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HEIKO TJARK DE MAN

3,022,509

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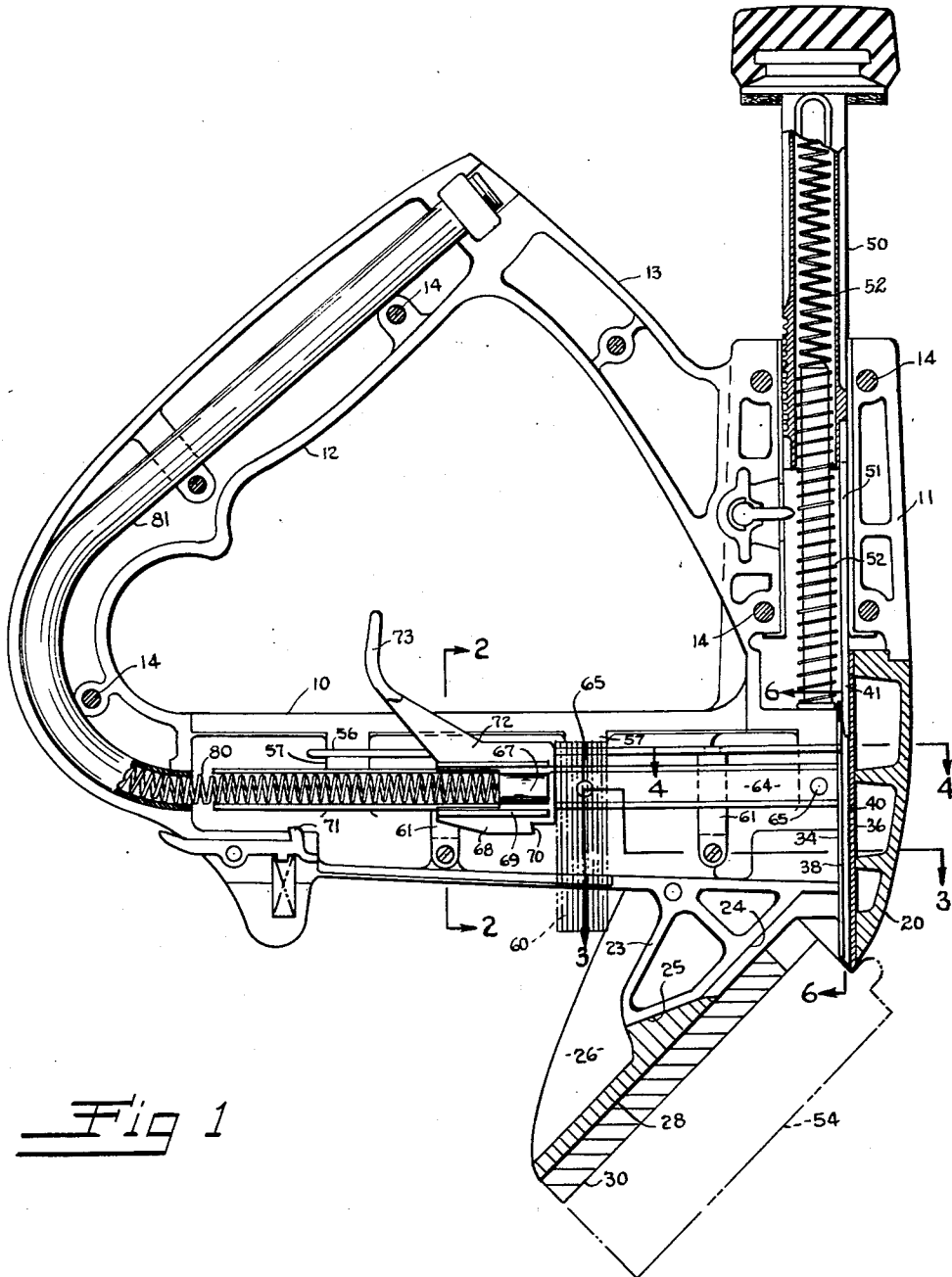


Fig 1

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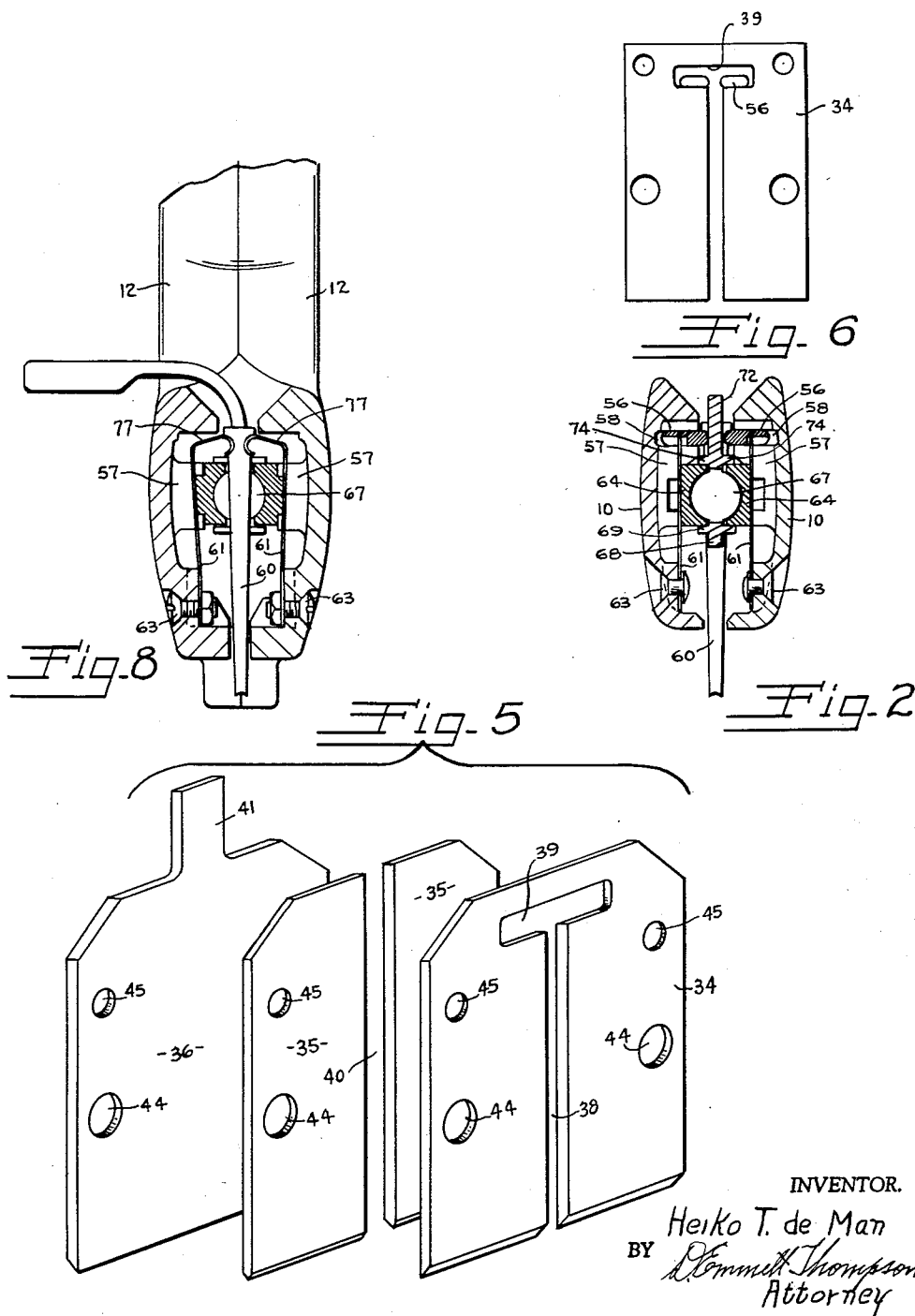
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

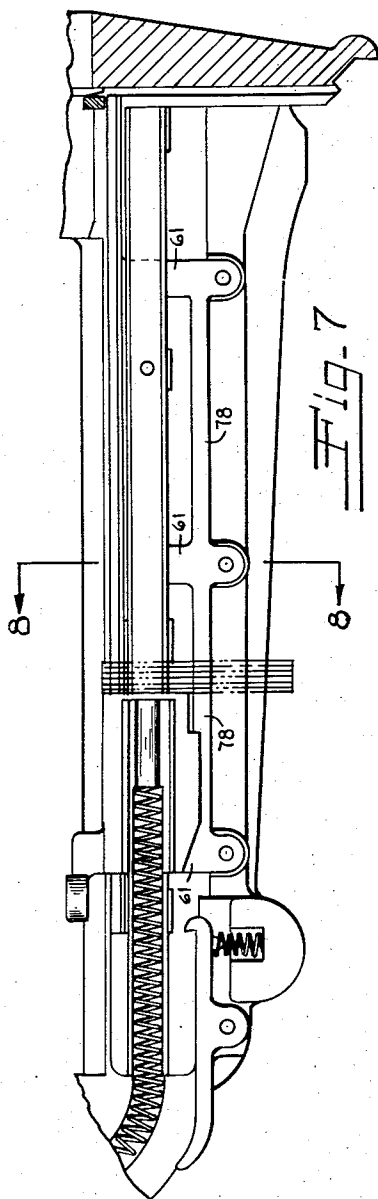


Fig. 7

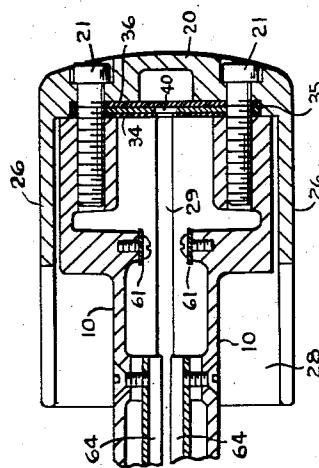


Fig. 3

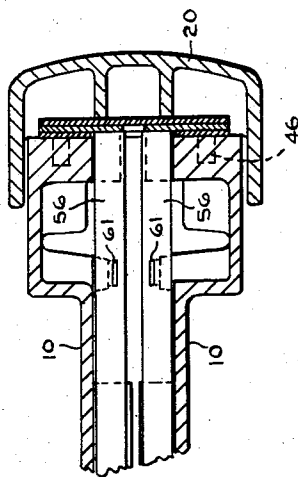


Fig. 4

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This invention relates to nailing devices of the type provided with a magazine for containing a number of nails which are advanced to a delivery passage and are driven downwardly through the delivery passage by a driver blade actuated by a blow from a hammer, or mallet.

These nailing devices are used extensively for the laying of hardwood floors, the devices assuring that the nails will enter the floorboards at the right place, and will be driven at the correct angle. Also, because of the magazine feature, the process of floor laying is materially speeded up.

At the present time, flooring is of varying thickness as, for example, one-half inch, twenty-five thirty seconds, and thirty-three thirty seconds. It is most advantageous to use nails of various dimensions according to the thickness of the floor being laid. However, at the present time, nailing devices are not constructed to efficiently drive nails of various dimensions.

This invention has as an object a nailing device embodying a magazine arrangement whereby a multiplicity of nails, secured together by adhesive in stick form, may be inserted into the magazine, by downward movement in a direction normal to the axis of the magazine, and yieldingly held therein against displacement.

The invention has as a further object a nailing device embodying a shear plate assembly structure which may be conveniently removed and replaced by a similar structure to accommodate nails of a different dimension.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

In the drawings—

FIGURE 1 is a vertical central section of a nail driving device embodying the invention.

FIGURE 2 is a view taken on line 2—2, FIGURE 1.

FIGURE 3 is a view taken on line 3—3, FIGURE 1.

FIGURE 4 is a view taken on line 4—4, FIGURE 1.

FIGURE 5 is a perspective of the parts making up the shear plate assembly.

FIGURE 6 is a view taken on line 6—6, FIGURE 1.

FIGURE 7 is a view, similar to the lower portion of FIGURE 1, illustrating a modified form of nail track.

FIGURE 8 is a view taken on line 8—8, FIGURE 7.

The nailing device consists of a pair of similarly shaped body parts 10 formed at their forward ends with upward extensions 11 forming a head portion, and at their rear ends with upwardly and forwardly extending portions 12 to form a handle, the upper end of which merges with the forwardly and downwardly extending portion 13 joining the upward extensions 11. These body parts are secured together by fasteners 14. The intermediate horizontal portions 10 of the body extend rearwardly from the head portion 11 in parallel spaced relation. A cap 20 is detachably secured to the forward ends of the body parts, as by screws 21, see FIGURE 3. The body parts 10 are formed adjacent their forward ends with depending web portions 23. These web portions have a surface 24 inclining downwardly and rearwardly in angular relation to the body parts, see FIGURE 1, the surface 24 merging with a surface 25 extending at a lesser angle.

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The cap 20 is formed with side flanges 26, which overlie the sides of the body parts 10, and extend rearwardly from the front ends thereof, see FIGURES 1-3 and 4. The lower edges of the flanges 26 are connected by a plate, or shoe, 28 which is formed centrally with a slot 29. The plate or shoe 28 is positioned upon the work piece into which the nail is driven and extends in angular relation to the body parts and the nail delivery passage, whereby the nail is driven into the work piece at the desired angle. Preferably, a plate 30 is secured to the shoe 28 and is formed out of material, such as plastic, so as not to mar the top surface of the work piece.

A shear plate and nail delivery passage assembly is interposed between the cap 20 and the forward ends of the body sections 10. This assembly consists of a lamination of a shear plate 34, a spacing plate 35, and a guide plate 36. These plates are best shown in FIGURE 5. The shear plate 34 is positioned against the ends of the body parts 10 and is formed with a T-shaped aperture consisting of a slot 38 extending upwardly from the lower edge of the plate and communicating with a transversely extending slot 39. The spacer plate 35 is positioned against the outer surface of the shear plate and is formed with a vertically extending nail delivery slot, or passage. Preferably, as shown in FIGURES 3, 4 and 5, the spacer plate is made of two parts separated so as to form the nail delivery passage 40. The guide plate 36 is positioned in overlying relation to the spacer plate 35 and is formed with an upwardly extending projection 41.

The plates 34, 35 and 36, making up this laminated assembly, are formed with aligned apertures 44, 45. The screws 21 extend through the apertures 44 and thread into the ends of the body parts 10, thus the laminated assembly is clamped between the body ends and the cap 20, with the nail delivery passage 40 arranged in registration with the aperture 38 of the shear plate 34. Locating dowels 46 extend through the apertures 45.

A plunger 50 is slidably mounted in the head portion formed by the extensions 11, and a nail driving blade 51 is affixed to the plunger. The plunger is urged upwardly by a coil compression spring 52 in the usual manner, and the lower end of the driving blade 51 is positioned between the extension 41 of the guide plate 36 and the top portion of the shear plate 34 when the plunger is in the up position, as shown in FIGURE 1. In other words, the driving blade 51 moves downwardly through the nail discharge passage 40 when a blow is struck on the upper end of the plunger. This effects driving of the nail downwardly through the delivery passage 40 into the work piece shown in dotted outline at 54, FIGURE 1.

A nail engaging member is mounted on the inner surface of each of the intermediate body parts 10. These nail engaging members are mounted for relative lateral movement toward and from the center of the space between the body parts. In the form shown in FIGURES 1, 2 and 4, these nail engaging members are in the form of bars 56. The inner surface of the body parts 10 are formed with bosses 57 which are provided with slots 58 in which the bars 56 are slidably mounted for movement transversely of the body parts. These bars 56 form an elongated track for supporting a row of nails 60, the nails being formed with notches adjacent their head ends to receive the confronting edges of the bars 56.

The bars 56 are yieldingly urged inwardly, as by leaf springs 61, the lower ends of which are affixed to the body parts 10, as by screws or rivets 63, see FIGURES 1, 2 and 3. The bars 56 are formed with notches through which the upper ends of the springs 61 project.

A guide member 64 is mounted on the boss 57 on each of the body parts 10, as by screws 65. These guide members also extend in spaced parallel relation lengthwise of

the body parts below the track bars 56 and their confronting sides are of concave form to slidably receive the cylindrical portion 67 of a nail pusher. This pusher is formed with a rib 68 depending between the guide members 64 and is formed with laterally extending flanges 69 to engage the bottom edges of the guide members. This lower rib 68 is also formed with a shoulder 70 for engagement by a latch 71 when the pusher is moved into the rear section of the body parts. The pusher 67 is also formed with an upwardly extending rib 72 having a handle portion 73. This rib 72 extends upwardly between the track bars 56, and it also has laterally extending flanges 74 for sliding engagement with the top edges of the guide members 64.

The springs 61 yieldingly urge the bars 56 inwardly, or toward the row of nails 60 positioned between the bars. This arrangement permits a multiplicity of nails, secured together as by adhesive in stick form, to be inserted through the top of the magazine structure. The springs 61 extend upwardly between the guide members 64 and the body parts 10, see FIGURE 2, and the guide members accordingly form a stop to limit the inward movement of the bars 56. The arrangement is such that the bars 56 grip the row of nails with a slight pressure, whereby the nails can not become accidentally dislodged from the magazine.

In the arrangement shown in FIGURES 7 and 8, the upper ends of the spring 61 are formed integral with a lengthwise extending portion 77 bent inwardly toward the center of the space between the body parts and curve downwardly for engagement with the row of nails 60, this curvature on the confronting edges of the spring portion 77 being complementary to the shape of the notches in the sides of the nail, see FIGURE 8. In either case, the nail engaging members extend through the horizontal slot 39 in the shear plate 34 and are supported thereby for the separation of the forwardmost nail of the row positioned in the delivery passage 40 upon descent of the driving blade 51.

The pusher 67 is urged forwardly by a helical compression spring 80, which extends into a tubular guide member 81 mounted in the handle portion 12 of the machine, see FIGURE 1.

This arrangement makes for quick and convenient loading of the magazine, and the proper feeding of the nails to the delivery passage 40.

Preferably the plates 34, 35 and 36, making up the laminated shear plate structure, are fixedly secured together as, for example, by spot welding. The thickness of the spacer plate 35 is comparable to the thickness of the nail being driven and accordingly, the thickness of this spacer plate 35 in the laminated assembly varies according to the thickness of the nail. In order that the cap 20 be maintained in the same relative position regardless of the shear plate structure employed, the thickness of the guide plate 41 also varies according to the thickness of the spacer plate 35 being used. For example, if the assembly is made up with a thinner spacer plate 35, the thickness of the guide plate 36 will be correspondingly increased so as to maintain an over-all uniform thickness of the assembly. This arrangement permits the nailing machine to be assembled with the shear plate structure having a delivery passage 40 for nails of desired thickness.

In the operation of the device, the pusher 67 is retracted by means of the handles 73 and is latched in retracted position by the latch 71. A stick of nails is inserted in the slot provided by the spacing of the body portions 10, the nails being gripped by the spring actuated members 56 or 77. The latch 71 is moved to released position, whereby the pusher is urged against the row of nails by the spring 80. The device is positioned on the work piece by positioning the shoe 26 thereon, which provides for driving the nail at the proper angle. The plunger 50 is then struck a blow, whereby the driving

blade 71 descends through the nail discharge passage to drive the foremost nail into the work piece.

I claim:

1. A nail driver, a body including a pair of similar shaped body parts secured together in parallel spaced relation, a nail driving passage at the forward end of the body, an elongated nail supporting member mounted in each body part, said members extending lengthwise of the body parts in confronting spaced relation to provide a nail supporting track terminating at said nail delivery passage, spring means urging said nail engaging members into gripping engagement with a row of nails positioned between said members, and a spring actuated pusher urging the row of nails along said members to said delivery passage.

2. A nail driving device comprising a pair of body parts secured together in parallel spaced relation, an end structure detachably secured to the forward ends of said body parts and having a nail delivery passage, an elongated nail supporting member mounted in each of said body parts for lateral movement therein, said nail supporting members having their confronting edges extending in spaced parallel relation for receiving and supporting a row of nails positioned therebetween, spring means carried by said body parts for urging said nail supporting members laterally toward the nails supported thereby, a pusher slidably mounted in said body parts, and spring means operable to urge said pusher forwardly to advance said nails along said nail supporting members to said nail delivery passage.

3. A nail driver, a pair of elongated body parts being formed at their forward ends with upward extensions forming a head portion, said body parts extending rearwardly from said head portion in parallel spaced relation, an elongated nail supporting member mounted on the inner surface of each of said body parts, said members extending lengthwise of the body parts in confronting spaced relation and forming a nail supporting track, said members being mounted for relative lateral movement toward and from each other, and spring means urging said members toward a row of nails positioned therebetween.

4. A nail driver, an elongated body formed with an upwardly extending head portion at its forward end, a shear plate positioned against the forward end of the body below said head portion and having a nail receiving aperture in registration with said magazine, a spacing plate having a nail delivery passage in registration with the nail receiving passage in said shear plate, a guide plate positioned against said spacing plate, an end cap overlying said guide plate, and means detachably securing said cap and plates to the forward end of said body parts.

5. A nail driver comprising a pair of body parts secured together and extending in parallel spaced relationship, a laminated shear plate and guide structure consisting of a shear plate positioned against the forward end of said body parts and having an aperture through which nails may be advanced, a spacing plate overlying said shear plate and having a nail delivery passage arranged in registration with the aperture in said shear plate, a guide plate overlying said spacing plate, an end cap overlying said laminated structure, means common to said cap and structure to detachably secure end cap and structure to said body parts, a nail guideway in said body parts, and means for advancing nails along said guideway through the aperture in said shear plate, and said cap having a depending supporting shoe for engaging a work piece.

6. A nail driver, a pair of body parts having vertical extensions at their forward ends forming a head portion having a nail delivery passage, said body parts extending rearwardly from said head portion in spaced apart relation, an elongated nail engaging member mounted in each body part for lateral movement, said members extending lengthwise of the body parts in confronting relation to provide a nail supporting track terminating at said nail

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delivery passage, spring means urging said nail engaging members into gripping engagement with a row of nails positioned between said members, and a spring actuated pusher urging the row of nails along said members into said delivery passage.

7. A nail driver, a pair of body parts formed with vertical extensions at their forward ends to provide a head portion, a cap member detachably secured to the forward end of said body parts and having a depending shoe for engaging the work piece into which the nails are driven, said body parts being formed with an elongated nail magazine, and spring actuated pusher nails for advancing a row of nails along said guideway into said head portion, a plate positioned at the forward ends of said body parts and being formed with an aperture arranged in register with said magazine guideway, a second plate positioned forwardly of said first plate and being formed with a vertically extending slot arranged in register with the aperture in said first plate, a third plate overlying said second plate, the slot in said second plate constituting a vertically disposed nail delivery passage, said plates being mounted intermediate the forward ends of said body parts and said shoe.

8. A nail driver, a pair of body parts, each having a vertical extension at its forward end, said extensions forming a head portion having a nail delivery passage, said body parts extending rearwardly from said head portion in parallel spaced apart relation to provide a nail receiving chamber, a pair of elongated nail supporting members carried by the body parts in said chamber and forming a support for a row of nails, a pusher mounted between the body parts for movement toward and from said head portion, spring means urging said pusher toward said head portion for advancing the row of nails along said supporting members toward said nail delivery passage, and spring means restraining relative lateral movement between said nail supporting members.

9. A nail driver, a pair of body parts having vertical extensions at their forward ends forming a head portion having a nail delivery passage, said body parts extending rearwardly from said head portion in spaced apart parallel relation, an elongated nail engaging member mounted in each body part and being movable laterally therein, said members extending lengthwise of the body parts in confronting relation to provide a nail supporting track terminating at said nail delivery passage, spring means urging said nail engaging members into gripping engagement with a row of nails positioned between said members, a guide member secured to each of said body parts, said guide members forming a guideway extending lengthwise of the body parts below said nail engaging members, a nail pusher slidably mounted in said guideway for advancing the row of nails forwardly along said nail engaging members, and spring means acting on said pusher to urge the same forwardly.

10. A nail driver, a pair of body parts formed with vertical extensions at their forward ends to provide a head portion, a positioning shoe detachably secured to the forward end of said body parts and having a depending flange for engaging the work piece into which the nails are driven, said body parts being formed with an elongated nail magazine guideway and spring actuated pusher for advancing a row of nails along said guideway into said head portion, a plate positioned at the forward ends of said body parts and being formed with an aperture arranged in register with said magazine guideway, a second plate positioned forwardly of said first plate and being formed with a vertically extending slot arranged in register with the aperture in said first plate, a third plate overlying said second plate, the slot in said second plate constituting a vertically disposed nail delivery passage, said plates being mounted intermediate the forward ends of said body parts and said shoe.

11. A nail driving device, a pair of body parts having vertical extensions at their forward ends forming a head

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portion, an end structure detachably secured to the forward ends of said body parts and having a nail delivery passage, said body parts extending rearwardly from said head portion in spaced apart parallel relation, an elongated nail engaging member mounted in each body part and being movable laterally therein, said members extending lengthwise of the body parts in confronting relation to provide a nail supporting track terminating at said nail delivery passage, spring means urging said nail engaging members into gripping engagement with a row of nails positioned between said members, an elongated guide member secured to each of said body parts, said guide member extending lengthwise of the body parts below said nail engaging members, said guide members forming a guideway, a nail pusher slidably mounted in said guideway for advancing the row of nails forwardly along said nail engaging members, and spring means acting on said pusher to urge the same forwardly.

12. A nail driving device comprising a pair of body parts secured together in parallel spaced relation, an end structure detachably secured to the forward ends of said body parts and having a nail delivery passage, an elongated nail engaging member mounted on the inner surface of each body part and being movable laterally therein, said nail supporting members having their confronting edges extending in spaced parallel relation for receiving a row of nails positioned between said members, spring means carried by said body parts for urging said nail supporting members laterally toward the nails supported thereby, an elongated guide member secured to the inner surface of each of said body parts, said guide members extending lengthwise of the body parts below said nail engaging members, the confronting sides of said guide members being concave and forming a guideway, a nail pusher slidably mounted in said guideway for advancing the row of nails forwardly along said nail engaging members towards said delivery passage, said guide members being cooperable with said spring means to limit lateral movement of said nail engaging members toward said nails.

13. A nail driving device comprising a pair of body parts secured together in spaced parallel relationship, an end structure detachably secured to the forward ends of said body parts and having a nail delivery passage, an elongated track mounted in said body parts for supporting a row of nails for advancement therealong to said nail delivery passage, a pusher guide member fixedly mounted on the inner surface of each of said body parts, said pusher guide members extending lengthwise of the body parts below said track, the confronting sides of said guide members extending in spaced parallel relationship and being of concave form, a nail pusher having a cylindrical portion slidably mounted in said guide members and having upper and lower ribs slidable between the upper and lower confronting edges of said guide members, and spring means urging said pusher forwardly.

14. A nail driver, a body including a pair of similar shaped body parts secured together, said body parts being formed at their forward ends with upward extensions forming a head portion, a nail delivery passage at the forward end of the body below said head portion, said body parts extending rearwardly from said head portion in parallel spaced apart relation, an elongated nail supporting member mounted on the inner surface of the rearwardly extending portion of each of said body parts, said nail supporting members being mounted in the body parts for relative lateral movement, said members extending lengthwise of the body parts in confronting spaced relation to provide a nail supporting track terminating at said nail delivery passage, a spring-actuated pusher urging a row of nails positioned between said members therealong to said delivery passage, and spring means yieldingly restraining relative outward movement

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of said nail supporting members in a direction away from said row of nails.

15. A nail driver comprising a body having an elongated nail magazine, a cap detachably secured to the forward end of the body, a laminated nail delivery structure detachably mounted intermediate the forward end of the body and said cap, said structure consisting of a shear plate having an aperture arranged in registration with said magazine, a spacing plate overlying said shear plate and having a nail delivery passage arranged in registration with the aperture in said shear plate, and a guide plate overlying said spacer plate, a nail pusher operable to advance nails along said magazine through the aperture in said shear plate into said delivery passage, and a nail driving blade slidably mounted in the forward portion of said body for driving a nail through said passage through a work piece.

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16. A nail driver as defined in claim 15 wherein said shear plate, spacing plate and guide plate are fixedly secured together.

17. A nailer as defined in claim 15 wherein said cap is formed with a work piece engaging shoe extending downwardly from the body in angular relation thereto.

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