

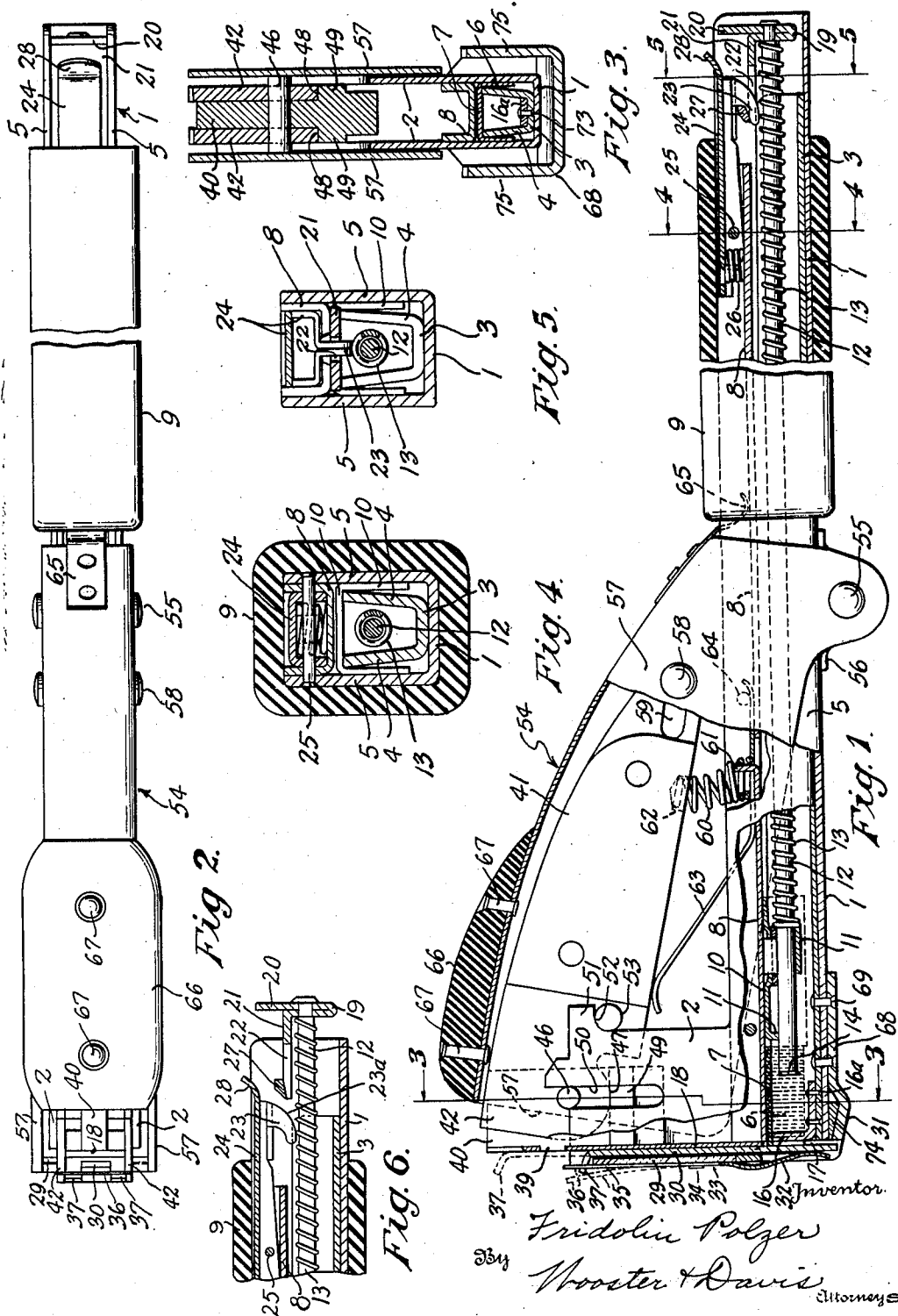
Feb. 29, 1944.

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2,342,818

STAPLE FEED MECHANISM FOR FASTENER APPLYING MACHINES

Original Filed Feb. 18, 1942



UNITED STATES PATENT OFFICE

2,342,818

STAPLE FEED MECHANISM FOR FASTENER
APPLYING MACHINESFridolin Polzer, Norwalk, Conn., assignor to The
E. H. Hotchkiss Company, Norwalk, Conn., a
corporation of ConnecticutOriginal application February 18, 1942, Serial No.
431,352. Divided and this application August
26, 1942, Serial No. 456,230

7 Claims. (Cl. 1—49)

This invention relates to fastener driving machines particularly of the type for driving substantially U-shaped or similar fasteners, and more especially to the mechanism for feeding the fasteners to the driving position and means for facilitating loading of the fasteners in the machine.

It is an object of the invention to provide an improved and simplified means for releasing the fastener feed mechanism so that it may be readily shifted to a position to permit easy insertion of the fasteners in the machine, but will be so constructed that there is practically no danger of its being inadvertently released during handling and operation of the machine.

It is also an object to provide a release for the feeding mechanism to permit loading, which may be operated with one hand, and in fact a single finger of that hand.

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

With the foregoing and other objects in view I have devised the construction illustrated in the accompanying drawing 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 embody various changes and modifications within the scope of the invention.

In the drawing:

Fig. 1 is a partial side elevation of the machine with parts broken away and other parts shown in section;

Fig. 2 is a top plan view thereof;

Fig. 3 is a vertical transverse section substantially on line 3—3 of Fig. 1, and

Figs. 4 and 5 are transverse sections on a somewhat larger scale taken respectively on lines 4—4 and 5—5 of Fig. 1.

Fig. 6 is a longitudinal section of the rear portion of the machine showing the finger piece disengaged from the catch.

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

The machine illustrated is for driving substantially U-shaped fasteners or staples, but the same machine may be used to drive various types of fasteners, such for example as two-pronged staples, tacks 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 or machine illustrated 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 laterally spaced 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 spaces for the prongs 15 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. 1 and 3. The side walls 4 of the staple support and guide may be inclined somewhat as shown in Figs. 3, 4 and 5, so that the guide is somewhat wider at the top than at the bottom, and if the staples or fasteners 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 or fasteners but may use staples or fasteners having parallel prongs. Spaced a short distance above the guide and support 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.

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-shaped 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 or similar opening 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 the slot or opening 22 in the wall 21 of member 19 and under the cross wall 27 of this member at the inner end of the 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 placed against the upper part of the upright wall 20 until the cross bar 27 clears the hook 23. Then the hook may be lifted by engaging the same or a different finger under the free 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 24 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 unless desired. However, if it is desired to remove the follower and the rod 12 from the machine to permit insertion of a strip of fasteners, the hook 23 may be lifted to allow this. It will be seen from Fig. 1 that as the hook 23 is inclined forwardly under the cross wall 27 and the spring 13 tends to shift the member 19 rearwardly, the wall 27 is retained in the hook and effectively prevents inadvertent lifting of the catch 24 to release the member 19. In other words, in order to release the hook of the catch from the member 19 it is first necessary to force the member 19 forwardly against action of the spring 13 sufficiently to carry the cross wall 27 out of the hook 23. For the same reason merely pushing the member 19 inwardly will cause the inclined or rounded under edge 23a (Fig. 6) of the hook to ride up on the cross wall 27 until this wall passes beyond the end of the hook at which time the catch 24 drops and the hook enters the slot 22. When pressure on member 19 is then released it is shifted backwardly or outwardly by spring 13 carrying cross wall 22 into the hook, as shown in Fig. 1, and securing member 19 in position. Therefore after the strip of fasteners is inserted in the machine on the the guide 3 the follower 10 and member 19 are inserted by merely pushing them into the machine onto the guide 3 through the open rear end.

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. Various types of fastener driving mechanism may be used. That shown is the same as disclosed in my prior application above noted and comprises the driver

18 of a thickness for the width or thickness of the staple or fastener to be used and 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 of a flat spring 33 secured to the front wall 29. The plate 30 and the 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 support or 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 the spring 33 which is 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 prevents jamming of a staple or fastener in the raceway and clogging of the machine.

The lower end portion of the plate 30 could also spring slightly to release 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 front wall 29 to determine its lower position and retain it against downward movement. By merely springing the top portion 35 of the spring outwardly as shown in dotted lines Fig. 1, 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 its operating mechanism and also removed.

Various types of mechanism may be used for operating the driver. In that illustrated, the driver 18 is provided with an opening 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 forward end of the lever is forked, the sides of the fork being indicated at 42, in which fork 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 sides 42 of the fork 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 in-

stead of through the pivot pin 46. The opposite ends of the pin 46 project beyond the sides of the fork so as to extend into and be guided by upright guide slots 50 in the side walls 2 of the body member, these slots extending through the top edges of these walls for easy insertion and removal. 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. 1, to limit upward movement of the lever.

The hammer lever 41 is mounted in a movable hollow hand lever 54, this latter lever being preferably of a substantially inverted U-shape in cross section and stamped and formed from sheet metal of a suitable thickness. It is pivoted to the body member 1 at 55 through downwardly extending lugs (not shown) on a small bracket 56 fastened to the under side of the body 1 by any suitable means such as rivets or welding. The sides 57 of the 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. A coil spring 16 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 seat at its lower end over an upwardly extending lug 61 on the bottom wall of the member 8, and may seat at its upper end in the recess 62 in the under side 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 also being mounted on the wall 8 and provided with an opening to seat over the lug 61 and extends 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 lever is moved to the 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. This is the same mechanism as disclosed in my prior application above noted.

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 way 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.

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 weight of the levers 41 and 54 will carry them downwardly to force the block 40 and driver 13 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, 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 into position preparatory for 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, then by pressing or a light blow on the cushion of the grip 66 with the other hand the levers 54 and 41 are forced downwardly carrying with them the driver 13 and driving a 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. The fasteners are fed successively by the follower 10 into the guideway 17 to a position under the driver 13 for each driving operation.

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

1. In a fastener driving machine comprising a body having spaced side walls, a fastener support and guide mounted between the side walls of said body, a follower mounted on the top of said support and slidable thereon to feed the fasteners along the support, a guide rod connected to the follower, a spring embracing the rod to force the follower forwardly, a supporting member connected to the outer end of the rod and located between the side walls of the body, said member including an upwardly extending wall forming a finger grip and a horizontal wall having an opening, and a catch in the body having a hook engaging in said opening to retain said member in the body.

2. In a fastener driving machine comprising a body having spaced side walls, a fastener support and guide mounted between the side walls of said body, a follower to feed the fasteners along the support, a guide rod connected to the follower, a spring embracing the rod to force the follower forwardly, a finger piece connected to the rod at its outer end and located between the side walls of the body and provided with a transverse wall, and a spring operated catch mounted in the body and having a downwardly and forwardly extending hook to engage under said transverse wall to retain the finger piece in position and require forward movement of said piece to permit release of the catch.

3. In a fastener driving machine comprising an elongated body including laterally spaced side walls forming a passage open at its outer end, a fastener support and guide mounted between the side walls and in said passage, a follower mounted on the top of said support and slidable thereon to feed the fasteners along the support, a guide rod connected to the follower, a spring embracing the rod to force the follower forwardly, a supporting member connected to the outer end of the rod and located at said open end of the passage, said member including an upright wall forming a finger grip and a forwardly extending wall having an opening, and a releasable catch in the body extending over said latter wall and having a downwardly extending hook to engage in said opening to retain said member in position.

4. In a fastener driving machine comprising

an elongated body including laterally spaced side walls forming a passage open at its outer end, a fastener support and guide mounted between the side walls and in said passage, a follower mounted on the top of said support and slidable thereon to feed the fasteners along the support, a guide rod connected to the follower, a spring embracing the rod to force the follower forwardly, a supporting member connected to the outer end of the rod and located at said open end of the passage, said member comprising an upright wall having a free upper end forming a finger grip and a forwardly extending wall having an opening therein, a pivoted catch having a free end extending over said latter wall and terminating adjacent the finger grip, and a downwardly extending hook on the catch to engage in said opening to retain the member in position.

5. In a fastener driving machine comprising an elongated body including laterally spaced side walls forming a passage open at its outer end, a fastener support and guide mounted between the side walls and in said passage, a follower mounted on the top of said support and slidable thereon to feed the fasteners along the support, a guide rod connected to the follower, a spring embracing the rod to force the follower forwardly, a supporting member connected to the outer end of the rod and located at said open end of the passage, said member comprising an upright wall having a free upper end forming a finger grip and a forwardly extending wall having a slot therein, and a pivoted catch having a free end extending over said latter wall and terminating adjacent the finger grip, said catch having a downwardly and forwardly extending hook to enter the slot and engage under the forward end

wall thereof and the lower side of the hook being inclined so as to ride up on the wall having the slot when the supporting member is pushed forwardly under the catch.

6. In a fastener driving machine comprising a body having spaced side walls, a fastener support and guide mounted between the side walls of said body, a follower to feed the fasteners along the support, a guide rod connected to the follower, a spring embracing the rod to force the follower forwardly, a finger piece connected to the rod at its outer end and located between the side walls of the body and provided with a transverse wall, a spring operated catch mounted in the body, and cooperating means on said catch and the transverse wall to retain the finger piece in position and so constructed and arranged as to require a forward movement of said piece to permit release of the catch.

7. In a fastener driving machine comprising an elongated body including laterally spaced side walls forming a passage open at its outer end, a fastener support and guide mounted between the side walls and in said passage, a follower mounted on the top of said support and slidable thereon to feed the fasteners along the support, a guide rod connected to the follower, a spring embracing the rod to force the follower forwardly, a supporting member connected to the outer end of the rod and located at said open end of the passage, said member including an upright transverse wall forming a finger grip and a forwardly extending wall, a releasable catch in the body adjacent said latter wall, and cooperating means on the catch and said wall to retain said member in position.

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