

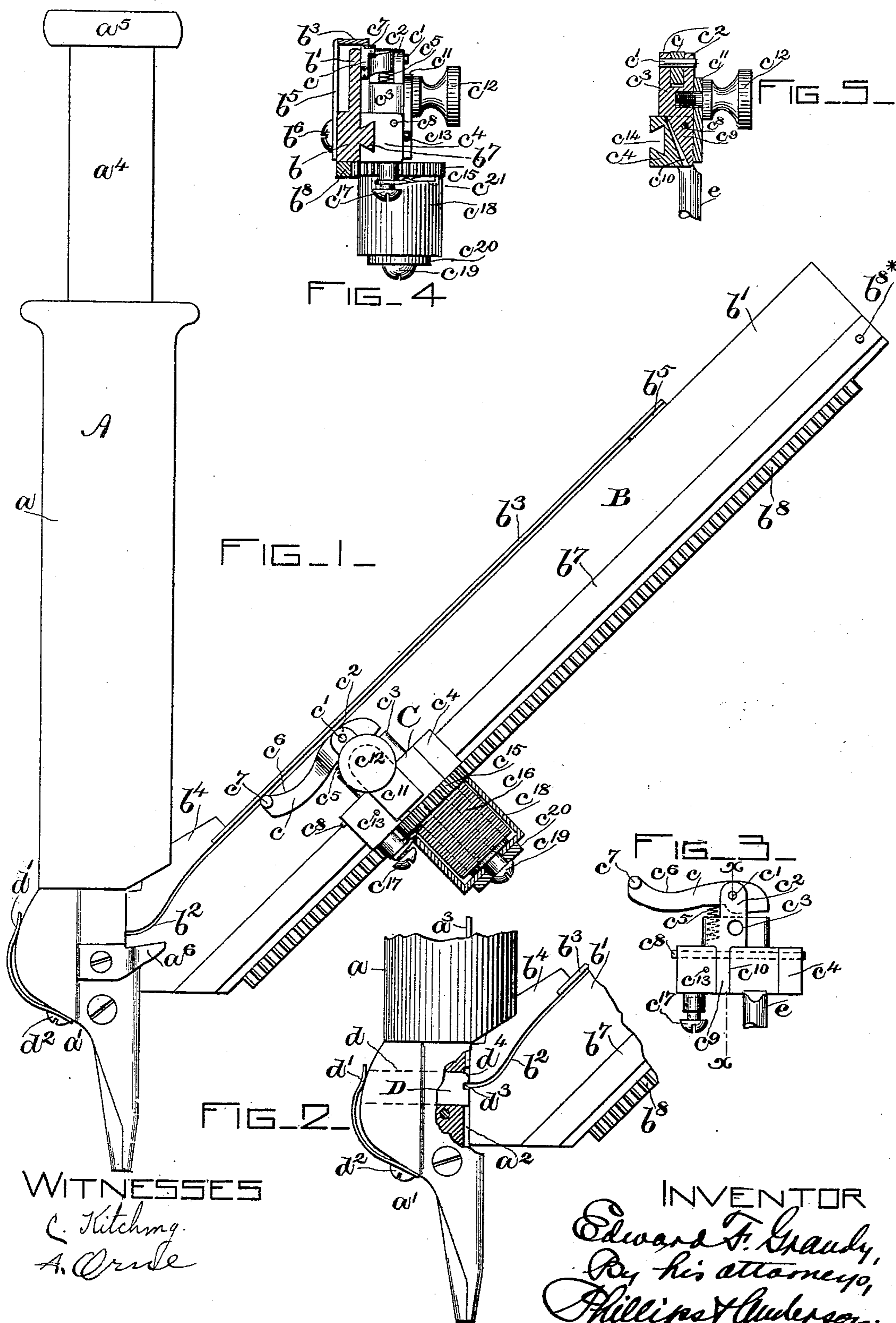
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E. F. GRANDY.
HAND NAILING IMPLEMENT.

(Application filed Feb. 7, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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HAND NAILING IMPLEMENT.

SPECIFICATION forming part of Letters Patent No. 618,085, dated January 24, 1899.

Application filed February 7, 1898. Serial No. 669,457. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. GRANDY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Hand Nailing Implements; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to machines for driving loose fastenings, and more particularly to a hand nailing implement arranged to feed and drive loose staples.

Hand staple-drivers are usually provided with an inclined raceway or chute arranged to receive a line of staples which are caused to advance toward the driver, which at each reciprocation removes the lowermost staple from the line of staples and drives it into the work.

The object of the present invention is to produce a stapling-machine having a follower of simple form and arrangement to act upon the line of staples and cause a steady advance or feeding of said staples toward the driver as they are removed one by one by said driver and to so arrange said follower that the raceway may be easily and quickly recharged with staples, as occasion may require, without the necessity of removing the follower from the raceway.

To the above end the present invention consists of the devices and combinations of devices, which will be hereinafter described and claimed.

The present invention is illustrated in the accompanying drawings, in which—

Figure 1 shows a side elevation of a hand nailing implement embodying the same. Fig. 2 shows in side elevation a fragmentary portion of the lower parts of the machine, a portion being broken out to show underlying construction. Fig. 3 shows in side elevation the follower removed from the raceway and certain portions of the follower-actuating means removed. Fig. 4 shows a vertical cross-section of the raceway in advance of the follower, the follower being shown in front elevation. Fig. 5 shows a vertical cross-section through the follower on the dotted lines xx , Fig. 3.

Similar reference characters will be used to designate corresponding parts throughout the specification and drawings.

The device of the drawings comprises a staple-driver A and a raceway B, the raceway being secured in any suitable manner to the driver A at or near its lower end and extending in an inclined direction upwardly and backwardly therefrom, as is usual in these devices.

The staple-driver A comprises the usual cylindrical sleeve a , provided at its lower end with a nozzle a' , having a driver-passage a^2 , in which the driver-bar a^3 is arranged to reciprocate, said driver-bar a^3 being fixed to a plunger a^4 , arranged to reciprocate in the sleeve a and normally held elevated therein by a spring, (not shown,) the said plunger a^4 having a head a^5 arranged to be struck by the hand or a mallet in the hands of the operator to drive the staple from the nozzle into the work, as is usual in the operation of hand tackers or drivers.

The raceway B is arranged to support a line of staples and at its lower end communicates, by means of a suitable opening in the nozzle a' , with the driver-passage a^2 , the lower end of said raceway having a vertical face which forms one side of the driver-passage, the space between such vertical face and opposite side of said passage being just sufficient to receive the driver-bar a^3 and the staple, thus insuring that the staple will be properly positioned beneath the driver-bar and properly guided while being driven.

The raceway B in the device of the drawings consists of a bar of suitable metal, which upon one side, near its lower edge, is provided with a projection or shoulder b , and above said shoulder the raceway is in the form of a thin vertically-extending plate b' , which is of sufficient thickness to fit between the legs of the staples which may be placed thereon and properly support and guide said staples to the staple-driver A. At its lower end where the staples enter the staple-driver the upper edge of the plate b' is curved downwardly and forwardly, as shown at b^2 , so that the staples will be caused to enter the driver-passage a^2 in a substantially vertical position. In order to insure the retention of the line of staples upon the bar b' in an even and regular line, a guard-

plate b^3 is provided, said guard-plate being supported so as to extend horizontally across the upper edge of the plate b' and raised above said edge a sufficient distance to permit a free movement of the crowns of the staples between said guard-plate and the upper edge of the plate b' and at the same time prevent the staples from riding over one another, insuring a correct and even line.

The guard-plate b^3 is preferably somewhat shorter than the raceway B and is secured thereto so that the upper end will be some distance removed from the upper end of the raceway, for a purpose to be hereinafter explained. The lower end of said plate abuts against a guard b^4 , which is fixedly secured to the staple-driver A, the guard b^4 covering the lower end of the raceway B and extending into the nozzle a' of the staple-driver A, forming a continuation of the guard-plate b^3 and insuring the proper control of the staples until they are delivered into the driver-passage a^2 . The guard-plate b^3 is supported by vertical arms b^5 , which are secured to the outer surface of the projection b by screws b^6 , whereby said arms will not interfere with the free passage of the staples along the plate b' .

In the present invention the line of staples is caused to advance along the raceway B by a suitable follower, which, as will be hereinafter set forth, is provided with self-contained propelling mechanism coacting with the frictional surface on the raceway, whereby said follower is caused to advance in an even and regular manner toward the driver and cause the steady advance of the line of staples along the raceway toward the driver, and, further, the follower is so constructed and arranged that the raceway may be replenished with staples without removing said follower from the raceway.

The above-suggested results are obtained in the illustrated embodiment of the present invention by a follower constructed and arranged as will be now described, and while such construction is the one now preferred by me such construction, in so far as details of mechanism are concerned, is by no means essential, as it is clear that the same may be varied without departing from the principle of the present invention.

The follower C consists of a pusher-arm c , which in order that it may bear against and follow the underside of the guard-plate b^3 and the guard b^4 is pivotally supported at or near its rear end at c' in upwardly-projecting ears c^2 of a block c^3 , which block is mounted upon a carriage c^4 , arranged to have a longitudinal travel along the raceway B as will be described.

The pusher-arm c is designed to lie against the face of the plate, back of the line of staples on said plate, with its forward end against the last staple in the line of staples, and its forward end is held yieldingly in contact with the under side of the guard-plate b^3 and guard b^4 by a coiled spring c^5 , which is seated in a

recess in the block c^3 and bears against the under side of the pusher-arm c at the left of its fulcrum c' , whereby said pusher-arm at its forward end is held in contact with the under side of the guard-plate b^3 and guard b^4 , so as to engage the line of staples on a line with the crowns of said staples and insure a proper travel of said staples along the bar b' , and as said pusher-arm c reaches the guard b^4 , the under surface of which is curved downwardly, as shown, said pusher-arm c may yield downwardly and follow the contour of the under surface of the guard b^4 .

In order that the pusher-arm c may act upon the staples clear up to the point at which said staples enter the driver, the said arm c at its forward end is curved, as shown at c^6 , whereby said pusher-arm may conform to the curved face of the guard b^4 , and in order that the forward end of the pusher-arm c may be properly guided as it reaches the driver A there is secured to the nozzle of said driver a finger a^6 , which engages a stud or projection c^7 , carried upon the outer side of the pusher-arm c , the finger a^6 engaging the stud c^7 and properly guiding the end of the pusher-arm c during the latter part of its travel toward the nozzle of the driver.

To permit the pusher-arm c to be moved outwardly away from the side of the bar b' in order that a free and unobstructed passage may be provided for a new line of staples when refilling the raceway B, the block c^3 is pivotally supported upon a pin c^8 in the carriage c^4 , said block having a downwardly-extending end c^9 , which fits into a recess c^{10} , cut in the outer face of the carriage c^4 , the inner face of the end c^9 being beveled or inclined and the base of the recess c^{10} being also inclined, a sufficient space being provided between the beveled face of the end c^9 and the base of the recess c^{10} to permit a limited rocking movement of the block c^3 upon the pin c^8 to remove the pusher-arm c away from the side of the bar b' of the raceway B, whereby said pusher-arm will be out of the way when refilling the raceway with staples. In order to hold the block c^3 in the position shown in Figs. 1, 4, and 5, with the pusher-arm c lying close against the face of the bar b' , a plate c^{11} , somewhat wider than the end c^9 of the block c^3 , is mounted upon said block c^3 by a clamping-screw c^{12} , tapped into a threaded bearing in said block, the plate c^{11} being arranged to swing loosely around the clamping-screw c^{12} to assume a position at right angles to the position in which it is shown in the drawings.

When the plate c^{11} is in the position shown in the drawings and the clamping-screw c^{12} is turned up tightly against said plate, said plate will engage the carriage c^4 upon each side of the recess c^{10} and cause the block c^3 to assume an upright position with relation to the carriage, with the pusher-arm c lying closely against the side of bar b' ; but if said set-screw c^{12} be loosened the plate c^{11} may be turned at right angles to its normal position,

when the block c^3 may be rocked upon its pivot c^8 , thus removing the pusher-arm c from contact with the side of bar b' , at which time the staples may be run upon the bar b' .

5 To prevent the plate c^{11} from turning with the screw c^{12} when setting up said screw, and thereby becoming displaced, a pin c^{13} may be placed upon the carriage c^4 , arranged to contact with the side of plate c^{11} and form a stop
10 for said plate.

In the present invention the line of staples must be kept under pressure tending to advance them toward the driver-passage a^2 and the lowermost staple in the line must be forced
15 into said passage against the wall of said passage opposite the end of the raceway in position to be picked off and forced downward and out of the driver-passage by the descending driver-bar. To secure this result, the pusher-arm c is constantly pressed against the last
20 staple in the line of staples by the following mechanism: The carriage c^4 of the follower C is supported by and arranged to travel along a guide b^7 , formed along the lower edge
25 of the raceway B, said guide b^7 in the illustrated embodiment of the present invention consisting of a dovetail rib or flange which engages a dovetail groove c^{14} , formed in the rear face of the carriage c^4 . To cause the
30 carriage c^4 to travel along the guide b^7 toward the staple-driver, the said carriage is provided with a depending stud or shaft e , upon which is mounted a friction-wheel c^{15} , said wheel being arranged to turn loosely upon
35 the shaft e and to engage a friction-surface b^8 , formed upon the raceway B below the guide b^7 , and said friction-wheel and friction-surface may be a pinion and a rack, as clearly shown. Surrounding the shaft e is a long
40 loosely-coiled spring c^{16} , which at one end is connected to the pinion c^{15} and at its other end to a stud c^{17} , secured to the carriage c^4 , the tension of the spring c^{16} being so adjusted that it will cause a rotation of the pinion from
45 right to left and by means of the rack b^8 cause the carriage and pusher-arm to advance toward the driver, thus advancing the line of staples in the same direction along the raceway. As the follower C advances toward
50 the driver the spring c^{16} will gradually unwind and its power be decreased, and as the follower is moved back along the raceway the rotation of the pinion will be against the tension of the spring, thus winding up the
55 spring and increasing its tension.

It will be understood, of course, that in assembling the parts the tension of the spring will be so adjusted that it will always have sufficient power to advance the line of staples
60 along the raceway.

In order to protect the spring from damage, a suitable cylindrical casing c^{18} may be fixed to the end of the shaft e by means of a screw c^{19} , which passes through a washer c^{20} , placed
65 against the outer side of the end of the casing, thence through the end of the casing into a screw-threaded aperture in the end of the

shaft e , by which means the casing is held fixedly to the shaft e and prevented from turning thereon. The casing at one side of
70 the inner end is cut away, as at c^{21} , forming an opening through which the end of the spring which is secured to its stud c^{17} passes.

D represents a detent which has a sliding movement toward and from the end of the
75 raceway B in a bearing d in the nozzle a' , said detent being normally held in contact with the end of the raceway B by means of a spring d' , which is secured to the outer side of the nozzle a' by means of a screw d^2 and
80 which bears against the outer end of the detent. The detent D is of a width to fit within the legs of a staple and at its forward end has a notch d^3 to receive the crown of the lowermost staple in the line of staples and
85 hold said staple depending in the driver-passage a^2 in position to be released and driven by the descending driver-bar a^3 . The detent D is withdrawn from the driver-passage a^2 to release the staple by the end of
90 the descending driver-bar coming in contact with a beveled surface d^4 , formed upon the inner side of the detent D above the notch d^3 , whereby as the driver-bar strikes such beveled surface d^4 the detent D will be forced
95 back against the tension of spring d' to release the staple to permit the driver-bar to force it out of the driver-passage into the work, the driver as it descends closing the
100 end of the raceway and preventing the staples from entering the driver-passage, and as it rises the detent D will be forced forward by its spring d' , thus receiving the lowermost staple and setting the machine for
105 another operation.

By making the guard-plate b^3 shorter than the raceway B the upper end of the bar b' is exposed, so that the staples from a tack-loading mechanism may be readily and quickly
110 fed upon the bar b' . At the upper end of the guide b^7 is fixed a pin b^{8*} , which acts as a stop to prevent the follower C from being withdrawn from the raceway B.

It is to be noted that in the present invention the follower is advanced toward the
115 driver by a self-contained propelling mechanism which coöperates with a friction-surface upon the raceway and that all elastic bands and springs extending from the driver to the follower are done away with. It is to
120 be further noted that it is unnecessary to remove the follower in order to refill the raceway with staples, and while I have shown and described the present invention as applied to a staple-driving machine I in no
125 sense consider the same as limited thereto, as with slight modification it can be applied to a tack-driving machine.

The operation of the invention having been sufficiently described in connection with the
130 foregoing description of its construction, further description is deemed unnecessary.

Having fully described the construction and mode of operation of my invention, I

claim as new and desire to protect by Letters Patent of the United States—

1. In a hand nailing implement, the combination with a tacker and raceway, of a follower arranged to advance the tacks along the raceway, said follower carrying a propelling mechanism arranged to advance the follower along the raceway toward the tacker, substantially as described.

2. In a hand nailing implement, the combination with a tacker and raceway, of a guard overhanging the upper edge of said raceway, a follower arranged to advance along the raceway, said follower carrying a pusher-arm arranged to travel along in contact with the under surface of the overhanging guard, substantially as described.

3. In a hand nailing implement, the combination with a tacker and raceway, of a follower arranged to travel along said raceway, and a spring-controlled friction-wheel engaging a friction-surface upon the raceway to advance the follower along said raceway, substantially as described.

4. In a hand nailing implement, the combination with a tacker and raceway, of a follower arranged to travel along said raceway, a pinion on said follower engaging a rack on the raceway and means to revolve said pinion to advance the follower along the raceway, substantially as described.

5. In a hand nailing implement, the combination with a tacker and raceway, of a follower arranged to travel along said raceway, a pinion on said follower engaging a rack on the raceway, and a spring arranged to revolve said pinion to cause it to advance the follower along the raceway, substantially as described.

6. In a hand nailing implement, the combination with a tacker and raceway, of a follower permanently connected with and arranged to travel along said raceway, said follower comprising a pusher-arm which is normally held in position to engage the line of

tacks on the raceway and means to permit said pusher-arm to be displaced from its normal position to permit the raceway to be filled with tacks, substantially as described.

7. In a hand nailing implement, the combination with a tacker and raceway, of a follower arranged to travel along said raceway, said follower comprising a pusher-arm, which is normally held in contact with the side of the raceway and means to permit said pusher-arm to be moved out of contact with the side of the raceway, substantially as described.

8. In a hand nailing implement, the combination with a tacker and raceway, of a follower arranged to travel along said raceway, said follower comprising a pusher-arm which is movable toward and from the side of the raceway, substantially as described.

9. In a hand nailing implement, the combination with a tacker and raceway, of a follower arranged to travel along said raceway and a pivoted spring-pressed pusher-arm carried by said follower, substantially as described.

10. In a hand nailing implement, the combination with a tacker and raceway, of an overhanging guard extending along the upper edge of said raceway, a follower arranged to move along said raceway and a spring-sustained pusher-arm arranged to engage the under side of said overhanging guard, substantially as described.

11. In a hand nailing implement, the combination with a tacker and raceway, of a follower arranged to move along said raceway and spring-actuated mechanism carried by said follower arranged to advance the follower along the raceway, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD F. GRANDY.

Witnesses:

T. HART ANDERSON,
C. KITCHING.