

July 27, 1943.

F. POLZER

2,325,341

FASTENER DRIVING MACHINE

Filed Feb. 18, 1942

3 Sheets-Sheet 1

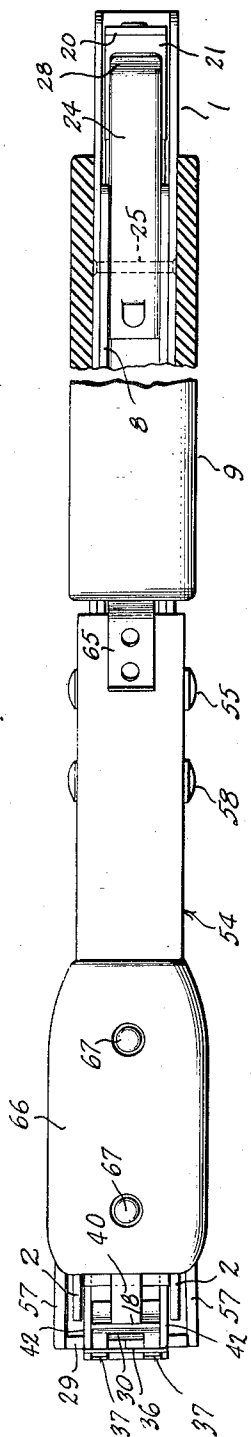


Fig. 2.

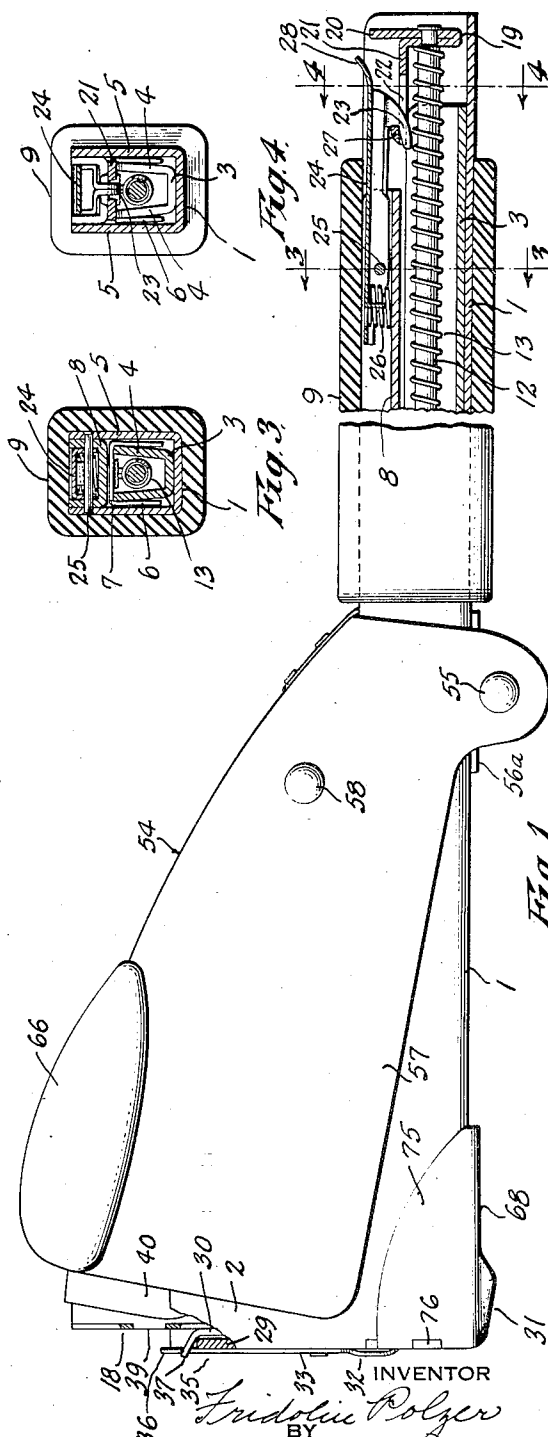


Fig. 1.

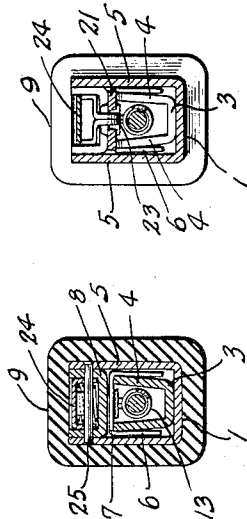


Fig. 3.

Fig. 4.

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3 Sheets-Sheet 2

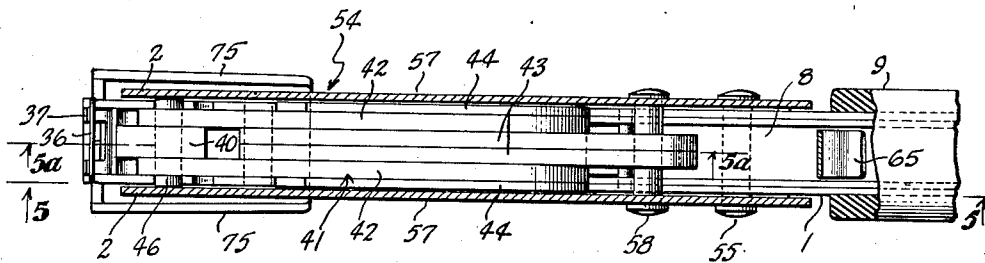


Fig. 6.

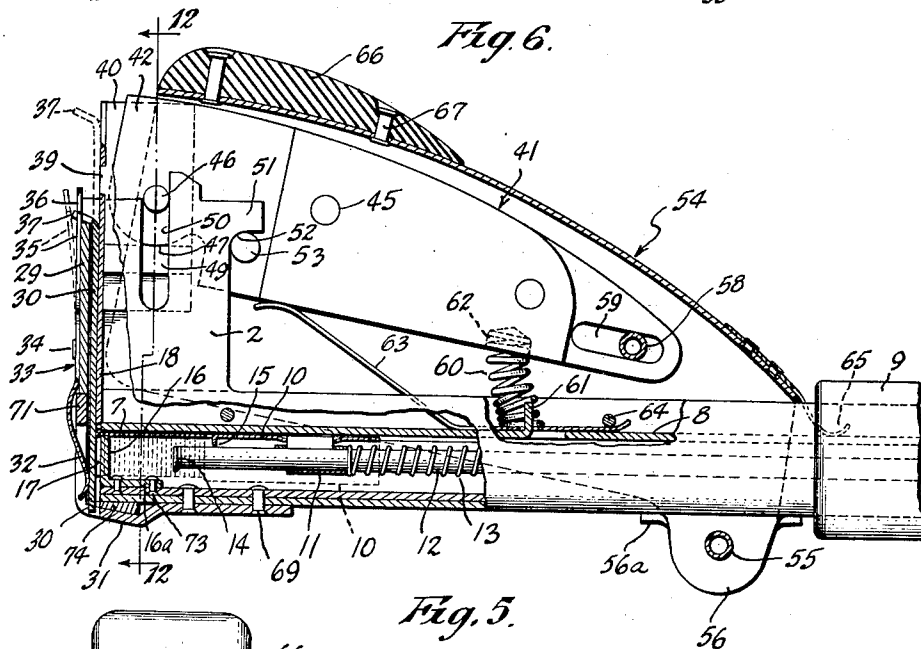


Fig. 5.

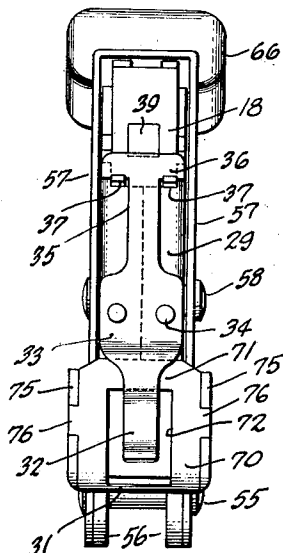


Fig. 7.

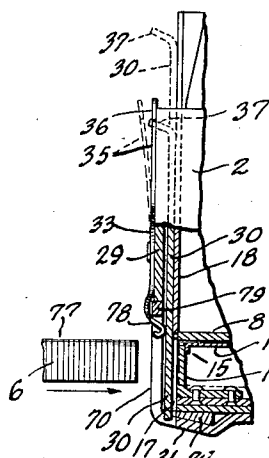


Fig. 8.

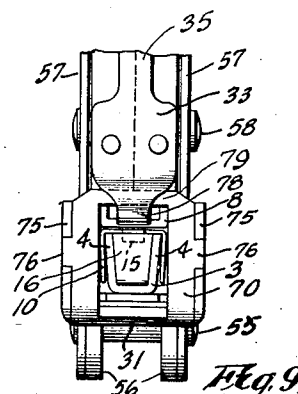


Fig. 9.

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3 Sheets-Sheet 3

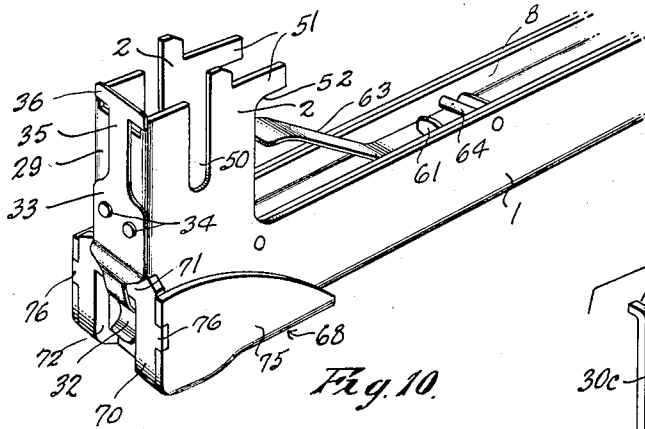


Fig. 10.

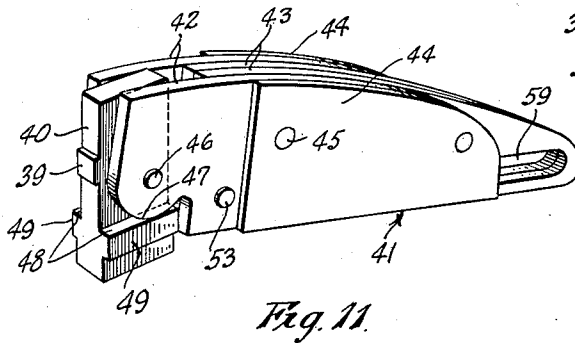


Fig. 11.

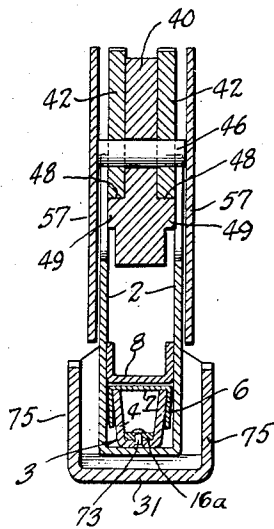


Fig. 12.

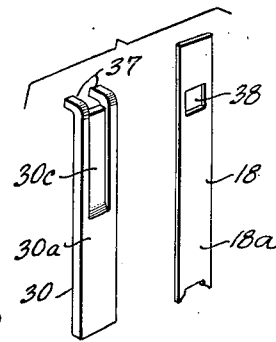


Fig. 13.

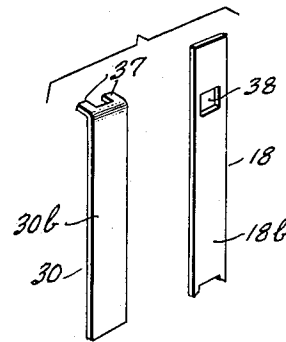


Fig. 14.

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2,325,341

FASTENER DRIVING MACHINE

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corporation of Connecticut

Application February 18, 1942, Serial No. 431,352

14 Claims. (Cl. 1—49)

This invention relates to fastener driving machines, particularly of the type for driving substantially U-shaped or similar fasteners by swinging of the device to strike a blow similar to the blow of a hammer, and it is a particular object to provide such a device which may be used not only in the manner of using a hammer but also may be used for hand operation in the manner of the usual desk or similar type fastener machine.

It is another object 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 fastener 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 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 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 of the device with parts broken away to more clearly show the construction;

Fig. 2 is a top plan view thereof with parts broken away to more clearly show the construction;

Figs. 3 and 4 are transverse sections substantially on lines 3—3 and 4—4 respectively of Fig. 1;

Fig. 5 is a vertical longitudinal section substantially on the line 5—5 of Fig. 6, or just inside the side plate of a 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 5a—5a of Fig. 6;

Fig. 6 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. 7 is a front elevation;

Fig. 8 is a partial side elevation and partial

section of the front of the machine showing slight modifications;

Fig. 9 is a front elevation of the arrangement of Fig. 8;

Fig. 10 is a perspective view of the front portion of the head of the machine with the driver operating mechanism removed;

Fig. 11 is a perspective view of the hammer lever for operating the driver;

Fig. 12 is a transverse section substantially on the line 12—12 of Fig. 5;

Fig. 13 is a perspective view of a driver and front plate which may be used;

Fig. 14 is a similar view of another driver and front plate, these Figures 13 and 14 showing how by 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.

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 for the different types of fasteners 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, 5 and 12. The side walls 4 of the staple support and guide may be inclined somewhat as shown in Figs. 3 and 12 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 having an upright wall 20 forming a finger grip and a horizontal wall 21 having a slot 22 to receive the hook 23 on a retaining catch 24 pivoted between the side walls 5 of the body by a transverse rivet 25. A spring 26 on the opposite side of the pivot tends to force the hook 23 downwardly to engage in a slot 22 in the wall 21 of member 19 and under the cross wall 27 of this member at the inner end of this slot to retain the member 19 and the rod 12 in position. If it is desired to remove the rod and follower to insert a new strip of staples or fasteners the member 19 is merely pushed inwardly or forwardly by the finger until the cross bar 27 clears the hook 23, then the hook may be lifted by engaging a finger under the end 28 of the catch 24, lifting the hook from the member 19 and permitting it to be drawn outwardly with the rod 12 and the follower. As the spring 26 however immediately returns the catch to the lower position the hook 23 will engage the rear end of the follower 10 and prevent its dropping from the machine inadvertently or its complete removal from the machine where the fastener strip is fed at the front of the machine, as will later be described. However, if it is desired to remove the follower and the rod 12 from the machine, the hook 23 may be lifted to permit this.

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 30 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. 5, 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. This lever may be made as one piece, but is preferably made of a plurality of relatively thick plates 42, 43 and 44 secured together side by side by any suitable means, such as rivets 45 or welding. With this construction the hammer lever can be made of stampings or press work. The forward ends of the plates 42 are extended beyond the plates 43 to provide a forked end for the lever 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 oppo-

site 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. 5, 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. The side plates 44 are really filling plates or spacer plates so as to fill in the space between the plates 42 and the sides 57 of the hand lever, but of course with clearance to permit easy relative movement between the levers. They also provide space for side walls 2 of the body and the projecting ends 49 and 53 of the cross pins. 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 the 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 52 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 Figs. 8 and 9, 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 portion 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. That is, the fingers need not be brought down to contact with the surface of the article being struck in order that the surface 31 shall lie parallel or flat on this surface struck. Also this permits the surface 31 to lie flat on the surface of the article being fastened when the machine is used as a hand operated machine to permit the grip 9 in this operation to be held above the surface of the article being fastened. The opposite ends of surface 31 are well rounded to prevent injury to the object struck. Any space between the inclined wall 31 and the bottom wall of the body 1 may be filled in with a filler block 74 which will also back up and support the wall 31. 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. 8 and 9, 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 lever 41 will carry it downwardly to force the block 49 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. The inclination of this surface 31 permits the grip to be held above the surface of the article with the fingers out of contact therewith and still have the surface 31 flat on the surface of the object, then 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. 13 and 14 illustrate two drivers for the fasteners of different thicknesses. That is, the driver 18a of Fig. 13 is shown as being of less thickness than the driver 18b of Fig. 14. 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 25 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 25, 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. 13 the front plate 30a should be correspondingly thicker, and when using the thicker driver 18b of Fig. 14 the corresponding front plate 30b 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 a handle, means connected with the handle for driving fasteners including a movable driver, a weighted lever for operating the driver on impact of the machine against an object, and a hand lever connected with the weighted lever for operating the driver through operation of the weighted lever by pressure on the hand lever.

2. A fastener driving machine comprising a handle having an extension at one end, a reciprocable driver in said extension for driving the fasteners, a hollow hand lever pivoted to the handle, a weighted lever enclosed in the hand lever, said weighted lever being connected to the driver to operate it on impact of the machine with an object, and said hand lever adapted to operate the weighted lever to drive a fastener.

3. A fastener driving machine comprising a handle having an extension at one end, a reciprocable driver mounted in said extension for driving the fasteners, a hollow hand lever pivoted to the handle, a weighted lever within the hand lever and connected with the driver to operate the driver on impact of the machine with an object, and cooperating guiding means on the weighted lever and the extension.

4. A fastener driving machine comprising an elongated body having a handle at one end and spaced upright side walls at the other end, a fastener driver mounted for reciprocating movement between the side walls, a pivoted lever connected to the driver for operating it on impact of the machine with an object, cooperating guiding means on the lever and side walls to guide the forward end of the lever in a given path, said pivot for the lever arranged to permit longitudinal as well as swinging movement of the lever, and a spring tending to shift the lever to its upper position.

5. A fastener driving machine comprising an elongated body having a handle at one end and laterally spaced upwardly extending side walls at the other end, a fastener support in said body, a front plate spaced from the forward end of said support to form a guideway, a reciprocable driver movable through the guideway to drive a fastener therethrough, means for feeding fasteners along the support to the guideway, a movable block to the rear of the driver, means for securing the driver to the block, a weighted driver lever to which the block is pivotally connected, cooperating guide means on the lever and the side walls, a hand lever for operating the first lever, and a pivotal connection between the weighted lever and the hand lever adapted to permit longitudinal movement of the weighted

lever so as to leave the latter lever a free floating lever.

6. A fastener driving machine comprising an elongated body of substantially U-shape in cross section and having a handle grip at one end and having laterally spaced upwardly extending side walls at its other end, a fastener support in said body, a front plate spaced forwardly of the forward end of said support to form a guideway, means for feeding fasteners along the support to the guideway, a reciprocable driver mounted between said side walls and movable through the guideway to drive a fastener, a weighted lever connected to the driver to operate it on impact of the machine against an object, a hand lever pivoted to the body extending over and enclosing the weighted lever for operating it to drive a fastener, and means pivotally connecting the weighted lever to the hand lever.

7. A fastener driving machine comprising an elongated body having a handle grip at one end and upwardly extending side walls at the other end, a block mounted for reciprocating movement between said side walls, a fastener driver connected to said block for operation thereby, and a weighted lever connected to said block to operate the same to operate the driver on impact of the machine against an object.

8. A fastener driving machine comprising an elongated body having a handle grip at one end and upwardly extending side walls at the other end, a block guided for reciprocating movement between said side walls, a fastener driver connected to and guided by said block for reciprocating movement, and a freely floating weighted lever pivoted to the block for shifting the block and driver to drive a fastener on impact of the machine with an object.

9. A fastener driving machine comprising an elongated body having a handle grip at one end and upwardly extending side walls at the other end, a transverse front wall connecting said side walls, a block mounted for reciprocating movement between said side walls and spaced rearwardly from the front wall, a fastener driver removably connected to the forward edge of the block for operation thereby, a removable front plate mounted between the driver and said front wall and forming a guide for the driver, and an operating lever connected to the block for operating the driver to set a fastener.

10. A fastener driving machine comprising an elongated body having a handle grip at one end, a block mounted for reciprocating movement in the other end portion and provided with laterally

extending shoulders, a fastener driver connected with the block for operation thereby, and an operating lever having a forked end pivoted to the block above said shoulders with the sides of the fork engaging said shoulders and rounded to roll thereon to transmit pressure from the lever to the block to operate the driver.

11. A fastener driving machine comprising an elongated body having a handle at one end, a reciprocable fastener driver mounted in the other end portion, a weighted lever connected with the driver to operate it to drive a fastener on impact of the machine against an object, said lever comprising a series of stampings in the form of plates secured together side by side, and means for pivotally mounting said lever.

12. A fastener driving machine comprising an elongated body having a handle at one end, a reciprocable fastener driver mounted in the other end portion, a block to which said driver is connected, a weighted lever pivoted to the block to operate the block and driver on impact of the machine against an object, said lever comprising a series of stampings in the form of plates secured side by side, a pair of said plates being extended forwardly to form a forked end in which the block is mounted, at least one plate being extended at its rear end and provided with an elongated slot, and pivot means extending through said slot for pivotally mounting the lever.

13. A fastener driving machine comprising an elongated body having a handle at one end and a head portion at the other end, a fastener driver mounted for reciprocating movement in the head portion, a weighted lever for operating the driver to set a fastener on impact of the machine against an object, a striking block on the lower part of the head portion at the fastener driving point, and said block having a downwardly and rearwardly inclined striking surface to engage flat on the surface of the object with the handle raised above said object.

14. A fastener driving machine comprising an elongated body having a handle at one end, a reciprocable fastener driver mounted in the other end portion, a block to which said driver is connected, a weighted lever pivotally connected to the block to operate the block and driver on impact of the machine against an object, a hollow hand lever pivoted to the body and enclosing the weighted lever, a pivotal connection between the weighted lever and the hand lever, and said block, weighted lever and hand lever adapted to operate as a unit.

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