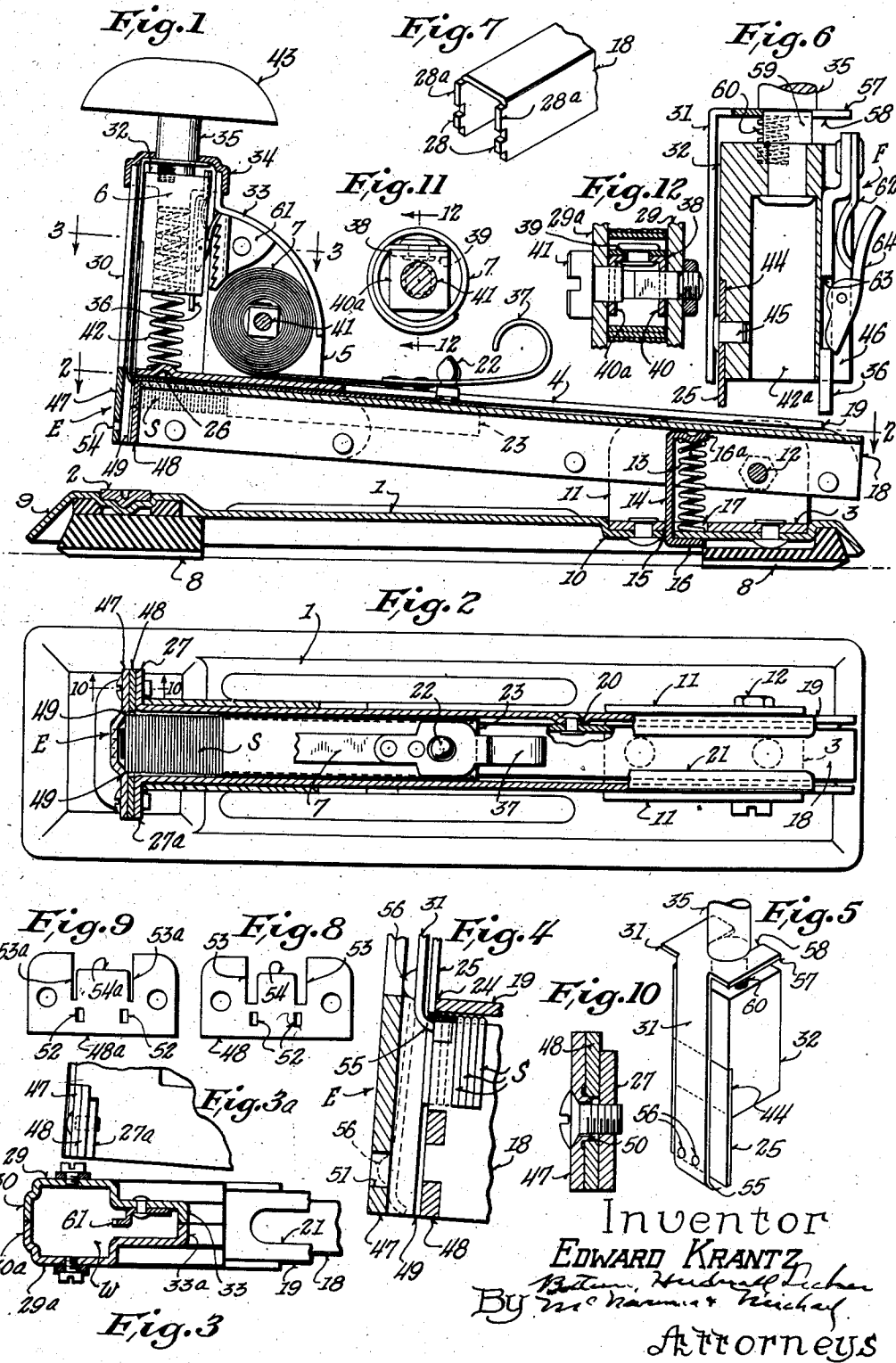


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STAPLING MACHINE

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STAPLING MACHINE

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This invention relates to an improvement in stapling machines of the type having a magazine for preformed staples.

One of the objects of this invention is to provide a stapling machine having an improved type of ejection chute through which staples are driven one by one from the magazine, the parts comprising the ejection chute being so designed and related that those parts receiving the greatest wear are readily replaceable while eliminating the usual inaccuracies of allocation present in devices of this type.

Another object of the invention is to provide a stapling machine having an improved type of mechanism for positively supporting the staple in contact with the staple driving blade during the major portion of its stroke.

Another object of the invention is to provide a stapling machine having improved means for insuring a full driving stroke of the plunger and staple driving tool, the means being so designed and related to the other parts of the device as to be susceptible of convenient and comparatively inexpensive manufacture and yet durable and reliable in use.

A still further object of the invention is to provide a stapling machine having an improved means for supporting and adjusting the tension of the spring which actuates the staple follower through the magazine.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawing forming a part of this specification, and in which:

Figure 1 is a sectional view in side elevation showing a stapling machine embodying the present invention;

Figure 2 is a sectional plan view taken on line 2—2 of Figure 1;

Figure 3 is a sectional view taken on line 3—3 of Figure 1, certain parts being omitted for the sake of illustration;

Figure 3a is a detail view of the main housing showing the manner of notching the walls;

Figure 4 is an enlarged detail view showing the staple support mechanism in its extreme positions of movement;

Figure 5 is a detail view in perspective showing the plunger, staple driving tool and the movable part of the staple support mechanism;

Figure 6 is an enlarged sectional view showing

the plunger and the movable part of the full-stroke mechanism;

Figure 7 is a view in perspective of the forward end of the core of the staple magazine;

Figure 8 is a view in elevation showing the die block of the ejection chute;

Figure 9 is a view in elevation showing a modified form of die block for the ejection chute;

Figure 10 is a fragmentary view in section taken on line 10—10 of Figure 2;

Figure 11 is an enlarged view in side elevation showing the follower spring terminal; and

Figure 12 is a fragmentary view in section taken on line 12—12 of Figure 11.

Referring to the drawing, it will be seen that the stapling machine comprises generally a base 1, adjacent one end of which is an anvil 2. At the end of the base opposite the anvil is mounting 3 for a beam magazine or staple carrying arm 4. The end of the magazine opposite that mounted to the base supports a main housing 5 which provides a support for the staple driving mechanism designated generally at 6. The housing also supports the spring 7 which operates the mechanism for feeding staples through the magazine.

The base 1 consists of a metallic plate-like member of inverted dished form which is supported by cushioning pads 8 contained within the marginal flanges 9 of the base. The anvil 2 is fixed to the base in any suitable manner and is of the customary design well known in the art. The rearward end of the base is formed with a depressed portion 10 which is shaped to receive in close fit the mounting or bracket member 3, the depressed portion acting to properly aline the bracket member in relation to the base and anvil. The bracket member 3 is provided with spaced upright members 11 between which the beam magazine 4 is mounted and guided. The bracket member is secured to the base by riveting, welding, or any other suitable method common in the art. The upright members form the support for a pivot 12 which extends between them and which passes through the beam magazine 4. The beam magazine is rotatable about the pivot 12 but is confined by the pivot and upright member to travel in proper alinement with the anvil 2.

The beam magazine is urged to a raised position relative to the base by the action of a coiled compression spring 13 and an upright limit member 14. Between the spaced upright members 11 and forward of the pivot 12 the base 1 is provided with a slotted opening 15. The member 14 extends through the opening 15 into the

dished-out portion of the base. The end of member 14 projecting into this portion is provided with a laterally projecting flange or stop shoulder 16, which coacts with the base to limit the upward movement of the member. The upper end of the limit member 14 passes through an enlarged opening 17 provided in the bracket member 3, which opening is also in alignment with opening 15, and is provided with a similar flange or cross-extension 16^a. The coiled compression spring has one end seated in the opening 17 and against the base 1 and the other end seated against the underside of the cross-extension 16^a. A circular protuberance or some similar device 15 may be formed on the cross-extension 16^a for the purpose of centering the spring. The upper side or the cross-extension rests or presses against the beam magazine. It will thus be seen that the free end of the beam magazine is normally maintained at a fixed distance above the base but upon receiving a downward pressure sufficient to overcome the compression of spring 13 will swing downwardly so that it contacts the base or anvil.

The beam magazine or staple carrying arm 4 is of elongated form and comprises a core or staple track 18 of general inverted channel-shaped form and a guide member 19 also of similar form superimposed on the core 18 and spaced therefrom. Preformed staples ride in straddle fashion on the core 18 and are contained in place by the guiding action of the member 19. The member 19 is properly spaced from the core 18 by spacers 20 (see Figure 2) struck inwardly from the bottom portions of the side walls of the guide member 19. The members are secured in this position either by rivets passing through the spacers 20 or some other suitable means such as welding. The top of the guide member 19 has a centrally located elongated slot 21 cut therefrom which extends from the rear end thereof to a point substantially near the rear wall of the housing 5. This slot accommodates the nipple 22 of the staple follower 23 as will be later described. The forward end of the top of the guide member extends within the housing 5 and projects forwardly beyond the top forward end of the core 18 to form a guide 24 (see Figure 4) for the staple driving tool 25 insuring its proper alignment as will be later described. Just rearwardly of the guide end 24 the top of the guide member 19 is provided with a spring centering protuberance 26. The sides of the guide member 19 at the forward ends thereof are provided with laterally projecting ears or flanges 27 and 27^a which provide a support for and means for aiding in securing parts of the staple ejection chute to be later described. The forward edges of the side walls of the core 18 are provided with forwardly extending projections or tongues 28 (see Figure 7) which act as dowels and interlock with parts of the ejection chute for the purpose to be later described. A further and additional set of projections 28^a may also be provided as will be more clearly pointed out in the following paragraphs.

The main housing 5 comprises two oppositely symmetrical sections 29 and 29^a (see Figure 3). The sections have an outline form similar to a quarter section of a circle. The sections 29 and 29^a have elongated lower portions secured to the respective side walls of the guide member 19 at the forward end thereof by rivets or some other suitable means. The forward edges of the sides of sections 29 and 29^a are formed with inwardly

projecting flanges 30 and 30^a which abut each other and properly space the sections. Each flange is slightly offset to provide a clearance space for the staple supporter 31 (see Figure 5). Rearwardly of the forward edges thereof the sides of sections 29 and 29^a are offset inwardly to provide rear guides for the staple plunger 32 and thereafter extend rearwardly and in approximate parallelism to provide the supports and guides for the follower spring 7. The rearward edges of the sides of sections 29 and 29^a are provided with inturned and abutting flanges 33 and 33^a designed to aid in properly spacing the sections and to complete the enclosure for the spring 7. The flanges 33 and 33^a extend downwardly only to a point sufficiently spaced from the top of guide member 19 so as to form an opening or outlet for the extending end of spring 7. The flanges 30 and 30^a extend downwardly only to a point approximately level with the top of guide member 19. At this point the lower front edges of the sides of sections 29 and 29^a are notched or cut away to provide room for the flanges 27 and 27^a which extend from the guide member 19 (see Figure 3^a). When the sections 29 and 29^a are assembled in abutting relation as indicated by the view shown in Figure 3 they provide a rectangularly shaped well W (see Figure 3) the inner surfaces of which form guides for the plunger 32 as well as a housing for spring 7. A cap 34 of inverted dish-shape is snugly fitted over and against the upper portions of the sections 29 and 29^a immediately over the rectangularly shaped well. The cap is secured to the sides of the sections in any suitable manner, preferably by little screws which permit of easy disassembly. The cap 34 acts to keep the sections 29 and 29^a in abutting relation and thereby aids in maintaining the rigidity of the housing 5. The cap is provided with an aperture through which the stem 35 of the plunger extends and is operable. The cap also acts as an abutment limiting the upward travel of the plunger 32, the staple supporter 31 and the sliding member 36 of the full-stroke mechanism.

The staple feeding mechanism comprises the follower spring 7, the staple follower 23 and attached nipple 22, the finger grip attaching clip 37 and spring terminal 38. The spring 7 is a ribbon-type spring wound in a volute coil. The inner end is secured to the flat cross member or connection portion 39 of the terminal 38 by a rivet or other suitable fastener (see Figure 12). The connecting portion 39 is approximately the same width as the spring 7 and has extending vertically from its opposite ends opposed and parallel side plates 40 and 40^a. These plates are designed to rest snugly within and against the inner surfaces of the rearward portions of the sections 29 and 29^a of the main housing 5 and are guided thereby. The section 29^a and the side plate 40^a are provided with round openings or holes axially aligned. The section 29 and the side plate 40 are provided with rectangularly shaped holes axially aligned with each other and with the round holes aforementioned, the greatest diameter of the rectangularly shaped holes being less than the diameter of the round holes. A shaft or axle 41 extends between the sections 29 and 29^a and is provided with a round or circular portion adapted to fit in the aforementioned round holes and a rectangularly shaped portion adapted to fit in the aforementioned rectangularly shaped holes. The shaft thus positions and secures the terminal 38 in the main housing. By

removing the shaft 41 axially so that the rectangular portion is out of engagement with the rectangularly shaped hole in section 29 and yet remains engaged with the rectangular hole in the plate 40, and then rotating the shaft while in this position, the terminal 38 will be rotated with the shaft 41, thus tightening or loosening of the tension of spring 7 is accomplished. When the desired tension is obtained the shaft 40 is moved axially so that the rectangularly shaped portion is again engaged with the rectangularly shaped hole in section 29. The shaft 41 and terminal 38 will then be locked in position. The shaft 40 is preferably provided with a head and screw driver slot at the end adjacent the round portion and an extended and threaded portion adjacent the rectangularly shaped portion. The head provides a ready means for rotating the shaft 41 while a nut may be placed on the threaded portion and adjusted to rest on the outside of the section 29 to prevent lateral displacement of the shaft except when required for adjusting purposes. The outer or free end of the spring 7 passes outside of the main housing 5 and has secured to it a finger clip 37. The clip 37 has a widened portion preventing its entry into the housing 5. The widened portion is provided with an aperture sufficiently large in diameter to allow it to be inserted over and down on the nipple 22. The tension in the spring 7 keeps the clip 37 and nipple 22 in operative engagement. The follower 23 consists of an elongated inverted channel-shaped piece adapted to ride on the core or staple track 18. The nipple 22 is riveted or otherwise secured to the rear top portion of the follower 23. It will be seen from the foregoing description that the spring 7, acting through the clip 37 and nipple 22, will cause the follower 23 to advance forwardly through the beam magazine and force staples riding on the core 18 toward and under the staple driving tool 25, the slot 21 in the guide member 19 permitting the nipple 22 to advance far enough toward the forward end of the magazine to let the forward end of the follower 23 advance a last remaining staple into the proper position. By removing the clip 37 from the nipple 22 the follower 23 may be moved rearwardly from the magazine to permit the charging of said magazine with a fresh supply of staples.

The driving mechanism consists of reciprocally acting plunger 32 which causes a driving tool 25 to engage staples from the forward end of the magazine and force them out through an ejection chute (indicated generally at E). The action of the plunger 32 is modified by a full-stroke mechanism indicated generally at F while the action of the driving tool 25 is aided by a staple supporter 31.

The plunger 32 consists of a metal block of four-sided or polygonal shape. The interior of the plunger 32 is hollowed out from the bottom upwardly as at 42^a to receive and guide the compression spring 42. The plunger is guided in the rectangular well W formed in the main housing 5 as previously described. The lower end of spring 42 rests against the top of the guide member 19 and is held in position by the protuberance 26. Secured to the top of the plunger 42 is a stem 35. The stem 35 may be formed separately from the plunger and riveted thereto in the customary manner indicated in Figure 6 or formed from the same piece of metal as the plunger. The stem 35 is preferably round and of smaller diameter than the plunger. The stem 35 extends through an

aperture in the cap 34 and is provided at its upper end with a presser knob 43 which is secured in a suitable manner such as riveting or welding. It will be seen that downward pressure placed on the knob 43 will force the plunger 32 downwardly in the housing until the bottom of the plunger rests against the top of guide member 19 which limits such downward motion. The spring 42, being compressed into the hollowed out portion 42 as the plunger is forced downwardly, will force the plunger upwardly when the downward pressure is removed. The upward movement of the plunger will be limited by the cap 34 which acts as an abutment. The lower portion of the forward face of the plunger 32 is recessed, as at 44, and the upper portion of the staple driving blade 25 is fitted in this recess. The recess provides a shoulder which absorbs the thrust forces between the plunger 32 and blade 25. The blade 25 is secured in this recess by a friction pin 45 or other suitable device. The rear face of the plunger 32 is provided with a longitudinal channel 46 extending from top to bottom of said plunger. The channel 46 is centrally located with respect to the side faces of the plunger and is of sufficient depth and width to accommodate parts of the full-stroke mechanism F.

The staple driving tool 25 consists of a thin flat piece of hardened metal. The width of the tool is slightly greater than the bridge portions of the staples which it is designed to drive. With the plunger 32 in its uppermost position within the housing 5 and with the upper portion of the tool 25 secured to the plunger as previously described, the bottom or driving edge of the tool 25 extends in front of and is guided by the forward top end of the guide member 19 (see 24 in Figure 4), and is sufficiently elevated to allow a staple to enter beneath it from the magazine. When in this position, the driving tool is guided from in front by the ejection chute cover plate 47. From the foregoing, it will be seen that the driving tool at the beginning of its stroke is accurately located and confined in its movement by both front and rear guides.

The ejection or discharge chute E comprises two removable members, namely, the cover plate 47 and the die block or die plate member 48. The cover plate member 47 extends across the forward end of the magazine and has lateral portions extending beyond the sides of the housing 5 to the same extent as the ears or flanges 27 and 27^a. The top of the cover plate abuts against the lower edges of the flanges 30 and 30^a. The bottom of the cover plate is approximately level with the bottom of the beam magazine. The central portion of the cover plate is offset to conform with the offset portion of the flanges 30 and 30^a for the purpose of providing a space for the staple supporter 31. On the inner surface of the cover plate and adjacent the junctures of the offset portions with the lateral portions, there is provided accurately dimensioned vertically extending grooves or shoulders 49. These shoulders or grooves extend vertically from the top to the bottom of the cover plate and form opposed surfaces which are spaced from each other a distance conforming to the width of the blade 25 and lateral forward surfaces against which the forward face of the blade 25 rests. The lateral forward surfaces are indented into the surface of the cover plate a depth substantially equal to the thickness of the blade 25. It will be seen that with the cover plate resting flatly against the die plate member 48, the opposed surfaces and lateral forward surfaces

form with the surface of the die plate member accurate guides for the driving blade 25 and staples being driven out through the ejection chute. Centrally located in the lateral portions of the cover plate are apertures, the edges of which are formed with dowel locks 50 (see Figure 10) fittable within apertures in the die plate member 48 to accurately and positively lock and position the cover plate and die plate in a fixed and predetermined relative position. The lower part of the offset portion of the cover plate is provided with spaced openings 51 (see Figure 4) which form an element of the staple supporting mechanism, as will be later described. The die block or die plate member 48 (see Figure 8) consists of a piece of flat hardened metal. It extends laterally from the outside edge of flange 27 to the outside edge of flange 27^a and vertically from the bottom of the magazine to a point level with the top of guide member 19. It is to be understood that the apertures in the cover plate 47, die block 48 and flanges 27 and 27^a are axially aligned to permit of the use of a screw or some other fastening device to hold these parts in close surface to surface contact, as illustrated in Figure 10. The die plate 48 is provided with spaced apertures 52 into which the tongues 28 on the core 18 snugly fit. The interfitting relationship thus established between the core 18 and the die plate 48 accurately allocates the latter with respect to the former, while the dowels 50 on cover plate 47 accurately locate it with respect to the die plate 48. The accurate positioning of the ejection chute E is thus maintained irrespective of the screws or other means by which the various elements comprising the chute are removably held together. The die plate 48 is provided with spaced slots 53 extending downwardly in vertical parallelism from the top thereof. The outer edges of slots 53 are in alignment with the inside surfaces of the side walls of the guide member 19 when the die plate is assembled in place and positioned by the apertures 52 and tongues 28, as previously described. When in this position, the inner edges of the slots 53 abut against the inner surfaces of the projection 28^a. The portion of the plate 48 lying between the slots 53 is cut off at a point below the top edge of said plate. This portion resembles a tongue indicated at 54 (see Figure 8). The top edge of tongue 54, when the plate is assembled as described, forms a continuation of the top of the core or staple track 18. It will thus be seen that the bridge portion of staples advancing on the track 18 will rest on the tongue 54 just before they are advanced into the ejection chute. It has been previously described how the staple driving tool 25 is guided prior to engaging a staple. As the tool 25 engages the staple and forces it downward by the grooves or shoulders 49 in the cover plate 47 and the forward surface of the tongue 54. The greatest wear and severest blows will occur at the top forward edge and forward surface of the tongue 54 and in the grooves 49. It is therefore advantageous to make the cover plate 47 and die plate 48 of hardened metal and to design these parts, as previously described, to be replaceable and yet maintain an accurate dimensional relationship between them. The die plate can be made in a modified form as shown at 48^a (see Figure 9). In this modification the projections 28^a are omitted from the forward end of the core 18 and the slots 53^a are formed so that the inner edges are in alignment with the outer surfaces of the sides of core 18. The legs of the staple as well

as the bridge portion will then rest on the tongue 54^a. In all other respects the die plate 48^a functions the same as die plate 48.

The staple support mechanism consists of an elongated metal strip or member 31 which lies along the forward surface of the plunger 32 and tool 25 and is maintained in position by the offset portions 30 and 30^a of the housing 5. The lower or bottom end of the member 31 is formed with a hook 55 which will engage the underside portion of the bridge of a staple as the staple leaves the tongue 54 and enters into the grooves 49 (see Figure 4). Adjacent the hook 55 and positioned slightly thereabove, the forward or outer surface of the strip 31 is provided with spaced protuberances 56 fittable within the openings 51. The upper end of the member 31 extends above the top of the plunger 32 and is provided with a rearwardly and laterally projecting flange or wing 57 which conforms in general shape and size with the top surface of said plunger. The wing or flange 57 is notched inwardly from the rear edge thereof as at 58. The notch 58 straddles a reduced section 59 formed in the plunger stem 35. The edges of the notch may be provided with circular shaped recess to provide a ready clearance between the notch and reduced section 59 and which will also act to keep the flange 57 in position relative to the plunger and stem. Compression springs 60 are provided between the flange 57 and the top of the plunger 32. The spring may be held in place by seats recessed into the top surface of the plunger. The supporter 31 is guided between the housing 5 and the plunger 32. It is in effect, however, carried by the plunger but has a limited up and down movement relative thereto. When the plunger is in a raised position, the flange 57 will abut against the underside of the cap 34 and since the spring 42 has a greater compressive force than springs 60 the top of the plunger 32 will abut against the flange 57. In this position the driving tool will be raised to allow a staple to advance into the ejection chute but the hook 55 will be directly in line with lower part of the bridge portion of the staple and will be urged to bear against the outer surface of the tongue 54 by the action of the protuberances 56 and the front wall of the main housing. Thus, the staple will be supported and will not drop down through the ejection chute (see Figure 4). As the plunger causes the driving tool to advance downwardly the supporter 31 will remain stationary until the driving tool engages the top of the bridge portion of the staple. This is true because of the reaction of the springs 60 tending to force the supporter upwardly relative to the tool and plunger. However, when the tool engages the staple and starts forcing it down, the staple, acting through the hook 55, will cause the supporter to travel downwardly with the tool and plunger. It will be seen that the reaction of springs 60 will cause the hook to support the bridge of the staple firmly against the driving edge of the staple tool.

When the staple is advanced by the tool to a point where the staple legs are extending out from the bottom of the ejection chute and only a small fraction of the driving action remains to be accomplished, the protuberances 56 will enter into the openings 51 which will allow the hook 55 to move laterally out from under the bridge of the staple and the driving tool. The tool is then free to force the bridge of the staple tightly against the material into which the staple is

driven. As the plunger and tool raise, the driving edge of the tool will come above the hook 55 and the hook will then be allowed to move laterally toward and under the driving blade to release the protuberances 56 from the openings 51 thereby allowing both plunger and supporter to again raise, under the force of spring 42, to the top or staple receiving position previously described.

100 The full-stroke mechanism F includes a tooth structure member 61 secured within the housing 5 and to the rear of the plunger 32. The teeth are of the usual rack variety commonly used with rack and detent devices. The teeth are formed on the forward edge of the member 61 and are slightly offset (see Figure 3) from the general plane of that member so as to be centrally located with respect to the well W. The body portion of the member 61 lies flatly against the inner surface of the walls of housing 5 and is shaped so that its edges abut against the flange 33, thereby firmly and accurately aligning the member 61 and properly positioning the teeth with respect to the plunger. The member 61 is secured to the housing 5 by a rivet or other suitable means. The plunger 32, as previously described, is provided with a channel 46. Slidably contained within the channel is a slide member 36 (see Figure 6) having at its upper end a rearwardly offset portion to which is secured a detent trigger spring 62. The member 36 is notched as at 63 to provide a camming surface or detent withdrawer. The member 36 is retained within the channel by a detent 64 which overlies the member 36 and which is pivoted to the sides of the channel in any suitable manner. The detent 64 has an upper or tooth engaging arm which is forced outwardly from the plunger by the spring 62 to engage with the teeth on the member 61. The lower portion of the detent 64 is formed with inwardly projecting spaced side plates which straddle the notch 63 in the slide member 36. The slide member is slightly longer than the vertical length of plunger 32. With the plunger raised to the staple receiving portion, the cap 34 acting through the flange 57 will abut the top of member 36 and slide it downwardly with respect to the plunger and detent so that the notch 63 will be in alignment with the side plates of the detent. In this position the spring 62 will be permitted to force the tooth engaging arm of the detent into operative engagement with the top teeth on member 61. As the plunger is depressed to cause a staple to be driven, the detent will engage successively lower teeth thereby preventing the plunger to be raised to the staple receiving position. However, when the plunger is depressed sufficiently to completely eject a staple, the bottom of slide 36 will strike against the top of guide member 19 and cause the slide 36 to move upwardly with respect to the follower and detent. This movement causes the lower edge of notch 63 to act as a camming surface to force the side plates of the detent out of the notch 63 and causing the tooth engaging arm to recede from engagement with the member 61 at the same time forcibly depressing the spring 62. The plunger will then be allowed to move upwardly until it again regains the staple receiving position at which time the detent is moved to active position as aforementioned. It will be seen from the above that the plunger must always cause a staple to be completely ejected before receiving a new staple.

75 While constructions in which this invention

may be embodied have been shown and described, it is to be understood that these constructions have been selected merely for the purpose of illustration and that various changes in the size, shape and arrangement of the parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

The invention claimed is:

1. In a stapling device, a beam magazine having a core forming a staple track and side plates to guide the staples on said track, laterally projecting ears at the forward end of said side plates, a plate on said ears and forming a part of a staple ejection chute, a second plate completing said ejection chute, staple driving mechanism, and a housing for said staple driving mechanism positioned on said magazine and having a cut away portion through which said ears project.

2. In a device of the type specified, a magazine for staples and an ejection chute operatively related thereto, said ejection chute comprising a die plate member and a cover plate member, said members having interfitting lugs and recesses formed thereon providing interlocking aligning means and being removably secured to said magazine.

3. In a stapling device, a beam magazine for staples having a core about which the staples fit, projecting tongues on the front edges of the sides of said core, a slotted plate at the forward end of said core and forming a part of a staple ejection chute, a portion of said plate being in alignment with the top surface of said core and acting as a guide for the bridge of staples, said tongues projecting through said slots and acting as a guide for the inside faces of staple legs to deliver the staples to said ejection chute.

4. A beam magazine for staples having a core upon which the staples ride, a slotted and apertured plate at the forward end of said core forming a part of an ejection chute, said core having tongues extending into such slots and apertures, the tongues extending into such slots guiding the staples to the ejection chute and the tongues extending into such apertures positioning said plate in relation to said core.

5. A staple carrying arm having a core upon which staples ride, a plate at the forward end of said core and forming a part of an ejection chute, a portion of said core extending through said plate to guide the staples to the ejection chute, and a portion of said plate forming a continuation of a portion of said core and also acting as guiding means for the staples to the ejection chute.

6. A beam magazine for staples having a core over which the staples fit, a plate at the forward end of said magazine forming a part of an ejection chute, portions of said plate and core interlocking and portions of said core and plate forming means to guide the interior of staples as they pass to the ejection chute.

7. In a staple carrying arm having a core upon which staples ride and side plates to guide the staples on said core, a plate forming a part of an ejection chute and having means interlocking with portions of said core to position said plate, said side plates having laterally projecting ears extending from the sides thereof, said plate being secured to said ears to hold said plate to said staple carrying arm, staple driving mechanism for driving staples, and a housing for said mechanism positioned on said arm and having portions overlapping said side plates, said portions being notched to receive said ears.

8. In a beam magazine for staples, a core, guid-

ing means for staples on said core, an ejection chute for staples at the forward end of said core, a plate forming one of the walls of said ejection chute, said plate having openings therein, portions of said guiding means extending into some of said openings, the top of said core terminating adjacent said plate and forming therewith a track for said staples, the sides of said core extending into other of said openings and forming the side guides for said track.

9. A beam magazine for staples comprising a core forming a staple track, and guiding means to guide the staples on said track, a staple ejection chute at the forward end of said magazine, said chute comprising two members, said members forming a rear guide, side guides and a front guide for the staples as they are discharged through said chute, said guiding means having flanges extending laterally from its sides, said ejection chute members being mounted upon said flanges, staple driving mechanism, and a housing for said mechanism positioned on said magazine and having notched portions for receiving said flanges.

10. In a stapling device, a beam magazine for staples consisting of a core upon which staples ride in straddle fashion and a member secured to said core and having top and side portions spaced from said core and forming an outer guide for staples on said core, a housing at the forward end of said magazine, said housing comprising two sections, each section having a portion overlapping and secured to said top and side portions, an apertured cap about the top of the housing and holding said sections in spaced relation, and a staple driving plunger movably mounted within said housing and operable through said aperture in said cap.

11. A stapling device having a beam magazine for staples, a housing mounted at the front end of said magazine, a reciprocal staple driving tool within and guided by said housing, an ejection chute for discharge of staples by said tool, said chute comprising a plurality of plates, said housing having a cut-out portion at its forward end, said ejection chute being mounted within said cut-out portion, and ears extending laterally from the sides of said beam magazine out through said cut out portion, said ejection chute being secured to said ears.

12. A stapling device comprising a beam magazine for staples, a housing on said magazine, a reciprocal staple driving plunger in said housing, said plunger having a polygonal section at its bottom end and a round portion at its upper end, a cap piece mounted on said housing and having an aperture therein providing a bearing for said round portion of said plunger, and spring means contained within said housing and extending within said polygonal section for urging said plunger upward.

13. In a stapling device, a housing, a staple driving plunger within and guided by said housing, said plunger having a four sided section at its lower end providing guide means in said housing and a reduced section at its upper end of less width than the lower section, and a cap on said housing, said top portion of said plunger and said cap cooperating to guide the upper end of said plunger, a spring within said housing and extending within said four sided section, and a staple driving tool connected to said plunger.

14. A stapling device having a staple carrying arm, a housing at the forward end of said arm, a plunger for driving the staples from the arm

mounted in said housing, a knob mounted on said plunger for hand operation, a spring within said housing having a portion extending into said plunger for returning said plunger to its starting position and a cap intermediate said plunger and said knob and secured to said housing to prevent said plunger from leaving said housing as said plunger is reciprocated within said housing, said cap having portions lying adjacent the outer side surface of said housing and secured thereto.

15. A stapling device having a staple driving plunger and guiding means to guide said plunger, an ejection chute through which staples are discharged by said plunger, a staple supporter having a hook end mounted on said plunger and movable therewith, spring means urging said hook end to force the bridge portion of a staple upwardly and against the driving face of said plunger, said plunger having spring means to urge it to its upper position, said latter spring means being of greater tension than said first-mentioned spring means, thereby allowing the driving face of said plunger as it approaches its upper position to raise above said hook end of said supporter.

16. In a device of the type specified, a plunger engageable with the top of the bridge of a staple for driving the same, a supporter carried by said plunger and having a portion engageable with the under portion of said bridge, spring means between said supporter and said plunger urging said supporter upwardly and means limiting the downward movement of said supporter and providing for lateral movement of said portion to permit disengagement between said portion and said bridge.

17. In combination with a staple driving plunger and housing therefor, a staple bridge supporter, said supporter being carried by said plunger and adapted to engage the underneath portion of the bridge of a staple, there being spring means between said supporter and said plunger to cause it to force said bridge upwardly against said plunger and means between said housing and said supporter limiting the downward movement of said supporter and permitting the disengagement thereof with said bridge.

18. In a stapling device, a housing, a staple driving plunger reciprocably mounted in said housing, a tooth structure in said housing, a detent slidable with said plunger, said tooth structure and said detent forming a full stroke mechanism to insure a full driving stroke of said plunger, a sliding member carried by said plunger and operable to disengage said detent from said tooth structure when said plunger has completed its driving stroke, said sliding member effecting engagement between said detent and said tooth structure when said plunger has reached its uppermost position.

19. In a stapling device, a housing, a tooth structure on said housing, a reciprocal staple driving plunger guided by said housing, a detent movable with said plunger and cooperable with said tooth structure to insure a full driving stroke of said plunger and a sliding member also movable with said plunger, said sliding member in one position thereof being effective to disconnect said detent from said tooth structure and in another position thereof effective to connect said detent with said tooth structure.

20. In a stapling device, a housing, a tooth structure thereon, a reciprocal staple driving plunger, guided by said housing, a detent pivoted to said plunger and cooperable with said tooth

structure to insure a full driving stroke of said plunger, a member slidably mounted and carried by said plunger and operable to disconnect or connect said detent with said tooth structure.

21. In a device of the type specified, the combination with a reciprocal plunger of a full stroke mechanism, said mechanism comprising a stationary tooth structure, a detent engageable with said tooth structure and carried by said plunger and a movable slide engageable with said detent, said slide having a spring and a camming surface, said spring when said slide is in one position being effective to cause engagement between said detent and said tooth structure, said camming surface when said slide is moved to another position being effective to move and hold said detent out of engagement with said tooth structure.

22. In a stapling device, an ejection chute for staples, a staple driving tool reciprocal in said chute and having a driving edge, a staple supporter in said chute movable with said tool and having a hook portion adapted to engage the bridge of a staple and hold the same against said driving edge, a spring between said tool and supporter to urge said hook portion upwardly toward said driving edge and means on said supporter and ejection chute to permit said hook portion to move laterally out from under said driving edge when said driving tool attains a predetermined position.

23. In a stapling machine, a guiding chute for staples, a staple driving tool reciprocal in said chute and having a driving edge and a top portion, a staple supporter in said chute movable with said tool, said supporter having a hook portion adapted to extend under said driving edge and an upper intumed portion overlying said top portion, a spring between said top portion and said intumed portion to urge said hook portion upwardly toward said driving edge, and abutment means in said chute to limit the upward movement of said supporter to depress said spring as said tool reaches its uppermost position in said chute.

24. In a stapling device, an elongated base having an anvil at its front end, a beam magazine for staples comprising a core upon which staples ride in straddle fashion and a channel member secured to said core and having top and side portions spaced from said core and forming an outer guide for staples on said core, said magazine being pivotally mounted at its rear end on said base, a housing at the forward end of said magazine comprising front and side walls with each side wall having a portion overlapping the top and

side portions of said channel member and secured to the side portion of said channel member, an apertured cap about the top of the housing, a staple driving plunger movably mounted within said housing and having a portion projecting through the aperture in said cap for operation of the plunger, and a compression spring disposed within the housing and interposed between the magazine and the plunger to urge the plunger outwardly.

25. In a stapling device, an elongated base having an anvil at its front end, a beam magazine for staples comprising a core upon which staples ride in straddle fashion and a channel member secured to said core and having top and side portions spaced from said core and forming an outer guide for staples on said core; said magazine being pivotally mounted at its rear end on said base, a channelled follower slidable on said core in the guide way formed by the channel member secured to the core and having a knob projecting upwardly, said channel member having a slot in the top portion through which the knob projects, a housing at the forward end of said magazine comprising front and side walls with each side wall having a portion overlapping the top and side portions of said channel member and secured to the side portion of said channel member, an apertured cap about the top of the housing, a staple driving plunger movably mounted within said housing and having a portion projecting through the aperture in said cap for operation of the plunger and a recess in its inner end, a compression spring with one end received in said recess and the other end abutting the top portion of said channel member to urge said plunger to inoperative position, and a coiled spring tape within the housing having one end projecting from the housing for detachable engagement with the knob on said follower.

26. A stapling device comprising a beam magazine for staples, a housing on said magazine, a reciprocal staple driving plunger slidably encased within said housing, a staple ejecting blade carried by said plunger, said plunger having a recess therein opening through the bottom end thereof and a round portion at its upper end for projection from the housing, a cap piece mounted on said housing and having an aperture therein providing a bearing for said round portion of said plunger, and compression spring means contained in said housing and extending within the recess in said plunger for urging said plunger upwardly.

EDWARD KRANTZ.