

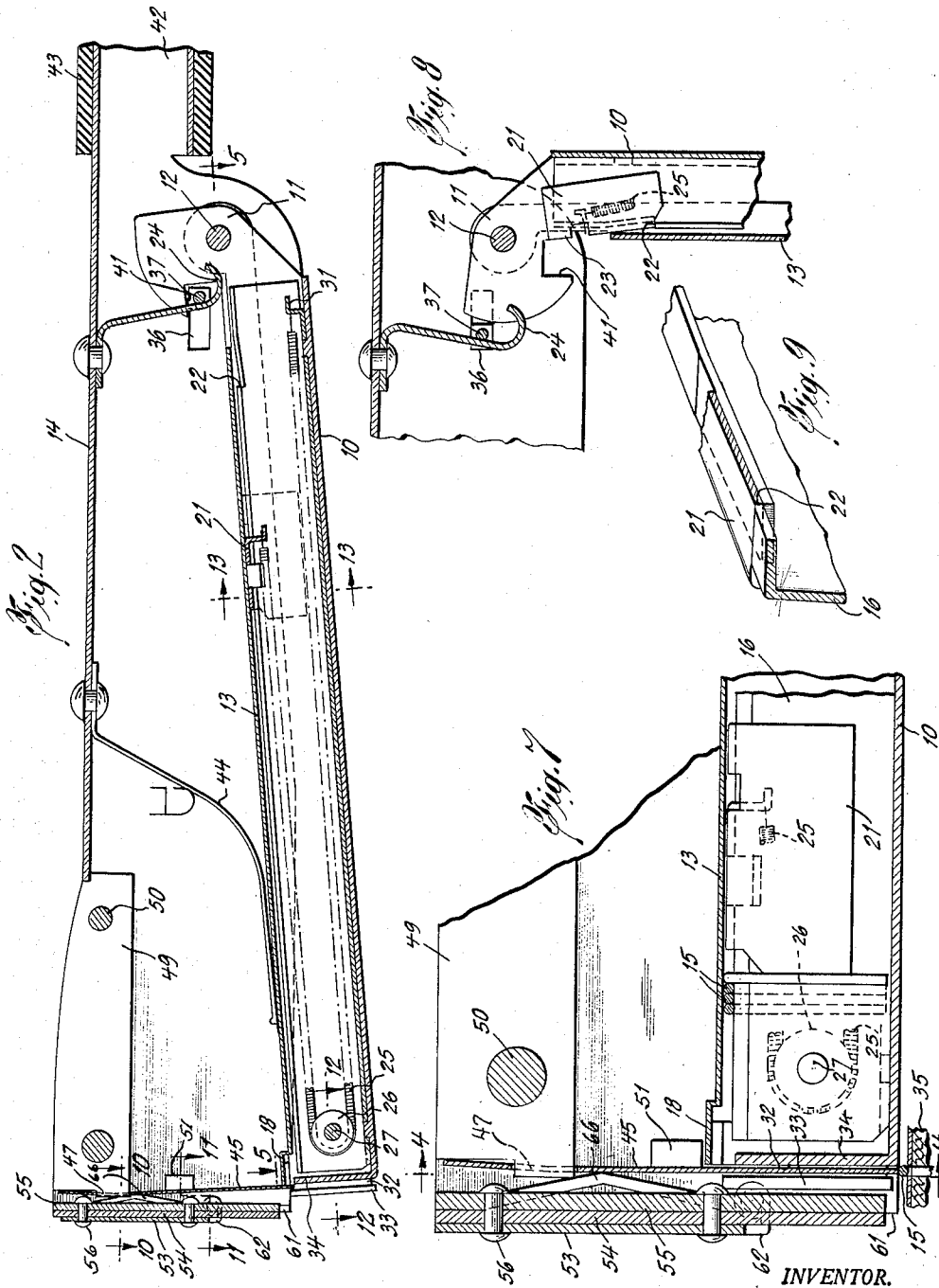
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STAPLE DRIVER

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STAPLE DRIVER

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4 Claims. (Cl. 1—49)

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This invention relates to new and useful improvements in heavy duty stapling machines and relates more particularly to a stapling machine of the "hammer" variety which is useful for tacking insulation to beams and studs and for other purposes wherein the staple must be driven with a sharp impact blow as distinguished from the lighter blows needed to drive staples through sheets of paper.

Staple driving hammers of this general character have a number of disabilities, principal of which is the fact that the staples are constantly jamming when the legs collapse during driving, and they must be dug out under trying conditions since the forward end of the hammer element supporting the driver has descended downwardly to a point where it has largely enclosed the throat of the magazine and the collapsed staple is inaccessible.

An important object of the present invention is to provide a hammer element with a sliding gate which may be instantly raised to fully expose the offending staple, and then lowered to operative position.

Another object of the invention is to provide a novel driver supporting means, which means includes a part of the foregoing sliding gate, and which permits quick removal and replacement of the driver.

Another object of the invention is to provide an improved magazine arrangement for hammer type of staplers wherein the feed of the stick of staples is positive at all times and wherein the magazine may be readily opened to receive a new stick of staples.

In the drawings:

Fig. 1 is a side elevation of the stapler of the present invention;

Fig. 2 is a broken vertical longitudinal section;

Fig. 3 is a front elevation of the driver frame or hammer element and showing certain details of the slidable door which enables jammed staples to be removed;

Fig. 4 is a section taken on line 4—4 of Fig. 7;

Fig. 5 is a broken plan view of the magazine;

Fig. 6 is a front elevation of the magazine;

Fig. 7 is a broken vertical section taken through the machine and showing the relation of the parts when the driver has driven the staple completely into the work;

Fig. 8 is a broken section showing the connection between the magazine and the hammer element;

Fig. 9 is a broken perspective view showing the

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means for holding the staple pusher retracted during loading;

Fig. 10 is a broken section taken on line 10—10 of Fig. 2;

Fig. 11 is a broken section taken on line 11—11 of Fig. 2;

Fig. 12 is a broken section taken on line 12—12 of Fig. 2;

Fig. 13 is a broken section taken on line 13—13 of Fig. 2.

Fig. 14 is a broken front elevation showing the front of the frame with its out-turned flanges and the gate in elevated position.

The stapling machine of the present invention includes a channel-shaped magazine 10 provided at its rear end with spaced upstanding ears 11 supporting a pivot pin 12. A magazine cover 13 and a frame or hammer element 14 are pivotally mounted on such pivot pin.

A "stick" of staples shown at 15 (Fig. 13) rides astride of a staple support bar 16 stamped from sheet metal and the cover 13 formed with side flanges 17 retains the staples within the magazine. The forward end of the cover is raised as shown at 18 (Figs. 2 and 7) to limit rearward movement of the staple driver. The staples are advanced by an inverted U-shaped staple pusher or follower 21 which also rides astride of staple support bar 16. The latter is cut transversely near its rear end and the material to the rear of the cut is bent downwardly, thus forming a shoulder 22 which is engaged by the forward edge of the pusher to retain the latter in rearward position during loading of the magazine.

A rearward extension 23 of the pusher is arranged to be engaged by a spring 24 when the magazine is moved from the open position of Fig. 8 to the closed position of Fig. 2, thus effecting a rocking action of the pusher and freeing it from shoulder 22 for forward travel. The pusher is urged forwardly by an elongated coiled spring 25 one end of which is secured to the pusher. The spring passes around a roller 26 journaled on a pin 27 mounted between the walls of frame 16 adjacent the throat of the machine. The other end of the spring is secured at 31 at the rear of the magazine.

The throat through which the forward staple passes is shown at 32 and comprises two inwardly turned wall sections 33 (Fig. 12) formed integrally with the side walls of the magazine and whose inner vertical edges are spaced apart. The throat further includes an upwardly turned portion 34 formed integrally with the base wall and which is spaced to the rear of wall section

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33 by a distance equal to the thickness of the staple. It will be noted that the upper edge of the turned portion is shaped to fit the bridge of the staple. Thus the forward staple resides in the throat at all times until driven and when it is driven by the driver it passes downwardly in the throat and into the work shown at 35.

Except during the insertion of new sticks of staples into the magazine the driver frame is secured relative to the magazine by means of a sliding catch in the frame which is mounted for sliding movement in slots 36 and which is manipulatable from the side of the frame and which has associated therewith a cross pin 37 which is urged rearwardly by spring 24. One of ears 11 extends upwardly further than the other and has a recess 41 which is engaged by the cross pin 37. When the catch is moved forwardly against the action of the spring the ear is free to move downwardly with the magazine to the position of Fig. 8.

The frame or hammer element is of channel shape and is provided with a rear handle portion 42 carrying a rubber grip 43. Adjacent its forward end a spring 44 is secured which retains the magazine in its downward position.

The driver 45 is formed from fairly heavy gauge spring steel and is provided with an opening 46 which receives a square boss 47 carried at the outer end of a block 49 secured by pins 50 at the forward end of the frame. Supplemental support is afforded the driver by internal lugs 51. The driver is formed with a rib 52 to strengthen the same and prevent undue flexion due to the distortion to which it is subjected as it moves from the position of Fig. 2 to that of Fig. 7.

The driver is retained in position by means of a sliding gate which is formed with three plates including an outer spring plate 53, a door plate 54 and a door spacer 55, all secured together by rivets 56.

The intermediate or door plate 54 (Fig. 10) is provided on opposite sides thereof with inwardly turned flanges 60 which mount the plate for sliding movement on outwardly turned flanges or trackways 61 formed in the forward edge of frame 14 forming the hammer element. It will be noted from an examination of Figs. 2 and 3 that these latter flanges extend below the door plate 54. Spring plate 53 has inwardly curled spring elements 62 on each side thereof and above the spring elements are lugs 63 forming finger grips for raising the gate. To increase the resiliency of the spring elements the spring plate 54 is cut away at 64 on each side of a downwardly projecting central portion 65.

Door spacer 55 (Figs. 2 and 11) has rearwardly extending, struck out portions or fingers 66 on each side of the central portion.

Door plate 54 has notches 71 (Figs. 3 and 14) on each edge through which the spring elements 62 pass and the trackways 61 which support the gate in its sliding movement have lower notches 72 (Figs. 3 and 14) in which the spring elements 62 are positioned during normal operation and upper notches 73 into which the spring elements pass when the gate has been raised to remove a jammed staple. When a new driver is to be inserted the entire gate assembly is removed upwardly from the hammer element.

The three plates are secured together by the rivets 56 to cause the gate to move as a unit and the struck out portions 66 on the door spacer plate 55 rest against the driver, retaining it in place.

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To load the magazine, the hammer element is released from the magazine by moving catch 36 and the magazine is lowered to the position of Fig. 8. The cover is opened and the pusher moved back to stop 22. The stick of staples is now inserted in the magazine, the cover closed and the hammer element moved down to engagement with the magazine and the staple is ready for use.

When the work shown at 35 is hit with the impact blow the lower edge of the magazine first encounters the work which is followed by the downward movement of the forward end of the hammer element and the driver which drives the staple into the work. If during the downward movement of the driver through the throat the staple collapses, causing the driver to jam, the driver is generally near the bottom of the throat. When this occurs the gate may then be raised, thus exposing the front of the throat as seen in Fig. 6. This enables the collapsed staple to be pushed downwardly and outwardly at the lower end of the throat.

I claim:

1. A staple driving machine comprising an inverted U-shaped frame and a U-shaped magazine which is partially enclosed by the side walls of the frame and is pivoted thereto at its rear end, the frame being provided with a handle portion to the rear of the pivot, a throat formed at the forward end of the magazine through which the staples are driven, a staple pusher for advancing the staples, a staple driver mounted at the forward end of the frame whose lower end passes through the throat to drive the staple when the forward end of the machine is forcibly moved in the direction of the work and the forward end of the magazine contacts the work, a gate mounted for vertical sliding movement at the forward end of the frame, and provided with a rearwardly extending portion for securing the driver in place, spring and detent means for securing the gate in a lowered position where it largely encloses the driver, and in a raised position wherein the lower section of the driver is exposed.

2. A staple driving machine comprising an inverted U-shaped frame and a U-shaped magazine which is partially enclosed by the side walls of the frame and is pivoted thereto at its rear end, the frame being provided with a handle portion to the rear of the pivot, a throat formed at the forward end of the magazine through which the staples are driven, a staple pusher for advancing the staples, a staple driver mounted at the forward end of the frame whose lower end passes through the throat to drive the staple when the forward end of the machine is forcibly moved in the direction of the work and the forward end of the magazine contacts the work, the forward end of the frame having outwardly turned, vertical trackways, a gate provided with inwardly turned flanges which engage the trackways to mount the gate for vertical movement and provided with a rearwardly extending portion for securing the driver in place, spring and detent means for securing the gate in a lowered position where it largely encloses the driver, and in a raised position wherein the lower section of the driver is exposed, the gate being completely removable from the upper ends of the trackways when a new driver is to be inserted.

3. A staple driving machine comprising an inverted U-shaped frame and a U-shaped maga-

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zine which is partially enclosed by the side walls of the frame and is pivoted thereto at its rear end, the frame being provided with a handle portion to the rear of the pivot, a throat formed at the forward end of the magazine through which the staples are driven, a staple pusher for advancing the staples, a staple driver mounted at the forward end of the frame whose lower end passes through the throat to drive the staple when the forward end of the machine is forcibly moved in the direction of the work and the forward end of the magazine contacts the work, outwardly turned trackways having vertically spaced notches therein formed at the forward end of the frame, a gate having inwardly turned flanges mounted for vertical sliding movement on the trackways and provided with spring elements which enter the vertically spaced notches for securing the gate in a lowered position where it largely encloses the driver, and in a raised position wherein the lower section of the driver is exposed, and a rearwardly extending finger on the gate which holds the driver in place.

4. A staple driving machine comprising an inverted U-shaped frame and a U-shaped magazine which is partially enclosed by the side walls of the frame and is pivoted thereto at its

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rear end, the frame being provided with a handle portion to the rear of the pivot, a throat formed at the forward end of the magazine through which the staples are driven, a spring means for advancing the staples, a staple driver formed with an opening at its upper end removably mounted at the forward end of the frame whose lower end passes through the throat when the forward end of the machine is forcibly moved in the direction of the work and the forward end of the magazine contacts the work, a boss on the frame, the opening in driver receiving the boss, a gate mounted for vertical sliding movement at the forward end of the frame, and provided with rearwardly struck-out portions which engage the driver and secure it in place in the boss, a spring and detent means for securing the gate in a lowered position where it largely encloses the driver, and in a raised position wherein the lower section of the driver is exposed.

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