Feb. 8, 1938. J. F. CAVANAGH 2,107,522

FASTENER APPLYING DEVICE

Filed March 12, 1936 3 Sheets-Sheet 1

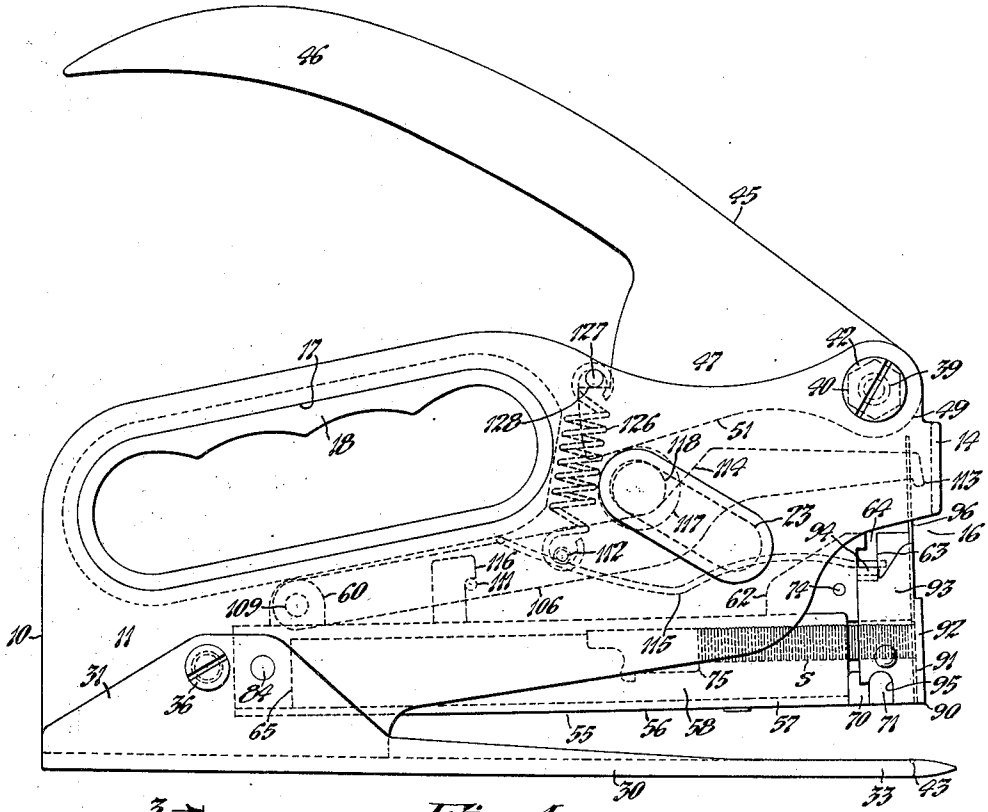


Fig. 1.

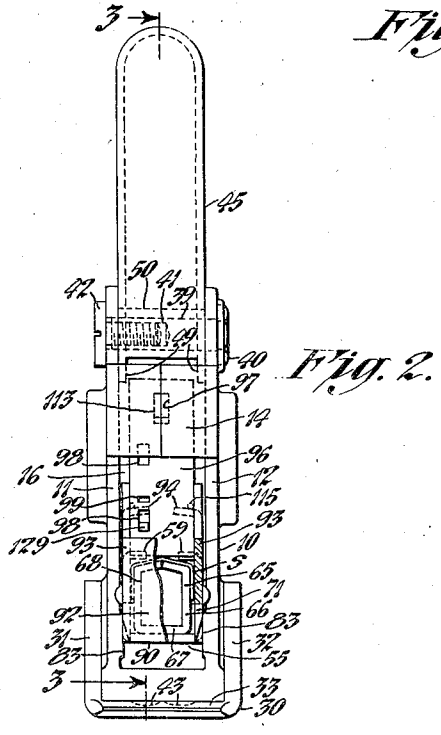


Fig. 2.

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FASTENER APPLYING DEVICE

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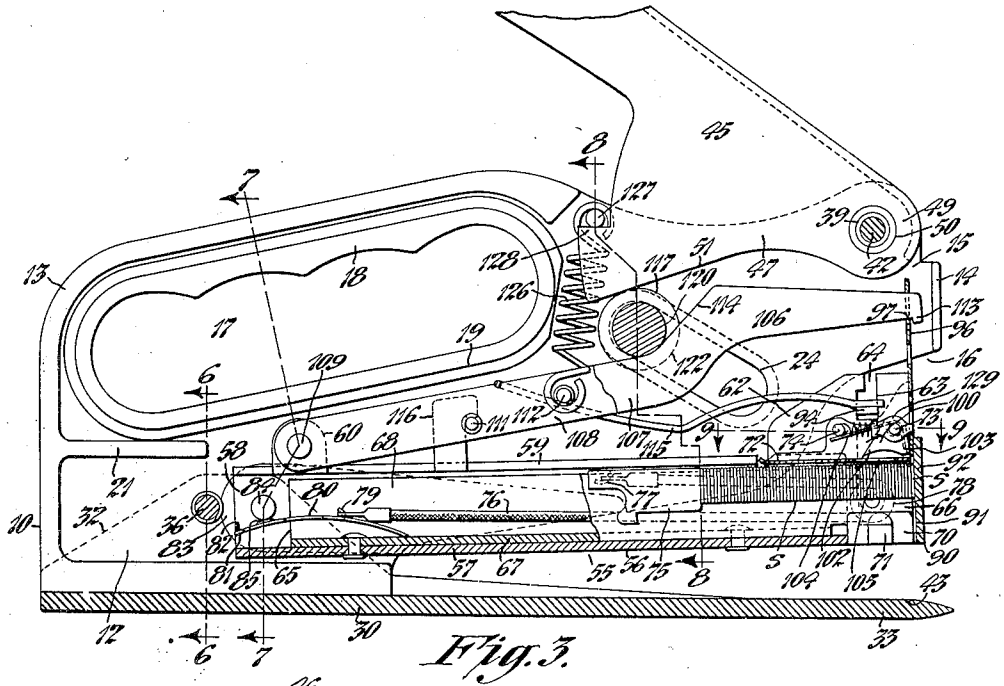


Fig. 3.

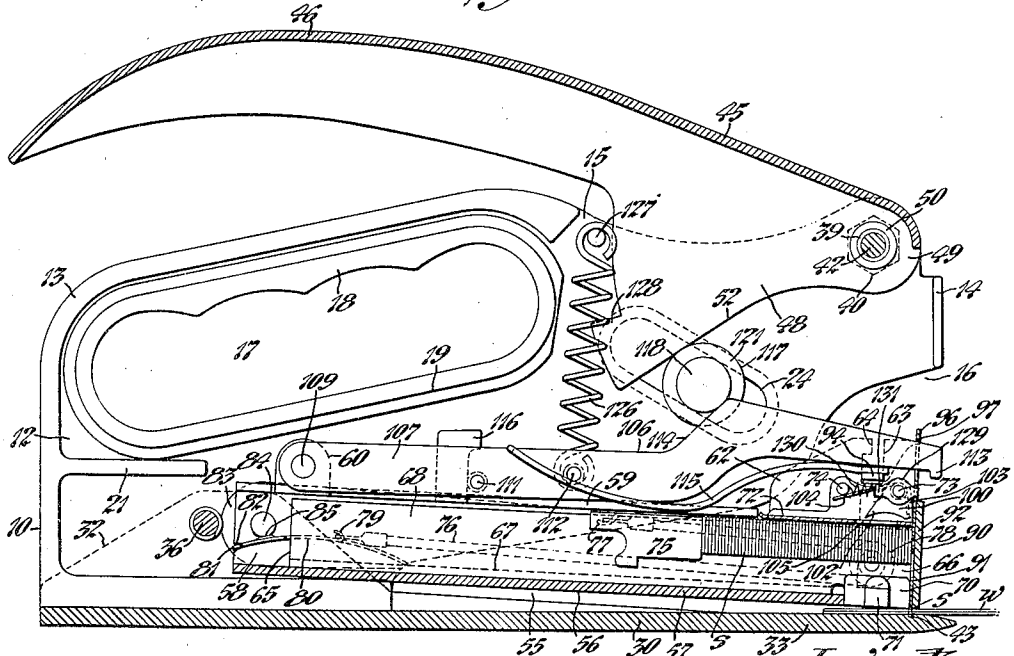


Fig. 4.

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FASTENER APPLYING DEVICE

Filed March 12, 1936 3 Sheets-Sheet 3

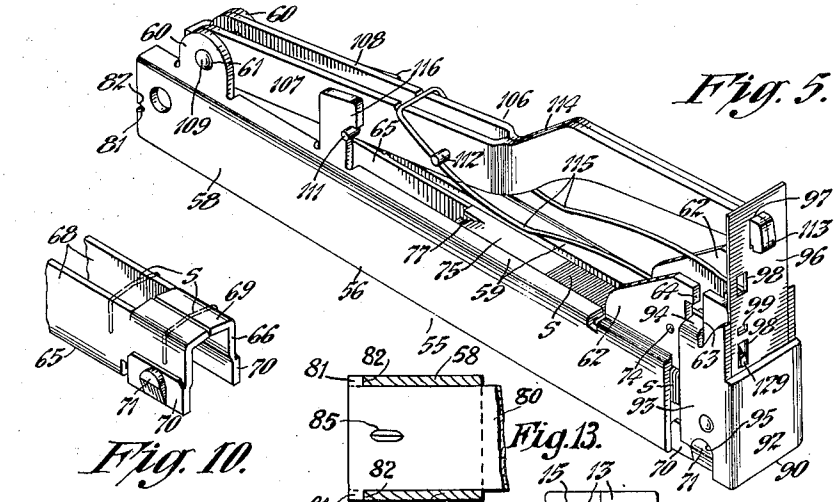


Fig. 5.

Fig. 10.

Fig. 13.

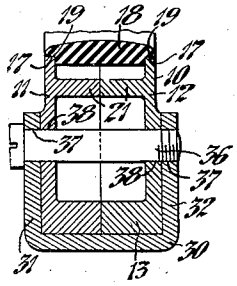


Fig. 6.

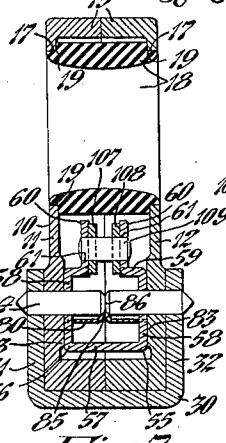


Fig. 7.

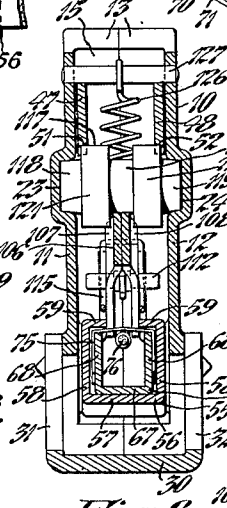


Fig. 8.

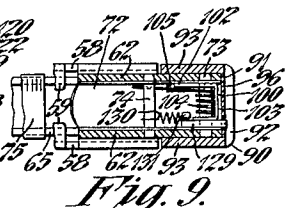


Fig. 9.

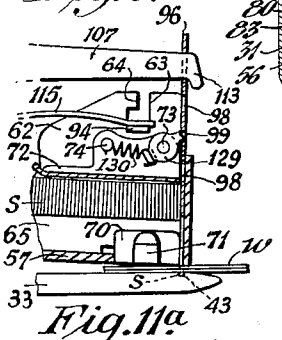


Fig. 11a.

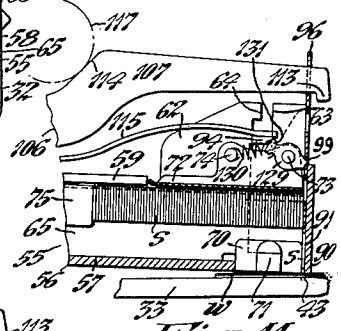


Fig. 11.

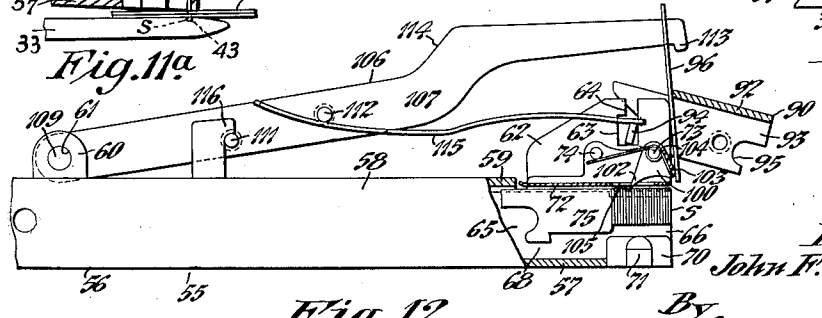


Fig. 12.

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Patented Feb. 8, 1938

2,107,522

UNITED STATES PATENT OFFICE

2,107,522

FASTENER-APPLYING DEVICE

John F. Cavanagh, Providence, R. I., assignor to Boston Wire Stitcher Company, Portland, Maine, a corporation of Maine

Application March 12, 1936, Serial No. 68,506

29 Claims. (Cl. 1—49)

This invention relates to improvements in fastener-applying devices such as stapling implements for attaching papers and other sheets, for stitching the flaps of cartons, for securing tags and labels to articles of commerce and for use generally in fastening or stitching together various objects and articles.

One of the objects of the invention is to provide an implement of the type indicated which may be held and manipulated by one hand to apply the fasteners to the work.

Another object of the invention is to provide an implement of the type indicated having compound levers for increasing the mechanical advantage or ratio of power to resistance whereby fasteners may be easily applied to relatively thick and hard materials.

Another object of the invention is to provide an implement of the type indicated in which a floating roller provides a bearing element between the levers and is moved by one lever along the other lever to gradually increase the mechanical advantage with a minimum of friction.

Another object of the invention is to provide an implement of the type indicated having improved features of construction which provide for ease and economy of manufacture and facilitate the assembly of the parts.

Another object of the invention is to provide an implement of the type indicated having a simple and compact mechanism which is positive and efficient in operation and adapted for use over long periods of time without repair or replacement of the parts.

Further objects of the invention are set forth in the following specification which describes a preferred form of construction of the invention, by way of example only, as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a side elevational view of a fastener-applying implement embodying the novel features of the present invention;

Fig. 2 is a front elevational view of the implement shown with the magazine-gate partly broken away to illustrate the relationship of the magazine and fastener-applying means;

Fig. 3 is a vertical sectional view of the implement taken on line 3—3 of Fig. 2 and showing the mechanism for actuating the fastener-applying means;

Fig. 4 is a similar vertical sectional view showing the relation of the elements of the actuating mechanism at the completion of a fastener-applying operation;

Fig. 5 is a perspective view of the fastener-applying unit;

Fig. 6 is a transverse sectional view taken on line 6—6 of Fig. 3 showing the manner of attaching the two-part frame and the base-plate in assembled relationship;

Fig. 7 is a transverse sectional view taken on line 7—7 of Fig. 3 showing the pivotal mounting for the fastener-applying unit on the frame;

Fig. 8 is a transverse sectional view taken on line 8—8 of Fig. 3 showing the bearing roller in operative position between the levers;

Fig. 9 is a longitudinal sectional view taken on line 9—9 of Fig. 3 showing the retainer for restraining the fasteners from ejection from the magazine when the gate is opened and the pawl for controlling the fastener-applying means;

Fig. 10 is a fragmentary perspective view of the forward end of the core for supporting the fasteners;

Fig. 11 is an enlarged fragmentary sectional view similar to Fig. 4 showing the operative position of the one-way pawl during a downward stroke whereof it prevents a return movement of the fastener-applying means until a full stroke has been completed; Fig. 11*a* is a view similar to Fig. 11 showing the operative position of the one-way pawl during a return stroke whereof it prevents a subsequent operation of the fastener-applying means until a full return stroke has been completed;

Fig. 12 is a side elevational view of the fastener-applying unit shown partly in section with the magazine-gate moved to an open position and the fasteners engaged by the retainer pawl; Fig. 13 is an enlarged part-sectional plan view of the rearward end of the staple-core showing the means for anchoring the bowed spring to which the end of the staple-pusher cord is attached.

The present invention relates generally to a fastener-applying implement comprising a hollow frame formed with a hand-grip so that the implement may be held and operated by one hand. Fastener-applying mechanism movably mounted in the frame is operated by a pair of spaced levers so arranged as to augment the manually applied power. The levers are pivoted at one end with the movable end of one overlying the hand-grip and the movable end of the other connected to the fastener-applying mechanism. A bearing roller is movably mounted in guideways in the frame and engages between the levers to transmit motion from one to the other. Preferably, the levers have cam-faces engaged by the bearing roller which together with the de-

fined path of movement of the roller operate the fastener-applying mechanism with a predetermined motion. An anvil connected with the frame of the implement is preferably in the form of a blade having clinching grooves at its end for co-operation with the fastener-applying mechanism.

Referring to the drawings, the implement as herein illustrated comprises a hollow frame 10, see Fig. 1, preferably made in two separable parts 11 and 12 of identical form as shown in Fig. 6, but of opposite hand; the separable parts being adapted to be die cast of a suitable light material such as aluminum alloy. The separable parts 11 and 12 have web-like side walls with inwardly-directed marginal flanges, the edges of which abut each other to form a wall 13, see Fig. 8, extending along the bottom, rear and top of the frame and a forward wall 14, see Fig. 3, with openings 15 and 16 therebetween. At the upper rearward portion of the frame 10 the side walls of the members 11 and 12 having alining openings 17 suitably formed to provide a hand-grip for the insertion of the fingers therethrough to adapt the implement to be held in one hand. Preferably, an insert 18 of soft rubber or other suitably resilient material is mounted in the openings 17 to provide a cushion for the hand. As illustrated in Figs. 6 and 7, the insert 18 has marginal recesses 19 at its opposite sides which are engaged by the edges of the openings 17. The cooperating frame parts 11 and 12, shown in Fig. 6, also have ribs 21 disposed with their edges abutting, and opposite recessed guideways 23 and 24, see Figs. 3 and 8, inclined downwardly toward the front of the frame and adapted to function for a purpose to be later explained.

The frame 10 is mounted in a member 30 having a flat base with opposite spaced flanges 31 and 32 which embrace the outer sides of the co-operating parts 11 and 12. The base of the member 30 is extended forwardly in the form of a blade 33 which serves as an anvil for cooperation with the fastener-applying means. As illustrated in Figs. 1 and 6, the flat bottom portion of the wall 13 at the rearward end of the frame 10 is seated against the flat base of the member 30 and each of the flanges 31 and 32 has holes 37 which aline with holes 38 in the frame parts 11 and 12. The two parts 11 and 12 of the frame 10 are held in assembled relationship in the base-member 30 by means of a screw 36 extending through the alined holes 37 and 38 in the flanges and frame and screwed into the hole 37 in one of the flanges which is tapped to receive the threads of the screw, see Fig. 6. At the forward end of the frame 10 the two parts 11 and 12 are clamped together in co-operative relationship by means of a stud 39 extending through suitable holes in the parts as shown in Fig. 2. Preferably, the stud 39 has a head 40 at one end abutting the outward side of the part 12 and a tapped axial hole 41 at its opposite end for receiving a screw 42, the head of which is set up against the outward side of the opposite part 11. The forwardly-projecting anvil-blade 33 on the base-member 30 underlies the frame 10 and is relatively thin to adapt it to be inserted between the flaps of a carton or to receive work of any description. The blade 33 has clincher-grooves 43 at its forward end for receiving the ends of the legs of staples driven through the work to clinch them against the under side thereof.

A lever 45 is pivotally mounted on the stud 39 at one end with its arched handle-portion 46 extending rearwardly to overlie the frame 10 above the openings 17, thereby forming a hand-grip to adapt the implement to be operated with the same hand in which it is held. Preferably, the lever 45 is constructed from sheet-metal folded into channel shape to provide depending side flanges 47 and 48 and curved gradually throughout its length. The flanges 47 and 48 at the forward end of the lever 45 are shaped to provide hub portions 49 which fit closely between the opposite inward sides of the frame parts 11 and 12 and provided with alining holes for receiving a bearing sleeve 50 which embraces the stud 39. Adjacent the hub portions 49, see Fig. 4, the flanges 47 and 48 of the lever extend into the opening 15 between the two parts 11 and 12 of the frame 10 and their terminal edges are shaped to provide cam-faces 51 and 52 which extend at an acute angle to the guiding grooves 23 and 24 in the frame.

The fastener-applying unit, illustrated in Fig. 5, is pivotally mounted in the frame 10 and co-operates with the blade 33 to apply the fasteners to the work. As herein illustrated, the unit is adapted to apply U-shaped staples *s* to the work and comprises a magazine 55 having a channel-shaped supporting member 56, preferably constructed from sheet-metal, with a bottom 57, upstanding sides 58 and flanges 59 folded inwardly from its sides to extend partly across the open top of the member, see Figs. 3 and 8. The supporting member 56 has spaced ears 60, see Fig. 5, at its rearward end which are bent upwardly from the flanges 59 and pierced with alining holes 61. At its forward end the supporting member 56 has stanchions 62 bent upwardly from the flanges 59 and extending forwardly to overhang the end of the member. Each of the stanchions 62 has a relatively wide slot 63 with a narrow neck 64 extending to the upper edge for a purpose to be later explained.

Welded, riveted or otherwise suitably secured to the bottom 57 of the supporting member 56 is a staple-core 65 of substantially the same length as the supporting member but with its forward end 66 projecting therebeyond and underlying the stanchions 62. The core 65 is formed with a bottom 67 and upstanding sides 68 across the top of which the staples *s* are adapted to be alined in straddled relationship with their legs received in the spaces between the sides of the core 65 and the sides of the supporting member 56; the flanges 59 and forwardly-extending stanchions 62 overlapping the heads or cross-bars of the staples to hold them from rising up on the core 65. The staples *s* preferably have crowned heads and as illustrated in Fig. 10, the forwardly-projecting end 66 of the core 65 has inwardly-directed flanges forming an arch 69 of a contour corresponding to the crown of the staples. On the outward sides of the forwardly-projecting end 66 of the core 65 and adjacent the bottom edges thereof are spacing flanges 70 formed with laterally-projecting lugs 71 employed for a purpose later to be explained. A trough-shaped shield 72, see Figs. 9 and 11, is mounted between the stanchions 62 at the forward end of the magazine forming a continuation of the arch 69 at the end of the core 65. The opposite sides of the shield 72 fit closely between the stanchions 62, and the shield is held in position by pins 73 and 74 extending through its sides with their ends engaging holes in the stanchions.

The staples *s* are slid forwardly in the magazine **55** to feed them successively into position to be driven by means of a pusher **75** of inverted U-shape straddling the sides of the core **65** and slidable thereon. The staple-pusher **75** is urged forwardly by an elastic cord **76** or the like having one end attached to a lug **77** on the staple-pusher and extending forwardly around a guide **78** and then rearwardly of the core with its opposite end attached to a lug **79** on a bowed spring **80**, see Fig. 3. The bowed spring **80** is positioned between the sides **68** of the core **65** with one end bearing against the bottom of the core and laterally-extending ears **81** at its opposite end engaging slots **82** at the end of the supporting member **56**, see Figs. 4 and 13.

As illustrated in Figs. 3 and 7, the magazine **55** is adapted to fit closely between inwardly-directed bosses **83** on the separable parts **11** and **12** of the frame **10** and is pivotally mounted on a pin **84** extending through suitable alined holes in the side flanges **31** and **32** of the base-member **30**, the frame parts **11** and **12**, and the rearward end of the U-shaped supporting member **56**. As herein illustrated, the pin **84** is engaged by a rib **85** on the bowed spring **80** to frictionally hold it in place; and the pin is preferably provided with a groove **86** into which the rib projects to prevent it from being easily removed. From the foregoing description it will be apparent that the staple-applying unit is adapted to be rocked about the pivot-pin **84** through the opening **16** in the frame **10** and toward the anvil or blade **33** on the base-member **30**.

A door or gate **90** is pivotally mounted on the stanchions **62** for cooperation with the end of the staple-core **65** to form a throat **91** therebetween, see Figs. 5, 9, 11, and 12. The gate **90** is of U-shape in cross-section having a front wall **92** and opposite side walls **93** which project upwardly beyond the front wall. The side walls **93** are slotted at their upper ends to provide lugs **94** which are bent inwardly to form trunnions for the gate. At their lower ends the side walls **93** are cut away to form notches **95** for cooperation with the latching lugs **71**, previously mentioned, on the projecting end **66** of the core **65**. To mount the gate **90** on the magazine **55** the lugs or trunnions **94** are inserted into the slots **63** in the stanchions **62** by holding the gate **90** in the position illustrated in Fig. 12 and sliding the lugs through the narrow neck portions **64** of the slots. The lugs **94** pivotally mount the gate **90** on the stanchions to adapt it to be rocked into closed position, as shown in Fig. 5, and the relatively long slots **63** permit the gate to be moved vertically on the stanchions to engage its notches **95** with the laterally-projecting latching lugs **71** on the end **66** of the staple-core **65**.

A staple-driver **96** is mounted to slide between the forward wall **92** of the gate **90** and the end of the staple-core **65**. The lateral edges of the staple-driver **96** fit closely against the opposite side walls **93** of the gate **90** and the driver is adapted to be reciprocated in the throat **91** to drive the staples advanced along the staple-core **65** and into the throat. The upper end of the staple-driver **96** projects above the gate **90** and has a central slot **97**, see Fig 5, a pair of relatively long slots **98** arranged in spaced relation adjacent one side, and a shorter slot **99** therebetween, these several slots serving for a purpose to be later explained. A staple-retainer **100**, shown in Fig. 12, is pivotally mounted on the pin **73** extending between the stanchions **62** and has a forward sharpened end **102** and a rearward abutment **103**. A spring **104** is coiled about the pin **73** with one extended end engaging the pin **74** which serves as a stop therefor while the other extended end engages the abutment **103** on the staple-retainer **100**. The spring **104** normally urges the sharpened end or beak **102** of the retainer **100** through an opening **105** in the shield **72** to engage it with the staples *s*, the abutment **103** being then positioned at an inclination to the plane of movement of the staple-driver **96**. When the gate **90** is rocked about its pivot to a closed position the staple-driver **96** will engage the abutment **103** and rock the staple-retainer **100** on the pin **73** to release the beak **102** from the staples in the manner illustrated in Fig. 4.

The staple-driver **96**, shown most clearly in Fig. 5, is operated by a pivoted lever **106** positioned below and in spaced relation to the hand-operated lever **45**. As herein illustrated, the lever **106** is of bifurcated form comprising two companion parts **107** and **108** having their forward portions welded, soldered or otherwise connected together and their rearward portions bent outwardly and then extending rearwardly in spaced-apart relationship. The lever **106** is pivotally mounted on the rearward end of the magazine **55** by means of a pin **109** extending through suitable holes in the spaced legs **107** and **108** and alined holes **61** in the ears **60** projecting upwardly from the supporting member **56**. The rearward legs **107** and **108** of the lever **106** are held in spaced relationship by pins **111** and **112** having enlarged body portions abutting their inward faces and reduced ends which extend outwardly through the parts and project beyond the sides thereof, see Figs. 8 and 12. At its forward end the lever **106** is shaped to form a hook **113** which projects through the central slot **97** at the upper end of the staple-driver **96** to provide a driving connection therewith. Intermediate its ends the lever **106** is formed with an angular cam-face **114** arranged in juxtaposition to the cam-faces **51** and **52** formed by the terminal edges of the flanges **47** and **48** on the hand-operated lever **45**.

The driver-actuating lever **106** is normally held in raised position with respect to the supporting member **56** by a hairpin-shaped spring **115** having its looped end embracing the top of the lever and its arcuately-bent legs projecting forwardly under the extended ends of the pin **112** with their terminal portions resting on the top of the inwardly-directed lugs or trunnions **94** of the gate **90**. The spring **115** thus tends to hold the actuating lever **106** in a raised position and the gate **90** depressed to engage its notches **95** with the latching lugs **71** on the staple-core **65**. The upward movement of the lever **106** is limited by suitable stops **116** clearly shown in Fig. 5 as notched ears integral with and extending upwardly from the side walls **58** of the magazine **55** and positioned to be engaged by the extended ends of the pin **111**.

In accordance with the present invention a bearing roller **117** is disposed between the levers **45** and **106** and adapted to be moved longitudinally of the levers to transmit motion from one to the other. As illustrated in Fig. 8, the roller **117** has reduced ends which form journals **118** and **119** arranged to roll in the grooved guideways **23** and **24** in the opposite parts **11** and **12** of the frame **10**. The roller **117** is also provided with a central annular recess **120** forming spaced bearing hubs **121** and **122**. The recessed portion **120** of the roller **117** bears against the actuating

lever 106 while the two hubs 121 and 122 bear against the cam-faces 51 and 52 on the hand-operated lever 45 formed by the terminal edges of the side flanges 47 and 48. The roller 117 is moved forwardly and downwardly in the guideways 23 and 24 by the cam-faces 51 and 52 and along the actuating lever 106, the cam-face 114 on the latter lever being so formed as to give the staple-driver 96 a predetermined motion.

The staple-applying unit as a whole is rocked with respect to the frame 10 about the pivot-pin 84 under the tension of a helical spring 126 having one end looped around the pin 112 between the spaced legs 107 and 108 of the lever 106 and the other end hooked to a pin 127 extending between the opposite parts 11 and 12 of the frame 10. The upward movement of the hand-operated lever 45, shown in Fig. 3, and thereby the movement of the fastener-applying unit 55, both of which are under the influence of the spring 126, is limited by rearwardly-extending shoulders 128 on the depending flanges 47 and 48 of the hand-lever 45 which engage the pin 127.

The action of the staple-driver 96 is controlled by a one-way pawl 129 to prevent reverse movement of the driver until a full stroke has been completed in each direction. The pawl 129 is pivotally mounted on the pin 73 adjacent the staple-retainer 100 and has a blunt end which bears against the rearward face of the staple-driver 96 in line with the slots 98 and 99. The pawl 129 is resiliently urged into engagement with the staple-driver 96 by a helical spring 130 which is connected between a hook 131 on the rearward end of the pawl and the pin 74 extending between the stanchions 62. The device having now been described in detail its mode of operation will be next explained.

The implement is prepared for operation by loading the magazine 55 with a supply of staples *s*. For this purpose the gate 90 is lifted against the action of the ends of the hairpin spring 115, to release the notches 95 from engagement with the latching lugs 71, and then rocked on the trunnions 94 to the position shown in Fig. 12. As the gate 90 is moved away from the end of the magazine 55 the staple-retainer 100 is released and rocked by the spring 104 to engage and hold any staples which may be contained in the magazine. The staples *s* are preferably united in the form of a stick which is pushed into the magazine 55 between the staple-core 65 and supporting member 56 to slide the staple-pusher 75 rearwardly on the core. As the staples move rearwardly into the magazine 55 the staple-retainer 100 is rocked to permit them to be slid thereunder, but immediately engages the staples to prevent them from being ejected when released. After a supply of staples have been inserted into the magazine the gate 90 is rocked back to its closed position into cooperative relation to the end of the staple-core 65 and latched by the engagement of the notches 95 with the lugs 71. As the gate is moved to closed position its forward wall 92 engages the abutment 103 of the staple-retainer 100 to rock the latter about the pivot-pin 73 to inoperative position. The staple-pusher 75 then acts to resiliently urge the staples forwardly along the staple-core 65. The inner walls of the sides 93 of the gate 90 engage the laterally-projecting flanges 70 at the bottom of the staple-core 65, thus providing spaces above the flanges at each side of the core for the legs of the staples to slide in. The engagement of the lugs or trunnions 94 by the extended ends of the hairpin spring 115 normally holds the gate 90 in latched engagement with the lugs 71 on the staple-core 65.

The work *w* is placed on the anvil formed by the blade 33, or the anvil may be inserted between the flaps of a carton to be stitched. With the implement held in one hand the operating lever 45 may be rocked about its pivot-stud 39 by pressure of the fingers of the same hand. The cam-faces 51 and 52 formed by the terminal edges of the side flanges 47 and 48 of the lever 45 then act against the bearing roller 117 to move it downwardly and forwardly in the guideways 23 and 24 in the frame 10. Due to the resistance of the hairpin spring 115, which is stronger than the spring 126, the staple-applying unit as a whole is rocked about its pivot 84 as the spring 126 yields until the forward end of the magazine 55 engages the work *w* in the manner indicated in Fig. 4. Upon further continued movement of the operating lever 45 the bearing roller 117 will continue its forward movement in the guideways 23 and 24 to rock the actuating lever 106 with respect to the magazine 55 as the hairpin spring 115 yields. The hook-and-slot connection 113 and 97 between the actuating lever 106 and the staple-driver 96 causes the latter to be moved downwardly to drive the foremost staple *s* which has been advanced into the throat 91 by the staple-pusher 75.

Due to the pivotal connection of the levers 45 and 106 at opposite ends and the location of the bearing roller 117 adjacent the forward ends of the levers the applied motion is reduced as it is transmitted to the staple-driver 96 whereby to increase the mechanical advantage and to provide for an easy application of the staples *s* to relatively thick and hard materials. Further, due to the movement of the bearing roller 117 forwardly between the levers during the staple-applying operation the mechanical advantage is progressively increased toward the end of the operative stroke of the staple-driver as the clinching operation is performed. The legs of the staple *s* are engaged by the anvil-blade 33 and clinched by the grooves 43 therein in the usual manner to set them against the under side of the work. The upper portion of the actuating lever 106 engaged by the bearing roller 117 preferably has the inclined cam-face 114 for actuating the staple-driver 96 with a predetermined quick motion, but this feature may be dispensed with and the guideways for the roller may take shapes other than that herein shown.

After the stapling operation has been completed the hand-operated lever 45 is released, whereafter the actuating lever 106 will be raised to its inoperative position by the hairpin spring 115 and the staple-applying unit as a whole raised by the spring 126. Due to the angular relation of the guideways 23 and 24 with respect to the cam-faces 114 and 51, 52 on the levers 106 and 45, respectively, the bearing roller 117 is moved upwardly and rearwardly in the guideways to return the hand-operated lever 45 to the position shown in Fig. 1. The upward movement of the driver-actuating lever 106 is limited by the engagement of the projecting ends of the pin 111 with the stops 116 and the upward movement of the staple-applying unit is limited by the engagement of the rearwardly-extending shoulders 128 on the hand-operated lever 45 with the abutment-pin 127.

During the reciprocation of the staple-driver

96 the one-way pawl 129 is resiliently held against its rearward face by the spring 130. If the hand-operated lever 45 is released before a staple-driving operation is completed or if the lever is pressed downwardly before the staple-driver 96 has completed a return stroke the driver is engaged by the blunt end of the pawl 129 at either the upper or lower edge of the short slot 99 to prevent movement of the driver in the opposite direction, see Figs. 11 and 11*a*. In other words, the end of the pawl 129 will dog against one edge of the slot 99 to hold the driver 96 from movement in the wrong direction before completing a full stroke either upwardly or downwardly. At the completion of either the driving or return strokes, however, the pawl 129 will project through one or the other of the long slots 98 so that when the direction of movement is reversed the pawl is rocked out of the way. The staple-driver 96 may then move with respect to the pawl 129 through its entire stroke.

As the actuating lever 106 returns the staple-driver 96 connected thereto to inoperative position after a staple has been applied to the work a succeeding staple *s* is moved forwardly along the staple-core 65 and into the throat 91 by the resiliently actuated staple-pusher 75. The lever 45 may then be manually rocked to again operate the staple-driver 96 to drive another staple into the work. The implement may thus be continuously operated until the supply of staples is exhausted, after which the magazine may be reloaded in the manner as previously explained.

It will be observed that the present invention provides a fastener-applying implement which may be held and operated by one hand to conveniently and easily apply fasteners to relatively thick and hard materials. It will also be observed that due to the arrangement for compounding the leverage by means of the bearing roller movable longitudinally of the levers a mechanical advantage is secured and friction between the moving parts materially reduced. It will further be observed that the implement is of simple construction, positive and efficient in its operation, and adapted to be economically manufactured and assembled.

While the present improved implement has been herein shown and described as embodied in a preferred form of construction it is to be understood that various modifications may be made in the structure and arrangement of its parts without departing from the spirit or scope of the invention. Therefore, without limiting myself in this respect, I claim:

1. In a device of the type indicated, fastener-applying means, a lever connected with the fastener-applying means, a second lever, means engaging between the levers and movable longitudinally of both levers, and means on one lever for moving the movable means longitudinally of the other lever to operate the fastener-applying means with a progressively increased mechanical advantage.

2. In a device of the type indicated, fastener-applying means, a pair of levers pivoted at opposite ends, a roller engaging between the levers and movable longitudinally of both of the levers, one of said levers having its free end connected with the fastener-applying means, and means on the other lever for moving the roller along the lever connected with the fastener-applying means to actuate the latter.

3. In a device of the type indicated, fastener-applying means, a lever connected with the fastener-applying means, a second lever, a roller engaging between the levers and movable longitudinally thereof, said first-mentioned lever having a cam-face engaged by the roller during its longitudinal movement thereof, and means on the second-mentioned lever for moving the roller longitudinally of the levers.

4. In a device of the type indicated, fastener-applying means, a lever pivoted at one end and connected with the fastener-applying means at its opposite end, a second lever, a roller engaging between the levers and movable longitudinally thereof, said first-mentioned lever being actuated by the longitudinal movement of the roller to operate the fastener-applying means, and a cam on the second-mentioned lever engaging the roller to move it longitudinally of the levers.

5. In a device of the type indicated, fastener-applying means, a lever pivoted at one end and connected with the fastener-applying means at its opposite end, a second lever, a roller engaging between the levers and movable longitudinally thereof, said first-mentioned lever having a cam-face engaged by the roller during its longitudinal movement to actuate said lever and the fastener-applying means, and a cam on the second-mentioned lever directly engaging the roller to move it longitudinally of the levers.

6. In a device of the type indicated, fastener-applying means, a lever connected with the fastener-applying means, a second lever, a roller engaging between the levers and movable longitudinally thereof, means for guiding the roller in an angular path with respect to said levers, and means on the second-mentioned lever for moving the roller in the guiding means to rock the first-mentioned lever to operate the fastener-applying means.

7. In a fastener-applying implement, a frame, staple-applying means on the frame including a staple-driver, an actuating lever pivoted at one end and connected with the staple-driver at its opposite end, a hand-operated lever pivoted to the frame at one end, a roller engaging between the levers and movable longitudinally thereof, and means on said hand-operated lever for moving the roller along the actuating lever to operate the staple-driver.

8. In a fastener-applying implement, a hollow frame, staple-applying means in the frame including a staple-driver, an actuating lever pivoted at one end and connected with the staple-driver at its opposite end, a hand-operated lever pivoted to the frame at one end, a roller engaging between the levers and movable longitudinally thereof, and a cam on the hand-operated lever for moving the roller longitudinally of the actuating lever to rock the latter about its pivot to operate the staple-driver.

9. In a device of the type indicated, a hollow frame, staple-applying means pivotally mounted on the frame and including a staple-driver, a lever pivoted at one end and connected with the staple-driver at its opposite end, a second lever pivoted to the frame at one end, and a roller engaging between the levers and movable longitudinally thereof, said roller actuated by the second-mentioned lever to move it along the first-mentioned lever to rock the staple-applying means about its pivot and operate the staple-driver.

10. In a fastener-applying implement, a hollow frame, staple-applying means in the frame including a staple-driver, an actuating lever pivoted at one end and connected with the staple-

driver at its opposite end, a manually-operative lever pivoted at one end on the frame, a roller engaging between the levers and movable longitudinally thereof, guideways in the frame for guiding the roller forwardly and downwardly, and means on the hand-operated lever for moving the roller in the guideways and along the actuating lever to operate the staple-driver.

11. In a fastener-applying implement, a hollow frame, staple-applying means in the frame including a staple-driver, a lever pivoted at one end and connected with the staple-driver at its opposite end, said lever having a cam-face intermediate its ends, a manually-operative lever pivoted at one end on the frame, a roller engaging between the levers and movable longitudinally thereof, guideways in the frame for guiding the roller forwardly and downwardly, and a cam-face on the manually-operative lever for moving the roller in the guideways and against the cam-face on the actuating lever to operate the staple-driver.

12. In a fastener-applying implement, a hollow frame comprising complementary side members, staple-applying means pivotally mounted on the frame between its sides and including a staple-driver, a lever pivoted at one end and connected with the staple-driver at its opposite end, a manually-operative lever pivotally mounted on the frame between its sides, a roller between the levers and movable longitudinally thereof, guiding grooves in the opposite sides of the frame into which the ends of the roller project, said grooves extending at an angle to the levers to guide the roller along the actuating lever to operate the staple-driver, and means on the manually-operative lever for moving the roller in the grooves.

13. In a fastener-applying implement, a hollow frame having an opening therein to form a finger-grip, fastener-applying means in the frame positioned below the finger-grip, a hand-operated lever pivoted at one end on the frame and overlying the finger-grip whereby the implement may be held and manipulated with one hand, and means mounted on the frame for movement longitudinally thereof, said last-named means being actuated by depressing the hand-operated lever to operate the fastener-applying means with a gradually increasing mechanical advantage.

14. In a fastener-applying implement, a two-part hollow frame formed with an opening therein to provide a finger-grip, a hand-operated lever pivoted to the frame adjacent one end and overlying the finger-grip whereby the implement may be held and manipulated with one hand, fastener-applying means mounted in the frame below the finger-grip, an actuating lever for the fastener-applying means, and a roller mounted in the frame for movement longitudinally thereof and engaging between the levers for transmitting motion from the hand-operated lever to the actuating lever.

15. In a fastener-applying implement, a frame having an opening therein to form a finger-grip, a hand-operated lever pivoted at one end to the frame and overlying the finger-grip, staple-applying means in the frame below the finger-grip and including a staple-driver, means mounted in the frame for movement longitudinally thereof, said last-named means being actuated by pivotal movement of the hand-operated lever for actuating the staple-driver, and an anvil-blade mounted on the frame and extending forwardly to a position below the staple-driver.

16. In a fastener-applying implement, a hollow frame having an opening therein forming a finger-grip, a hand-operated lever pivotally mounted between the sides of the frame and extending above the finger-grip, a fastener-applying unit pivotally mounted between the sides of the frame below the finger-grip, resilient means for holding the fastener-applying unit in its inoperative position, an anvil-blade connected with the frame and extending forwardly below the fastener-applying unit, and means mounted in the frame for movement longitudinally thereof, said last-named means being actuated by the pivotal movement of the hand-operated lever to rock the fastener-applying unit into engagement with the blade and thereafter operate the unit to drive a fastener.

17. A fastener-applying unit comprising a magazine for containing a supply of fasteners, stanchions at the end of the magazine having bearing shoulders, said stanchions having slots extending from the bearing shoulders to their marginal edges, and a gate closing the end of the magazine and having inwardly-directed pintles cooperating with the bearing shoulders to pivotally mount the gate, said gate being adapted to be mounted on the stanchions by sliding its pintles through the slots into engagement with the bearing shoulders.

18. A fastener-applying unit comprising a magazine for containing a supply of fasteners, stanchions at the end of the magazine having bearing shoulders, said stanchions having slots extending from the bearing shoulders to their marginal edges, and a gate closing the end of the magazine and having integrally formed inwardly-directed lugs for cooperation with the shoulders on the stanchions to pivotally mount the gate, said gate being mounted on the stanchions by sliding the lugs through the marginal slots into engagement with the bearing shoulders.

19. A fastener-applying unit comprising a magazine for containing a supply of fasteners, stanchions at the end of the magazine having relatively wide slots forming bearing shoulders and narrower slots extending therefrom to the marginal edges of the stanchions, a gate for closing the end of the magazine having inwardly-directed lugs cooperating with the bearing shoulders on the stanchions to pivotally mount the gate, said gate being mounted on the stanchions by sliding its lugs through the narrow slots into engagement with the bearing shoulders, and interengaging means on the gate and magazine for latching the gate in closed position.

20. A staple-applying unit comprising a magazine for containing a supply of staples, a gate pivotally mounted on the magazine at its forward end, a staple-driver between the end of the magazine and the gate, an actuating lever having one end pivoted to the rearward end of the magazine and the opposite end connected to the staple-driver, said lever having an abutment intermediate its ends, and a spring extending longitudinally of the lever with one end bearing against its top and the opposite end bearing against the gate and engaging the abutment on the lever to yieldingly hold the lever in inoperative position and the gate closed.

21. In a staple-applying unit, a magazine for containing a supply of staples, spaced stanchions at the forward end of the magazine having slots therein, a gate for enclosing the end of the mag-

azine having inwardly-directed lugs at its sides projecting into the slots to form trunnions for pivoting the gate, a staple-driver between the gate and the end of the magazine, a lever pivoted to the magazine at one end and connected to the staple-driver at the opposite end, and a spring engaging the lever at one end with its opposite end engaging the trunnion lugs on the gate to hold the lever in inoperative position and the gate closed.

22. In a fastener-applying unit, a sheet-metal driver-blade adapted to be reciprocated to drive the fasteners, said driver-blade having a pair of relatively long slots arranged in spaced relation and a shorter slot therebetween, and a pivoted pawl bearing against the rearward face of the driver-blade, said pawl cooperating with the shorter slot to prevent reverse movement of the driver-blade until a full stroke has been completed in either direction, and said long slots permitting a reverse movement of the pawl at the end of the stroke of the driver-blade in either direction.

23. In a staple-applying unit, a magazine for containing a supply of staples and having spaced stanchions at its forward end, means cooperating with the end of the magazine to form a throat through which the staples are driven, a sheet-metal staple-driver in the throat, said driver having a slot formed therein, means for actuating the staple-driver, and a pawl pivotally mounted between the spaced stanchions and cooperating with the slot in the staple-driver to prevent a return movement of the staple-driver until a full stroke has been completed in either direction.

24. A staple-applying unit comprising a magazine for containing a supply of staples and having spaced stanchions at its forward end, a gate pivotally mounted on the stanchions and adapted to close the end of the magazine, a staple-driver between the gate and the end of the magazine, said driver having a pair of relatively long slots disposed in spaced relationship and a shorter slot between the long slots, means for operating said staple-driver, and a pawl pivotally mounted between the stanchions and adapted to bear against the rearward face of the staple-driver, said long slots permitting the pawl to be reversed at the end of a full stroke in either direction, and said narrow slot engaging the pawl to prevent return movement of the staple-driver until a full stroke has been completed in either direction.

25. In a device of the type indicated, a pivoted stapling arm carrying a staple-driver, said stapling arm being movable from one to the other of two positions, an actuator connected to the staple-driver to operate the latter, a spring between the stapling arm and actuator for normally holding the latter raised with respect to the arm, means for limiting the upward movement of the actuator with respect to the arm, and a second spring connected to the actuator for yieldingly holding the stapling arm in one of its two positions.

26. In a device of the type indicated, a frame, an anvil on the frame having clincher-grooves, a stapling arm pivotally mounted on the frame for movement toward and away from the anvil and carrying a staple-driver for cooperation with the clincher-grooves, an actuator connected to the staple-driver to operate the latter, a spring between the stapling arm and actuator for normally holding the latter raised with respect to the arm, means for limiting the upward movement of the actuator with respect to the arm, and a second spring directly connected to the actuator and the frame for rocking the actuator and arm on the frame away from the anvil.

27. In a device of the type indicated, fastener-applying means, a lever connected to operate the fastener-applying means, a second lever, means engaging between the levers and movable longitudinally thereof, and means for moving the movable means toward the fulcrum of one lever and away from the fulcrum of the other lever whereby to cause the fastener-applying means to be operated with a progressively increased mechanical advantage.

28. In a fastener-applying implement, a frame having spaced side walls with alined openings therein, a detachable insert in the openings bridging the space between the side walls to form a finger-grip, fastener-applying means on said frame, a hand-operated lever pivoted at one end on the frame and overlying the finger-grip whereby the implement may be held and manipulated with one hand, and means connecting the hand-operated lever to actuate the fastener-applying means.

29. In a fastener-applying implement, a hollow frame having spaced parallel side walls with alined openings therein, an annular insert of resilient material positioned in the openings to form a finger-grip, said insert having grooves in its periphery for receiving the edges of the side walls surrounding the openings to hold it in place, fastener-applying means on the frame, a lever on the frame overlying the finger-grip whereby the implement may be held and manipulated in one hand, and means connecting the lever to operate the fastener-applying means.

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