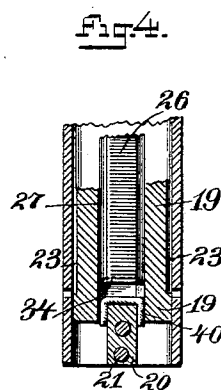
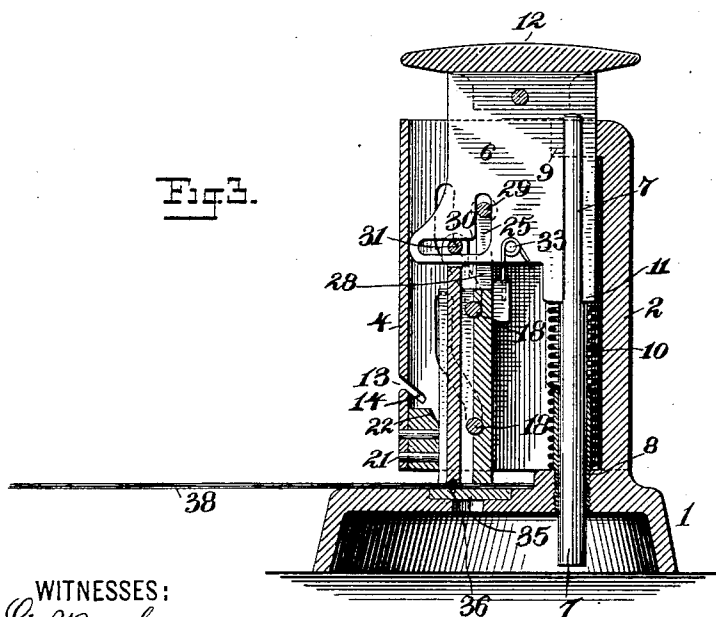
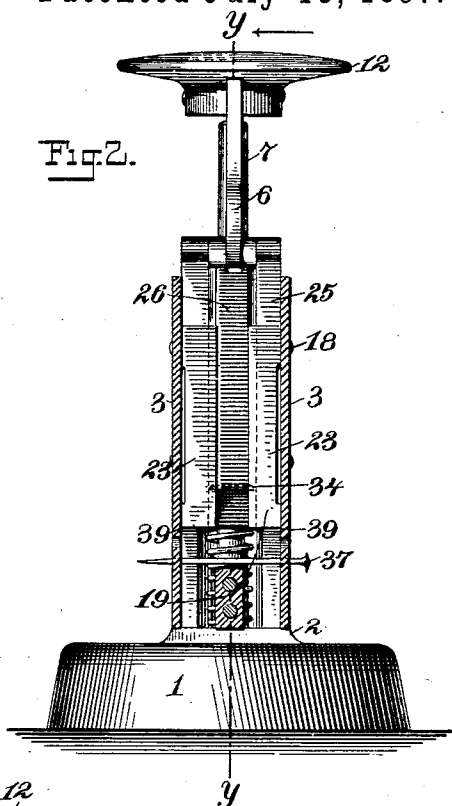


2 Sheets—Sheet 1.

No. 586,515.

Patented July 13, 1897.



WITNESSES:
Geo. W. Maylor.
K. V. Donovan.

INVENTOR
Lee S. Burridge
BY *Jacob Felber*
ATTORNEY

(No Model.)

2 Sheets—Sheet 2.

L. S. BURRIDGE.
STAPLING MACHINE.

No. 586,515.

Patented July 13, 1897.

Fig. 5.

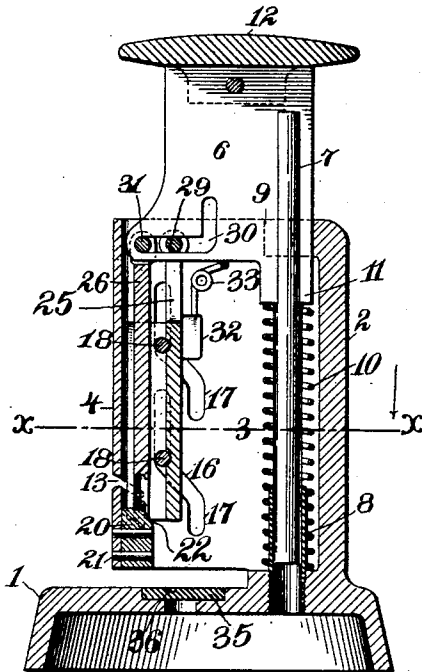


Fig. 6.

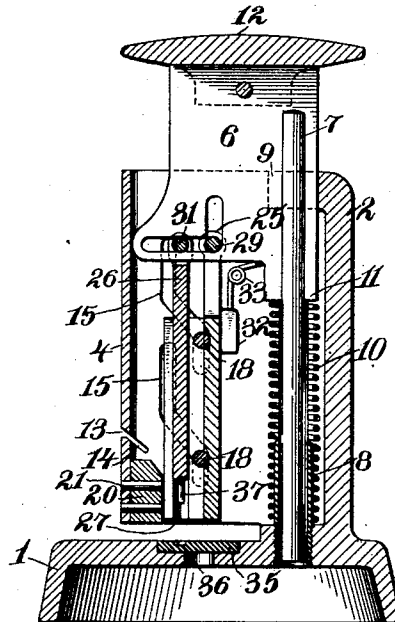


Fig. 8.

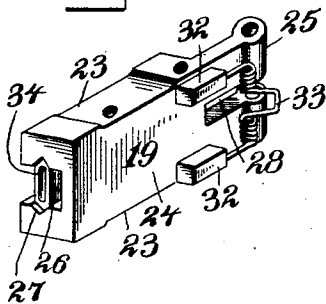
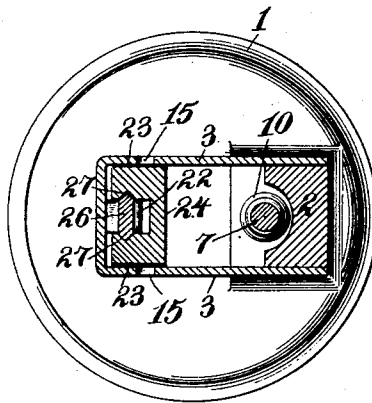


Fig. 7.



WITNESSES:

Geo Mayhew
L. V. Moran

INVENTOR

Lee S. Burrige
BY
Jacob F. Fabel
ATTORNEY

UNITED STATES PATENT OFFICE.

LEE S. BURRIDGE, OF NEW YORK, N. Y., ASSIGNOR TO THE CENTURY MACHINE COMPANY, OF SAME PLACE.

STAPLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 586,515, dated July 13, 1897.

Application filed January 4, 1897. Serial No. 617,871. (No model.)

To all whom it may concern:

Be it known that I, LEE S. BURRIDGE, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Stapling-Machines, of which the following is a specification.

My invention relates to that class of stapling-machines in which the staple is formed from a pin or piece of wire and is driven through the paper or other material and clenched; and my objects are to provide a simple, durable, and effective structure, machine, or implement of this character.

My improvements consist in certain features of construction and combinations of devices, all as will be hereinafter more fully explained, and particularly pointed out in the appended claims.

In carrying out my invention I place the pin, piece of wire, or other material which is to form the staple into the mouth of an inclined guideway or receptacle formed at the front side of the framework, and the said pin or wire by its own weight slides downwardly and inwardly over a fixed anvil attached to the framework and under a combined cutter and bender which slides in said framework. This cutting and bending device is connected to a slide or plunger by means of an L-shaped slot and a cross-pin. A driver mounted to slide in ways in said bender (which I shall hereinafter designate the "device" for brevity and convenience) is also connected to the slide or plunger by means of a pin which works always in the horizontal portion of the L-shaped slot in the latter. Other slots are formed in the side plates of the framework, and pins projecting from the bender travel in said slots, which are so shaped as to give to the bender and the driver their proper movements, it being necessary for these various parts to first move downwardly in a right line, then rearwardly and downwardly, and finally for the driver to move down alone in a vertical direction, as will be presently seen. The slide or plunger moves always in the same vertical path, and during its descent the staple is formed, inserted, and clenched. A spring restores

the slide or plunger and the bender, as well as the driver, to their normal positions.

The several parts involve other features of detail construction, which will be more fully explained hereinafter.

The inserted pin or wire is first cut to size by the shearing edges of the descending bender, which then immediately forces the blank down upon the fixed angle. By continuing to descend the bender then operates to form the staple about said anvil by bending down the protruding end portions of the wire at right angles to the middle portion, which rests upon the top of the anvil. The slide or plunger still descending, the bender is then retreated or forced rearwardly and downwardly by reason of the pins and the inclined portions of the slots in the side plates, and the staple is carried back therewith, owing to grooves or channels in the bender, and far enough to enable the staple to entirely escape the anvil and take a position in line with a clenching-recess formed in the base-plate. After this action the bender, still holding the staple, is forced down perpendicularly upon the paper or other material to be stapled and thereafter acts as a clamp to securely hold the material upon the bed-plate. The movement of the slide or plunger continuing after the bender has come to a bearing on the material, the driver is then carried down independently in the ways in the bender, and acting on the staple forces its legs through the material and at the same time the clenching-recess in the bed-plate operates to turn the legs of the staple inwardly toward each other and cause them to bear up against the under side of the material substantially parallel with the crown or head of the staple, all as will now more fully appear from the description of the accompanying drawings, in which—

Figure 1 is a side elevation of the machine or implement in its normal condition. Fig. 2 is a front sectional elevation taken on the line *z z*, Fig. 1. Fig. 3 is a longitudinal section taken on the line *y y*, Fig. 2, but with the moving parts in the positions which they occupy at the completion of the stapling action—that is to say, with the staple driven and clenched. Fig. 4 is a front sectional

view showing the position of the cutter and bender and driver at the completion of the formation of the staple on the anvil. Fig. 5 is a central vertical section similar to Fig. 3, but showing the parts in the positions they occupy just before the retraction of the bender, driver, and staple. Fig. 6 is a similar view showing the parts in the positions which they occupy immediately after the retraction of the bender, driver, and staple, but just previous to the final downward clamping movement of the bender illustrated at Fig. 3 and before the descent of the driver to effect the insertion of the staple, this last-mentioned operation being also illustrated at Fig. 3. Fig. 7 is a cross-section taken on the line *xx*, Fig. 5. Fig. 8 is a perspective view of the combined cutter and bender with its accompanying driver.

In the various views the same part will be found designated by the same numeral of reference.

From the base-plate 1 at its rear side rises a standard or bracket 2, forming part of the framework and supporting the remainder of the framework, which is comprised of the parallel side plates or cheeks 3 and front plates 4, preferably formed of a piece with the side plates. The latter are attached at near their rear edges to the standard by means of screws 5 5.

6 designates a plunger or slide of plate-like form, but having a depending cylindrical guide-rod or shank 7, which slides at its lower end in a bushing 8, inserted in the bed-plate and projecting upwardly a suitable distance above the top thereof.

The rear portion of the slide 6 is guided between a pair of lugs or ears 9, projecting forwardly from the uppermost end of the standard. The guide-rod or shank 7 is bifurcated at its upper portion, and the slide 6 is fitted between the forks thereof and secured, preferably, by means of rivets; but of course, if desired, these two portions may be made integral out of one and the same piece of metal. Fitted over the bushing at its lower end is a coiled spring 10, which surrounds the guide-rod and bears at its upper end against the downwardly-extending rear portion or wing 11 of the slide 6. Said spring serves to hold the parts in their raised normal position and also to return them thereto after depression. To enable the slide to be conveniently depressed by a blow, its uppermost end is provided with a disk-like head 12, which may be attached by means of a rivet, as shown.

The front plate 4 is formed with a mouth or opening 13, extending across its full width, and each side or cheek plate 3 is formed with a downwardly and rearwardly extending slot 14 in open communication with said mouth or opening and forming therewith an inclined guideway for the reception and retention of the pin or wire previous to the cutting and bending operation requisite to form the staple.

In each cheek-plate 3 and at near the front

edge thereof are formed two slots, one arranged over the other and each comprising a straight or vertical portion 15, an inclined or oblique portion 16, and a second or final vertical portion 17. The two slots in one cheek-plate are arranged directly opposite the similar slots in the other. These slots receive the projecting ends of a pair of pins 18, fitted or seated in holes formed horizontally in the bender 19.

Below the plane of the inclined slots which receive the pin or wire to be formed into the staple is arranged the anvil 20, which is preferably secured to the front plate 4 by means of rivets 21. The upper surface of the anvil is flat, and about this portion the staple is formed. The rear upper corner of the anvil is beveled, as shown at 22, to facilitate the removal of the finished staple.

The cutting and bending device 19 is preferably three-sided in cross-section, being open at the front side. It is formed of a block of steel and comprises the side members 23, back member 24, and an extension or shank 25. The block is hollow longitudinally or has an interior space formed by the several members 23 24 for the accommodation of a driver 26, whose longitudinal edges are beveled in opposite directions and slide in a V-shaped groove 27, formed on the inner sides of the side members 23 and extending to the bottom or lower end of the device 19.

The extension or shank 25 is slotted longitudinally and centrally at 28 and is provided with a transverse pin 29, which passes through an L-shaped or rectangular slot 30 in the slide or plunger, said slot consisting of a horizontal portion and a vertical portion communicating with the rear end of the horizontal portion and extending upwardly. The driver is bifurcated at its upper end and is also provided with a cross-pin 31, which passes through the horizontal portion of the L-shaped slot. By means of these pins the bending device and the accompanying driver are suspended from the slide or plunger. On the rear wall or member of the bending device are two lugs 32, to which are attached the lower ends of a coiled spring 33, the opposite looped end of which bears against the lower edge of the slide.

In the lower end of the driver is formed a groove or recess 34 for the crown of the staple, and in the surface of the bed-plate or in a plug 35, inserted therein, is formed a clenching-recess 36 for the legs of the staple, said clenching-recess being located in a vertical plane in rear of the anvil.

As will be seen at Fig. 1, when the movable parts are in their normal positions the slide or plunger is in an elevated position, the cross-pins 29 and 31 of the bender and driver, respectively, stand in the horizontal portion of the L-shaped slot 30, the guide-pins 18 on the bender-stand at the upper ends of the vertical portions 15 of the slots in the side plates, and the bender and driver are sus-

pended over the anvil and above the mouth of the inclined guideway which receives the pin or wire to be made into a staple. In the drawings I have shown an ordinary pin 37; but a plain piece of wire may of course be used in lieu thereof.

The pin or wire to be formed into the staple is conveniently passed into the mouth 13, whereupon it descends at once by gravity to the ends of the side slots 14, which terminate at a slight distance above the top of the anvil. The papers to be stapled are inserted in the space formed by the top of the bed-plate and the bottom of the side plates 3 and front plate 4, as shown at Fig. 3, designating three sheets of paper. The pin or wire and the papers having been placed in position, the machine or implement is ready for action. One blow on the head 12 suffices to cut the pin or wire to staple size, to form the staple, to carry the staple into line with the clenching-recess, to insert the staple in the paper, and to clench the legs thereof, and all of these operations take place during the downward movement of the slide or plunger.

I shall now describe each action or operation separately.

The cross-pin 29 of the bender occupying a place in the horizontal portion of the L-shaped slot 30, the bender is carried down at the beginning of the descent of the slide or plunger until the bottom of the bender strikes the pin or wire resting in the path thereof. The outer side edges 39 of the bender cooperating with the inner edges of the inclined slots 14 act immediately to cut off the projecting ends of the pin or wire, which ends fall outwardly on the paper or on the desk or table. At the same time the central portion of the pin or wire is carried down by the bender onto the top of the anvil. The bender continuing to descend, it at once operates to bend or turn down the lateral unsupported portions of the pin or wire each to a vertical position or at right angles to the top or supported portion of the wire, and thus forming or completing the staple, as illustrated at Fig. 4, the staple being designated by the numeral 40. During this operation the bender embraces the upper portion of the anvil and at the same time the legs of the staple are caused to enter the lower portions of the V-shaped grooves 27 in the bender, the lower end of the driver at this time being at such an elevation as to permit the legs of the staple to enter said grooves. At the conclusion of this operation the pins 18 have traveled to the lower ends of the straight portions 15 of the slots in the cheek-plates, or are both at the positions illustrated at Fig. 5. Thus far the bender has descended in a line perpendicular to the bed-plate and the driver has come down with it without altering its position relatively thereto, but, as illustrated at Fig. 5, at the end of this operation the driver is forced down onto the crown or top of the staple and the groove or depression therein

has embraced the same. Thus the staple is now engaged by the grooves in the bender and by the groove or depression in the driver, which grooves may be either rounded or V-shaped. Owing to this engagement of the staple by the bender and the driver, but particularly the former, the staple may now be positively withdrawn from the anvil and carried back to a position for insertion in the papers in register with the clenching-recess.

The withdrawal of the staple from the anvil is accomplished by a retreating or backward and downward movement of the bender, which is performed by the action of the pins 18 on the inclined portions 16 of the slots in the cheek-plates, such inclined portions acting as cams or wedges to force the bender rearwardly during its continued descent. As soon as the pins 18 are acted upon by the inclined walls 16, the bender and with it the driver are forced to move rearwardly or away from the anvil, and in this movement the staple accompanies them. During the retraction of the bender and driver under the action of the pins 18 and inclines 16 the cross-pins 29 and 31 travel rearwardly in the horizontal portion of the L-shaped slot in the slide 6 until the parts are brought to the positions represented at Fig. 6, where it will be seen that the pins 18 are now at the upper ends of the vertical portion 17 of the slots in the cheek-plates, and the cross-pin 29 is at the lower end of the vertical portion of the L-shaped slot 30, the cross-pin 31 being still in the horizontal portion of said slot and at about the middle thereof.

The parts are now in position to enable the staple to be driven through the papers and to be simultaneously clenched, but just prior to the driving of the staple the bender is brought down upon the paper to clamp it securely upon the bed-plate, as shown at Fig. 3, yet this movement takes place before any independent movement of the driver, and hence before the driver has arrived at the position shown at Fig. 3. In other words, the bottom of the bender takes a bearing upon the papers before the relationship existing between the driver and the bender has been changed from that shown at Fig. 6 to that shown at Fig. 3.

When the parts have got into the position shown at Fig. 6, the continued descent of the slide or plunger causes both the bender and the driver to descend therewith until the foot of the bender which projects some distance beyond that of the driver comes to a bearing on the paper, where upon meeting this resistance to its further movement the bender is arrested, but the driver now continues to descend independently of the bender sliding in the V-shaped grooves or ways therein, and in its descent forcing or driving the staple-legs through the paper and into the clenching-recess, by which they are upturned against the under side of the paper, as shown at Fig. 3. During the movement of the bender from the

position shown at Fig. 3 to that shown at Fig. 6 the pins 18 travel in the lower vertical portion 17 of the slots in the cheek-plates, and hence the bender is caused to move down perpendicularly to the paper, so that its foot will be planted squarely thereupon.

During the final independent descent of the driver the vertical portion of the L-shaped slot travels down about the cross-pin 29, which is at this time stationary, and the bottom edge of the slide 6 moves down through the slot 28 in the shank of the bender. Immediately the bender has come to a bearing on the paper and the driver has started down independently the slide 6, acting on the loop of the spring 33, tends to wind or tighten the coils of the spring 33 and cause said spring to exert a downward force upon the bender to hold it firmly in place during the descent of the driver and slide 6 independently thereof.

On the completion of the stapling operation the coil-spring 10 operates to restore the slide to its normal position, and the inclined portions 16 of the slots in the cheek-plates, together with the pins 18, operate to independently restore the driver and bender to their normal positions.

It will be seen from the foregoing that the operations of forming the staple, carrying it to a driving position, clamping the paper, and driving and clenching the staple all successively take place rapidly during the descent of the slide or plunger 6 under a single blow or force upon the head 12 thereof.

Various changes in detail, construction, and arrangement may be made without departing from the features of my invention as embodied in the subjoined claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a stapling-machine, the combination of a vertical slide or plunger, a bender suspended therefrom, a stationary anvil in the path of descent of the bender, means for retreating said bender after the formation of the staple about said anvil, a driver, and a paper-support beneath said anvil.

2. In a stapling-machine, the combination of a bed-plate, a framework, a stationary anvil supported by said framework above the bed-plate, a slide or plunger guided in said framework, and a bender loosely suspended from said slide or plunger and also independently guided in said framework.

3. In a stapling-machine, the combination of a slide or plunger, a stationary anvil, a bender carried by said slide or plunger and adapted to cut the staple material to staple size and to form the staple about said anvil, means for retreating said bender during the continued descent of the slide or plunger and causing said bender to remove the staple from the anvil and take it to a position in line with a clenching device, means for bringing said bender down upon the material to be stapled during a further descent of said slide or plunger, and a driver also connected to said slide

or plunger and adapted to be moved independently during the final descent thereof and to force the legs of the staple through the material and, with the clenching device, cause them to be clenched or upturned on the under side of said material.

4. In a stapling-machine, the combination of a bed-plate having a clenching device, a framework, a slide or plunger adapted to slide therein, a stationary anvil supported by said framework above the bed-plate, a bender suspended from said slide or plunger, a driver also suspended from said slide or plunger and movable independently in said bender, and means for retreating said bender and driver after the formation of the staple, but before the completion of the descent of the slide or plunger, and means whereby, during the latter portion of the descent of the slide or plunger, the bender carrying the staple is first brought down upon the material to be stapled and then, during the final portion of the descending movement of the slide or plunger, the driver is forced down independently and causes the legs of the staple to be driven through the material.

5. In a stapling-machine, the combination of a bed-plate having a clenching device, a framework having a stationary anvil and guiding-slots, a spring-pressed slide or plunger having an L-shaped slot, a bender suspended from said L-shaped slot and having guiding-pins adapted to the guiding-slots in the framework, and a driver also suspended from said L-shaped slot.

6. In a stapling-machine, the combination of a bed-plate having a clenching device, a standard, a pair of side or cheek plates having guiding-slots, a front plate having an anvil and an inclined guideway for the wire or other material, a spring-pressed plunger comprising a plate-like portion, a rod or shank, and a head, and having in said plate-like portion an L-shaped slot, a bender suspended from said slot and having a spring and also guiding-pins adapted to the guiding-slots in said cheek-plates, and a driver also suspended from said L-shaped slot and adapted to slide independently in said bender.

7. In a stapling-machine, the combination of a bed-plate having a clenching device, a standard, a pair of cheek-plates terminating above said bed-plate and provided with guiding-slots comprising the vertical portions 15 and 17 and the intermediate inclined portion 16, the front plate having an anvil and a mouth or opening above said anvil, inclined slots in the cheek-plates communicating with said mouth or opening, a slide or plunger having an L-shaped slot, a bender suspended from said slot, a driver also suspended from said slot and adapted to slide independently in said bender, a spring connected to said bender and to said slide or plunger, and a returning-spring for said slide or plunger.

8. In a stapling-machine, the combination with an anvil and a bender, of a front plate

having a mouth or opening above said anvil adapted to receive and support the wire or other substance to be cut and formed into a staple.

5 9. In a stapling-machine, the combination of a bender, a front plate having an anvil attached thereto at its lower end and having a mouth above said anvil, and side plates having slots communicating with said mouth.

10 10. In a stapling-machine, the combination with an anvil and a bender, of an open-mouthed inclined receptacle arranged over said anvil for the introduction and support of the material to be formed into a staple.

15 11. In a stapling-machine, the combination of a bed-plate, a standard, two side plates having each a pair of guiding-slots, one over the other, and consisting each of the vertical portions 15 and 17 and the intermediate inclined portion 16, the front plate supporting the fixed anvil, the wire-receptacle above said anvil, a slide or plunger, a bender loosely carried thereby so that it may be retreated, and guiding-pins on said bender adapted to the 25 two pairs of slots in said cheek-plates.

12. In a stapling-machine, the combination of a slide or plunger, a bender suspended therefrom at its upper end and adapted to be retreated or moved transversely of the path 30 of movement of said slide or plunger, and means for retreating said bender during the depression of said slide or plunger, after the formation of the staple.

13. In a stapling-machine, the combination 35 of a slide or plunger, a bender supported therefrom at its upper end and adapted to be retreated or moved transversely of the path of movement of said slide or plunger, projecting pins on said bender, and inclined slots 40 or walls for retreating said bender during the descent of said slide or plunger, after the formation of the staple.

14. In a stapling-machine, the combination 45 of a slide or plunger having an L-shaped slot, a bender suspended from said slot and pro-

vided with laterally-projecting pins, a fixed anvil, and side plates having guiding-slots comprising the vertical parallel portions 15 and 17 and the inclined portions 16 to cooperate with said laterally-projecting pins in the 50 bender.

15. In a stapling-machine, the combination of an anvil, a bender having longitudinal grooves adapted to receive the legs of the 55 formed staple, a driver adapted to reciprocate in said grooves and formed at its end with a transverse recess adapted to receive the crown of the staple, means for retreating said bender and driver, means for forcing the bender down onto the material in advance of 60 the driver, and means for then depressing the driver and forcing the staple-legs through the material and clenching the same.

16. In a stapling-machine, the combination of a bed-plate having a clenching device, an 65 anvil arranged above said bed-plate, a slide or plunger, a bender and a driver suspended therefrom, means for simultaneously retreating the bender and the driver, and means whereby the said slide or plunger is thereafter 70 enabled to first cause the bender to clamp the material and then cause the driver to force the legs of the staple through the material and clench the same.

17. In a stapling-machine in which the staple 75 is formed, retreated, inserted and clenched at one blow, the combination of a slide or plunger which receives the blow, a bender and a driver suspended therefrom, an anvil, means for retreating the bender and the driver, and 80 a paper bed or support below the anvil and having a clenching device.

Signed at New York city, in the county of New York and State of New York, this 31st day of December, A. D. 1896.

LEE S. BURRIDGE.

Witnesses:

CORNELIUS P. McLAUGHLIN,
K. V. DONOVAN.