

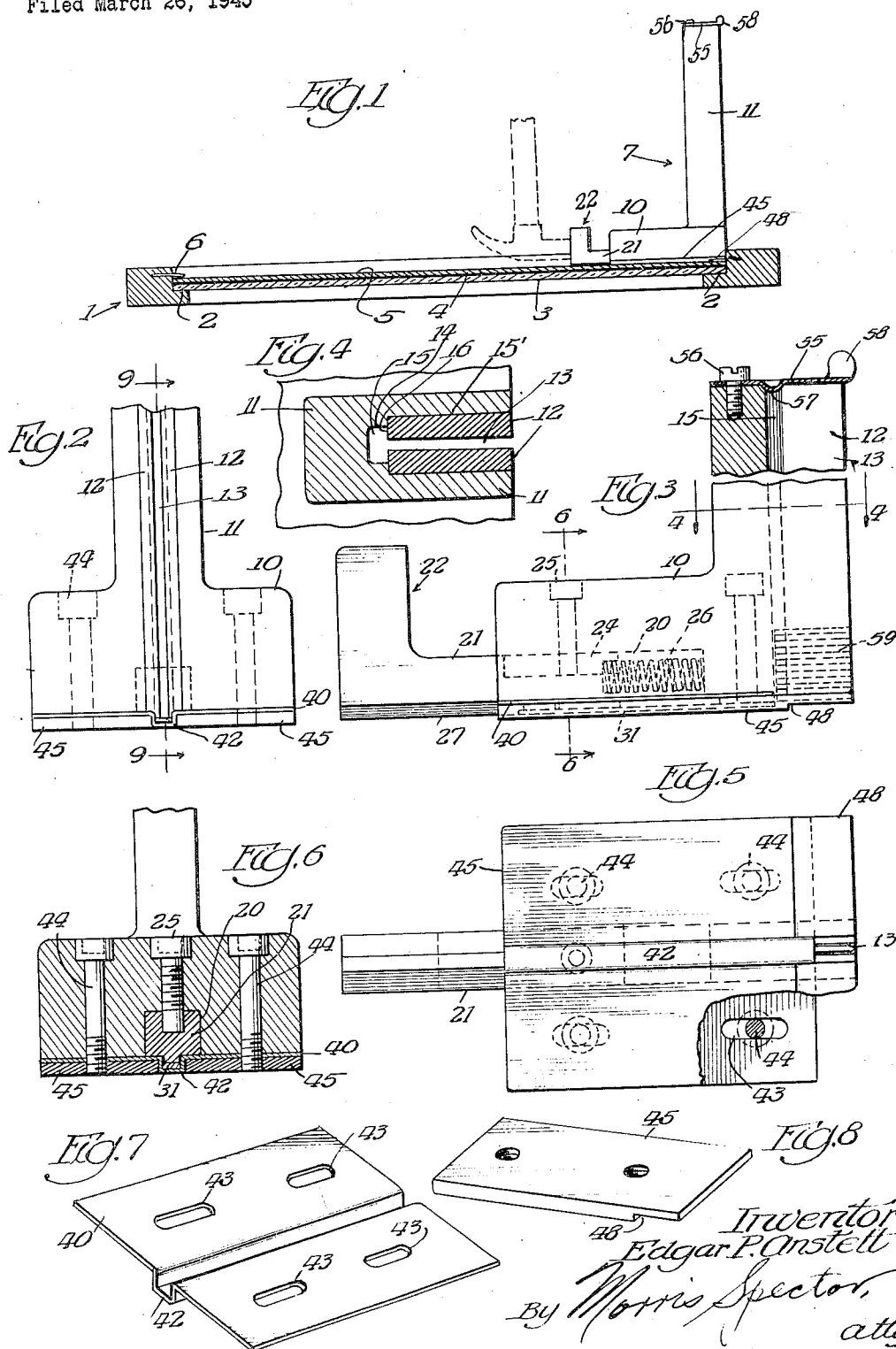
Feb. 7, 1950

E. P. ANSTETT
NAILING MACHINE

2,496,974

Filed March 26, 1945

2 Sheets-Sheet 1



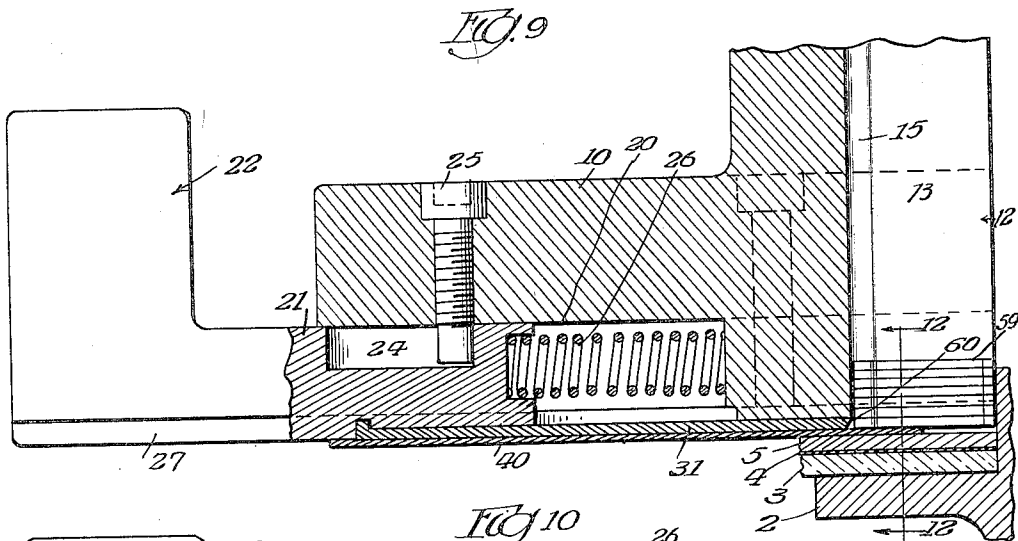
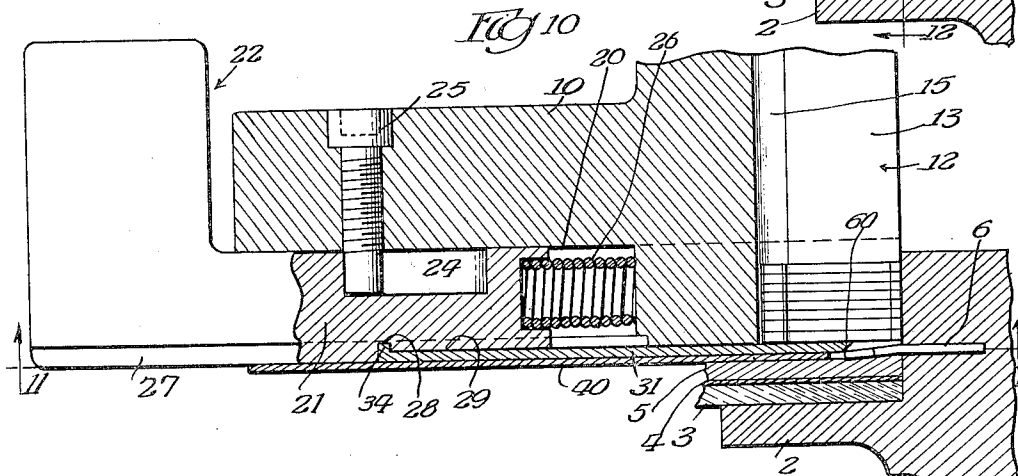
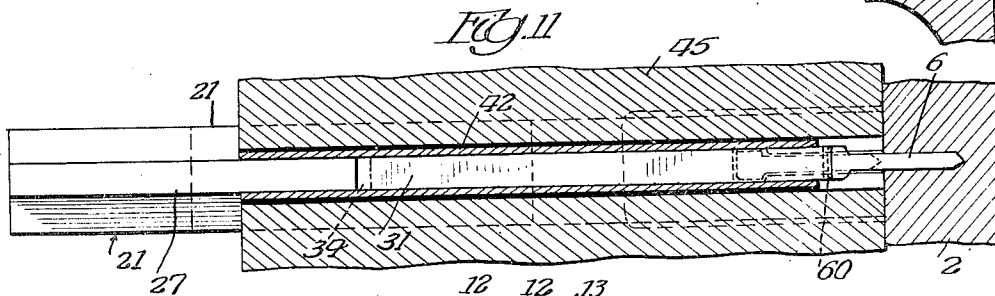
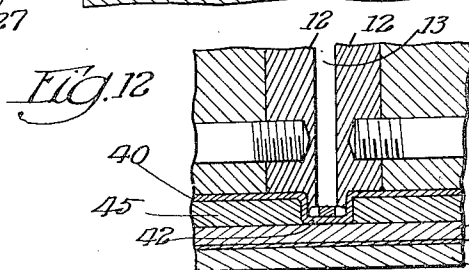
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2 Sheets-Sheet 2



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NAILING MACHINE

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1

This invention relates to nailing machines of the type which are used for driving a nail into a picture frame or the like, for holding a cardboard or similar backing which is positioned in the frame over the glass.

In the mounting of pictures or the like in picture frames it is usual to place a glass in a rabbet in the frame, then place the picture or other paper to be framed over the glass and back the same with a piece of cardboard of approximately the same size as the piece of glass. The assembly is then held in place by a series of nails which are driven part way into the wood of the frame so that a portion of each nail projects inwardly of the frame opening and overlies the cardboard backing. In order to prevent any possible movement of the cardboard backing it is necessary that the projecting part of the nail be in such a position as to exert some pressure against the cardboard, pressing it towards the glass. It is one of the objects of the present invention to provide a nailing machine particularly adapted for use in connection with picture frames, which nailing machine will drive a nail straight through the first fractional part of its travel into the frame and then will drive it at an angle to force the portion of the nail that has not yet been driven into the wood out of its original straight line position into pressure engagement with the cardboard backing, and which nailing machine will continue to drive the nail a very short distance while at the same time also pressing the nail towards the cardboard backing. As a result of this arrangement the nail is positively forced into pressure engagement with the cardboard while the part of the nail which is in the wood, or a major part of that part of the nail which is in the wood, is snugly held in place by the wood.

It is a further object of the present invention to provide a nailing machine wherein the individual nail that is being driven into the wood is confined against buckling during at least the major part of the nail driving operation.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawings forming a part thereof.

In the drawings:

Figure 1 is a side view of the nailing machine of the present invention in use;

Figure 2 is a front view of the nailing machine of the present invention;

Figure 3 is an enlarged side view of the machine

2

with certain parts broken away to illustrate the interior construction;

Figure 4 is a section taken along the line 4—4 of Figure 3 and looking in the direction of the arrows;

Figure 5 is a bottom view of the nailing machine of the present invention, with certain parts thereof broken away;

Figure 6 is a sectional view taken along the line 6—6 of Figure 3;

Figure 7 is a perspective view of the plate which supports the driven nail during a portion of its stroke;

Figure 8 is a perspective view of one of the base plates;

Figure 9 is an enlarged longitudinal sectional view through the nailing head of the machine of the present invention, said view being taken along the line 9—9 of Figure 2;

Figure 10 is a view similar to Figure 9 and showing the driving plunger in its extreme driven position;

Figure 11 is a view taken along the line 11—11 of Figure 10 and looking in the direction of the arrows; and

Figure 12 is an enlarged sectional view taken along the line 12—12 of Figure 9.

Reference may now be had more particularly to the drawings wherein like reference numerals designate like parts throughout.

The machine of the present invention is particularly adapted for driving into a picture frame those nails which are used to hold the picture and glass in place. At 1 there is illustrated a cross sectional view of a conventional type of wooden picture frame wherein the frame members have the usual rabbet 2 on which is supported a rectangular glass pane 3 whereon is laid the picture 4 to be framed, which picture is backed by a cardboard backing 5. Nails 6 are driven into the wood frame part way of the length of the nail, and the protruding part is bent downwardly into engagement with the back of the cardboard back 5 to hold the backing in place and thus hold the picture 4 and glass 3 in place. The machine 7 of the present invention is particularly adapted for driving the nails 6 in place in such a manner that by a single operation the nail is driven into the picture frame and is bent downwardly into engagement with the backing 5.

The machine of the present invention comprises a base 10 having an upright handle 11 extending therefrom. The base and handle constitute one unitary casting, preferably of a plastic material which may be thermoplastic or thermo-

3

setting. The handle 11 has a vertically extending straight bore on opposite sides of which are mounted two lengthwise extending steel strips 12—12 which constitute a trackway for a stack of nails. The strips 12—12 extend the full height of the machine and are spaced apart, as indicated at 13, an amount slightly in excess of the width of the nail. The inner side of the bore within which the strips 12—12 are mounted is a lesser width as indicated at 14 than at 15. The width at 14, however, is greater than the width of the space 13 between the strips. There is thus formed a longitudinally extending vertical groove 15 for receiving the heads of the nails of a stick of nails, said heads bearing against shoulders 16 which are the edges of the strips 12. The shoulders act as rails for holding the heads of the nails against forward movement through the space 13 while permitting downward movement of the nails.

The base 10 of the nailing machine extends rearwardly from the handle 11 and has, at its bottom rear portion, a rectangular channel-shaped groove 20 for receiving a rectangular shank 21 of a plunger 22. The plunger 22 has a straight slot 24 in the top surface thereof for receiving the lower end of a screw 25 which is threaded in the base 10 and acts as a limiting stop to limit the stroke of the plunger. A spring 26 normally urges the plunger to its retracted position.

The bottom of the plunger 22 has a central longitudinally extending straight projection 27 extending the full length thereof. The projection 27 is of a width only slightly greater than the width of the head of a nail to be driven by the machine. The projection 27 has a cross slot 28 intermediate the ends thereof, and is of a shorter height at the front of the plunger than at the rear, as indicated at 29. A steel driver blade 31 of a width exactly the same as that of the projection 27 and of a thickness equal to the difference in height between the base of the projection 27 and the surface 29 is positioned against the surface 29 and has a bent over lip 34 that extends into the slot 28.

A metal plate 40, of a thickness of approximately $\frac{1}{4}$ of an inch, is laid on the bottom surface of the base 10. The plate has a longitudinally extending channel 42 that embraces the projection 27 and the blade 31. The inside width of the channel very slightly exceeds the width of the head of a nail to be driven by the machine. The bottom of the trough 42 of the plate 40 is flush with the bottom of the plates 45—45, as may be seen from Figure 6. The top of the trough 42 of the plate 40 acts as a support for the blade 31 of the plunger. The plate 40 has four oval holes 43—43 through which the shanks of fastener screws 44 may extend. The four screws 44 pass through holes in the base 10, through the elongated holes 43—43 in the plate 40 and thread into two steel plates 45—45, drawing those steel plates firmly against the plate 40 and drawing that plate firmly against the bottom of the base 10. It is obvious that by loosening the screw 44—44 the position of the plate 40 may be shifted to or from the forward end of the machine and then by retightening the screws the position of the plate is locked.

The steel plates 45 are each of a length equal to the length of the base 10 of the machine and of a width slightly less than half of the width of the base 10, each of the plates 45 extending from the outer flange of the channel 42 of the

4

plate 40 to the side of the machine, as may be seen from Figure 6.

The forward bottom surface of each plate 45 is milled to a reduced thickness, as indicated at 48 in Figure 8. The portion of reduced thickness extends back from the forward edge of the plate 45 an amount approximately one-half inch, or an amount slightly in excess of the maximum distance which the end of a driven nail protrudes from the rabbet 2 of a picture frame or the like. This is for a purpose which will be apparent as this description proceeds.

The top of the handle 11 is provided with a spring closure plate 55 which lies flat on the top of the handle and is held in position by a single screw 56 that also acts as a pivot for the closure 55. The closure 55 has a slight depression 57 that extends into the space 15 of the handle and thus holds the closure 55 against turning about the center of the screw 56. The closure 55 also has a short upstanding gripping ear 58.

If it is desired to insert nails into the machine the ear 58 of the closure plate 55 is grasped and pulled upwardly an amount sufficient to clear the projection 57 from the vertical groove 15. This lifting action is possible without actuating the screw 56, due to the springiness of the material of the closure 55. After the closure has been lifted an amount such that the projection 57 clears the groove 15, the closure plate is turned 180° about the screw 56 as a center. Thereafter a stick of nails, indicated at 59, is inserted into the machine. The nails are sheet metal stampings, T-shaped, with the head of the T approximately twice as wide as the width of the shank of the nail. The nails are positioned one above the other and are adhered together into a stick by a coating of glue. The shanks of the nails of the stick extend into the space 13 between the two strips 12—12, and the heads of the nails ride upon the shoulders 16, the heads being too wide to pass through the space 13 between the two strips 12—12. The strips 12—12 thus act as rails guiding the heads of the nails downwardly. The bottom nail of the stick rests upon the top surface of the channel web 42 of the plate 40, as may be seen from Figure 9. The forward edge of the plate 40 terminates rearwardly of the forward edge of the machine an amount slightly less than one-half inch. The exact amount is determined by the manual positioning of the adjustable plate 40, which may be shifted forwardly or rearwardly within the limits determined by the sizes of the oval slots 33 through which the screws 44 extend.

It is to be noted that the forward driving edge 61 of the blade 31 is not at right angles to the top and bottom planar surfaces of the blade but at a slight inclination to the vertical. This inclination may be of the order of 20°—30° to the vertical.

When the blade 31 is in the position illustrated in Figure 9 it is ready to engage the head of the bottommost driving nail. If the blade 31 is moved forwardly from the position illustrated in Figure 9 it then moves the lowermost nail forwardly driving it into the rabbet of the picture frame. At the same time the inclined edge 60 of the driving blade 31 tends to drive the rear end of the nail downwardly. The rear end of the nail cannot move downwardly because it is supported by the top surface of the channel 42 of the plate 40. The nail is thus driven straight into the rabbet, and continues to move straight until the head of the nail clears the plate 40.

5

At this time the nail is no longer supported against downward movement. Due to the inclination of the surface 60 of the driving blade 31 further movement of the driving blade imposes a downward force on the head of the nail and forces the head downwardly into engagement with the cardboard backing 5 in the picture frame. The adjustment of the plate 40 is made such that the forward end 60 of the blade 31 in its extreme forward driven position is slightly in advance of the forward edge of the plate 40. As a result the nail is driven forward and downwardly for only a very short distance, approximately $\frac{1}{16}$ of an inch.

The blade 31 is of a width equal to the width of the head of the nails. After the nail has been driven forward a very slight amount the head of the nail and the end of the driving blade 31 move between the bottom of the steel strips 12—12 and the top or inner surface of the web of the channel 42 and are confined in that space against upward or downward movement. This confining action permits the use of a driving blade 31 no thicker than the thickness of the nail. After the nail head clears the plate 40 and is no longer confined against downward movement the steel strips 12—12 still continue to support the blade 31 and the nail head against upward movement.

If longer nails are used the plate 40 is moved slightly rearward. Also, for longer nails the blade 31 is preferably, but not necessarily, replaced by a similar blade of a slightly shorter length. By way of example, if the nail is $\frac{1}{4}$ inch longer the blade may be $\frac{1}{8}$ inch shorter.

After the nail has been driven into the wood the machine may be slid along the edge of the picture frame to the next nail driving position. During such movement of the machine the cut-out part 48 of the plate 45 passes over the portion of the nail that projects from the vertical wall of the rabbet of the picture frame. As a result of this cut-away portion 48 a side movement of the machine from one nailing position to the next while keeping the machine in position on the picture frame does not impose any side bending stresses on the projecting end of the last driven nail.

If it is desired to drive a nail completely into the wood the plunger 21 is replaced by one having a longer slot 24, which will give the plunger a longer stroke, and the plate 40 is adjusted forwardly until its forward edge is at or very close to the forward edge of the machine.

In compliance with the requirements of the patent statutes I have here shown and described a preferred embodiment of my invention. It is, however, to be understood that the invention is not limited to the precise construction here shown, the same being merely illustrative of the principles of the invention. What is considered new and desired to be secured by Letters Patent is:

1. A nailing machine having a nail driving plunger adapted to bear against the head end of a nail, the nail driving bearing end of the plunger being inclined with respect to a plane at right angles to the direction of travel of the plunger, and means for supporting a nail against bending under the action of said inclined bearing end of the plunger during at least a part of the nail driving movement.

2. A nailing machine having a nail driving plunger adapted to bear against the head end of a nail, the bearing end of the plunger being inclined with respect to a plane at right angles

6

to the direction of travel of the plunger, and means for supporting a nail against bending under the action of said inclined bearing end of the plunger during at least a part of the nail driving movement, said means terminating short of the end of the driving stroke of the nail whereby as the driving stroke is being completed the inclined bearing end of the plunger forces one end of the nail to deflect from a straight line path.

3. A nailing machine including means for driving a nail for a distance equal to a fractional part of the length of the nail, means for supporting the nail against side movement during the major portion of the driving travel of the nail, said nail clearing the said supporting means as the nail approaches its limit of travel, said driving means including means for forcing one end of a nail sideways towards the end of the driving movement thereof after the nail clears said supporting means.

4. A nailing machine having means for receiving a stack of nails, a plunger adapted to drive the first nail of the stack forward, said plunger having a nail bearing end at an inclination to the end of the nail being driven so that the plunger tends to impart a side force in addition to the forward driving force to the nail, means confining the nail against said side, said confining means terminating short of the limit of travel of a nail under the action of the plunger so that as a nail approaches its limit of travel a portion thereof is capable of side flexing under the action of the side force imposed thereon by the plunger.

5. A nailing machine including a nail driving plunger, a plate supporting a surface of the nail being driven and along which the plunger and the driven nail slide, said nail clearing said supporting plate as the nail approaches its limit of travel whereby for the remainder of the driving stroke of the nail it is unsupported along that surface of the nail which previously slid on the plate, said plate being located at an end of the machine and being adjustable in the direction of driving movement of the nail to alter the position at which the nail ceases to be supported by the plate, and means for securing the plate in its adjusted position.

6. In a nailing machine, a magazine for supporting a stack of nails, a plunger having an angled face for driving the nails one at a time, and guide means for guiding the driven nail for a predetermined distance in the direction of movement of the plunger, one end of said nail thereafter being deflected at an angle to its initial movement by said angled face of said plunger as the nail clears the guide means.

7. In a nailing machine, a magazine for supporting a plurality of nails, a plunger having an angled face for driving the nails one at a time, guide means for restricting movement of a driven nail to a single direction for a predetermined distance when force is applied thereto by the angled face of said plunger, thereafter said angled face causing movement of one end of said driven nail at an angle to said direction, and means for automatically returning said plunger in readiness for driving the next nail.

8. In a portable nailing machine, a magazine for holding a plurality of nails, a plunger having an angled face for driving said nails one at a time, a guide plate having a channel portion for supporting part of said plunger and part of the driven nail, said guide plate terminating a predetermined distance short of the extent of driv-

7

ing movement of the angled face of said plunger, and plates adjacent said channel portion having recessed portions extending forward of the end of said channel portion, whereby said portable nailing machine may be slid past the nail that has been partially driven thereby.

9. In a machine for driving a headed nail, a magazine for receiving a plurality of said nails having a receiving recess conforming to the contour of said nail but slightly in excess thereof, a plunger having an angled face for driving the nails one at a time, and a guideway underlying a portion of said plunger and a portion of the driven nail, said guideway terminating short of the extent of forward movement of the angled face of said plunger, whereby the driven nail is guided between the underside of said magazine and said guideway during only a portion of its driven movement and thereafter one end of said nail is free to move also at an angle to its guided movement during the remainder of the driving stroke of the angled face of said plunger.

10. In a nailing machine, a magazine for supporting a plurality of nails, a plunger having an angled face for driving of said nails one at a time, and an adjustable guideway supporting at least a portion of said plunger and only a portion of the driven nail, said guideway terminating short of the extent of forward movement of the angled face of said plunger, whereby said driven nail will

8

be driven by the angled face of said plunger in a single direction for the extent of said guideway and thereafter one end of said nail will be deflected at an angle to said direction by the angled face of said plunger, and means for adjustably securing said guideway in place.

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