

Oct. 31, 1944.

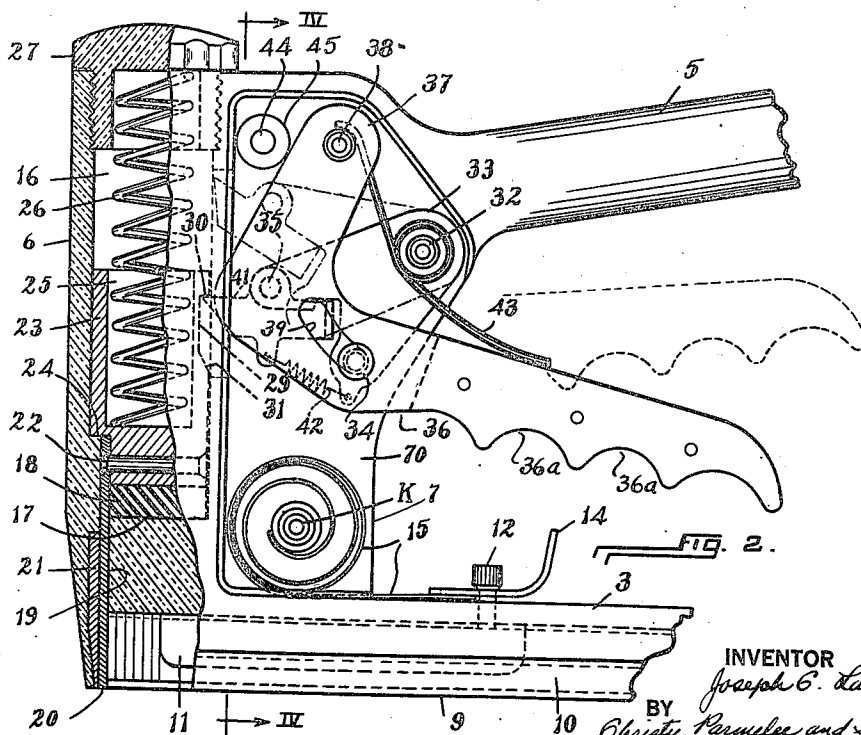
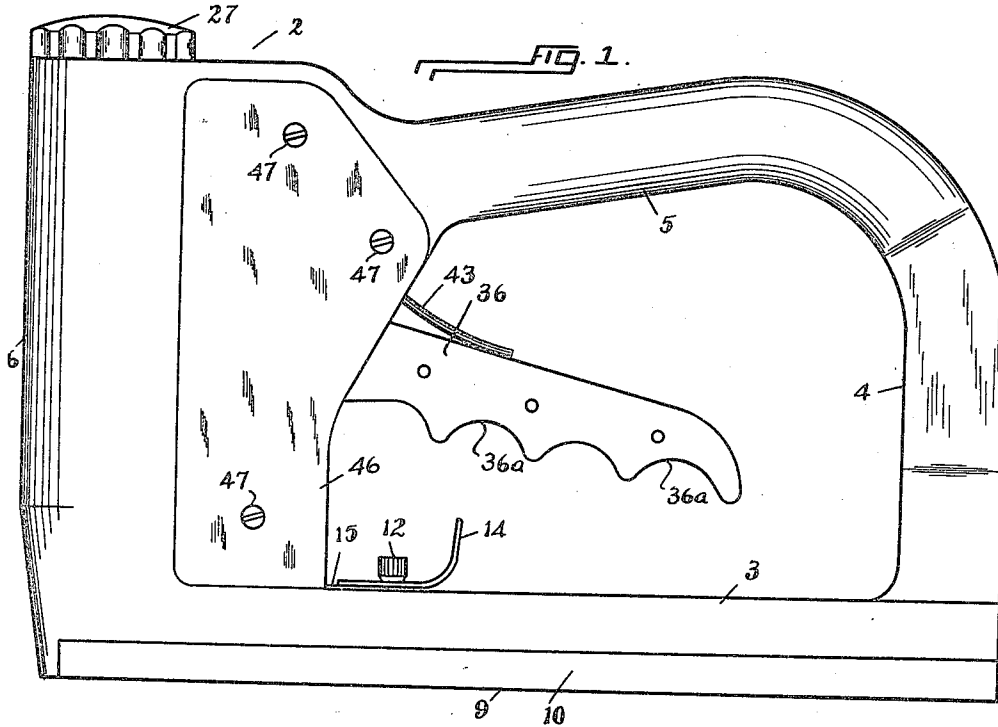
J. C. LANG

2,361,483

STAPLE DRIVING TOOL

Filed May 16, 1942

2 Sheets-Sheet 1



INVENTOR
Joseph C. Lang
BY *Christy, Parmelee and Strickland*
ATTORNEYS

Oct. 31, 1944.

J. C. LANG

2,361,483

STAPLE DRIVING TOOL

Filed May 16, 1942

2 Sheets-Sheet 2

FIG. 3.

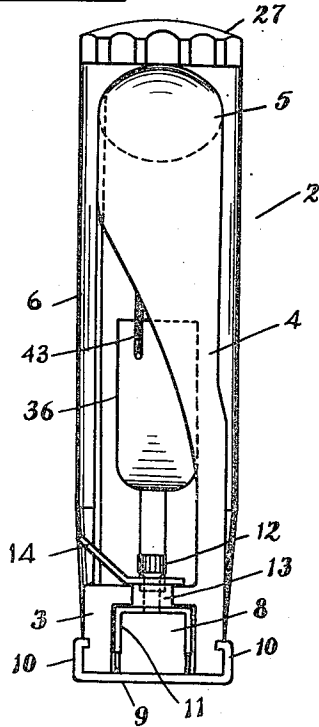


FIG. 4.

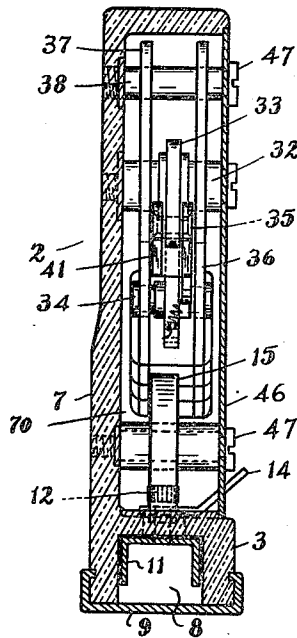
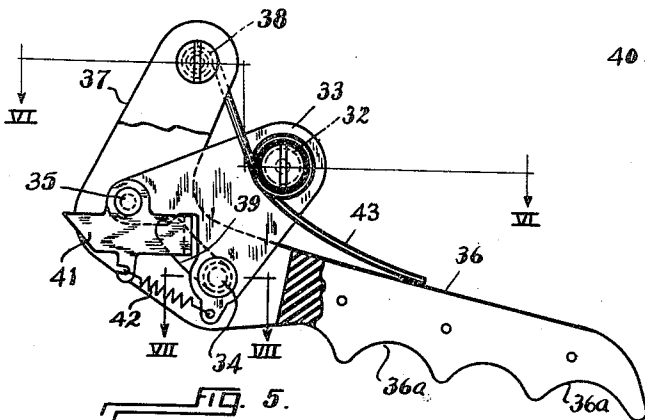
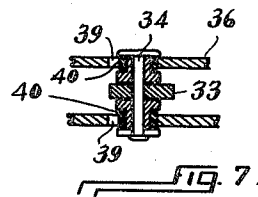
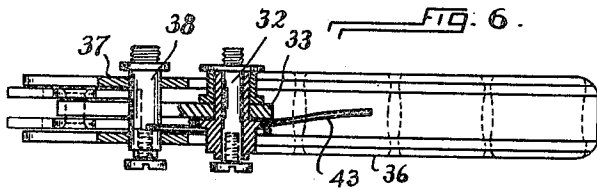


FIG. 6.



INVENTOR
Joseph C. Lang
BY
Christy, Parmelee and Strickland
ATTORNEYS

UNITED STATES PATENT OFFICE

2,361,483

STAPLE DRIVING TOOL

Joseph C. Lang, Pittsburgh, Pa., assignor to Bocell Corporation, a corporation of Delaware

Application May 16, 1942, Serial No. 443,199

5 Claims. (Cl. 1—49)

This invention relates to the art of stapling and is for a tool or machine in the nature of a hand tool for driving staples.

Tools of this character commonly comprise a base member with a magazine therein to receive a strip of staples and with means movable along the base member for urging the strip of staples toward the delivery end of the magazine. Mounted on the base at the delivery end of the magazine is a guide through which operates a vertically reciprocable driver. This driver is usually moved upwards by hand power and when it has been raised a predetermined distance is released and propelled down to drive the staple by means of a spring which is put under compression on the upstroke of the driver. It is to this class of machines that the present invention relates.

In machines of this character as heretofore generally constructed a handle or frame extends horizontally above the base in spaced relation thereto. This frame supports a lever which projects upwardly above the frame at an angle thereto and which is pivoted to the frame at its forward end. The lever is connected with a mechanism for raising and releasing the driver. In the operation of the tool the lever and the portion of the frame which forms a fixed handle are grasped in the hand of the operator and a squeezing pressure is applied, tending to move the lever down toward the frame. This requires substantial pressure in order to compress a spring sufficiently strong to operate the driver. The application of pressure to the lever in this way tends to lift the nose of the stapler, i. e. the portion through which the staple is delivered to the work away from the work and the natural tendency is for the heel of the stapler, i. e. the end most remote from the nose to be pressed against the work. To overcome this difficulty the operator must consciously manipulate the tool in such a way as to hold the nose tight against the surface into which the staple is being driven, while at the same time squeezing the lever in a manner which tends to lift the nose away from the work.

According to the present invention a driving mechanism is provided wherein the lever for lifting the driver is positioned between the base and the fixed horizontal frame and the lever is moved upwardly instead of downwardly in the process of raising the driver against the spring pressure. This naturally tends to force the nose or delivery portion of the stapler closer to the work, making the tool easier to operate and assuring of the

staples being more completely driven. It is also easier on the wrist of the operator because all of his effort serves to hold the nose of the machine close to the work and he does not have to consciously create conflicting movements of the muscles of his hand and wrist in the operation of the machine.

The invention may be fully understood by reference to the accompanying drawings which illustrate a present preferred embodiment of my invention and in which:

Figure 1 is a side elevation of a tool constructed in accordance with the present invention;

Figure 2 is a side view partly in section and partly in elevation of the operating end of the tool shown in Figure 1, the cover plate which forms an enclosure for the operating mechanism being removed;

Figure 3 is a rear end elevation of the tool shown in Figure 1;

Figure 4 is a section in substantially the plane of line IV—IV of Figure 2;

Figure 5 is a fragmentary view showing a portion of the operating handle, the bell crank and pawl detached from the rest of the mechanism;

Figure 6 is a section in substantially the plane of line VI—VI of Figure 5; and

Figure 7 is a detailed view of the pin assembly through which motion is transmitted from the operating handle to the bell crank.

In the drawings, 2 designates generally the frame of the machine which is preferably made integrally from Bakelite or other sufficiently strong plastic material. It has a horizontal base portion 3 and upright portion 4 that extends upwardly from one side of the base member and which is of upwardly increasing thickness, merging into a generally horizontal arbor or fixed handle 5. At the forward end of the base portion the frame has an upwardly extending part 6 and an upwardly extending web portion 7, the web portion 7 having a recess in the face thereof to receive the operating mechanism which is hereinafter described.

The base member 3 is provided with a longitudinally extending inverted channel 8. A metal strip 9 having upwardly extending flanges 10 with inturned edges forms a closure for the bottom of this channel. Slidable along the inside of the channel is a pusher for engaging a row of staples and moving it toward the delivery or nose end of the machine, this pusher being designated 11. It is provided with an upwardly extending pin 12 that passes through a slot 13 on the top of the base member and it has a finger

grip 14 to enable it to be pulled back when a new charge of staples is to be placed in the magazine. A spring tape 15 received within the recess 70 about a post K has its free end attached to the pin 12 and serves to pull the staple pushing means 11 toward the nose of the machine in a manner well known to those skilled in the art.

The portion 6 extending upwardly from the nose end of the base of the machine is formed with a cylindrical chamber 16. At the bottom of this cylindrical chamber is a shoulder or abutment 17 on which is set a pad 18 of rubber or other cushioning material. Extending downwardly through the vertical portion 6 to the nose of the base member is a narrow rectangular passage 19. This passage forms a guide in which the staple driver 20 reciprocates. On the interior of the passage 19 is a wear-plate 21 formed of metal and which may be molded in place during the forming of the body of the tool. The driver 20 is connected at its upper end by means of a rivet 22 with a plunger 23, the plunger 23 having a shoulder 24 against which the upper end of the driver abuts. Within the plunger 23 is a socket 25 to receive a compression spring 26. The plunger is of less length than the cylindrical chamber 16. At the top of the cylindrical chamber and threaded into it is a metal nut 27 which forms an abutment for the opposite end of the spring 26 and a closure for the chamber 16. By turning the nut 27 to screw it up or down the compression of the spring 26 can be regulated. Formed on the exterior of the plunger is a recess 29 which terminates in a shoulder 30, the opposite end of the groove or recess 29 being sloped as indicated at 31.

Received within the recess in the portion 7 of the frame of the machine is a pin 32. This pin may be molded into the frame when the frame is being formed. It serves as a pivotal support for a bell crank 33 which is shown in detail in Figures 5 and 6, and which has a pin 34 on the lower portion thereof and a pin 35 on the upper portion thereof. This bell crank is adapted to be swung in an arc about the post 32 as a pivot. The free end of the bell crank 33 projects between the two sides of a bifurcated lever designated generally as 36, which lever has an offset end portion 37 pivotally supported on a pin 38. The lower edge of the lever 36 has notches 36a therein to accommodate the fingers of the operator. As shown, the lever is made of two similar metal stampings with a molded plastic handle portion between the handle portion of these plates. The free notched end of the lever 36 is located under the upper part 5 of the frame of the machine.

The lever 36 is provided with an arcuate slot 39. The pin 34 of the bell crank 33 projects through these slots and as shown in Figure 7 is provided with rollers 40 to engage the sides of the slot. Pivotaly hung from the pin 35 of the bell crank is a pawl member 41, the outer end of which normally engages under the shoulder 30 on the exterior of the plunger. A tension spring 42 connected to the pawl serves to swing the pawl to a normally horizontal position as shown in Figures 2 and 5. However, this spring allows the pawl to tilt in a direction to stress the spring when the bell crank 33 is moving downwardly. The pawl is constructed of an integral piece of sheet metal folded over to form two side portions connected at the right hand end of the pawl as viewed in Figure 5, each side

portion having an ear through which pin 35 passes.

In the operation of the new machine the parts are normally in the position shown in Figure 2 and the pusher 11 is urging the row of staples toward the left against the driver. In driving the staple the operator grasps the machine in his hand with the palm of the hand engaging the crossbar 5 of the frame and the fingers engaging the handle 36. Upon squeezing the handle 36 it moves upwardly. As the handle 36 moves up, the arcuate slot 39 acting against the rollers 40 on the pin 34 causes the bell crank 33 to be moved upwardly. The ends of the pawl 41 engaging under the shoulder 30 on the plunger lifts the plunger against the compression of the spring 26. When the plunger approaches the upper limit of its movement the tip of the pawl will clear the shoulder 30 and the spring will act to drive the plunger down. When the plunger is lifted the driver 20 is moved out of the path of the oncoming staple and a staple is advanced into the guide 19. When the plunger moves downwardly the driver hits the staple with considerable impact, thereby driving it. The operator then releases the handle 36 and a torsion spring 43 returns the handle to its normal position. When the handle moves down the bell crank 33 also moves down. The tip of the pawl 41 will ride past the plunger as it moves downwardly until the tip of the pawl clears the shoulder 30 when the pawl will be pulled back into the position shown in Figure 2 where it is engaged under the shoulder 30.

A fixed pin 44 with a roller 45 thereon provides a limit stop to limit the upward movement of the bell crank.

A removable metal plate 46 secured in place by screws 47 entered into the posts K, 32 and 38 forms an enclosure for the mechanism at one side of the frame.

Since the operator naturally pushed down on the crossbar 5 as the handle 36 is lifted, he tends to hold the nose of the tool in contact with the surface into which the staple is to be driven. A simple mechanism is provided by the invention wherein the movable operating lever instead of being above the frame 5 is below it and wherein the upward movement of the lever moves the plunger upwardly. Not only does the machine make the operations easier from the standpoint of the operator but the over-all height of the machine is substantially reduced and the tool can therefore be used in closer quarters.

While I have illustrated and described one present preferred embodiment of my invention it will be understood that various changes and modifications may be made therein within the contemplation of my invention and under the scope of the following claims.

I claim as my invention:

1. A stapling mechanism of the class described comprising a base member having a staple-receiving magazine therein, an open frame extending from the base member having an upper crossbar spaced above the base member, a staple driver housed within the forward portion of said frame, an operating lever pivotally carried on the frame and projecting rearwardly above the base member and under the crossbar of said frame and movable in an arc toward and away from the crossbar, and mechanism connected with the lever for operating the driver when the lever is moved upwardly away from the base member.

2. A stapling mechanism of the class described

comprising a base member having a staple-receiving magazine therein, an open frame extending from the base member having an upper crossbar spaced above the base member, a staple driver housed within the forward portion of said frame at the driver end thereof, an operating lever having its forward end pivotally carried on the frame and projecting rearwardly above the base member and under the crossbar of said frame and movable in an arc up and down between the crossbar and the magazine, and mechanism connected with the lever for operating the driver when the lever is moved upwardly away from the base member, the cross portion of the frame and the free end of said lever being normally so positioned that when the palm of the hand of the operator rests on the top of said cross portion the fingers may extend under the lever and the lever raised by closing the fingers.

3. A stapling tool of the class described comprising a base member having a staple-receiving guide therein, a staple-feeding slot at the forward end of said guide, a driver movable in said slot, a plunger having a recess therein to which the driver is connected, a spring for urging the plunger down, a bell crank member having a pivoted pawl thereon, the tip of said pawl normally cooperating with the recess in said plunger, a lever member having a camming slot therein, a pin on the bell crank member engaging in said slot, and a supporting frame housing the plunger and providing a support for the lever and bell crank, the organization of the bell crank and lever being such that upward movement of the lever imparts an upward movement to the bell crank whereby the pawl is carried upwardly in an arc to raise and then release the plunger.

4. A stapling tool of the class described comprising an open frame having a base portion with a staple-receiving magazine thereon, an upper crossbar portion spaced above the base portion and a framework at the front of the tool connecting the base portion and said upper portion, said framework having a chamber therein, a

plunger movable vertically in the chamber, a spring for resisting upward movement of the plunger and a driver on the plunger projecting downwardly across the forward end of said staple guide, said frame portion also having a lever pivotally supported thereon, said lever having a handle portion and an offset arm portion, the end of said arm portion being pivotally supported in the frame, the handle portion of said lever projecting into the space above the base of the frame and below said upper cross portion of the frame, a bell crank pivoted in the frame, cooperating means on the bell crank and lever for rocking the bell crank upwardly in an arc when the handle portion of said lever is moved upwardly, a pawl pivotally carried on the said bell crank, and an abutment on the plunger which normally cooperates with said pawl, the arrangement being such that when the handle portion of the lever is moved upwardly the pawl on said bell crank being carried upwardly in an arc first lifts the plunger and then releases it.

5. A stapling tool including a frame comprising a front portion in which there is an axially reciprocable driver, a base portion substantially perpendicular to the front portion and extending laterally from the bottom of the front portion, a fixed handle member extending laterally from said front portion in spaced relation to and directly over the base portion, a movable operating handle pivotally supported in said front portion and extending laterally therefrom under the fixed handle and over the base, said fixed and movable handles being juxtapositioned to be simultaneously grasped and squeezed by the hand of an operator, and means connected with the movable handle for operating said driver when the movable handle is moved toward the fixed one, the base portion constituting a magazine for holding staples to be delivered to the front portion beneath the driver, the base portion being in a plane with the end of the front portion, so as to provide a continuous flat surface.

JOSEPH C. LANG.