(No Model.) 2 Sheets—Sheet 1.

F. CHASE.

NAIL PRESENTING AND DRIVING MECHANISM.

No. 547,662. Patented Oct. 8, 1895.

Fig. 4.

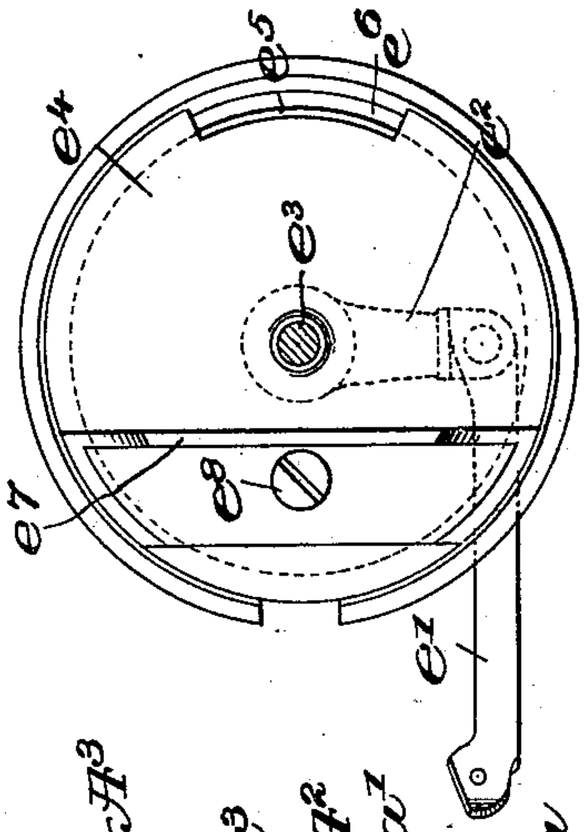


Fig. 2.

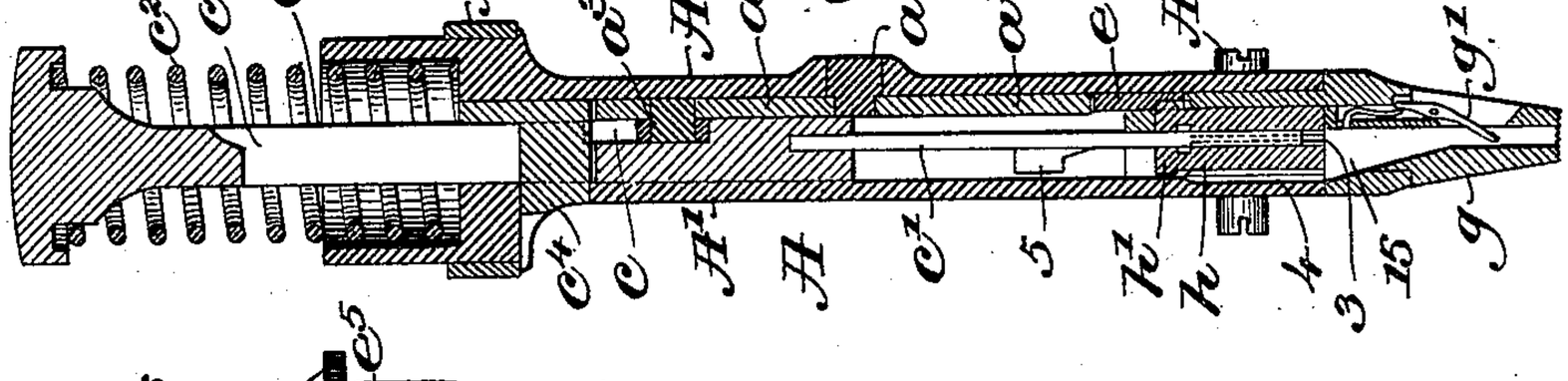


Fig. 3.

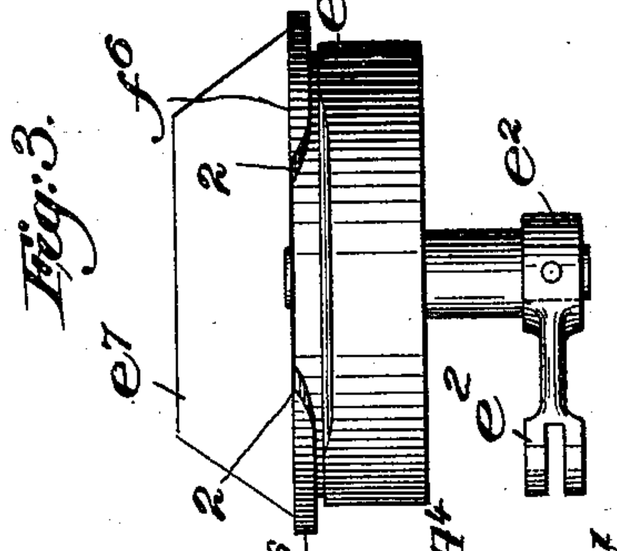
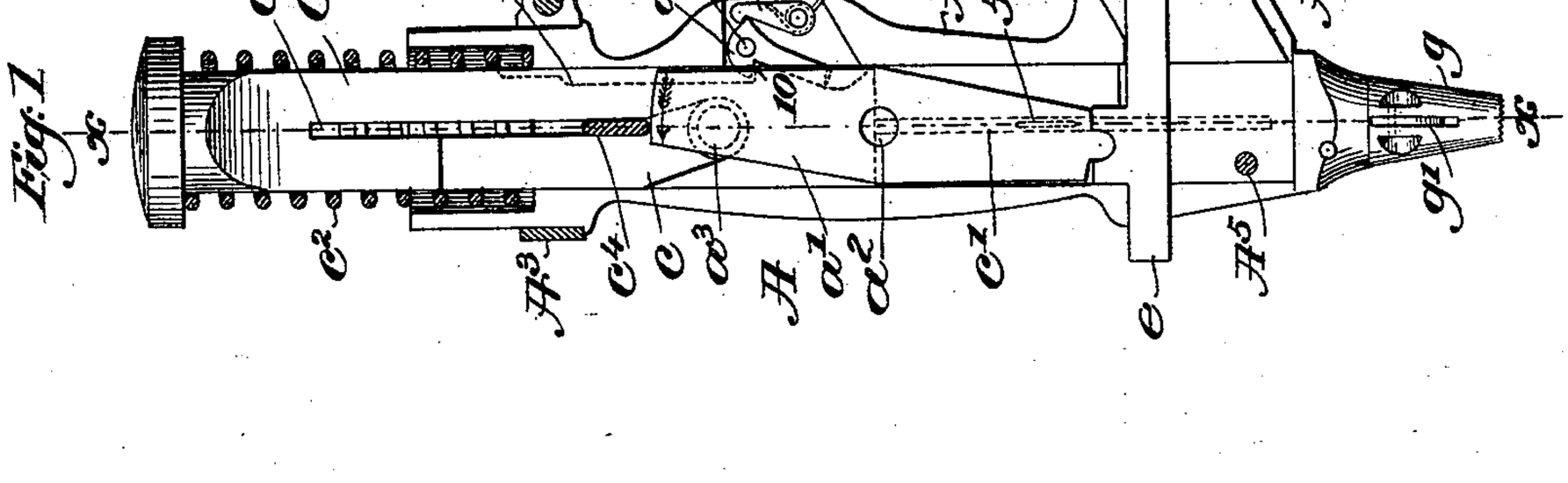


Fig. 1.



Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

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NAIL PRESENTING AND DRIVING MECHANISM.

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Fig. 5.

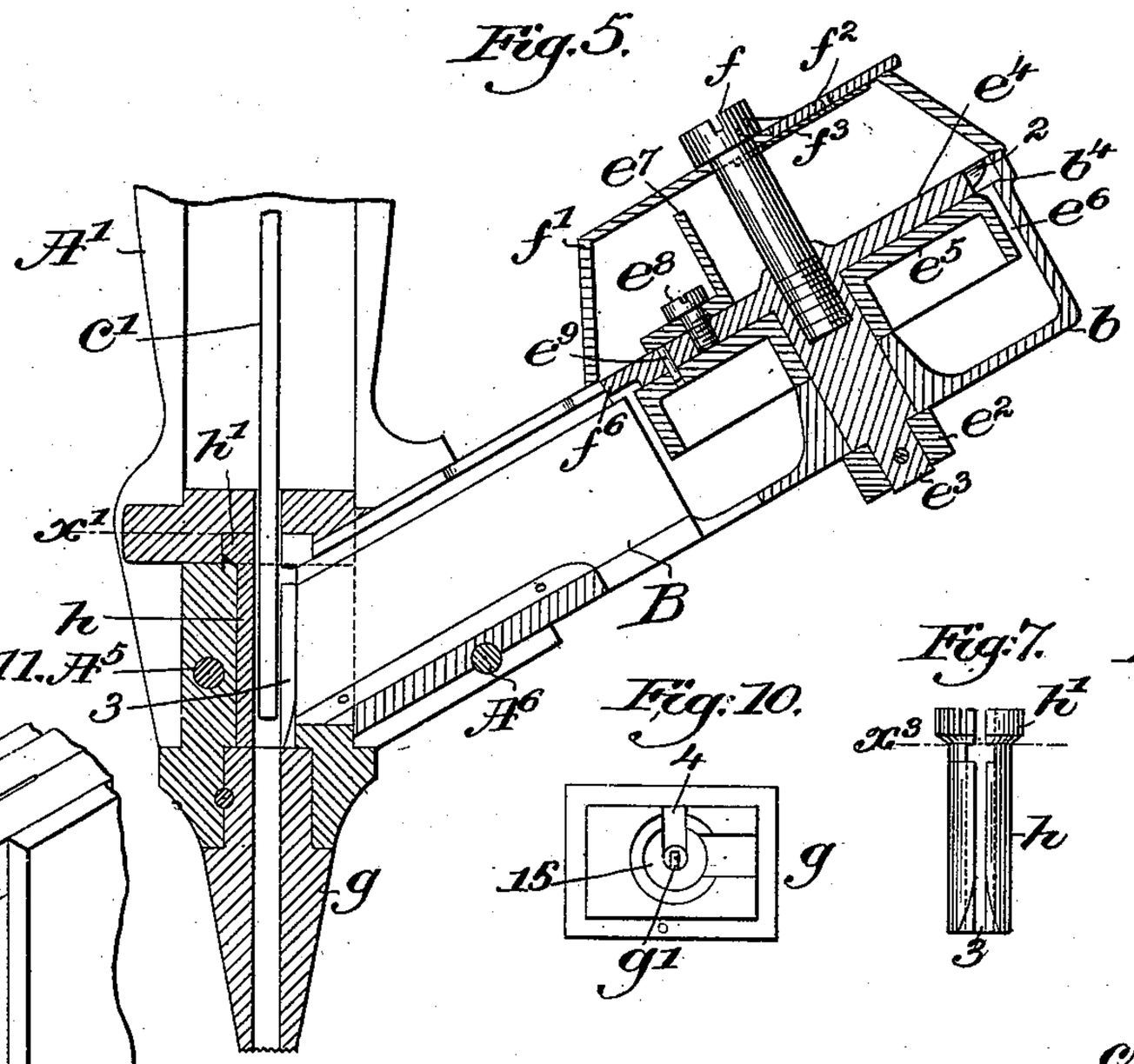


Fig. 11.

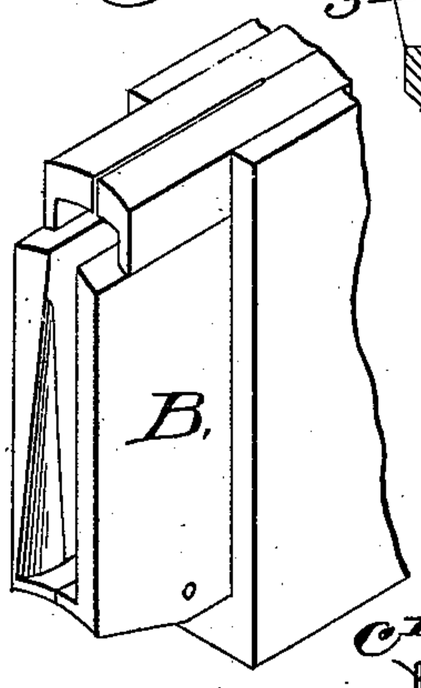


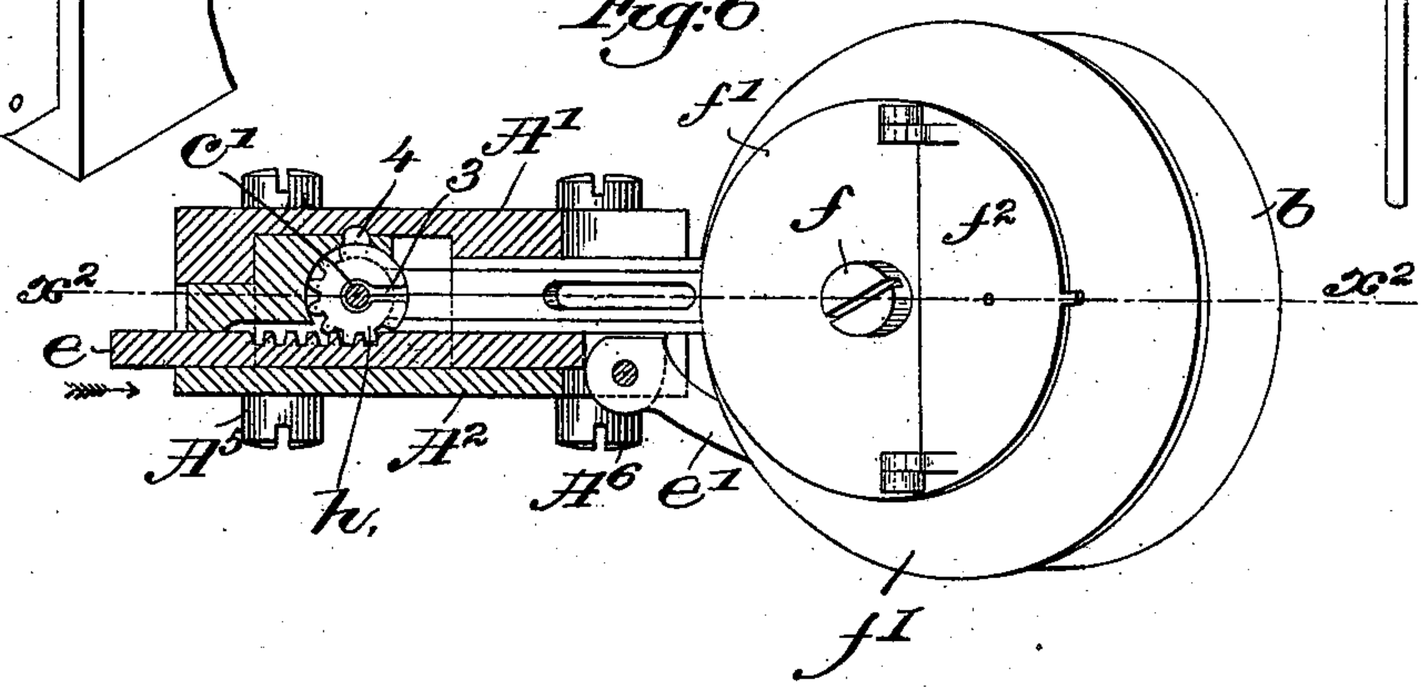
Fig. 10.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 6



Witnesses.
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Inventor:
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UNITED STATES PATENT OFFICE.

FRANK CHASE, OF MALDEN, MASSACHUSETTS, ASSIGNOR TO FRANK F. STANLEY, TRUSTEE.

NAIL PRESENTING AND DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 547,662, dated October 8, 1895.

Application filed May 29, 1894. Serial No. 512,899. (No model.)

To all whom it may concern:

Be it known that I, FRANK CHASE, of Malden, county of Middlesex, State of Massachusetts, have invented an Improvement in Nail Presenting and Driving Mechanism, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object the production of a novel tool for receiving nails in bulk and feeding them into a revoluble carrier, from which they pass into a nose, said revoluble carrier also forming a guide for the driver, said carrier taking one nail after another and discharging it through an auxiliary nail-passage into the nose at a point under the said carrier, so that it may be struck by the driver and driven into the work when the nose of the driver is pressed to the work to receive the nail.

In accordance with my invention the upper end of the raceway is provided with bearings for the reception of a shaft having a connected feed-table which is covered by a cup-shaped cap, said feed-table being located within the curb connected to the upper end of the raceway, the edges of the cap resting, preferably, close to or on the top of the curb, the diameter of the feed-table being enough smaller than the interior diameter of the curb as to leave a narrow substantially circular slot, into which the shanks of the nails to be driven may drop and hang therein from their heads and travel in said slot as the table is reciprocated, the nails finally entering the open upper end of the raceway and passing therefrom into a vertical slot made in one side of a revoluble carrier, through the center of which the driver reciprocates, the slot in said carrier being in line with the lower end of the raceway when the driver is in its elevated position, and in this instance of my invention, wherein the slot is cut to intersect the driver-passage, the nail as it leaves the raceway comes against the side of the driver; but as the driver descends it through suitable actuating mechanism actuates the carrier and effects a partial rotation thereof, so as to place its open slot containing the nail in line with an auxiliary nail-passage into which the nail is dropped, said auxiliary passage leading the nail into a space in the nose located below the said carrier, where the nail is stopped by one side of the driver then acting upon and driving a nail, and later when the driver is elevated it retires from the said nail, letting it drop a little farther to meet an arresting device which yields to the pressure of the nail when acted upon by the driver at its next descent.

Figure 1 in side elevation represents a sufficient portion of a nail presenting and driving mechanism with one of its side plates removed with my improvements added to enable my invention to be understood. Fig. 2 is a section thereof in the line x, the hopper or nail-supply being removed; Fig. 3, an enlarged elevation of the upper end of the raceway with the cap referred to. Fig. 4 is a top or plan view of the feed-table, together with part of the mechanism for actuating it, together with its surrounding curb b. Fig. 5 is an enlarged sectional detail through the feeding-table and cap, raceway, and part of the frame to be grasped by the hand. Fig. 6 is a partial top view and section of the devices shown in Fig. 5 below the line x', the section in Fig. 5 being along the line x^2, Fig. 6. Fig. 7 is a detail showing the revoluble carrier; Fig. 8, a section thereof in the line x^3; Fig. 9, a detail showing part of the driver with its wing, which insures the discharge of the nail from the carrier into the auxiliary nail-passage and thence into the nose. Fig. 10 is a top view of the nose removed from the frame and with the carrier taken out and the raceway omitted. Fig. 11 is an enlarged perspective view of the lower end of the raceway.

Referring to the drawings, A represents the main part of the hand-frame of my improved hand-nailer, the said frame having a removable side piece A^2, confined in position by means of a ring A^3, clamped about the two parts by a suitable screw A^4, the lower ends of the frame being connected by a screw A^5, another screw A^6 serving to unite the raceway B to a projection A^7 of the part A'. The removable plate A^2 has a fulcrum a, extended inwardly to receive upon it a lever a', having a hole a^2 (see Fig. 1) to fit said fulcrum, the upper end of said lever having a roller or other stud a^3, which plays in a cam-groove c,

made in a driver-bar C, having attached to its lower end a driver c', said driver-bar being surrounded between its head and the upper end of the handpiece with a spiral or other spring c^2 to normally lift the driver-bar, so that the lower end of a slot c^3 therein will contact with an up-stop or cross-bar c^4, fixed to the removable side piece A^2.

The edge of the driver-bar is notched, as best represented in Fig. 1, and is made cam shape to operate and be engaged by a dog d, pivoted at d' and acted upon by a suitable spring-controlled latch d^2. The edge of the driver-bar has a shoulder or stop 10, which is engaged by the dog d, as shown in Fig. 1, when the driver-bar is in its most elevated position, and at a proper distance above said shoulder said bar has a dog-releasing cam 12. The lower end of the dog d is normally kept pressed toward the driver-bar, as shown in Fig. 1, by the spring-controlled latch d^2. When the driver descends far enough to properly drive a nail from the nose, the nose forming the end of the frame of the machine, the releasing-cam 12 meets the head of the dog and turns its lower end outwardly, so that the spring-latch bears on the opposite edge of the head of the dog and keeps the lower end of the dog out away from the driver-bar, so that as said driver-bar begins its ascent the lower end of the dog will not meet the shoulder 10, but as soon as the said shoulder meets the head of the dog it will act to restore the dog into its normal position. (Shown in Fig. 1.) Should, however, the driver-bar fail to complete a stroke or move far enough to properly drive a nail, such movement being insufficient by reason of carelessness or otherwise, then the dog-releasing device 12 will not descend far enough to strike the head of the dog and turn it, as before described, far enough to enable the latch to hold the lower end of the dog out of the path of movement of the shoulder 10 as the driver-bar next rises, and consequently said shoulder 10 meets the said dog and the ascent of the driver-bar is prevented. It will be understood, consequently, that the driver-bar cannot rise to its full extent unless at its previous descent the nail then below the driver-bar has been properly driven.

The lower end of the lever a' is suitably shaped to engage and move a rack e, kept in suitable guideways of the framework by the plate A^2, said rack being jointed at its inner end by a link e' to an arm e^2, connected to a shaft e^3, mounted in a suitable bearing of a curb b, attached to or forming a part of the upper end of the raceway, said curb receiving within it a feed table or plate composed, essentially, of a disk e^4, attached to or forming part of the said shaft and having applied to it at its under side a disk e^5, the periphery of which forms the inner side of the slot e^6, into which may drop the shanks of the nails to be driven, they following the groove or circular passage formed between the said disk e^5 and the inner wall of the curb to the slotted upper end of the raceway B, where the said nails leave the said slot e^6 and enter the groove in the raceway.

The disk e^4 has fast upon it an agitator e^7, the latter being held in place by a screw e^8, a suitable pin or projection e^9 connecting the said disk e^4 with the said disk e^5, and thereby forming the feed-table.

The shaft e^3 receives in it a suitable screw f, which is passed through the cap f', made like a cup, the edges of which, as herein represented, rest upon the upper end of the curb b, the said cap having a suitable door f^2, which may be opened outwardly and which is normally kept closed by a suitable spring f^3.

The lever a' is fully reciprocated once for each full operation of the driver-bar in the case A, said driver-bar being moved by striking its upper end by the hand or in other suitable manner. As the driver-bar is thrown down, the cam portion thereof (see Fig. 1) will push the upper end of the lever a' in the direction of the arrow, Fig. 1, which will effect the sliding of the rack e and the movement of the feed-table.

At each movement of the feed-table, which is at times quite frequent—as, for instance, when a number of nails are to be driven in quick succession—the agitator e^7, by striking the nails placed in bulk on the feed-table and covered by the cap, throws said nails against the inner side of the cap, so that some of them drop into the slot e^6, which is really the commencement of the raceway, and the said table and the said disk e^5 by their movement aid the nails in following the circular slot e^6 to the open top of the raceway. I have shown part of the periphery or edge of the feeding-table as cut away sufficiently to leave a shed or web f^6 to overlap the heads of the nails in the slot e^6, said shed also performing the important function of a protector for the heads of the nails hanging in the slot e^6, said shed lying between the heads of the nails going to the raceway and the bulk of nails lying on the feed-table. To effect the proper introduction of the said nails into the slot e^6 with their heads under the shed and so that the heads will rest properly on a shoulder b^4 of the curb and a corresponding shoulder on the disk e^5, I have cut away the said shed or web for a part of its periphery (see Figs. 3 and 4) to leave inclined ends 2 2 with an open slot between, said ends acting on the heads of the nails during the reciprocations of the table and settling the bodies of some of said nails properly into the slot e^6.

The handpiece has connected to its lower end a suitable nose g, having an outlet at its bottom for a nail, said nose containing a spring-controlled nail-support or gate g', which normally stands in and partially closes the nose-outlet, said gate serving to sustain the upper end of each nail while the driver descends to meet the head of the nail to drive it out through the nose. The handpiece contains a revoluble carrier h, (shown detached

in Figs. 7 and 8,) said carrier having an enlarged head or upper end h', having a series of teeth to be engaged by the rack e, said carrier also having a slot 3 at one side, which at times stands in the line of the opening in the raceway, so that a nail can enter said opening and come, it may be, in contact with the driver c', then standing therein. As the driver descends to drive a nail sustained by the gate g', the lever a' is moved, moving the rack e in the direction of the arrow near it in Fig. 6, which movement imparts a partial rotation to the carrier, causing it to move the opening 3 therein opposite the auxiliary nail-passage 4 in the handpiece, so that said nail may enter said auxiliary passage; but should the nail fail to enter said passage, then as the driver descends the projection 5 on said driver will come behind the head of and will strike the nail, causing it to be transferred into and so as to follow down said passage into the space 15 in the nose; but said nail does not pass to the gate, for the driver, it then driving a nail from the nose, occupies a position in said nose, so that the nail entering the latter drops against one side of the driver. After the driver has driven a nail and the driver-bar is elevated to lift the driver, the nail, resting against the side of the driver and then in the nose below the carrier immediately drops down to and is arrested by the gate g', and as the driver-bar completes its ascent it acts through the lever a' to move the latter in the direction opposite the arrow thereon and moves the rack e in the direction to again put the slot 3 of the carrier opposite the lower end of the raceway to receive another nail.

Fig. 11 shows the shape of the end of the raceway, it being concaved to substantially fit and form a bearing for one side of the revoluble carrier, one of the walls of the lower end of the raceway being reduced in thickness toward the bottom of the raceway to prevent any clogging of the nails which should enter the slot 3 in the side of the said carrier.

I have found by practice that by cutting away one portion of one side wall of the delivery end of the raceway and rounding the same to present a sort of convex cam-surface, as in Fig. 11, all tendency of the point of the endmost nail of the raceway sticking to the raceway when it should be taken off by the carrier is obviated, and so also the tendency of the point of the next to the endmost nail to sag forward and enter the slot in the carrier h is practically prevented.

From the foregoing description it will be understood that the driver-bar by its position determines whether or not the nail-carrier shall be moved or oscillated back into its position to receive from the raceway a nail, and it will be understood that in case the driver-bar should fail to be moved far enough to properly drive the nail then under the driver the driver-bar will not ascend far enough to effect the backward movement of the carrier, and consequently a nail will not be taken from the raceway unless the nail previously taken therefrom has been properly driven.

When the carrier is in a position to enable its open slot to be put in register with the auxiliary nail-passage, then a part of the carrier acts as a stop to prevent the escape of nails from the raceway.

The feed-table, located within the surrounding curb, and the cap f' constitute a hopper, and the feed-table constitutes a movable bottom for the hopper.

The carrier h performs the function of a driver-guide, and, as shown, the center of motion of said carrier is substantially coincident with the center of the driver, and the driver when it meets a nail to drive the same meets said nail always below the lower end of the carrier and in the nose terminating one end of the framework or handpiece.

This invention is not limited to the exact construction shown for the devices intermediate the driver-bar and driver and the movable feed-table or to the exact devices shown for effecting the movement of said table or of said carrier.

The carrier in this my invention does not act as a pick-off to take a nail from the end of the raceway and carry said nail directly under an elevated driver, so that said nail is driven from said carrier in line with its center of motion, but, on the contrary, the carrier merely travels between the end of the raceway and an auxiliary nail-passage, through which a nail is driven by a device 5, in this instance of my invention shown as attached to and movable in unison with the driver; but this invention is not limited in all instances to connecting said device 5 directly to the driver or operating it directly from the driver.

The feed-table, occupying in use an inclined position and constituting the bottom plate of the hopper to support the nails in bulk, has its shed or flange f^6 partially cut away to leave a space terminated by projections 2 2, which projections as the plate is moved or reciprocated act on the nails in said space between said projections and serve to arrange the nails in the slot e^6, leading to the upper end of the raceway, the heads of the nails passing along said slot to the raceway under said shed or flange. By the expression "nail" I intend to cover and include any headed nail or tack.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for driving nails, the following instrumentalities, viz:—a raceway; a nose, a nail passage leading thereto, a carrier located at the end of said raceway and having a slot to receive a nail, said carrier being adapted in its movements to take a nail from the raceway to said nail-passage, combined with a driver-bar having a driver, and a device to act on the nail in the carrier and posi-

tively move the nail out of the carrier and into said nail passage below said carrier, substantially as described.

2. In a nail driving machine the following instrumentalities, viz:—a raceway to receive and guide loose nails; a driver-bar having a driver; a carrier located at the end of said raceway, and having a slot to receive a nail from the raceway, a device to act on the nail in the carrier and positively move it out of and below the carrier; and means under the control of the driver to prevent a nail being taken from the end of the raceway until after the nail previously taken from said raceway has been driven, substantially as described.

3. In a nail driving mechanism, the following instrumentalities, viz:—a frame piece having a nose and an auxiliary nail-passage; a raceway having a curb, a movable feed-table therein constituting the bottom of a hopper adapted to contain loose nails; a revoluble carrier having a central passage to act as a driver guide, and having at one side a slot to receive a nail from the raceway; a driver-bar; devices to actuate the carrier and take a nail from the raceway to the said auxiliary nail-passage, and means to positively move the nail through the carrier and into said nail-passage, substantially as described.

4. In a nail driving mechanism, a raceway having at its receiving end a curb in the plane of the raceway combined with a concentric circularly movable feed-table the periphery of which constitutes one side of a curved passage-way to receive the bodies of and lead nails to the upper end of the slot in the said raceway, the curb constituting the other side of the passage-way, substantially as described.

5. The raceway, and its curb, provided with an interior shoulder upon which may rest the heads of nails the bodies thereof depending below the shoulder; combined with a feed-table, and a shed or web thereon to overlap the heads of nails properly supported on their way to said raceway, said shed or web serving to protect the heads of the nails going to the raceway from the action of loose nails lying on said feed table, substantially as described.

6. A raceway, and a nail-receiving passageway leading to the entrance thereof, a hopper provided with an inclined oscillating bottom, having at its upper edge a recess to permit nails to pass into the nail-receiving passageway, and an agitator below the center of oscillation of and on the hopper bottom, whereby the movement of the agitator throws the nails upward along the inclined hopper bottom and into the recess, substantially as described.

7. The raceway, and a movable carrier cooperating therewith, having a slot to receive a nail from said raceway, combined with a longitudinally movable wedge-like device having a shoulder, said device entering the slot in the carrier behind the nail and pushing the same laterally from the slot, the shoulder thereafter acting upon the head of the nail to force it down away from the carrier, substantially as described.

8. An inclined raceway having an attached curb in the same plane thereof, a movable table surrounded by said curb and constituting the inclined bottom of the hopper, to receive nails in bulk, the periphery of said table also forming one side of a passageway leading to the upper end of the raceway, the curb forming the other fixed side thereof, and an agitator, combined with means to move said feed table and agitator, for the purposes set forth.

9. The raceway having a concave end to form a bearing for one side of the carrier, and having one of its end walls cut away to form an outwardly inclined cam face, combined with a movable slotted carrier mounted at and to move across the end of said raceway, and with means to move said carrier, said concave bearing and cam face preventing the injurious catching of nails, substantially as described.

10. A raceway having an attached curb, a cap co-operating with said curb, combined with a movable feed table provided with a projecting shed or web cut away for a portion of its length to enable the heads of nails to pass below said shed or web as the bodies of said nails lie in the slot communicating with the upper end of the raceway, said shed or web acting as a protector for the heads of nails properly suspended and on their way to the raceway, and to keep said heads from being acted upon by the loose nails placed in bulk upon the top of said feed table, the latter constituting the bottom of a hopper, substantially as described.

11. In a nail presenting and driving mechanism, the following instrumentalities, viz:—a hopper to receive nails in bulk, an inclined movable nail-supporting plate therein having a nail passage communicating with a slot to receive nails to be conducted to a driver, said plate having projections to arrange the nails in said slot, to operate, substantially as described.

12. In a nail presenting mechanism, the following instrumentalities, viz:—a raceway, a connected curb, forming a continuation of the sides of the raceway, a plate therein occupying an inclined position and sustaining the nails in bulk, and a shed or lip at the periphery of the said plate, it acting as a cover for a passageway which leads nails to said raceway, the curb forming the outer side thereof, combined with an agitator to cause the nails to be moved into position to enter said passageway, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK CHASE.

Witnesses:
GEO. W. GREGORY,
EMMA J. BENNETT.