March 24, 1942. W. G. PANKONIN 2,277,347

RISER STRUCTURE FOR STAPLING MACHINES

Filed Feb. 23, 1940 2 Sheets-Sheet 1

Fig: 8

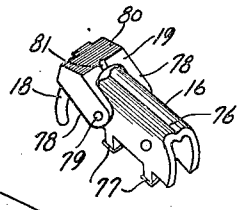
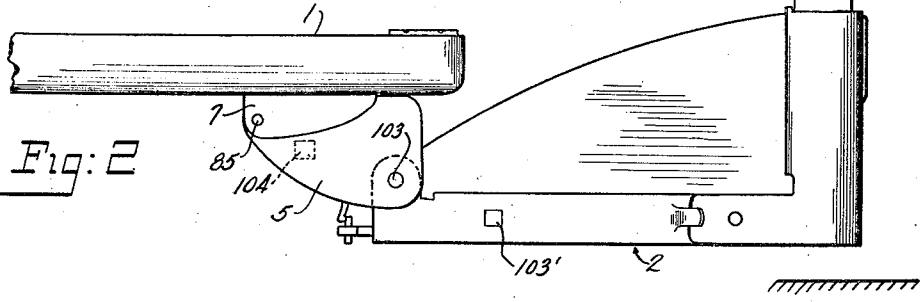


Fig: 1

Fig: 2



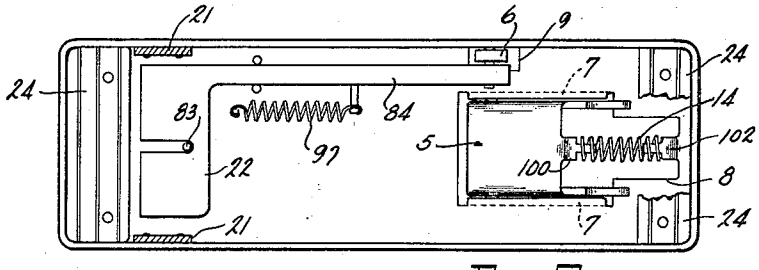


Fig: 3

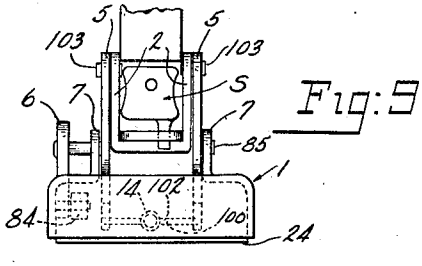


Fig: 9

INVENTOR.
WILLIAM G. PANKONIN

BY John W. Michael

ATTORNEY.

March 24, 1942. W. G. PANKONIN 2,277,347

RISER STRUCTURE FOR STAPLING MACHINES

Filed Feb. 23, 1940 2 Sheets-Sheet 2

Fig: 4

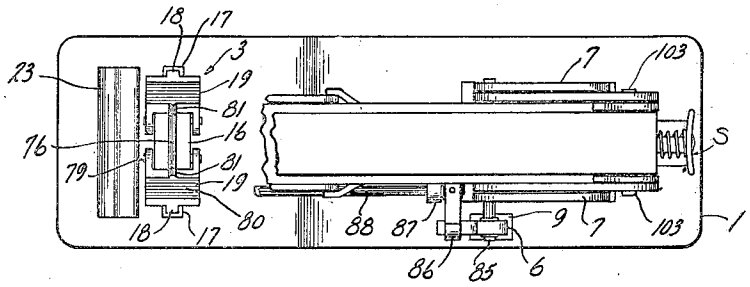


Fig: 5

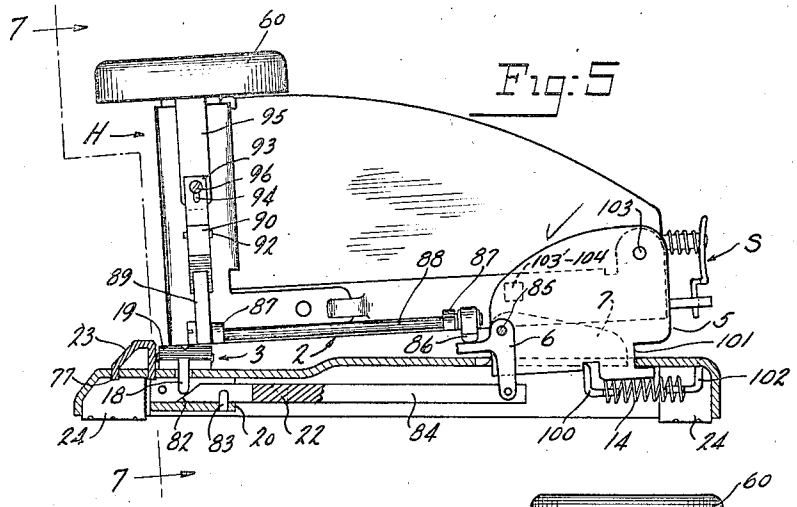


Fig: 6

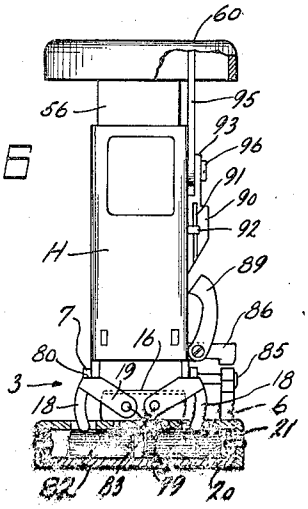
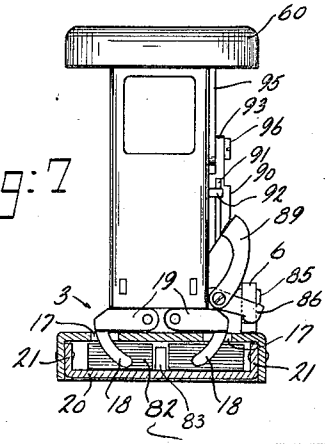


Fig: 7



INVENTOR.
William G. Pankonin

BY John W. Michael

ATTORNEY.

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RISER STRUCTURE FOR STAPLING MACHINES

William G. Pankonin, Chicago, Ill.

Application February 23, 1940, Serial No. 320,326

4 Claims. (Cl. 1—3)

This invention relates to an improvement in stapling machines.

The present application is a continuation in part of the copending application of William G. Pankonin, Serial No. 218,080 filed July 8, 1938, and issued as Patent No. 2,228,778 on January 14, 1941, for Stapling machine.

One of the objects of the invention is to provide a stapling machine having means controlled by the action of the driving mechanism to flatly clinch the legs of the staple after they have penetrated the material to be stapled.

Another object of the invention is to provide a stapling machine having a novel construction of the riser member whereby the base and its associated anvil may be swung clear of the staple carrying arm and driving mechanism permitting the device to be used as a tacker.

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 drawings, forming a part of this specification, and in which:

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

Figure 2 is view in side elevation showing the base swung clear of the stapling arm;

Figure 3 is a bottom plan view, partly in section, showing the riser mechanism and sliding cam support for the flat clinching mechanism;

Figure 4 is a fragmentary view in top elevation, with parts being omitted for the sake of simplicity and clearness, showing the fixed anvil and pivoted anvils of the flat clinching mechanism in flattening position;

Figure 5 is a view in side elevation, with parts being shown in section, showing the flat clinching mechanism positioned as at the completion of the driving stroke;

Figure 6 is a sectional view taken on the line 6—6 of Figure 1, showing the pivoted anvils of the flat clinching mechanism in initial staple leg bending position;

Figure 7 is a sectional view taken on the line 7—7 of Figure 5;

Figure 8 is a perspective detail view showing the fixed anvil and one of the pivoted anvils of the flat clinching mechanism; and

Figure 9 is a fragmentary view in rear elevation of the stapling machine embodying the present invention.

Referring now to the drawings, the stapling machine comprises generally a base 1 to which is pivoted the staple carrying arm 2. Positioned on the forward end of the base 1 are the fixed and pivoted anvils of the flat clinching mechanism 3. Carried on the forward end of the staple carrying arm 2 is the staple driving mechanism 4 which is cooperable with the anvils of the flat clinching mechanism 3 to drive staples from the staple carrying arm 2 through material to be stapled and to flatly clinch the legs of the staple on the under side of the material. The stapling machine is designed to be constructed from sheet metal parts stamped or struck up in dies to render the machine light in weight and economical to manufacture, although the various parts may be otherwise constructed.

The base 1 is of general inverted dish shape and is of enlarged depth at the rear portion thereof to provide operating space for the riser 5 and bell-crank 6, and sliding cam support of the flat clinching mechanism. Struck up from the upper rear portion of the base are upright projections 7 forming brackets for the pivotal support of the staple carrying arm 2. In between the brackets, the top surface, and a portion of the rear edge of the base are cut away, as indicated at 8, to provide operating space for the purposes hereinafter set forth. Adjacent one bracket 7, the top surface of the base is provided with a slot 9 through which the bell-crank 6 operates.

On the top surface of the forward portion of the base is suitably riveted in place the fixed anvil 16 of the flat clinching mechanism 3. At each end of the fixed anvil the surface of the base is provided with apertures 17 through which the curved positioning fingers 18 of the pivoted anvil members 19 operate. Positioned within the end of the base 1 and below the fixed anvil 16 is a saddle 20. The saddle 20 (Fig. 6) may be held in place by having the ends 21 thereof upturned and riveted or otherwise secured to the side walls of the base 1. The saddle provides a support for the sliding cam 22 of the flat clinching mechanism 3, as will be hereinafter more fully described. On the top surface of the forward end of the base, positioned forwardly and in alignment with the fixed anvil 16 is a material guide 23 having its forward side sloped as indicated. Positioned within the forward and rearward ends of the base are rubber foot pads 24, which project below the bottom of the base 1, whereby the machine can be supported without injury to desk tops or the like.

As previously described, the flat clinching mechanism comprises a fixed anvil 16, the form

of which is clearly illustrated in Figure 8. Extending longitudinally and centrally of the top surface of the fixed anvil is a staple guiding groove 76. The fixed anvil is secured to the top surface of the forward end of the base 1 with the groove 76 in alignment with the ejection chute of the staple carrying arm 2 by means of lugs 77 formed on the lower edges of the fixed anvil 16 and riveted to the base. Pivotally secured to the fixed anvil 16 are movable anvils 19. The movable anvils 19 are duplicates in construction and size; each comprises a body portion having extending laterally thereof two spaced fingers 78 having apertures for receiving a shaft 79 by which anvil 19 is pivotally secured to the fixed anvil 16. A portion of the surface of the body portion is sloped as indicated at 80 so that with the anvil 19 disposed at an angle upwardly of the surface of the fixed anvil 16, the sloped portion 80 will be substantially horizontal. On the top of the body portion the anvil 19 is provided with a staple guiding groove 81 so positioned as to be in alignment with the guiding groove 76 in the fixed anvil 16 when the pivoted anvil 19 is lowered to its horizontal position. The groove 81 is in alignment with the ejection chute of the staple carrying arm 2 and is of an extent sufficient to receive the leg of the staple as it penetrates through the material.

The sloped portions 80 of the pivoted anvils 19 when in their raised position provide flat surfaces against which the material to be stapled rests during the initial driving of the staple. To maintain the pivoted anvils 19 in raised position there is provided on each anvil 19 a curved finger 18 projecting downwardly from the outer edge of the body portion. The fingers 18 operate through apertures 17 provided in the base 1 and are cooperable with the camming and flat surface of the slidable cam 22. With the pivoted anvils 19 in raised position and with the fingers 18 resting on the flat surface of the sliding cam 22 (Fig. 6), the legs of staples as they are forced through material by the action of the staple driver will strike against the grooves 81 and be deflected inwardly and an initial bend placed on them. After the initial bend has been formed on the legs of the staple, it is desirable to permit the pivoted anvils 19 to resume a horizontal position with the guiding grooves 81 in alignment with the guiding groove 76 so that further driving action will flatly press the legs of the staple against the under surface of the material being stapled. To accomplish this end, the sliding cam 22 is controlled by the action of the staple driving mechanism 4 so that it will be moved rearwardly after a desired portion of the driving stroke has occurred. The rearward movement permits the curved fingers 18 to slide down the sloping face 82 and the pivoted anvils 19 assume a horizontal position resting flatly on the upper surface of the base 1 (see Figures 5 and 7).

The forward end of the sliding cam 22 is held in position by the saddle 20 and is guided by a slot and pin arrangement 83 to maintain it in accurate alignment with the curved fingers 18. Rearwardly and to one side of the forward end of the cam slide 22 there is provided an extending arm 84 running within the interior of the base 1 to a point substantially at one of the brackets 7. Secured to one of the brackets 7 by means of a pivot 85 is the bell-crank 6. The lower arm of the bell-crank 6 projects through the aperture 9 in the top portion of the base 1 and is pivoted to the end of arm 84. The upper arm of the bell-crank 6 is positioned above the surface of the base 1 and extends forwardly of the pivot 85 to engage with the operating arm 86 carried on the side of the staple carrying arm 2. Positioned on the side of the staple carrying arm 2 are two longitudinally spaced bearings 87 in which is rotatably supported a transmission rod 88. At the rear end of the rod 88 is secured by means of a dowel pin (not shown) the operating arm 86 which extends outwardly from the side of the staple carrying arm 2 and has its operating end in alignment with the upper arm of the bell-crank. At the forward end of the rod 88 is secured in a similar manner an operating trigger 89 so positioned as to extend upwardly along the side of the housing H. The end of trigger 89 is sloped to provide a cam for cooperation with a camming member 90 slidably carried on the side wall. The cam member 90 is secured to the side wall by means of grooves 91 provided in opposite sides thereof and cooperable with retaining lugs 92 riveted to the side wall. The upper end of the camming member 90 is provided with an upwardly extending connecting arm 93 spaced from the side wall. An elongated slot 94 is provided on arm 93. Secured to the cap 60 and extending downwardly therefrom in substantial alignment with the side is a driving rod 95, the lower end of which lies between the arm 93 and the side wall and is provided with an adjusting screw 96 fitting within the slot 94.

The cam member 90 by means of the adjusting screw 96, can be so adjusted upwardly or downwardly as to vary the point at which the trigger 89 will be operated relative to the full movement of the plunger 56. A coil spring 97 is provided on the under surface of the base 1 and is positioned to continually urge the sliding cam 22 forward.

In the operation of the device just described, material is inserted between the surfaces 80 of the pivoted anvils 19 and the staple carrying arm 2. As pressure is applied to the operating cap 60, the arm 2 is depressed against the urge in spring 14 compressing the material tightly between it and the surfaces 80. Continued pressure on the cap causes the plunger 56 to move downwardly, whereupon the driver engages the bridge of a staple (positioned in the ejection chute under the urge of the feeder mechanism) and forces the same downwardly so that the legs penetrate through the material and engage in the grooves 81 sloped relatively thereto. The engagement between the grooves 81 and the legs bends the legs inwardly as the staple is continued to be forced through the material. At a predetermined time, depending upon the adjustment of camming member 90, the sloping surface thereof engages with the cam surface of the trigger 89, forcing it outwardly of the side, thereby applying torque to the transmission rod 88 causing the arm 86 to press against the upper arm of the bell-crank 6 which in turn causes the lower arm of the bell-crank 6 to move rearwardly drawing with it (and overcoming the force in spring 97) the sliding cam 22. The rearward movement of the sliding cam 22 causes the sloping surface 82 on the forward end thereof to come in alignment with the curved fingers 18 of the movable anvils 19. The pressure exerted on the outer ends of the pivoted anvils 19 during a driving stroke is communicated through the curved fingers 18 to the sloping surface 82

of the slidable cam 22 which aids in causing it to move rearwardly permitting the pivoted anvils 19 to assume a flat position on the surface of the base. Thereafter, continued pressure asserted on the cap 60 will flatten the curved portion of the legs of the staple and clinch the legs flatly and tightly against the under portion of the material.

The riser 5 is formed with a base portion and two upwardly projecting side wings. The riser 5 is pivotally secured in between and to the brackets 7 by the pivot 85 which extends therebetween. The base portion projects down into the opening 8 in the base 1 and is provided with a spring centering finger 100 centrally located on and projecting below its edge. The lower edge of the side wings also project down into the opening 8 and have at their rear edges a cutout 101 which receives therein the rear edge of the opening 8. The cutout 101 is of sufficient size to permit the riser 5 to pivot about the pivot 85 the number of degrees necessary for proper action of the staple carrying arm 2. The rear edge of the opening 8 has a downwardly projected spring centering finger 102. A coiled compression spring 14 extending between the fingers 100 and 102 urges the riser 5 clockwise about the pivot 85 and tends to normally maintain the riser in the position shown in Figure 1. The staple carrying arm 2 is pivoted in between and to the upper rear corners of the side wings by pivot-like rivets 103. Interfitting projection and recesses 103' and 104 formed on the staple carrying arm 2 and inner surface of the side wings of the riser 5 maintain the arm 2 in a releasable predetermined relation with respect to the riser. This relation is shown in Figures 1 and 5 and is the staple clenching relationship; the intermediate bottom portion of the staple carrying arm 2 rests upon the pivot 85 and the pivoting action taking place about the pivot 85 with the spring 14 urging the arm 2 to normal raised position permitting paper to be inserted between the end of the arm and the anvil 3.

In order to use the device as a tacker machine the staple clenching relationship is changed by breaking the frictional engagement between projections and recesses 103' and 104 and swinging the base 1 about the pivot 103 out and away from under the arm 2 to the position shown in Figure 2. Because of the height of the pivot 103 above the base 1 there will be sufficient clearance to allow the end of the staple feeder mechanism S to freely swing by the base.

In swinging the base to use the machine as a tacker the mechanism operating the flat clinching mechanism is not disturbed. The operating arm 86 will lift away from the bell crank 6 when the device is converted. It is not necessary to disconnect any portion of the mechanism during this operation.

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 or example, 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.

I claim:

1. In a stapling machine a base, a riser member pivoted to said base and having limited pivotal movement with respect thereto, a spring for urging said riser in one direction, and a staple carrying arm pivoted to said riser and having an intermediate portion resting upon the pivotal interconnection between said member and said base whereby said spring also acts to resiliently maintain said arm with its free end in raised position from said base.

2. In a stapling machine a base, a riser member pivoted to said base and having limited pivotal movement with respect thereto, a spring for urging said riser in one direction, a staple carrying arm pivoted to said riser, and frictional engaging means between said arm and said member to normally prevent said arm from pivoting with respect to said riser whereby said spring acts to resiliently maintain said arm with its free end in raised position from said base.

3. In a stapling machine, a base, a riser member having its forward end pivoted to said base, tongue and notch means acting between the rearward end of said member and said base to limit the pivotal movement therebetween, spring means acting between said member and said base to urge said member in a clockwise direction about said pivotal connection, and a staple carrying arm pivoted to the rearward end of said member and having an intermediate portion resting upon the pivotal interconnection between said member and said base whereby said spring also acts to resiliently maintain said arm with its free end in raised position from said base.

4. In a stapling machine, a base, a riser member having its forward end pivoted to said base, tongue and notch means acting between the rearward end of said member and said base to limit the pivotal movement therebetween, spring means acting between said member and said base to urge said member in a clockwise direction about said pivotal connection, a staple carrying arm pivoted to the rearward end of said member, and an interfitting projection and recess between said member and said arm to releasably maintain engagement therebetween whereby said spring also acts to resiliently maintain said arm with its free end in raised position from said base.

WILLIAM G. PANKONIN.