June 9, 1942. J. J. HARLEY 2,285,512

STAPLING MACHINE

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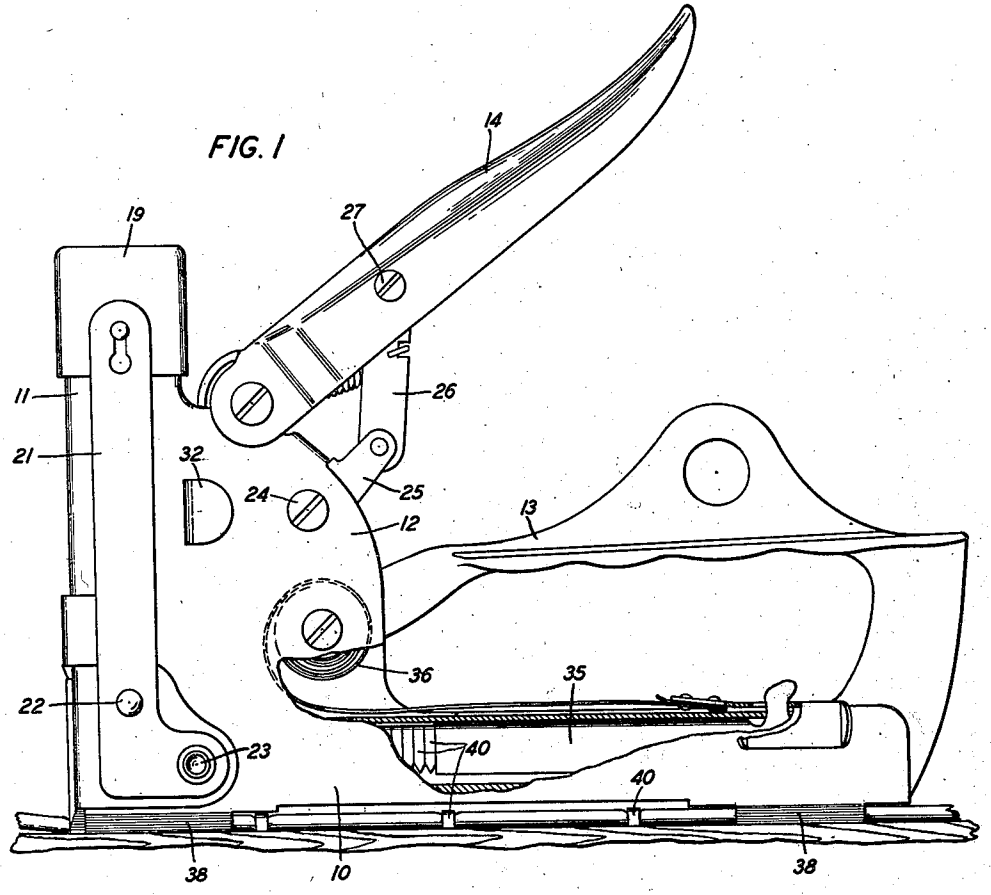
FIG. 1



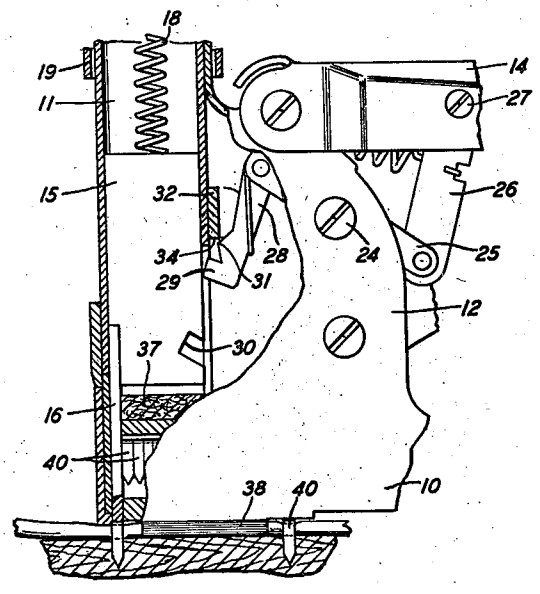


FIG. 5

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FIG. 4

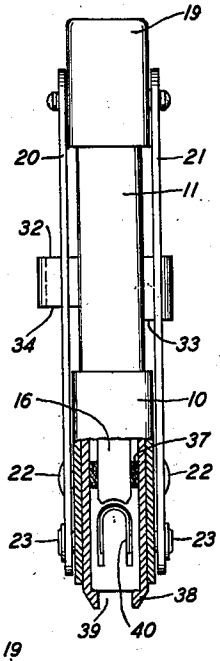


FIG. 2

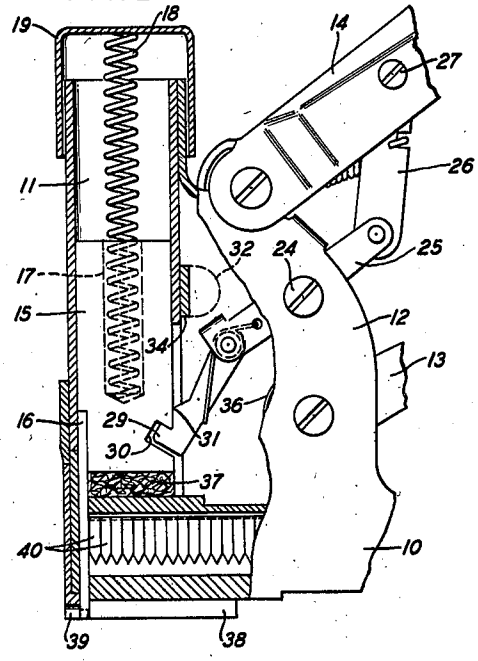


FIG. 3

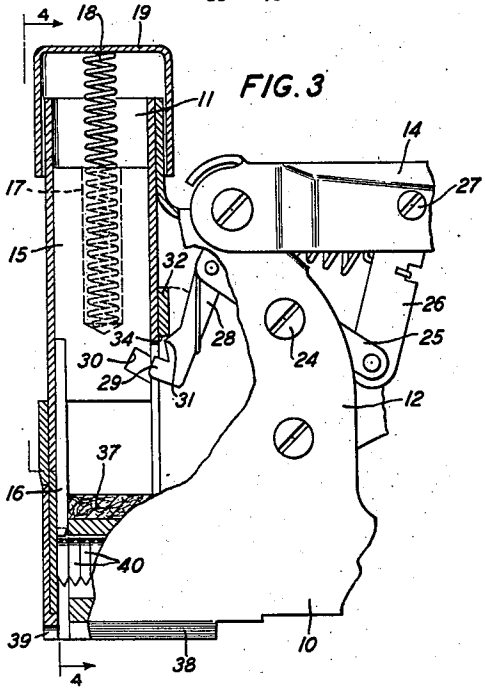


FIG. 7

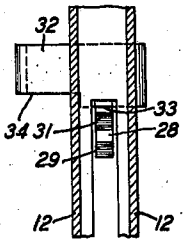
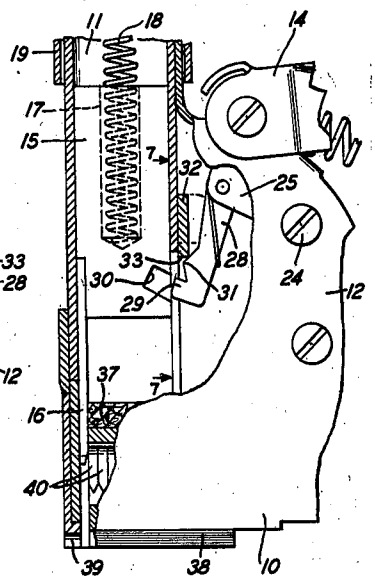


FIG. 6



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Patented June 9, 1942

2,285,512

UNITED STATES PATENT OFFICE

2,285,512

STAPLING MACHINE

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Application February 29, 1940, Serial No. 321,369

4 Claims. (Cl. 1—49)

This invention relates to stapling machines and more particularly to a device in which the staple is driven by energy stored up in a compressed spring bearing against a plunger having a staple driving blade attached thereto, which is released when the spring has been compressed a predetermined amount.

In devices of this general nature, for every downward stroke of the hammer or plunger and its associated blade, a staple is driven and as the hammer and blade are retracted just prior to the driving of another staple a staple is positioned underneath the driving blade ready to be driven. Thus it can be readily observed that for all types of wood or material each staple receives but one blow and where the character of the material is such that one blow will not suffice, no provision is made for delivering an additional blow or blows to that particular staple.

Applicant, realizing the shortcomings of the present types of staple driving mechanisms, particularly when using them for securing telephone wires to walls, base-boards and the like, which are constructed from materials having varying degrees of hardness, has provided means, controlled by the operator of the tool, for delivering an additional blow or blows to the staple to drive it home when one blow will not suffice.

It is the object of the present invention to provide, in a staple driving mechanism, means controlled by the operator for delivering a plurality of blows to a staple to drive it home without feeding an additional staple.

In the drawings:

Fig. 1 is a side elevational view of the tool of this invention with a part of the casing broken away to show the staples and the staple feeding mechanism;

Fig. 2 is a fragmentary side elevational view partly in section, with the plunger, driving blade and operating lever in their normal positions;

Fig. 3 is a view similar to Fig. 2 with the plunger and driving blade retracted by means of the operating lever, and ready to be released to drive a staple;

Fig. 4 is an end view partly in section of Fig. 3 taken in the directions of the arrows on line 4—4;

Fig. 5 is a view similar to Fig. 2 with the plunger and driving blade released and driving a staple;

Fig. 6 is a view similar to Fig. 3 except that the plunger and driving blade are now in a position to deliver an additional blow to the staple previously driven without feeding another staple, due to the fact that the plunger will be released before the driving blade clears the top edge of the staple which is bearing against the face of the blade, and

Fig. 7 is a fragmentary view of the release control mechanism taken on line 7—7 of Fig. 6.

As shown in the accompanying drawings, the tool of this invention comprises a housing or casing 10, which is provided at its front or driving end with a tubular chamber 11, having wing or flat parallel portions 12 extending rearwardly a short distance. Secured between the members 12 and extending toward the rear of the casing 10, where it is firmly secured, is the handle 13. This handle is fixedly supported and is located directly beneath the operating lever 14 so that the fingers of the operator's hand may conveniently grip the handle while the palm of the hand engages the operating lever 14 to apply a downward force thereto.

Slidably mounted in the tubular chamber 11 of the housing 10, as shown in Figs. 2, 3, 5 and 6, is a spring-driven plunger 15 having a staple driving blade 16 located thereon and extending beyond the bottom edge thereof.

As shown in Fig. 4, the blade 16 is curved at its bottom edge to conform to the shape of the staple 34 and is maintained in alignment therewith, due to the fact that there is very little clearance between the tubular housing 11 and the plunger 15 to which the blade 16 is secured.

Located in the top portion of the plunger 15 is a recess 17 in which one end of a coil spring 18 is positioned. The other end of the spring bears against the cap 19 which is held in place against the tension of the spring 18 by means of a pair of arms 20 and 21 which are secured to the casing 10 by means of the rivets 22 and 23.

Located between the members 12 and pivotally mounted by means of the screw 24 is the rocker arm 25, one end of which is connected to a link member 26 which in turn is connected to the operating lever 14 by means of the screw 27. On the other end of the rocker arm 25 is a pawl or dog 28, one end of which is rotatably secured to the rocker arm 25 while the other end is provided with an extending portion 29 which engages the recess 30 in the side of the plunger 15 to raise said plunger when the spring controlled operating lever 14 is depressed, as shown in Fig. 3 and Fig. 6. The pawl 28 is provided, adjacent the extending portion 29, with a raised portion 31, which acts as a cam to release the plunger 15 by causing the pawl 28 to be kicked out of the

recess 30 when the cam 31 engages the undersurface of the member 32.

The member 32, which is shown in detail in Fig. 7, is slidably mounted in apertures located in the sides of the members 12 and is provided on its lower edge with high and low portions 33 and 34; thus by moving the member 32 to one side or the other either the high or low portions of this member are interposed in the path of the cam 31. Thus the time of the release of the plunger 15 can be varied at will as it is readily apparent that when the high part 33 of the member 32, as shown in Figs. 6 and 7, is interposed in the path of the pawl 28, it will be kicked out of the recess 30 sooner than when the lower portion 34 of the member 32 is interposed in its path, as shown in Fig. 3.

By referring to Figs. 1 and 2, it will be observed that the operating mechanism of this tool is in its normal position and ready to drive one of the staples 40 which are positioned in the staple driveway of the magazine in the tool and are fed by means of a following member 35 which is held in engagement with the last staple by means of the coiled spring tape 36 attached thereto, which causes the first staple to bear against the face of the driving blade 16.

When the operating lever 14 is depressed due to the link 26, rocker arm 25 and the pawl 28, the plunger 15 and driving blade 16 are raised against the tension of the spring 18, thus permitting a staple 40 to be positioned directly under the driving blade 16 (see Figs. 3 and 4). Continued movement of the operating lever 14 causes the pawl 28 to become disengaged from the recess 30 due to the cam surface 31, thereby permitting the plunger 15 and its associated driving blade 16 to travel downward and strike the staple 40 a smart blow, to drive it into the desired location, as shown in Figs. 1 and 5.

When the character of the material into which the staple 40 is to be driven is so hard that a single blow will not suffice, the member 32 is moved to its other position; that is, so that the high portion 33 is interposed in the path of the pawl 28 (see Figs. 6 and 7). Thus, when the operating lever 14 is depressed and the plunger 15 and its associated driving blade 16 are raised, the plunger 15 will be released before the bottom of the driving blade 16 clears the top of the staple 40, thereby permitting any number of additional blows to be delivered without feeding a staple.

When the staple has been struck the required additional number of blows and is driven home, the member 32 is moved back to its normal position as shown in Figs. 2, 3 and 5 and is ready to feed and drive the next staple.

A pad of resilient material 37 is provided inside of the housing 11 at the base of the plunger 15 to absorb the shock of said plunger.

In order to facilitate the positioning and fastening of wires and the like, the bottom of the tool has been provided at its front and rear ends with suitable V-shaped bosses 38 forming a longitudinal wire receiving groove 39 in the bottom thereof.

While applicant has shown and described the preferred form of his invention, it is understood that variations and modifications may be made therein without departing from the spirit of the invention and he is only limited by the appended claims.

What is claimed is:

1. In a staple driving machine, a casing, a staple magazine therein, a plunger, a staple driving blade on said plunger, a spring for actuating said plunger, a seat for said spring connected to said casing, a chamber for said plunger and said spring in said casing, an operating lever pivoted in said casing adapted to raise said plunger and compress said spring upon the operation of said lever, and means in said casing in the path of said lever comprising a shiftable stepped bar whereby the time of release of said plunger and staple driving blade may be varied.

2. In a staple driving machine, a casing, a staple magazine therein, a plunger, a staple driving blade secured to said plunger, a spring for actuating said plunger, a seat for said spring connected to said casing, a chamber for said plunger and said spring in said casing, an operating lever pivoted in said casing and adapted to raise said plunger and compress said spring upon the operation of said lever, and means mounted in said casing in the path of said lever for causing the release of said plunger and staple driving blade before the bottom of the staple driving blade reaches the top of the next staple, said means comprising a shiftable stepped bar at right angles to the path of travel of the lever.

3. In a staple driving machine, a casing, a staple magazine therein, a plunger, a staple driving blade secured to said plunger, a spring for actuating said plunger, a seat for said spring connected to said casing, a chamber for said plunger and said spring in said casing, an operating lever pivoted in said casing, a pawl in said casing connected to said lever and in engagement with said plunger for raising said plunger and compressing said spring upon the operation of said lever, and means mounted in said casing in the path of said pawl for varying the time of release of said plunger and said staple driving blade thereby permitting an initial blow to feed and drive a staple while the succeeding blows are delivered to the same staple, said means comprising a shiftable stepped bar located in the path of travel of said pawl and at right angles thereto.

4. In a staple driving mechanism, a casing, a staple magazine therein, a pair of bosses each having a longitudinal groove therein extending from the bottom of said magazine, a plunger, a staple driving blade secured to the bottom of said plunger, a spring for actuating said plunger, a seat for said spring connected to said casing, a chamber for said plunger and said spring in said casing, an operating lever pivoted in said casing, a pawl in said casing connected to said lever and in engagement with said plunger for raising said plunger and compressing said spring upon the operation of said lever, and a manually operated stepped bar mounted in said casing in the path of said pawl for varying the time of release of said plunger and staple driving blade, thereby permitting the initial blow to feed and drive a staple while the succeeding blows are delivered to the same staple.

JOSEPH J. HARLEY.