

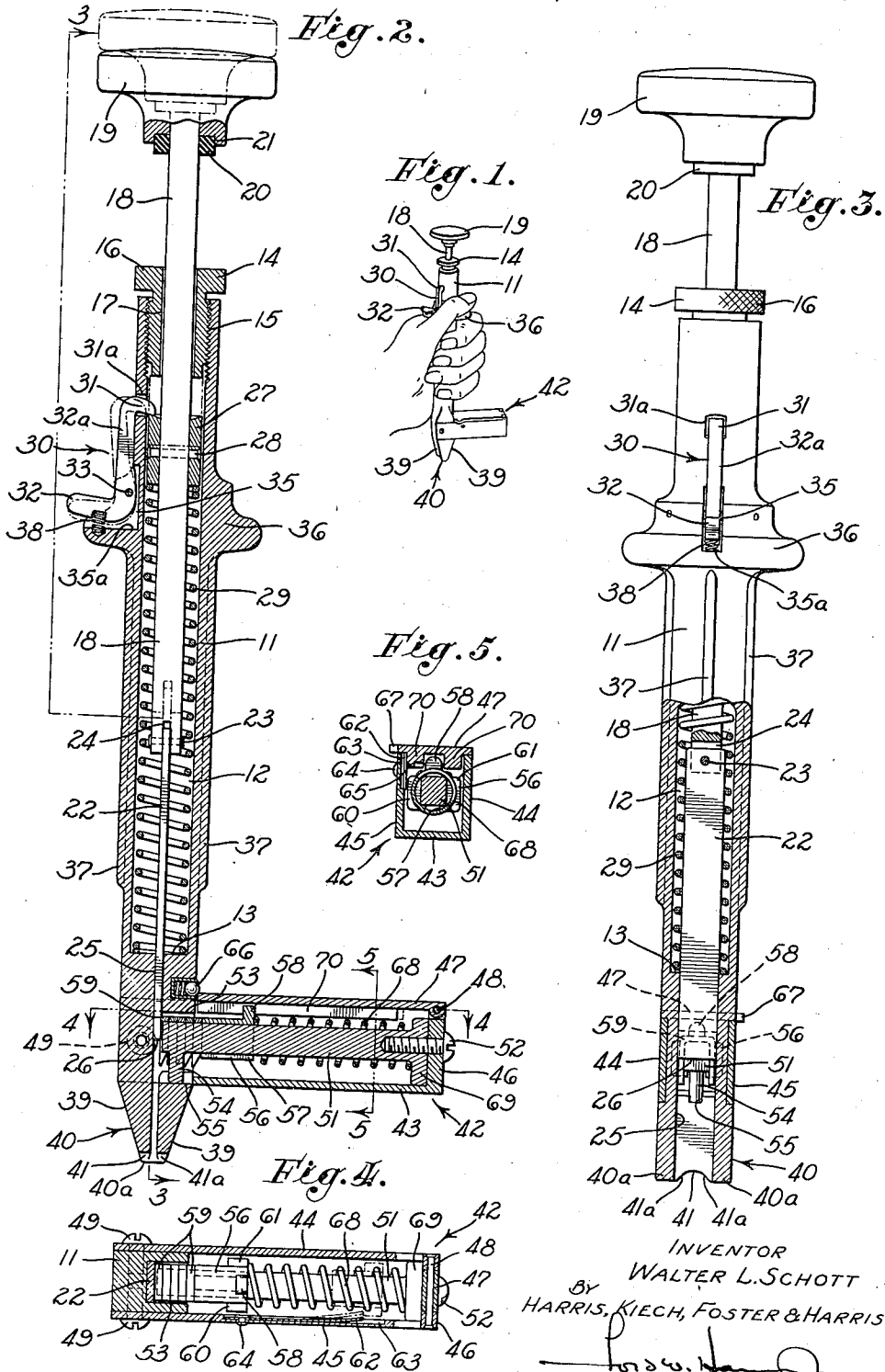
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STAPLE DRIVER

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STAPLE DRIVER

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1 Claim. (Cl. 1—49)

This invention relates to a staple driver. The invention as to some of its features is adaptable to tools for driving nails, tacks, and other fasteners of similar character.

The invention has as its object to provide a staple driver of the type used for driving staples and similar fasteners at separated points into a stationarily disposed object, which shall be capable of use to drive fasteners into floor, wall, and ceiling surfaces adjacent corner angles or into other inaccessibly located surfaces.

It has as another object the provision of means in a staple driver for regulating the depth of drive of the staple into an object.

It has as a further object the provision of means in a staple driver of the magazine type for preventing at the will of the operator the feed of a staple from the magazine into drive position. Thereby the operator may withhold the feed of a second staple into drive position until the preceding staple has been driven into an object to the desired depth.

It has as a further object the provision in a staple driver of the magazine type of means for readily loading the magazine and thereafter automatically conditioning it for feeding.

Further objects and advantages of the invention will be evident from the following part of the specification and the accompanying drawing, in which:

Fig. 1 is a perspective view of a staple driver embodying this invention showing the manner in which it is grasped by the operator;

Fig. 2 is an elevational view of the staple driver, the greater portion being shown in vertical section;

Fig. 3 is a front elevational view of the driver, taken along the line 3—3 of Fig. 2, the lower portion thereof being shown in vertical section;

Fig. 4 is a horizontal sectional view taken along the line 4—4 of Fig. 2; and

Fig. 5 is a vertical sectional view of the magazine taken along the line 5—5 of Fig. 2.

The main frame element of the driver is a cylindrical body 11 having a bore chamber 12 which extends the major portion of the length thereof from its upper end to a bottom end wall 13. The upper end of the bore 12 is threaded at 15 and is closed by a plug nut 14 formed with a central bore 17 and having a flanged enlargement 16 at its upper end. A rod or plunger 18 is seated in the bore 17 of the plug nut 14 and extends at its lower end well within the bore chamber 12 of the body 11 and also extends above the plug nut 14, its upper end having

rigidly secured thereto a head 19 formed for receiving blows from the palm of the hand of the operator.

The plunger 18 may be reciprocated vertically in the bore 17 and in the bore chamber 12. A hard rubber washer 20 inlaid in a recess 21 in the lower face of the head 19 engages the upper face of the plug nut 14 to limit the downward stroke of the plunger 18. A drive blade 22 is pivotally mounted in a slot 24 in the lower end of the plunger 18 by means of a pin 23 which, passing transversely across the slot, is secured in the walls of the plunger 18. The lower end portion of the drive blade 22 reciprocates in a slotted channel 25 formed in the body 11 and extending from the bottom wall 13 to the lower end of the body. The flat lower end 26 of the drive blade 22 serves to engage the yoke of a staple, and, when the plunger 18 moves downward, to drive the staple into an object at the lower end of the body 11.

A collar 27 is rigidly secured to the plunger 18 approximately midway of its length by a transverse pin 28. A helical spring 29 within the bore 12 bears at its lower end upon the end wall 13 of the bore and at its upper end upon the lower end of the collar 27. This spring serves to resiliently press the plunger 18 upward, normally holding it in an uppermost position indicated by dotted lines on Fig. 2, in which position the upper end of the collar 27 is seated against the lower end of the plug nut 14.

The plunger 18 can be held in a lower position, indicated by full lines in Fig. 2, by a trigger 30. This trigger, which is in the form of a bell crank lever, is mounted on a horizontal pivot pin 33 secured in the side walls of a vertically disposed slot 35 formed in an annular flange 36 formed on the body 11. A vertical arm 32a of the trigger 30 is bent inwardly at its upper end to form a detent or catch 31 which projects through an aperture 31a in the side wall of the body 11. A small coil spring 38 seated between a horizontal arm 32 of the trigger 30 and a horizontal bottom wall 35a of the slot 35 holds the vertical arm 32a inwardly against the side of the body 11, in which position of the trigger 30 the detent 31 projects into the bore chamber 12 sufficiently to engage the upper end of the collar 27 and prevent the spring 29 from moving the plunger 18 to its uppermost position.

For correct operation of the tool, the hand of the operator should grasp the body 11 below the annular flange 36 in the manner shown in Fig. 1. The thumb of the operator is then in position for

ready application of a downward pressure upon the horizontal arm 32 to disengage the detent or catch 31 from the collar 27 when it is desired to permit the plunger 18 to assume its uppermost position. To facilitate the grip of the operator's hand upon the tool, the body 11 is fluted below the flange 36 to provide ribs 37.

The lower end portion of the body 11 is rectangular in cross section for manufacturing convenience in attaching the magazine to the body in a manner to be hereinafter described. At the extreme lower end of the body 11, two opposite side faces 39 are inclined downwardly toward each other and toward the mouth of the channel 25 in such a manner as to provide a relatively thin downwardly tapering tip 40 of rectangular cross section, facilitating the application of the lower working end of the tool in corner angles between the walls of a room or between the surfaces of an object into which staples are to be driven.

The channel 25 has in cross section the configuration of a rectangle wide enough to receive a staple edgewise and long enough to snugly engage the prongs of a staple. The channel is disposed centrally within the body 11 and the body tip 40. The tip 40 is formed at its lower end with an upwardly directed recess 41 disposed centrally of the longer horizontal span of the tip. At the ends of this recess are lugs 40a which, when the tool is being operated, engage the surface of the object into which the staples are being driven, serving to prevent slipping of the lower end of the tool upon the object and to prevent spreading of the upper ends of the prongs of the staple. Centrally converging walls 41a of the recess 41 serve to shift laterally an electric cord which it is desired to staple to an object against which the cord is lying, and to center the cord with respect to the longer span of the channel 25 and to the staple within it.

A magazine 42 which is rectangular in cross-sectional configuration has in integrally secured relationship a bottom wall 43, side walls 44 and 45, and an end wall 46. A cover 47, hinged at the outer end of the magazine to the upper end of the end wall 46 by means of a hinge pin 48, is detachably held in closed position by a spring-urged catch ball 66 seated in the side wall of the body 11.

The side walls 44 and 45 of the magazine, which are longer than the bottom wall 43 and cover 47 by the thickness of the body 11, fit within slots in opposite external walls of the body 11 and are secured to the body 11 by screws 49 in such position that the magazine extends outward perpendicular to the body 11 near its lower end with the inner ends of the side walls 44 and 45 registering with the far side wall of the body 11 and the inner ends of the cover 47 and bottom wall 43 substantially in contact with the near side wall of the body 11.

A staple-holding and staple-feeding guide bar 51 is horizontally secured within the magazine 42 and in spaced relation with its side walls, bottom wall, and cover, by means of a screw 52. This bar 51 is somewhat longer than the bottom wall 43 and cover 47 of the magazine and projects into a recess 53 formed in the adjacent side wall of the body 11 substantially to the near side of the channel 25. At its forward end the guide bar 51 is provided with a leg 54 which is seated between the side walls of a slot 55 formed in the bottom wall of the recess 53 in a manner to pre-

vent lateral play of the inner end of the guide bar.

The guide bar 51, as can be seen by reference to Fig. 5, is of rectangular cross-sectional configuration with slightly rounded upper corners and is so dimensioned that when a tier of staples 59 are placed on the rod from above, the staple yokes rest on the top of the guide bar, their prongs snugly embracing the sides of the guide bar and the prong points projecting somewhat below the bottom of the guide bar. The tier of staples is urged toward the channel 25 by means of a follower 56 and a coiled spring 68 which encircles the bar and bears at one end against the follower 56 and at the other end against a flanged enlargement 69 at the outer end of the guide bar 51. The follower 56 is in the shape of a rectangularly configured sleeve slidably mounted upon the guide bar 51. Its bottom wall is longitudinally slotted at 57 to enable it to be passed over the leg 54 when being assembled in position upon the guide bar 51. Its top wall is provided at its outer end with a lug 58 which slidably engages the inner side walls of elongated guide bars 70 formed on the under side of the cover 47. The side walls of the follower 56 are formed at the outer end of the follower with laterally extending ears 60 and 61.

A leaf spring 62 is secured in seated position in a recess 63 of the magazine side wall 45 by a rivet 64. The outer end of this leaf spring 62 projects into the magazine chamber sufficiently to engage the inner end of the ear 60 when the follower is retracted to its outermost position as shown in dotted lines in Fig. 4. One of the guide bars 70 is at its outer end chamfered inwardly and downwardly to form a cam surface 65. This cam surface 65 is disposed with reference to the end of the leaf spring 62 so that when the follower 56 is in its outermost fully retracted position with the ear 60 in engagement with the end of the leaf spring 62 and the cover 47 is moved from open to closed position, the cam surface 65 will engage the end of the spring 62 and move the spring end toward the side wall 45 sufficiently to clear the ear 60 and permit the spring 68 to move the follower 56 resiliently against the outer end of the tier of staples. A small ear 67 projecting laterally from the inner end of the cover 47 facilitates manually opening the cover 47 against the retaining action of the catch ball 66.

The staple driver is operated as follows. The magazine cover 47 is opened, and the operator, applying his thumb to the lug 58, retracts the follower 56 to its outermost position shown in dotted lines in Fig. 4. A tier of staples is then placed in position upon the guide bar 51. The cover 47 is closed, its closing movement automatically releasing the follower 56 from retention by the leaf spring 62. The tool is held in the left hand of a righthanded operator in the manner shown in Fig. 1, and the trigger arm 32 is depressed to allow the plunger 18 to assume its uppermost position shown in dotted lines in Fig. 2. The drive blade 22 is thereby elevated so that its lower end face is disposed just above the tier of staples, allowing the innermost staple to be pressed into position in the channel 25.

The lower end of the tool body is next placed in position upon the object into which a staple is to be driven in proper position, as, for instance, with the lugs 40a straddling an electric cord lying upon the object. The trigger 30 is now released, and the head 19 is struck a blow with

the palm of the right hand of the operator. As the plunger 18 descends, the detent 31 enters the bore of the body 11 after the collar 27 has passed downwardly in the bore chamber. The downward movement of the drive blade 22 drives the staple in the channel 25 into the surface of the object securing the electric cord, for example, thereto. By adjustment of the plug nut 14, the position of the drive blade end 26 at which the washer 20 engages the nut 14 may be varied. Thus, the depth of entrance of the staple prongs into the work object may be regulated so that the yoke of the staple may be driven below the surface of the object, may be disposed merely in contact with the surface of the object, or may be left elevated thereabove any desired spacing distance, in order to accommodate, for instance, an electric cord of a given thickness or any other article which is being stapled to the surface of the work object.

If by one blow of the operator the staple is driven home to the desired depth, the hard rubber washer 20 striking the plug nut 14, the operator presses down the trigger 30, permitting the plunger to be retracted by the action of the spring 29 to its uppermost position ready for the next staple-driving operation. If the first blow is, however, not sufficient for driving the staple to the desired depth, and the washer 20 does not strike the plug nut 14, the operator refrains from pressing down upon the trigger 30 and repeats the blows until the staple is driven to the desired depth. As the spring urges the plunger 18 upward after each of these preliminary driving blows, the detent 31 engages the collar 27 and holds the plunger 18 in such position that the lower end 26 of the drive blade 22 is horizontally opposite the guide bar 51, preventing the deposit of the next staple 59 from the magazine into the channel 25 in position for a drive blow. The operator can, therefore, safely repeat the driving blows upon a first staple without danger of the next staple entering the channel and being driven downward upon the top of the first staple and becoming wedged thereagainst in the channel 25 and jamming the tool.

When the first staple has been successfully driven into position in the work object either by

one blow or by several blows, the operator presses down upon the trigger 30, permitting the plunger 18 to assume its uppermost position and the next staple to be deposited in the channel ready for the next driving operation.

As has been stated at the outset of this description, as to some of its features the invention is applicable to tools in which the driver, the drive channel, and the magazine are constructed to accommodate fasteners of other kinds than staples. It will be further understood that the invention is not limited to the particular embodiment shown and described herein but is to be given the scope of the following claim.

I claim as my invention:

In a staple driver for driving staples at separated points in a stationarily disposed object, the combination of: an elongated tubular body provided intermediate its ends with an external annular flange and adapted to be gripped below said flange by one hand of the operator to move said driver between drive points and provided at its lower end with a staple-feeding channel; a driving plunger mounted in the bore of said body to reciprocate longitudinally thereof and adapted at its lower end to engage and drive a staple through said channel, said plunger projecting from said body at its upper end; a head on the upper end of said plunger adapted to be engaged by the other hand of the operator to drive said plunger downward; a spring in said body mounted to press said plunger upward; a magazine secured to said body adjacent said feeding channel and adapted to store staples flatwise against each other in a tier and feed them successively into said channel in edgewise relation therewith; a catch on said body adapted to engage said plunger and limit its upward movement to a point where its staple-engaging lower end is below the top of said tier of staples; and a vertically depressible spring-retrievable latch for disengaging said catch from said plunger and mounted on said flange and extending radially outward above the lower face of said flange in a position to be readily depressible by the thumb of said first hand when gripping said body.

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