

Oct. 27, 1953

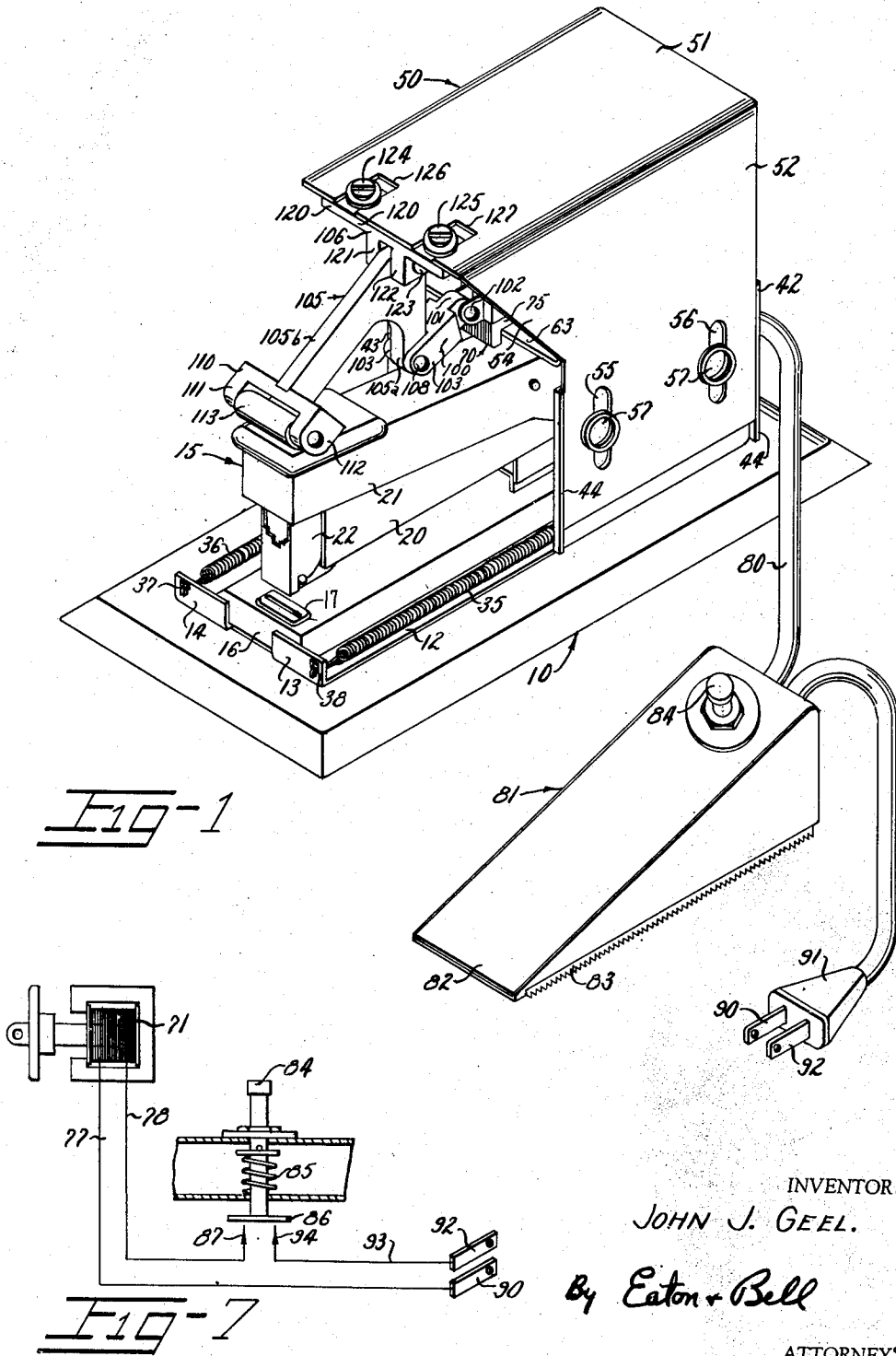
J. J. GEEL

2,656,537

ELECTRICALLY OPERABLE STAPLER ACTUATOR

Filed Oct. 11, 1950

3 Sheets-Sheet 1



Oct. 27, 1953

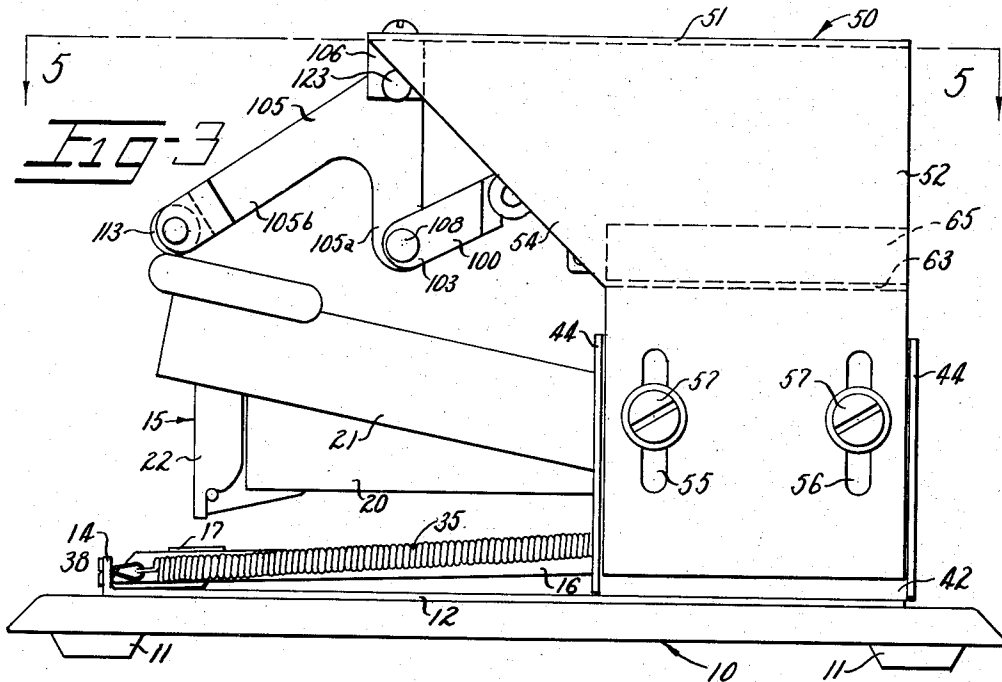
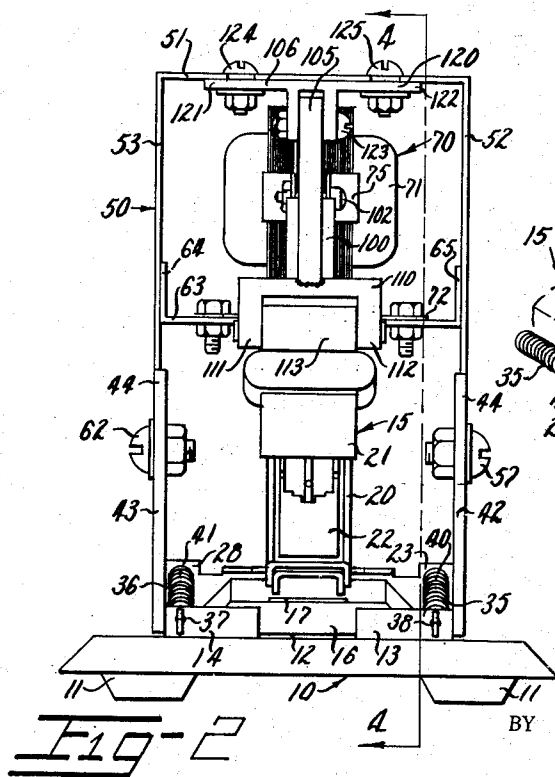
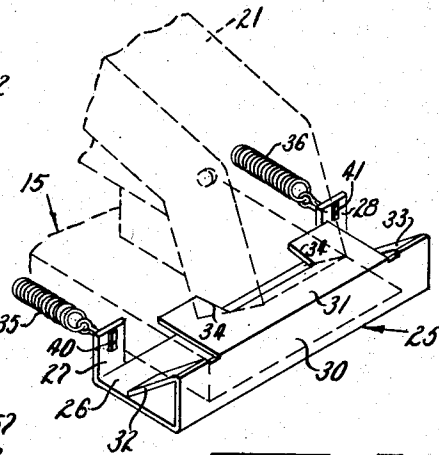
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ELECTRICALLY OPERABLE STAPLER ACTUATOR

Filed Oct. 11, 1950

3 Sheets-Sheet 2



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2,656,537

ELECTRICALLY OPERABLE STAPLER
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Application October 11, 1950, Serial No. 189,535

9 Claims. (Cl. 1—3)

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This invention relates to an improved electrically operable stapler actuator and more especially to a device adapted to receive a conventional hand operated stapling machine and which is provided with improved electrically operable means for actuating the conventional stapling machine.

It is an object of this invention to provide a stapler actuator which has means therein for adjustably holding various sizes of conventional staplers and which is provided with improved electrically operable means adapted to impart a positive driving action to the stapler to cause the same to operate upon an electrical circuit being completed to the electrically operable means.

Various attempts have heretofore been made to actuate a stapler by electrical means such as an electro-magnet or the like and these previous attempts have resulted in complicated and expensive devices for actuating the stapler, said devices being adapted to actuate only one type of stapler and embodying various levers and the like which frequently become inoperable and fail to impart a positive action to the stapler. It is therefore an object of this invention to provide a device of simplified construction which is adjustable to permit the same to be used with staplers of various types and sizes and which is provided with an electric solenoid, said solenoid having a link connected thereto which is connected to one end of a bell crank pivotally mounted in the housing of said device, and the other end of the bell crank being provided with a roller adapted to rest upon the upper portion of a stapler, whereby upon electrical current being transmitted to the solenoid a positive movement will be effected of the link moving the bell crank downwardly in a smooth positive stroke to impart positive action to the stapler, and said device being constructed of a minimum number of parts for maximum durability.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

Figure 1 is an isometric view of the improved stapler actuator showing one type of a conventional stapler associated therewith;

Figure 2 is a front elevation of the improved actuator looking at the left-hand side of Figure 1;

Figure 3 is a side elevation of the improved actuator;

Figure 4 is a vertical sectional view of the actuator with the stapler removed therefrom and taken substantially along the line 4—4 in Figure 2;

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Figure 5 is a sectional plan view of the improved actuator taken substantially along the line 5—5 in Figure 3;

Figure 6 is an isometric detail of the spring actuated means for holding the stapler in the improved device, a portion of the stapler being shown in phantom lines;

Figure 7 is an electrical diagram showing the circuit for the electrically operable stapler actuator.

Referring more specifically to the drawings the numeral 10 broadly designates a base plate of the improved device which may be of any suitable construction such as stamped metal and which is preferably provided with a plurality of feet 11 which may be of resilient material if desired. The base plate 10 has an auxiliary or stapler holding plate 12 suitably secured thereto, as by welding, the stapler holding plate 12 preferably being substantially rectangularly shaped and having overall dimensions which are less than the overall dimensions of the bed plate 10 so that the stapler holding plate 12 may be positioned on the upper surface of the bed plate 10 leaving a portion of the upper surface of the bed plate 10 exposed around each edge of the stapler plate 12. The front portion of the stapler plate 12 has two upwardly bent portions 13 and 14 adapted to receive the front end of a conventional stapler 15.

This invention may be used with various types and various sizes of staplers and for purposes of illustration the stapler 15 shown is of the type entitled "Bostitch Model B5B" embodying disclosures found in Patent Nos. 1,584,788; 2,037,334; 2,150,332; and Design Patent Number 91,242.

The stapler 15 is provided with a base 16 having an anvil 17 thereon and a hammer carrying arm 20 pivotally mounted at the end of the base 16 remote from the anvil 17 and carrying a hammer actuating arm 21 adapted to actuate a conventional hammer container within a housing 22 at the front portion of the hammer carrying lever 20. The housing 22 and the lever 20 also carry a plurality of conventional wire staples which are adapted to be moved by the hammer within the housing 22 to penetrate material placed between the housing 22 and the anvil 17 and to staple said material together upon the hammer actuating handle 21 being moved downwardly in a conventional manner. It is an object of this invention to provide improved electrically operable means for actuating the hammer actuating handle 21 by positively moving the same downwardly upon electrical energy being applied to the means to be disclosed.

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The stapler 15 is held in position on the stapler plate 12 by the front of the base 16 of the stapler 15 resting against the upturned portions 13 and 14 of the stapler plate 12 with the base 16 of the stapler 15 resting upon the upper surface of the stapler plate 12. A stapler holding bracket 25 (Figure 6) is provided which may be formed of any suitable material such as sheet metal or the like and which has a base portion 26 with upwardly extending flanges 27 and 28 at opposed ends thereof and an upwardly extending back piece 30 is provided with a laterally and forwardly extending guide 31 and support members 32 and 33 which extend from the upper opposed ends of the back plate 30 downwardly and have their free ends resting against the base plate 26. The rear end of the base 16 of the stapler 15 is adapted to fit on the upper surface of the base 26 of the bracket 25 between the upstanding flanges 27 and 28 and to be engaged by the back plate 30, the guide plate 31 being cut away as at 34 to receive the rear portion of the hammer actuator 21.

Suitable tension springs 35 and 36 are provided which are secured at their front ends to the upstanding portions 13 and 14 of the stapler plate 12, respectively, as at 37 and 38 and the rear ends of the tension springs 35 and 36 are secured to the upstanding members 27 and 28 of the bracket 25 as at 40 and 41, respectively.

It will thus be observed that the bracket 25 is connected to the front portion of the stapler plate 12 by the springs 35 and 36 and the bracket 25 may thus have sliding movement along the upper surface of the stapler plate 12. When the stapler 15 is placed in position on the device, the bracket 25 holds the rear end of the base 16 thereof against the upstanding portions 13 and 14 of the stapler plate 12 to thus position the stapler 15 securely in position. By use of the springs 35 and 36 and the movable bracket 25, it is possible to use staplers of various sizes in this device and the tension springs 35 and 36 will hold the stapler in a secured position on the stapler plate 12.

Suitably secured to the base 10 at the rear-most portions thereof and adjacent opposed sides of the stapler plate 12 are vertically disposed guides 42 and 43 each preferably being provided with flange portions 44 at the front and rear sides thereof. The vertically disposed guides 42 and 43 may be formed integral with the stapler plate 12 if desired or may be secured thereto and to the base 10 as by welding, if desired.

Means for supporting the electrically operable actuator means are provided comprising a housing 50 having a top wall 51 and side walls 52 and 53 suitably secured thereto or formed integral therewith and depending therefrom in right-angular relation to the top 51, the side walls 52 and 53 at their lowermost ends being of substantially the same width as the width of the vertically disposed guides 42 and 43 between the flange portions 44 and the side walls 52 and 53 being provided with a forwardly extending projection 54 and 55, respectively, at the uppermost front portion thereof to provide an overhanging portion of the housing 50.

The width of the housing 50 is substantially equal to the distance between the vertically disposed guides 42 and 43 and the side walls 52 and 53 of the housing 50 are mounted for vertical sliding movement in the guides 42 and 43. The side wall 52 is provided with at least one and

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preferably two slots 55 and 56 each of which are penetrated by bolts 57 which also penetrate the vertically disposed guide 42. The side wall 53 is provided with at least one but preferably two vertically extending slots 60 and 61 which are penetrated by suitable bolts 62 which also penetrate the vertically disposed guide 43 and the bolts 57 and 62 serve to hold the housing 50 in the desired vertical position on the vertically disposed guides 42 and 43. The slots 55, 56, 60 and 61 permit vertical sliding adjustment of the housing 50.

A horizontal shelf or support member 63 having flanges 64 and 65 at the opposed edges thereof is secured within the housing 50 substantially midway of the vertical height of said housing, the flanges 64 and 65 being secured to the inner surfaces of the side walls 52 and 53 in any suitable manner as by welding. The horizontal shelf or support member 63 provides a support for an electrically operable solenoid coil designated at 70 which includes a solenoid coil 71 supported in a suitable bracket 72 secured to the horizontal shelf 63 as by bolts 73. The solenoid coil 71 surrounds a solenoid plunger 75 which is held in position within the solenoid coil 71 and in spaced relation to the interior thereof by a suitable guide 76. Wires 77 and 78 within a suitable cable 80 are connected to the solenoid coil 71 and extend to a foot operated switch broadly designated at 81.

The foot operated switch 81 has an inclined housing 82 and a resilient base 83. The foot operated switch 81 has a switch button 84 mounted therein for vertical sliding movement and which is normally held in open position as shown in Figure 7 by a spring 85 surrounding the same. The switch button 84 has a contact plate 86 on the lower end thereof. The wire 78 leading from the solenoid coil 71 has its other end connected to a contact point 87 adjacent the contact plate 86 of the switch 84. The wire 77 leads to one side 90 of suitable plug 91 adapted to be connected to a suitable source of electrical energy. The other side 92 of the plug 91 has a wire 93 connected thereto which has its other end connected to a contact point 94 adjacent the contact plate 86 of the switch button 84 whereby upon the switch button 84 being depressed the contact plate 86 will contact the points 87 and 94 to complete a circuit to the solenoid coil 71, when the plug 91 is connected to a suitable source of electrical energy.

A link 100 having a hook portion 101 adapted to fit over a pin 102 provided at the front end of the solenoid plunger 75 extends outwardly from the solenoid plunger 75 and is bifurcated as at 103.

A bell crank 105 is pivotally mounted in a bracket 106 adjustably secured to the top plate 51 of the housing 50 and the bell crank 105 has an arm 105a which depends from the bracket 106 and has its lower end positioned between the bifurcated end portion 103 of the link 100 and is pivotally secured therein as by a pin 108 penetrating the bifurcated portion 103 of the link 100 and penetrating the lower end of the arm 105a of the bell crank 105. The bell crank 105 also has an arm 105b which extends downwardly at an angle from the pivot point and is provided with a laterally extending projection 110 having downwardly extending projections 111 and 112 at the opposed ends thereof in which the opposed ends of a roller 113 are rotatably mounted.

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The bracket 106 in which the bell crank 105 is pivotally mounted may be of any suitable construction and if desired the bell crank 106 may be pivotally secured directly to the under surface of the top plate of the housing 50. The bracket 106 is preferably adjustably mounted in the top plate 51 of the housing 50 and comprises a base portion 120 having downwardly extending lugs 121 and 122 between which the bell crank 105 is pivotally mounted as by a pin or bolt 123. The base 120 of the bracket 106 is provided with bolts 124 and 125 penetrating the same which also penetrate suitable longitudinally extending slots 126 and 127, respectively, in the top plate 51 of the housing 50. Adjustment of the bolts 124 and 125 thus permits longitudinal adjustment of the bracket 106 for positioning the bell crank 105 in any desired position.

It will be observed in Figures 1 and 3 that when a stapler 15 is positioned in the apparatus as heretofore described the roller 113 on the bell crank arm 105b will be positioned in contact with the upper surface of the hammer actuating arm 21, the hammer actuating arm being held in the position shown by conventional spring means, not shown. After being depressed, the hammer actuating arm will thus move back to its raised or normal position as shown in Figure 1, which movement will return the bell crank 105 to the position shown in Figure 1 after each operation. The hammer actuating arm 21 thus holds the bell crank arm 105b in the desired position and through the link 100 the solenoid plunger 75 is held in position out of the electrical field of the solenoid coil 71.

Upon a circuit being completed to the solenoid coil 71, an electrical field is set up causing the solenoid plunger 75 to move within the solenoid coil 71 or from left to right in Figures 1, 3 and 4 thus moving the link 100 and the bell crank 105 to press the roller 113 downwardly against the upper surface of the hammer actuating member 21 to depress the handle actuating member 21 to actuate the hammer to staple goods positioned between the hammer and the anvil 17. Upon each depression of the foot switch button 84, a circuit will be completed to again actuate the hammer in the stapler 15 and it is thus seen that an operator may thus be positioned before the improved staple actuating device and pass material through the same using both hands and may actuate the stapler by depressing the foot button switch 84, to thus increase the amount of work that can be performed by the stapler 15.

The provision of the bell crank 105 and the single link 100 gives a positive actuating force to the hammer actuating member 21 upon movement of the solenoid plunger 75, and this is effected with a minimum number of movable parts.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a descriptive and generic sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. An improved electrically operable stapler actuator adapted to receive a stapler having a base portion with an anvil thereon and a hammer actuating member, said improved actuator comprising a base portion, means on said base

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portion for holding said stapler, a housing mounted on said base portion and extending upwardly therefrom and partially over said stapler on said base, a solenoid coil secured to said housing, a solenoid plunger within said solenoid coil, a double-arm bell crank pivotally secured at the juncture of its two arms to the upper portion of said housing and depending therefrom, a link connecting said solenoid plunger with one arm of said bell crank, the other arm of said bell crank being in engagement with the hammer actuating member of said stapler, switch means for completing an electrical circuit to said solenoid to move said solenoid plunger and to cause movement of said bell crank to thus move the hammer actuating member of the stapler downwardly to actuate said stapler.

2. An improved stapler actuator comprising a base, means for holding a stapler on said base, said stapler having an actuating member, a housing secured to said base and extending partially over said stapler, said housing having a solenoid secured therein above said stapler provided with a solenoid plunger, a bell crank pivotally secured to said housing and depending therefrom in superposed relation to said stapler, a single link connecting said bell crank and said solenoid plunger, said bell crank having means thereon engaging the stapler actuating member, and means for completing an electrical circuit to said solenoid to move said solenoid plunger to actuate said bell crank to move said stapler actuating member.

3. In a stapler actuator having a base adapted to receive a stapler having an anvil and a hammer actuating member, improved means for actuating said stapler comprising said stapler actuator base having a housing secured thereto and extending upwardly and having a horizontal portion disposed above part of said stapler, a double-arm bell crank pivotally secured at the juncture of its two arms to said horizontal portion, a solenoid secured to a portion of the housing which is higher than said stapler, said solenoid having a solenoid plunger therein, a link pivotally connected to said solenoid plunger and pivotally connected to one arm of said bell crank, the other arm of said bell crank engaging said hammer actuating member, and switch means for completing an electrical circuit to said solenoid to move said plunger to, in turn, move said bell crank for actuating said stapler.

4. In a stapler actuator having a base portion adapted to receive a stapler having an anvil and a hammer actuating member, improved means for actuating said stapler comprising said stapler actuator base having a housing secured thereto adjacent one end thereof, said housing extending upwardly to a point higher than the top of said stapler and having a horizontal portion extending over a portion of said stapler, a bell crank having a long arm and a short arm and being pivotally mounted on said horizontal portion of said housing and depending therefrom, the long arm of said bell crank engaging said hammer actuating member, a solenoid secured to an upper portion of said housing and having a solenoid plunger therein, a link pivotally connected at one end to said solenoid plunger and pivotally connected at its other end to said short arm of said bell crank, and means for closing an electrical circuit to said solenoid coil to cause movement of said solenoid plunger to pivot said bell crank to actuate said stapler.

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5. In a stapler actuator having a base portion adapted to receive a stapler having an anvil and a hammer actuating member, improved means for actuating said stapler comprising said stapler actuator base having an inverted U-shaped housing secured thereto with the web portion thereof positioned at a point higher than said stapler, said housing having a horizontal shelf portion spaced from the web portion thereof, a double-arm bell crank pivotally mounted at the juncture of its arms on the web portion of said housing, a solenoid coil mounted on the horizontal shelf portion of said housing and having a plunger therein, a link pivotally connecting said solenoid plunger with one arm of said bell crank, the other arm of said bell crank engaging said hammer actuating member, and means for momentarily energizing said solenoid to cause said plunger to move said bell crank to actuate said stapler.

6. In a stapler actuator having a base adapted to receive a stapler having an anvil and a hammer actuating member, improved means for actuating said stapler comprising a housing having a horizontally disposed web portion and spaced depending leg portions, the lower ends of said leg portions being secured to said base, said horizontally disposed web portion being positioned at a point higher than said stapler, a double-arm bell crank pivotally secured at the juncture of its arms to the horizontally disposed web portion of said housing, a solenoid coil secured to said housing and said solenoid having a solenoid plunger therein, a link pivotally connecting said solenoid plunger with one of the arms of said bell crank, the other of the arms of said bell crank engaging said hammer actuating member, and means for momentarily energizing said solenoid to move said plunger and said bell crank to actuate said stapler.

7. In a stapler actuator having a base adapted to receive a stapler and also having a housing and a solenoid supported thereby and bell crank means secured to the housing and to the solenoid and engageable with said stapler for actuating the same, means for holding a stapler on said base comprising a flange secured to said base and

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against which the front portion of the stapler abuts, a bracket adapted to receive the rear portion of the stapler, and spring means connecting said flange with said bracket and normally urging said bracket toward said flange.

8. In a stapler actuator for staplers having a base portion and an actuating member pivotally secured to said base portion, said stapler actuator having a base and a housing extending upwardly from said base and a bell crank and a solenoid secured to said housing for moving said bell crank into engagement with said actuating member, means for adjusting said stapler actuator to accommodate staplers of varying sizes comprising a pair of spaced guide members having their lower ends secured to said base adjacent one end thereof, said housing having a top wall and side walls, said side walls being slidably mounted in said guide members and screw means penetrating said guide members and said side walls to hold the same in a desired adjusted position.

9. In a stapler actuator for staplers having an anvil and a hammer actuating member, said stapler actuator having a base and a housing extending upwardly from said base and a bell crank and a solenoid secured to said housing for moving said bell crank into engagement with said hammer actuating member, means for adjusting said stapler actuator to accommodate staplers of varying sizes, comprising a pair of guide members mounted on said base, said housing having a horizontal web portion and depending leg portions, said leg portions being adjustably mounted on said guide members, said horizontal web portion of said housing having a bracket adjustably secured thereto, said bell crank being pivotally mounted in said bracket, whereby said bell crank may be adjusted horizontally and said housing may be adjusted vertically relative to said guide members to thus accommodate different size staplers.

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