

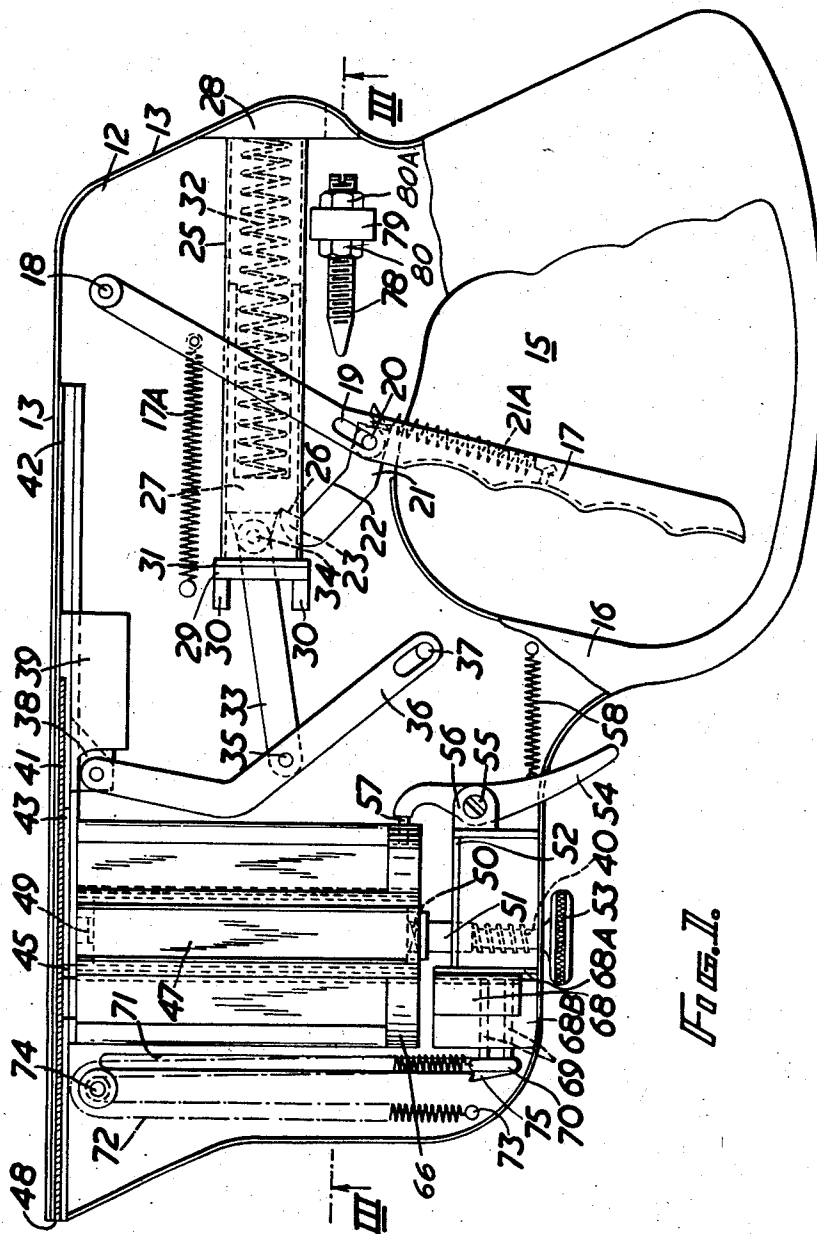
Nov. 27, 1956

H. KLOPSTOCK
STAPLING APPLIANCES

2,771,609

Filed July 25, 1951

5 Sheets-Sheet 1



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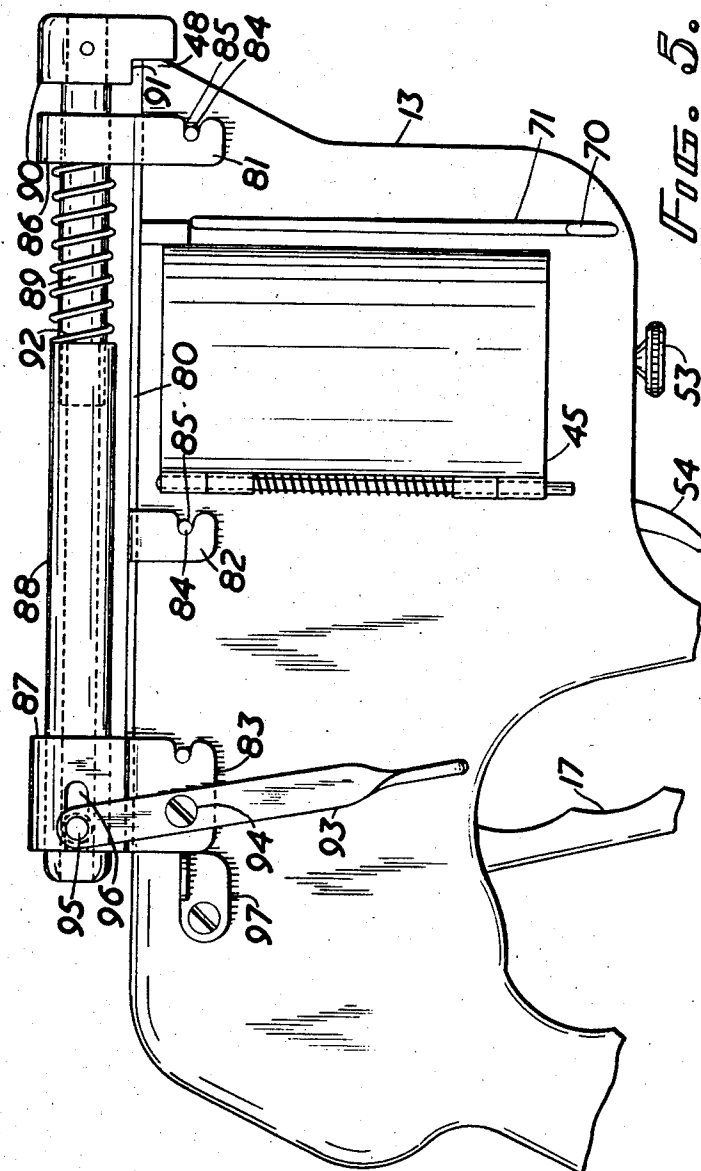
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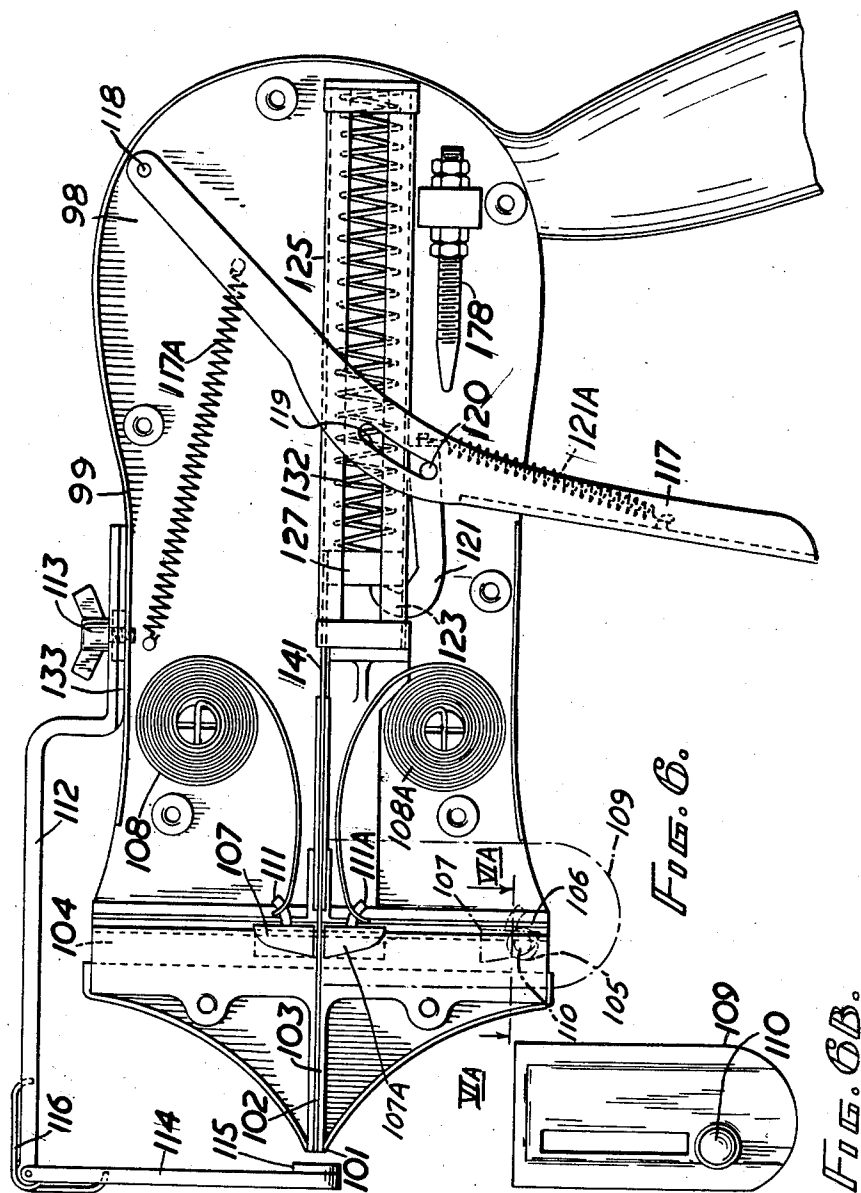
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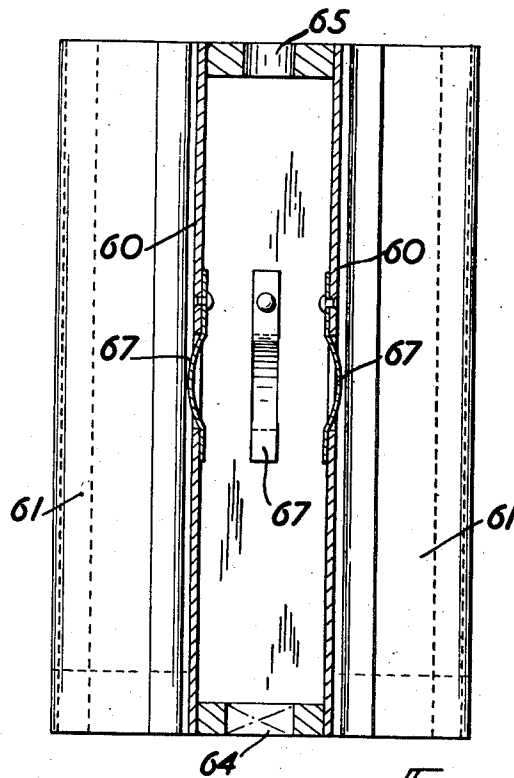


FIG. 4A.

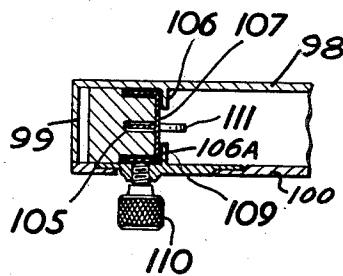


FIG. 6A.

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STAPLING APPLIANCES

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2 Claims. (Cl. 1—49)

This invention relates to stapling appliances.

Stapling machines are well known wherein staple-strips are fed forward under spring pressure against a stop at the end of the staple bar and individual staples are forced by a driver blade through sheets of paper or the like against a plate or base to connect them together, and in other instances to attach sheets of paper to wooden boxes, drawing boards and the like by driving the single staple through paper, cardboard and the like into the wood without clinching the staple legs.

Such machines are quite satisfactory for office and other uses such as attaching labels to boxes. But all such machines hitherto produced suffer from the defect that they can only be manipulated on flat, readily accessible surfaces.

The object of the present invention is to provide a stapling tool which can be conveniently handled and applied for all normal purposes for which stapling machines are used at present but can also be used for driving staples in corners and other places not readily accessible.

The broad characteristic which distinguishes the present invention from the known stapling appliances is that it is in the form of a trigger operated pistol or gun, the staple ejection orifice of which is in an extension of the body of the appliance which extension projects forwardly of the body so that if this forward projecting end be pressed against a surface and the trigger operated a staple is forcibly projected into and through or against the surface on which the gun is pressed or, if the pistol or gun is not pressed on to a surface, a staple will be discharged into space in the same fashion as a projectile is discharged from a pistol or gun.

The primary use of the appliance is for such purposes as in furniture manufacture, or interior decoration where a sheet of material has to be applied to a wooden surface or frame work, but as will hereafter appear by the use of auxiliary accessory devices the gun can be effectively used for connecting papers together or, indeed, for all the purposes for which known stapling appliances are now used.

In its broader aspect the invention consists of a stapling appliance comprising a magazine for holding a bank of staples and means for forcing the bank of staples against a stop so as to bring successively a single staple in alignment with a blade operable for propelling the staple from the appliance, elastic means adapted to be put in compression behind the blade and means for releasing the compression to cause the elastic means to expand and actuate the blade and cause it forcibly to eject the staple aligned with it from the appliance.

The elastic means may conveniently be constituted by a helical spring adapted to be put on compression and then have the compression released to effect the ejection of the aligned staple by the action of a trigger.

In the accompanying drawings we have illustrated examples of appliances constructed in accordance with the invention. In these drawings:

Figure 1 is a side view of the stapler gun with the cover removed;

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Figure 2 is a plan view of the gun;

Figure 3 is a section of the line III—III of Figure 1;

Figure 4 is an enlarged underneath view of the staple magazine;

Fig. 4A is an elevational view thereof.

Figure 5 is a side view of the stapler gun with the clincher attached;

Figure 6 is a side view of a modified form of stapler gun,

Figure 6A is a section taken on the line 6A—6A of Figure 6, and

Figure 6B shows the lower slide cover plate for the magazine of the gun of Figure 6.

Referring to the drawings, the stapler casing comprises a punched flat steel side plate 12 having an upstanding flange 13 round the periphery and a similarly flanged cover plate 14 forming the other side parallel to side 12. Cover plate 14 is attached to side plate 12 parallel thereto by any suitable means such as bolts so as to form with the flange 13 a closed structure of general pistol shape. Both side plate 12 and cover plate 14 have aligned apertures 15, the periphery of that in plate 12 having a peripheral flange 16 to bridge the gap between the plates.

The pressed steel operating lever 17 of generally channel form is pivoted to side plate 12 by pivot pin 18 welded to the side plate 12 and extends into the opening formed to apertures 15. The lever 17 has longitudinal slots 19 in its parallel walls carrying a pin 20 on which is pivoted a hooked member 21 passing through a suitable aperture in the lever 17. The latch member 21 has a cam part 22 inclined upwardly and terminating in a hook part 23 which passes through a slot 24 in the bottom wall of a plunger guide 25 and engages in a notch 26 in the forward end of a piston 27 mounted in the plunger guide 25 for sliding movement therein. The plunger guide is welded to side plate 12 and is held in place longitudinally by a steel block 28 interposed between the rear end of the plunger guide and the flange 13 and by a stout plate 29 having reinforcing flanges 30 all welded to side plate 12. A gasket 31 of tough resilient material is interposed between plate 29 and the forward end of plunger guide 25.

The plunger 27 is recessed from its rearward end and a powerful compression ejector spring 32 is disposed within the plunger guide to engage at one end against the block 28 and at the other end against the end of the plunger recess. The solid forward end of plunger 27 is recessed from the front end to receive a link 33 pivoted to the plunger by pin 34. A helical spring 17A attached at one end to lever 17 and at the other end to side plate 12 forwardly of the lever 17 ensures that the operating lever will be restored to its normal position after being operated while a similar spring 21A attached to the lever 17 below the hook member 21 and to the hook member rearward of the lever 17 operates to restore the hook member to the position shown in Figure 1 when the lever 17 is restored to its normal position after the stapler has been operated as will hereinafter be described.

Link 33 is pivoted at 35 to link 36 which at its lowermost end is slotted to receive a pin 37 held between plates 12, 14. At the upper end, link 36 is bifurcated and is pivoted to a forwardly extending tongue 38 of a block 39 to which on its upper side is attached a thin ejector staple driving blade 41 extending in the normal position of the stapler to the muzzle 43 of the gun. Blade 41 forms the staple ejector of the stapler and is mounted for movement between guide strips 42, 43 attached to the flange 13. The lower guide strip 43 is in two separated parts forming therebetween a channel 45 through which the staples pass from the magazine for ejection from the stapler.

The forward part of the plates 12, 14 contain aligned large rectangular recesses closed by doors 46 which are

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arc-shaped in section and which are hinged to their respective plates 12, 14. The space enclosed by doors 46 forms the chamber for the magazine 47 which is mounted on a pin 49 on the underside of guide strip 43 and on the square ended head 50 of shaft 51 carried in bearings in flange 13 and a supporting internal flange 52 welded to the side plate 12. Shaft 51 carries on its lowermost end which is outside the stapler casing a knob 53 by which the magazine may be rotated as will hereinafter be described. Shaft 51 may be moved axially by knob 53 against the action of spring 49 to withdraw head 50 from the magazine 47 for removal of the magazine. A hand operated lever 54 pivoted on a pin 55 between a lug 56 on internal flange 52 and side plate 12 projects through flange 13 to be readily available for finger operation. The upper end 57 of the lever 54 is suitably cut away to engage with the magazine and hold it against rotation. By moving lever 54 clockwise as seen in Figure 1 against the action of tension spring 53, the end 57 is disengaged from the magazine 47 permitting rotation thereof by knob 53.

Referring now to Figure 4, the magazine 47 comprises four channel members 59 each adapted to receive a bank of staples. The four members 59 extend the whole length of the magazine as shown in Figure 1 and are arranged with their webs 60 innermost and secured together, e. g. by welding, in the form of a square. Attached to the parallel flanges of each channel member 59 are guide members 61 which are bent over the outer ends of the flanges and are disposed within the channel in spaced relation from the channel flanges to form slots 62. The guide members also extend the whole length of magazine so that a bank of staples can be accommodated within each channel member, the legs thereof lying within the slots 62. The webs 60 of the channel members are bridged by square plates 63 at either end of the magazine, the plate at the lower end having a square hole 64 therein to receive the square head 50 of shaft 51 and that at the upper end having a circular hole 65 to receive the pin 49. Arcuate reinforcements 66 bridge adjacent channel members 59 at the ends of the magazine while midway of the length of the channel members are secured leaf springs 67 (Figure 4A) riveted at one end to the webs 60 and bent to bulge outwardly through a hole in the web.

With the magazine 47 in position in the stapler as shown in Figure 1, the channel shaped staple pusher 68 is arranged to move in the forwardmost channel member 59 to engage the bank of staples in that member and to urge them upwards so that the uppermost staple is forced into channel 45. Staple pusher 68 is attached by bolt 69 to a small strip member 70 disposed with its ends passing through guide slots 71 in the plates 12, 14 so as to enable the member 70 to be manually manipulated, the guide slots 71 running parallel to the length of the magazine 47. Staple pusher is urged upwards by two helical springs 72 each attached at one end to a pin 73 on plate 12, passing over pulley 74 and attached at its other end to strip member 70. The slots 71 are enlarged at the lowermost ends to form a shoulder 75 in the plates 12, 14 against which the strip member 70 may be engaged to hold the staple pusher 68 out of the slots 62 of the magazine and to hold it in a slot 68A between the internal flange 52 and a divided block 68B.

To load the stapler, a bank of staples 77 is inserted through the hole 76 in the top wall of the door 46 and into the channel member 59 therebeneath with the legs of the staples located in the slots 62, the leaf spring 67 (Figure 4A) holding the bank in position. Lever 54 is then operated to remove the reduced end 57 from the rearmost channel member 59 of the magazine and the magazine rotated by knob 53 through 90° in an anti-clockwise direction as viewed from above. The next channel member is similarly filled with a bank of staples and the process repeated until all four channels are filled.

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Lastly spring 58 is permitted to restore lever 54 to its normal position in which it holds the magazine against rotation, the strip member 70 is removed from shoulder 75 and the staple pusher 68 allowed to enter the forwardmost channel 59 to urge the bank of staples therein upwards so that the uppermost staple is forced into channel 45 into engagement with the underside of the staple drive blade 41. The stapler is then ready to be used.

To operate the stapler, assuming it is desired to drive a staple through a label or the like into a piece of wood or like material, the muzzle 48 is placed into engagement with the articles to be secured together and the lever 17 pulled back by hand, the stapler being operated like a gun. As the lever is pulled the hook member 21 draws back the plunger 27 compressing the spring 32 and withdrawing the staple drive blade 41 through the action of links 33, 36. Towards the end of the lever motion, blade 41 uncovers the bank of staples in the forwardmost channel member 59 of the magazine allowing the uppermost staple to enter the staple drive way between guide strips 42, 43. Immediately thereafter, the inclined cam part 22 of hook member 21 comes in contact with the forward end of a pointed releasing member 78. Releasing member 78 is externally threaded and is mounted in an internal threaded block 79 welded to plate 12 so as to be adjustable axially at will, the nuts 80, 80A disposed at either side of the block 79 preventing unintentional movement of the member 78. Owing to the edge of part 22 being inclined to the axis of member 78, small backward movement of lever 17 after contact of member 78 and part 22 causes the hook part 23 to be withdrawn from piston 27, permitting the spring to force the piston outwardly with great force and through links 33, 36 causing the blade 41 to drive the staple, the weight of block 39 attached to the blade 41 increasing the driving force. The staple is thus forced out of the staple into the materials to be secured and the springs 17A, 21A restore the lever to its normal position and the hook part 23 into engagement with the piston ready for the next stapling operation.

When the bank of staples in the forwardmost channel of the magazine is exhausted, the lever 54 is merely operated and the magazine 47 rotated anti-clockwise by knob 53 to bring the next channel into the forwardmost position ready for further stapling. In this way all four banks of staples may be used before reloading is required; alternatively a fresh bank may be inserted through hole 76 into the channel newly exhausted after each rotation of the magazine 47.

It will be seen that the positioning of the muzzle 48 near the top of the stapler enables the stapler to be used at points overhung by adjacent objects; in fact in general the design of the muzzle enables stapling to be effected with ease at parts otherwise reached only with difficulty.

When it is desired to clinch the staples e. g. when pieces of paper, fabric and like material are stapled together, the clincher attachment illustrated in Figure 5 is employed. The clincher comprises a base platform 80 intended to overlie the flange 13 along the top of the stapler and having attached to it pairs of downwardly extending lugs of which one of each pair is shown at 81, 82, 83. Each pair of lugs straddles the stapler casing being attached to the plates 12, 14 by the engagement of pins 84 externally secured to plates 12, 14 in recesses 85 in the lugs. Mounted on platform 80 are two blocks 86, 87 immediately over the lugs 81, 83 respectively; block 87 is bored to receive a tubular member 88 into one end of which is screwed the cylinder 89 carried in bored block 86. The free end of cylinder 89 carries the clinching block 90 which is shouldered at 91. A compression spring 92 is located round cylinder 89 and abuts at one end against block 86 and at the other end against the extremity of tubular member 88 so as to urge member 88 and cylinder 89 rearwardly and the clinching block against the muzzle 48. A lever 93 is pivoted to lug 83 at 94 and

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to tubular member 88 by pin 95 which passes through a slot 96 in the block 87. The catch 97 is pivoted to plate 12 so as to be able to engage against the rear edge of lug 83 and prevent rearward movement of the clincher and disengagement of pins 84 and recesses 85.

If it is desired to staple two or more thin articles together, the clincher is attached, the catch 97 being in the position shown in the drawing and the lower end of lever 93 drawn rearwardly by hand. This causes member 88 and cylinder 89 which are interconnected and clincher block 90 fixed to cylinder 89 to be moved forward away from the muzzle 48 permitting the articles to be inserted between these parts up to shoulder 91. The clincher block is then allowed to return under the action of spring 92 to hold the articles in place. On operation of lever 17, the legs of the staple pass through the articles and are clinched by being forced into contact with the clinching block 90. To remove the clincher, catch 97 is disengaged from lug 83 and the lower end of lever 93 pulled backwards to draw the lugs from pins 84.

Referring now to Figure 6, this shows a somewhat simplified form of stapling gun which, as in the case of Figures 1 to 5, has a side plate 98, an upstanding flange 99 and a cover plate 100. In this case the forward part of the gun is brought to a point 101 approximately centrally located with respect to the body of the gun, the edge of the casing being cut away above and below point 101 to facilitate the application of the muzzle so formed to parts otherwise difficult to reach. At the forward end of the implement is a staple guide 102 formed by guide plates 103 similar to Figures 1 to 5. The staple drive blade 41 travels in staple guide 102 as before but in this case this blade is secured directly to the piston 127 which is mounted in a plunger guide 125 and is outwardly biased by heavy-spring 132. Piston 127 can be retracted by operating lever 117 which is pivoted at 118 and which is coupled to the piston by a latch member 121 having a hooked part 123 normally engaging the forward face of the piston. Latch member 121 carries a pin 120 which is mounted in slot 119 in the lever 117. A releasing member 178 is mounted on side plate 98 and springs 117A, 121A, bias lever 117 and pawl 121 respectively. The arrangement of piston 127, plunger guide 125, lever 117, hooked part 123 and the releasing member 178 are similar to and operates in the same way as the corresponding parts of Figures 1 to 5 and requires no further explanation.

The magazine comprises two magazine blocks (see Figure 6A) one 104 being located above guide 103 and the other 105 being located opposite block 104 on the other side of staple guide 102. Each magazine block 104, 105 receives a bank or clip of staples with their legs straddling the block and projecting into grooves formed at either side of the blocks between the blocks and the plate 12 at one side and suitable slide plates 109 (Figures 6A and 6B) which slide over the blocks. The lower slide plate 109 only is shown in Figure 6A for the sake of simplicity. The staples are held in place longitudinally of the gun by the raised flanges 106, 106A secured to the plate 98 and plate 109 respectively parallel to the blocks 104, 105.

The staple channels formed by blocks 104, 105 have staple pushers 107, 107A urged towards guide 103 by separate coil springs 108, 108A respectively. These staple pushers thus urge the staples from the two banks through suitable apertures in the guide plates 103 into guide 102 in front of the staple drive blade 141 when this is retracted by operation of lever 117 as before. The lower slide plate 109 has a knurled headed bolt 110 passing therethrough to engage the lower driver plate 107A when the lower magazine block 105 holds a full bank of staples; this enables the bank of staples in the upper block 104 to be used first, after which, bolt 110 may be screwed outwardly to release the lower driver blade 107A to feed staples singly from the lower bank into the guide 102.

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The lower spring 108A is weaker than upper spring 108 and is not strong enough to force staples through guide 102 into the upper staple channel against the action of upper spring 108. Loading of the magazine is effected by sliding out the slide plates 109, detaching the springs 108, 108A from the pins 111, 111A on staple pushers 107, 107A, removing the staple pushers from the staple channels in which they operate, and inserting banks of staples into the channels. The staple pushers 107, 107A are reinserted and attached to springs 108, 108A and lastly the slide plates 109 slid into place and the bolt 110 screwed up to prevent feeding from the lower channel. The driving of staples fed into guide 102 by the staple drive blade 141 will be obvious from the operation of the stapler of Figures 1 to 5.

The clincher of the stapler of Figure 6 comprises a bar 112 bifurcated at its rearward end 133 for attachment to the flange 99 by the wing nut 113. At the forward end of bar 112 is pivoted the lever 114 at the lower extremity of which, opposite the muzzle of the stapler, is attached the clinching block 115. The spring 116 biases block 115 towards the muzzle. The operation of this clincher will be apparent from a comparison with that of Figure 5. A forwardly projecting guide member may also be attached to the gun by means of wing nut 113 for the purpose of enabling the staples to be ejected in a line a definite distance from an edge, the guide member being placed against that edge.

What is claimed, is:

1. A stapling appliance comprising in combination a casing in the form of a pistol, a butt secured to said casing at the rearward end, a forwardly projecting pointed extension on said casing having a staple ejection opening therein, a staple guideway within said casing and said extension and aligned with said opening, an ejector blade slidably located in said guideway and normally extending substantially to said opening, a staple magazine mounted in said casing and having a staple receiving channel therein for a bank of staples, said channel being normal to said guideway and opening thereto within said casing spring biased means in said channel for normally urging the leading staple of said bank against the ejector blade and for bringing said leading staple into said guideway in front of said blade when said blade is retracted, a manually operable lever pivoted in said casing and projecting from said casing and forming with said butt a manually operable pistol grip, a strong compression spring within the casing at one end against a stationary part in said casing, a plunger on the other end of said spring, a hooked member pivoted to said lever and normally engaging said plunger whereby operation of said lever results in compression of said spring, a link operatively pivotally connected to said blade at one end and pivoted in said casing at the other end, a link pivoted at one end to said first link intermediate the ends and pivoted at the other end to said plunger, and release means for releasing engagement of said hooked member with said plunger when said spring is compressed causing an ejection stroke of said blade.

2. A stapling appliance comprising in combination a casing, a butt secured to said casing at the rearward end, a forwardly projecting pointed extension on said casing having a staple ejection opening therein, a staple guideway within said casing and said extension and aligned with said opening, an ejector blade slidably located in said guideway and normally extending substantially to said opening, a staple magazine mounted in said casing and having a staple receiving channel therein for a bank of staples, said channel being normal to said guideway and opening thereto within said casing, spring biased means in said channel for normally urging the leading staple of said bank against the ejector blade and for bringing said leading staple into said guideway in front of said blade when said blade is retracted, a manually operable lever pivoted in said casing and projecting from

said casing and forming with said butt a manually operable grip, a strong compression spring within the casing abutting at one end against said casing, a plunger on the other end of said spring, a member pivoted to said lever and normally engaging said plunger whereby operation of said lever results in compression of said spring, a link operatively pivotally connected to said blade and pivoted in said casing, a link pivoted at one end to said first link and pivoted at the other end to said plunger, and release means for releasing engagement of said member with said plunger when said spring is compressed causing an ejection stroke of said blade.

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