

H. B. WALTER.
DRIVING AND CLENCHING DEVICE FOR STAPLING MACHINES.
APPLICATION FILED SEPT. 4, 1919.

1,357,534.

Patented Nov. 2, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

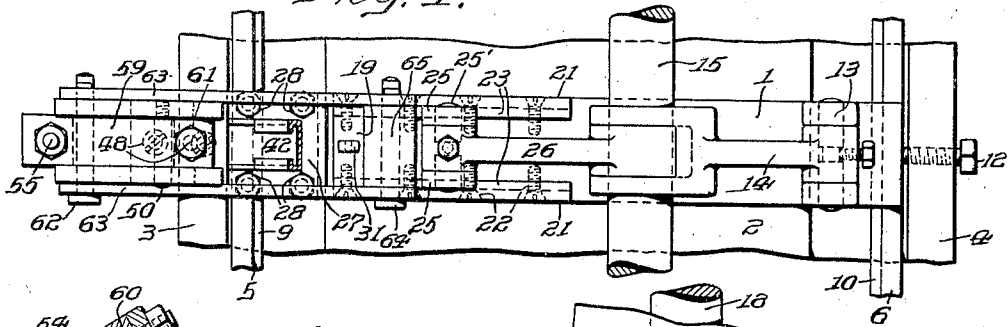


Fig. 2.

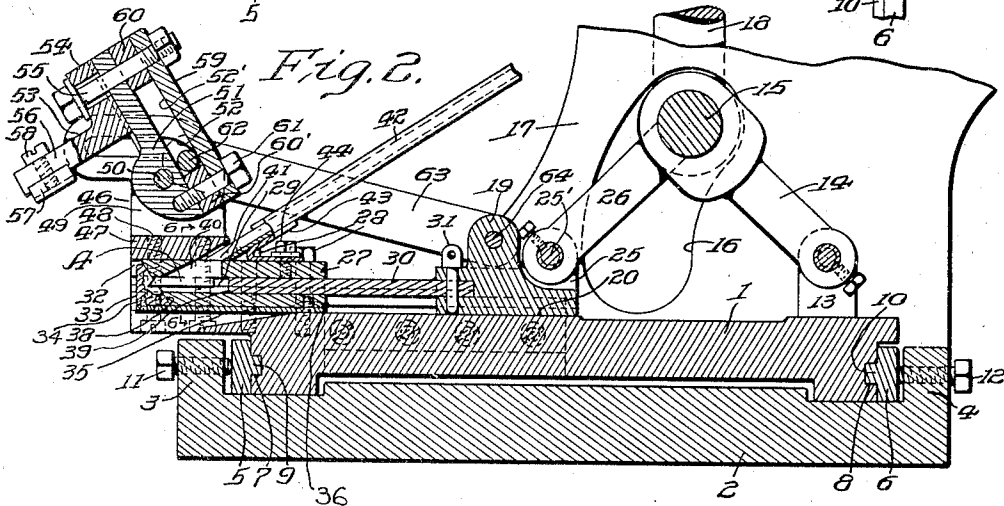
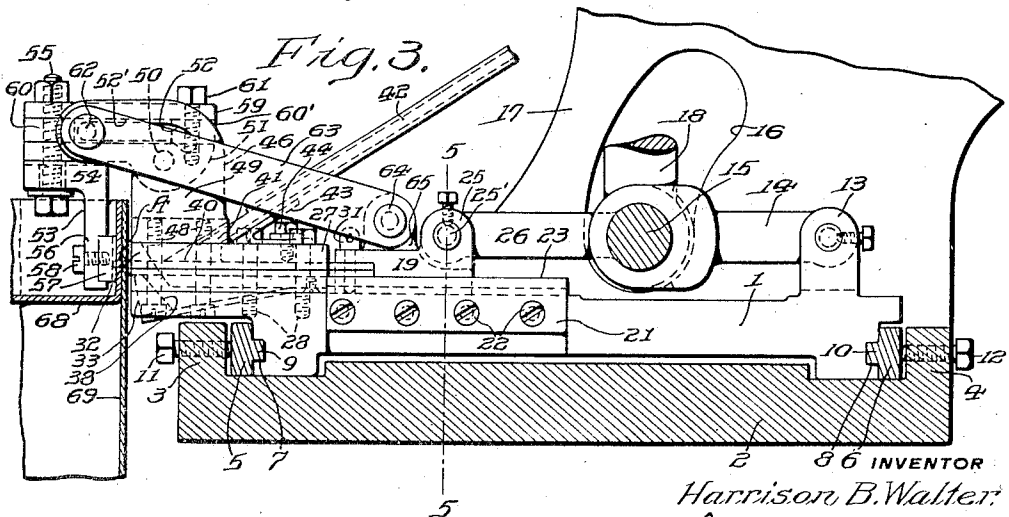


Fig. 3.



WITNESS

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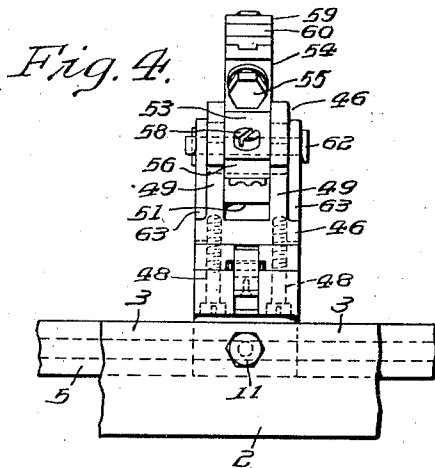
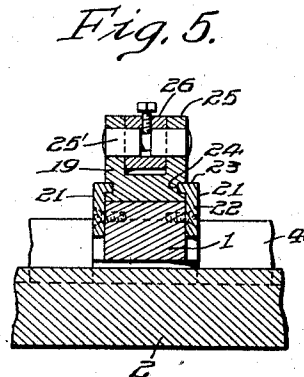


Fig. 6.

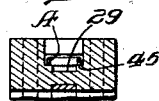


Fig. 7.

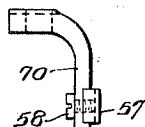


Fig. 9.

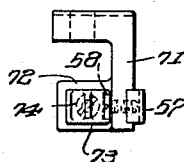
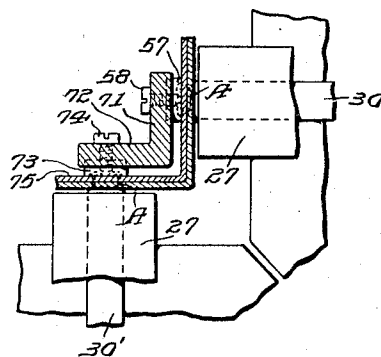


Fig. 8.



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UNITED STATES PATENT OFFICE.

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DRIVING AND CLENCHING DEVICE FOR STAPLING-MACHINES.

1,357,534.

Specification of Letters Patent.

Patented Nov. 2, 1920.

Application filed September 4, 1919. Serial No. 321,692.

To all whom it may concern:

Be it known that I, HARRISON B. WALTER, a citizen of the United States, and a resident of the city of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Driving and Clenching Devices for Stapling-Machines, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

The invention relates to a stapling machine, preferably of the multiple type, wherein any number of a plurality of staples may be simultaneously driven through and clenched about the parts to be secured together by said staples.

The invention, however, relates more particularly to the staple driving and clenching mechanism adapted to receive in succession made staples and to drive the same through the parts to be secured together in combination with a clenching means for coordinately clenching the ends of the driven staples, and is intended to be used in a machine of the type shown and described in my copending application, Serial No. 290,155, filed April 15, 1919.

As in said copending application, one of the objects of the invention is to provide a machine that is adapted to use previously made staples with automatic means to drive and clench the same in multiple as herein-after more fully described but it is to be observed, however, that my herein described driving and clenching means is not limited to the use of a multiple stapling machine but may be of utility in a machine for driving a single staple at a time, without departing from the spirit of my invention.

Another object is to construct a machine with novel and useful means adapted to operate upon fiber shipping cartons, cases or casings for the purpose of sealing the same into a sealed package without the use of any adhesive, tape or similar means of securement but by merely driving and clenching at properly spaced points a predetermined number of made staples for securing the parts of the casing together.

A still further object is to provide the machine with a novel and useful means for forcibly driving and simultaneously clenching the staples at the points of securement in the fiber casing.

A still further object is to provide a novel and useful driving and clenching device comprising means for positively locking the clenching means in position during the driving operation.

A still further object is to provide a novel and useful driving and clenching device adapted to simultaneously operate upon two or more sides of the fiber casing in transverse planes near the intersection thereof, as for example, in the proximity of a corner of a casing.

Such other and advantageous objects of my invention will be more fully disclosed in the following specification and illustrated in the accompanying drawing.

A practical embodiment of my invention is illustrated in the accompanying drawing in which:

Figure 1 is a top plan view of the driving and clenching device;

Fig. 2 is a view in vertical section of the same with the parts shown in one position of operation;

Fig. 3 is a view in side elevation of the same with the parts in another position of operation;

Fig. 4 is a view in front elevation of the device;

Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a fragmentary transverse sectional view taken on the line 6—6 of Fig. 2;

Fig. 7 is a view in elevation of a resilient clench block hanger;

Fig. 8 is a view in horizontal position of a special form of clench means applied to a corner of a casing, and,

Fig. 9 is a view in side elevation of the special clench block hanger.

Referring now more particularly to the drawing in which similar reference characters are used to designate the corresponding parts in the several views, I have shown in a stapling machine of the type referred to above, generally, driving plungers operating in chucks to drive staples or similar fastening elements through the sides of a fiber casing to the flanges of a head to be attached thereto, clench blocks carried by supporting arms connected to the driving devices adapted to carry the blocks in place to receive and clench the ends of the staples, and specially formed members in the na-

ture of cams for first rapidly moving and then positively locking the clench blocks in position during the clenching operation. The fastening elements may be fed to this means by a suitable feeding device operating to receive and then feed fastening elements to the driving and clenching devices by suitable chutes or raceways, such separating and feeding means being of any suitable type, as that referred to and disclosed in my copending application hereinbefore mentioned.

The driving and clenching means, of which there may be a multiple in the machine above referred to, comprises a longitudinal chuck bolster 1 horizontally arranged transversely of a deck plate 2 and adapted to be adjustably positioned thereupon as desired. The deck plate may be provided at its forward and rear edges thereof with upstanding parallel flanges 3 and 4. Within these flanges and resting upon the deck plate are located gibs 5 and 6 respectively adjacent and parallel to the flanges 3 and 4. The chuck bolster 1 is disposed between the gibs and is provided at the ends thereof with guide grooves 7 and 8 adapted to slidably fit over the tracks 9 and 10 formed upon the gibs 5 and 6 respectively. Both of the flanges 3 and 4 are provided with several set screws 11 and 12 which may be operated to bear against and laterally move the gibs for the purpose of clamping the same against the ends of the chuck bolster to thereby maintain the same fast in adjusted position. Accordingly when the screws 11 and 12 are loosened the chuck bolster may be moved laterally relative to the other chuck bolsters to space or locate the same as well as the parts carried thereby and connected thereto, in the spaced relation desired, preferably the distance apart equal to the distance between the points where the staples are to be driven and clenched. When so located the screws may be again tightened to hold said bolster in such position.

Upon the top of the bolster and at the rear end thereof may be secured a stationary pivot post 13 preferably formed integral with the bolster 1. The pivot post 13 has pivotally connected thereto a link 14, at an end thereof, with the other end of the link pivotally connected to a transverse thrust shaft 15 which extends through slots 16 provided in the side walls 17 of the machine. To this thrust shaft may be connected vertically reciprocable thrust rods 18 for the purpose of bodily raising and lowering said shaft with said thrust rods upon the operation thereof. Forwardly of the thrust shaft 15 and upon the chuck bolster is located a slidable drive block 19 which is adapted to slide longitudinally upon the top surface 20 of the chuck bolster. The block

19 in its forward and rearward reciprocation over the chuck bolster is suitably guided by the side plates 21 secured to the sides of the chuck bolster by means of screws 22 with the upper edges of the guide plate provided with lateral flanges 23 which fit into horizontal longitudinal slots 24 provided in the sides of the drive block. The rear end of the drive block is provided at the upper side thereof with a pair of pivot wings 25 suitably supporting a pivot pin 25' to which may be pivotally connected a link 26 at an end thereof, the other end of said link being pivotally connected to the thrust shaft 15.

At the forward end of the bolster 1 and forwardly of the driving blocks 19 is suitably secured a chuck 27 as by means of screws 28. The chuck is provided with a T-shaped guide-way 29 for the operative reciprocation therethrough of the staple driver 30. The latter is also of T-shaped cross-section to slidably fit in said guide-way 29 and is secured at an end thereof by a pin 31 to the driving block 19 and is adapted to move with the block during the reciprocation of the latter over the chuck bolster. The forward end of the chuck may be provided with a wedge shaped socket 32 in which is located a similarly shaped supporter 33 secured by means of screws 34 to the free end of a flat spring 35, the latter being attached at the other end thereof to the lower surface of the chuck 27 by means of the screws 36. The forward end of the chuck bolster is suitably tapered to form a recess in which the spring 35 with its connected supporter 33 is adapted to move during the operation of the driver. The purpose of the supporter 33 is two-fold, the first of which is to act as an abutment and positioning means for the staple as it slides down the raceway into the chuck 27 and to prevent such staple from jumping forward and falling out of the chuck as the staple leaves such raceway, and a more important function is to laterally brace the legs of the staple or fastening element in the guide-way 29. For this purpose the supporter is interposed between the legs of the staple during the driving operation so as to maintain them in proper spaced relation during the clenching action in order that the legs of the staples will not tear laterally through the sides of the fiber casing or otherwise become buckled. The width of the supporter is accordingly slightly less than the distance between the legs of the staple. The supporter is so arranged in the chuck 27 that as the staple is moved forwardly under the action of the driver 30 the supporter is adapted to gradually move downwardly to clear the head of the staple and to permit both the staple head and the driver 30 to pass over the top of said supporter as the staple is being driven and clenched. For this purpose the sup-

porter is provided with an inclined or sloping surface 38 against which the lower corner 39 of the driver is adapted to contact as the latter moves forwardly thus gradually camming or forcing said supporter downwardly as a staple is being driven forwardly, the remaining upper portion of the supporter still being maintained between the legs of the staple yet to be driven into the casing, thereby maintaining a space between said legs at all times until the head of the staple passes over the top of the supporter.

The chuck is further provided at its upper side thereof with an inclined opening 40 with which registers the lower end 41 of the raceway or chute 42, the latter being suitably supported by an angular bracket 43. The bracket may be secured to the top of the chuck by the screw 44 or by any other appropriate securing means.

The guide-way 29 within the chuck 27, as aforesaid, is of T-shaped cross-section thereby providing shoulders 45 upon which the staple A may horizontally rest, after its passage down the raceway 42, with the points of the staple directed forwardly and the head of the staple bridging said shoulders and lying adjacent the forward end of the driver 30.

For the purpose of clenching the staples as they are driven by the driver 30 the machine is provided with a clenching device mounted at the forward end of the chuck 27, such device comprising a substantially U-shaped member 46 provided with a base 47 secured at the top of the forward end of the chuck 27 by means of screws 48. The vertical side members 49 of the U-shaped member 46 are provided with aligned perforations or bearings in which is supported a pivot pin 50. To this pivot pin is connected a swinging block 51 located in the space between the vertical members 49 and adapted to reciprocate angularly about said pivot pin 50 therebetween. Each of the vertical members is provided with substantially horizontally disposed slots 52 with the rear ends thereof curving downwardly and rearwardly and with said members 49 extending forwardly and including the forward straight portions of the slots 52. At the forward end of the swinging block 51 depends a clench block hanger 53 of L-shape, with the flange or base 54 thereof rigidly secured to the end of the block 51 by means of a bolt 55 and with the depending end or leg 56 thereof provided near its lower end with a clench block 57 suitably secured to said leg 56 by means of a screw 58. Above the swinging block 51 and disposed parallel thereto is provided a strap plate 59 which is spaced from said swinging block 51 by the spacers 60 and 60' to provide a space or slot 52' between the strap plate 59 and the top surface of the swinging block 51

substantially equal to the width of the slots 52. The parts may be rigidly secured together by a screw 61 and the bolt 55. The space thus provided constitutes a slot which corresponds somewhat to the slot 52 as will more fully appear hereinafter.

Transversely through the slots 52 and 52' is disposed a cross pin 62 to the ends of which are secured the forward ends of the links 63, the rear ends of the latter being pivotally connected to the drive block 30 by means of the pivot pin 64 and the bearing member 65 formed integrally with the driving block 19. The cross pin 62 is adapted to slide in the slots 52 and 52' during the forward movement of the driver 30 and the links 63, from the lower or rear ends of said slots to the other end, these slots being substantially straight for a greater part of their length. This cross pin is also adapted to bear against the upper and lower surfaces of the swinging block 51 and strap plate 59 respectively so that the forward movement of the cross pin will cause the same to bear against the former surface to cause the swinging block and its attached parts to swing or turn about the pivot pin 50 to lower the clench block into contact with the inner wall of the head 68 of the carton or casing 69. The cross pin during the latter part of its movement travels horizontally to the end of the slots 52 and 52'. During its backward movement the cross pin bears against the latter surface and effects an upward movement of the swinging block for withdrawing the clench block from the carton to a position above the same. As the cross pin travels over the rear curved portion of the slots 52 a downward pressure is applied to the swinging block at a point to the rear of the vertical plane passing through the axis of the pivot pin 50 to thereby rapidly swing the parts mentioned from the clenching position to the inoperative position as shown in Fig. 2.

The clench block hanger shown in Figs. 1 to 4 inclusive may be of cast metal and comparatively rigid or stiff to operate upon boxes or casings of usual or uniform thickness but situations often arise where the fiber layers are varied in thickness or when the clenching action occurs at points where the ends of the fiber layers overlap each other to form joints, thus making that part of the casing of greater thickness than at either side thereof. For this purpose the clench block hanger may be made of resilient material, such as steel and may be of the form shown in Fig. 7 wherein the leg thereof may be adapted to substantially flex or bend at the time when the same is brought into contact with the walls of the head 68 of the casing, thus accommodating itself to the particular thickness of material operated upon.

When the staples are distributed at points close to the corners of a casing and the machine is so constructed as to operate upon the adjacent transverse surfaces of a casing simultaneously, such surfaces being substantially perpendicular to each other, the clenching members at each corner would interfere with each other and, therefore, with the driving and clenching means thereof. At such corner may be provided a special form of clench block hanger of the type shown in Fig. 8 which may be operated similarly to that described above with reference to the form shown in Figs. 1 to 4 inclusive with the exception that the leg 71 thereof is provided with a lateral extension 72 disposed at right angles to the leg 71 and also provided with an additional clench block 73 secured thereto by a screw 74 whereby the two clench blocks are adapted to operate in planes at right angles to each other. This clench block hanger may be operated by one of the driving and clenching means at one side whereby the same may be brought in position to cause the clench block 57 to contact with the inner surface of the head 68 in the usual manner while the clench block 73 will slide over the surface 75 of the head to the position shown in Fig. 8 opposite to the driver 30'. It will be observed that the driver 30' operates without any effect upon the clench block 73, the latter being controlled only by the driver 30.

In operation the thrust shaft receives a substantially vertical reciprocation from the operating mechanism of the machine and is adapted to swing the links 14 about the pivot of the pivot post 13 thereby rearwardly and forwardly moving the drive block 19, the links 14 and 26 acting as a toggle with one end connected with the fixed or stationary pivot post 13 and the other end connected to the drive block 19 so as to reciprocate the latter longitudinally over the chuck 45 bolster. As the drive block 19 is also connected to the hanger links 63, it will be observed that when the parts are in the position shown in Fig. 2 and as the thrust shaft is then moved downwardly whereby the links 14 and 26 are brought into a straight line position the drive block 19 moves forwardly to cause the hanger links 63 to force the swinging block 51 to turn about the pivot pin 50 thereby causing the clench block hanger 53 and the clench block 57 to enter within the recessed head 68 of the carton 69 to place the block 57 adjacent the inner face of a flange of said head preparatory to receiving the points of the staples being driven through the wall of the carton and the flange of said head. During this operation the cross pin 62 as it is caused to move through the curved rear end of the slots 52 presses against the top surface of

the swinging block 51 and rapidly turns the swinging block to a horizontal position and the clench block into place. Upon passing from the curved portions of the slots 52 the cross pin 62 continues to move along the remaining straight portions thereof to the end of the slots at a point to one side of the pivot pin 50 and above the chuck block whereby the latter is positively locked in place so as to prevent any movement that might be effected by any resistance offered to the clench block tending to cause a rearward rotation of the clench block hanger and the swinging block about the pivot pin 50, by reason of the cross pin 62 bearing against the upper horizontal surfaces of the slots 52 in the side flanges or members 49.

The forward movement of the drive block 19 also carries the driver 30 through the guide-way 29 of the chuck 27 with the forward end of said driver bearing against the head of the staple horizontally disposed upon the shoulders 45 of the guideway with the points thereof directed toward the carton 69 and the clench block 57. The lower forward corner 39 of the driver also engages with the inclined surface 38 of the supporter 33 and gradually cams it downwardly against the pressure of the flat spring 35, the supporter acting to maintain the position of the legs of the staple the original distance apart during the driving action.

Upon the upward movement of the thrust rods and the thrust shaft the drive block 19 is caused to move rearwardly to withdraw the driver 30 through the chuck 27 and to also withdraw the hanger links 63 so as to cause the cross pin 62 to slide through the slots 52 and 52' to a point where the same will move through the rear curved portion of the slots 52 during which movement the block hanger and swinging block will be rapidly swung from the clenching position, as shown in Fig. 3, to a position above the carton, as shown in Fig. 2. It will be observed that for the greater portion of such movement of the cross pin, that is to say, through the horizontal portion of the slots 52, no effect is produced in moving the clench block hanger and the swinging block but as soon as the cross pin commences to follow the curved rear portion of the slots 52 the pin 62 contacts with the rear spacer 60' as well as the under surface of the strap plate 59 and immediately starts a movement of such hanger and swinging block to rapidly move it from its clenching position to its inoperative position.

Staples are fed from the machine in any suitable manner so as to successively slide downwardly in the chute or raceway 42 and be deposited in the space provided therefor in the chuck 27.

While I have disclosed one form of device

for carrying out my invention, and certain modifications thereof, I wish it to be understood, however, that my invention is not necessarily limited to the particular details described and shown but that such invention
5 may comprehend any number of equivalent devices and details which do not depart from the spirit of my invention and the scope of the appended claims.

10 Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a stapling machine, the combination of a power actuated staple driving means, means for clenching said staples during the operation of said driving means, means connected to said driving means and said clenching means and actuated by said driving means to position said clenching means in operative clenching relation with said driving means and guide means operative with said connecting means and said clenching means for initially rapidly moving said clenching means into said operative clenching relation with said driving means and for locking said clenching means from movement during the driving and clenching operation.

2. In a stapling machine, the combination of staple driving means, means for clenching said staples, means connected to said driving means and said clenching means and actuated by said driving means to position said clenching means in operative clenching relation with said driving means, guide means, means on said clenching means and operative with said connecting means and said guide means for rapidly moving said clenching means into said operative clenching relation with said driving means and for locking said clenching means from movement during the driving and clenching operation and means for maintaining the legs of the staples in parallel relation during said driving and clenching operation.

3. In a stapling machine adapted to operate upon boxes provided with flanged heads, the combination of means for driving staples through the walls of said boxes and the flanges of said heads, and means for first rapidly moving a clench block within said heads and adjacent said flanges and for then slowly locking and for maintaining locked, said clench block in position, during the driving and clenching operation, said means adapted to first release and then rapidly move said clench block upon the reverse movement of said driving means, and adapted to move said clench block to clear the flanges of said heads and ends of said boxes.

4. In a stapling machine adapted to operate upon boxes provided with flanged heads, the combination of means for driving staples

through the walls of said boxes and the flanges of said heads, means connected and actuated by said driving means for first rapidly moving a clench block within said heads and against said flanges and for then locking and maintaining locked, said clench block in position, during the driving and clenching operations, and actuated by the movement of said driving means for first slowly releasing and then rapidly moving said clench block into inoperative position and to clear the flanges of said head and the end of said boxes and means for maintaining the legs of the staples parallel during the driving and clenching operation.

5. In a device for operating upon fastening elements, the combination of means for driving said elements through the materials to be fastened, a clench block for clenching said fastening elements during the driving operation of the driving means, angularly movable means connected to and carrying said clench block, link connections between said driving means and said angularly movable means, guide means for controlling the movement of the connection between said links and said angularly movable means, said guide means having a curved portion whereby said angularly movable means rapidly moves to and from operative position, said guide means having a relatively long substantially straight portion whereby said connection between said links and said angularly movable means moves into locked position for maintaining said movable means and said clench block in operative position during the driving operation.

6. In a device for operating upon fastening elements, the combination of driving means for driving said fastening elements into clenched position, means for clenching said fastening elements during said driving operation comprising a clench block, a resilient clench block hanger and a movable supporter for said hanger, means connected to said driving means and said clenching means for moving said clenching means from and into operative relation with said driving means, said resilient clench block hanger compensating for the thickness of materials to be fastened together.

7. In a stapling machine adapted to operate upon boxes provided with flanged heads, the combination of means for simultaneously driving staples through two side walls of said box and the flanges of said head, clenching means comprising clench blocks adapted to simultaneously operate in planes transverse to each other and near the intersection thereof and means connected to one of said driving means operative to drive staples in one of said planes whereby said clenching means moves into operative position for clenching staples in both of said planes.

8. In a stapling machine adapted to operate upon boxes provided with flanged heads, the combination of means for simultaneously driving staples through different side walls
5 of said box and flanges of said head, means for clenching said staples simultaneously, including means for simultaneously clenching staples adjacent the corners of said box and in planes transverse to each other,

and means connected thereto and to the driving means for a side of the box whereby said third mentioned means moves into operative position for clenching staples in said transverse planes. 10

In witness whereof, I hereunto set my hand this 2nd day of August, 1919. 15

HARRISON B. WALTER.