June 25, 1957 J. F. FILSINGER ET AL 2,796,607

POWER OPERATED STAPLING MACHINE

Filed Nov. 9, 1953 6 Sheets-Sheet 1

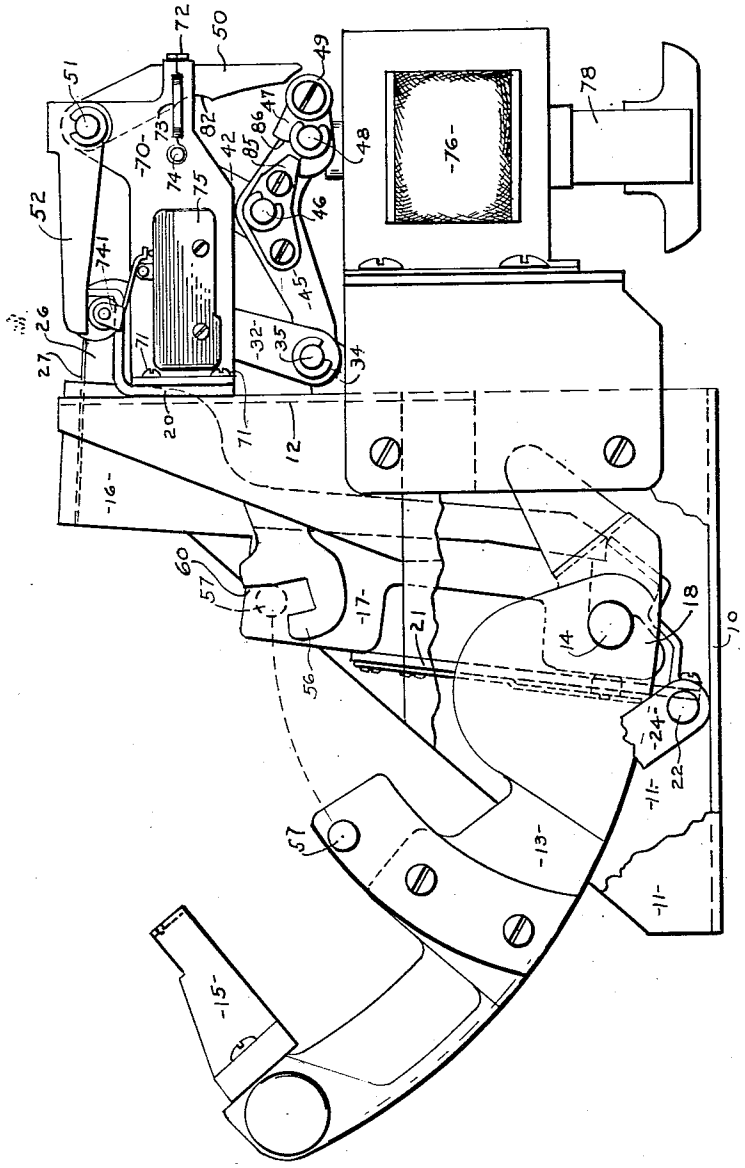


FIG 1

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POWER OPERATED STAPLING MACHINE

Filed Nov. 9, 1953 6 Sheets-Sheet 2

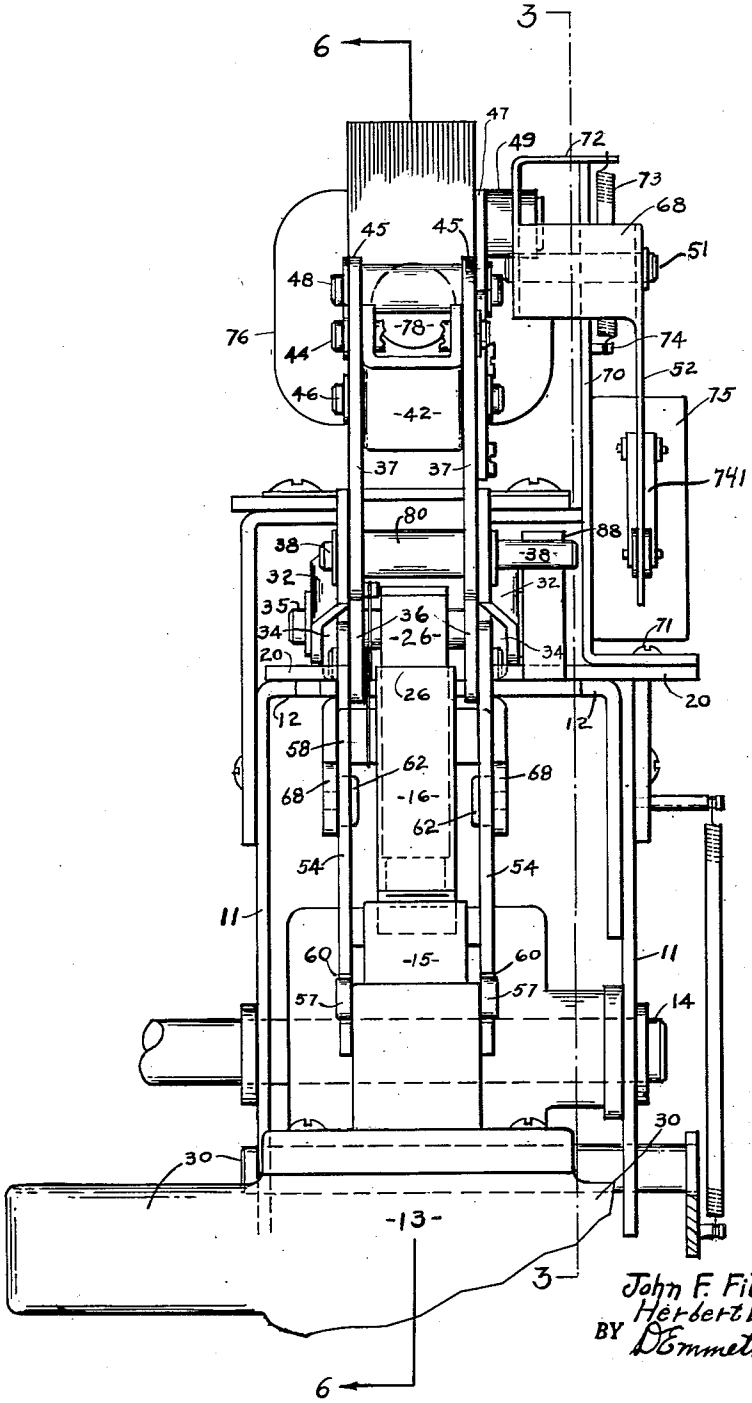


FIG 2

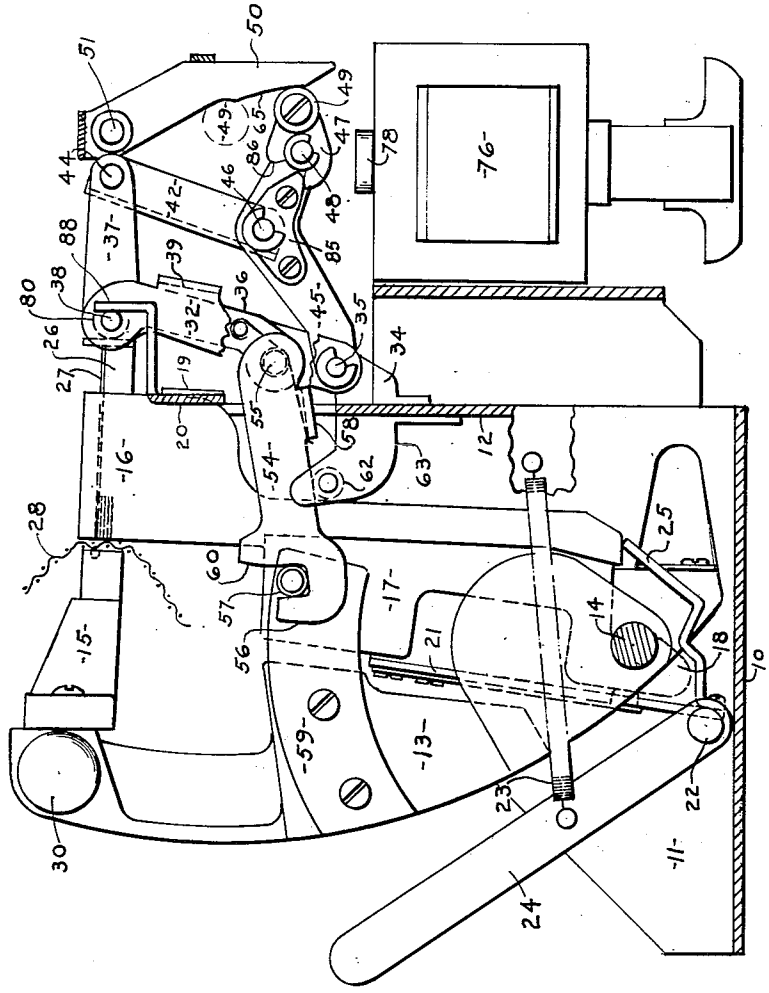
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POWER OPERATED STAPLING MACHINE

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FIG 3



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POWER OPERATED STAPLING MACHINE

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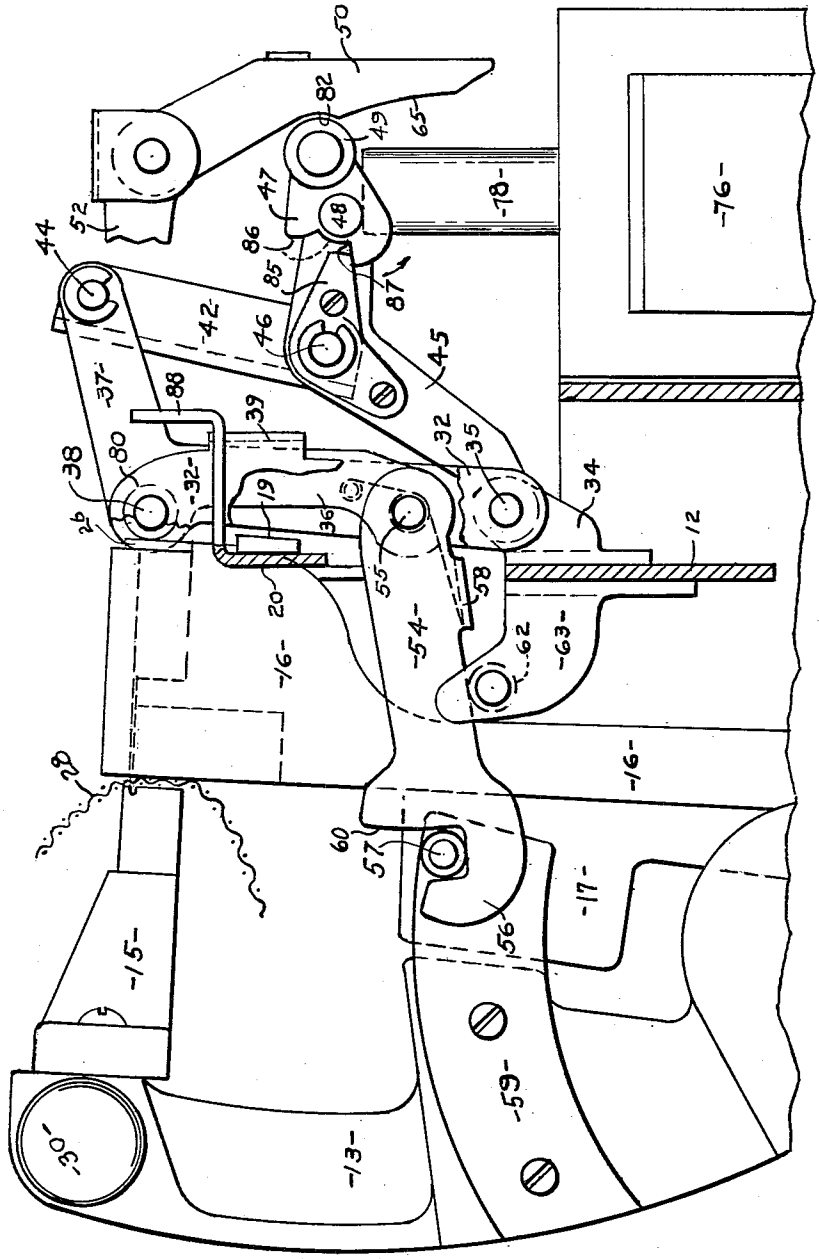


FIG 4

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POWER OPERATED STAPLING MACHINE

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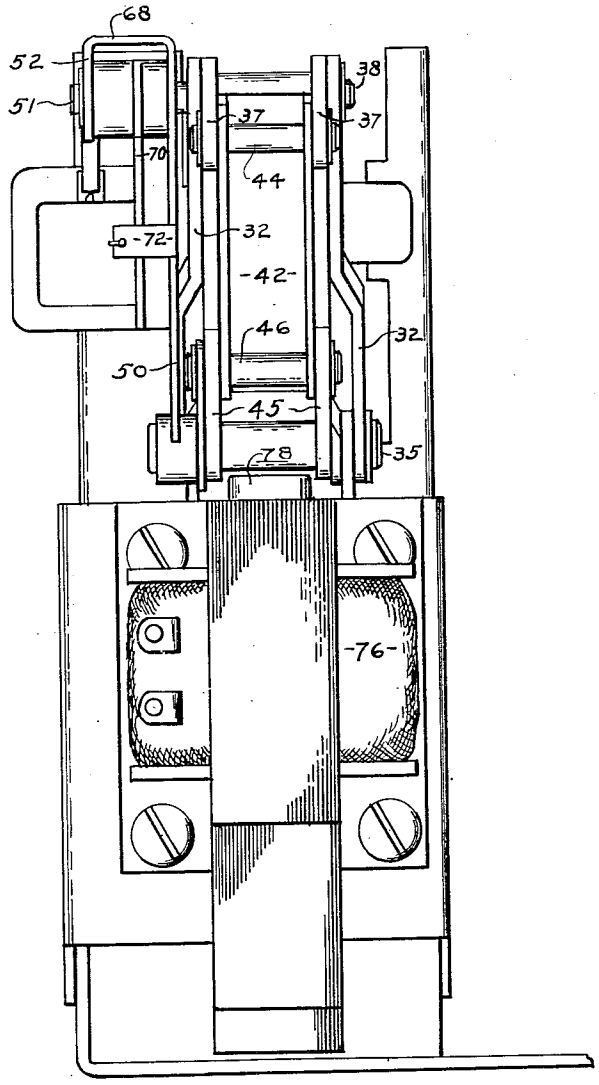


FIG 5

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POWER OPERATED STAPLING MACHINE

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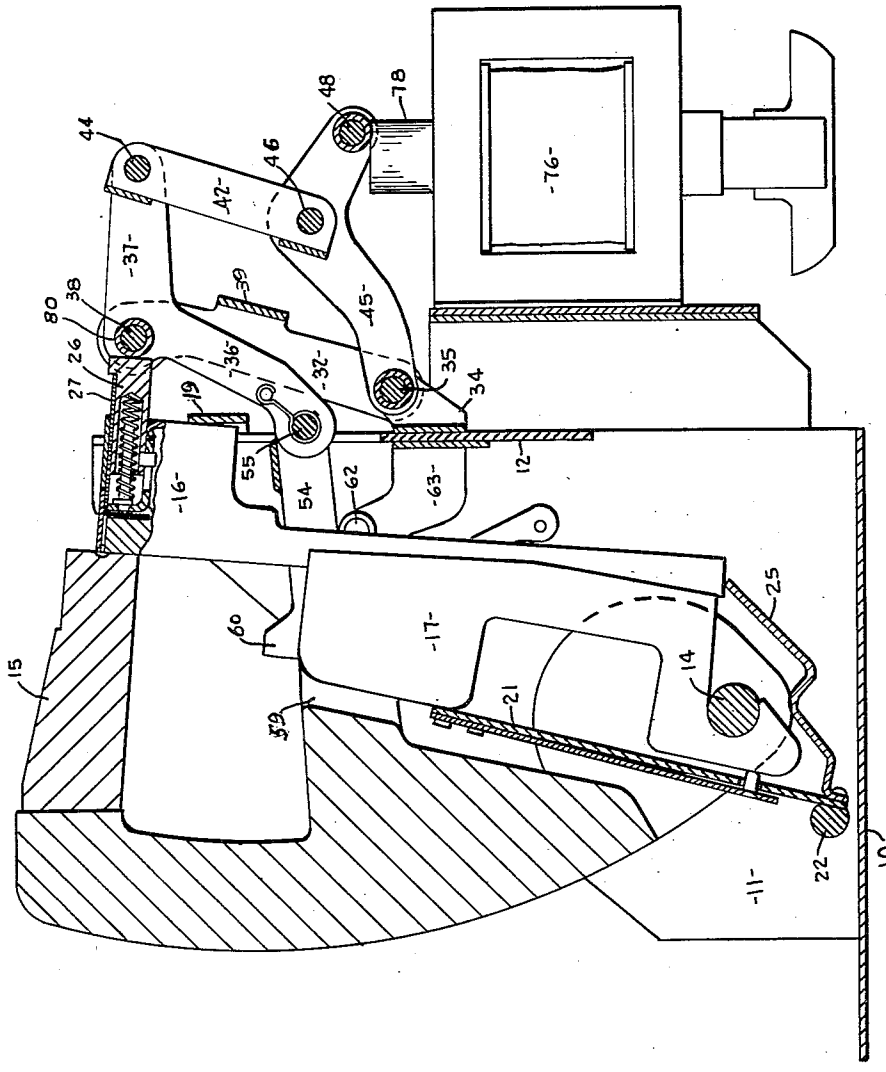


FIG. 6

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United States Patent Office 2,796,607 Patented June 25, 1957

2,796,607

POWER OPERATED STAPLING MACHINE

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Application November 9, 1953, Serial No. 390,804
3 Claims. (Cl. 1—3)

This invention relates in general to stapling machines, and more particularly to a machine for attaching tags to garments and other articles for identification thereof while they are being processed in a laundry or dry cleaning establishment.

At the present time, such machines are manually operated, the operator placing the garment or article over a clinching anvil mounted upon a pivoted arm, and then manually moving the arm toward the stapler. A tag of paper, or like material, bearing the proper indicia is arranged in juxtaposition to the stapling head and the manual movement of the arm into engagement with the stapling head effects ejection of the staple through the tag and the article, and effects the clinching of the ends of the staple.

In the devices of this type, the staples are ejected from the stapling head by an ejector consisting of a plunger and a staple engaging blade. The plunger is spring actuated—that is, the operator must push the arm against the stapling head with sufficient force to move the plunger against the spring, this requiring considerable effort on the part of the operator. Often, when the operator has operated the machines over a period of time and has become fatigued, the clinching anvil is not pressed with sufficient force against the stapling head to completely eject the staple, or to effect proper clinching of the prongs of the staple, with the result that the identifying tags become loosened from the garments and other articles, causing considerable difficulty to properly identify the garments and articles after the cleaning process.

This invention has as an object a stapling machine involving a novel mechanism operable when the anvil carrying arm is manually moved in proximity to the stapling head to automatically apply power effecting a compression or squeezing pressure on the arm and the staple ejector to drive and clinch the staple, and to thereupon release the arm for retrograde movement from the stapling head, this application of power being substantially instantaneous whereby the operator simply moves the anvil carrying arm toward and from the stapling head without being conscious of any different feel in the operation of the machine but without exercising any pressure or force during the driving of the staple, the motor automatically taking over the operation of the machine during the actual driving and clinching of the staple. This results in all staples being uniformly driven and clinched and without any effort on the part of the operator and regardless of the thickness of the material being stapled.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

In the drawings—

Figure 1 is a side elevational view of the portion of a tag applying machine disclosing the stapling mechanism embodying our invention.

Figure 2 is a top plan view of slightly enlarged scale of the structure shown in Figure 1, with the anvil in adjacency to the stapler.

Figure 3 is a view taken on line 3—3, Figure 2.

Figure 4 is an enlarged view of the upper portion of the structure shown in Figure 3 and illustrating the position of the actuating mechanism with the staple driven and clinched.

Figure 5 is an end view looking toward the left, Figure 1.

Figure 6 is a vertical sectional view taken on line 6—6, Figure 2.

The structure consists of a frame having a base plate 10, side walls 11, and a rear plate 12. An arm 13 is mounted in one end on a shaft 14 journalled between the side walls 11. This arm carries at its upper end a staple clinching anvil 15. A stapling head 16 is positioned between the side plates 11 for engagement by the anvil 15 when the arm 13 is moved upwardly about the pivot 14. The stapler 16 is mounted on a block 17, the lower end of which is formed with a hook portion 18 hooked over the shaft 14. The upper end of the stapler is held against a rearwardly offset central portion 19 of a cross bar 20 attached to the flanges 12. The stapler is removably held against the portion 19 of cross member 20 by an arm 21 engaging the block 17, the arm being carried by a shaft 22 also journalled in the side plates 11. The bar 21 is yieldingly urged against the block 17 by spring 23. The shaft 22 is also provided with a handle 24 and a rearwardly extending arm 25. The shaft 22 is oscillated by the handle 24 to move the arms 21, 25, in a counter-clockwise direction. By such movement, the arm 21 is moved outwardly from the block 17, and the arm 25, engaging the hook portion 18 and the lower end of the stapler 16, effects outward and upward movement of the stapler, whereby it is conveniently removed from the machine to replenish the staple magazine.

The stapler 16 is of conventional construction having a plunger 26 slidably mounted for movement toward and from the anvil and carrying a staple driving blade 27 which, upon movement of the plunger toward the anvil, ejects a staple driving it through the tag and material, and folding or clinching over the prongs of the staple by engagement with the anvil 15.

Heretofore, the operator having placed the garment or material, indicated at 28, Figures 3 and 4, over the end of the anvil 15 and then moves the arm 13 about its pivot to bring the anvil with the material tauted thereover into engagement with the stapler, this movement of the arm being conveniently effected by handles 30 extending laterally from opposite sides of the upper or free end of the arm. In that operation, the operator applied the necessary force against the stapler to effect functioning of the staple plunger 26 which is yieldingly urged outwardly, as shown in Figure 3, by a compression spring positioned within the stapler, as is conventional in devices of this type.

In this structure herein disclosed, motion transmitting mechanism is employed to connect the arm 13 and the staple plunger 26, and this mechanism is power operated. The mechanism consists of a yoke member 32 pivotally mounted at its lower end to a bracket 34 fixedly secured to the rear plate 12 of the frame, as by a pin 35. An angle lever having a downwardly extending leg 36, and a rearwardly extending leg 37, is pivotally mounted at its bight on a pin 38 carried at the upper end of the yoke 32. The yoke 32 is formed with spaced apart side members joined by a transversely extending portion 39 and, as here shown, the angle lever 36, 37 is also formed of spaced apart side members. A link 42 of channel formation is pivotally connected at its upper end to the leg 37, as by pin 44, and this link is pivotally connected at its lower end to a link 45, this connection being effected by a pin 46 positioned intermediate the ends of the link 45. One end of this link 45 is mounted on the pivot pin 35. To the opposite end of the link 45 there is pivotally connected a member 47 by pin 48, and this member

carries a roller 49 arranged to engage a depending leg 50 of an angle lever pivoted at its bight on the pin 51 and having a forwardly extending leg 52.

There is pivotally connected to the lower end of leg 36 of the first angle lever, a latch member 54, as by pin 55. This latch is formed with a hook portion 56 arranged to receive pins 57 carried by arm 13. The latch 54 is also formed of a pair of spaced apart side members straddling the stapler 16 and joined by a transversely extending portion 58. The arm 13 is provided on each side with an arcuate shaped plate 59 and at the forward end portion of each of these plates is carried one of the pins 57.

When the arm 13 is moved towards the stapler, the pins 57 engage a slightly curved surface 60, as indicated in dotted outline Figure 1. Further advancement of the arm effects rearward movement of the latch member 54 which is supported on rollers 62 journalled on a bifurcated bracket 63 secured to the forward surface of the end wall 12. The rollers 62 are positioned in a plane below the pin 55 whereby, when the latch 54 is moved rearwardly, the free hooked end of the latch is moved upwardly, whereby the hook portion 56 interlocks with the pins 57.

During this rearward movement of the latch 54, the angle lever 36, 37, is moved about its pivot pin 38 in a counterclockwise direction, Figures 1, 3 and 4, this effecting upwardly movement of the link 45 through the link 42, causing the roller 49 to engage the edge of the leg 50. The edge engaged by the roller 49 is in the form of a cam surface 65, effecting counter-clockwise movement of the angle lever 50, 52. The forwardly extending leg 52 of this lever is offset outwardly from the leg 50 by a horizontally extending portion 68, see Figures 2 and 5. The pin 51 is carried by a bracket 70 attached to the cross member 20 as by screws 71, Figures 1 and 2. The depending leg 50 of the lever is formed with an outwardly extending tab 72 to which there is attached at one end a tension spring 73, the opposite end of which is secured to a pin 74 carried by the bracket 70. The forwardly extending leg 52 of this lever is arranged to depress a switch actuator 741, closing the contacts of a micro switch 75 mounted on bracket 70 and connected in circuit with solenoid coil 76.

With the solenoid thus energized and the anvil 15 positioned in proximity to the stapler 16, the plunger 78 of the solenoid moves upwardly engaging the pin 48 and causing further counter-clockwise movement of the link 45 about link 35 and transmitting upward movement to the link 42. However, this motion does not impart further counter-clockwise movement to the lever 36, 37, about its pivot 38, due to the fact that the latch 54 is interlocked with the pins 57 carried by the arm. Accordingly, this upward movement of the link 42 effects counterclockwise movement of the yoke 32 about its pivot 35. The pin 38 carries a centrally located roller 80 which is positioned in engagement with the end of the plunger 26. Accordingly, it will be apparent that the upward movement of the plunger 78 of the solenoid effects movement of the plunger 26 toward the anvil 15 and simultaneously, movement of the anvil toward the stapler, that is, the motion transmitting mechanism described effects a squeezing force between the anvil and the staple plunger. As the link 45 is moved upwardly under the influence of the solenoid, the roller 49 enters a depression 82 formed in the edge of the depending leg 50 of the switch actuating angle lever, permitting clockwise rotation of the angle lever under the influence of spring 73 to open the switch 75, whereupon the solenoid plunger 78 descends permitting link 45 and the associated mechanism to move downwardly. During this downward movement, the member 47 pivots upwardly on the pin 48, this pivotal movement being limited by a stop member 85 affixed to the link 45 and engaging a notch formed in the member 47, this notch being defined by the surfaces 86, 87.

Normally, the upper end of the yoke 32 is positioned as shown in Figures 1 and 3, the pin 38 extending laterally, see Figure 2, and engaging a stop bracket 88 formed integral with cross member 20. It will be apparent that the solenoid is only momentarily energized during the upward movement of the plunger 78. When the plunger has actuated the motion transmitting mechanism to move the roller 49 into the recess 82, the switch 75 is opened and the plunger moves downwardly, permitting downward movement of the link 45 and associated parts, whereby the arm 13 is free to be moved outwardly from the stapler, this outward movement moving the latch 54 outwardly on the roller 62 and when the arm has moved outwardly sufficient to move the anvil 15 out of proximity with the stapler 16, the hook portion 56 of the latch has moved out of engagement with the pins 57, this all taking place in the continuous outward movement of the arm. Accordingly, the operator is not conscious of the latching of the arm, or the action of the solenoid. It will be further apparent that the solenoid is automatically energized to furnish power for the ejection and clinching of the staple regardless of the thickness of the material inserted between the anvil and the stapler.

What we claim is:

1. A stapling machine comprising a frame, a stapling head, an arm pivotally mounted on the frame and carrying a staple clinching anvil at its free end, said arm being movable about said pivot to effect movement of the anvil into operative registration with the stapling head, said stapling head having a staple ejector movable when actuated toward and from the anvil for ejecting and clinching staples, a yoke pivotally mounted at one end to the frame, the free end of said yoke engaging said ejector, an angle lever pivoted at its bight to the free end of said yoke, a latch pivotally connected at one end to said lever and having means at its opposite end for interlocking engagement with the arm upon movement of the same toward the stapler, said latch being operable upon further movement of the arm, after such engagement, to further move said angle lever about its pivot, a motor, a switch for energizing the motor, a switch actuator, said angle lever being cooperable upon such further movement by said latch to operate said switch actuator to close said switch, said motor when energized being operable to engage and move said angle lever about its pivot and to effect movement of the yoke about its pivot to effect a squeezing pressure between said anvil and ejector.

2. A stapling machine comprising a frame, a stapling head, an arm pivotally mounted on the frame and carrying a staple clinching anvil and being manually movable toward said stapling head to position said anvil in proximity to the stapling head, said stapling head having a staple ejector movable toward and from said anvil for the ejection of staples, motion transmitting means including a latch member supported on a bracket on said frame for free movement in the direction of the movement of said arm, an angle lever mounted at its bight on a pivot arranged in juxtaposition to said ejector, means for supporting said pivot for movement in a direction parallel to the movement of the ejector and for restraining movement of said pivot in a direction normal to the movement of the ejector, one leg of said angle lever being pivotally connected to one end of said latch, said latch member having means at its opposite end for interlocking with said arm when the anvil carried thereby is positioned in proximity to the stapling head, and power means cooperable with the other leg of said angle lever, upon the engagement of said latch member with said arm, to move said angle lever about its pivotal connection with said latch member to effect a squeezing pressure between said arm and ejector.

3. A stapling machine as defined in claim 2, wherein the pivot of said angle lever is supported by a yoke member pivotally mounted on the frame of the machine.

No references cited.