

(No Model.)

C. BECK.  
BOX STAPLING MACHINE.

No. 473,813.

Patented Apr. 26, 1892.

Fig. 1.

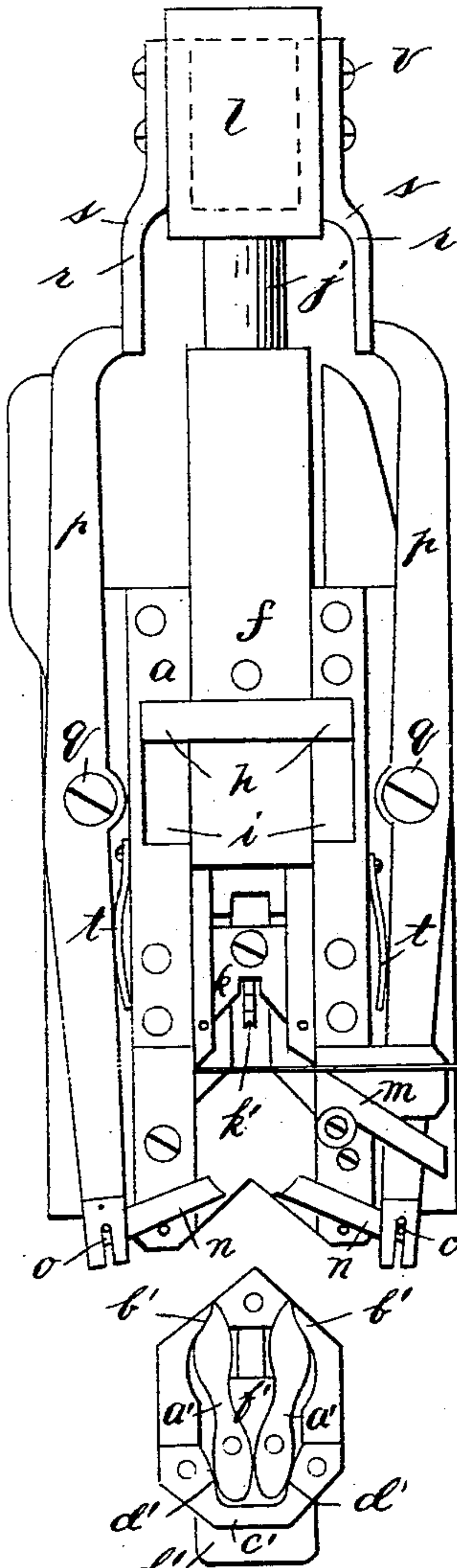


Fig. 2.

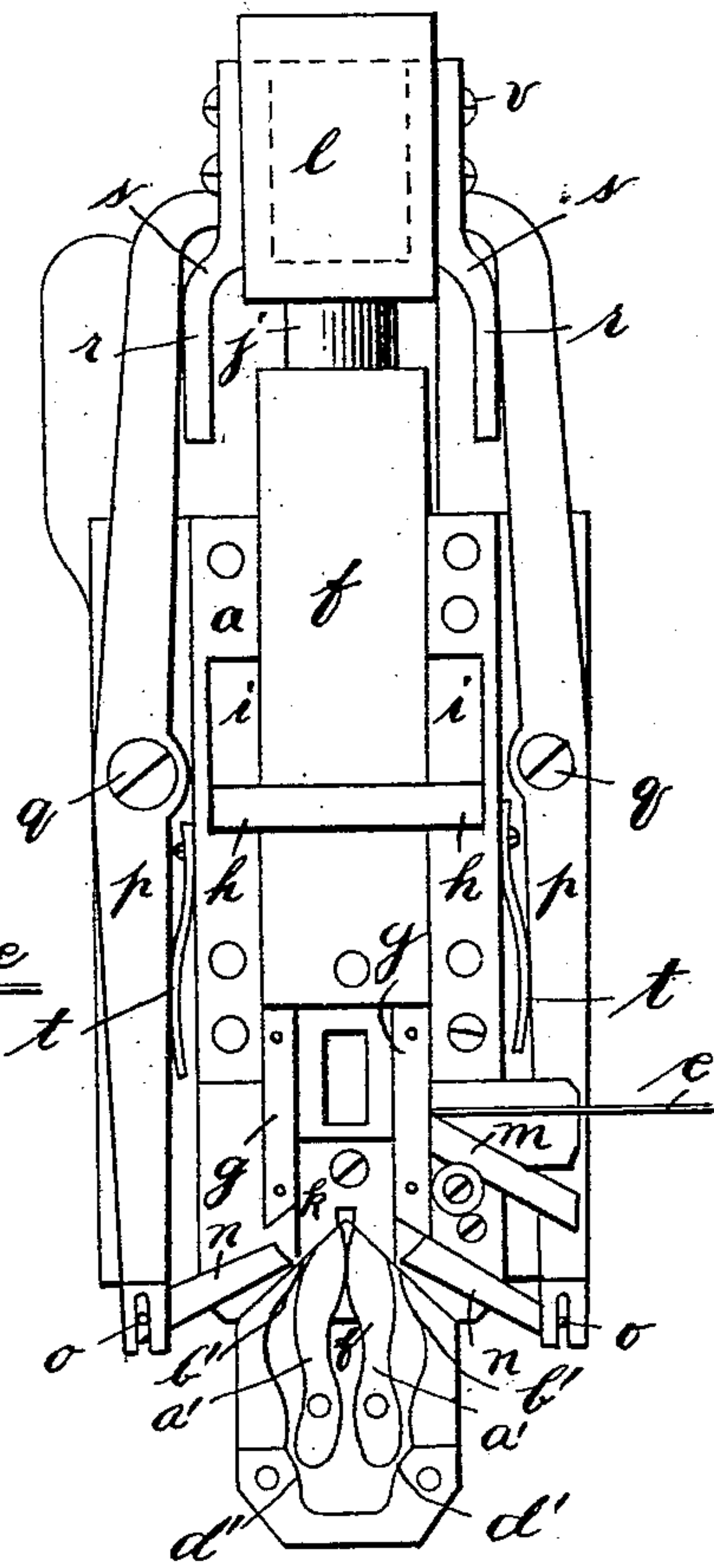


Fig. 3.

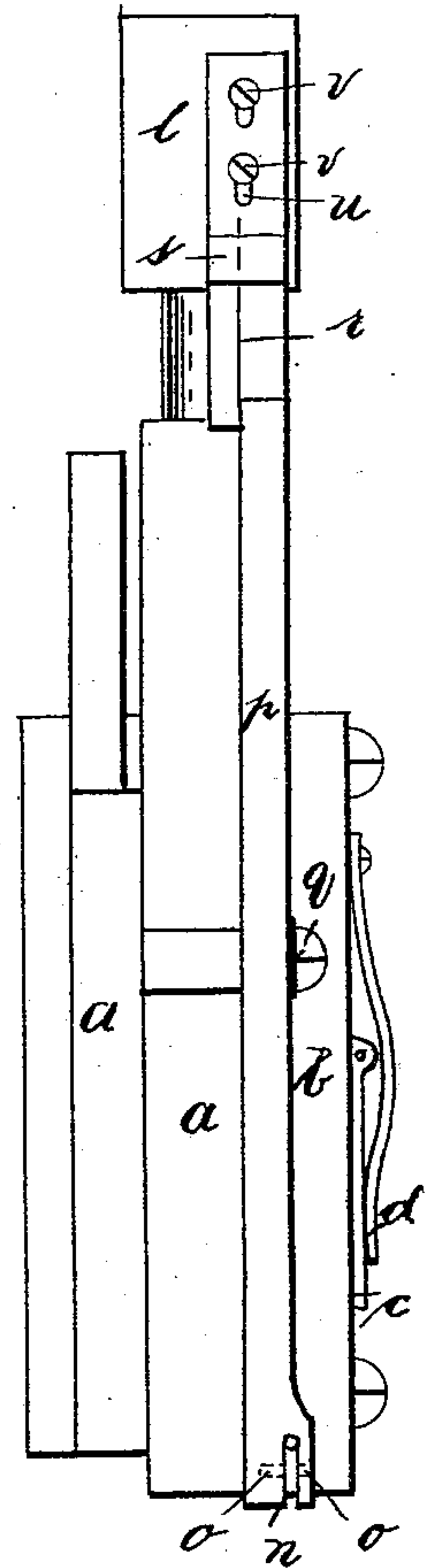


Fig. 4.

Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## BOX-STAPLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 473,813, dated April 26, 1892.

Application filed November 9, 1891. Serial No. 411,423. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES BECK, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Box-Stapling Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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 the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in box-stapling machinery.

The object of the invention is to provide certain improvements in the construction of the staple forming and driving and clinching mechanisms described and shown in my former patent, No. 441,051, dated November 18, 1890.

The invention consists in certain novel features of construction, and in combinations of parts more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is an elevation of the staple forming and driving mechanism of my box-stapling machine with the front plate of the main head removed, the parts being shown at their limit of upward movement with the wire fed in so that it can be cut and formed into the staple. Fig. 2 is a similar view showing the clinchers, the parts being shown in the position they assume immediately after a staple has been driven and clinched. Fig. 3 is an edge view of the main sliding head. Fig. 4 is a detail elevation of the clinchers.

In the drawings, *a* indicates the main hollow head of the staple forming and driving mechanism of the machine, such as described in my before-mentioned patent. This head is provided with a front wall or plate *b*, through which the wire-bending and staple-forming anvil *c* loosely extends into the chamber of the head, and this anvil is held yieldingly in position by the spring *d*.

In operation the wire (shown in Figs. 1 and 2 at *e*) is fed transversely through an opening in the side of the head across the interior thereof through a groove in the anvil. The

wire-cutting and staple-forming head *f*, located within the main head and at its lower end provided with wire-cutting and staple-forming knives *g g*, then descends and the said knives *g g* cut off the wire and pass down on each side of the anvil and thereby bend the wire into the staple, and as the said head *f* continues to descend the anvil is pushed out and the staple is carried down. The head *f* has a limited independent movement in the head *a* by means of the lateral projections *h h*, extending into vertical grooves *i i* in the interior of the main head. The staple-driving plunger *j* extends loosely down through the wire-cutting and staple-forming head, and at its lower end between the knives *g g* said plunger is provided with the staple-driving die *k*, preferably having its lower edge V-shaped and provided with the spring-holder *k'* to prevent the body of the staple bending as it is carried down by the die. The plunger is provided with suitable head *l* on its upper end, to which the rocking actuating-lever (not here shown) is attached to reciprocate the parts, the suitable connecting mechanism (not here shown) being provided to cause the plunger and two heads to move together a portion of their strokes and then to move separately and independently the remainder of their strokes. In cutting off the wire one of the knives *g* coacts with a knife or edge *m*, rigid with the main head. The lower end of the main head is preferably V-shaped to fit the box-corner. The staple, when formed, is carried down by the cutting and bending knives and the driving-die, so that the ends of the staple engage the inner curved ends of the bending or guiding blocks *n*, and are bent thereby, so as to enter the box sides at right angles. These blocks extend at an angle loosely through apertures in the sides of the main frame and at their outer ends are provided with lateral lugs *o*, the lugs *h h* being so arranged that the knives *g* stop at a point just above the bending and guiding blocks *n*, as shown in Fig. 2. The plunger and driving-die descend independently of head *o* and drive the staple into the box. Just previous to the descent of the driving-die and after the ends of the staple have been bent to enter the box at the proper angle the guid-



ing-blocks  $n$  are drawn outwardly from the path of the driving-die by suitable mechanism and positive connections, such as the swinging levers  $p$ , fulcrumed between their ends at  $q$ , and to the sides of the main head, so that their lower ends will throw the bending-blocks  $n$  in and out of the main head, said lower ends of the levers straddle the outer ends of the bending-blocks and are provided with slots, in which the lateral lugs  $o$  of the bending-blocks fit. The bending-blocks can thus be easily and quickly removed from the levers when desired, as the slots extend upwardly from the lower ends thereof. The upper ends of the levers are provided with bearing surfaces or ends, which engage the cam-bearing surfaces or cam-arms  $r$ . These cam-arms  $r$  are rigidly secured to the plunger or part thereof, preferably head  $l$ , and extend downwardly and outwardly therefrom at their lower ends, the lower ends being made straight and extending outwardly, so that the upper ends of the levers  $p$  will be forced outwardly to hold the blocks  $n$ , extending into the interior of the main head to act on the staple; but after the head  $f$  has reached its limit of downward movement and the die has started down and the ends of the staple have been bent to the proper angle, the upper ends of the levers slide in on the inclines  $s$  to the upper portions of the arms  $r$ , which are located nearer together or have reduced surfaces, so that the lower ends of the levers swing outwardly and draw out the blocks  $n$  under the action of the springs  $t$ , acting on the levers  $p$ . The arms  $r$  are provided with elongated or vertical slots  $u$ , through which the securing-screws  $v$  pass, by which the arms  $r$  can be adjusted vertically to change the point or time in the operation at which the blocks  $n$  will be thrown out or in. By means of this construction and by operating the bending-blocks by positive mechanical connections the machine is made to work smoothly and friction and wear on the bending-blocks are obviated, and there is no wear on the cutting-knives or the driving-die by contact with the bending-blocks. When the staple has been driven through the box-corners, the two clinchers  $a'$  move up and their upper ends are drawn together by engaging the stationary cam-surfaces  $b'$ , so that they clinch the staple, and when the staple has been clinched and the clinchers dropped their lower ends engage the curved stationary cam-surfaces  $d'$ , which press in together the lower ends of the clinchers and throw the upper ends outwardly to their normal position, as shown in Fig. 4. The lower head  $c'$ , which extends into the box when being operated on, has a space between its outer plate in which the clinchers  $a'$  are located, the edges of this space being stationary and formed into the cam-grooves  $b' d'$ . The clinchers  $a'$  are carried by reciprocating plate  $f'$ , to which the clinchers are pivoted between their ends, and the opposite ends of the clinchers are curved or rounded,

substantially as shown, to engage and coact with the cam-surfaces to accomplish the results just mentioned. By this means springs to operate the clinchers are dispensed with and the operation of the clinchers made thorough and positive.

It has not been deemed necessary to illustrate the complete working parts of the box-stapling machine; but only such parts have been shown as were needed to illustrate my present improvements.

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

1. In a box-stapling machine, the staple-driving die and its plunger and head, the downwardly-extending cam-arms rigid with said head, the hollow head of the machine, the lower bending-blocks movable in and out of the path of the die in said head, the levers pivoted between their ends to the head and at their upper end bearing on and controlled by said cam-surfaces and at their lower ends loosely joined to and operating said blocks, and springs acting on the levers.

2. The main head, the plunger therein having the staple-driving die, the cam-arms adjustably secured to the upper end of the plunger, the lower guiding-blocks extending through the sides of the head and movable in and out of the path of the driving-die, and the rocking levers between their ends fulcrumed on said head and at their upper ends held bearing on said cam-arms by springs and having their lower ends removably embracing the outer ends of said blocks, as and for the purposes set forth.

3. In a stapling-machine, the combination of the head, a driving-plunger having cam-surfaces moving therewith, means clamping said cam-surfaces in position so that they can be vertically adjusted, substantially as described, the swinging levers pivoted to said head with their upper ends held yieldingly in engagement with said cam-surfaces by springs, and the movable bending-blocks extending into the head and loosely joined to said blocks so that the blocks can move in and out of the head.

4. In a stapling-machine, a head, a reciprocating plunger having cam-surfaces, the swinging levers fulcrumed on the head and at their upper ends bearing on said surfaces, springs holding the upper ends of the levers against said surfaces, and the bending-blocks moving in and out of the head, the lower ends of said levers formed to removably straddle the outer ends of said blocks so as to control the in-and-out movement thereof, combined substantially as described.

5. In a stapling-machine, the combination of the head, reciprocating plunger therein, the cam-arms having longitudinal slots, and means for clamping said arm to the upper portion of said plunger so that the arms can be vertically adjusted, the swinging levers fulcrumed to the head with their upper ends



bearing on said arms, and bending-blocks extending into the head engaged and operated by the lower ends of said levers, substantially as described.

5 6. In a box-stapling machine, the combination of the head, the reciprocating plunger, the levers fulcrumed to the head and operated by movement of said plunger, the bending-blocks extending into the lower portion of  
10 said head provided with lateral lugs on their outer ends, the lower ends of said levers be-

ing slotted, substantially as described, so as to straddle the outer ends of said blocks and move the blocks in and out, as described.

In testimony that I claim the foregoing as 15 my own I affix my signature in presence of two witnesses.

CHARLES BECK.

Witnesses:

CHAS. G. BACKENKAMP,  
PHILIP STEPHENS.