

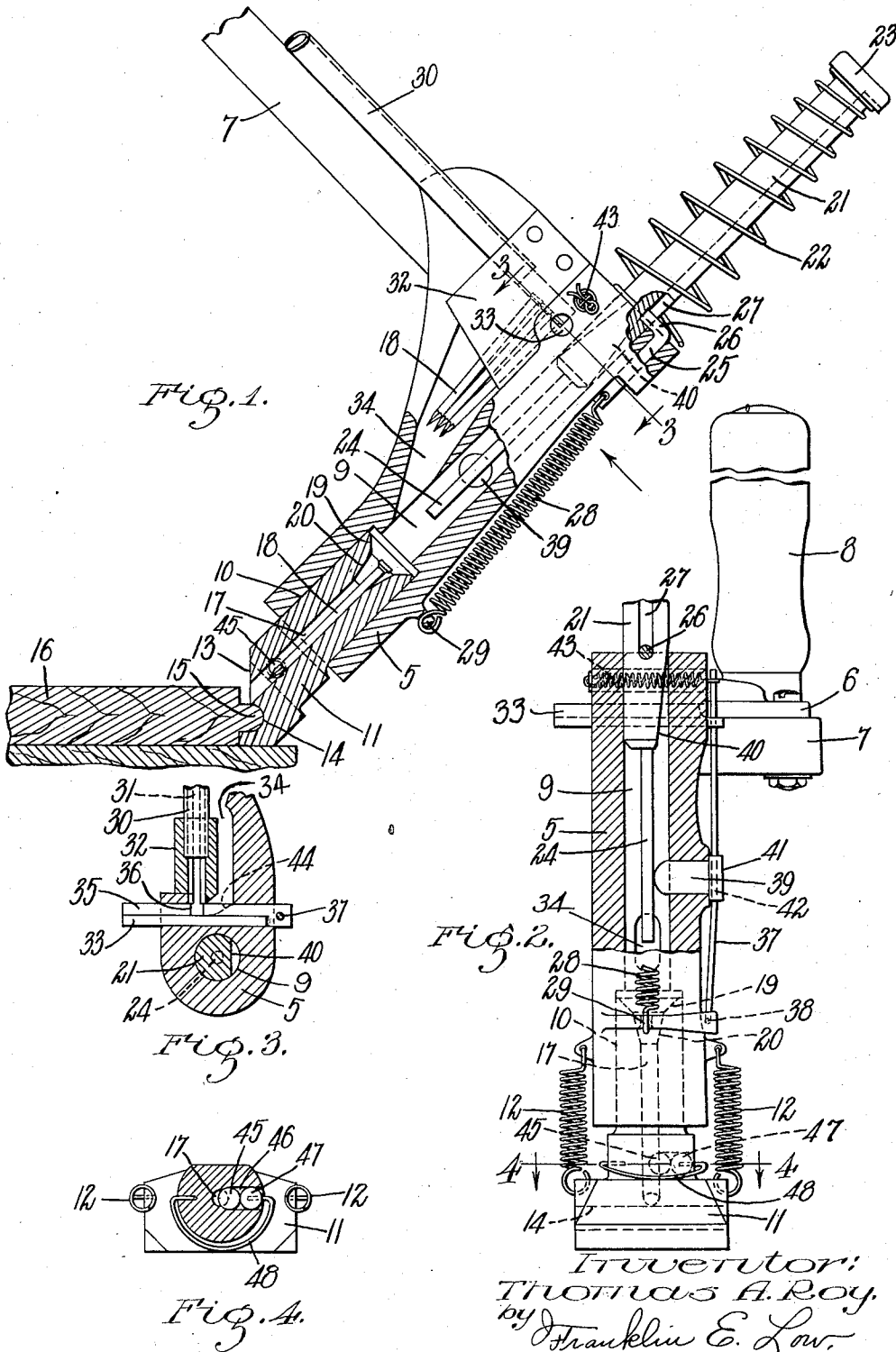
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NAIL-DRIVING DEVICE

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## NAIL-DRIVING DEVICE

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9 Claims. (Cl. 1—46)

This invention relates to a nail driving device and particularly to a device for driving and setting nails in the tongue and grooved boards of hard wood floors.

5 The object of the invention is to provide a light, easily handled device of the character mentioned, wherein nails may be fed automatically into position to be driven manually at an angle into floor boards above the tongue provided thereon without danger of marring or otherwise injuring said boards.

10 Another object of the invention is to provide a simple effective means for releasing the nails one at a time and discharging them into driving position.

15 Another object of the invention is to provide a structure wherein a driver head and work-engaging foot therefor are yieldable rotatably and longitudinally with respect to each other.

20 Another object of the invention is to provide a novel means for holding the nails in driving position out of engagement with the work until the nail is contacted by the driver.

25 Still another object of the invention is to provide a simple effective means for absorbing the rebound of the driver on its return movement after each nail driving operation.

30 The invention consists in a device for driving nails as set forth in the following specification and particularly as pointed out in the claims.

Referring to the drawing:

35 Fig. 1 is a side elevation, partly in section, of a nail driving device of this invention positioned to drive nails in the tongue and grooved boards of a hard wood floor; the handle portion of the device being broken away to save space in the drawing.

40 Fig. 2 is a front elevation of the device looking in the direction of the arrow in Fig. 1, a portion of the driver head being broken away and illustrated in section.

Fig. 3 is a detail transverse section as taken on the line 3—3 of Fig. 1.

45 Fig. 4 is a detail transverse section as taken on the line 4—4 of Fig. 2.

Like numerals refer to like parts throughout the several views of the drawing.

50 In the drawing, 5 represents a driver head having a flanged portion 6 embodied therein to which an arm 7 is secured in any suitable manner. The arm 7 is preferably constructed of wood and has a handle 8 attached thereto at a suitable location thereon. Extending through the head 5 from top to bottom thereof is a bore 9 in a lower portion 10 of which a work-engag-

ing member or foot 11 is loosely mounted, said foot being yieldingly supported in the head 5 by means of a pair of helical tension springs 12 which are attached at their upper ends to said head and at their lower ends to said foot in a manner to permit a restricted yielding rotary movement of the foot in said head and also permit a longitudinal movement of the head and foot relatively to each other. The springs 12 will act to effectively return the foot 11 to its normal position in the head 5 after each nail driving operation while the device is being moved from one nail driving position to another and is out of contact with the work. The foot 11 is provided with a flat work-engaging face having 15 a groove 14 provided therein adapted to receive the tongue 15 of a matched floor board 16 of well-known type in a manner to hold the device correctly positioned with respect to the tongue of the board during a nail driving operation and when the device is positioned as illustrated in Fig. 1. The foot 11 has a nail passage 17 extending downwardly therethrough positioned to discharge nails 18 through the face 13 of said foot at a point just above the groove 14 therein, 25 and said nail passage 17 has tapering portions 19 and 20 embodied therein at the upper end thereof, while the lower portion of said passage is cylindrical in form and just a trifle larger in diameter than the diameter of the heads of the 30 nails utilized.

Slidably mounted in the head 5 within the upper portion of the bore 9 is a reciprocatory plunger 21 constituting a driver for the nails 18. The driver 21 is normally held in an elevated 35 position in the head 5, as illustrated in Fig. 1, by means of a spring 22 which is interposed between the top of said head 5 and a head portion 23 of said driver, said head portion 23 being adapted to be contacted by a suitable manually operated hammer during the nail driving operation. The lower portion of the driver 21 is reduced in diameter at 24 to fit the lower portion of the nail passage 17 in the foot 11. The driver 21 is prevented from rotating in the head 5 and the upward movement of said driver is cushioned by means of a yieldable pin 25 which is slidably mounted in the head 5 in parallel relation to the driver 21, said pin having a laterally bent portion 26 embodied therein which projects into a longitudinal groove 27 provided in said driver. A helical spring 28 is attached at its upper end to the lower end of the pin 25, while the lower end of said spring is attached at 29 to the head 5. Normally the spring 28 pulls the pin 25 downwardly 55

and holds the lateral portion 26 thereof in contact with the top surface of the head 5, and the spring 22 pushes the driver 21 upwardly with the lower extremity of the groove 27 contacting with the lateral portion 26 of the pin and thereby restricting the upward movement of said driver. The downward pulling action of the spring 28 is considerably greater than the upwardly pushing action of the spring 22, but after the driver 21 has been contacted by a hammer to drive a nail 18, during the return movement of said driver upwardly, the spring 28 will act to cushion the blow caused by the lower extremity of the groove 27 contacting with the lateral portion 26 of the pin 25.

The nails 18 are delivered to the head 5 to be driven one at a time by the driver 21 by a mechanism as follows: Extending lengthwise of the arm 7 and secured thereto in any suitable manner is a tubular nail chute 30 having a longitudinally extending slot 31 provided therein through which the shanks of the nails project, the heads of said nails being contacted by the opposite edge portions of said slot and the nails hanging in an upright position from said chute. The nails 18 are supplied to the chute 30 from a suitable hopper which may be of any well-known type. The lower end portion of the chute 30 is secured to the head 5 within a member 32 which is fastened to said head, and said chute terminates adjacent to a separator slide 33, mounted in the head, above a delivery passage 34 also provided in said head and communicating with the bore 9 above the upper extremity of the nail passage 17 provided in the foot 11. The separator slide 33 is shouldered at 35 to support the head of a nail 18, and notched at 36 to receive the shank of said nail, and normally the notch 36 is positioned opposite the slot 31 in the chute 30 so that the lowermost nail in said chute is delivered into said notch with the head of the nail resting upon the shoulder 35 of the separator. The separator 33 is moved laterally of the chute 30 in order that a nail held in said separator may be released therefrom and discharged into the delivery passage 34 from which it will drop point down into the passage 17 provided in the foot 11 by means of a rod 37 pivotally attached at its lower end at 38 to the head 5 and at its upper end operatively connected to the separator.

A rocking movement is transmitted to the rod 37 from the driver 21 through a pin 39 which is slidably mounted in the head 5. The inner end of the pin 39 projects into the bore 9 and into the path of the driver 5 and is contacted during the downward movement of said driver by a flat bevelled surface 40 provided upon the side of the driver. At its outer end the pin 39 is provided with a head 41 which is slotted at 42 to receive the rod 37, and the latter is held in said slot and the separator in its normal position by means of a coil spring 43, one extremity of which is attached to the head 5 while the other extremity is attached to the upper portion of said rod. During the downward movement of the driver 21 to drive a nail 18 which has previously been fed into driving position, the bevelled portion 40 of said driver will contact with the inner extremity of the pin 39 and force the latter outwardly against the tension of the coil spring 43 causing the rod 37 to be rocked upon its pivot 38 and imparting a lengthwise sliding movement to the separator 33. During this sliding movement of the separator the shank portion of the nail will engage a cam surface 44 provided upon the head

5, see Fig. 3, and the nail will be pushed off the separator 33 and will drop point down into the delivery passage 34 from which it will drop into the passage 9 beside the driver 21 which at this time is descending and completing the driving of a previously positioned nail into a board. When the driver 21 rises after completing a driving and setting operation, the nail will drop into the passage 17 where it will be intercepted by a spherical stop member 45 which is located within a recess 46 provided in the foot 11, said stop member projecting into the passage 17 a sufficient amount to temporarily stop the downward movement of the nail in said foot until the next driving operation. The spherical member 45 is backed up by another spherical member 47 and both of said members are yieldingly held within the recess 46 by means of an arcuate spring 48, one extremity of which projects into the member 47 and the other extremity of which projects into a recess provided in the opposite side of the shoe 11 from that in which the members 45 and 47 are located. During each driving operation as the lower portion 24 of the driver 21 contacts with the head of a nail positioned within the foot 11, the spherical members 45 and 47 will yield in unison to permit the passage of said nail through the foot 11 and into a board 16 located therebeneath.

Successive nails may be driven as fast as may be desired, it being understood that at each driving operation the driver 21 is struck with sufficient force to complete a nail driving and setting operation with one blow of a hammer upon said driver.

The general operation of the device hereinbefore specifically described is as follows: As each successive board 16 of a floor is placed in position upon the rough false flooring located therebeneath, a workman carrying a device in one hand and a hammer in the other hand, places said device against a board 16 in such a manner that the tongue 15 of said board projects into the groove 14 of the foot 11. At this time the foot 11 is free to yield rotatably within the driver head 5 if the occasion so demands, and a nail 18 is held in driving position within the passage 17 of said foot out of contact with the work by means of the yieldable spherical stop member 45. When the device is correctly positioned with respect to the floor board the head 23 of the driver 21 is contacted by a suitable hammer actuated by the workman and said driver is forced downwardly against the action of the spring 22. In descending, the portion 24 of the driver 21 contacts with the head of a nail 18 which up to this time has been held in driving position within the foot 11 out of contact with the work, and said nail is driven and set with one blow of the hammer upon said driver. During the downward movement of the driver 21, a nail is released from the nail chute 30 by contact of the bevel 40 with the pin 39, which through the spring 37 actuates the separator 33, and is discharged into the nail passage 34 where it remains until it is permitted to drop into driving position within the foot 11 when the driver rises. During the upward movement of the driver under the influence of the spring 22, the lower extremity of the groove 27 provided in said driver contacts with the portion 26 of the yieldable pin 25, whereupon the spring 28 will act to cushion the driver as it reaches the limit of its upward movement. With each nail driving operation, as the driver descends and contacts with a nail, the driver head 5 is permitted by the springs 12 to yield

upwardly with respect to the foot 11 while the latter is held in contact with the edge and lower face of the tongue of the floor board (see Fig. 1). There is, therefore, a yielding recoil of the driver head 5 upwardly after each blow of the driver 21. Each blow of the driver in driving a nail will also apply pressure to the board to force the same toward the previously laid board and into close relationship with said board. Successive driving operations are repeated as may be required to fasten the boards 16 to the false floor located therebeneath, the foot 11 with a nail 18 positioned therein being moved along said board with the tongue of the latter located within the groove 14 provided in said foot and the latter yielding rotatably within the head as occasioned by the position of the head with respect to the board. In moving the device of this invention from one position to another a nail is always held in driving position within the foot 11.

I claim:

1. A nail driving device of the character described comprising, in combination, a driver head, a driver for a nail operable therein, a work-engaging member yieldingly mounted in said head beneath said driver, means to feed nails to the head, means to release said nails one by one from said feeding means to drop into said work-engaging member, and a spherical member yieldingly intercepting a nail within the work-engaging member and holding said nail in driving position out of contact with the work until contacted by the driver.

2. A nail driving device of the character described comprising, in combination, a driver head, a driver for a nail operable therein, a work-engaging member loosely mounted in said head beneath said driver to yield rotatably and longitudinally with respect thereto, means to feed nails to the head, means actuated by the driver to release said nails one by one from said feeding means to drop into said work-engaging member, means to hold a nail in driving position within the work-engaging member and out of contact with the work until contacted by the driver, and means to cushion the return movement of said driver after a nail driving operation.

3. A nail driving device of the character described comprising, in combination, a driver head, a driver for a nail operable therein, a work-engaging member mounted in said head beneath said driver, said work engaging member and head being yieldable rotatably and longitudinally with respect to each other, means to feed nails to the head, means to release said nails one by one from said feeding means to drop into said work-engaging member, and means to hold a nail in driving position within the work-engaging member.

4. A nail driving device of the character described comprising, in combination, a driver head, a driver for a nail operable therein, a work-engaging member mounted in said head beneath

said driver, said work engaging member and head being yieldable rotatably and longitudinally with respect to each other, means to feed nails to the head, means to release said nails one by one from said feeding means to drop into said work-engaging member, means to hold a nail in driving position out of contact with the work until contacted by the driver, and means to cushion the return movement of said driver after a nail driving operation.

5. A nail driving device of the character described comprising, in combination, a driver head, a driver for a nail therein, a work-engaging member loosely mounted in said head to yield rotatably and longitudinally therein, means to release nails one by one to drop into said work-engaging member, and means to hold a nail in driving position out of contact with the work until contacted by the driver.

6. A nail driving device of the character described comprising, in combination, a driver head, a driver for a nail therein, a work-engaging member loosely mounted in said head to yield rotatably and longitudinally therein, means actuated by the driver to release nails one by one to drop into said work-engaging member, means to hold a nail in driving position out of contact with the work until contacted by the driver, and means to cushion the driver upon its return to its normal position.

7. A nail driving device of the character described comprising, in combination, a driver head, a driver for a nail therein, a work-engaging member loosely mounted in said head to yield rotatably and longitudinally therein, means actuated by the driver to release nails one by one to drop into said work-engaging member, and a member yieldingly mounted within the work-engaging member and yieldingly intercepting a nail and holding the latter in driving position out of contact with the work.

8. A nail driving device of the character described comprising, in combination, a driver head, a driver for a nail yieldable longitudinally in opposite directions in said head, a work-engaging member loosely mounted in the head beneath said driver to yield longitudinally within the head, means to feed nails to said work-engaging member, and means to hold a nail in driving position within the work-engaging member.

9. A nail driving device of the character described comprising, in combination, a driver head, a driver for a nail yieldable longitudinally in opposite directions in said head, a work-engaging member loosely mounted in the head beneath said driver to yield longitudinally and rotatably within the head, means to release nails one by one to drop into said work-engaging member, and means to hold a nail in driving position within the work-engaging member and out of contact with the work.

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