

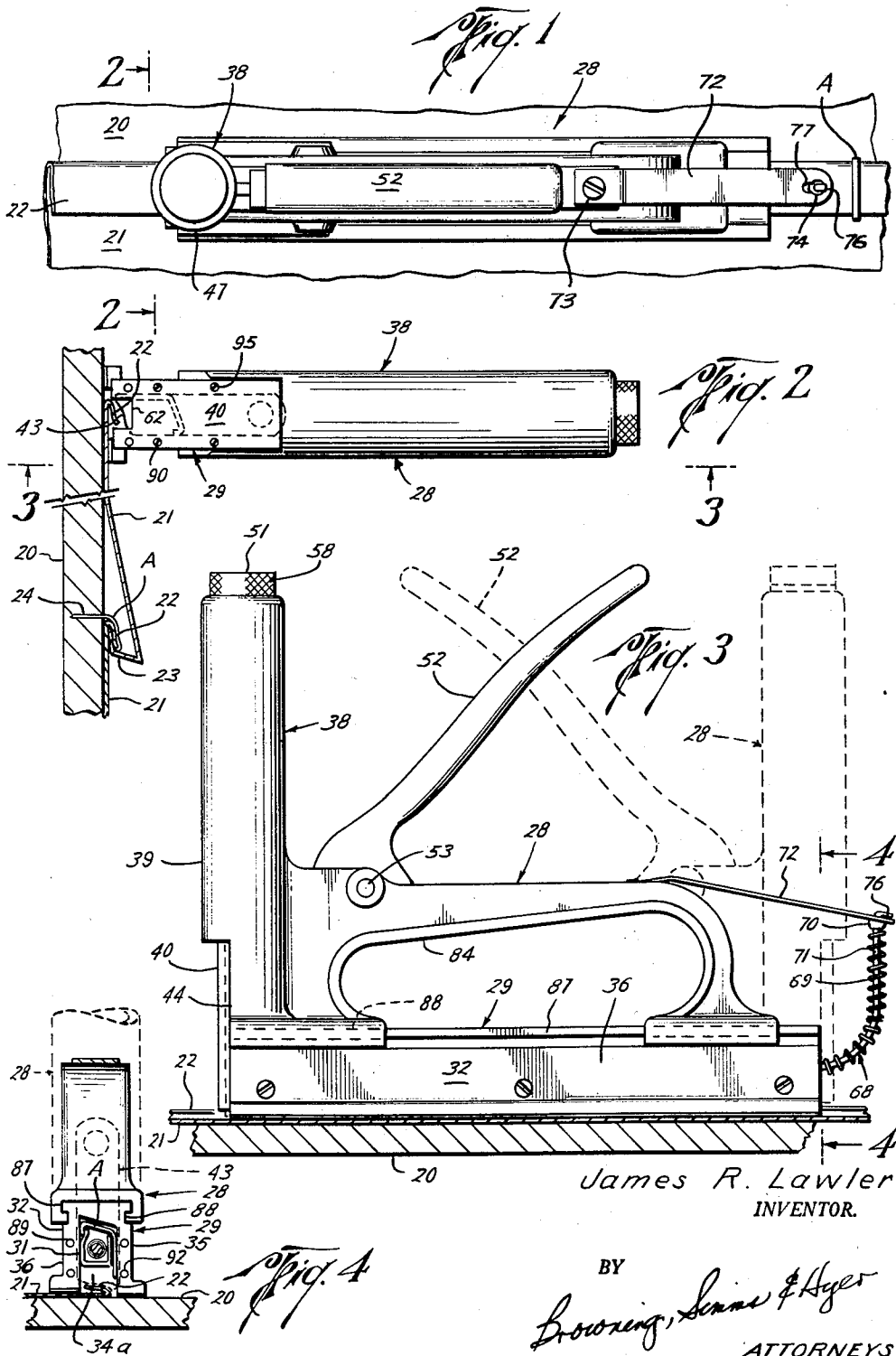
April 5, 1960

J. R. LAWLER
STAPLING APPARATUS

2,931,040

Filed Jan. 22, 1957

3 Sheets-Sheet 1



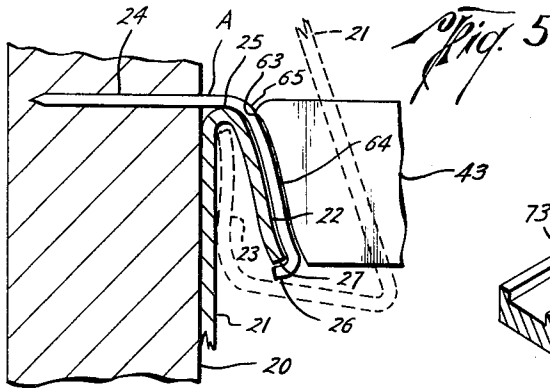
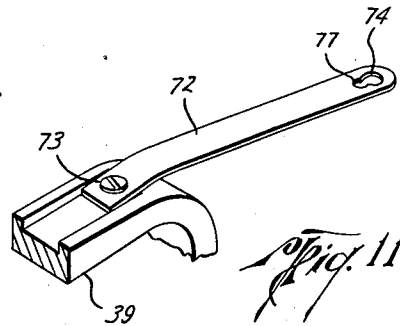
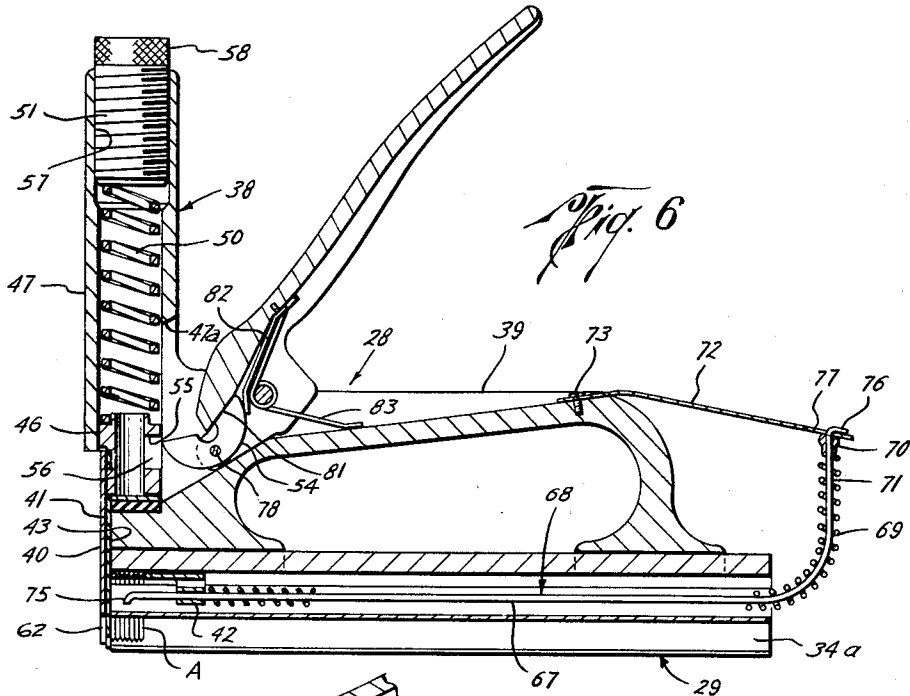
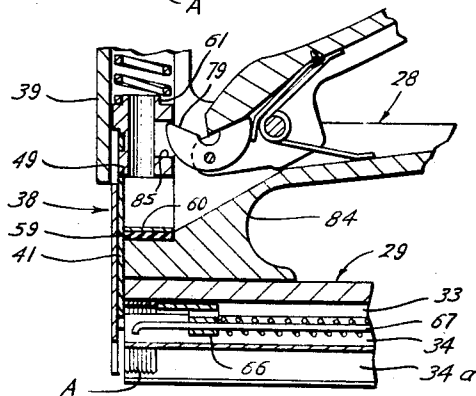
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3 Sheets-Sheet 2



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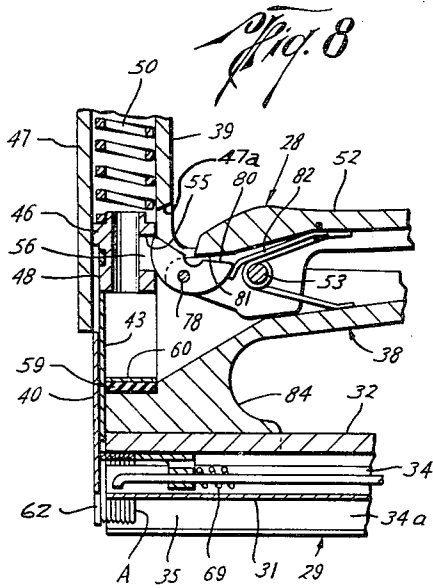
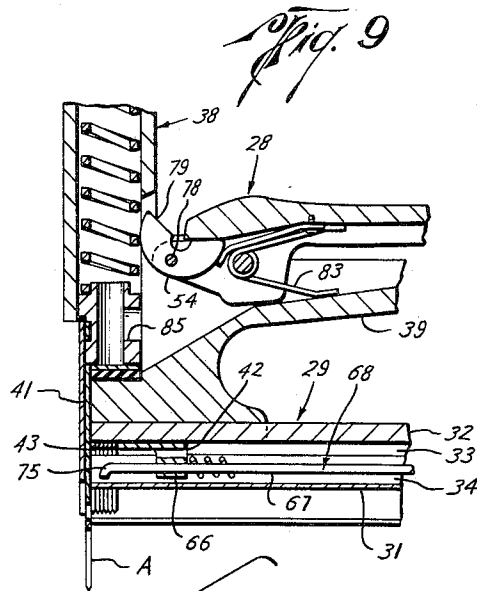
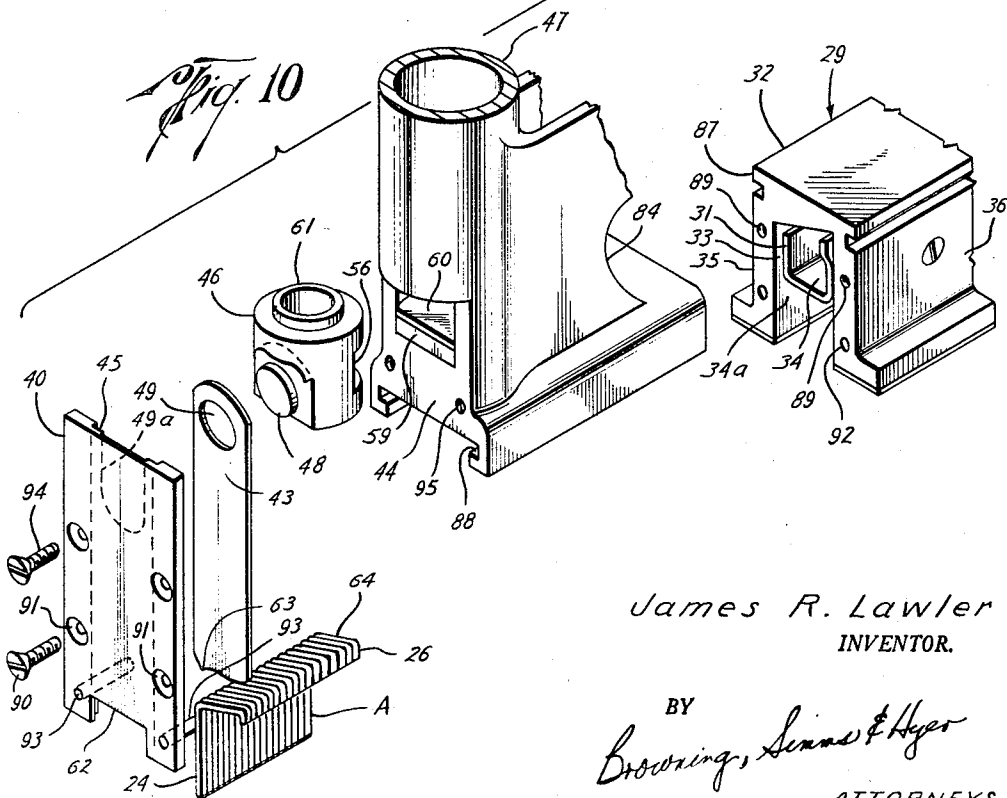
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STAPLING APPARATUS

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3 Sheets-Sheet 3



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1

2,931,040

STAPLING APPARATUS

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7 Claims. (Cl. 1—46)

This invention relates generally to improvements in stapling apparatus. In one of its aspects, it relates to such apparatus which is especially well adapted for use in securing siding strips or the like to a building wall. In other of its aspects, it relates to a stapling device having novel means for advancing and driving the staples.

Outside building walls are frequently covered with strips of aluminum siding which are secured thereto and interlocked with respect to one another by means of oppositely turned flanges along their longitudinally extending borders. If the siding strips are nailed directly to the wall, they may buckle due to expansion and contraction. For this purpose, it has also been the practice to secure the siding strips to the wall by means of nailing clips which fit over and under the upper flanged border of the strips. Although this means of attachment permits the strips to expand and contract, it requires the use of two hands in holding the clip in place and nailing it to the wall. Furthermore, these clips permit the strip which it secures to be jarred upwardly by the lower flanged border of another strip being interlocked therewith, so that the upper flanged border of the secured strip may be displaced from its clip.

An object of this invention is to provide apparatus for securing siding strips of this general type to a wall with the use of only a single hand and in a manner which permits the strips to expand and contract.

Another object is to provide such apparatus which is adapted to secure the siding strips to a wall without penetrating the strips, and yet in a manner which limits upward as well as downward movement of the upper flanged border of the strips so as to prevent displacement from secured position during interlocking of an adjacent strip.

A more particular object is to provide a device for driving one leg of a staple into the wall adjacent the outer edge of the flanged border of a strip and the other leg thereof into securing position over the inner edge of said border without penetrating the siding strip.

Obviously, it is more convenient, in the case of a right-handed workman, for the leg of the staple to be driven into the wall to be disposed on one side of the device rather than the other. Conversely, it is more convenient for a left-handed workman for said leg of the staple to be driven from the other side of the device. It is, therefore, another object to provide a stapling device of the character above described which is adaptable for either right or left hand use.

A further object is to provide a stapling device having means for driving each staple with substantially the same amount of force.

A still further object is to provide a stapling device having quickly detachable and attachable means for advancing staples into a position to be driven.

Other objects, advantages and features of this invention will be apparent to one skilled in the art upon a consideration of the written specification, the attached claims and the annexed drawings.

2

In the drawings, wherein like reference characters are used throughout to designate like parts:

Fig. 1 is a top plan view of a stapling device constructed in accordance with the present invention and disposed over the upper flanged border of a siding strip for right hand manipulation in securing the strip to a building wall;

Fig. 2 is an end view of the device of Fig. 1, as seen from broken line 2—2 of Fig. 1, and illustrating the position of the driver and staples with respect to said border;

Fig. 3 is a side elevational view of the device of Figs. 1 and 2, as seen from broken line 3—3 of Fig. 2, and illustrating in broken lines the position which the device would assume when disposed over the border for left hand manipulation;

Fig. 4 is a partial end view of the stapling device, as seen from broken lines 4—4 of Fig. 3, and also illustrating the position of the driver and staples with respect to the border;

Figs. 5 is an enlarged partial front elevational view of the driver of the stapling device at the completion of its stroke for driving a staple into securing position over the flanged border of the siding strip;

Fig. 6 is a longitudinal sectional view of the stapling device with its driver in a lowermost or rest position;

Fig. 7 is a partial view similar to Fig. 6, but with the hand lever for actuating the driver depressed to a position for lifting it above its rest position;

Fig. 8 is another view similar to Fig. 6, but with the lever further depressed to lift the driver above the staple passageway and thus permit a staple to be advanced into position for being driven by the driver upon its downward working stroke;

Fig. 9 is a still further view similar to Fig. 6, but with the hand lever depressed to its lowermost position in which it has released the driver to drive the staple so advanced;

Fig. 10 is an exploded perspective view of the forward end of the stapling device; and

Fig. 11 is a perspective view of a part on the rearward end of the device to which a means for advancing the staples is releasably attachable.

Although the apparatus of the present invention is especially well adapted for securing for securing siding or the like to a wall, and for this reason will be described in connection with such use, it should be understood that the novel concepts of the present invention are not necessarily limited thereto.

The stapling device comprises a body having a longitudinal passageway therein for receiving staples having spaced apart legs adapted to straddle the flanged border of a siding strip or the like and a guideway intersecting the forward end of the passageway. Means are provided for advancing the staples into the passageway and a driver is reciprocable in the guideway for driving one leg of a staple so advanced into a wall or other base member adjacent the outer end of the flanged border and the other leg thereof into securing position over the inner edge of the border without penetrating the siding strip.

The one leg of the staple is caused to penetrate the wall by means of a pointed head on the lower end of the driver which is disposed toward one lateral edge thereof for first striking the staple generally above the inner side of said leg. The other staple leg is caused to descend into securing position over the inner edge of the border without penetrating the strip—and, more particularly, in a manner to leave a space into which a flanged border on another strip may be moved into interlocking position—due to a predetermined relation of the remainder of the lower edge of the driver and its lower limit of reciprocation to the bottom of the body.

In accordance with a further novel concept of the

3

present invention, the stapling device comprises a plurality of separable parts which may be interchangeably connected with one another in a manner to drive the staple leg adapted to penetrate the wall selectively from one or the other side of the device. This adaptability is made possible by forming the longitudinal passageway for receiving the staples in a magazine which is releasably connected to a driver assembly in which the driver is reciprocable by means of parts on the magazine arranged symmetrically of its length to permit it to be reversed end-for-end. Still further, the driver assembly includes a base and a cover plate releasably connectable thereto to form the guideway for the driver, and the driver is releasably connected to a ram for imparting a driving force thereto in such a manner that, upon removal of the cover plate, the driver may be reversed side-for-side.

In accordance with a still further novel concept of the present invention, a stapling device of the general construction above mentioned is provided with a hand lever-operated pawl for lifting the ram against the force of a spring within a housing above the guideway in order to store energy within the spring and then releasing same to impart driving force to the driver. More particularly, the pawl and ram are so related that the pawl is snapped out of engagement with the ram so as to effect release of the ram at substantially the same elevation upon each operation. This, in turn, insures driving each staple with substantially the same force.

Also, there is provided an assembly including a pusher for advancing the staples within the longitudinal passageway which is attachable and detachable with respect to the body of the device in a manner to facilitate ease and speed of staple reloading. This assembly prevents movement of the pusher into the guideway upon advance of the last staple into said guideway, so as to provide a positive means for insuring that the pusher is not damaged by the driver.

Turning now to a detailed description of the drawings, there is shown in each of Figs. 1 to 4 a base member or building wall 20 and a strip of aluminum siding 21 which is to be secured to the wall. The siding strip is provided with an outwardly and downwardly turned flanged border 22 along its upper longitudinal edge and an inwardly and upwardly turned flanged border 23 along its lower longitudinal edge. As best illustrated in phantom in Fig. 5, the flanged border 23 is adapted to pass beneath the flanged border 22 so as to interlock therewith.

As can be seen from Fig. 5, each of the strips is secured to the wall by means of staples A disposed over the upper border 22 with one leg 24 thereof driven into wall 20 adjacent the outer edge 25 of the border and the other leg 26 disposed in securing position over the inner edge 27 of said border. The end of the leg 26 of the staple A is spaced from the siding strip so as to permit the flanged border 23 to be moved freely into interlocking position. Since the strips are not penetrated by the staples, they are free to expand and contract. The flanged border 22 of the strips is fixed against displacement from interlocking with borders 23 by means of the staple legs 26.

As shown in each of Figs. 1 to 4, a stapling device 28 may be moved along the flanged border 22 for driving a succession of staples into securing position thereover. Thus, the device shown in solid lines may be grasped by the righthand of a workman and moved from right to left. On the other hand, with the device disposed as shown by the broken lines of Fig. 3, and the parts thereof reassembled in a manner to be described hereinafter, it may be grasped by the left hand and moved from left to right.

The body of the device 28 includes a staple magazine 29 disposable over the border 22, and made up of inner and outer longitudinally extending channel shaped members 31 and 32. These members are arranged one within another and in oppositely facing relation so as to provide an inverted U shaped passageway 33 therebetween for receiving the legs of the staples in position to straddle

4

the border 22, and a chamber 34 within the inner member 31 for a purpose to be described hereinafter. The lower end of member 31 is raised above that of the other member 32 so as to provide a downwardly facing channel 34a in the bottom of the magazine for fitting over the flanged border 22, as shown in Figs. 2 and 4. More particularly, the leg 35 of the outer member 32 adjacent the portion of the passageway adapted to receive staple leg 24 is longer than that of the opposite leg 36 adjacent the portion of the passageway to receive the other leg, so that both legs rest evenly on the wall and siding, respectively, to permit the stapling device to be held upright when in use.

The body of the stapling device 28 also includes a driver assembly 38 connected to the top of the magazine and comprising a base 39 and a cover plate 40 detachably connected to the base to define a guideway 41 therebetween which intersects the forward end of the staple passageway 33 and the channel 34a in the bottom of the magazine. As shown in Figs. 6 to 9, a pusher 42 is disposable within the passageway 33 and moveable therein, by means to be described hereinafter, for advancing the staples A into the guideway 41, and a driver 43 is reciprocable within the guideway 38 for driving a staple so advanced. More particularly, the end of the base to which the cover plate is connected is recessed to provide a face 44 adjacent the forward end of the magazine 30, and the cover plate 40 is provided with a vertically extending slot 45 (see Fig. 10) which defines the forward dimension of the guideway 41 opposite the face 44 of the base.

A driving force is imparted to the driver 43 by means of a ram 46 which is guideably reciprocable in a housing 47 of the base above the guideway 38. As best shown in Fig. 10, the ram 46 comprises a hollow, substantially cylindrical member having a boss 48 in a cut-away portion on its forward side which is removably disposable within an opening 49 on the upper end of the driver 43. The cut-away portion of the ram above the boss engages with the upper end of the driver to transmit force there-to over a large area. As can be seen from Fig. 10, the slot 45 in the cover plate 40 is recessed at 49a to prevent interference with the boss 48.

As best shown in Figs. 6 to 9, the ram 46 is urged in a downward direction by means of a coil spring 50 arranged between a plug 51 closing the upper end of the housing 47 and the upper end of the ram 46. Energy is stored within the spring 50 by means of a hand operated lever 52 pivotally connected at 53 to the base of the driver assembly and a pawl 54 swingable, in response to depression of the lever, to engage the upper end 55 of a slot 56 in the rear side of the ram and thus lift the ram to compress the spring. The back side of the ram housing 47 is open at 47a to permit the pawl to engage the ram. Further depression of the hand lever causes the pawl to disengage from the upper end 55 of the ram slot so as to release the stored energy and thereby impart a driving force to the driver. The plug 51 is threaded into the housing 47 as at 57 and knurled at its upper end 58 to permit the degree of compression of the spring to be adjusted.

During actuation of the hand lever in the manner above described, the lower end of the driver 43 is lifted above the staple passageway so that, as shown in Fig. 8, the forwardmost staple in the passageway is advanced by the pusher 42 into the guideway 41 beneath the driver. Thus, as illustrated in Fig. 9, when the ram and driver are subsequently released, the staple so advanced is engaged and driven by the lower end of the driver. In this respect, it will be noted that the lower end of the ram housing 47 is provided with a layer 59 of suitable cushioning material such as rubber so as to absorb the shock of the ram upon release. This layer of cushioning material may be covered by a thin metal disc 60 in order to prevent it from being cut by the lower end of the ram. It will

5

also be noted that the hollow ram is provided with a rim 61 at its upper end for guiding the lower end of the coil spring 50.

As indicated in Fig. 6, at the completion of its working stroke and in its rest position, the lower end of the driver 43 is disposed just slightly above the bottom of the magazine. Thus, in order to properly dispose the stapling device over the flanged border 22 of a siding strip, the hand lever must be depressed to raise the driver above the border, as shown in Figs. 2 and 4. The lower end of cover plate 40 is provided with a window 62 therein which is substantially aligned with the channel 34a in the bottom of the magazine, so that the window and channel locate the staples in straddling position over the border 22.

As best shown in Fig. 5, the lower end of the driver 43 is provided toward one lateral edge thereof with a pointed head 63 for striking a staple A generally above the inner side of the leg 24 thereof to be driven into the wall 20. As also shown in this enlarged view, the leg 26 of the staple is connected to the web 64 thereof by a curved corner 65 of relatively small radius. Thus, the pointed head 63 of the driver strikes the staple generally at the intersection of the curved corner with the web. In this manner, the head 63 will bite into and grab the staple so as to drive it straight into the wall.

As previously mentioned, the remainder of the lower end of the driver 43 and its lowermost limit of reciprocation are so related to the bottom of the magazine that the leg 26 is driven over the inner edge 27 of the flanged border so as to secure same without penetrating the siding strip 21 and, more particularly, to a level in which its lower end is spaced above the strip.

Preferably, this remaining portion of the lower end of the driver is contoured correspondingly to the border, as shown in Fig. 5, so that it prevents the web of the staples above the border from being forced upwardly due to the impact of the head 63 with the staple.

Normally, the leg 24 of the staple which is driven into the wall will be considerably longer than the leg 26 disposed over the inner edge of the border, and will form an obtuse angle with the web of the staple. Obviously, the inner and outer magazine members 31 and 32 will be shaped accordingly, and the lower end of the driver 43 will normally taper upwardly from its pointed head 63.

The pusher 42 is substantially channel-shaped in cross section and has sufficient flexibility to permit it to accommodate to the staple passageway 33 for movement longitudinally therein, in either end-for-end position of the magazine. The pusher is provided with a centrally depending part 66 which moves within the chamber 34 and has an opening therethrough for slidably receiving the forwardly extending portion 67 of a rod 68. A coil spring 69 is received about the rod and is compressed between the part 66 and a lug 70 on a portion 71 of the rod extending outwardly and upwardly of the chamber. Thus, with the rod releasably located against movement longitudinally to the body, as will be described herein-after, the spring 69 urges the pusher forwardly against the staples in the passageway 33.

The means for so locating the pusher rod comprises a leaf spring 72 secured to the base of the body at 73 and extending rearwardly therefrom. An opening 74 (see Fig. 11) through the leaf spring is adapted to fit closely over and bear downwardly against the upper end of the lug 70, which is urged in an upward direction by the coil spring 67. Since the coil spring also urges the lug rearwardly against the opening 74, this interengagement of the lug within the opening in the leaf spring will normally lock the rod in the position shown in the drawings.

The end of the forwardly extending portion 68 of the pusher rod is provided with a stop part 75 against which the pusher is adapted to abut in its forwardmost position. This stop part is spaced from the lug 70 at

6

the opposite end of the rod so that the pusher will abut therewith at such time that it has advanced the last staple into the driver guideway. In this manner, the pusher will not be damaged by engagement of the lower end of the driver subsequent to driving the last staple.

The outer end of the pusher rod adjacent the lug 70 is provided with a hook 76 extending rearwardly from the lug and adapted to engage over the top of the leaf spring 72 for preventing accidental displacement of the lug from the opening 74. In order to accommodate movement of the hook 76 into and out of such position, the leaf spring is provided with a slot 77 (see Fig. 11) extending forwardly from the opening 74 therein. Thus, in attaching the rod to the leaf spring, the lug is moved forward slightly from its normal locked position so as to permit passage of the hook through the slot 77. Then the lug is moved rearwardly to its normal locked position wherein the hook moves over the top of the leaf spring rearwardly of the opening 74. Obviously, the aforementioned force of the coil spring may be overcome to permit the rod to be detached from the leaf spring by a reversal of the above procedure.

Returning now to a more detailed description of the means for actuating the driver, the pawl 54 will be seen to be pivotally connected to the forward end of the lever 52 by means of a pin 78, and to be provided with a pair of arms 79 and 80 arranged symmetrically on opposite sides of the pivotal connection 78. One of the arms 79 is swingable, upon depressing of the lever 52, in a path for engaging with and then disengaging from the upper end of the slot 56 so as to lift and then release the pawl. The other arm 80 is adapted to be engaged by a surface 81 on the hand lever in order to prevent rocking of the pawl about its pivotal connection during substantially all of lifting of the ram by means of the first mentioned arm 79.

As shown in each of Figs. 6 to 9, the arm 80 is normally urged into engagement with the surface 81 on the hand lever by means of a spring 82 connected to the hand lever and bearing against the back side of the arm 80. As also shown in each of these figures, another spring 83 is received about pin 53 for bearing between the hand lever 52 and the base of the body of the stapling device so as to normally urge the hand lever to a raised position. As the ram 46 is released and the hand lever returns from its Fig. 9 to its Fig. 6 position, the pawl will swing therewith so as to resume its position adjacent the slot of the ram. During such swinging, the pawl is free to move against the spring 82 as the back side of the arm 79 slides over the coil spring and top of the ram.

As can be seen from Fig. 8, during lifting of the ram, the back side of the arm 79 is engaged by the lower end 85 of the slot 56. At a point toward the end of the lifting cycle, the force due to bearing of the lower end of the slot upon the back side of the arm 79 overcomes the force of the spring 82 acting upon the backside of the other arm 80 and thereby causes the pawl to disengage from the upper end of the slot with a snap action. This movement is facilitated by rounding the corners on the outer ends of the arms 79 and 80. As a result of this positive disengagement of the pawl, the ram is released at substantially the same elevated location during each operation.

The top of the magazine member 32 is provided with a longitudinally extending tongue 87 which is adapted to interfit with a longitudinally extending groove 88 in the legs of the base of the driver assembly which are spaced on opposite sides of a hand hole 84. The outer magazine member 32 is provided with threaded openings 89 in its opposite ends for releasable connection with threaded bolts 90 and bolt 91 therefor in the cover plate 40. More particularly, the threaded openings 89 on opposite ends are longitudinally aligned with one another so as to be symmetrical of the length of the magazine. Thus, upon

removal of the bolts 90, the magazine may be removed from the driver assembly, reversed end-for-end, and reconnected to the assembly. This endwise reversal of the magazine in turn reverses the position of the staple passageway so as to dispose the leg 24 of the staples received in passageway 33 on the side of the stapling device best suited for the workman operating same.

The opposite ends of the magazine are also provided with aligned openings 92 for receiving dowel pins 93 press-fitted into holes in the cover plate. These dowels enable a closer alignment of the vertical slot 45 in the cover plate with the staple passageway 33 in the magazine than is possible in the case of threadedly connected parts, and thus provide additional assurance of striking the staples in the location desired.

The cover plate is also releasably connected to the base of the driver assembly by means of threaded bolts 94 receivable within threaded openings 95 in said face 44. As can be seen from Fig. 6, with the driver in its lowermost or rest position, its connection with the ram 46 is disposed opposite the cover plate so as to permit it to be removed from the ram upon removal of the cover plate. More particularly, the opening 49 in the driver which fits over the boss 48 on the ram to make up this connection is formed symmetrically of the opposite lateral edges of the driver. Thus, when the magazine is reversed end-for-end and reassembled with the driver assembly to dispose the leg 24 of the staples on a desired side of the passageway 33, the driver is also reversed side-for-side and reassembled with the ram to dispose its pointed head 65 in position to strike said leg in its reversed position.

It is apparent that this device is useable, with minor modifications, for driving staples of a different shape and for a different purpose. Thus, the inner magazine member 31 may be disconnected from the outer member 32 and replaced by another such member having a configuration adapted to provide a passageway to accommodate the new staple. Similarly, the driver 43 may be removed and replaced by one having a lower end constructed to strike the new staple in the manner desired.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. In a device for use in securing a siding strip or the like having a flanged border to a base member, a body having a channel formed in the bottom thereof for disposal over the border, a passageway in the body extending longitudinally of the channel for receiving staples having spaced apart legs of unequal length in position to straddle the border, a guideway in the body intersecting the forward end of the passageway and the channel, means for advancing the staples into the guideway, and a driver reciprocable in the guideway and having a pointed head on its lower end toward one lateral edge thereof for first striking a staple so advanced generally above the inner side of the longer leg thereof to drive it into the base

member adjacent the outer edge of the flanged border, the lower limit of reciprocation of the remainder of the lower end of the driver being spaced above the bottom of the body to drive the shorter leg of the staple into securing position over the inner edge of the flanged border.

2. In a device of the character defined in claim 1, wherein the bottom of the body on the side of the channel adjacent the shorter leg of the staple is raised with respect to the bottom of the body adjacent the longer leg of the staple whereby the body may be disposed over the border in a substantially upright position.

3. In a stapling device, a body having a longitudinal passageway therein for receiving staples having spaced apart legs of unequal length and a guideway intersecting the forward end of the staple passageway, means for advancing the staples into the guideway, and a driver reciprocable in the guideway and having a pointed head on its lower end for first striking a staple so advanced generally above the inner side of its longer leg.

4. In a stapling device, a body comprising a driver assembly and a staple magazine, a longitudinal passageway in the magazine for receiving staples having spaced apart legs, said driver assembly including a base and a cover plate releasably connectable thereto to form a guideway therebetween intersecting the forward end of the staple passageway, means for advancing the staples into the guideway, a driver reciprocable in the guideway for striking a staple so advanced toward one lateral edge thereof, and a ram reciprocable in the base and connected to the driver for imparting a driving force thereto, symmetrical releasable means connecting the driver assembly to the magazine, and symmetrical releasable means connecting the driver to the ram, whereby the driver assembly and the driver may be reversed with respect to the magazine.

5. In a stapling device of the character defined in claim 4, said symmetrical releasing means connecting the driver assembly to the magazine comprising a tongue and groove.

6. In a stapling device of the character defined in claim 5, wherein the driver assembly and the magazine have symmetrical aligned openings with the openings in the magazine being threaded to receive screws for retaining the parts in either position of assembled relation.

7. In a stapling device, a body comprising a driver assembly and a staple magazine, means releasably connecting the magazine to the driver assembly for reversal end-for-end with respect thereto, a longitudinal passageway in the magazine for receiving staples having spaced apart legs, a guideway in the driver assembly intersecting the forward end of the staple passageway, means for advancing the staples into the guideway, a driver reciprocable in the guideway for striking a staple so advanced toward one lateral edge thereof, and a ram reciprocable in the driver assembly and connected to the driver for imparting a driving force thereto, said driver being releasable from and reversible with respect to the ram for striking a staple toward said same lateral edge when said magazine is reversed end-for-end with respect to the driver assembly.

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