

April 8, 1941.

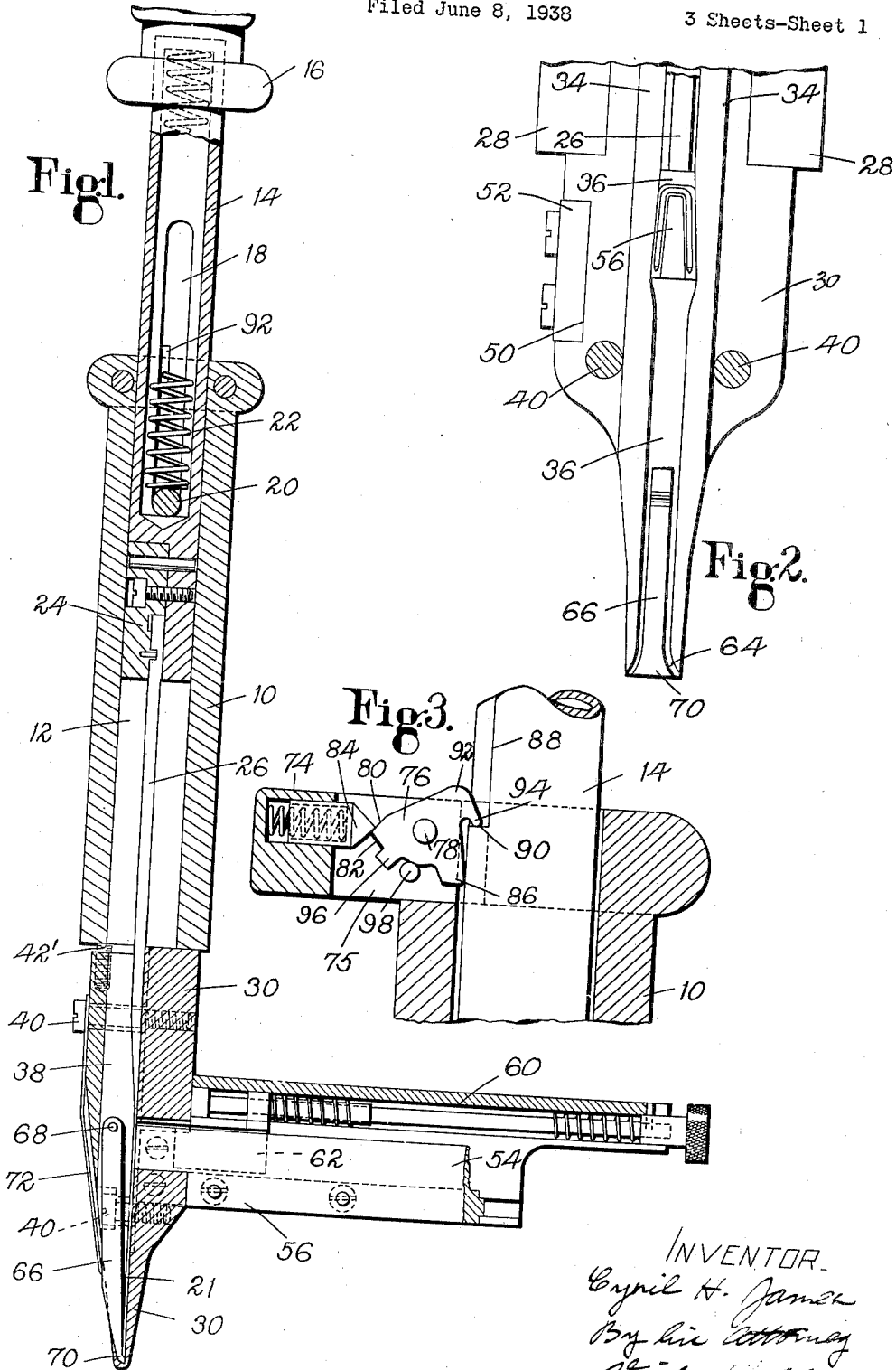
C. H. JAMES

2,237,438

FASTENING INSERTING MACHINE

Filed June 8, 1938

3 Sheets-Sheet 1



INVENTOR.
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April 8, 1941.

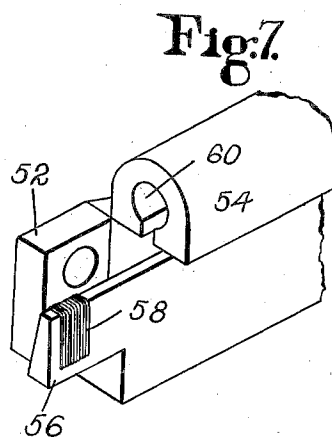
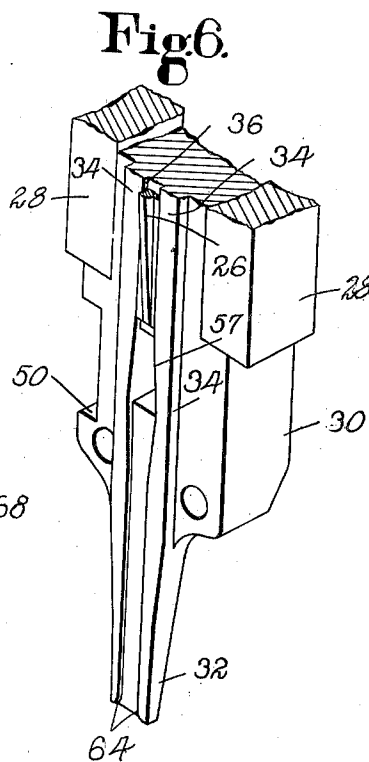
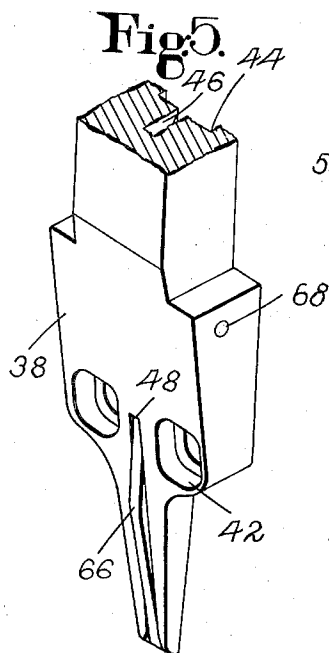
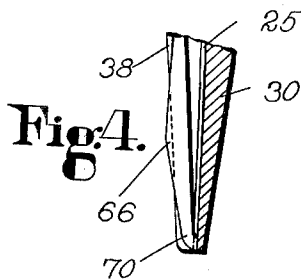
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 9.

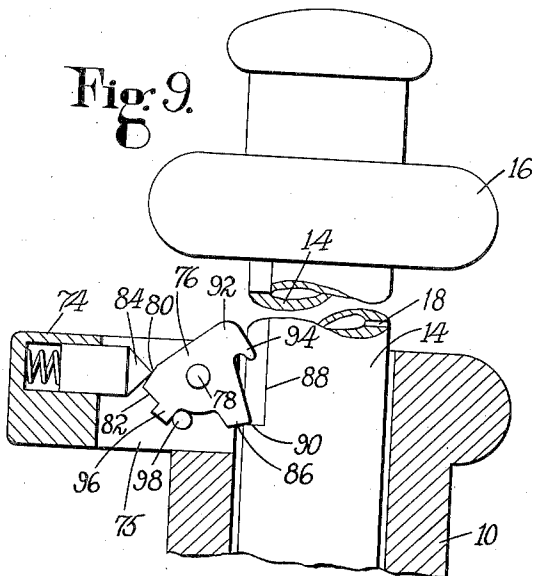


Fig. 10.

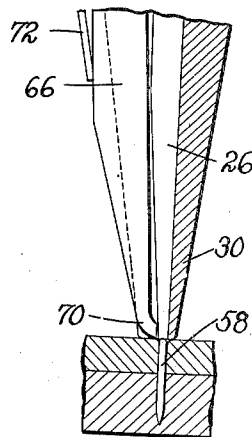
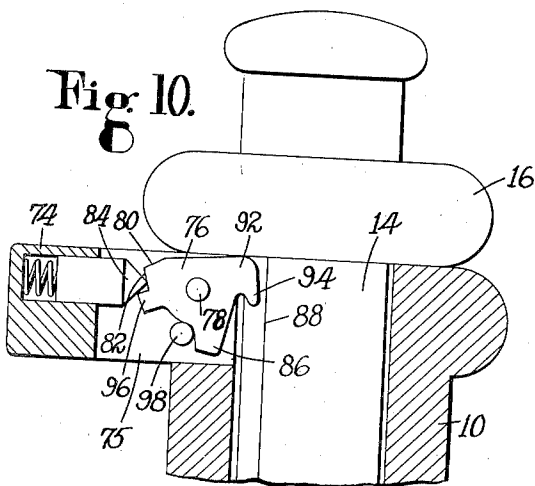


Fig. 11.

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UNITED STATES PATENT OFFICE

2,237,438

FASTENING INSERTING MACHINE

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Application June 8, 1938, Serial No. 212,535
In Great Britain June 26, 1937

4 Claims. (Cl. 1—49)

This invention relates to stapling machines and is disclosed herein as embodied in a hand stapling machine for toe lasting stitchdown shoes. It is desirable, as explained in application Serial No. 162,890, filed September 8, 1937, in the names of Ricks, Boothroyd & James, now U. S. Letters Patent No. 2,152,855, granted April 4, 1939, to staple the upper flange of a stitchdown shoe to the sole while wipers are pressing the flange against the sole, and a principal object of this invention is to provide a hand-operated device to fill this requirement.

As explained in the application referred to, it is desired to bend the staple legs outwardly instead of inwardly, in driving the staple, and an important feature of the present invention resides in means to effect this result. Accordingly, I have provided a driver passage for the staple having outwardly flared walls at its delivery end permitting such deflection of the staple legs, in combination with a deflector having similarly flaring surfaces adjacent the said walls to form diverging passages for the staple legs. Advantageously, also, the deflector is adjustable longitudinally of the driver passage to vary the curvature of the staple legs as they are driven into the work.

Another feature of the invention resides in means for preventing the jamming of several staples in the nozzle. A hand-operated stapling machine is liable to be occasionally operated with insufficient force to drive a staple completely and such a staple may not even be ejected from the nozzle so that the following staple is liable to jam with it in the nozzle.

I have obviated this difficulty by a construction wherein the driver, after engaging a staple to be driven, releases a locking device which prevents return of the driver far enough to engage a second staple, the locking device being rendered inoperative when the driver reaches the proper extremity of its throw.

These and other features of the invention comprising certain combinations and arrangements of parts will be apparent from the following description of a preferred embodiment of the invention shown in the drawings, in which—

Fig. 1 is a cross-sectional side elevation of the machine in its normal condition of rest with the staple driving mechanism retracted;

Fig. 2 is a cross-sectional front elevation of the nozzle;

Fig. 3 shows the locking device in the position it occupies when the driving mechanism is fully retracted;

Fig. 4 is a vertical section of the nozzle;

Fig. 5 is a perspective view showing the lower portion of the front block which forms a part of the head of the machine;

Fig. 6 is a similar perspective view showing the block portion which forms the other part of the machine head, the lower end of the staple driver also being shown in the position it assumes when fully retracted;

Fig. 7 is a detail of the staple supplying means;

Fig. 8 shows a staple driven into a work piece.

Fig. 9 is a sectional view of the upper portion of the machine and illustrates the plunger locked in partially retracted position;

Fig. 10 is a view similar to Fig. 9 illustrating the plunger in the fully depressed position in which it releases the locking device; and

Fig. 11 is a view similar to Fig. 4 showing the position of the parts at the nozzle when the plunger is fully depressed to drive a staple.

The illustrated device comprises a frame formed as a tubular casing 10, adapted as a hand hold, within the cylindrical bore 12 of which is movable a plunger 14 having a head 16. A pin 20 carried in the casing 10 extends transversely through a slot 18 formed in the plunger and provides a seat for one end of a spring 22 confined between it and the head 16, thereby tending to keep the plunger in its highest position. The lower end of the plunger 14 is provided with clamping means 24 of ordinary construction for holding a driver 26, which is in the form of a flat bar having a reinforcing rib on its front side, as is well known.

The casing 10 has a pair of lugs 28 (Figs. 2 and 6) at its lower end between which is secured a block 30, the front face of which is diametral of the bore 12 and the lower end of which is narrowed at 32 to provide the rear half of a staple guiding nozzle. The front face of the block 30 is provided with two parallel ribs 34 which form a slot 36 for guiding the driver.

A front block 38, shaped similarly to the block 30, is bolted to the front face of the latter by screws 40 extending through elongated holes 42 in the block 38 to allow for heightwise adjustment of the block 38 on the block 30. A screw 42' in the upper face of the block 38, and in contact with the lower face of the casing 10, gages such adjustment. The block 38 has a recess 44 in its rear face which encloses the ribs 34 and the recess 44 has a recess 46 opening into it to accommodate the rib on the driver 26. The lower nozzle portion of the block 38 tapers to—

ward the rear so that the recess 46 runs out into its front face at 48.

The block 30 has a lateral recess 50 in which is mounted a lug 52 on a staple carrier 54 (Fig. 7). The lower part of the member 54 is formed as a saddle 56 which projects through a hole 57 in the block 30 so that its end is flush with the bottom of the groove 36, for carrying a strip of formed staples 58, cemented to one another side by side. The upper part of the member 54 is formed as a keyhole-shaped guide 60 for a spring-pressed plunger 62 (Fig. 1) which hangs down in contact with the rear end of the strip 58 and pushes the staples forward until the foremost staple is beyond the end of the saddle 56 and in the driver passage 36 resting against the front wall thereof (the block 38). The lower end of the driver, in its normal position, is just above this staple and when it is driven downward it breaks off this foremost staple and drives it through the nozzle.

The sides of the driving passage 36 are flared outwardly at 64 at their lower ends, as shown in Figs. 2 and 6, to permit the staple legs to be deflected outwardly, as is desired for some classes of work. A deflector 66 is mounted in the recess 46, and pivoted on a pin 68 in the block 38. This deflector is bent toward the rear at its lower end (70) and this bent end 70 is forced against the lower rear wall of the driving passage 36 by a leaf spring 72 mounted on the front face of the block 38. The lower portions of the side faces of the deflector 66 are spread correspondingly to the faces 64 of the driving passage, and thus form a diverging guide for a staple passing through the nozzle. Such a staple, in passing through the nozzle, straddles the end 70 of the deflector 66 and as it emerges from the nozzle its bar forces the bent end 70 of the deflector aside, to effect its passage out of the nozzle. The above-mentioned vertical adjustment of the block 38 permits some adjustment of the timing of the deflection and secures a certain control of the curve on which the staple legs are deflected.

The design of the tool is such that when the end of the driver 26 reaches the end of the nozzle, as shown in Fig. 11, the head 16 will strike the upper end of the casing, as shown in Fig. 10.

In case the head 16 were not struck hard enough to drive a staple past the obstruction afforded by the deflector 66 and clear out of the nozzle, the driving of a second staple without clearing the driving passage of the improperly driven preceding staple would be liable to clog the driving passage. This difficulty is avoided by the construction now to be described.

A lateral extension 74 (Fig. 3) is provided on the head 16 of the casing 10 and is slotted at 75 to accommodate a pawl 76 pivoted on a pin 78, the slot 75 opening into the bore 12. The pawl 76 has a cam 80—82 at its end cooperating with a resilient plunger 84 which tends to ride up on either side of the cam 80—82 with which it may be in contact, thus causing the pawl to rotate in one direction or the other. In the position shown in Fig. 3, which corresponds to the uppermost position of the plunger 14, the resilient plunger 84 is urging the pawl 76 in a counterclockwise direction. This movement is prevented by a lug 86 on the pawl which rests against the side of the plunger 14. An upper projecting stem portion 88 of the plunger 14 is slotted on its left side to form an abutment or step 90. When the plunger 14 descends to drive a staple the step 90 will drop below the lug 86 which will then swing

counterclockwise under the reaction of the plunger 84 and lie above the step. When the plunger 14 is forced completely down, as shown in Fig. 10, so that the driver 26 reaches the bottom of the nozzle, the head 16 strikes a second lug 92 on the upper side of the pawl 76 and forces it to turn clockwise and to be held by the plunger 84 on the surface 82, thus removing and holding the lug 86 from the path of the plunger 14. The step 90 is thus permitted to rise to the position shown in Fig. 3 where it strikes a third lug 94 on the pawl 76 and tips the pawl counterclockwise back to the Fig. 3 position. The upward movement of the plunger 14 is thus stopped by the lug 94. In case the plunger 14 has not been depressed far enough to drive the staple out of the nozzle, the head 16 will not reach the lug 92 and the lug 86 will lock on the step 90 when the plunger 14 comes up, as shown in Fig. 9. The lower end of the driver 26 will then be below the top of the saddle 56 and no more staples can be detached or driven until the plunger 14 has been forced completely down and the driving passage cleared.

The pawl 76 is provided with a tooth 96 which, with a side of the lug 86, cooperates with a pin 98 to limit the throw of the pawl 76 under the cam reaction of the plunger 84.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A stapling machine having, in combination, a nozzle having a driving passage, a driver operating therein, the end of said passage being outwardly flared to permit the outward deflection of the legs of a driven staple just prior to their entry into a work piece, and a deflector located in said passage and having flared surfaces lying adjacent the flared surfaces of the passage to form two diverging passages effecting the deflection of the staple legs when driven through said diverging passages, said deflector having a cam surface arranged to contact with the bar of the staple as it leaves the nozzle whereby the deflector will be displaced to permit passage of the bar.

2. In a stapling machine, a nozzle having a passage for driving a staple, said passage having an open slot in one side, the end walls of said slot being outwardly flared at their staple delivering ends, a deflector resiliently mounted in said slot having an end portion bent to partially obstruct said passage and having outwardly flared surfaces arranged, with said first-named flaring walls, to form diverging passages for the legs of a driven staple, and means for adjusting said deflector longitudinally of said passage.

3. In a stapling machine, a staple-supplying station, a driving nozzle having a passage for driving a staple, said nozzle having an open slot in one side, a plunger, a driver carried by the plunger and operating in said passage, the end walls of said slot being outwardly flared at their staple delivering ends, a deflector resiliently mounted in said slot having an end portion bent to partially obstruct said passage and having outwardly flared surfaces arranged with said first-named flaring walls to form diverging passages for the legs of a driven staple, and means for insuring that the driver will move to project a staple past the obstruction afforded by said deflector before the driver can be retracted to engage another staple.

4. In a stapling machine, a staple-supplying station, a driving nozzle having a passage for driving a staple, said nozzle having an open slot

in one side, a plunger, a driver carried by the plunger and operating in said passage, the end walls of said slot being outwardly flared at their staple delivering ends, a deflector resiliently mounted in said slot having an end portion bent to partially obstruct said passage and having outwardly flared surfaces arranged with said first-named flaring walls to form diverging passages for the legs of a driven staple, said end portion

having a cam surface cooperating with the bar of a staple being driven, to move said end portion from obstructing position and to permit the bar of the said staple to pass said end portion, and means for insuring that the driver will move to project a staple past the obstruction afforded by said deflector before the driver can be retracted to engage another staple.

CYRIL HARRY JAMES.