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F. POLZER

STAPLING MACHINE

Filed Feb. 24, 1928

Fig. 1.

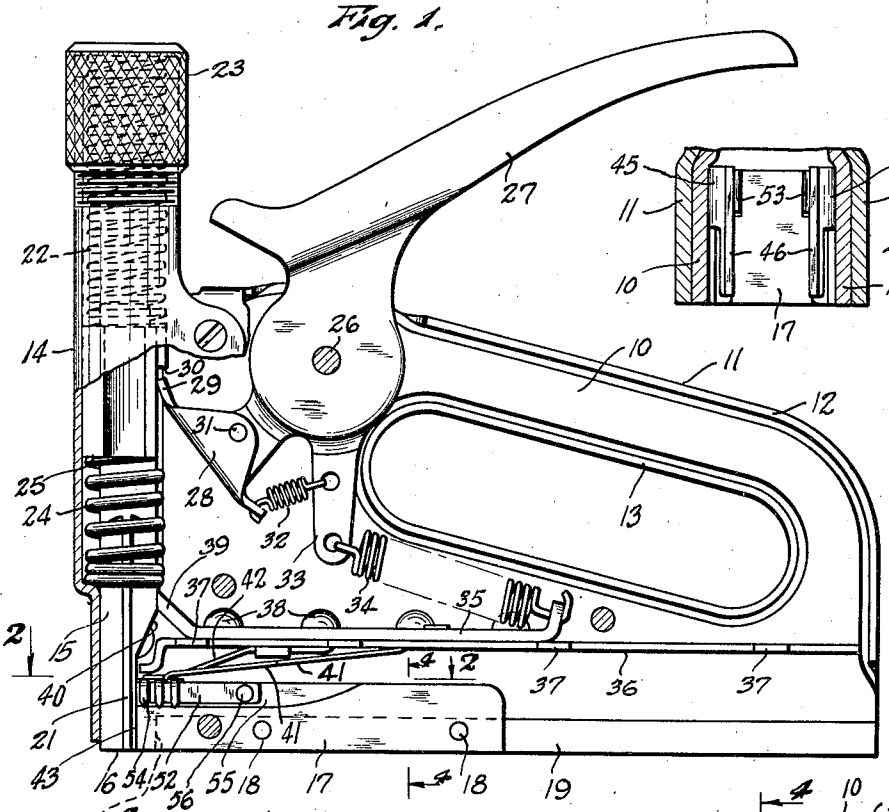


Fig. 3.

Fig. 2.

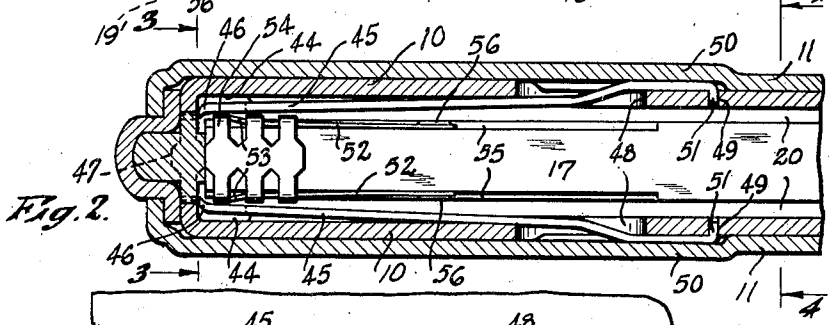


Fig. 4.

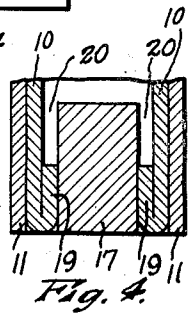
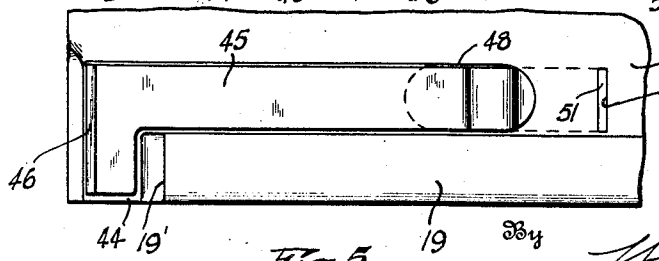


Fig. 5.



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UNITED STATES PATENT OFFICE.

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STAPLING MACHINE.

Application filed February 24, 1928. Serial No. 256,556.

This invention relates to staple driving machines particularly of the type in which substantially U-shaped staples are severed one at a time from a strip of connected staples and driven. The mechanism is adapted for use either in a so-called stapling machine in which the staples are clinched, or in a so-called tacker in which the staples are merely driven into the work.

It is a particular object of the invention to provide an improved means for holding and guiding the first staple on the strip during the severing and driving operation to prevent its turning out of the upright position and becoming jammed in the raceway, and also to provide improved means for holding the strip against backward movement either under retrograde movement of the feeding device or other means.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawing forming a part of this specification. In this drawing,

Fig. 1 is a side elevation of the mechanism with one side of the main housing removed and a portion of the plunger housing being shown in section.

Fig. 2 is a horizontal section on an enlarged scale taken substantially on line 2—2 of Fig. 1.

Fig. 3 is a vertical detail transverse section at the forward part of the staple strip slide bar taken substantially on line 3—3 of Fig. 2.

Fig. 4 is a similar section taken substantially on line 4—4 of Figs. 1 and 2, and

Fig. 5 is a detail elevation looking toward the inside of one side of the main housing showing the means for mounting the staple holding and guiding means.

The main housing comprises inner and outer plates 10 and 11 respectively, in the present case stamped from sheet metal and are placed in nested relation as indicated, and the outer plates have inwardly extending flanges 12 and 13 which are arranged in abutting relation, the outer flanges serving to close the back of this housing and the inner flanges 13 serving to form the side walls of a hand opening providing a hand grip. Mounted in a removable housing 14 secured at the front of the machine is a vertically reciprocable plunger 15 having a cutting edge at its lower end 16 adapted to cooperate with the front upper edge of the staple strip slide or guide bar 17 mounted between the side walls of the main housing by any suitable means, such as rivets or screws 18. The lower edges of the inner plates 10 are folded upwardly on the inner wall of the plates to form spacing means 19 to provide a space 20 between the upper portion of the slide bar and the inner walls of the main housing for passage of the prongs of the staples. The plunger has lateral ribs 21 which assist in guiding this plunger for vertical movement in its housing, and they are also in alignment with the prongs of the staple to assist in driving the staple. The plunger is forced downwardly for the severing and driving operation by a spring 22, the tension of which may be adjusted by adjusting the cap 23 threaded on the outside of the plunger housing, and the downward movement of the plunger is arrested at a certain point by a coil spring 24 embracing the lower part of the plunger and adapted at its upper end to engage a shoulder 25 on the plunger just before the plunger reaches its lowest position. This spring will thus form a cushion stop for the plunger and absorb shocks should the plunger be operated without driving staples.

Mounted in the main housing on a pivot 26 is a hand lever 27. This lever carries a pivoted catch or pawl 28 having a nose 29 adapted to engage under a shoulder 30 on the plunger so that when the free end of the lever is depressed it will raise the plunger against the action of the driving spring 22. When the plunger reaches its upper position this pawl will slide off the shoulder, releasing the plunger and permitting it to be forced downwardly under action of the spring. The pawl is pivoted to the lever at 31 and its nose is held against the plunger by spring 32 so that when the lever 27 is moved upwardly the free end of the pawl may yield to pass under the shoulder 30. The hand lever 27 also carries an extension 33 which is connected to one end of a coil spring 34. At its other end this spring is connected to a reciprocable feed bar 35 mounted to slide on a support 36. This support 36 is a strip of metal extending transversely between the sides of the housing and having lugs 37 seated in openings in the side walls of the housing. The feed bar 35 is guided between the support and inwardly extending ears 38 struck inwardly from the guide plates 10 and extending over the top of the feed bar. The front end of this feed bar

is bent upwardly, as shown at 39, and cooperates with an inclined cam surface 40 on the plunger so that as the plunger comes down this cam surface by engaging the end of the feed bar will force the feed bar backwardly a distance corresponding to the distance between two staples on the strip in preparation for the next feeding movement of the staple strip. This feed bar carries a downwardly extending feed pawl 41 adapted to engage at its forward end the rear edges of the cross bar of successive staples to advance the staple strip step by step to bring the staples successively into the driving position under the plunger. The support 36 may carry a downwardly extending spring finger 42 engaging the top of the staple strip to assist in holding it in proper position on the slide bar.

The forward ends of the spacing members 19 are terminated short of or at a distance from the front end 43 of the slide bar, as shown at 19′, to provide clearance spaces 44 between the sides of the slide bar and the inner walls of the housing and extending throughout the height of this bar to provide a clearance space for the prongs of the staples should they bend out of position. This will prevent their jamming in the raceway and will permit easy clearing of the machine because they permit the bent staples to either drop out of the machine or be forced out by the plunger.

Mounted in these clearance spaces are spring operated yieldable holding fingers 45 for the staple being severed and driven. These fingers are preferably of spring metal and are secured to the side walls of the housing at the outer side of the staple prongs. They are bent inwardly at their forward ends to form an upright guiding and holding rib 46 which is adapted to move inwardly between the first and second staples into alignment with the rear edge of the prongs of the first staple 47 when it is in a position for driving and prevent these prongs from turning backwardly under the action of the plunger or for any other reason. These guide ribs 46 preferably extend substantially throughout the entire height of the slide bar, as shown in Figs. 3 and 5, so as to guide the staple being driven throughout substantially its entire movement. Improved means for mounting these fingers comprises providing the inner plates 10 with an elongated opening 48 and to the right hand of this opening a vertical slot 49. The outer plates 11 of the housing are forced outwardly somewhat, as indicated at 50, to form a groove on the inner side of this plate. The end of the fingers 45 are bent outwardly through the openings 48, extended in the recess formed by the bulge 50 in the inner plate 10 so that it is located between the plates, and then the free end 51 extends inwardly into the vertical slot 49 as indicated clearly in Figs. 2 and 5. It will be obvious that when the plates 10 and 11 are assembled these fingers are securely held in position without any riveting operation and they may be easily removed for renewal.

Improved means are also provided for preventing backward or retrograde movement under the action of the feed pawl when it is retracted for preparation for the feeding operation, or for any other means. For this purpose I have provided a spring finger 52 on each side of the slide bar 17 so that they are on the inside of the staple strip. At their forward ends they are bent outwardly somewhat, as shown at 53, to provide holding pawls adapted to move outwardly to a position in alignment with the rear edges of the prongs of the second staple 54 and to engage these prongs to hold the staple against backward movement. These fingers are preferably mounted in longitudinal recesses 55 formed in the side walls of the slide bar 17 and may be mounted therein by any suitable means, such as a rivet 56.

The operation is as follows: The elements are normally in the position of Fig. 1. When the lever 27 is depressed the pawl 28 will lift the plunger 15 against the action of the operating spring 22. This action of the lever will also tension or increase the tension of the feed spring 34. As soon as the lower end of the plunger is moved to a position above the slide bar 17 the feed spring 34 will force the feed bar 35 forwardly, which movement through the feed pawl 41 will force the staple strip forwardly and bring the first staple 47 on the strip to a position under the plunger in the raceway, as shown in dotted lines, Fig. 2. During this movement of the staple strip the forward ends of the holding fingers 45 will yield laterally outward permitting the forward staple to advance into the raceway, and they will then move inwardly to the position of Fig. 2 with the guiding rib 46 just behind the prongs of the first staple to form a vertical guide for these prongs at the rear side thereof. During this forward movement of the staple strip the forward ends of the holdback fingers 52 yield inwardly to permit the prongs of the second staple 54 to pass, and then these free ends spring outwardly, as shown in Fig. 2, so as to lie immediately to the rear of the rear edges of the prongs of the second staple 54 and will hold the staple strip against backward movement, either under action of the plunger, the feeding means or other means. When the plunger reaches a certain position it is released by the pawl 28 and is forced downwardly by its operating spring 22. This downward movement of the plunger causes its lower end to sever the first staple from the strip and to drive it into the work. During this operation the vertical guide ribs 46 of fingers 45 will provide a holding and guiding means and prevent the staple turning backwardly out of its proper

upright position. As the plunger approaches its lower position the cam 40 engages the front end of the feed bar 35 and forces it backwardly to the position of Fig. 1 so that the feed pawl 41 will engage the next rearward staple, which was the third staple but is now the second staple in position for the next feeding movement.

Having thus set forth the nature of my invention, what I claim is:

1. In a staple driving machine, a housing, a staple strip slide bar in the housing, a movable plunger for driving the individual staples, means for operating the plunger, means for feeding the staple to driving position, means on the outside of the staple strip to enter behind first staple on the strip when in driving position to prevent the prongs from turning back, and holdback means mounted on the slide bar inside the staple strip to engage the rear edge of the second staple to prevent retrograde movement of the staple strip.

2. The combination in a staple driving machine comprising a housing, a staple strip slide bar, a reciprocable plunger for driving the staples, means for operating the plunger, and feeding means for the staple strip; of yieldably mounted fingers secured to the housing and having a vertical front end adapted to enter behind the legs of the first staple when in driving position to prevent the staple bending backwardly, and yieldably mounted fingers secured to the slide bar and adapted to engage the rear edge of the legs of the second staple to prevent backward movement of the strip.

3. The combination in a staple driving machine comprising a housing, a staple strip slide bar, a reciprocable plunger for driving the staples, means for operating the plunger, and feeding means for the staple strip; of spring fingers secured to the housing at the opposite sides of the slide bar having inwardly bent free ends adapted to enter between the first and second staples on the strip and hold the prongs of the first staple from turning backward and guiding the same during the driving operation, and spring fingers mounted on opposite sides of the slide bar and provided with free ends adapted to move outwardly to a position between the second and third staple to prevent backward movement of the strip.

4. In a staple driving machine, a housing, a staple strip slide bar mounted in the housing, a reciprocable plunger mounted to move across the front end of the slide bar to drive the individual staples, a reciprocable feed device for advancing the staples on said slide to the driving position, said slide being provided with longitudinally extending recesses in the opposite side walls thereof, spring operated holdback fingers mounted in said recesses and provided with shoulders adapted to engage the rear edges of the prongs of the second staple on the strip to prevent retrograde movement thereof, and spring operated fingers mounted in the housing outside the staple strip and provided with shoulders adapted to move inwardly to a position back of the prongs of the first staple on the strip to hold and guide this staple during the driving operation.

In testimony whereof I affix my signature.

FRIDOLIN POLZER.