

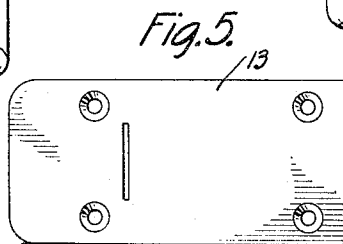
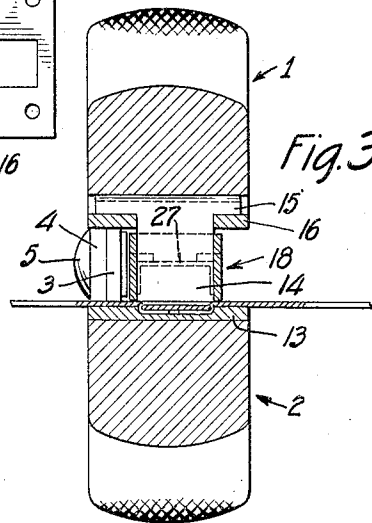
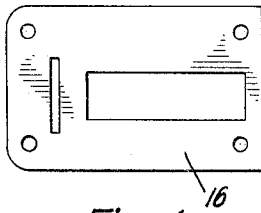
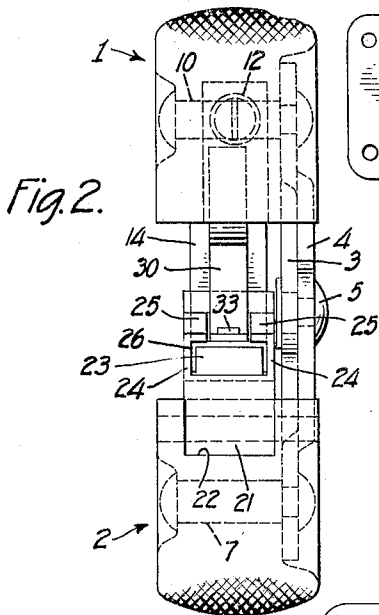
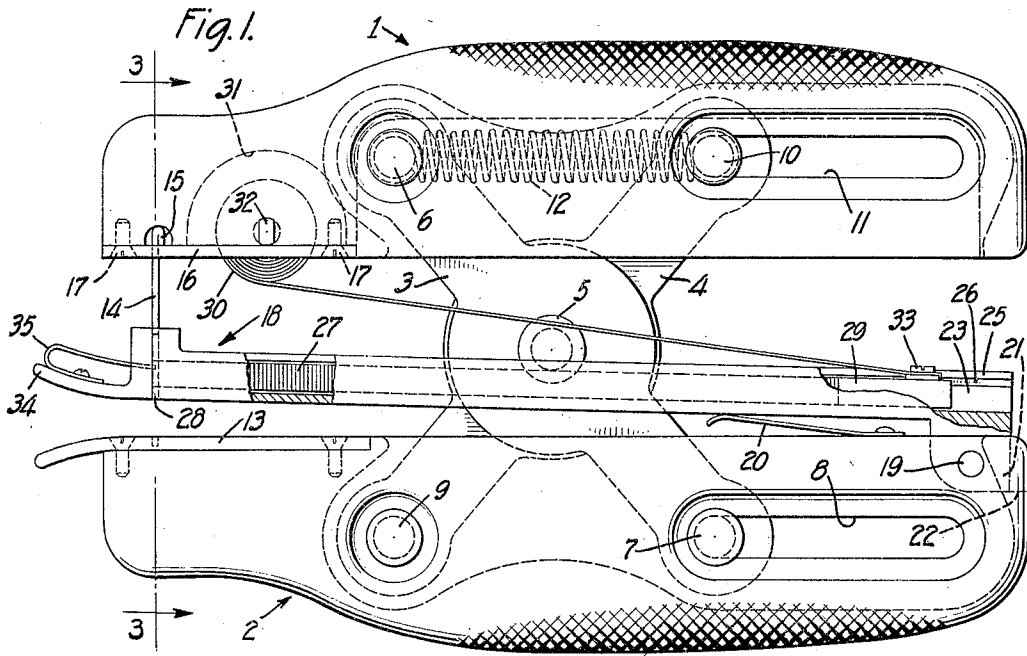
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T. S. FALK

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STAPLING DEVICE

Filed June 19, 1930



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STAPLING DEVICE

Application filed June 19, 1930. Serial No. 462,195.

This invention relates to stapling machines, and has for an important object to provide a hand implement which is simple in operation, economical to manufacture, and so compact and light that it may be carried about in the pocket of a garment without substantial inconvenience.

To this end it is a feature of the invention that provision is made of a pair of opposed handles, one carrying an anvil and the other a driver, and a staple magazine interposed between the handles, the arrangement being such that all of the operating parts are mounted within and between the boundary surfaces of the handles so that the hand of an operator is fully protected by the handles against injury by the operating parts.

It is a further object of the invention to provide a hand operated implement which includes a staple magazine and staple feeding means of the kind adapted to handle unconnected, preformed staples. Such staples involve no metal severing operation, and hence may be set by a hand device without resort to force multiplying mechanism if the staples are formed of thin wire. Such thin wire staples are also very advantageous in a hand operated device, because a large number of them may be stored upon a magazine of moderate length. In order that the staples may be formed of thin wire, it is important that the staple legs be supported through their entire lengths at the penetration of the work. It is accordingly a feature of this invention that the magazine, which is movable away from the anvil at the separation of the handles to provide a work receiving opening, is moved to engage the work and clamp it firmly against the anvil in a preliminary stage of the setting operation and before the staple is driven against the work.

It is a further feature of the invention that the gripping portions of the handles are situated closely adjacent the driving point, that the stroke of the handles is short, and that the handles are constrained to move in parallelism. As a result of this arrangement the staple setting device may be very quickly and accurately positioned with reference to the

work, and the handles may be fully operated at a single operation without any necessity for shifting the grip in the course of the operation.

Other objects and advantages will hereinafter appear.

In the drawings forming part of this specification:

Figure 1 is a side elevation, partly broken away, of a stapling device embodying features of the invention;

Figure 2 is a rear elevation of the device of Figure 1;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1, looking in the direction of the arrows;

Figure 4 is a plan view of a driver supporting plate; and

Figure 5 is a plan view of the anvil.

The illustrative device comprises upper and lower handles 1 and 2 connected for parallel motion toward and from one another by crossed links 3 and 4, which links are pivotally connected at their centers by suitable means, such as a rivet 5. The link 3 is pivotally connected at its upper forward end to the handle 1 by means of a pivot bolt 6 and is slidably connected at its lower rear end to the handle 2 by means of a bolt 7 which plays in slots 8 formed in opposite sides of the handle. The link 4 is pivotally connected at its lower forward end to the handle 2 by means of a pivot bolt 9 and is slidably connected at its upper rear end to the handle 1 by means of a bolt 10 that plays in slots 11 formed in opposite sides of the handle 1. The slots 8 and 11 are parallel to one another, and since the links 3 and 4 are connected to one another at their centers, the handles are always maintained in parallelism with one another throughout their relative movements. A coil spring 12 is stretched between the bolts 6 and 10 and always tends to draw them toward one another, and hence to pull the handles apart to the limiting position illustrated in Figure 1. The handle 2 carries an anvil 13. The handle 1 carries a driver 14. The upper end of the driver 14 has an enlarged head which lies in a recess 15 of the handle 1. The recess 15 loosely

receives the head of the driver, and hence permits some pivoting and shifting of the driver 14 with reference to the handle 1. The upper end of the driver is retained in place by a retaining plate 16 which is held to the handle 1 by screws 17.

A staple magazine 18 is interposed between the handles 1 and 2, being pivotally mounted at its rear end upon the handle 2 by means of a pivot pin 19. The magazine 18 is normally urged upward to the position illustrated in Figure 1 by a leaf spring 20, and is prevented from moving farther upward than the position illustrated by engagement of its tail portion 21 with the bottom of a recess 22 formed in the rear portion of the handle 2. The magazine comprises a staple supporting bar 23 and upright side members 24 which include top flanges 25. The supporting bar 23, together with the uprights 24 and the flanges 25 thereof, form in effect a continuous substantially inclosed channel 26 for the staples 27 which in cross section is in the form of an inverted U. The channel 26 at its forward end lets into a vertically extending driving throat 28 which is just wide enough to receive one staple at a time. The staples are urged forward toward this driving throat by means of a U-shaped feeder 29 which rides upon the magazine bar 23 behind the staples and pushes them forward. A coil spring 30 is housed in a recess 31 formed in the handle 1, being secured at its inner end to a center pin 32. Said pin is fixedly mounted in slots 33 formed in the handle 1, which slots are closed at their lower ends by the retaining plate 16. This spring is connected to the feeder 29 by a screw 33 and constantly urges the feeder forward. A gap is provided between the flanges 25 to accommodate the spring in its travel.

The forward end of the magazine 18 carries an arm 34 upon which a leaf spring 35 is mounted. This leaf spring, as shown, is doubled back and extends through a slot into the driving throat in a position such that it is straddled by the single staple present in the driving throat. The spring 35 supports this staple and prevents the ejection of it until after the magazine has been depressed to firmly grip the work.

The operation of the device is as follows:

The parts normally occupy the position shown in Figure 1. Sheets to be stapled together are inserted in the space provided between the anvil and the magazine, and the handles are then squeezed toward one another. The first effect of the squeezing together of the handles is to move the driver 14 down into engagement with the top of the staple standing in the driving throat. Since this staple is supported by the leaf spring 35, however, there is no further relative movement of the driver and the magazine for the time being, and the two move in unison until the magazine has been clamped firmly

against the work. When the magazine is thus positively arrested, the relative movement of the driver and the magazine is resumed, the driver acting to force the staple down the driving throat and through the work, and to cause the staple legs to be clinched by the anvil.

The grip upon the handles is now relieved, with the result that the handles are restored by the spring 12 to the position shown in Figure 1. This withdraws the driver 14 part way from the driving throat, as seen in Figure 1. As the driver clears the staple passage the feeder forces the staple stack forward in the magazine and causes the foremost remaining staple to enter the driving throat. The leaf spring 35 has by this time been restored to its initial position, and is, therefore, in a position to support this end staple.

The magazine moves upward substantially in unison with the handle 1 in the preliminary upward movement of said handle. There is not, therefore, any danger whatever of the driver being completely withdrawn from the driving throat at any time.

It will be observed that since the handle 1 remains in parallelism to the handle 2 while the anvil is pivotally mounted on the handle 2, there will be some slight relative pivotal movement of the anvil and the handle 1. It is for this reason that provision is made for swinging movement of the driver 14 with relation to the handle 1. With the arrangement illustrated the driver 14 is free to accommodate itself to the angle of inclination of the driving throat at all times.

It will be observed also that all moving parts of the device are inclosed within the contour surfaces of the handles, the outer handle walls being recessed for concealing the bolts 6, 7, 9 and 10, and actually extending outward beyond the bounds of all of the other parts.

While I have illustrated and described in detail certain embodiments of the invention, it should be understood that changes may be made therein. I do not, therefore, desire to limit myself to the specific construction illustrated, but intend to cover my invention broadly in whatever form its principles may be utilized.

I claim:

1. In a hand stapling implement, in combination, a pair of opposed handles movable toward and from one another, means for urging the handles apart, an anvil carried by one of the handles, a driver carried by the other, a magazine interposed between the handles and mounted on the anvil carrying handle with capacity for movement relative thereto, and means for yieldingly urging the magazine away from the handle upon which it is mounted, said handles jointly forming a housing for substantially enclosing the other parts.

2. In a hand stapling implement, in combination, a pair of opposed handles movable toward and from one another, an anvil carried by one of the handles, a driver carried by the other, a magazine interposed between the handles and mounted on one of the handles with capacity for movement relative thereto, means for yieldingly urging the magazine away from the handle upon which it is mounted, and means for limiting separation of said handle and the magazine, said handles jointly forming a housing for substantially enclosing the other parts.

3. In a hand stapling implement, in combination, a first handle, a driver carried thereby, a second handle, an anvil carried thereby, a staple magazine mounted on the second handle with provision for movement relative thereto, means normally urging the magazine away from the handle on which it is mounted, and means for causing the magazine to be moved toward said handle before a staple is driven against the work, said handles jointly forming a housing for substantially enclosing the other parts.

4. In a hand stapling implement, in combination, a first handle, an anvil carried thereby, a second handle, a driver movable therewith, the handles being movable toward one another to set a staple, means urging the handles apart, a staple magazine for individual preformed staples having a driving throat, means constantly urging the staples toward the driving throat, means urging the magazine away from the anvil carrying handle, and means for causing the staple magazine to be moved toward the anvil carrying handle into position to support the staple legs continuously at the work penetrating operation before the staple legs are driven against the work.

5. In a hand stapling implement, in combination, a pair of handles, means directly interconnecting the handles and urging them apart, a staple magazine interposed between the handles and mounted on one of them but movable relative thereto, means urging the magazine away from its supporting handle and means for moving the magazine toward said handle into work clamping position before the staple is driven against the work.

6. In a hand stapling implement, in combination, a pair of handles, means directly interconnecting the handles and urging them apart, said means also constraining the handles to move in parallelism, a magazine for individual preformed staples interposed between the handles and having a driving throat, and means constantly urging the staples toward the driving throat, said handles jointly forming a housing for substantially enclosing the other parts.

7. In a hand stapling device, in combination, a first handle, an anvil carried thereby,

a staple magazine pivoted on said handle and having a driving throat, a second handle, means interconnecting the handles and constraining them to move in parallelism, and a driver swingingly mounted on the second handle and guided by the driving throat.

8. In a hand stapling device, in combination, a first handle, a driver loosely carried thereby, a second handle, an anvil carried thereby, means interconnecting the handles for parallel movement and urging them apart, a magazine for individual preformed staples pivotally mounted on the second handle and having a driving throat, means for feeding the staples toward the driving throat, means urging separation of the magazine and the handle by which it is carried, means limiting such separation, and means mounted on the magazine and yieldingly opposing movement of the driver relative to the magazine so that upon approach of the handles movement along the driving throat of the staple to be set will be prevented until the magazine has been moved into work engaging position.

In testimony whereof I have affixed my signature to this specification.

THEODORE S. FALK.