Oct. 19, 1943. F. POLZER 2,332,257

FASTENER DRIVING MACHINE

Original Filed Feb. 18, 1942 3 Sheets-Sheet 1

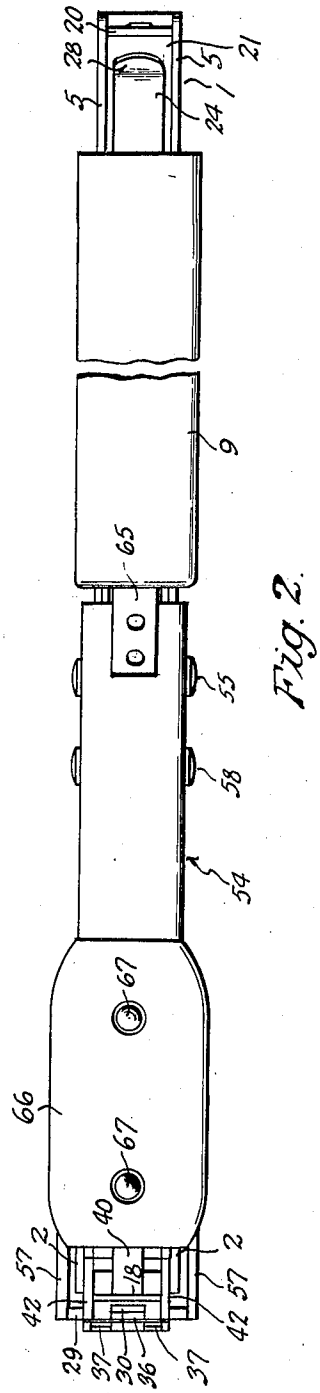


Fig. 2.

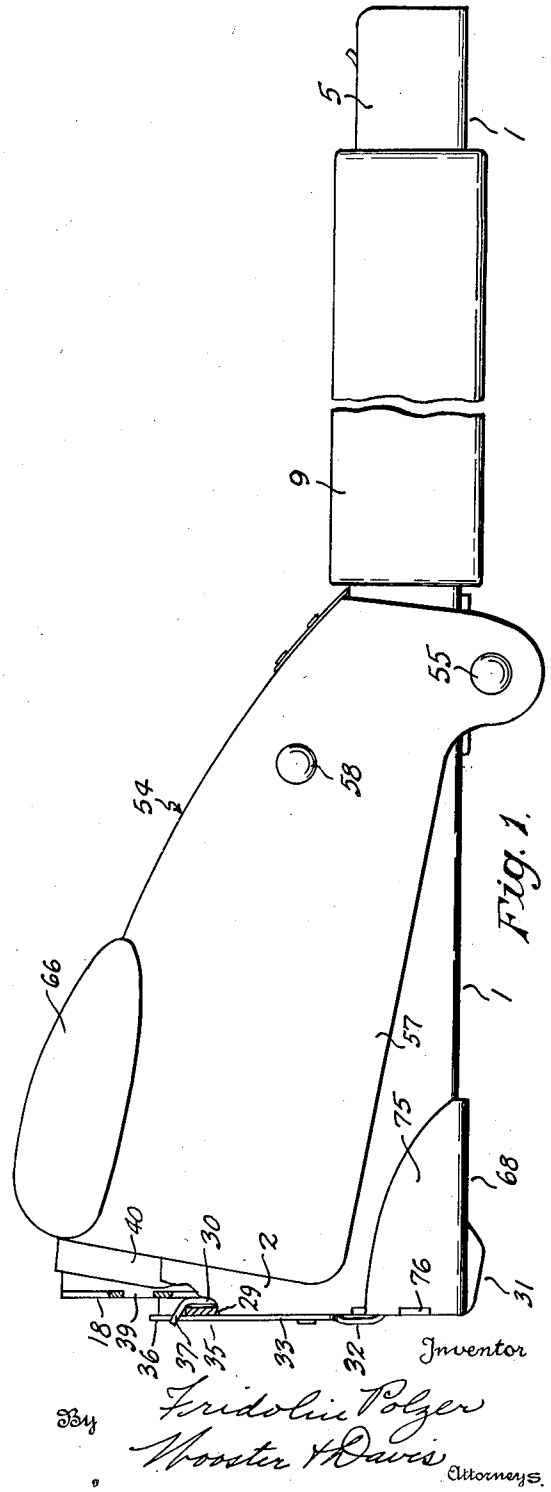


Fig. 1.

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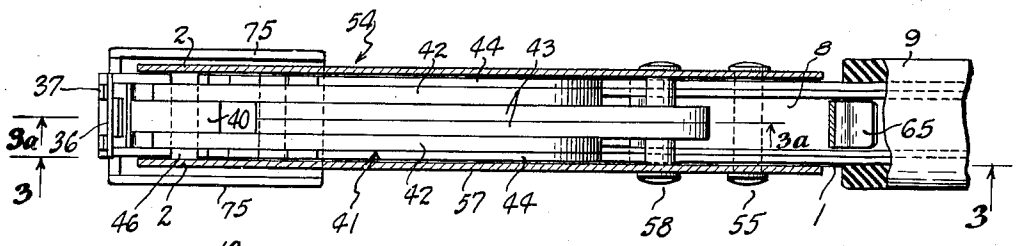


Fig. 4.

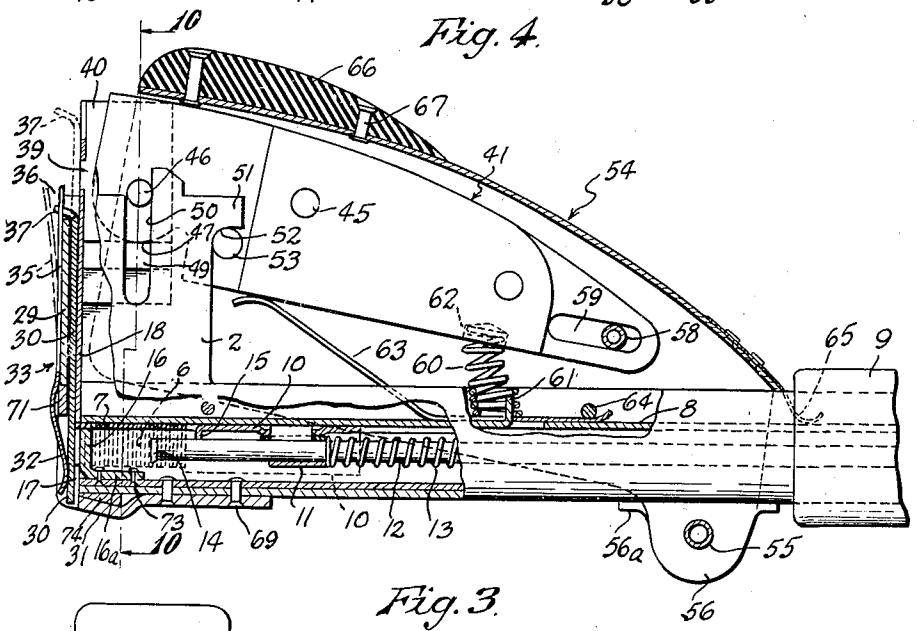


Fig. 3.

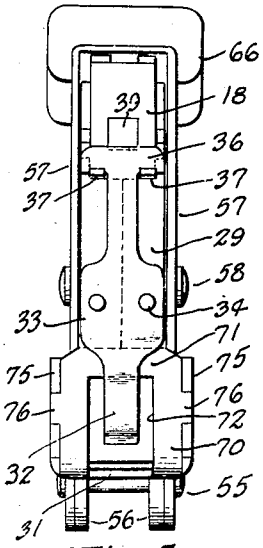


Fig. 5.

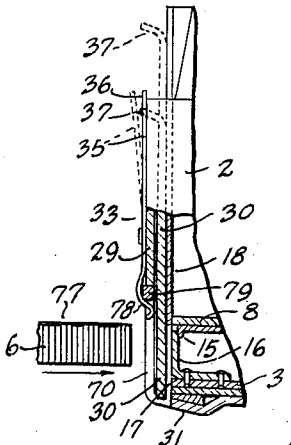


Fig. 6.

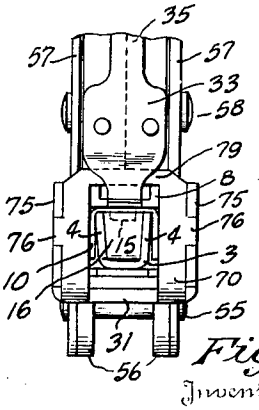


Fig. 7.

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FASTENER DRIVING MACHINE

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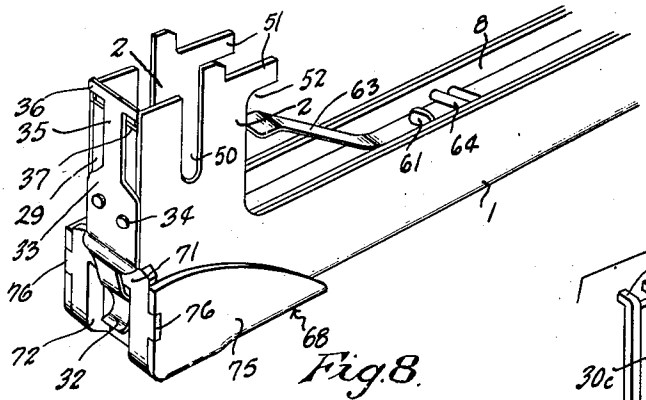


Fig. 8.

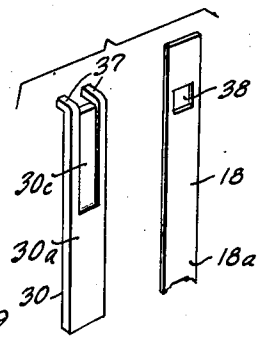


Fig. 11.

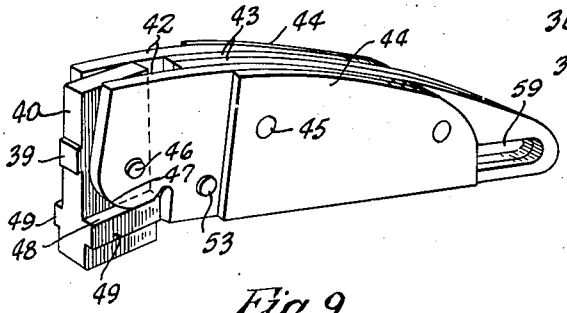


Fig. 9.

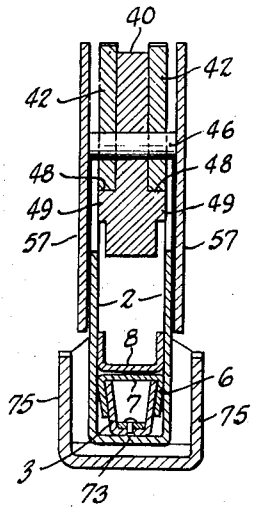


Fig. 10.

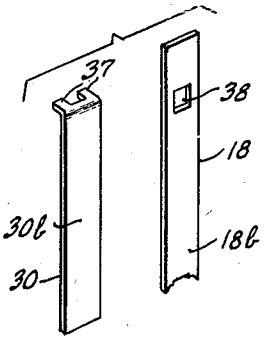


Fig. 12.

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Patented Oct. 19, 1943 2,332,257

UNITED STATES PATENT OFFICE

2,332,257

FASTENER DRIVING MACHINE

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Original application February 18, 1942, Serial No. 431,352. Divided and this application August 26, 1942, Serial No. 456,229

12 Claims. (Cl. 1—49)

This invention relates to fastener driving machines particularly of the type for driving substantially U-shaped or similar fasteners.

A particular object is to provide a construction in which fastener drivers of different thicknesses may be used, and mounted so that the drivers may be readily changed to drive different widths or sizes of fasteners so that the same machine, merely through a simple operation, may be adapted for driving different widths or sizes of fasteners, giving in effect several machines in one.

It is another object to provide a structure for a machine of this type in which practically all of the parts may be made of press-work and stamped and formed from sheet metal of suitable gauge or thickness.

With the foregoing and other objects in view I have devised the construction illustrated in the accompanying drawings forming a part of this specification. It, however, is to be understood the invention is not limited to the specific details of construction and arrangement shown but may employ various changes and modifications within the scope of the invention.

In these drawings:

Fig. 1 is a side elevation with parts broken away to more clearly show the construction;

Fig. 2 is a top plan view thereof;

Fig. 3 is a vertical longitudinal section substantially on the line 3—3 of Fig. 4, or just inside the side plate of the hand lever, showing certain of the internal members in side elevation, and certain of them broken away so that the section through the driver and the fastener feed is substantially on the line 3*a*—3*a* of Fig. 4;

Fig. 4 is a top plan view just under the top wall of the hand lever, thus showing the sides of the hand lever in section and the internal members in plan view;

Fig. 5 is a front elevation;

Fig. 6 is a partial side elevation and partial section of the front of the machine showing a slight modification;

Fig. 7 is a front view of the arrangement of Fig. 6;

Fig. 8 is a perspective view of the front portion of the head of the machine with the driver operating mechanism removed;

Fig. 9 is a perspective view of the hammer lever for operating the driver;

Fig. 10 is a transverse vertical section substantially on line 10—10 of Fig. 3;

Fig. 11 is a perspective view of a driver and front plate which may be used, and

Fig. 12 is a similar view of another driver and front plate, these Figures 11 and 12 showing how by the use of drivers and front plates of different thicknesses the machine may be readily changed to adapt it for driving different widths or sizes of fasteners without changing the structure of the machine, so that the same machine is adaptable for driving several different sizes or widths of fasteners.

This application is a division of my prior application for patent for fastener driving machine, Serial No. 431,352, filed February 18, 1942.

The machine illustrated is for driving substantially U-shaped fasteners or staples, but the same mechanism may be used to drive various types of fasteners, such for example as two-pronged staples, tacks, nails and the like, it being necessary to merely change the shape and size of the fastener guiding and feeding means and the driver to suit the type and size of fastener used.

The device comprises an elongated body member 1 having a horizontal portion substantially U-shaped in cross section forming a handle at one end and at its forward end having upright extensions 2 on the side walls forming a head portion. This member may be stamped and formed from heavy sheet metal of suitable thickness and therefore may be press-work rather than a casting. It encloses the fastener support or guide 3 which extends longitudinally of the horizontal portion and is also preferably of substantially U-shape with its side walls 4 spaced from the side walls 5 of the body 1 to provide space for the prongs of the fasteners, in the illustration shown substantially U-shaped staples 6, supported on the top of the guide 3 with their cross bars 7 resting on the top of the support 3 as shown in Figs. 3 and 10. The side walls 4 of the staple support and guide may be inclined somewhat as shown in Fig. 10 so that the guide is somewhat wider at the top, and if the staples are similarly shaped with the side prongs inclined inwardly they will grip the guide and be held from a tendency to move off the guide, but the device is not limited to the use of such staples but may use staples having parallel prongs. Spaced a short distance above the support and guide 3 is a closure member 8 for closing the top of the horizontal portion of the body and also forming a guide for the staples to retain them on the guide and support 3. This may also be of substantially U-shape in cross section to fit between the side walls of the body and may be secured therein by any suitable means such as welding or cross rivets. This member may also be formed from sheet metal of suitable thickness.

Enclosing the rear end portion of the handle body 1 is a hand grip 9 which may be of any suitable material, such for example as rubber, wood or other composition.

The fasteners 6 are fed along the support and guide 3 to the driving position by a feed mechanism including a follower 10 of substantially inverted U-shape in cross section so as to rest on top of the guide 3 and embrace the sides thereof, and it includes a downwardly extending loop 11 embracing and slidable on a rod 12 about which is a light feed spring 13 tending to force the follower forwardly and with it the fasteners to carry them to the driving position. The end of the rod may be enlarged as shown at 14 to prevent the follower sliding off, and the follower may have a downwardly extending lip 15 on its forward end to engage the rear wall 16 of the staple raceway or guideway 17, to prevent the forward end of the follower from being carried into the raceway under the driver 18. The rear end of the horizontal portion of the body 1 is open for insertion of the staple or fastener strips onto the support and guide 3, and the rod 12 is supported by a member 19. The member 19 is held in position by a pivoted catch 24 to hold both this member 19 and the rod 12 in position, but by releasing the catch member 24, the rod 12, spring 13 and follower 10 may be withdrawn through the rear end of the machine to permit feeding of a strip of fasteners onto the guide and support 3. Details of this catch are not shown as they are not claimed in the present application, but they may be the same as shown in the parent application above mentioned.

The mechanism for driving the fasteners is mounted at the forward portion of the body. Although substantially U-shaped staples or fasteners are shown, it will be understood that other shapes and types of fasteners may be employed, in which case the fastener feeding device and driver would be changed to adapt them for the particular fastener used. The driver 18 of a thickness for the width or thickness of the staple or fastener to be used is mounted for vertical reciprocating movement between the side walls 2 of the body member and the back wall of a removable front plate 30 which extends downwardly to a point adjacent the striking wall 31. The removable front plate is retained in position relative to the front wall 29 by means later described. The plate 30 and driver 18 are in back of the front wall 29 of the head portion, the removable plate 30 being between the driver and the front wall 29 and forms a forward guide for the driver. The lower end portion of the plate 30 is spaced forwardly from the forward end of the fastener supporting guide 3 a distance substantially that of or slightly wider than the thickness of the staple or fastener to form a guideway or raceway 17 for the fasteners through which they are forced by the driver 18 and driven into the object which is to be fastened. The lower end portion of the plate 30 is held in this position by the lower end 32 of a spring 33 secured to the front wall 29 by any suitable means such as the rivets 34, and this permits the lower end of the plate 30 forming the front wall of the raceway 17 to move forwardly or yield a short distance, should a staple or fastener of slightly oversize be forced into the raceway, and thus prevent jamming of a staple or fastener in the raceway and clogging of the machine. The lower end portion of plate 30 could also spring slightly to relieve a jammed fastener or one slightly oversize. The upper end portion 35 of the spring is used to releasably retain the front plate 30 in position. For this purpose the spring is provided with a T-head or cross bar 36 and plate 30 is bent forwardly and recessed to provide the spaced lugs 37 which may engage under the cross bar 36 to thus retain the plate 30 and prevent its being drawn upwardly with the driver. The lugs 37 rest on the top edge of the wall 29 to determine its lower position and retain it against further downward movement. By merely springing the top portion 35 of the spring outwardly as shown in dotted lines Fig. 3, the front plate 30 is released and may be raised as indicated by the dotted lines and removed from the machine. After this plate is removed the driver 18 may be released from this operating mechanism and also removed.

This driver 18 is provided with an opening 38 to seat over a lug 39 on the front edge of a block 40 pivotally mounted in the forward end of the hammer lever 41. The block 40 supports the driver and backs it up at its rear side so the driver is prevented from moving away from the front plate 30 and is held at the rear side of this plate. This lever is a weighted lever so that it will have sufficient weight or mass to operate the driver to set a fastener when the device is swung so that its forward end strikes an object. The lever has a forked forward end in which the block 40 is mounted and in which it is supported for limited swinging movement by the transverse pivot pin 46. The lower edges of the plates 42 under this pivot are rounded as indicated at 47 to rest on shoulders 48 on the top of transverse ribs 49 on opposite sides of the block 40, whereby pressure from the lever 41 is transmitted directly to the block 40 in the fastener driving operation instead of through the pivot pin 46. The walls 47 are struck on the arc of a circle with the center of the pin 46 at the center so these curved walls will roll on the shoulders 48 as the block 40 swings on its pivot. The opposite ends of the pin 46 project beyond the side plates 42 so as to extend into upright guide slots 50 in the side walls 2 of the body member, these slots extending through the tops of these walls for easy insertion and removal. These slots guide the block 40 for straight up and down movement parallel to the front wall 29, and as it carries the driver 18 it retains the driver closely adjacent the rear side of the front plate 30 for its up and down reciprocating movement. It will be seen that at the top portion of each of the side walls 2 is a rearward extension or lug 51 forming a stop shoulder 52 to be engaged by the ends 53 of the transverse stop pin, as indicated in Fig. 3, to limit the upward movements of the lever.

The hammer lever 41 is mounted in a movable hollow hand lever 54, this lever being preferably of substantially inverted U-shape in cross section and stamped and formed from sheet metal of suitable thickness. It is pivoted to the body member 1 at 55 through downwardly extending lugs 56 on a small bracket 56a fastened to the under side of the body 1 by any suitable means such as rivets or welding. The sides 57 of this lever 54 are extended downwardly so as to enclose the hammer lever 41 and the head portion of the body to protect them and also help retain them in position as well as to cover them up to give a better appearance. The hammer lever 41 is pivoted to the hand lever 54 by the cross bolt or rivet 58 extending between the side walls 57, and to permit free and unrestricted movement

of the lever 41 this pivotal rivet passes through an elongated slot 59 in the lever. The lever 41 is thus in effect a floating lever. This elongated slot can be conveniently located in rearward extensions of the plates 43. A coil spring 60 mounted on the top wall 8 and under the lever 41 tends to move this lever and the lever 54 to the upper or normal position ready for a fastener driving operation and retain it therein. It may engage at its lower end over an upwardly extending lug 61 cut and bent upwardly from the bottom wall of the member 8 and may seat at its upper end in a recess 62 in the underside of the lever. An additional flat spring 63 may also be mounted on the member 8 and engage under the lever 41 to help raise this lever and the lever 54, this spring being also mounted on the wall 8 and provided with an opening to seat over the lug 61 and extend at its rear end under a cross pin 64 to retain it in position on the member 8. A clip 65 mounted on the top wall of the lever 54 is extended downwardly and rearwardly to engage the member 8 when the lever is in its upper position to form a sort of cushion or resilient stop as the levers move to their upper position and reduce the blow of the stops 53 against the lugs 51. On the top of the hand lever 54 is mounted a hand cushion or grip 66 of rubber or other suitable relatively soft or yieldable resilient material to cushion the pressure or blow against the hand when the device is used as a hand operated staple or fastener setting device, this cushion being secured to the lever by any suitable means such as rivets 67. With this construction and arrangement the block 40, hammer lever 41 and hand lever 54 may operate as a unit.

The striking surface 31 is on the lower side of the hammer member 68 stamped and formed of heavy metal to substantially U-shape and secured to the bottom wall of the body 1 by any suitable means such as rivets 69 or welding. The same rivets can be used to fasten the staple guide or support 3 in the body. The forward wall 70 of the member 68 extends upwardly in front of the fastener guide and provides a cross wall 71 in front of the front plate 30 to support and back up this plate and limit its outward movement. There is, however, ordinarily a certain amount of clearance between the front plate 30 and the cross wall 71 to permit limited yielding movement of the plate 30 as above described should an oversized fastener be forced into the raceway. The front wall 70 is cut away, as shown at 72, to permit the spring 32 to engage the front plate 30 and also to expose the front portion of the staple guide 3 when the front plate is removed to permit clearing of the machine should a staple or other fastener be jammed in the machine. This also permits insertion of a staple or fastener strip onto the guide 3 from the front of the machine, as will presently be described in connection with the modified construction of Figs. 6 and 7, as well as removal of fasteners through the front of the machine should it be desired to do so. The rear wall 16 of the raceway 17 is formed by the upwardly extending portion of an L-shaped member mounted between the side walls of the guide 3, the other portions 16a resting on the bottom wall of the member 3 and secured thereto by any suitable means such as welding or rivets 73. The striking wall 31 is shown as inclined downwardly and rearwardly so that in striking an object with this device it may be struck with this wall 31 substantially parallel to the surface being struck and the handle grip 9 raised above this surface so as to protect the fingers of the user. The hammer member 68 has upwardly extending side walls 75 spaced outwardly from the side walls 2 of the body member to permit the lower edges of the side walls 57 of the hand lever to pass down between them. These walls 75 and front walls 70 are locked together to give greater strength to the hammer member by means of lugs or extensions 76 on the edges of the front wall 70 and seating in notches in the front edges of the walls 75.

In the modification shown in Figs. 6 and 7, an arrangement is shown whereby the fasteners, such for example as a staple strip 77, may be fed or inserted in the machine from the front. In this case the spring 78 corresponding to the spring 31 is raised higher, the cross wall 79 corresponding with the cross wall 71 being narrowed for this purpose, so that the lower end of this spring 78 resting against the front plate 30 is spaced above the top wall of the staple guide and support 3. Therefore when the front plate 30 is raised the staple strip 77 may be slid onto the top of the support 3 by sliding it in from the front thereof, as shown by the arrow. This may be forced in against the action of the feed spring 13, but preferably the spring and the follower 10 would first be retracted toward the rear of the machine after releasing the catch 24.

In operation the machine is gripped by the handle grip 9 and by swinging it in the manner similar to swinging a hammer, the forward end and particularly the striking surface 31 is struck against the object to be fastened. This of course arrests the movement of the head end of the device, but the inertia of the weighted levers 41 and 54 will carry them downwardly to force the block 40 and driver 18 downwardly to drive a fastener through the raceway 17 into the object, after which the springs 60 and 63 will raise the levers and the driver to the upright or normal position shown in Fig. 5, at which the next following staple is fed by follower 10 and spring 13 into the raceway 17 under the lower end of the driver in position preparatory to the next driving operation. If the device is to be used as a hand operated device, the grip 9 is held in one hand with the surface 31 resting on the article to be fastened. By pressing or a light blow on the grip or cushion 66 with the other hand the levers 54 and 41 are forced downwardly, carrying with them the driver 18 and driving the fastener into the work. Therefore the device is equally adapted for use either in the manner of a hammer or as a hand operated device.

Figs. 11 and 12 illustrate two drivers for the fasteners of different thicknesses. That is, the driver 18a of Fig. 11 is shown as being of less thickness than the driver 18b of Fig. 12. The driver 18a would therefore be used for driving fasteners or staples of less width than would the driver 18b, as for proper operation the driver should preferably be of substantially the width of the fasteners. However, as the space between the front wall 29 and front edge of block 40, and the forward end of the fastener support and guide 3 and the upright wall 16 and the forward wall 29, 71 of the head portion of the machine is fixed, the front wall 30 should be changed and be of the proper thickness to correspond with the space between the driver and the front wall. Thus when using the thinner driver 18a of Fig. 11 the front plate 30a should be correspondingly thicker, and when using the thicker driver 18b of Fig. 12 the corresponding front plate 30a

should be thinner. With the thicker plate **30a** and the thin driver **18a**, the plate **30a** may be relieved by a groove **30c** in the upper portion in the rear wall thereof to form a clearance for the projecting end of the lug **39** on the operating block **40**. It will thus be seen that by using different thicknesses of the driver **18** and front plates **30** of correspondingly different thicknesses, the machine may be adapted for driving several different widths of fasteners, the range of course being limited only by the capacity of the machine as determined by the clearance in the head of the machine provided for the driver **18** and the front plate **30**. To thus adapt the machine for driving any particular width of fastener all that is necessary is to remove the plate **30** and driver **18** and insert a driver and plate of the proper thickness for the fastener involved, which it will be seen is a very simple operation. Therefore exactly the same mechanism without any change or adjustment can be easily and quickly adapted for different thicknesses or widths of fasteners, making in effect several machines in one, as a new machine is not required for a different size staple or fastener.

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

1. A fastener driving machine comprising an elongated body having an upright transverse front wall at its forward end, a fastener support and guide in the body terminating at its forward end spaced rearwardly of said wall, a fastener driver mounted to the rear of said front wall for reciprocating movement and spaced therefrom, an operating lever to which the driver is detachably connected so it may be removed from the machine, a front plate removably mounted between the driver and the front wall to form a front guide for the driver and spaced from the forward end of the fastener guide to form a raceway for the fasteners, said driver being movable in the raceway to drive a fastener, and means for feeding fasteners to the raceway to be driven by the driver.

2. A fastener driving machine comprising an elongated body having an upright transverse front wall at its forward end, a fastener driver mounted to the rear of said front wall for reciprocating movement and spaced therefrom, an operating lever to which the driver is removably attached so that it may be removed from the machine, a front plate mounted between the front wall and the driver to form a front guide for the driver and retain it connected to the lever, said front plate being removably mounted to release the driver, a fastener guide and support terminating a short distance to the rear of the front plate to form therewith a raceway under the driver through which fasteners may be driven by said driver, and means for feeding fasteners along said support to the raceway.

3. A fastener driving machine comprising a body including a fastener support and guide, a removable front plate arranged with its lower end portion spaced forwardly of the front end of said support to form a guiding raceway through which the fasteners may be driven, a fastener driver reciprocable in said raceway to drive the fasteners therethrough, said front wall extending above the support to form a front guide for the driver, means at the rear side of the driver for guiding and operating it, said front plate and driver being detachably mounted so they may be removed from the machine, and said machine adapted for mounting front plates and drivers of different thicknesses to adapt the machine for driving fasteners of different thicknesses, and means for feeding fasteners along the support to the raceway.

4. A fastener driving machine comprising a body including a fastener support and guide and an upright transverse front wall above and forwardly of the front end of said support, a removable front plate at the rear side of said front wall and at its lower end portion being spaced forwardly of the front end of said support to form therewith a raceway for the fasteners, a fastener driver mounted at the rear side of said front plate to reciprocate in the raceway to drive a fastener, guiding and operating means for the driver at the rear side thereof, said driver being detachably secured to the operating means so that it may be removed from the machine, the space between the front wall and said rear guiding means being adapted to receive front plates and drivers of different thicknesses to adapt the machine to drive fasteners of different thicknesses, and means for feeding fasteners along the support to the raceway.

5. A fastener driving machine comprising a body, a fastener support and guide mounted therein, an upright removable front plate spaced forwardly of the front end of the support to form a fastener guideway with the support, a fastener driver mounted at the rear of the front plate and guided thereby and movable through the guideway to drive a fastener, a spring catch to retain the front plate in the body and releasable to permit removal of said plate and the driver, yieldable means holding the lower end of said plate in position and arranged to permit the plate to yield outwardly to permit an oversized fastener to be driven through the guideway, means for operating the driver, and means for feeding fasteners along the support to the guideway.

6. A fastener driving machine comprising a body including upright side walls connected by a transverse front wall, a fastener driver mounted to reciprocate between the side walls at the rear of the front wall, a fastener support in the body, a removable front plate between the front wall and said driver and spaced at its lower end portion forwardly of the front end of said support to form a guideway for the fasteners, a lug on the upper end of said front plate engaging over the upper edge of the front wall to limit downward movement of the plate, a catch spring engaging over the lug to retain the plate in position, means for operating the driver to drive a fastener through the guideway, and means for feeding fasteners along the support to the guideway.

7. A fastener driving machine including a body, a raceway for fasteners, a fastener driver mounted for reciprocating movement in the raceway, means for operating the driver to which the driver is detachably connected so it may be removed from the machine, a front plate mounted at the forward side of the driver in position to form a front guide for the driver and retain it connected to the operating means, means for removably mounting the front plate so that it may be removed to permit removal of the driver, said latter means being adapted for mounting front plates of different thicknesses so that drivers of different thicknesses may be used, and means for feeding fasteners to the raceway under the driver.

8. A fastener driving machine including a body, a raceway for fasteners in the body, a removable front plate forming the front wall of said raceway, a fastener driver mounted for reciprocating

movement in the raceway, means for operating the driver to which it is detachably connected so that it may be removed from the machine, means in the body for removably mounting front plates of different thicknesses to provide raceways of different thicknesses for different widths of fasteners, and said operating means being adapted for operating drivers of different thicknesses.

9. A fastener driving machine comprising a body, an upright transverse front wall at the forward part of the body, a fastener support and guide in the body terminating at its forward end to the rear of the front wall, a fastener driver mounted to reciprocate to the rear of the front wall, a removable front plate between the driver and the front wall forming a guide for the driver and spaced at its lower end forwardly of the end of the said guide to form therewith a guideway for the fasteners, the lower end of said plate being adapted to yield outwardly away from the guide to relieve a fastener in the guideway, means to limit downward movement of the front plate, means to releasably hold the plate in position, and means to feed fasteners along the guide to the guideway.

10. A fastener driving machine comprising a body, an upright transverse front wall at the forward part of the body, a fastener support and guide in the body terminating at its forward end to the rear of the front wall and located below the lower edge thereof, a fastener driver mounted to reciprocate to the rear of the front wall, a shiftable front plate between the driver and the front wall and extending at its lower end to a position in front of and spaced from the end of the guide and support to form a guideway for the fasteners, means for securing the front plate in position and releasable to permit raising of the plate to carry its lower end to a position above the top of the guide and support to permit insertion of a strip of fasteners on said support from the front end thereof, and means for feeding fasteners along the support to the guideway.

11. A fastener driving machine comprising a body including a fastener support and guide and an upright transverse front wall above and forwardly of the front end of said support, a removable front plate at the rear side of said front wall and at its lower end portion being spaced forwardly of the front end of said support to form therewith a raceway for the fasteners, a fastener driver mounted at the rear side of said front plate to reciprocate in the raceway to drive a fastener, means for operating the driver, said plate being normally spaced a short distance from the front wall, a spring mounted on the body and engaging the front side of the said plate adjacent the lower end thereof tending to move said lower end toward the support and adapted to permit the plate to yield away from the end of the support, and means for feeding fasteners along the support to the raceway.

12. A fastener driving machine comprising an elongated body having a handle at one end and spaced upright side walls connected by a transverse front wall at the other end, a fastener guide and support in said body, a removable front plate immediately to the rear of said front wall and spaced forwardly of the forward end of the fastener guide to provide a raceway for the fasteners, a removable driver mounted at the rear side of the front plate and movable through the raceway to drive a fastener, an operating lever connected with the driver to operate it to drive a fastener through the raceway, and means for feeding fasteners to the raceway.

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