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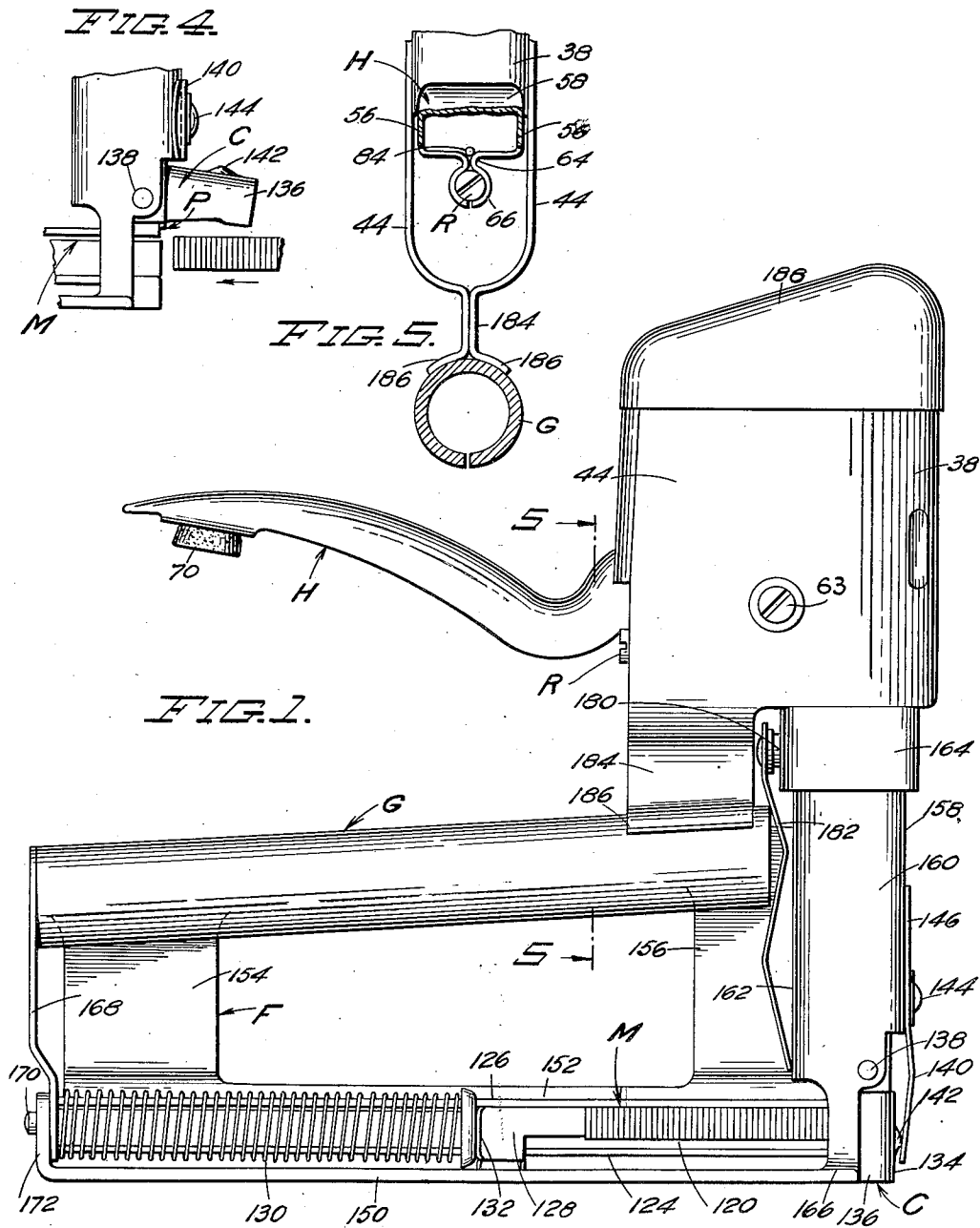
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LEVER OPERATED STAPLE DRIVER

Filed Aug. 16, 1938

3 Sheets-Sheet 1



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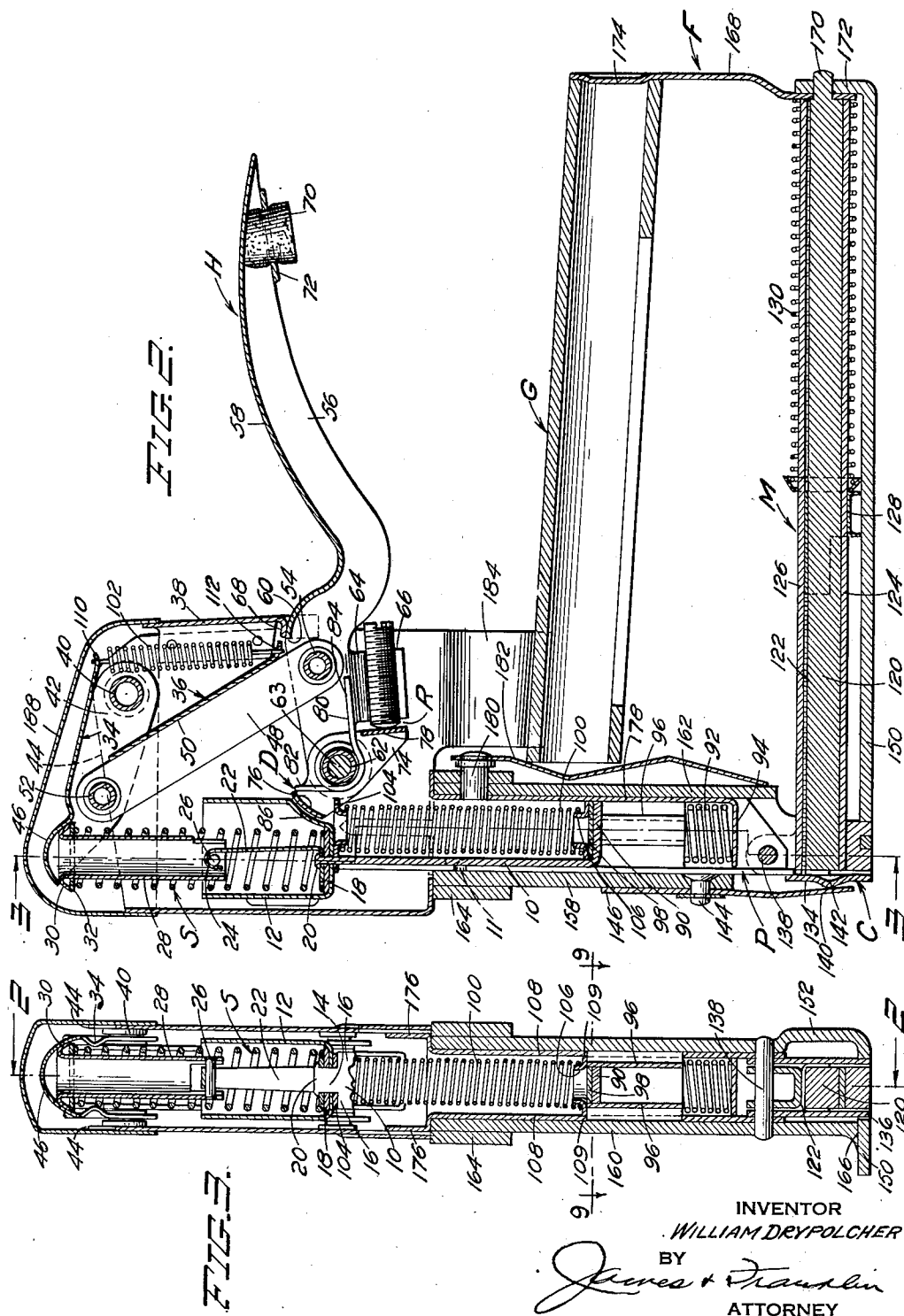
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UNITED STATES PATENT OFFICE

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LEVER OPERATED STAPLE DRIVER

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25 Claims. (Cl. 1—49)

This invention relates to stapling machines, and more particularly to stapling machines of the lever operated type.

The primary object of my invention is to generally improve stapling machines, particularly of the lever operated or impact type.

Machines which load from the rear end are sometimes awkward to use because of various follower mechanisms which must be withdrawn from the magazine at the time of insertion of the staples, the follower mechanisms sometimes dropping to the floor and being stepped on and bent or becoming lost; and sometimes the spring means to operate the follower mechanism is of such design that it may be stretched beyond its elastic limit and rendered inoperative. Furthermore, in the event of a staple jam, a great deal of extra work is necessary in opening up the front end of the machine and clearing it out, and at the same time removing the feed mechanism from the rear end. To overcome these difficulties, I prefer front loading.

However, when an impact type machine is arranged to load from the front end, certain new difficulties arise. In most impact type machines, the drive ram is raised against a heavy compression spring, and at the proper point the energy of the compression spring is automatically released to operate the ram and drive the staple. Should the operator attempt to load the staples at the time the ram is raised to its upward position, the ram is near its point of release, and the operator must gauge his actions rather carefully so as to get the staples into the magazine before the ram starts to descend. There is ever-present danger that the ram may unexpectedly descend and work some injury on the operator's fingers.

A more particular object of my invention is to overcome the foregoing difficulties and to provide a stapling machine in which the staple driving plunger is normally clear of the front end of the magazine, and which therefore requires no auxiliary means for moving or holding the same out of the way. To accomplish this, I raise the entire driving mechanism to a normal elevated position well above the feed path of the staples in the magazine. In this way, should the front portion of the machine be opened up for loading purposes, the driving ram is always in an elevated position where it cannot interfere with normal loading requirements.

Machines using a normally elevated driving ram have heretofore been suggested, but such machines have been operated by means of a

straight push. A cylindrical handle is grasped by the operator's hand, and pushed to compress the drive spring. This direct push on the drive spring requires very considerable force. The full power of the operator's arm and shoulder is necessary, and the operation is very tiring. In addition, such machines are frequently used in certain types of work, such as window dressing or putting up signs, where the operator may be on top of a stepladder. The horizontal push required to operate the machine may over-balance the operator and upset the stepladder. In general, the machine is troublesome to operate in a difficult position. A gear arrangement may reduce the effective pressure required to compress the drive spring, but a much longer stroke is required, and the efficiency of the gear means is relatively low.

In accordance with a further feature and object of my invention, I combine an elevated drive mechanism with an effective compound lever mechanism. Such a machine can be operated quite conveniently simply by grasping the lever or handle and a portion of the frame or grip of the machine, and squeezing the two parts together in one hand, the normal grip of the operator being sufficient, through the leverage, to operate the machine even under conditions requiring the staple to be driven with a considerable amount of pressure.

To the accomplishment of the foregoing and other more particularized objects which will hereinafter appear, my invention consists in the stapling machine elements and their relation one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawings in which:

Fig. 1 is a side elevation of a stapling machine embodying features of my invention;

Fig. 2 is a section taken in elevation through the stapling machine in the plane of the line 2—2 of Fig. 3;

Fig. 3 is a transverse section taken in the plane of the line 3—3 of Fig. 2;

Fig. 4 is a detail explanatory of the manner in which the machine is loaded;

Fig. 5 is a detail looking in the plane of the line 5—5 of Fig. 1;

Fig. 6 is a fragmentary section similar to the left-hand portion of Fig. 2, but showing the relation of the parts when the handle has been depressed far enough to compress the drive spring, but not far enough to release the staple driving blade;

Fig. 7 is a similar section with a handle depressed far enough to release the drive spring and staple driving blade;

Fig. 8 is a perspective view showing the relation between the staple driving blade and the guide strap to which it is secured;

Fig. 9 is a horizontal section through Fig. 3 taken in the plane of the line 9-9 of Fig. 3; and

Fig. 10 is a fragmentary sectional view shown in perspective and explanatory of a detail of the construction. The section plane is substantially on the line 3-3 of Fig. 2, or the same as in Fig. 3.

Referring to the drawings, and more particularly to Fig. 2, the stapling machine comprises a staple driver P, a staple magazine M extending transversely thereof, a compression drive spring S for actuating the staple driver, a detent D for normally holding the driver and spring in elevated position, a pivoted oscillatable handle H for compressing the drive spring, and means R for retracting the detent in the course of the operating stroke of the handle, thus releasing the driver for sharp downward movement against the endmost staple under the influence of the previously compressed spring S. The aforesaid parts are mounted in a frame generally designated F, said frame preferably comprising spaced upper and lower portions, the lower portion carrying the staple magazine M and the upper portion G acting as a grip when operating the stapling machine. For this purpose, the part G and the handle H are so relatively disposed that they may be grasped in one hand, the handle H being moved or squeezed toward the grip G while holding the entire stapling machine in desired position on the work. The machine is thus a one-hand machine.

The staples are loaded through the forward end of the magazine, and for this purpose, the machine is provided with an openable door or closure C. It will be noted from inspection of Figs. 2 and 4 that the lower end of the driver P is disposed above the level of the staples in the staple magazine while the machine is at rest and while the spring S is not under compression. There is accordingly no danger of accidental descent of the driver during the loading operation.

Considering the arrangement in greater detail, the driver P is a hardened steel blade mounted with its upper end abutting a hollow driving shell 12 which in turn receives the drive spring S. Driver P is secured to a strap 10, as by means of two lugs 11 (see Fig. 8) bent from strap 10 and passing through mating recesses 15 at the side edges of the blade P. Strap 10 is secured to the shell 12 by reducing the upper end of the strap to form a neck 14 (Figs. 3 and 8) and shoulders 16. Neck 14 is received in a mating slot cut through the bottom of shell 12. A strengthening washer 18 (Figs. 2 and 3) is preferably disposed above the bottom of shell 12. The end of neck 14 is riveted at 20 to lock the parts together. The drive spring S is preferably provided with expansion limiting means, which in the particular form here illustrated, includes a strap 22, and the lower end of strap 22 may conveniently be secured to the shell 12 by the riveted connection 14, 20 previously referred to.

The upper end of strap 22 is bent to hook shape at 24 and is arranged to cooperate with a cross pin 26 which extends transversely across

the lower end of a tubular member 28. The upper end of member 28 is flanged outwardly at 30, and the resulting flange is preferably curved downwardly to form part of the surface of a sphere. Tube 28 is disposed within drive spring S, and the flange or enlargement 30 is adapted to bear downwardly against the upper end of the drive spring during compression of the spring. If desired, a flat washer 32 may be disposed between flange 30 and drive spring S in order to provide a better surface for compression of the drive spring.

The motion of handle H is applied to force the upper end of the drive spring S downwardly. This is preferably done indirectly through a spring compression lever 34 and a link 36. Spring compression lever 34 is preferably formed by bending heavy gauge sheet metal to channel shape or inverted trough shape. Lever 34 is pivotally mounted within a housing 38 by means of a tubular bearing pin 40, said pin passing through the side of walls 42 of lever 34 and through the side walls 44 of housing 38. The free end of lever 34 is cupped or rounded, as is indicated at 46, giving the same a spherically surfaced configuration for best cooperation with the rounded flange 30 of tubular member 28.

The link 36 may also be formed by punching and forming heavy gauge sheet metal. The piece of sheet metal is bent to channel shape, and comprises side walls 48 connected by wall 50. The ends of side walls 48 are connected to spring compression arm 34 by means of a tubular bearing or pin 52 and to the handle H by means of a similar tubular bearing or pin 54.

The handle H, (Figs. 2 and 5), like the remaining parts of the machine, is preferably made by stamping and forming heavy gauge sheet metal. The handle comprises side walls 56 connected by a preferably smoothly rounded top wall 58. The top wall is interrupted beyond the point 60 so that there is no interference with the link 36, the latter extending between the side walls 56. The forward end of the handle is pivotally mounted between the side walls 44 of housing 38 by means of a tubular bearing or pin 62 (Fig. 2) held in place by a screw 63 (Figs. 12 and 6).

The side walls 56 of the handle are projected downwardly to receive the detent retracting screw R, and are bent inwardly as shown at 64 in Fig. 5, and then convexly to form a tubular passage 66 which is threaded to receive the screw R. The rear wall of housing 38 terminates at the inwardly turned flange 68, and this acts as a limit for upward movement of the handle H, as will be clear from inspection of Fig. 2. Downward movement of the handle is limited by a rubber or like resilient stop or bumper 70, which bears against the top of grip G when the handle has been moved all the way down. To hold the bumper 70 in position, the side walls 56 of the handle are extended and bent inwardly toward one another to form a plate 72. The meeting edges are semi-circularly recessed, thus forming a circular opening into which the bumper 70 is squeezed.

The detent D may be formed of heavy gauge sheet metal, and comprises side walls 74 connected by means of an arcuate stop wall 76. The side walls are also bent toward one another and meet in edge to edge relation to form a surface 78 which is adapted to be pushed by the end of screw R. The side walls 74 of the detent are perforated to receive the bearing sleeve 62, about

which the detent is oscillatable. A spring wire 80 is coiled about sleeve 62 and has one end 82 bearing against the detent and the other end 84 bearing against any suitable reaction point, in this case the point 64 where the sides of the handle come together, as is best shown in Fig. 5. It will be understood that the expansion of the spring normally urges the detent in a counter-clockwise direction, so that the stop surface 76 thereof bears against a mating stop surface 86 formed at the lower end of the drive shell 12. In the drawings a faintly perceptible space has been left between the parts 76 and 86 in order to clearly show the two separate parts of the structure, but this space is either non-existent or exists only when the handle H is in its uppermost position.

The drive shell is held by the detent against downward movement during operation of the handle H, and as the handle is depressed the detent retracting screw R bears against the surface 78 and turns the detent in a clockwise direction. The parts then reach the condition shown in Fig. 6, in which the spring S is almost fully compressed. Finally, when the curved stop surface 76 leaves the mating surface 86, the drive shell is free to descend, and is impelled sharply downwardly by the spring S, as shown in Fig. 7.

The exact point at which the drive shell is released may be adjusted by rotating the screw R. In this way the force of the blow on the staple may be varied to suit the working conditions being encountered. The adjustment of the screw R is maintained because the screw is held frictionally between the convexed walls 66 (Figs. 2 and 5).

When the shell 12 is released it is forced abruptly downwardly by the previously compressed drive spring S, as is clearly shown in Fig. 7. This in turn forces the strap 10 and the staple driving blade P downwardly. If desired, shock-absorbing means may be provided to absorb some of the blow which may occur if the staples are driven into a surface offering but little resistance. For this purpose the lower end of strap 10 is bent rearwardly at 90, as is best shown in Fig. 8. This rearwardly bent part slides up and down with the staple driver P. A short compression spring 92 rests with its lower end on a forwardly turned support 94. At the end of the staple driving blow the part 90 reaches and bears against the upper end of shock-absorbing spring 92. It will be noted that inwardly projecting rails 96 (Figs. 7 and 9) are provided, and these cooperate with recesses 97 (Fig. 8) cut in the sides of part 90, thus preventing any tendency toward twisting of the reciprocable mechanism. The rails 96 are formed by indenting or inwardly channeling side plates 108, the plates 108 being incised, of course, at the top and bottom ends of rails 98.

The parts are restored to initial position by appropriate resilient means. In the present case two restoring springs are employed, these being the springs 100 and 102 (Fig. 2). Spring 100 is a compression spring the upper end of which bears against a collar 104 secured to shell 12 by the riveted connection 14, 20 previously referred to. The lower end of spring 100 rests on a collar 106 supported at its sides by welding the same to side plates 108, as is indicated at the points 109 in Fig. 3, or it may be supported by resting directly on top of the upper ends of rails 96 (which rails are indented as is shown also in Fig. 9). In the present case the collar 106 is supported in both ways. The lower end of spring

100 is thus supported on a stationary or fixed support which also acts as an upper limit for movement of strap 10 because when the plunger is elevated, the inwardly bent part 90 of strap 10 reaches and bears against the bottom of the support 106. If desired, a strip of leather, felt, or like silencing material 98 may be interposed between the part 90 and the support 106. Spring 100 obviously moves the drive shell 12 upwardly, and this in turn tends to elevate the spring compression lever 34, the link 36, and the handle H.

The handle H is more directly elevated by spring 102 which is a tension or pull spring. The upper end of spring 102 is anchored on the lug 110 projecting from the spring compression lever 34, and is connected at its lower end to a lug 112 projecting from the connecting wall 50 of the link 36. The spring 102 assumes the load of elevating the handle H and associated linkage, and the use of two springs in this manner is of advantage over using a single heavier spring for the spring 100, in that the spring 100 opposes the action of the main drive spring S. The use of a heavier spring 100 would in turn make it necessary to use a heavier spring for the drive spring S.

The staple magazine and feed mechanism may be conventional. It comprises a staple core 120 on which a staple clip 122 rides. Staple core 120 is secured to the lower wall 124 of a channel shaped member the upper wall 126 of which is spaced from the top of staple core 120 by an amount sufficient to receive the staple clip. The staples are moved along staple core 120 by means of a suitable sheet metal staple pusher 128 which in turn is urged forwardly by a feed spring 130. The staple pusher has a small finger piece or handle 132 bent sidewardly therefrom, as is best shown in Fig. 1, and this may be used to pull the pusher rearwardly against feed spring 130 when the door or closure C is to be opened. Any conventional detent mechanism may be provided to hold the pusher in retracted position.

The closure C consists of a piece of heavy gauge sheet metal bent to form a front wall 134 and side walls 136. The side walls fit closely about the forward end of the staple core, and the inner surface of the front wall acts as a guide for the staple driving blade P. It also acts as one surface of the staple guide channel. The side walls are perforated to receive a pin 138, and the door may be swung upwardly about pin 138 in the manner shown in Fig. 4. When the door is closed it may be locked in closed position by means of a locking strip 140 (Fig. 1) the lower end of which rides over and bears against a teat or projection 142 formed on the door. Locking strip 140 is itself pivoted on a rivet 144 and is projected beyond rivet 144 by means of an extension 146 which rests against the front wall of the casing of the machine when the strip 140 is turned to the closed position shown in Fig. 2. In this way, a substantial pressure may be exerted by the strip 140 against the closure C. To open the door, the strip 140 is first turned sidewardly about rivet 144, as shown in Fig. 4, whereupon the closure C is readily lifted upwardly.

The frame and housing of the present machine is in some respects a little unusual in that the handle and driver operating mechanism is designed to be used with a staple magazine and lower frame portion of a type also used for a completely different form of stapling machine which is not lever operated, but which is instead operated by two hands, one to hold the frame, and the other to push downwardly on a knob at

the top of a plunger. The lower part of the frame is made of a single piece of very heavy gauge sheet metal. The lower edge of this metal is bent sidewardly to form the base portion 150. The metal then extends upwardly to form the side wall 152 which is disposed alongside the staple core. This wall extends upwardly still further to form end connections 154 and 156 (see Fig. 1) which extend upwardly to the grip G. The grip G is also formed of the same piece of metal, the upper edge being curved sidewardly and downwardly while a part of the waste metal between the connections 154 and 156 is turned downwardly and sidewardly until these two parts meet in edge to edge relation, as is shown in Fig. 5, thus forming a grip G which is substantially cylindrical. The vertical housing for the plunger mechanism is also formed of the same piece of metal, this metal being turned sidewardly from the forward edge of connection 156 to form the front wall 158 of the housing, and then rearwardly to form the opposite side wall 160 of the housing, and then transversely to form the rear wall 162 of the housing, (see Fig. 9), thus completing a substantially tubular plunger housing which is substantially rectangular in section. The upper end of the housing may be reinforced by a surrounding band 164, (Figs. 1, 2 and 3), thus guarding against any possibility of spreading or opening of the walls of the housing. The side wall 160 may be welded at its lower end to the bottom wall 150, as is indicated at 166.

To complete the lower frame, a strap 168 is disposed at the end of the frame. This extends from the staple core, the rear end of which is reduced to form a pin 170 received in an ear 172 bent upwardly from base 150. The lower end of strap 168 is received by pin 170, and the upper end is indented at 174 to fit into the end of tubular grip G.

The impact driving mechanism is received in an upper housing 188 designed to be detachably assembled with the lower housing so far described. For this purpose, the upper housing 38 has side plates 108 secured thereto, as by welding the same at the points 176 (Fig. 3). The side plates 108 may be slid downwardly into the plunger housing previously described. Side plates 108 are connected by a rear plate 178 (Figs. 2 and 9), and it is the lower end of plate 178 that is bent forwardly to form the support 94 (Fig. 2) of the shock-absorbing spring 92.

To hold the upper housing in assembled relation with the lower housing, I provide a pin 138, and a lock consisting of a pin 180 which passes through collar 164 and the rear wall 162 of the plunger housing, and through a mating opening in wall 178. This is clearly shown in Fig. 2. The pin 180 is secured to and carried by a leaf spring 182. The intermediate part of leaf spring 182 bears against the forward end of grip G, while the lower end of spring 182 bears against the rear wall 162 of the plunger housing. This construction will be evident from inspection of Figs. 1 and 2. By removing pin 138, and prying locking pin 180 rearwardly, the entire upper mechanism including the lower end, that is, the side plates 108 with connecting plate 178 and its bottom bend 94, rails 96, also plunger P, strap 10, springs 92 and 100, etc., may all be slid bodily upwardly from the plunger housing, and thereby removed therefrom.

At the lower rear part of the upper housing

38, the side walls 44 of the housing are bent inwardly to come in face to face relation at the area 184, as is best shown in Fig. 5. The walls are then spread outwardly to form flanges 186 which rest against and fit partially around the upper surface of the grip G.

The upper housing is completed by a removable cap 188 which is frictionally received over the upper end of the housing and may, if desired, be locked in position by mating spring parts. The cap 188 may be removed to expose much of the mechanism for inspection or repair.

It will be understood that the housing or framework of the machine may be readily re-designed to provide a somewhat simpler and more convenient construction if the frame-work is to be used solely for lever operation, instead of being useful for two different kinds of machine, as in the present case.

The operation of the machine is as follows: To load the machine, the arm 140 is turned on pivot 144 and door C is raised, whereupon a bar of staples may be added as is shown in Fig. 4. The staple driving blade or plunger P is not in the way, it being in its normally elevated position. The door is then closed and the arm 140 swung back to the position shown in Fig. 1. If a catch has been used to hold the staple pusher in retracted position, as is usual in these machines, the catch should, of course, be released. The machine is then ready for use.

It is held in one hand, the hand being passed about both the handle H and the frame G. The device is then placed on the work in proper location, whereupon handle H is pushed or squeezed down toward frame G. Referring to Fig. 2, the handle turns about pivot 63, thereby pulling the link 36, which in turn pulls the lever 34 downwardly about pivot 40. The end 46 of lever 34 compresses the spring S. The lower end of spring S remains stationary, because of the action of the detent D.

This is best shown in Fig. 6 in which the handle H has been pushed nearly, but not, all the way down. The spring S is almost fully compressed. The restoring spring 100 remains unchanged. Screw R has been moved by handle H, and has turned the detent D to disengage it or retract it from the part 86 of shell 12, but the detent is not yet disengaged, and the staple-driving plunger P is therefore still in its initial position.

Upon a little further movement of handle H, however, the detent is disengaged, thereby releasing the lower end of spring S, which instantly expands and so pushes the shell 12, strap 10, and staple driver P downwardly, as is shown in Fig. 7.

In the course of its downward movement, the plunger P strikes the endmost staple and separates it from the remaining staples and drives it down into the work. The plunger is stopped by means of a cushioning spring 92. The downward movement of shell 12 compresses the restoring spring 100, it being understood that the main driving spring S is stiffer than and dominates the restoring spring 100. The hook 22 comes down to and re-engages the cross pin 26, thereby limiting the maximum expansion of spring S.

Upon release of the handle H, it is restored to upward position by spring 100, the latter moving the shell 12 and driving blade P, as well as the lower end of spring S upwardly. Spring S is stiff enough so that its upper end moves with its

lower end, thereby raising the lever 34 and link 36 and with it the handle H. During this upward movement, the detent D remains in its disengaged position, it bearing against the shell 12, and therefore remaining in the position shown in Fig. 7. At this time the detent surface 78 leaves the screw R until the upward movement of the handle is nearly completed. The lifting of the handle may be aided by spring 102 if it is desired to use such an auxiliary spring.

At the end of the upward movement of handle H and shell 12, the part 86 of the shell reaches the part 76 of detent D, whereupon the spring 80 restores the detent to the holding position shown in Fig. 2.

Meanwhile, the upward movement of staple-driving blade P above the staple magazine permits the forward feed of the staples by means of the staple pusher spring 130, thus bringing another staple beneath blade P. The machine is then ready for another stapling operation.

It is believed that the construction and operation, as well as the many advantages of my improved lever operated front loading stapling machine, will be apparent from the foregoing detailed description thereof. It will also be apparent that while I have shown and described my invention in a preferred form, many changes and modifications may be made in the structure disclosed, without departing from the spirit of the invention defined in the following claims. In some of the claims I refer to the drive spring as being vertically disposed and as being compressed downwardly, but this terminology is used merely for convenience, and not by way of limitation, because these machines are often used with the plunger in a horizontal position, as for tacking up signs or decorations in store windows, or on bill boards, etc.

I claim:

1. A lever operated stapling machine comprising a staple driving plunger, a staple magazine, a feed spring for feeding staples through the magazine toward the plunger, a bodily movable compression drive spring for the plunger, a detent for normally holding the plunger in elevated position, a pivoted oscillatable handle for compressing the drive spring, and means for retracting the detent near the end of the operating stroke of the handle, whereupon the spring drives the plunger against a staple.

2. A lever operated front loading stapling machine comprising a staple driving plunger, a staple magazine extending transversely thereof, a feed spring for feeding staples through the magazine toward the plunger, a door at the plunger end of the magazine for loading staples into the magazine, a vertically disposed bodily movable compression drive spring for the plunger, a detent for normally holding the plunger and spring in elevated position, a pivoted oscillatable handle for compressing the upper end of the drive spring downwardly, and means to retract the detent near the end of the operating stroke of the handle.

3. A lever operated front loading stapling machine comprising a staple driving plunger, a staple magazine extending transversely thereof, a feed spring for feeding staples through the magazine toward the plunger, a door at the plunger end of the magazine for loading staples into the magazine, a compression drive spring for the plunger, a detent for normally holding the plunger in elevated position, a pivoted oscillatable

handle for compressing the drive spring, means to retract the detent near the end of the operating stroke of the handle, resilient means for elevating the handle and plunger, and means for restoring the detent to normal holding position.

4. A lever operated stapling machine comprising a frame having spaced lower and upper portions, a driving plunger slidably mounted at the forward end of the frame, a staple magazine extending transversely thereof and carried by the lower portion of the frame, a feed spring for feeding staples through the magazine toward the plunger, a drive spring for the plunger, a detent for normally holding the plunger in elevated position, an oscillatable handle pivotally mounted on said frame above the aforesaid upper portion of the frame for compressing said spring, said handle and upper portion of the frame being so relatively disposed that they may be grasped in one hand, the upper portion of the frame acting as a grip toward which the handle may be moved while holding the machine in desired position with one hand, means to retract the detent near the end of the operating stroke of the handle, and resilient means for elevating the handle and plunger.

5. A lever operated front loading stapling machine comprising a frame having spaced lower and upper portions, a driving plunger slidably mounted at the forward end of the frame, a staple magazine extending transversely thereof and carried by the lower portion of the frame, a feed spring for feeding staples through the magazine toward the plunger, a door at the forward end of the frame for loading staples into the magazine, a vertically disposed bodily movable compression drive spring for the plunger, a detent for normally holding the plunger and spring in elevated position, an oscillatable handle pivotally mounted on said frame above the aforesaid upper portion of the frame for compressing the upper end of the spring downwardly, said handle and upper portion of the frame being so relatively disposed that they may be grasped in one hand, the upper portion of the frame acting as a grip toward which the handle may be moved while holding the machine in desired position with one hand, means to retract the detent near the end of the operating stroke of the handle, means for restoring the handle and plunger to normal elevated position, and means for restoring the detent to normal holding position.

6. A stapling machine comprising a staple driving plunger, a staple magazine, feed means for feeding staples through the magazine toward the plunger, a drive spring for the plunger, a detent for holding the plunger and spring in normally elevated position, a handle for compressing the drive spring, and means including an adjustable element to retract the detent at a desired time during the operation of the handle, whereby the driving force exerted by the spring on the plunger is adjustable by means of said adjustable element.

7. A lever operated front loading stapling machine comprising a staple driving plunger, a staple magazine, feed means for feeding staples through the magazine toward the plunger, a door at the plunger end of the magazine for loading staples into the magazine, a vertically disposed bodily movable compression drive spring for the plunger, a detent for holding the plunger and drive spring in elevated position, a pivoted oscillatable handle for compressing the upper end of the drive spring downwardly, means including

an adjustable screw to retract the detent at a desired time during the operation of the handle, the driving force exerted by the spring on the plunger being adjustable by means of said adjustable screw, and means for restoring said handle and plunger to elevated position.

8. A stapling machine comprising a staple driving plunger, a staple magazine, feed means for feeding staples through the magazine toward the plunger, a drive spring for the plunger, a detent for holding the plunger and spring in elevated position, a handle for compressing the drive spring, means to retract the detent during the operation of the handle, a resilient shock absorbing means for absorbing the blow of the plunger when the detent is released, and means for returning said handle and plunger to elevated position.

9. A lever operated front loading stapling machine comprising a staple driving plunger, a staple magazine extending transversely thereof, a feed spring for feeding staples through the magazine toward the plunger, a door at the plunger for loading staples into the magazine, a vertically disposed compression drive spring for the plunger, a detent for holding the plunger and spring in elevated position, a pivoted oscillatable handle for compressing the upper end of the drive spring downwardly, means to retract the detent during the operation of the handle, resilient shock absorbing means for absorbing the blow of the plunger when the detent is released, and means for restoring said handle and plunger to elevated position.

10. A lever operated stapling machine comprising a driving plunger, a staple magazine extending transversely thereof, feed means for feeding staples through the magazine toward the plunger, a driving shell secured to the upper end of the plunger, a vertically disposed compression spring carried within said shell for driving the plunger, a detent engaging and normally holding the driving shell in elevated position, an oscillatable pivotally mounted handle for compressing the upper end of the spring downwardly, means moved by the handle for retracting the detent near the end of the operating stroke of the handle, restoring means for elevating the handle, the plunger, the drive shell, and the drive spring, and means for returning the detent to normal holding position, when the drive shell is elevated.

11. A lever operated stapling machine comprising a driving plunger, a staple magazine, feed means for feeding staples through the magazine toward the plunger, a vertically disposed compression spring for driving the plunger, a detent for normally holding the plunger in elevated position, an oscillatable pivotally mounted handle, a spring compression lever pivoted at one end and having its opposite end so connected as to cause downward movement of the upper end of the drive spring, a link connecting said handle to said lever whereby downward movement of the handle causes downward movement of the lever and consequent compression of the drive spring, means moved by the handle for retracting the detent near the end of the operating stroke of the handle, restoring means for elevating the handle, the plunger, the drive spring and the lever, and means for returning the detent to normal holding position.

12. A lever operated stapling machine comprising a driving plunger, a staple magazine with associated feed means, a driving shell secured to the upper end of the plunger, a vertically dis-

posed compression spring carried within said shell for driving the plunger, a detent for holding the plunger and driving shell in elevated position, a pivotally mounted handle, a spring compression lever so connected as to cause downward movement of the upper end of the drive spring, a link connecting said handle to said lever whereby downward movement of the handle causes compression of the drive spring, means moved by the handle for retracting the detent near the end of the operating stroke of the handle, resilient means for elevating the handle and plunger and means for returning the detent to holding position.

13. A lever operated front loading stapling machine comprising a frame having spaced lower and upper portions, a driving plunger slidably mounted at the forward end of the frame, a staple magazine carried by the lower portion of the frame, a staple loading door at the forward end of the frame, a driving shell secured to the upper end of the plunger, a vertically disposed compression spring carried within said shell for driving the plunger, a detent engaging and normally holding the driving shell in elevated position, a handle pivotally mounted on said frame above the aforesaid upper portion of the frame and arranged to compress the upper end of the spring downwardly, said handle and upper portion of the frame being so relatively disposed that they may be grasped in one hand, means moved by the handle for retracting the detent near the end of the operating stroke of the handle, means for elevating the handle and plunger, and means for returning the detent to holding position.

14. A lever operated front loading stapling machine comprising a frame having spaced lower and upper portions, a driving plunger slidably mounted at the forward end of the frame, a staple magazine carried by the lower portion of the frame, a staple loading door at the forward end of the frame, a vertically disposed compression spring for driving the plunger, a detent for holding the plunger in elevated position, a handle pivotally mounted on said frame near the aforesaid upper portion of the frame, said handle and upper portion of the frame being so relatively disposed that they may be grasped in one hand, a spring compression lever so connected as to cause downward movement of the upper end of the drive spring, a link connecting said handle to said lever whereby downward movement of the handle causes compression of the drive spring, and means for retracting the detent near the end of the operating stroke of the handle.

15. A lever operated front loading stapling machine comprising a frame having spaced lower and upper portions, a driving plunger slidably mounted at the forward end of the frame, a staple magazine carried by the lower portion of the frame, a staple loading door at the forward end of the frame, a driving shell secured to the upper end of the plunger, a vertically disposed compression spring carried within said shell for driving the plunger, a detent for holding the plunger and driving shell in elevated position, a handle pivotally mounted on said frame above the aforesaid upper portion of the frame, said handle and upper portion of the frame being so relatively disposed that they may be grasped in one hand, a spring compression lever so connected as to cause downward movement of the upper end of the drive spring, a link connecting said handle to said lever whereby downward movement of the handle causes compression of the drive spring,

and means moved by the handle for retracting the detent near the end of the operating stroke of the handle.

16. A lever operated front loading stapling machine comprising a frame having spaced lower and upper portions, a driving plunger slidably mounted at the forward end of the frame, a staple magazine with associated feed means carried by the lower portion of the frame, a staple loading door at the forward end of the frame, a driving shell secured to the upper end of the plunger, a vertically disposed compression spring carried within said shell for driving the plunger, a detent for holding the plunger and driving shell in elevated position, a handle pivotally mounted on said frame above the aforesaid upper portion of the frame, said handle and upper portion of the frame being so relatively disposed that they may be grasped in one hand, a spring compression lever so connected as to cause downward movement of the upper end of the drive spring, a link connecting said handle to said lever whereby downward movement of the handle causes compression of the drive spring, means moved by the handle for retracting the detent near the end of the operating stroke of the handle, resilient means for elevating the handle and the plunger, and means for returning the detent to holding position.

17. In a device of the type indicated, fastener-applying means including a normally elevated reciprocable driver, a spring for actuating the driver, means operatively connected to the driver for holding the latter in its elevated or inoperative position, means movable relatively of the driver to compress the spring while the driver is held in its normal elevated position by the holding means, and a pivoted lever for actuating the movable means, said pivoted lever also actuating the holding means in such a manner that after the spring is compressed the driver is released.

18. In a device of the type indicated, fastener-applying means including a normally elevated reciprocable driver, a spring connected to actuate the driver, means operatively connected to the driver for holding the latter in elevated position, means other than the last-named means and movable relatively of the driver for compressing the spring while the driver is held in its normal elevated position by the holding means, said means including a pivoted lever and appropriate linkage operated thereby for compressing the spring with a mechanical advantage, said means functioning to move the holding means to release the driver after the spring is compressed, said spring thereupon actuating the driver to apply the fasteners to the work.

19. In a device of the type indicated, fastener-applying means including a normally elevated reciprocable driver, a spring connected to actuate the driver, latch-means operatively connected to the driver for holding the latter inoperative in elevated position, and manually-operable means comprising compound levers movable relatively of the driver and arranged to compress the spring while the driver is held in its normal elevated position by the latch means and actuate the latch-means at the end of said movement to release the driver, said spring actuating the driver with a quick action to apply the fasteners to the work.

20. In a device of the type indicated, fastener-applying means including a reciprocable driver, a hollow plunger connected to the driver, a coiled spring in the plunger, a latch for holding the plunger in raised position, and a manually-operable lever arranged to compress the spring and thereafter actuate the latch to release the plunger, said spring actuating the plunger and driver to apply the fasteners to the work.

21. In a device of the type indicated, the combination of fastener-applying mechanism including a reciprocable driver, and operating means for the driver comprising a hollow plunger connected thereto, a spring in the plunger, a latch for holding the plunger in raised position, an arm pivoted at one end with its opposite end movable with respect to the plunger and so arranged that movement of the arm results in compression of the spring, and means on the arm for actuating the latch to release the plunger after the spring has been compressed.

22. In a fastener-applying device, a magazine for fasteners, a normally elevated driver movable across the end of the magazine, latch-means operatively connected to the driver for holding the latter raised to permit fasteners to be advanced along the magazine to position them beneath the driver, a compression spring for actuating the driver, and manually-operative means comprising compound levers movable relatively of the driver for successively compressing the spring while the driver is held in its normal elevated position by the latch means and actuating the latch to release the driver.

23. In a fastener-applying implement, a magazine for holding a supply of fasteners, a pivoted gate cooperating with the forward end of the magazine to form a throat through which the fasteners are driven as they are advanced along the magazine, said gate being movable away from the end of the magazine to supply fasteners thereto, a reciprocable driver in said throat for applying the fasteners to the work, a latch for holding the driver in raised position, a spring for actuating the driver, and means movable relatively of the driver for successively compressing the spring while the driver is held by the latch and thereafter actuating the latch to release the driver.

24. In a device of the type indicated, fastener-applying means including a driver, a plunger connected to actuate the driver, a spring for actuating the plunger, latching means for holding the plunger and driver inoperative, manually-operable means comprising compound levers for compressing the spring while the plunger is held inoperative, and means operated by said manually-operable means to release the latch after the spring has been compressed.

25. In a device of the type indicated, fastener-applying means including a driver, a plunger connected to operate the driver, a spring for actuating the plunger, latching means for holding the plunger and driver inoperative, means for compressing the spring while the plunger and driver are held inoperative, and a lever for operating said last-named means and releasing the latching means after the spring has been compressed.

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