

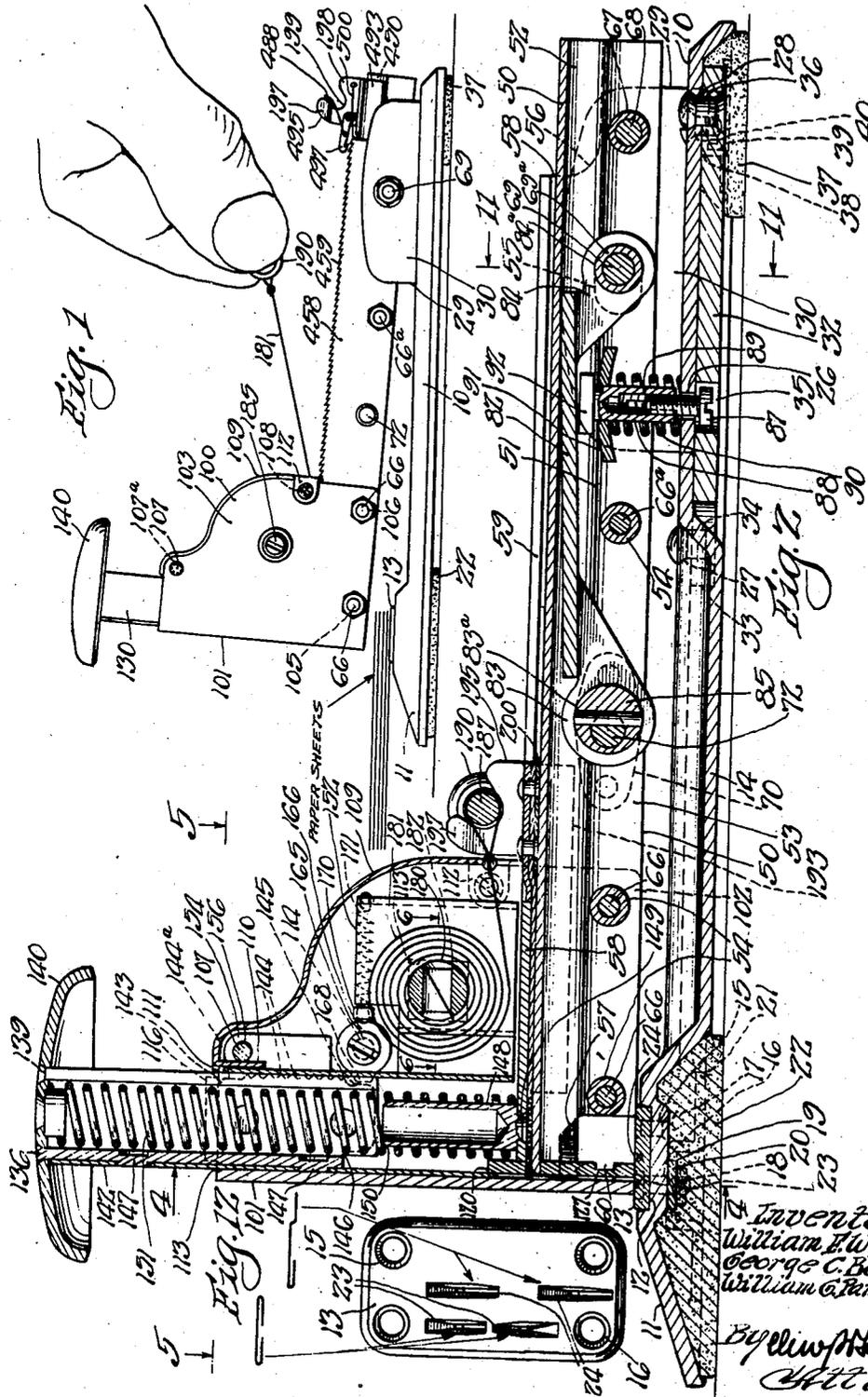
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W. F. WEBER ET AL
STAPLING MACHINE

2,112,941

Filed Oct. 20, 1930

4 Sheets-Sheet 1



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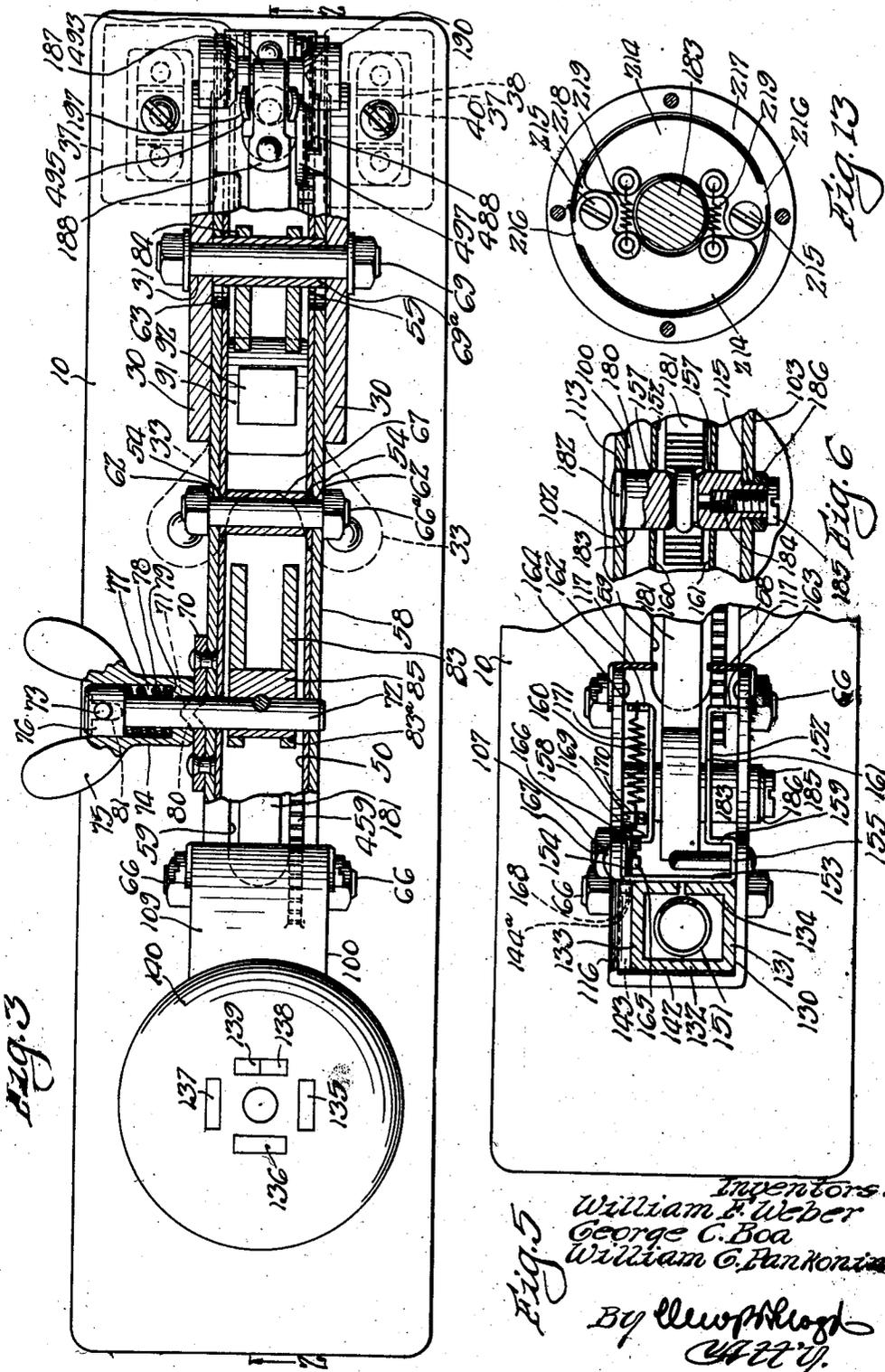
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4 Sheets-Sheet 2



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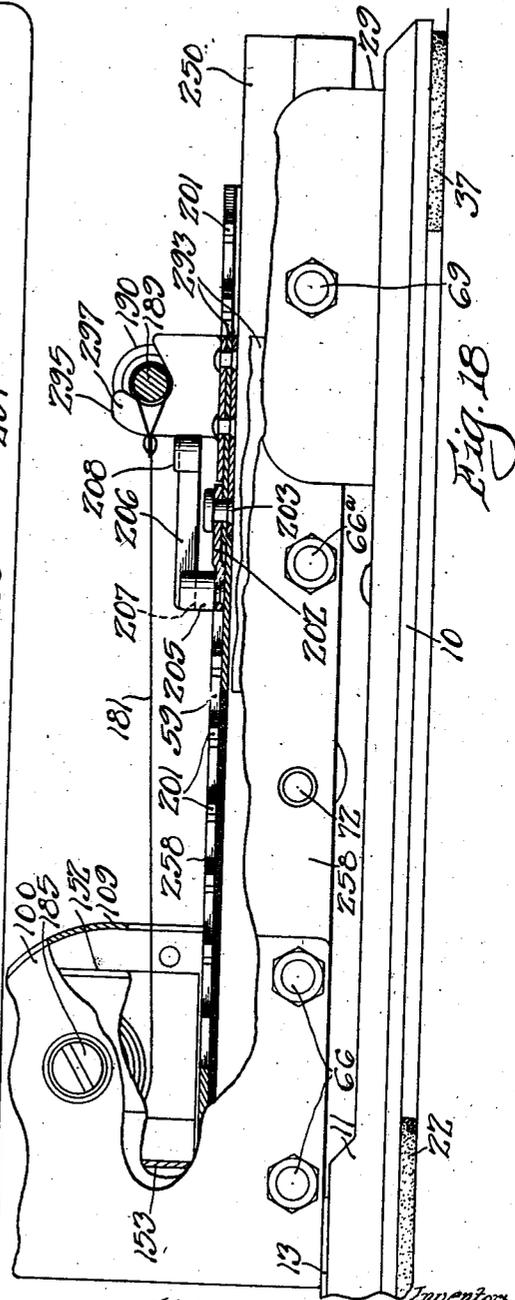
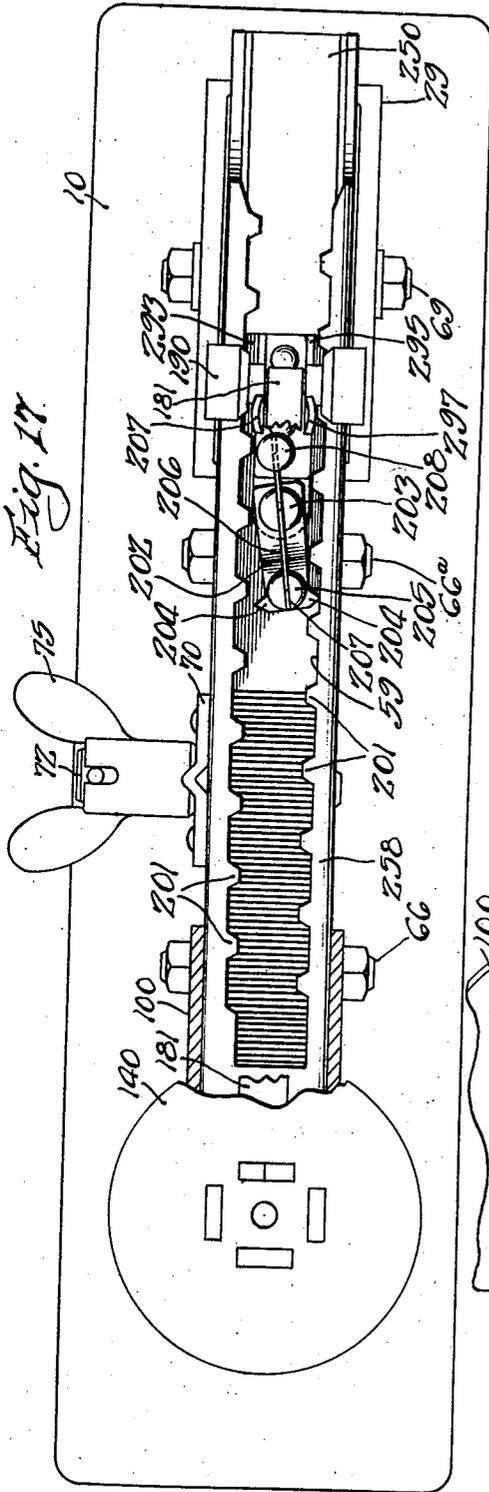
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STAPLING MACHINE

Filed Oct. 20, 1930

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,112,941

STAPLING MACHINE

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38 Claims. (Cl. 1—3)

The present invention relates to a stapling device and has particularly to do with an apparatus primarily adapted to force a U-shaped staple through a plurality of sheets of paper or other material and to deform such staple, by the use of an anvil die so as to maintain the several sheets in a group. The device may be used for different purposes, as for example, as a hammer tacker, or as a desk tacker, and it may be adapted to operation by foot power.

One of the objects of the invention, and perhaps the primary object thereof is to provide a mechanism which can not readily be clogged, and at the same time which rids itself of deformed staples when such are loaded thereinto.

Further objects of the invention, among others, include the provision of the following:

More than one opening in the staple discharging head for discharging staples or parts thereof;

Means in the staple discharging head for straightening slightly deformed staples and cutting badly deformed staples into a plurality of parts;

A method of interlocking the staple discharging die plate comprising the staple channel and track in position by a casing member;

An improved mechanism which is adapted to lock the staple driving plunger against reversal of movement when an up or down stroke thereof is incomplete;

Means insuring a full stroke of the staple driving plunger in one direction followed by a full stroke in the opposite direction without possibility of reversal of the plunger until each stroke is fully complete;

A unique staple discharging head;

An improved means for guiding a staple driving plunger;

Means adapted to force the return of a staple magazine beam a selected portion of the distance over which it may travel;

A unique means for varying the proportion of a magazine beam lift;

A novel movable magazine beam provided with height adjusting elements;

A unique means for mounting a spring which actuates the follower in a staple magazine;

An improved means for anchoring a follower in a staple magazine to a spring by which it is actuated;

An improved method of securing a spring for a follower in a staple magazine in the housing of a staple driving device and including unique instrumentalities for facilitating the variation of the tension of such a spring;

An improved combination of spring shaft and a housing for adjusting a spring therein;

An improved front housing member for a staple discharging head;

An improved magazine beam structure for a stapling device;

A unique follower in a staple magazine and improved means for attaching such follower to its actuating spring;

An improved spring basket forming a section of a stapling device and adapted to be held in position by other parts thereof;

An improved basket for housing a main and auxiliary spring used in a stapling device;

An improved anvil die adapted to provide a plurality of means for treating a staple as an incident to it being discharged thereagainst from a stapling device;

A base for a stapling device having an improved means for securing thereto protective feet;

A unique arrangement of a staple magazine beam, a base, and a connecting member therebetween;

Improved feet for a stapling or similar device and in which metal and rubber are formed into a unitary structure preliminary to attachment to the device;

Mechanism for shifting the position of a staple magazine beam in a stapling device whereby the staple discharged therefrom is brought into contact with different depressions in an anvil die as selected;

A rigid anvil die associated with a movable staple magazine beam to provide a plurality of different types of fastenings by means of similar staples;

A governor or an escapement means to prevent a staple follower from severely striking against staples in a stapling machine magazine;

An improved loop connection for the end of a spring to attach it to a handle member or the like;

A staple magazine follower which cannot be attached to a stapling device in an incorrect assembly;

Means for moving a staple magazine beam relatively to an anvil die; and

Means for preventing the retraction of the staple magazine follower when the follower actuating spring is connected thereto.

These objects, and such other objects as may hereinafter appear, are obtained by the unique construction, improved arrangement, and novel combination of parts comprising the stapling de-

vice and modifications thereof illustrated in the accompanying drawings, in which drawings:

Figure 1 is a side elevation of a hand stapling device embodying the invention;

5 Figure 2 is an enlarged longitudinal section of the device illustrated in Figure 1;

Figure 3 is a plan view, partly in section, of the device shown in Figure 2;

10 Figure 4 is a vertical transverse section of the same device taken on the line 4-4 of Figure 2;

Figure 5 is a longitudinal section on the line 5-5 of Figure 2;

Figure 6 is a horizontal sectional detail of the staple follower spring and shaft 6-6 of Figure 2;

15 Figure 7 is a fragmentary longitudinal section taken on the line 7-7 of Figure 4 and looking in the direction of the arrows;

Figure 8 is a fragmentary vertical section of the staple driving head showing the track for staples and the guide die block therefor, a slightly bent staple being shown;

Figure 9 is a view similar to Figure 8 illustrating the "cutting-up" of a badly bent staple;

25 Figure 10 is an enlarged detail in elevation of the means for preventing outward movement of the staple follower when under the tension of the staple follower spring;

Figure 11 is a transverse vertical section on the line 11-11 of Figure 2;

30 Figure 12 is a plan view of one form of anvil die usable with the device, lead lines being drawn to staples deformed therein;

Figure 13 is a detail, in elevation, of the braking mechanism adapted to be used in association 35 with the staple follower spring;

Figure 14 is a radial section illustrating the assembly with the apparatus of the braking mechanism shown in Figure 13;

40 Figure 15 is a side elevation of the staple driving head and magazine, with base removed, but with finger rests attached thereto;

Figure 16 is a front elevation taken on the line 16-16 of Figure 15 and looking in the direction of the arrows;

45 Figure 17 is a plan view, partly in section, of a device similar to that previously illustrated, but employing means preventing the staple follower from running freely along the staple magazine; and

50 Figure 18 is a fragmentary side elevation, partly in section, of the device illustrated in Figure 17.

Like reference characters are used to designate similar parts in the drawings and in the description of the invention hereinafter given.

55 *The base member*

In the device illustrated, there may be a base member 10. Generally said base member 10 is rectangular in horizontal section, and it may be 60 of an inverted dish type. At the front end thereof is a section 11 of greater height than the main body of the base. In section 11, there is a central seat 12 for an anvil die 13. A centrally disposed rib 14 extends from the rear edge of section 11 toward the rear of the device forming a 65 groove or channel in the top of the base 10. Said rib 14 reaches to the bifurcated section of a bracket member extending through said base, later to be described, and is used to reinforce the material of said base 10.

70 At the corners of the anvil die seat 12 are paired apertures 15 and 16. The rearmost apertures 15 are adapted to receive rivets 17 which depend through the rear of anvil die 13. Apertures 16 at the front of said anvil die 13 are

arranged to receive machine screws 18, which screws extend through anvil die 13, seat 12, and into a metallic insert 19 for the front foot of the device. Said insert 19 is H-shaped in its horizontal position and is articulated at its central section to elevate a transverse section 20 thereof above legs 21 extending outwardly therefrom. Said legs 21 project into a pad 22 which is molded to form an integral cushioned front foot of rubber or other flexible compressible material. Said pad 22 is of a generally square transverse section and covers the open bottom of section 11 of the base 10 with a furniture protecting foot projecting downwardly of section 11 beyond the lower edge of base 10.

Said anvil die 13 has two or more staple receiving depressions, 23 and 24, generally arranged in pairs having complementary cooperative members. Each staple receiving depression is adapted to act upon the end of a single staple struck thereagainst in a downward stroke of the head of the device, to deform such staple end. Generally the depressions are arranged so that when such depressions receive staples, the depressions deform such staples from a U-shape, into a clinching 25 pinning, or other selected fastening configuration in respect to a plurality of papers or the like through which the staple while in a U-shape is forced by a downward stroke of the head of the device before deformation of the staple. The anvil die 13 is secured firmly in rigid position and in proper alignment with the remainder of the apparatus by the plurality of fasteners described. The character and arrangement of such fastening members may be altered without departing from 35 the principles of construction illustrated and described or the advantages obtained thereby.

At the rear end of base 10, there is a pair of parallel slots 25 of equal length. The ends of said slots are in parallel alignment. Intermediate said slots 25 is an aperture 26 to receive an adjusting screw, later to be described.

Three additional apertures are in base 10 for holding fastening members for a bracket 29. Two of such apertures 27 are at the front of slots 25 and may be out of alignment therewith. The third aperture 28 is in the base 10 intermediate slots 25 and adjacent to the rear end thereof.

Said bracket 29 is U-shaped in transverse section. Its legs 30 extend upwardly through and closely fill said slots 25. The tops of said legs 30 are arcuately rounded. Through each of said legs 30 is a shaft bearing 31, the said bearings being in alignment.

The body of the U-shaped bracket comprises a 55 rectangular section 32 defined by the legs 30 which are articulated upwardly therefrom. Its front is a bifurcated spreading section 33 integral with section 32. Through the bifurcated section 33 are apertures 34 registering with apertures 27 in base 10. In the rectangular portion 32, there are apertures 35 and 36, the former registering with aperture 26 in base 10 for the reception of a beam adjusting screw, and the latter registering with aperture 28 in base 10. The bifurcated section 33 extends to and about each side of the rib 14 in base 10.

Suitable fastening members extend through apertures 27 in base 10 and apertures 34 at one end of bracket 29, and aperture 28 in base 10 and aperture 36 at the other end of said bracket 29 to secure the latter firmly upon the base 10. Said fastening means, in conjunction with slots 25, maintain bracket 29 in correct alignment with base 10 at all times.

Across the rear end of the base 10 are two pads or feet 37, each pad being similar to pad 22 at the front of the device. Said rear pads 37 may be of lesser dimension than the front pad 22 because there are no blows struck against the top of the device at the rear end thereof. Each rear cushion 37 includes a metallic insert 38, a U-shaped member. The legs 39 extend into the pad 37, or the material of said pad is molded about said insert 38 to provide a flat cushioned base. In each of said legs 39, there may be apertures (not indicated by reference characters but plainly visible) to receive a portion of the molded material to provide a more secure jointer between insert 38 and pad material 37. Said pads 37 are at each side of bracket 29 and in alignment therewith. They are held in position by screws or other fastening means extending through said base 10 and into threaded apertures in said metallic parts 38 of the foot. The apertures 40 in said base for said screws are adjacent to the rear end and to the outside of slots 25. Each foot 37 extends below the lower edge of base 10 to protect furniture or the like from damage from said metallic base.

The beam

The present device uses a staple magazine beam. Said beam comprises two U-shaped or channel members providing a magazine for a supply of staples. One of said members provides an internal and bottom track for such staples to slide along while the other provides an upper and outer track to guide the staples into the staple discharging head to which the said beam is secured. The inner track member 50, in transverse section, includes shoulders 51 suitably obtained. Inner member 50 externally is narrower above the shoulders 51 than therebelow. For convenience the narrower section of member 50 will be designated 52. On such narrower section 52, the smaller staples may ride. The lower and wider section of member 50 is designated 53 and such section is joined to the outer and top member of the magazine track. Said member 50 is adapted to extend from one end of the beam to the other end thereof. A portion of the top section 52 and the whole of section 53 is removed at 57, the removed material being taken from the under side of the member 50 at its front end.

Intermediate its length, member 50 may have a plurality of round apertures 54 extending transversely of section 53 thereof. Removed from the rear end of said member through said section 53 is an elongated aperture or shaft opening 55.

Secured to said inner and bottom member 50 is an outer and top member 58 which may comprise a unitary sheet of material articulated or shaped to provide a channel. This member guides the outside of the staples and holds them in the magazine. Said member 58 has an open top 59 beginning at its rear end and extending the major portion of its length. The end of said opening provides a stop for a staple follower in said magazine and later to be described. At the front and at each side of member 58 are tongues 60, and at the rear end 56 thereof, the top and a portion of the sides of said member are cut away to provide for ready loading of the staple magazine beam with staples. There is a short portion of section 52 of inner and bottom 50 exposed in its entirety above the shoulders 51 thereof at its rear end to receive staples as they are loaded into the magazine, generally in strips, but infrequently singly. In the top and outer member 58, at

its front, is an aperture to receive a spring guide post later to be described.

Staples when loaded into the beam are adapted to be moved therealong under the influence of spring pressure, being propelled by the force of a follower also later to be described. The staples when loaded into the beam magazine, rest upon the internal member 50 and are guided by the internal wall of outer member 58, the top portion of which has an elongated opening from its rear end to allow the ingress and egress of a spring actuated follower, the end of the opening forming a stop, as indicated just above. Such stop prevents the follower from reaching the path of the staple driving hammer or member when the last staple is discharged from the beam magazine.

The guide member 58 has a plurality of apertures 62 registering with apertures 54 in inner member 50, also an elongated aperture 63 registering with elongated aperture 55 in member 50. The said apertures 62 and 63 extend through both sides of said outer member 58 in accurate alignment.

Said outer and top member 58 and said inner and bottom member 50 are held together by a plurality of transverse bolts. Running through the two forwardly aligned apertures 54 and 62, are bolts 66. Through the next rearward aligned apertures 54 and 62 is a shorter bolt 66a. About each bolt 66 and about bolt 66a is a spacer 67 extending from internal wall to internal wall of member 50. The apertures 54 and 62 at the rear end of the beam are filled with a channel spacer 67 through which cylindrical member there extends a locator 68 or blind pin having ends which clear the internal walls of the legs 30 of bracket 29. Each bolt 66 and bolt 66a may have two threaded ends, and the two forward bolts 66 of the beam may pass through a housing for the staple discharging head which housing surrounds the beam. Through the elongated apertures 55 and 63 in said beam members 50 and 58 is a shaft 69 which also passes through the legs 30 of the U-shaped bracket 29 extending upwardly out of the base 10. About said shaft 69 is a sleeve 69a which extends from the inner face of one leg 30 to the inner face of the other leg 30, which sleeve 69a is engaged by a link for shifting the beam longitudinally of the base 10 within the limits of the longitudinal extents of the elongated apertures 55 and 63 which are in close registry.

In the present device, there is a single anvil die 13, which anvil is provided with a plurality of means 23 and 24 for differently deforming a staple forced thereagainst by the downward movement of a follower or plunger. A stationary anvil die will permit of more accurate registry with a staple discharging element than a movable anvil die. The reason for this is simple. When there are two moving parts which have to be adjusted relatively to one another, inaccuracy may be had by the dislocation of either or both moving parts. On the other hand, if there is a stationary part and a part movable relative thereto, it is necessary only to keep the movable part in correct alignment with the fixed part in order to establish accurate registry therebetween.

Instead of employing a movable anvil die and adjusting such anvil die to a beam, which beam is movable in all conventional stapling instrumentalities, there is provided the stationary anvil die 13 rigidly secured to base 10, and means are attached to said beam whereby it is adjustable relatively to said stationary anvil die to provide accurate registry between the staples dis-

charged therefrom one at a time, with either of the deforming parts 23 and 24 as selected.

One form of beam shifting instrumentality is illustrated. Upon the side of outer magazine member 58 is a plate 70 having a vertical rib 71 which is normal to the beam. Said plate 70 may be attached to the outer and upper magazine member 58 by rivets or in any other suitable manner. Extending through the material of the plate 70 in alignment with said rib 71 and projecting through the material of said inner member 50 and said outer member 58 is a shaft 72 which is journaled for rotation in said beam. At the outer end of shaft 72 is a transverse pin 73. Intermediate the plate 70 and said pin 73 is a barrel 74 of a wing nut 75. Said shaft 73 has an enlarged head 76 through which pin 73 is secured.

Within said barrel 74 which is internally enlarged to provide a spring housing 77 is a coil spring 78 which normally engages the bottom 79 of said spring housing 77. The outer convolution of said spring 78 rests against the enlarged head 76 of shaft 72. Thus the coil spring urges wing nut 75 against the plate 70, the contiguous face of said wing nut 75 having therein a diametrical groove 80 which registers with the transverse rib 71 of the side plate 70. Said wing nut 75, intermediate the wings thereof, has a pair of diametrically opposed slots 81 extending inwardly a limited distance from the outer edge of the barrel 74. It is in said slots 81 that the transverse pin 73 rides.

Rotation of the wing nut 75 causes rotation of the shaft 72 to which is splined said wing nut 75 in the manner indicated. Such rotation of the wing nut 75 may be had by twisting the wing nut 75 with sufficient force to cause it to cam outwardly over the rib 71, thus compressing the spring 78. The movement of the wing nut 75 as a result of such camming action is longitudinal of the shaft 72. The pin 73 engages the material adjacent the slots 81 in said wing nut 75 to prevent axial relative movement between the wing nut 75 and said shaft 72. Said wing nut 75 by the construction shown may occupy stable positions 180° apart, and is unsuited to maintain any other position. If it is desired to use an anvil die with more than two staple deforming arrangements, more stable positions for the beam are provided so that the beam may be made to occupy as many positions as needed.

Below the inner magazine member 50 is a link 82. At each end of said link 82 are extensions at each side thereof, each of which extensions has an annular aperture therein. The extensions at the front of the link are designated 83 and those at the rear designated 84. The latter encircle bushing or sleeve 69a about shaft 69. Said sleeve 69a freely rotates around said shaft 69. There is between said sleeve 69a and shaft 69 sufficient clearance to prevent any possibility of binding and consequent wear. Opposed annular apertures in parts 83 and 84 are in accurate alignment and designated 83a and 84a.

As previously pointed out, there are apertures 55 and 63 in inner magazine member 50 and outer magazine member 58, respectively, in close registry. Through these said beam bearing shaft 69 and sleeve 69a are adapted to operate. The main shaft 69 for the beam is the axis of the movement for said beam because of the attachment of said link 82 about said sleeve 69a, said sleeve 69a rotating freely on beam shaft 69.

At its opposite ends, said beam shifting link 82

through openings 83a is connected to an eccentric 85 which is adapted to rotate in said openings. Said eccentric 85 is keyed to the shift shaft 72 operated by the wing nut 75, the eccentric 85 being penetrated by said shaft 72 off center.

In the position shown in Figure 2 of the device, said eccentric 83 maintains the beam in an extreme forward position, that is, with the beam moved forwardly in the base 10 of the machine. By rotation of the shift shaft 72 one hundred and eighty degrees, the beam is moved to its back position, or as far rearward of the base 10 as it is possible to move it.

When in the rearmost position, the discharge orifice for the staple in the stapling head which is secured to the beam registers with the rearmost staple operating section 24 of the anvil die 13. While the beam is in its foremost position, said staple discharging orifice is in accurate registry with the front staple engaging portion 23 of the anvil die 13.

If more than two different types of staple deformations are required, as previously indicated, means may be supplied to provide more than two positions for the beam to occupy relatively to the stapling anvil die 13, said beam being adapted to register in predetermined position for engagement with the various staple operating portions of the anvil die one at a time.

The limit of movement between base 10 and the beam is determined by the engagement of the staple discharging head upon the anvil die 13, in one extreme position, and by the contact of the rearmost end of the beam with the top of base 10 as the beam rocks about shaft 69 in the other extreme position. These two extreme positions may be had by manual operation of the beam.

A spring member is provided to lift the staple discharging head from anvil die 13. Such member has in association therewith means for regulating the extent of the movement upwardly of the front end of the beam under the influence of the spring if it is desired to limit such actuated return to a portion of the arc defining the entire possible movement of said beam.

Through the body of the base 10 in aperture 26 there is a height adjusting screw 87. Said screw also extends through bracket 29 by way of aperture 35, the aperture 35 being countersunk, bored or larger than aperture 26 to receive the head of such beam return adjusting screw 87. Said screw 87 extends inwardly of a nut 88 cylindrical in shape and internally threaded. Said nut has a square head to prevent turning and is slotted to allow for friction. The shank 89 of said nut 88 is surrounded by a spring 90 which extends from the top of the base 10 to a spring plate 91. Said spring plate 91 is rectangular in configuration and is slightly arcuate in longitudinal section. The sides of plate 91 are held between the internal walls 53 of the U-shaped internal member 50 and the edges contact shoulders 51. At the upper side of plate 91, the nut 88 has a square head 92 fitting loosely into section 52 of the inner magazine member 50 which prevents it from rotating and forming an adjustable stop for plate 91. Rotation of the height adjusting screw 87 will regulate the limit of upward movement of the beam, such upward movement being under the urge of the spring 90 in respect to plate 91. Thus the beam may be adjusted to return any selected fraction of the arc defining its maximum movement relative to base 10.

The staple discharging head

At the front end of the beam and assembled with it is a staple driving head into which staples from the beam are received and discharged, one at a time, against the anvil die 13. The head includes primarily staple driving means and means for advancing the staples to the driving means.

The head comprises a housing 100 which has a rectangular front 101, and two sides 102 and 103. Each side 103 and 102 is somewhat of a mutton leg shape, the top, bottom and rear edges thereof being parallel. Side 102 and side 103 have aligned opposed apertures 105 and 106 at the front and back thereof whereby dowel bolts or dowel screws 66 secure housing 100 to the beam. At the top and rear of housing 100 are aligned apertures 107a through which a dowel bolt or pin 107 extends.

In each of sides 102 and 103 are also opposed apertures 108 to receive a screw passing through ears in a cover member 109 having a body extending from the top back edge of housing 100 to adjacent the beam. At its top cover 109 has a tongue 110 extending over dowel pin or bolt 107 to be hooked thereon, there being two short extensions 111 at the sides of the tongue to rest on the edge of sides 102 and 103. Adjacent its bottom end, cover 109 has ears 112 which extend over sides 102 and 103 and are secured thereto by screws penetrating the ears and projecting into apertures 108.

In side 102 is a square aperture 113 to receive the square end of a staple feeder spring shaft, and a round aperture 114 to provide anchorage for a pawl stud screw, while side 103, opposite aperture 113, has a round opening 115 to receive the other end of such staple feeder spring shaft. Side 102 also has a tongue 116 which is turned inwardly to provide a bearing surface for a plunger which is spaced from side 102 at its top by said tongue 116. Said tongue also forms a stop for upward travel of the plunger as is pointed out later.

At each side of cover 109 at its bottom are extensions 117 between which the staple feeder spring is adapted to be guided. Intermediate the end of the beam and the front 101 of housing 100 is a die plate 120. Said die plate has at its vertical edge flanges 121 which provide a track for staples intermediate the inside wall of front 101 and said die plate 120 and in which a staple driver rides to drive a staple against anvil die 13. The outer edges of the flange may be beveled to provide a snug fit in the corners of housing 100 which is articulated to form the sides 102 and 103 at ninety degrees from front 101. The flanges 121 may be formed in any suitable manner. Intermediate said flanges, there is an inverted U-shaped opening 122, such opening 122 extending from the internal edge of one flange 121 to the internal edge of the opposite flange.

Into the opening 122, there extends a tongue 123. Intermediate the tongue 123 and adjacent flanges 121, the material of die plate 120 is shaped to provide a V-shaped wall, the top edge being designated 124. One face of said V-shaped section designated 125, is inclined toward the front of the device, and the other, 126, which is longer, is inclined toward the rear of the apparatus. The distance between flanges 121 below opening 122 is slightly less than the distance between said flanges above opening 122, and very slightly less than the outside dimension of the usual wire staple to be forced between said flanges. Such

narrowness prevents a staple loosened from a strip from dropping downwardly in the track therefor between flanges 122 until driven downwardly by an urging force other than gravity. At the back of die plate 120 is a slot 127 extending thereacross and at its ends to receive the tongues 60 of guide member 58, while the inner magazine member 50 is arranged to rest on the top of tongue 123 with its front edge flush with the front of said tongue 123. Thus, there is provided two apertures through the die plate 120 at the sides thereof in the legs of the inverted U-shaped opening 122 through which staples or portions thereof may be discharged when not discharged by way of the track between flanges 121.

By the arrangement shown, a staple discharged from the inner staple magazine member 50 and into the groove between the flanges 121 at the front of die plate 120 is guided downwardly there-through with the points projecting downwardly. Should said staple be slightly deformed, that is, the legs thereof be not in perfect alignment with the body and with one another, the ends of the staple will strike upon the sloping surface 125 of the wall 124 and be guided into the space between the plate 120 and the front 101 of the device, to be straightened and to be forced into an object resting upon the anvil die 13 or beneath the staple discharging head. If, on the other hand, the deformation of the staple is gross, a leg or a part of the staple will be forced across the top of the wall 124 by contact with rear face 126 thereof. The further downward movement of the staple under pressure will cause the staple to be pressed upon the lower edge of face 125, and with sufficient force, it will be cut into sections. When so cut, a part of the staple may fall down the channel in which the staple follows, or a part of said staple may be discharged through the openings back of the point 124 through the legs of opening 122, falling to base 10 without interference because of the removal of section 57 of member 50. It will be noted that there is always a continuous passageway from above the point 124 to the base 10 through which staples are manually forced as a result of the action of the staple plunger, such passageway permitting of the escape of broken, mutilated or cut sections of staples.

In said housing 100, a plunger 130 for driving staples downwardly and out of the staple discharging head is provided. In the present device there is a square hollow member having sides 131, 132, 133 and 134. Said sides are formed by articulating a sheet of metal, sides 131, 132, and 133 being of one continuous piece and side 134 comprising nearly abutting extensions from sides 131 and 133. Tongues 135, 136 and 137 project upwardly from sides 131, 132 and 133 respectively and two adjacent tongues 138 and 139 project from the opposite sections of side 134.

Said plunger 130, at its top is closed by a cap 140 having recesses to receive said several tongues, the cap 140 being rounded to receive the impact of the palm of the open hand or the lower side of a closed fist without discomfort to the operator of the device. Any suitable means may be employed to secure cap 140 upon plunger 130. It may be riveted into position or brazed.

Plunger 130 at its front 132 has secured there-to by rivets or otherwise a tool steel staple driving punch 142 which may be called a staple hammer or driver, said punch extending well below the bottom of plunger 130 and at its free end between the flanges 121 of die plate 120, the

downward extent of the movement of said driver being to the bottom edge of housing 100. Punch 142 slidably engages the internal face of front 101. Side 131 of plunger 130 rides closely against side 103 of housing 100. The top end of hammer 142 may extend upwardly into cap 140 to provide a concealment for the top of said punch and a firm buttress for said top end.

On side 133 of plunger 130, there is a rack 143 having teeth 144 intermediate offset top and bottom sections 144a and 145, respectively. At the front and bottom of rack 143 is another recess or cutaway section 146 to clear die plate 120. Said rack is secured to side 133 by rivets 147 or by other suitable fastening members, said rack spacing plunger side 133 from side 103 of housing 100. The tongue 116 on housing side 102 provides a stop for plunger 130 by engaging the top of rack 143 to limit the upward movement of plunger 130. At this point, it is well to again note that the front 132 of plunger 130 and rack 143 at its bottom front edge 146 are cut away to clear the top of die plate 120.

From the outer magazine member 58, there extends a plunger spring guide stud 148 having an extension secured to the former by extending said extension through the aperture 149 in the top and front of guide member 58 heretofore mentioned without reference character, and then riveting it into position. Said stud has a round or beveled exposed end 150 to facilitate the sliding from the top thereof of any of the convolutions of a coil spring surrounding said stud, if accidentally disarranged to engage the said stud at its top.

To urge the plunger 130 upwardly, a coil spring 151 is disposed about stud 148 with its bottom resting on outer magazine member 58. Said spring extends upwardly into the square hollow barrel of plunger 130, resting at its top end against plunger cap 140. The plunger 130, when in uppermost position has its lowermost section just above the top 150 of stud 148.

To provide a guide for the fourth side 134 of plunger 130, there is disposed in the housing 100 a basket 152, comprising a sheet of material articulated to provide a front wall 153 adapted to form the guide for the side 134 of plunger 130. Said front 153 is substantially co-extensive with the height of housing 100. At each side of front 153 are sides 154 and 155. Sides 154 and 155, adjacent their top are relatively narrow in width, and through the said sides at their top apertures 156 extend to receive dowel bolt 107. Apertures 156 register with apertures 107a in housing 100. The tongue 110 of cover 109 reaches inwardly of housing 100 to the rear of basket front 153 but in front of dowel bar or pin 107.

The sides 154 and 155 also have aligned apertures 157 therethrough in registry with aperture 115 in housing side 103 to receive a shaft for a staple follower spring, which shaft and dowel bolt or pin 107 secure the basket 152 firmly in the proper position in housing 100 to serve as a guide for plunger 130. Sides 154 and 155 are both articulated to provide inwardly turned sections 158 and 159, parallel adjacent sections 160 and 161, and outwardly turned flanges 162 and 163.

A part of side 154, inwardly turned section 158 and section 160, is removed to provide space for a pawl shortly to be described. A section of flange 162 is cut away to provide a hook 164 for a spring associated with said pawl. Between

sections 161 and 162, a spring for the staple feeder is disposed.

Extending outwardly through aperture 114 is the shank of a pawl fulcrum stud 165 on which and within housing 100 a pawl 166 is adapted to freely rock. Said pawl stud 165 is secured in proper position by a nut 167, there being provided proper shoulders on said stud to facilitate the free movement of the pawl.

Said pawl 166 is generally annular and has a 10 central opening for the stud 165. At one side, it has a tongue or tooth 168 while opposite thereto is an extension 169 turned outwardly to form a spring hook 170. A coil spring 171 has one end looped over said hook 170 and its other end 15 looped over hook 164 in basket 152 whereby to maintain the tooth 168 in substantially horizontal position.

In rack 143 there are ten teeth as shown. More or fewer teeth could be employed. In practice, 20 the first four teeth at the bottom of the rack illustrated as having recesses of the same depth as all other recesses may have deeper recesses therebetween and are a greater distance apart than the remaining teeth to facilitate a more effective action of the pawl 166. The end faces 25 are at a greater angle to prevent wedging of the pawl and to insure proper throwing from one position to the other.

The action of the rack 143 and of the pawl 166 30 is as follows: In the uppermost position of the rack 143, the tooth 168 of the pawl 166 is resting in the recessed section 145 of the rack 143. As is indicated in the drawings, there is room for a slight movement of the plunger 130 before the 35 rack 143 engages the tongue or tooth 168 of the pawl 166. Downward movement of the plunger 130 causes the first tooth of the rack 143 to push the pawl end 168 out of its way by a rotative movement of the pawl of probably thirty or forty 40 degrees about the stud 165. Further movement downwardly of the plunger 130 causes the pawl to assume various angular positions with the tongue 168 engaging the toothed edge of the rack 45 because the tension of the spring 171 extending from the hook 170 on the rear end of the pawl to a hook 164 upon the basket 152.

If the actuating force is removed from the plunger 130 before the teeth of the rack 143 shall 50 have completed their travel past the pawl 166, upward movement of the plunger 130 is arrested because the tongue 168 of the pawl 166 engages in the teeth of the rack 143, there being insufficient area for pawl 166 to fully rotate when the 55 teeth in the rack 143 are opposite the pawl 166. Once the plunger 130 has moved the rack sufficiently far for the lowermost tooth on the rack 143 to engage the tongue 168 of the pawl 166, there can be no upward movement of the plunger 60 130 until the entire rack 143 shall have passed the tongue of the pawl 166. When the urging force applied to the cap 140 upon the plunger 130 shall have forced the plunger 130 inwardly a distance causing the top tooth of the rack 143 65 to pass the tongue 168 of the pawl 166, the pawl 166 then assumes a horizontal position under the urge of the coil spring 171 intermediate said pawl and said hook upon said basket.

Further slight movement of the plunger 130 70 may be had to clinch or deform a staple on anvil 13. The lowermost position of the plunger is determined by the engagement upon the guide 58 of the plunger 130. A slight amount of play at the end of the down stroke is available in the 75

apparatus as illustrated while tongue 168 of pawl 166 rests in top recess 144a of rack 143.

Upward movement of the plunger 130 is controlled by rack 143 and pawl 166 in exactly the same way except the pawl and rack move in the opposite direction, the stroke beginning with the tongue 168 in recess 144a and ending with the tongue 168 in recess 145.

In the basket 152 and housing 100, there is journalled a shaft 180 for a clock spring 181 to urge a staple feed along the magazine member 50 while guided by outer magazine member 58. Said clock spring 181 is anchored in said shaft 180 in any customary manner, as for example, by threading one end of the spring through a hole or slot in said shaft and securing such end of the spring to and about said shaft to prevent accidental separation of the spring and shaft. Said spring 181, after being wound around said spring shaft a plurality of times, extends rearwardly out of the staple discharging head between the extensions 117 on the cover member therefor, the outermost end of the spring 181 being adapted to be secured to a staple feed finger and thumb member.

Shaft 180 comprises a square head 182, a round shank 183, and a smaller neck or step, the latter projecting outwardly of housing 100. Said square head 182 is adapted to be seated in the square aperture 113 in side 102 of said U-shaped housing 100. At its other end, said shaft 180 is internally threaded through its neck or step, as indicated by the ordinal 184, and there is adapted to be threaded into such internal section, a machine screw 185 having a slotted head. Shaft 180 is rotatable in aperture 113 in side 103 of housing 100 and in apertures 157 in basket 152. The neck or step of said shaft 180 is substantially twice the thickness of the wall of housing 100 so that when the spring shaft 180 is in a seated position with the head 182 in aperture 113, said neck will extend through the housing member the thickness of a washer. When the device is assembled, usually there is a washer intermediate the wall 103 of said housing 100 and the head of said machine screw 185. Said washer is used to prevent longitudinal displacement of the shaft 180.

The head 182 of the shaft 180 which is square, as shown, is of relatively little depth, i. e., substantially the same depth as the washer 186 heretofore mentioned or of the side 102 of housing 100. To tighten the tension of the main spring 181, the machine screw 185 is removed and thereafter the washer 186 is taken from about the neck or step of the shaft 180. The screw 185 is then replaced and threaded into position, and pressure is brought to bear laterally of the housing to force the square head 182 of the shaft 180 out of the aperture 113 by the side 102 of said housing 100.

Rotation is then had of the machine screw 185 to increase the tension upon the main spring 181. To reduce the tension on the spring 181, it is allowed to unwind itself. When the proper adjustment is made, the square head 182 is forced back into its seat 113 by being moved to register with said seat, there being a bevel in the inside of square head 182 to assist in securing registration. When registry is had, the head 182 is pressed inwardly. Thereafter the machine screw 185 is removed, the washer 186 replaced, and the screw 185 replaced in its normal position. The square head 182 at one side, and the shoulder between the shank and the neck or step at the other side in connection with the washer 186 and

the machine screw 186 prevent lateral and axial displacement of shaft 180 when the shaft is assembled in adjusted position.

At the outermost end of said spring 181, there is a narrowed portion 187, terminating in an enlarged end 188, said narrowed portion 187 being looped over the shank 189 of a finger and thumb member 190. Part 188 is riveted to the main body of the spring 181 beyond the narrowed portion 187. By the loop thus formed, the finger and thumb member 190 is held on the end of spring 181. Said finger and thumb member comprises a central portion 189 of small diameter about which the looped spring is secured, and has adjacent thereto at each side thereof enlarged sections or barrels 191. Projecting from the barrels 191 are cup like members 192. The cups 192 are adapted to receive the tip of the thumb and a finger to make the manipulation of the spring 181 an easy matter.

To force staples longitudinally of the staple magazine comprising members 50 and 58, there is provided a staple follower 193. Said channel member has in its top surface adjacent to its rear end, a slightly elevated section 194. On such elevated or platformed section 194, there is a hook 195, which comprises an articulated piece of metal having a shouldered extension 196. The main body of said member 195 is adapted to rest over the platform 194 on said follower 193 while the shouldered extension 196 thereof is adapted to extend over the top surface of said channel member beyond the platformed section 194 thereof to contact with the end of the slot in outer magazine member 58 to arrest inward progress of the follower when the last staple is discharged from the head.

At each side of said hook member 195, there are complemental opposed and aligned upturned wings. Said wings are divided into two upstanding sections, 197 and 198, thus forming a slot 199 therebetween. Section 197 has an undercut in its rear surface in which the sections 191 of finger and thumb member 190 engage. The rear section 198 is lower than section 197 and has a contour which provides no possibility of holding handle 190. The front contour of section 197 is such that the handle member cannot be engaged therealong.

This arrangement permits of the follower 193 being placed in position intermediate the staple magazine members 50 and 58 with the finger and thumb member 190 at the rear of section 197 only. The under cut portion of section 197 receives the intermediate section 191 of the finger and thumb piece 190, the loop and a portion of the spring extending between the wings forming sections 197 and 198.

If for any reason, an operator should attempt to put the follower 193 into the device with the follower reversed, the finger and thumb piece 190 under the urge of the spring 181 to which it is attached, will refuse to remain in engagement therewith because no part of the wings will then provide a hooking section for the finger piece.

Beneath the follower 193 in the elevated section 194 thereof is an elongated washer 200. Rivets are used to secure the hook member 195 upon the follower 193, such rivets extending through the hook member 195, the channel member 193 and the washer 200. Other fastening means may be substituted for the rivets. When the spring 181 is released from the staple feeder, the finger and thumb piece 190 rests against the cover 109 of housing 100.

It may be desirable to provide means in a stapling device whereby the staple feeder, under any condition, will not be allowed to strike against the strip of staples in the staple magazine (parts 5 59 and 58) while under the full urge of the feeder spring. The average operator of a stapling device is not careful of the manipulation thereof and will release the staple feeder from the hand to permit the follower to speed into the staple magazine under the full urge of the extended staple 10 follower spring. The result is that the staples in many devices are jammed or deformed or the strips thereof caused to buckle. In the present device, such buckling or deformation is quite im- 15 material because the device is provided with means for reshaping staples which are slightly bent and for breaking up and discharging badly deformed staples. It may be desirable, however, to provide a mechanism of such character in 20 order to avoid damage to the staples. Three means for preventing a staple follower from striking staples in a magazine a severe blow are illustrated.

One of these means comprises an escapement. 25 A staple magazine comprising inner member 250 and an outer member 258 with teeth 201 at each edge of the slot therein is provided. The teeth 201 are opposed and in staggered arrangement. Adjacent to a hook 295 upon a follower 293, there 30 is provided a pawl 202 which is pivoted at one end 203, and which at its other and free end has opposed teeth 204. In association with said pawl 202 is a lug 205 which provides a holder for a spring 206. An opening 207 in lug 205 is ar- 35 ranged to receive said spring 206 and is parallel to the direction of the movement of the follower 293. In said lug 205, the spring 206 may be frictionally secured, and it may be of the flat clock 40 type. The free end of said spring 206 is weighted as indicated at 208 so that the weight and spring retard the rapid operation of pawl 202 as it is projected from one side to the other while the follower moves inwardly of the staple magazine. In installing such retarding device, it is necessary 45 to slightly elevate the handle engaging fingers 297 of the hook above the level provided therefor in a device not having such speed retarding mechanism.

When the follower 293 is placed in position in 50 the staple magazine comprising members 250 and 258, the teeth 201 on said outer and upper member 258 first on one side and then upon the other side are engaged by the adjacent tooth 204 upon the pawl 202, the teeth 201 projecting inwardly 55 sufficiently to be in the path of a section of the adjacent tooth 204. For the staple follower 293 to pass any one tooth 201 under the urge of the spring 181, it is necessary for said follower 293, through the pawl 202, to engage a tooth 201. 60 Such tooth 201 forces the pawl 202 to the opposite side of the magazine beam, the weight 208 on spring 206 acting as a pendulum providing resistance to the rapid reverse movement of pawl 202, thus slowing the speed of the follower 293. 65 The pawl 202 then strikes the next opposed tooth 201 and again is forced to the opposite side against the resistance of the pendulum comprising spring 206 and weight 208. The constant arcuate swinging movement of the pawl 202 from side to side, 70 such movement being against the opposing urge of the spring 206 and weight 208, makes it impossible for the follower 293 to travel rapidly along the staple magazine with the result that when the follower 293 engages the outermost 75 staple in the magazine, said follower 293 strikes

such staple a relatively light blow, wholly insufficient to damage any of the staples in the magazine.

Instead of employing a staple magazine having a speed reducing element for the staple follower, the staple feed spring may be supplied with a 5 governor or brake member, which limits the speed at which the spring may coil. Such governor or brake may be inactive during the uncoiling operation, or it may be arranged that the 10 device may have a governor that is operatable in both directions. Such an apparatus in the form of a braking instrumentality is herein illustrated.

The staple feed spring 381 is anchored to the 15 spring shaft 380 in the usual way. About the spring 381 is a drum 212 to which the outer end of said spring is attached. To drum 212, a tape or steel band 213 is secured and to this is secured the finger and thumb piece 190. Rotation of 20 shaft 380 determines the pull of band 213 because drum 212 is directly connected to said tape 213. At the side of the drum 212 are two weights 214, pivoted at 215. Each weight is arcuate in configuration and has a short shoe 216 25 to engage the periphery of a band 217 held rigid in the staple discharging head. The weights 214 are upon a frame 218 or are otherwise adapted to rotate with the drum 212 and to move relatively to band 217. Springs 219 normally main- 30 tain weights 214 out of engagement with band 217, but if the drum 212 rotates more rapidly than a predetermined speed, the weights 214 fly outwardly on their pivots 215 and engage the internal periphery of band 217 to arrest such excessive speed and to brake the spring drum 212 35 against too rapid rotation.

As selected, one braking device may be employed to arrest inward movement of tape 213, 40 or two braking devices may be used at opposite sides of spring 381 to arrest movement in one direction only, or two braking devices may be disposed at opposite sides of the spring 381, one to arrest movement in one direction and the other to retard movement in the other direction. 45

Many persons have a tendency to play with desk appliances and the like. A favorite toy is a stapling device and a happy pastime is to reciprocate the staple follower in a stapling magazine, drawing the follower and its spring back 50 manually and then releasing the two to allow the follower to snap against the staples in the loaded magazine.

Two methods for reducing the force of the blow 55 of the follower upon staples have been hereinabove described. An effective means for preventing such playfulness and its ulterior effect is now to be described.

The staple magazine upon which such device is 60 illustrated comprises a lower member 458 and a top and outer member 456. The main or staple magazine follower spring, finger and thumb piece, and associated parts may be the same as for any of the other devices illustrated. Upon 65 the top surface of outer member 456 and at one side thereof is a rack 459.

In connection with a staple magazine follower 493 is an upright hook member 495 of substantially the same configuration as hook member 195. Pivoted at 496 and at the side of said hook member 495 is a pawl 497, the hooked end of which is adapted to engage in the teeth comprising rack 459.

From said pawl 497 an arm 488 projects in- 75

wardly of the hook like back periphery of the hook member 495, such arm normally extending rearwardly of the peripheral faces of the hook sections of member 495 an appreciable distance. Such member 488 is firmly secured at point 499 of the pawl 497 and said member may be of flat spring material bent to provide a camming face to be engaged by the finger and thumb piece 190 whereby said pawl 497 is forced into the teeth in rack 459 when the finger and thumb piece is back of the hook member 495. The pawl 497 and rack 459 are arranged so as not to retard forward movement of the staple follower 493 under the urge of the main spring. Retractable movement of the staple follower 493 is prevented, however, because the camming force of the finger and thumb piece under the urge of the main spring causes the pawl 497 to hook itself upon the next rearwardly disposed tooth in rack 459 in the path of pawl 497. Hence, follower 493 can not be moved rearwardly in the staple magazine with the finger and thumb piece in position in hook member 495.

When the finger and thumb piece is released from the hook member of follower 493, the pawl 497 may be readily lifted out of engagement with rack 459 and to insure such disconnection between pawl 497 and rack 459 as an incident to the release of the finger and thumb piece from the follower 493, a second and light spring 500 is secured at one end to the side of hook member 495 by a stud 501, the other end of said spring 500 being secured to pawl 497 to urge the hook end of said pawl 497 upwardly and away from rack 459 coincidentally with the release of the finger and thumb piece from the follower 493. The urge of spring 500 necessarily is less than the urge of the main spring through the finger and thumb piece upon camming spring 488.

Under such an arrangement, the follower 493 can not be reciprocated with the finger and thumb piece in its connected position, and the follower 493 and the main spring can not be readily pulled rearwardly conjointly.

It is sometimes desirable to use a stapling device of the character here described in conjunction with a drawing board to pin sheets of drawing thereon. Thus, using the present device as a tacker, it is usual to remove the base 10 therefrom which operation may be readily accomplished in the present apparatus by taking out the beam shaft 69. When separated from the base 10, the staple discharging head drives the staples directly through a drawing sheet into a drawing board without deforming the staples.

To facilitate the accurate positioning of the apparatus for a tacking operation, gripping members may be supplied. These comprise opposed members 230, having a body section 231 adapted to be secured to the side of the housing 100 by the removal of the nuts from the two front dowel pins or bolts 66. There are apertures 232 in said members 230 to fit over said dowel bolts. After the side members are fitted over the said bolts 66, the nuts are replaced, whereby the hand members 230 are firmly held in position. Each of the hand members has a wing flaring section facilitating the gripping of the housing 100 in one hand with the palm of the hand resting upon the plunger cap 140, the fingers of the operator's hand being disposed beneath the wings of the side members 230 to facilitate a strong leverage of the hand upon the plunger 130 when a tacking operation is desired.

The positive locking of the plunger 130 against return movement during the staple discharging stroke and the step by step advance of the plunger under the influence of the rack and pawl has a pronounced advantage in the use of the device as a tacker. A staple may be ejected to a selected point and frictionally held in the staple discharging head by moving the plunger the required discharging distance and then removing the urging force. The staple will remain stationary and cannot be forced back into the staple discharging head because the plunger cannot be moved upwardly against the resistance of the pawl the end of which is locked in the rack.

In the present device, if the force of the hand is insufficient to cause the ejection of a defective staple, it is customary to invert the device, holding the device at its rear end and hammering the plunger cap 140 on the floor until the defective staple is driven out or is cut into parts and then discharged.

The staples 210 for use in the present apparatus could be individually fed into the device, but this is not a convenient way of loading the apparatus. Staples of U shape comprising fine wire are generally marketed in strips, 211, comprising a plurality of staples 210 in parallel alignment, adjacent staples being held together by a thin coating of adhesive which has previously been applied thereto and allowed to dry. Staple strips 211 are a common commodity in the market at the present time.

We claim:

1. In a stapling device for wire staples and having members forming a staple discharging passage, a beam comprising parallel channeled members, the staples riding upon one of said members and the other of said members extending over such staples to maintain them against displacement from the first mentioned member, and a U-shaped housing for surrounding the front end of said channeled members and forming one of the walls of said staple discharging passage.

2. In a stapling machine for preformed wire staples having an ejection chute and staple driver reciprocal therein, said ejection chute comprising opposed walls having flat inner surfaces spaced to slidably engage the bridge and legs of a staple when driven therethrough, an opening through one of said walls, certain of the edges of said opening providing flat surfaces normal to said chute for slidably engaging the inside of the bridge and legs of a staple while passing through said opening, other edges of said opening being positioned below and spaced from the ends of the legs of a staple resting upon said first mentioned edges, said other edges forming with the inner surface of said wall cutting edges, said other edges being adapted to guide the legs of deformed staples laterally from said chute out through said opening to the outer side of said wall, said driver cooperating with said cutting edges to sever the legs of deformed staples so guided whereby they may fall to the outside of said wall.

3. In a stapling machine for preformed wire staples having an ejection chute and staple driver reciprocal therein, said ejection chute comprising opposed walls having flat inner surfaces spaced to slidably engage the bridge and legs of a staple when driven therethrough, an opening through one of said walls, certain of the edges of said opening providing flat surfaces normal to said chute for slidably engaging the inside of

- the bridge and legs of a staple while passing through said opening, other edges of said opening being positioned below and spaced from the ends of the legs of a staple resting upon said first mentioned edges, said other edges comprising inwardly and downwardly sloping surfaces forming with the inner surface of said wall cutting edges, said driver cooperating with said cutting edges to sever the legs of deformed staples.
4. A stapling machine having a staple driving punch, and a magazine to receive staples for discharge by said punch, in combination with a staple follower in said magazine, a spring for actuating said follower, and means upon said follower for retarding the movement of said follower to a speed less than the speed at which it would travel under the unrestrained urge of said spring.
5. A stapling device comprising a staple driving punch, and a magazine adapted to receive staples for discharge by said punch, in combination with a follower in said magazine for advancing said staples, means for actuating said follower, and means upon said follower and engaging said magazine for regulating the speed of travel of said follower along said magazine.
6. A stapling device having a staple discharging punch, and a magazine to receive staples for discharge by said punch, in combination with a staple follower in said magazine, a spring for actuating said staple follower, and means in association upon said magazine and follower for governing the speed of movement of said follower under the urge of said spring.
7. In a stapling device, a staple driving head, a magazine for staples, a follower for staples in said magazine, a spring for actuating said follower, a drum about said spring, and means associated with said drum serving as a brake during the rotation of the drum.
8. In a stapling device, a staple discharging head, and an anvil die having a series of depressions of a different nature operating upon staples driven thereagainst by said staple discharging head, said staple discharging head being movable relatively to said anvil die to register with the selected member of said series of staple operating depressions.
9. In a stapling device, an anvil die having a plurality of independent staple engaging sections, each deforming a staple in a different manner, a staple discharging head, a beam for supporting said head, and means for moving said beam relatively to said anvil die to cause said head to register with a selected staple engaging section.
10. A stapling device comprising a base, an anvil die in fixed position on said base and having a plurality of independent depressions adapted to act upon the legs of staples, each depression deforming a staple in a different manner, a staple discharging head in association with said anvil die, and means upon said base for moving said staple discharging head to procure registration of said head with a selected depression in said anvil die.
11. In a stapling device, a staple discharging head, a magazine, a bifurcated follower in said magazine, a spring for said follower and having an end in the form of a loop, and a cross bar in said loop, the ends of which are adapted to engage the furcations of said follower whereby to facilitate connection of said spring and said follower.
12. A stapling device comprising a U-shaped housing, a plunger reciprocating in the closed end thereof, a magazine beneath said plunger, a spring basket in the open side of said housing to secure said plunger therein, a magazine spring in said basket, and a shaft for said spring having bearings in said housing and basket.
13. A stapling device comprising a U-shaped housing, a plunger reciprocating in the closed end thereof, a magazine beneath said plunger, a spring basket in the open side of said housing to secure said plunger therein, a magazine spring in said basket, and a shaft for said spring having bearings in said basket and adapted to be secured against and released for rotation by selective movement of said shaft transversely of said housing.
14. A stapling device comprising a base, a staple driving head, a beam pivoted to said base and supporting said head, said base engaging said beam to admit of said head being movable a predetermined distance above said base, means for maintaining said head when not in operation in a selected position less than such predetermined distance above said base, and means for varying the distance above said base at which said head is maintained.
15. In a stapling machine, a head comprising a housing, a plunger reciprocable therein and having a rack, a pawl in said housing, a spring therefor, and a member disposed within said housing and providing a bearing surface for said plunger and an anchor for said spring.
16. A stapling device having a housing, a plunger reciprocable therein, a magazine, a coil spring for said plunger and a post secured to said magazine projecting into and forming a guide for said spring.
17. A stapling device comprising a magazine and ejection chute, a guide plate for staples forming a part of said chute, a tongue in said plate to engage said magazine, and a punch reciprocating adjacent said plate, there being a cutting edge in the material intermediate said guide plate and said tongue.
18. A stapling device comprising a housing, a guide plate therein having a tongue, and a magazine, said magazine having nested channel members, one of which members rests on said tongue and the other interlocking with said plate, there being a continuously open passage in said guide plate and through the material of said channel members adjacent said guide plate.
19. In a stapling device, a head, a magazine feeding staples into said head, a driving blade discharging staples from said magazine one at a time, and a member in said head forming therewith an ejection track, there being on said member a cutting edge in a plane beneath the lower extremity of staples in said magazine, said cutting edge being formed by the inner surface of said member and an inwardly and downwardly sloping surface, said surface being adapted to straighten slightly deformed staples when being moved by said driving blade and an outwardly sloping surface connected with said first mentioned surface and providing a discharge chute laterally of said member for parts of badly deformed staples subsequent to their engagement with and separation into parts by said cutting edge.
20. In a stapling machine, a magazine upon which staples travel in one direction, a plunger for discharging the staples from said magazine one at a time, means forming a path for the staples after leaving said magazine, said means having a plurality of openings, there being inter-

mediate said openings a shouldered member having a downwardly and inwardly sloping surface forming a cutting edge below the undermost point of staples in their travel in said magazine, and a second surface extending outwardly of said member and means, said sloping surface cooperating with said path forming member to straighten and render usable slightly deformed staples, said second surface providing a discharge chute for badly deformed staples cut into parts by contact with said cutting edge while being moved by said plunger.

21. In a staple driving machine, a housing having a raceway, a plunger movable in the raceway to drive a staple therein, a guide bar for guiding staples to the raceway, a cutter at each side of the bar and each having a cutting edge at the rear of the raceway to cooperate with the plunger to cut staples extending backward from the raceway, said cutting edges being located below the free ends of the prongs of the staples on the guide bar, and downwardly extending passages at the rear of the cutters for carrying the cut off prongs of the staples from the housing.

22. In a staple driving machine, a housing having a raceway, a plunger movable in the raceway to drive a staple therein, a guide bar for guiding staples to the raceway, an inverted V-shaped lug on the opposite sides of the bar providing knife edges at the rear side of said raceway, said edges acting to align the prongs of a staple with said raceway, said edges acting to guide unduly bent prongs of a staple out of said raceway, and portions of said lug cooperating with said plunger to cut off the prongs of a staple after they are guided out of said raceway by said edges.

23. In a stapling machine, a magazine including a core of inverted U-shaped cross section upon which staples ride in straddle fashion, an ejection chute for said staples having a front guide, a die plate having spaced vertical forwardly projecting flanges interposed between said guide and said magazine, the forward face of said plate between said flanges being in substantially flush vertical alignment with the end of said core, said die plate having a tongue-like portion fitting within the confines of said core, the forward face of said portion being flush with the end of said core to provide a guiding surface for the bridge of staples as they are ejected through said chute, said plate being formed to permit of the passage of staples from said magazine to said ejection chute, and a staple driver reciprocable in said ejection chute and guided by said guide, said portions and said flanges.

24. In a stapling machine, a magazine for preformed staples including a core upon which staples ride in straddle fashion, an ejection chute for said magazine including a front guide, a die plate interposed between said magazine and said guide, said plate having a passage-way therethrough permitting staples to pass from said magazine to said ejection chute, said plate having a portion lying within the outer confines of said core and providing a guiding surface for the bridge of staples as they pass through said chute, and a portion positioned above said passage-way, said portions being spaced from said guide and a staple driver reciprocable in said ejection chute and guided by said guide and said portions during its reciprocable action.

25. In a stapling machine, a magazine including a core of inverted U-shaped cross section upon which staples ride in straddle fashion, an ejection chute for said magazine having a front guide, a

die plate interposed between said guide and said magazine, said plate having an aperture permitting staples to pass therethrough, said plate having portions, the forward faces of which are in substantially vertical alignment with the forward end of said core, one of said portions fitting within said core and providing a guiding surface for the bridge of staples as they pass through said chute, another portion lying above and spaced from said core, and a staple driver reciprocable in said ejection chute and guided by said guide and said portions.

26. In a stapling machine, a magazine including a core of inverted U-shaped cross section upon which staples ride in straddle fashion and side plates for maintaining said staples thereon, an ejection chute for said staples having a front guide, a die plate interposed between said guide and said magazine and resting against the forward end of said side plates, the forward face of said die plate being in substantially flush vertical alignment with the end of said core, said die plate having a tongue-like portion fitted within the confines of said core and providing a guiding surface for the bridge of staples as they are ejected through said chute, said die plate being formed to permit the passage of staples from said magazine to said ejection chute and a staple driver reciprocable in said ejection chute and guided by said guide and said plate.

27. In a stapling machine, a magazine for staples, an ejection chute therefor and a staple driver reciprocable in said chute, said magazine including a member upon which staples ride in straddle fashion, said member at its forward end being provided with an inverted U-shaped channel, means opposite one end of said magazine and forming the forward guide of said ejection chute, and a die plate having its forward face flush with the end of said member and spaced from said wall to form the rear guide of said ejection chute, said plate having a tongue fitting within said U-shaped channel, said driver being guided by said means and said tongue.

28. In a stapling machine, a magazine including a core upon which staples ride in straddle fashion and plate-like means for retaining staples thereon positioned above the forward end of said core, an ejection chute for said staples positioned at the front of said magazine, a die plate forming one of the walls of said chute, said plate having an opening through which staples are fed to said ejection chute, a plunger reciprocable in said chute to drive staples therefrom, said plunger preventing staples from entering said chute unless raised above said opening, means preventing said plunger from so rising until after it has completed a full ejection stroke, said means requiring for operation a limited upward movement of said plunger above said opening, said die plate having a bridge portion above said opening, forming a rear guide for said plunger during said limited upward movement, and spring means resting on said plate-like means at the rear of said bridge portion for normally maintaining said plunger in raised position.

29. In a stapling device, an arm having a staple discharging head and a magazine for staples, a spring within said head, a follower slidable within said magazine, said spring being detachably secured to said follower, means carried by said follower to prevent withdrawal thereof from said magazine unless said spring has been detached therefrom.

30. In a stapling machine, a magazine for staples, a follower movable in one direction to advance staples in said magazine, means on said follower preventing its movement in the other direction, a spring for moving said follower to advance staples, and means detachably securing said spring to said follower, said last mentioned means acting to render said first mentioned means inoperative when said spring is disconnected from said follower.

31. A stapling device comprising a magazine, a housing mounted on said magazine and having front and side walls forming a rearwardly facing opening therein, a plunger reciprocably guided within said walls, a spring basket in said opening forming a rear guide for said plunger, said basket being secured to said walls at one point, a magazine spring in said basket and a shaft for said spring, said shaft coacting with said walls to form another point of connection between said basket and said side walls.

32. A stapling device comprising a magazine, a housing mounted on said magazine and having a front wall and side walls forming a rearwardly facing opening therein, a plunger reciprocably guided within said walls, a member inserted in said opening and between said walls, said member having a first portion extending over the rear face of said plunger to form a rear guide therefor, rearward of said first portion said member being provided with second portions spaced inwardly from said side walls, a magazine spring mounted between said second portions, and projections on said member contacting said side walls to maintain said second portions in proper spaced relation.

33. In a device of the type specified, the combination of a movable member, stapling mechanism carried by said member, clinching means located opposite said stapling mechanism, and eccentric means for effecting adjustment of the movable member to align the stapling mechanism with the clinching means.

34. In a device of the character described, a base member, staple clinching means carried by said base member, an arm pivotally mounted on the base member and longitudinally shiftable relative thereto, a staple driver carried by said arm and cooperable with said clinching means,

and eccentric means for relatively shifting said arm and base member.

35. In a device of the type specified, a base member, a staple clinching anvil thereon, a movable member, staple mechanism carried by said movable member and cooperable with said anvil, a pin providing a pivotal support between said members, and eccentric means for shifting the axis of said pivotal support relatively to one of said members.

36. In a stapling machine, the combination of, complementary members defining a vertically disposed raceway, one of said members comprising a plate including forwardly disposed squared ledges, said plate having a central reduced squared portion spaced from said ledges defining therewith openings to permit fragmentary portions of a staple to fall in back of said plate, the other complementary member comprising a channeled body having transverse surface means disposed against the forward faces of said forwardly disposed ledges.

37. In a stapling device, a housing having side walls and at the rear of said housing and between said walls having an open space, a plate member on said housing and over the open space of said housing, interlocking means between the edges of said walls and said plate member to maintain said walls in spaced apart relation.

38. In a stapling device, a base having an anvil, staple driving mechanism supported for movement as a unit toward and from said anvil, said mechanism including a reciprocal plunger and spring controlled pawl and tooth means for insuring a full stroke of said plunger, a housing for said mechanism including a member having a forward wall and rearwardly projecting spaced side walls, the inner surfaces of said walls providing a guide for the front and sides of said plunger and a second member positioned between said side walls and spaced from said forward wall to provide a rear guide for said plunger, said second member being formed to permit operating contact between said pawl and tooth means, and spring means within said housing for normally urging said plunger to raised position.

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