hub. This construction has particular merit in view of the adjustment of the wheel 46 which is required said wheel 46 being the feed-wheel into the interdental spaces of which the spurs of the metal corner-strips enter in being fed along the strip-way 11 and between the shears to be cut off. Owing to the fact that it is desirable to cut the strip between the spurs thereof, the feed-wheel 46 has circumferential adjustment on the hub 44 and owing to the fineness of the thread thereon the said adjustment may be made without appreciable lateral adjustment of the wheel 46. In said strip-way, back of the wheel 46 as shown in Figs. 9 and 10 is a recess 47, having ledges 48 at its ends whereon rest the ends of a spring-plate 49, so set as to form a depressible bearing for the metal corner-strip as it passes under the feed-wheel 46, whereby in case of the said strip sticking in the channel 11 for any cause, said strip will be depressed by the feed-wheel into the recess 47 against the action of the spring-plate 49 which will allow the feed-wheel 46 to revolve in contact with the points of the spurs on the metal corner-strip without feeding said strip or subjecting the feed-mechanism to unnecessary strain. The mechanism for intermittently revolving the said feed-wheel and stopping same at the right place will be now set forth.

Mounted in the piston 6 concentrically with the curvature of the lower back corner thereof, is the shaft 50 to which is secured the segment 51, as shown in Figs. 1 and 14 which revolves freely on said shaft and has on it peripheral surface teeth, as shown in the first-named figure. A pitman 52 is connected with one of the arms of this segment by means of a wrist-pin 54 set in the end of the wrist-pin 5 on the shaft 3. The said wrist-pin 54 is set in the end of the wrist-pin 5 slightly ahead of the center thereof, so that the segment will be caused to partially revolve with its shaft upwardly a sufficient distance to clear the feed-pawl hereinafter described from the anvil before the piston shall descend sufficiently to catch same. Just inside the teeth on the segment is a semi-circular series of holes, 55, there being one of said holes near each tooth of the segment except a few at the top, where they are unnecessary. The second row of holes 56 are screw-threaded, and are situated in the inner edge of the segment. A strap 57 is slotted in one end as shown in Figs. 11 and 12 and a thumb-screw 58 is inserted therein, which is adapted to secure the said strap to the segment by being screwed into one of the holes 56, said strap carrying a roller 59 on a pin on its other extremity, a leader 60 on the end of said pin entering one of the smaller holes 55 insuring stability and exactitude of adjustment. Three or more adjustments of the roller 59 may be made without moving the screw 58 to another hole 56. Secured to the upper end of the segment 51 is a bracket, 61, which carries on its end a pin 62, and a roller 63. The rollers 59 and 63 are merely abutments, and it is not necessary that they be rollers, although it is preferable.

Reference being had to Figs. 1, 5, 6 and 7 it will be seen that mounted loosely on the end of the stud 42 is a lever 64. On the distal extremity of said lever is journaled a pinion 65, which meshes with the gear 43 on said stud. On the upper end of this lever 64 is an arm 66 adapted to engage the roller 63, as shown in Fig. 1, and by said engagement to depress that end of the lever 64 slightly, moving it from the position shown in Fig. 5 toward the position shown in Fig. 1. On the downwardly projecting end of the lever 64 is a block 67 provided with a face 68, a face 69 inclined thereto, and stop-blocks 70 and 71. Fastened on the stud 42 so as to have adjustment pivotally thereon is an arm 72, which is curved so as to bring its end parallel to the said stud. A bell-crank lever 73 is pivoted on the end of said arm and extends so as to contact with the roller 59 on the upward movement of the segment when the said lever is in the position shown in Fig. 1 said contact throwing the lever into the position shown in Fig. 5, a lug 74 thereon engaging a tooth of the gear 43. On the upper side of the opposite end of the lever 73 and in a position thereon correlatively opposite the block 67 is a block 75 provided with an inclined face 76, a face 77, and stop surfaces 78 and 79. In the end of the lever 73 is a pin 80 and in the side of the lever 64 is a pin 81, a pulling-spring 82 being connected at each end to the free ends of said pins and acting to draw them toward each other. The reasons for this somewhat complicated construction will be seen on a description hereinafter of the operation of the device.

Secured to the end of the shaft 50 is a disk 84, which has thereon a wrist pin 85, and revolves with the shaft. As shown in Figs. 14 and 15, the said disk and the hub of the segment 51 on the same shaft are engaged by means of a spring-pressed pin 86, which is set in the said hub, and projects into an oblong recess 87 in the disk, its end being pointed and entering conical depressions in each end of the said recess 87, by means of which a slight movement of the disk independently of the hub of the segment is allowed. As shown in Figs. 1, 16, and 17 a guide is formed in the lower end of the segment 51 radially thereof and through this passes the stem 88 of the feed pawl, said pawl being formed of a strip of steel bent inwardly as shown in Fig. 17 and backwardly as shown in Fig. 16, having on its extremity an upturned lip 89, as shown in both these figures, which lies across the channel 11 in such a position that it will when elevated, enter between two opposite pairs of spurs on the tin-strip next below the

shears, and as the segment descends after the piece of tin is cut from the strip, will carry the piece so cut off downwardly through the groove 11 and so deliver it to the groove in the under end of the piston 6. The stem 88 of the feed pawl is connected by a pitman 90 to the wrist pin 85 of the disk 84, and it is hence obvious that the movement allowed by the construction shown in Figs. 14 and 15 will cause the feed-pawl to engage and disengage the tin strip. It is necessary to cause this engagement at the same moment the shears work and the segment starts down, and to cause the disengagement just before the time the said segment begins its upward movement. On the opposite end of the shaft 50 and made integrally therewith in the construction shown in Figs. 3, 18 and 18ª is a wheel 91 which is provided with a cam projection 92 having a curved face, while slightly above the cam a stud projects from the side of said wheel 91 and carries a roller 93. A plate 95 shown in the figure just named and also in Fig. 19, is secured to the side of the frame in such a manner that the tappets 96 and 97 will be contacted with by, and act upon the projection 92 and the roller 93 at the proper time in the movement of the piston, the wheel 91 being carried upon and moving with the piston while the plate 95 is stationary on the frame. The pitman 98 is connected with the wheel 91 by means of a pin 99, its distal extremity being provided with an open-sided slot 100 which is hooked over and engages the pin 40 in the stud 39, Fig. 6. By means of the slot the shears are opened and closed at the extremes of the reciprocating movement of the pitman 98 and in removing from the machine the moving shear-blade 38 a slight twist thereof will detach it from the said pitman by passing the pin 40 out of the open side of the slot.

As shown in Figs. 1, 23, 24, and 25, an upright 101 is secured to the back upper corner of the piston (extension 8) in such a manner as to leave the groove 11 open between the said upright and piston, and a groove 102 is milled in the face, which groove is so formed and situated as to guide the strip along the upright 101 and into the groove 11, a presser-plate 103 being hinged to the said bar so as to press upon the strip and keep it in its place in the groove 102. A spring 104 acts to keep the said plate pressed into place. This presser-plate also serves to hold two lengths of strip together after being hooked, as will be understood upon a description hereinafter of the operation of the device. The free edge of the plate 103 may be curved backward if desired as shown in Fig. 25, thereby rendering easier the operation of swinging the said plate slightly back to enable the operator to hook on a new strip the strip slipping freely under the plate in inserting. The upper end of the upright 101 is curved backwardly as shown at 105, and a bell 106 is carried on the upper extremity thereof. A lever 107 is pivoted thereon as shown in Fig. 24 its end being turned back forming an arm 108 to which is secured a clapper 109 the arm and clapper being so formed and extended as to bring the latter close to the bell. A spring 110 acts to draw the lever in such a direction as to cause the bell to be struck by the clapper, namely, in the direction shown by the arrow *a* Fig. 24. The object of this bell is to sound an alarm as soon as the upper end of the strip enters between the upright 101 and the presser plate 103. The construction necessary to complete this function is as follows: An arm 112 is formed on the lever 107 and has a backwardly extending lip 113 turned thereon. When the strip is in the position shown by broken lines in Fig. 24 this lip 113 rests against its edge the engagement of the spurs on the strip with the groove 102 preventing a displacement of the strip thereby. As soon as the strip is drawn downwardly by the feed-wheel until the upper end of the strip is below the said lip 113 the tractile spring 110 having its fixed end fastened to the upright 101 above the pivotal point of the lever 107 will cause a movement of the lever to sound the alarm. In order that there shall be no strain edgewise on the strip which could possibly cause a displacement thereof under any conditions and to hold the lip 113 out of constant engagement therewith, an upward projection 114 may be provided if desired on the lever 107 opposite the lip 113, and bear upon the opposite edge of the tin-strip.

A finger 111 on the upper corner of the part 105 of the upright 101 serves as a bearing point for the strip opposite the arm 114 and acts also to prevent the strip becoming disengaged from the said arm upon the sudden downward movement of the piston in operating. The strip now has two opposite bearing points above the lip 113 and the lever 107 is by the bearing of the arm 114 on the edge of the strip, held in such a position that the lip does not touch the strip until same is drawn below said arm 114 when the lever moves slightly and brings the lip against the said strip from which position it trips the lever 107 as soon as the strip descends a sufficient distance.

The piston in its movement as before stated stops at midstroke in its movement downward and hence starts at the same point the shaft making a single complete revolution. To produce this intermittent motion a peculiar clutch mechanism is required that is, a clutch which when caused to engage the continually revolving element will make one complete revolution, and stop automatically, ready to again be thrown into action.

The operation of this device is as follows: The device is in its normal position as shown in Fig. 1. A strip of tin bearing spurs suitable for affixing is placed between the projection 114 and the lip 113 of the bell-lever 107, and pressed under the free edge of the spring-pressed plate 103 until the spurs register with the groove 102, when the plate

closes, pressing said spurs into the groove. The strip is then manually drawn downwardly until its lower end enters the groove 11 and passes downwardly through same to the feed-wheel 46, after which one revolution of the main shaft of the machine, will, as hereinafter specified cause the said feed-wheel to force the strip down to and slightly through the shears, and cause said shears to cut off the projecting piece which is the only waste occurring at any time during the operation of the machine, unless from accident it shall be necessary to insert another strip to form the initial one of a connected series. The strips are fed continuously to the machine by allowing the strip to be fed downward as it is used until the bell rings, which occurs as hereinbefore mentioned as soon as the upper end of the strip has passed the projection 113 and hence is between the bar 101 and the hinged plate 103. The operator then takes a new strip and places same on the bell-lever as just described above, and enters same in the above-described manner between the upright and hinged plate drawing it downward therebetween and hooking the first or first and second pairs of spurs of the new strip into the holes left in punching the first or first and second spurs of the strip previously inserted. The presser-plate 103 will obviously hold the said strips thus engaged until they enter the groove 11 when it will, of course, be impossible for them to disengage, and their operation both in feeding and being affixed to the box-corner is precisely the same as a continuous strip the length of both. Strips may thus be successively inserted and connected and their entire length is utilized, leaving no waste of metal which is an item of considerable importance. The machine is now in its normal position and is charged with a strip ready to be fed downward. The anvil 14 is moved on its seat until it projects under the piston from its back side just the depth of the box to which the strip is to be affixed, and, by means of the wedge 18 the said anvil is raised or lowered to accommodate the thickness of the board used in the box. The number of spurs which a strip should have which would be of a length sufficient for the depth of the box is then determined, and the strap 57 is so set that the leader 60 will enter a hole in the series 55, which is a proper number in the series. These adjustments being made, the machine is then started by throwing in a suitable clutch, whereby connection is made between the fly-wheel which has been previously set revolving and the shaft 3, starting said shaft to revolve in the direction of the arrow *b* thereon in Fig. 1. This movement of the shaft starts the piston descending, and through the pitman starts the segment upward on its partially rotary movement. The cam 91 is in a position normally which is shown in Fig. 18ª and on the movement of the segment revolves in the direction of the arrow *c* thereon. The descent of this piston, and the revolution of the segment and cam 91 brings the projection 92 into contact with the tappet 96, which causes a movement of the shaft 50 to the limit of the slot 87, Fig. 15, independently of the movement of the segment, and in the direction of the arrow *d*, Fig. 1, which causes the feed-pawl 89 to move downwardly as in disengaging from between the spurs of a strip, were one at this point of the operation in the die on the under end of the piston. As the segment 51 ascends, it actuates the gear 65, said gear having been previously thrown into engagement therewith, which will be hereinafter described, and through it drives the feed-wheel 46, by means of the gear 43, said feed-wheel revolving in the direction of the arrow *e* Fig. 1, and drives the strip downward through the groove 11 and the shears, and continues so to do until the roller 59 on the strap 57 comes into contact with the end of the arm 73, which partially revolves said lever in the direction of the arrow *f* Fig. 1, releasing the engagement between the blocks 67 and 75 and inserting the block 74 between two teeth of the gear 43 whereby the revolution of the gear 43 and the feed-wheel is instantly stopped allowing the spring 82 to swing the lever 64 on the stud 42 which swings the axis of the gear 65 in a direction from the segment and causes the said gear 65 to travel upon the teeth of the gear 43 and so be revolved in the same direction as previously shown and thus be drawn out of mesh with the teeth of the segment, rolling as it is drawn out. In this manner the piece of tin has been fed down so as to project below the shears a sufficient distance to fit the box-corner, and it now remains for the mechanism to cut same off and feed it into the grooves on the lower end of the piston 6. The piston 6 then reaches its limit of depression applying the pressure, and commencing its ascent, the upward movement of the segment 51 continuing, and hence the revolution of the cam-wheel, continuing in the direction of the arrow *c*, Fig. 18, until when the piston reaches the position shown in Fig. 1, the wrist-pin 5 being diametrically opposite the position shown in said figure and the segment having reached its point of ultimate elevation relative to the piston, the cam-wheel 91 is in the position shown in Fig. 18, as is, also, the pitman 98, the shears being ready to close, the feed-pawl being directly under the shears and ready to engage between the spurs of the strip as before stated, said strip being in position to be cut and engaged. The wrist-pin 5 is, at this time, approaching and passing the dead-center relative to and distal from the pin 53 of the segment, and hence the segment is, practically at a standstill, and the shaft 50 is moving upward in the direction of the arrow *c'* in Fig. 18. Owing to this motion the roller 93 is brought into forcible and operative contact with the tappet 97 which partially revolves the cam-

wheel 91 in the direction of the arrow *c* Fig. 18 imparting thereto a very quick motion to the limit of the slot 87 which partially revolves the disk in the direction opposite the arrow *d* Fig. 1 thereby quickly pulling the lip 89 on the feed-pawl 88 between the pair of spurs of the strip next below the shears, thereby engaging same, and simultaneously closing the shears, thereby severing the strip. The segment 51 now starts downward carrying the section of the strips so cut off downwardly through the groove 11 carrying it to the grooves in the lower end of the piston 6 and into a position to be affixed. During the time the segment continues downwardly carrying the strip the shears stand closed on account of the lost motion due to the slot 100 in the pitman 98, but during the latter part of such movement the shears are partially opened by the end of the slot 100 coming into contact with the pin 40 of the shears, and the opening is completed by the action of the cam wheel and tappet which disengages the feed-pawl in which open position it remains until again closed, as hereinbefore specified. Just before the segment reaches its downward movement the roller 63, Fig. 1 is brought into contact with the arm 66, Figs. 1 and 5, the lever 72, and contiguous parts being in the position shown in Fig. 5 at this time, as they were left by the operation previously described, the feed-wheel 46 being at rest, and engaging spurs of the strip to be fed. This engagement of the roller 63 and arm 66 moves the lever 64 on the pivot 42 in the direction of the arrow *h* Fig. 5 a sufficient distance to bring into operation the two inclined faces 69 and 76 of the blocks 67 and 75 respectively, and at that time the spring 82 acting through the arm 80 moves the lever 73 in a direction opposite the arrow *f* Fig. 1, which causes the said inclined faces to move upon each other and continue the movement of the lever 72 just mentioned until the gear 65 shall be meshed with the teeth of the segment. During this time the block 74 has been engaged with the teeth of the gear 43 holding same from revolving, whereby a planetary movement has been imparted to the gear 65 causing it to roll into engagement with the teeth of the segment. As soon as this engagement is completed the block 74 has been withdrawn from the teeth of the gear 43 and hence same is ready to be revolved and perform the operation of feeding the strip and being released from engagement with the segment, both of which have been described. The stops 70 and 71 and the stop surfaces 78 and 79, co-operate to limit the movement of the lever 72 in obedience to the action of the spring 82; and may obviously be so constructed and placed as to subserve this purpose in any desired way. The parts are now in position to repeat the operation from the beginning.

The operation of affixing the strip as far as it relates to the operation of those parts not hereinbefore described is as follows: The strip of tin has been by the mechanism inserted in the piston as hereinbefore set up. The operator then places the box in position the bottom resting on the plate 17 and held thereon by his thumbs, pressing the fore-finger of each hand upon the sides to be joined and bringing the same against the faces 15 of the anvil, causing the edges thereof that are to be joined to lie approximately parallel along the apex of the anvil. The piston descending first sets the sides in position by bringing the rounded edges of the presser-plates 24 into contact therewith and then affixes the strip in the usual manner by pressure.

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

1. A reciprocable piston having a V-shaped groove in its lower face, parallel grooves cut therein, one in each of the faces of the V-shaped channel, adapted to hold the tin strip, and an anvil corresponding in form on its upper side to the V-shaped groove, substantially as and for the purpose specified.

2. The combination of a reciprocable channeled and grooved upper die, a lower die conforming in shape to the channel in the said upper die, and plates pivoted on and extending along the sides of the upper die and a considerable distance below its face so as to contact with the box prior to the contacting of the strip in said grooves, substantially as and for the purpose specified.

3. A reciprocable grooved piston, set in a frame, an anvil fitting said groove by its upper face and having an inclined bottom side, and seated upon ledges of said frame, a wedge fitting under said anvil and on said ledges and means for clamping the said anvil in place, substantially as and for the purpose specified.

4. A reciprocating grooved piston set in a frame, and an anvil having a correlatively formed working face set on a ledge of said frame so as to slide parallel to its working face a vertically adjustable lower bearing for said anvil, means for clamping said anvil in place, and a hooked bolt engaging its back end and operating against upward movement thereof.

5. An anvil, a piston reciprocable to contact therewith, a strip guideway on said piston leading to the working face thereof, a bar secured to and carried by said piston, substantially parallel to a portion of the guideway and grooved to receive the spurs of the binder-strip and means for elastically holding said binder strip in place, for the purpose specified.

6. An anvil, a piston reciprocable to contact therewith, a strip guideway on said piston leading to the working face thereof, a bar secured to and carried by said piston, substantially parallel to a portion of the guideway and a groove to receive the spurs of a binder

strip, and means for elastically holding said binder strip in place, consisting of a plate hinged to the said bar parallel thereto and spring-pressed against the strip.

7. A piston and an anvil thereunder, a feed guideway, a bar also provided with a guideway, a bell on the upper end of same, a spring pressed lever carrying the bell-striker and pivoted in the path of the strip in said guideway and provided with arms adapted to engage opposite edges of the said strip when the striker is retracted.

8. A piston and anvil thereunder, a feed guideway, a bar also provided with a guideway, a bell on the upper end of same, a spring pressed lever carrying a bell-striker pivoted in the path of a strip in said guideway and provided with arms adapted to engage opposite edges of the said strip when the striker is retracted and a finger secured to the said bar at its upper end alongside the edge of said strip and acting as a fulcrum in inserting a new strip.

9. An anvil and a piston reciprocable thereover, having correlative working faces, a strip guideway on the piston leading to the working face thereof, a shear blade set in said piston transversely of said guideway, a movable shear blade so set as to coact therewith, and means for operating said shears consisting of a shaft set revolubly in the piston and a crank thereon, a pitman connecting said crank with the said movable shear-blade, for the purpose specified.

10. An anvil and a piston reciprocable thereover, having correlative working faces, a strip guideway on the piston leading to the working face thereof, a shear blade set in said piston transversely of the said guideway, a movable shear blade so set as to coact with same, and means for operating said shears consisting of a shaft set revolubly in the piston, a crank on each end thereof, a pitman connecting said shears with the correlative crank, and a pitman connecting the other crank with the wrist-pin on the main shaft of the machine.

11. The combination of the anvil, the piston reciprocably mounted thereover, both having correlatively formed working faces, a guideway leading to the working face of the piston, shears removably secured to said piston transversely of the guideway, a stud carried on the movable blade of said shears, a pin set transversely of the end of said stud, a shaft set revolubly in the piston, a crank on each end thereof, a pitman provided at one end with an open-sided slot secured to one of said cranks the said slot in its other end engaging the pin in the stud aforesaid, and a pitman connecting the other crank on the same shaft with the wrist-pin on the main shaft of the machine, all combined, arranged and operating, substantially as and for the purpose specified.

12. A piston and anvil having correlatively formed working faces, a semi-circular curved surface on said piston, a guide-way along said curved surface leading to the working face of the piston, a shaft mounted in said piston, a segment revolubly set on said shaft and connected by a pitman with the wrist pin of the main-shaft, a feed-pawl seated in said segment so as to have radial motion relatively thereto, and to lie transversely of the guideway, and means for causing said radial movement of said feed-pawl substantially as and for the purpose specified.

13. An anvil and a piston having correlative working faces, a semi-circular curve on said piston, a guideway therein leading to its working face, a shaft seated in said piston, carrying a cam disk having a roller and projection, and tappets seated on the frame in a position to be contacted with by said roller and projection alternately on reverse motions of the pitman, a segment revolubly mounted on said shaft and operatively connected with the crank on the main shaft by means of a pitman, a pin and slot connection between the said segment and the shaft, preventing more than a relative short movement thereof, a crank on said shaft, a feed-pawl seated so as to have radial movement on said segment and connected to said crank, and lying transversely of said guide-way.

14. An anvil, and a piston reciprocably mounted thereover, having correlative working faces, a guideway in the said piston leading to the working face thereof, a toothed segment mounted on a shaft thereon and means for imparting a semi-rotary motion thereto, a toothed wheel mounted so as to run its periphery in the guide-way, a gear connected thereto on the same axis, an arm mounted on said axis, an intermediate gear mounted on said arm and meshing with the aforesaid gear, said arm swinging so as to bring said gear into mesh with the teeth of the segment, and an abutment on said segment so set as to contact with said lever on the descent of the segment and so draw the intermediate gear into mesh with the segment teeth, and means for throwing said lever back to its normal position, for the purpose specified.

15. An anvil, and a piston reciprocably mounted thereover having correlatively working faces, a guide-way in the said piston leading to the working face thereof, a toothed segment mounted on a shaft thereon and means for imparting a semi-rotary movement thereto, a toothed wheel mounted so as to run its periphery in the guide-way, a gear connected thereto on the same axis, an arm mounted on said axis, an intermediate gear mounted on said arm and meshing with the aforesaid gear, said arm swinging so as to bring said gear into mesh with the teeth in the segment, an abutment on said segment so set as to contact with said lever on the descent of the segment and so draw the intermediate gear into mesh with the segment

teeth, means for throwing back said lever to its normal position, and a spring actuated lever carrying a block engaging a correlative block on the aforesaid swinging lever when same is depressed.

16. An anvil and a piston reciprocably mounted thereover, having correlative working faces, a guide-way in the said piston leading to the working face thereof, a toothed segment mounted on a shaft thereon and means for imparting a semi-rotary motion thereto, a toothed wheel mounted so as to run its periphery in the guide-way, a gear connected thereto on the same axis, an arm mounted on said axis, an intermediate gear mounted on said arm and meshing with the aforesaid gear and a block on its opposite end provided with an inclined face, said arm swinging so as to bring said intermediate gear into mesh with the teeth of the segment and an abutment on said segment so set as to contact with said lever on the descent of the segment and to draw the intermediate gear into mesh with the segment teeth, and means for throwing said lever back to its normal position, and a spring-pressed lever carrying a block having the face inclined correlatively opposite that of the block on the first mentioned lever, whereby said lever is forced downwardly by the apposition of the said inclined faces due to the swinging of said spring-pressed lever.

17. An anvil and a piston reciprocably mounted thereover having correlatively formed working faces, a guide-way in the said piston leading to the working face thereof, a toothed segment mounted on the shaft thereon, means for imparting a semi-rotary motion thereto, a toothed wheel mounted so as to run its periphery in the guide-way, a gear connected thereto on the same axis, an arm mounted on said axis, an intermediate gear mounted on said arm and meshing with the aforesaid gear, said arm swinging so as to bring said intermediate gear into mesh with the teeth of the segment and an abutment on said segment so set as to contact with said lever on the descent of the segment and so draw the intermediate gear into mesh with the teeth of the segment, and means for throwing back said lever to its normal position and a spring actuated lever, carrying a block engaging a correlative block on the aforesaid swinging lever when same is depressed and a second block thereon engaging the teeth of the gear on the feed-wheel axis when said lever is out of engagement with the first mentioned lever for the purpose of causing a planetary movement of the intermediate gear said first named blocks having peripheral surfaces whereby said spring pressed lever is prevented from moving when said swinging lever is elevated and said surfaces in contact.

18. An anvil and a piston reciprocably mounted thereover having correlative working faces, a guideway in the said piston leading to the working face thereof, a toothed segment mounted on a shaft thereon and means for imparting a semi-rotary motion thereto, a toothed wheel mounted so as to run its periphery in the guideway, a gear connected thereto on the same axis, an arm mounted on said axis, an intermediate gear mounted on said arm meshing with the aforesaid gear, said arm being adapted so as to bring said gear into mesh with the teeth of the segment, and an abutment on said segment so set as to contact with said lever on the descent of the segment and so draw the intermediate gear into mesh with the segment teeth, and means for throwing said lever back to its normal position, an arm adjustably secured to the axis of the feed-wheel, and a spring-pressed lever pivotally secured to the extremity thereof and a block on said spring-pressed lever engaging a correlative block on the swinging lever when the latter is depressed, for the purpose specified.

19. An anvil and a piston having correlative working faces, a guideway in the piston leading to the working face thereof, a toothed segment mounted so as to be partially revoluble and means for giving same a semi-rotary movement, the feed-wheel running in said guideway, a gear secured to said feed-wheel on the same axis therewith, a swinging lever mounted on said axis and spring-pressed in the direction of elevation, an intermediate gear carried on the end of said lever so as to mesh with said segment when said lever is depressed, means for depressing it, a spring pressed lever so mounted as to engage the said swinging lever when same is depressed and hold same depressed against the action of the spring and having an extension to near the segment, and an abutment on the lower end of said segment adapted to contact with said extension of said spring pressed lever and disengage same from the swinging lever.

20. An anvil and a reciprocable piston thereover, a guideway in said piston leading to the working face thereof, a toothed segment mounted on said piston, means for causing a semi-rotary movement to said segment, a feed wheel mounted so that its periphery runs in said stripway, a gear mounted on the axis of and connected to said feed wheel, a swinging lever also mounted on said axis carrying on one end an intermediate gear meshing with the aforesaid gear and on its other end a block having an inclined working face and a stop thereon, an arm adjustably secured on said axis, a lever pivoted to said arm carrying a block of a form correlative to the aforesaid block, a second block thereon adapted to engage the teeth of the feed wheel gear, studs on each of said levers and a spring secured to each, all combined, arranged and operating substantially as and for the purpose specified.

21. An anvil and a piston reciprocably mounted thereover, both having correlative

working faces, a guide-way in said piston, a recess in the bottom thereof, a spring plate seated over said recess, and a wheel dentated on its periphery to engage the strip and pivoted in such a position that the strip will be directly interposed between said wheel and spring plate when it is in the guide-way, and means for causing rotary motion of said wheel, substantially as and for the purpose specified.

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

ALBERT A. WOOD.

Witnesses:
ALBERT P. WOOD,
EDWARD P. WOOD.