

Aug. 1, 1961

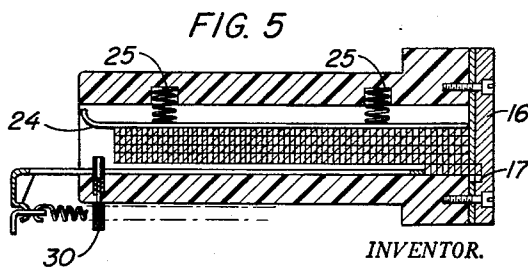
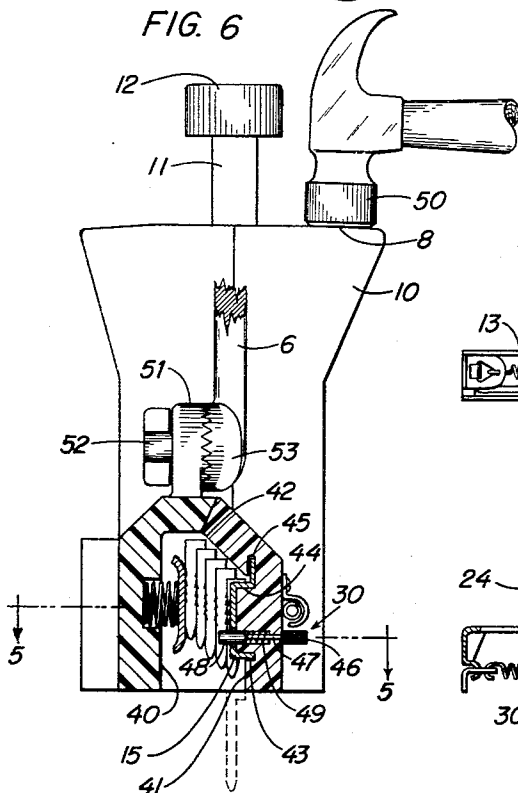
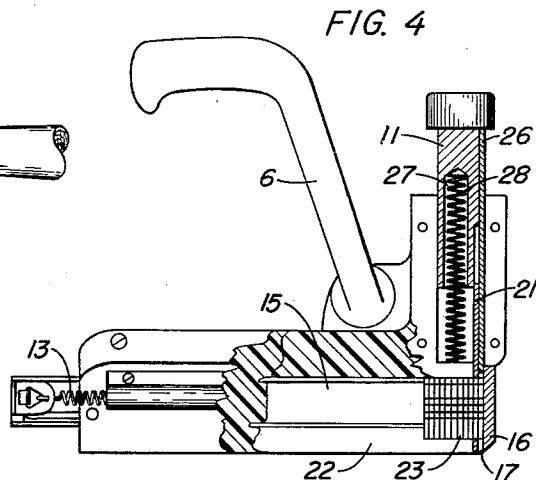
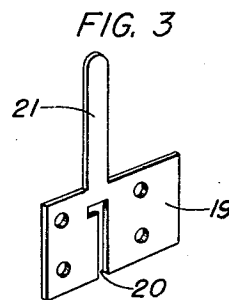
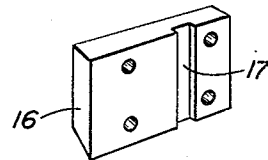
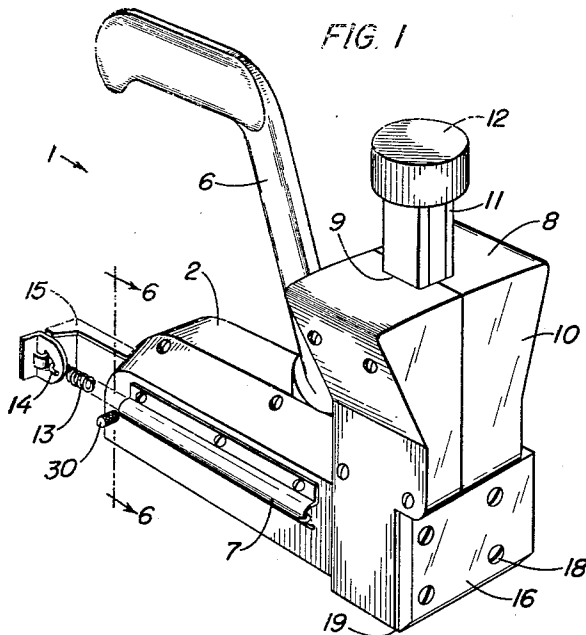
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2,994,878

NAILING MACHINE AND MAGAZINES THEREFOR

Filed Dec. 12, 1957

4 Sheets-Sheet 1



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FIG. 10

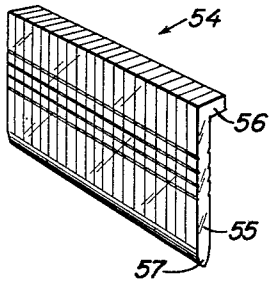


FIG. 11

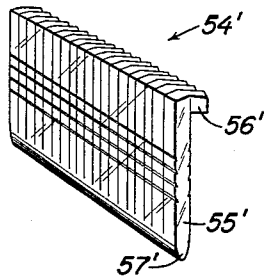


FIG. 12

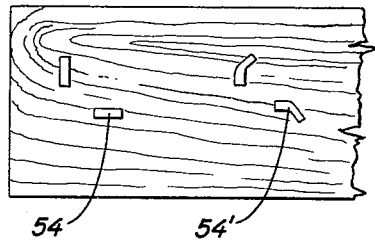


FIG. 7

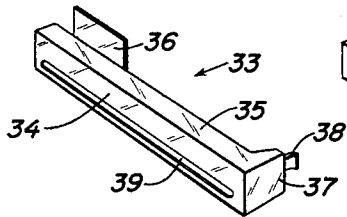


FIG. 8

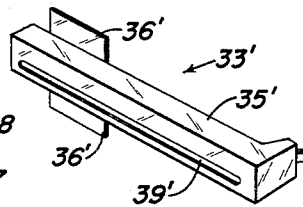


FIG. 9

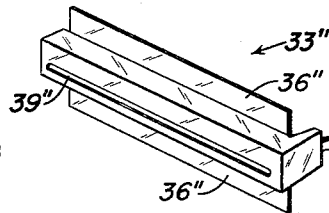


FIG. 13

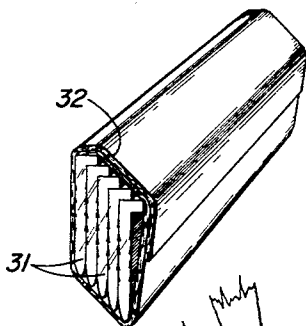


FIG. 14

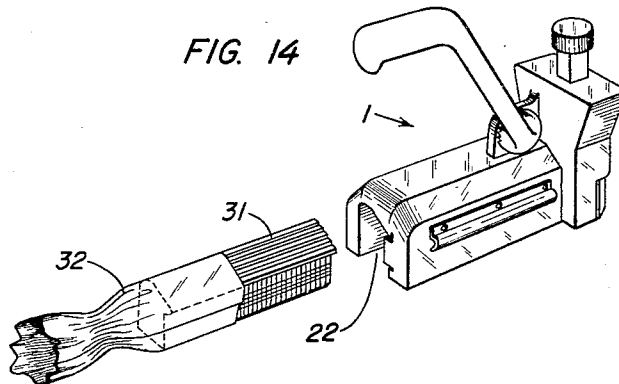
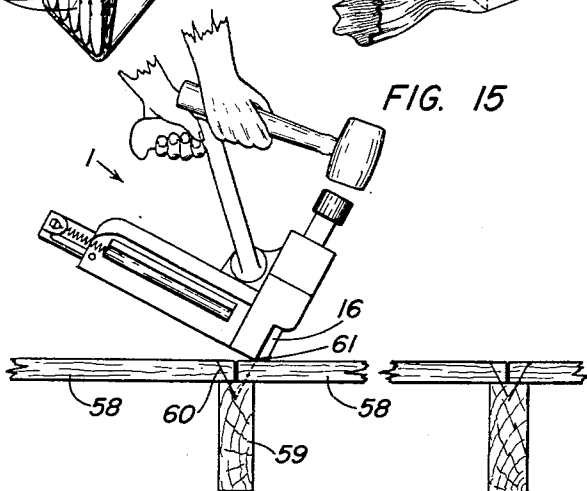


FIG. 15



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FIG. 16

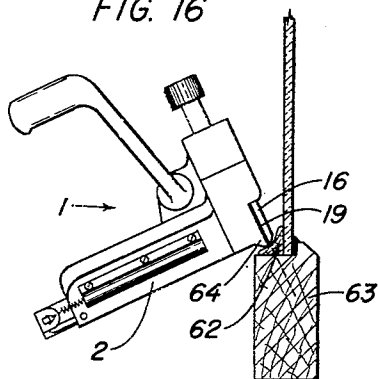


FIG. 17

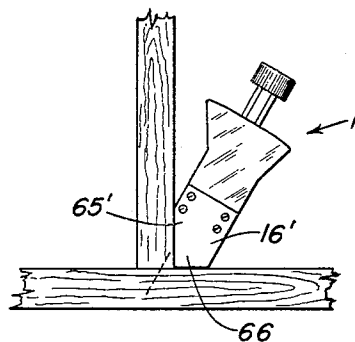


FIG. 18

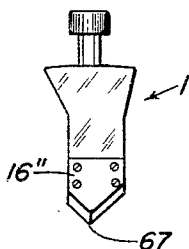


FIG. 19

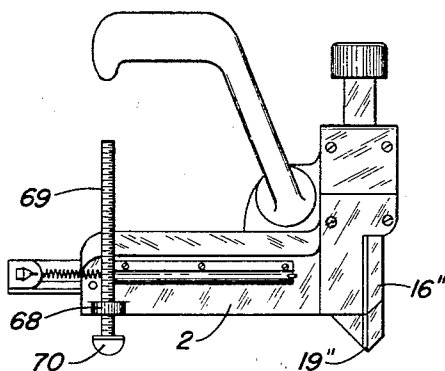


FIG. 20

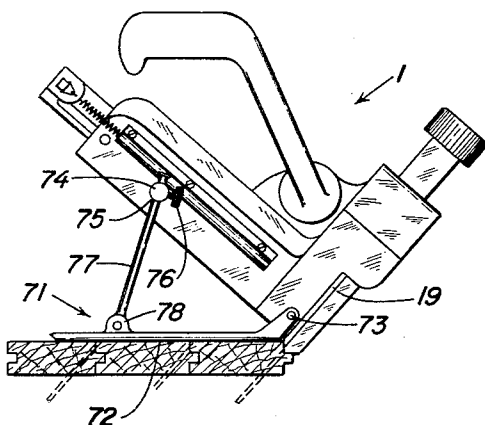
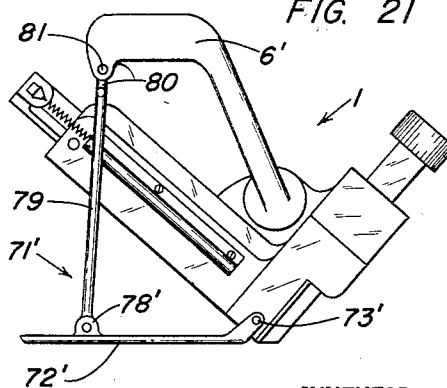


FIG. 21



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FIG. 22

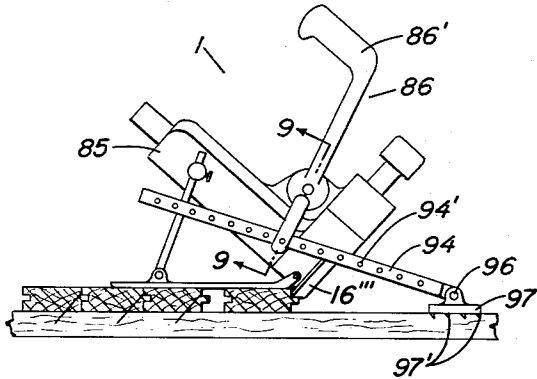


FIG. 24

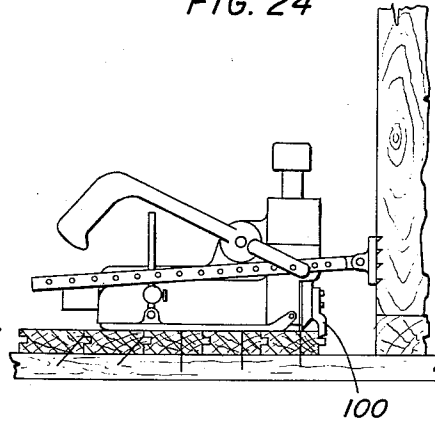


FIG. 23

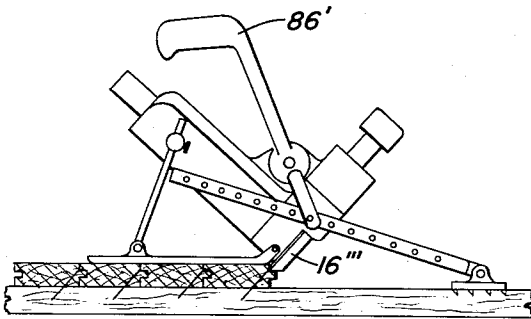
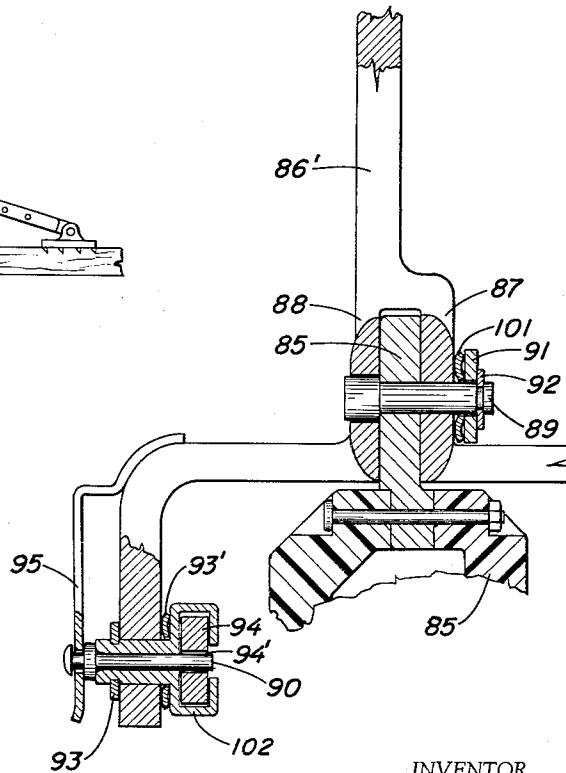


FIG. 25



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NAILING MACHINE AND MAGAZINES THEREFOR

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Filed Dec. 12, 1957, Ser. No. 702,319
9 Claims. (Cl. 1—46)

This invention relates to an improved portable nailing machine and more particularly to a nailing machine wherein a nail is driven by means of a mallet or hammer blow upon the head of a plunger which in turn forces the nail into the desired material. This invention is further characterized by the use of a magazine adapted to provide a large number of nails with great ease.

Previous nailing machines have lacked utility in many respects, for example, (1) they have not been useable successfully in certain areas due to inherent size limitations, in the device, (2) it has been necessary to reload such machines quite often, and (3) each "stack" of nails used to reload such devices tend to break into many pieces when carried in an operator's pocket and consequently it is generally the practice for the operator not to carry such stacks of nails but to carry the nailing machine back to a central source of supply and pick up a stack of such nails upon every occasion that the supply of nails in the nailing machine is used up. Use of a stronger adhesive to make the stacks less breakable has not proved satisfactory since it is desirable and intended for one nail to be struck loose from the stack, during operation of the machine, with relatively easy facility.

The invention described herein relates to improvements in nailing machines of the type described in Anstett Patents 2,423,821; 2,430,321; 2,496,974; and 2,580,065.

Further difficulty with such machines has been the difficulty in utilizing them in nailing flooring since the floor board to be nailed must be held in place as by the operator's foot during the nailing operation.

Another difficulty has been a tendency for the device to fail when the last nail in a stack of nails contained in the machine is driven.

It has also been difficult with such machines to drive nails at angles (hidden nailing) such as is desirable in the case of fastening sub-flooring and roofing boards to joists or rafters in certain locations.

It is therefore an object of this invention to provide an improved nailing machine.

Another object is a nailing machine wherein a very large number of nails may be driven without reloading of the machine.

Another object is such a machine comprising a magazine for receiving a large number of nails to be driven without reloading of the machine.

Another object is such a machine which may be utilized to drive nails at angles, as in toe-nailing, with great facility.

Another object is such a machine which may be utilized to drive nails in recesses including recesses which cannot normally be reached by a hammer.

Another object is such a machine wherein the last nail in a group of nails contained therein may be driven with relatively great facility.

Another object is a means for loading such a machine with nails arranged in such a manner that each stack of nails lies upon the stack before it during or prior to the loading operation.

Further objects will become apparent from the drawings and from the following detailed description in which it is intended to illustrate the applicability of the invention without thereby limiting it to a scope less than that of all equivalents which will be apparent to one skilled

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in the art. Like reference numerals refer to like parts and in which:

FIGURE 1 is a perspective view of one embodiment of the invention;

FIGURE 2 is a perspective view of a part of the device of FIGURE 1;

FIGURE 3 is a perspective view of a part of the device of FIGURE 1;

FIGURE 4 is a cross-sectional elevation of the embodiment of FIGURE 1;

FIGURE 5 is a cross-sectional plan view of a portion of the device of FIGURE 6 taken along line 5—5;

FIGURE 6 is a cross-sectional elevation of the device of FIGURE 1;

FIGURE 7 is a perspective view of the pusher bar of the embodiment of FIGURE 1;

FIGURE 8 is a perspective view of a modified type of pusher bar of the embodiment of FIGURE 1;

FIGURE 9 is a perspective view of a modified type of pusher bar of the embodiment of FIGURE 1;

FIGURE 10 is a perspective view of a stack of nails used in the device of FIGURE 1;

FIGURE 11 is a perspective view of a modified type of stack of nails;

FIGURE 12 is a plan view of a material containing nails of the types shown in FIGURES 10 and 11;

FIGURE 13 is a perspective view of a package of stacks of nails in accordance with the invention;

FIGURE 14 is a perspective view showing the operation of the package of FIGURE 13 in connection with the embodiment of FIGURE 1;

FIGURE 15 is an elevation of the device of FIGURE 1 in operation;

FIGURE 16 is an elevation of a modification of FIGURE 1 in operation;

FIGURE 17 is an elevation of a modification of the embodiment of FIGURE 1 in operation;

FIGURE 18 is an elevation of a modification of the embodiment of FIGURE 1;

FIGURE 19 is an elevation of the device of FIGURE 18;

FIGURE 20 is an elevation of a modification of FIGURE 16;

FIGURE 21 is an elevation of another modification of FIGURE 16;

FIGURE 22 is an elevation of a modification of FIGURE 20;

FIGURE 23 is an elevation of the modification of FIGURE 20 in a somewhat different position than that of FIGURE 22;

FIGURE 24 is an elevation of the modification of FIGURE 20 in a somewhat different position than that of FIGURE 23; and

FIGURE 25 is a detailed cross section of FIGURE 22 taken along the line 9—9.

Referring now to FIGURE 1 there is shown a nailing machine indicated generally as 1 adapted to contain a plurality of "stacks" of nails therewithin and adapted to dispense individual nails. A longitudinally extending base portion 2 of the device has at its forward extremity a raised head portion 10 which presents a horizontal surface 8 having therein a vertically extending aperture 9 which slideably receives a driving plunger 11 having a head portion 12.

A handle 6 pivotally adjustable in a direction parallel to the length of the base 2 of the device is adjustably attached to said frame behind the raised head portion 10. Along one lateral side of the base a spring housing assembly 7 houses a tension spring 13 which is firmly attached to the frontal head of the spring housing assembly and which has at its other extremity a hook 14 which is

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adapted to contact and hold the rearward end of a nail pusher bar 15.

A frontal facing plate 16 having a vertical recess 17 (FIGURE 2) is positioned at the lower forward extremity of the device and is attached as by bolts 18 to a back facing plate 19 (FIGURE 3) which is firmly attached to the frame as by bolts 18 and which contains an inverted L-shaped aperture 20 therein. Plate 16 may be magnetized and in that case plate 19 is constructed of a stainless steel or any other non-magnetic alloy. The base of one plate 16 may be chamfered or both of the plates 16 and 19 may be chamfered or the body of the device may be chamfered so that the device will perform its function in a variety of positions. At the upper extremity of plate 19 affixed thereto or integral therewith is an extended portion 21 which serves as a guide for blade 26 (FIGURE 4).

Referring now to FIGURE 4 an open bottomed magazine 22, containing a plurality of stack of nails 23, having the heads of each succeeding stack atop the heads of the preceding stack extends longitudinally almost along the entire base of the device. In operation one stack of nails 23 is forced to the frontmost portion of the magazine (recess 17 in plate 16) thru the interaction of the pusher bar 15 and tension spring 13 while the remaining stack of nails (FIGURE 5) are positioned adjacent the first mentioned stack of nails and/or the pusher bar 15 thru the action of compression springs 25 which are firmly affixed to the side of the magazine opposite the first mentioned stack of nails and which bear upon positioning bar 24 which in turn bears upon the stacks of nails. It can thusly be seen that as long as pusher bar 15 is to the rear of a stack of nails, a nail in the stack is positioned in the recess 17 of plate 16. When only one nail of the stack is left it too is positioned in the recess 17 and held there by the magnetized frontal facing plate.

Plunger 11 has, positioned in a vertically extending recess, a driving blade 26 which is affixed to the plunger in such a manner that the extremity of the blade extending past the plunger may move a limited distance in any direction. Blade guide 21 which is affixed to or integral with plate 19 guides the driving blade upon excitation of same, by entering the recess in plunger 11 thereby coming between said blade and said recess and effectively guiding said blade in a substantially vertical path. An aperture 27 extends for a distance up plunger 11 and is adapted to receive a non-fixed spring 28.

In practice upon depression of the plunger 11 as by a hammer blow the driving blade 26 moves down thru recess 17 in plate 16 and there contacts one nail of a stack, the force of the impact of the driving blade on the nail breaking it loose from the stack and pushes it out of the recess and into the material desirous of being nailed whereupon the compression spring 28 forces the plunger etc. back to its normal position for another cycle.

When a stack of nails becomes exhausted the nail pusher bar may be detached from the spring 13 (FIGURE 1) and pulled back until it contacts a removable stop 30 consisting of a spring activated knurled headed screw (FIGURE 6) whereupon compression springs 25 and positioning bar 24 position another stack of nails against one side of the magazine. The pusher bar is again attached to the compression spring and allowed to contact the rearmost portion of the new stack of nails and the device is ready for operation.

When all of the stacks of nails in the magazine are exhausted the stop 30 is pulled back thereby permitting the pusher bar to be removed. A package of stacks of nails 31 (FIGURE 13) having a paper or plastic holding wrapping 32 around it is procured and inserted in the magazine (FIGURE 14) by first pulling the stacks 31 from the wrapping 32 thence placing the stacks in the rearmost portion of the magazine 22 of the device 1.

Referring now to FIGURE 7 it can be seen that pusher bar 33 consists of a rectangular back 34 having inwardly

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turned portions 35 at the top and bottom of same and a raised section 36 at the top frontal end of same. A portion 37 at the rearward portion of the bar 33 extends at right angles to the length of the bar continuous in a vertical direction and culminates in a hook 38 adapted to engage hook 14 on tension spring 13. Extending for a distance along the rectangular back portion of the pusher bar 33 is a slot 39 which is adapted to receive stop 30.

The open bottomed magazine 22 (FIGURE 6) is defined by sidewalls 40 and 41 and by a top wall 42. Side wall 41 is substantially vertical and has therein slots 43 and 44 which are substantially perpendicular to said sidewall 41 and a slot 45 which extends at right angles to slot 44. The purpose of the slots in sidewall 41 is to receive and juxtapose portions of a pusher bar 15.

Stop 30 consisting of a knurled head 46 at one extremity of said stop 30, a body portion 47 intermediate between a stopping chuck 48 and said knurled head, a compression spring 49 housed in a recess in sidewall 41, is positioned in a transverse direction to the length of the device so that normally stopping chuck 48 protrudes thru the longitudinally extending aperture in pusher bar 15 and normally prevents removal of the bar by contacting the forward end of aperture 39. When removal of the bar is necessary as in the case of exhaustion of all nails in the magazine the stop 30 is pulled back away from the device thusly allowing the bar to be removed.

Hammer 50 is shown striking the horizontal surface 8 of raised head portion 10 prior to striking head 12 of plunger 11 as for example in rendering a warped floor board flat; this condition of the board being kept thru the use of arm pressure on the adjustable handle 6 until the head 12 of plunger 11 of the device is struck with the hammer causing a nail to be driven into and securing the board in place.

Adjustable handle 6 consists of a notched or ratchet mounting 51 mounted to the rear of the raised head section 10 and having an aperture therethru adapted to receive positioning screw 52. Positioning screw 52 is screwably received in the lower section of the handle which also is notched.

In operation when a change of handle angularity is desired screw 52 is disengaged from section 53 of handle 6 and the handle is positioned with the desired angle. Screw 52 is then tightened thereby engaging section 53 of handle 6 causing the two notched sections to come together and securely lock the handle in place.

A modified type of pusher bar 33' is shown in FIGURE 8 wherein two raised portions 36' are located at the forward extremity of the bar and serve to cut down any turning movement of the bar while in operation. In practice the use of the bar in FIGURE 8 is identical to that of the bar having only the one raised forward section except that an extra slot must be present in the magazine to accommodate the additional raised section.

FIGURE 9 discloses a pusher bar 33'' of the type described but having raised portions 36'' extending along substantially the entire length of the bar 33''. As before the operation etc. of this bar is identical to that of the bars of FIGURES 7 and 8.

FIGURE 10 discloses a stack of nails 54 consisting of a plurality of affixed nails having a body portion 55 having at one end a pointed portion 57 and at the other extremity a head portion 56 at substantially right angles to said body portion wherein said head and body portions are of substantially the same thickness.

FIGURE 11 discloses a stack of nails 54' consisting of a plurality of affixed nails having a body portion 55' having at one end a pointed portion 57' and at the other extremity a head portion 56' at substantially right angles to said body portion and extending in a direction first away from them toward the axis of said body portion. It is to be noted that as a matter of necessity the head

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portion 56' must be of a lesser thickness than that of body portion 55'.

The great advantage of this type of nail (FIGURE 12) over the type shown in FIGURE 10 is that when properly nailed this type of nail holds a greater plurality of both longitudinal and transverse fibers than does nail 54 thusly presently presenting a stronger fastening device as well as one less likely to split the object being nailed.

FIGURE 15 discloses the device 1 in operation securing floor boards 58 to a common beam 59. It is to be noted that the nails 60 have been hammered into the boards and beam at an angle; the ease with which said angular driving of nails is accomplished being due to the inwardly bevelled portion 61 of front facing plate 16.

FIGURE 16 discloses the device 1 in operation securing molding 62 to a beam 63. Both front facing plate 16 and a portion of the body 2, 63, are inwardly bevelled one to the other along their lower extremities toward the longitudinal direction of the machine so as to achieve a great degree of nailing angularity.

FIGURE 17 discloses the device 1 performing a "toe nailing" operation. In this modification both the front and back facing plates 16' and 19' and a portion of the body of the device are inwardly bevelled along both sides 65' and 66 in a direction transverse to the longitudinal direction of the machine.

FIGURE 18 discloses a modification of the device 1 wherein front facing plate 16'' and a portion of the body of the device are inwardly bevelled on all four sides so as to achieve point contact between the nailing end of the device 67 and the material desirous of being nailed.

It is to be noted that the facing plates (only one of which is shown for the sake of convenience) are positioned in such a way as to project substantially below the body of the device so as to permit nailing at any angle as well as nailing wherein the head of the seated nail is below the upper level of the work.

FIGURE 19 discloses more clearly the extent the facing plates 16'' and 19'' of FIGURE 18 extend below the body 2 of the device as well as the means for permitting angular nailing which consists of a threaded lug 68 affixed by any convenient means to the body 2 of the device, and adapted to receive a threaded elongated bolt 69 further characterized by having a substantially circular rubber surfaced head 70 at its lower extremity.

In practice when a particular nailing angle is desired the bolt 69 is adjusted in the lug 68 so as to achieve the desired angle. The head member 70, due to its high frictional resistance with respect to the medium on which it rests serves to aid in keeping the device from moving during the nailing operation.

FIGURE 20 discloses a modified nailing device 1 having a moveable angular positioner 71 having a basal portion 72 which is pivotally attached to a stationary cross-wise extending pin 73 positioned at a point in close proximity to the back facing plate 19. Attached to the frame 2 of the device on either side of same are pivoting lugs 74 characterized by having an aperture therethrough at a point midway between the point of juncture between said pivoting supports and said frame, and between set screws 76 at the other extremity of said support. The apertures 76 are adapted to receive rods 77 which are pivotally affixed at their lower extremity to basal portion 72 thru supports 78.

In operation when the operator in the course of his work deems it necessary to perform angular or hidden nailing he unscrews set screws 76 thereby releasing basal portion 72 from its position of parallel adjacency to the base of the device. He then positions the basal portion 72 of the angular positioner at an angle of from 1 to 50° with respect to the base of the device and secures the angular positioner in this position by tightening set screws 76.

It can be seen that this modification makes hidden nailing easier and more uniform since once the angular posi-

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tioner is set the nailing function becomes as easy as "flat" nailing.

FIGURE 21 discloses a modification of FIGURE 20 having a moveable angular positioner 71' consisting of a basal portion 72' which is pivoted at its forward end to the frame of the device thru pin 73' and which extends throughout the width of the base. Toward the rear of the basal portion 72' two rods 79 are pivotally attached thereto thru pivoted support 78'. The attachment to the basal portion and come together forming an inverted U just below one extremity of the adjustable handle 6'. A raised lug portion 80 near the center portion of the inverted U section is firmly affixed thereto and pivoted at its other extremity thru pivot 81 to the adjustable handle 6'. As before (but not shown for the sake of convenience) the adjustable handle 6 consists of a notched or ratchet mounting mounted behind the raised head section and having an aperture therethru adapted to receive a positioning screw. The lowermost section of the handle 20 is also notched and has an aperture therein adapted to screwably receive the positioning screw.

In operation when a particular nailing angle is desired all the operator need do is loosen the set screw on handle 6 which allows the handle and angular positioner to be moved to the desired position. Upon tightening of the set screw the handle and angular positioner by virtue of their pivotal attachment are locked in place and the device is ready for operation.

This modification has the great advantage of achieving the proper handle and angular positioner position in one single quick operation.

FIGURE 22 discloses a modification of FIGURE 20 and is indicated generally as 1. Extending upwardly from both sides of the body 85 of the device is a handle member 35 86 which consists (FIGURE 25) of a handle member 86' which bifurcates into members 87 and 88. Members 87 and 88 juxtapose a portion of the body of the device and are pivoted around a pin 89 which extends through both of said members and also through a portion of the body 85 of the device. Pin 89 is firmly maintained and kept in position by virtue of friction washer 101, washer 91 and snap ring 92.

A portion of both members 87 and 88 extends past the pin 89 thence outwardly from the body 85 of the device thence downwardly in a substantially parallel plane to the handle member 86'. Only one lower leg (88) is shown for the sake of convenience but it is understood that both lower legs 87 and 88 have the same configuration and mechanical attachments.

A pin 90 extends through the bottom-most portion of member 88 and is maintained in position by virtue of a spring 95 mounted on member 88. A holding member 102 surrounds pin 90 and on one end of said member extends first in a perpendicular direction to said pin, thence in a parallel direction to said pin, thence in a perpendicular direction to said pin thereby creating an open cavity on the side of the body of the device which is adapted to receive a U-shaped member 94 which contains aperture 94' which is adapted to receive pin 90. Holding member 102 is maintained in position by virtue of snap ring 93 and friction washer 93'.

At the point near the forward-most extremity of member 94 (the base of the U) pin 96 (FIG. 22) extends through both legs 87 and 88 and through a gripping member 97 which has mounted thereon a plurality of gripping edges 97'.

In operation then when it is desired to force a board into position against the last nailed board and for one reason or another a hammer blow against the device the board itself will not suffice as a "tight" corner the gripping edges 97' are brought to bear against the base flooring and the gripping handle member 86' moved toward the rear of the device thereby causing pressure to be brought to bear on member 94 which causes the front facing plate 16'' of the device to forceably bear against

the last nailed board, thusly forcing same into its proper position.

FIGURE 23 discloses the device of FIGURE 22 after pressure on handle member 86' has been brought about and the board forced into place.

FIGURE 24 discloses the device of FIGURE 23 with a modified front facing plate 100 which extends upwardly then inwardly. The particular configuration of plate 100 allows, in the case of flat nailing, pressure to be brought to bear on the device through the engaging of the gripping edges 97' on a vertical wall.

As before, the front facing plate is aligned with the board desirous of being forced into place and the gripping member 97 positioned so that the gripping edges 97' of the gripping member bear against a vertical wall, thence downward pressure is brought to bear on the handle member 86' and as before the board is forced into place.

In summary, then, the modifications of the basic device disclosed in FIGURES 22-25 enable, in conjunction with the basic device, the positioning and nailing of floor boards any place where flooring is desired.

Further, this device is characterized by a new and unique type of magazine which inherently saves time and money due to the quantity of nails carried in the magazine which in turn cuts down on the number of nail loadings by the operator. The device is further characterized by the variety of tasks it may perform.

While certain modifications and embodiments of the invention have been described, it is of course to be understood that there are a great number of variations which will suggest themselves to anyone familiar with the subject matter thereof and it is distinctly understood that this invention should not be limited except by such limitations as are clearly imposed in the appended claims.

I claim:

1. In a nailing machine, a magazine extending longitudinally along the base of the device; said magazine defined by sidewalls and a top wall wherein one of said sidewalls is substantially vertical and characterized by having slots extending thereinto adapted to receive extended portions of a pusher bar and a slot extending thereinto adapted to receive the heads of nails of a first stack of nails; said magazine further characterized by being adapted to receive a plurality of stacks of nails wherein the heads of the nails in said first stack are received in said slot and the heads of each succeeding stack of nails rest upon the heads of the next adjacent stack; a longitudinally extending positioning bar adapted to hold said stacks of nails in close proximity to one another; spring members extending from one of said sidewalls and urging said positioning bar in a transverse direction against said nails; a pusher bar extending into said magazine in the direction of flow of said nails and adapted to bear against said first stack; spring means urging said pusher bar against said first stack and adapted to force said stack toward a pre-defined end of said magazine.

2. A device as in claim 1 wherein said slots in said sidewall comprises a slot extending into said sidewall and a second slot extending from said first slot at an angle thereto.

3. A device as in claim 1 wherein said slots in said sidewall comprise two first slots extending into said sidewall and a second slot extending from one of said first slots at an angle thereto.

4. A device as in claim 1 wherein a retractable stop is positioned near the rear of the device in a substantially transverse position to the longitudinal direction of said device thru the body of same and wherein said stop protrudes into an interfering relation to said pusher bar and is adapted to normally prevent said pusher bar from being removed from said magazine.

5. A device as in claim 1 wherein said pusher bar comprises: a longitudinally extending back portion hav-

ing inwardly extending longitudinally continuous projections at the top and bottom of said bar perpendicular to said back portion; an inwardly extending portion at one extremity of said pusher bar, perpendicular to said back portion and continuous in a vertical direction; the extremity of said inwardly extending portion at one extremity of said pusher bar, culminating in a member adapted to connect with said spring means.

6. A device as in claim 1 wherein said pusher bar comprises a longitudinally extending back portion having inwardly extending longitudinally continuous projections at the top and bottom of said back portion perpendicular thereto; a raised ear portion extending for a longitudinal distance at an angle to one of said inwardly extending longitudinally continuous projections, a laterally extending portion at one extremity of said pusher bar, perpendicular to said back portion and continuous in a vertical direction; the extremity of said laterally extending portion culminating in a member adapted to connect with said spring means.

7. A device as in claim 1 wherein said pusher bar comprises a longitudinally extending back portion having inwardly extending longitudinally continuous projections at the top and bottom of said bar perpendicular to said back portion; raised rear portions extending for a longitudinal distance perpendicular to said inwardly extending longitudinally continuous projections, at the top and bottom of same; an inwardly extending portion at one extremity of said pusher bar, perpendicular to said back portion and continuous in a vertical direction; the extremity of said inwardly extending portions at one extremity of said pusher bar, culminating in a member adapted to connect with said spring means.

8. In a nailing machine a magazine extending longitudinally along the base of the device; said magazine defined by sidewalls and an irregular top wall; one of said sidewalls having longitudinally extending slots therein adapted to receive a portion of a pusher bar; said magazine further characterized by being adapted to contain a plurality of stacks of nails wherein one of said stacks of nails is adapted to be positioned in the longitudinal path of said pusher bar; side biasing means mounted in one of said side walls and bearing against a member in contact with one of said stacks of nails; said pusher bar further characterized by being urged in a longitudinal direction with respect to said magazine by resilient means.

9. A magazine for a nailing machine comprising a substantially closed area adapted to contain a plurality of stacks of nails in close adjacency to one another; a pusher bar adapted to force one of said stack of nails in a longitudinal direction with respect to said magazine; resilient means removably attached to said pusher bar and to the frame of the device and adapted to urge said pusher bar in a longitudinal direction with respect to said magazine; means integral with the device adapted to enable removal of said pusher bar from said magazine; resilient means adapted to urge said stacks of nails in a direction substantially normal to the longitudinal direction of said magazine.

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