(No Model.) 2 Sheets—Sheet 1.

T. E. SMITH.

NAIL DRIVING MACHINE.

No. 323,081. Patented July 28, 1885.

Fig. 1.

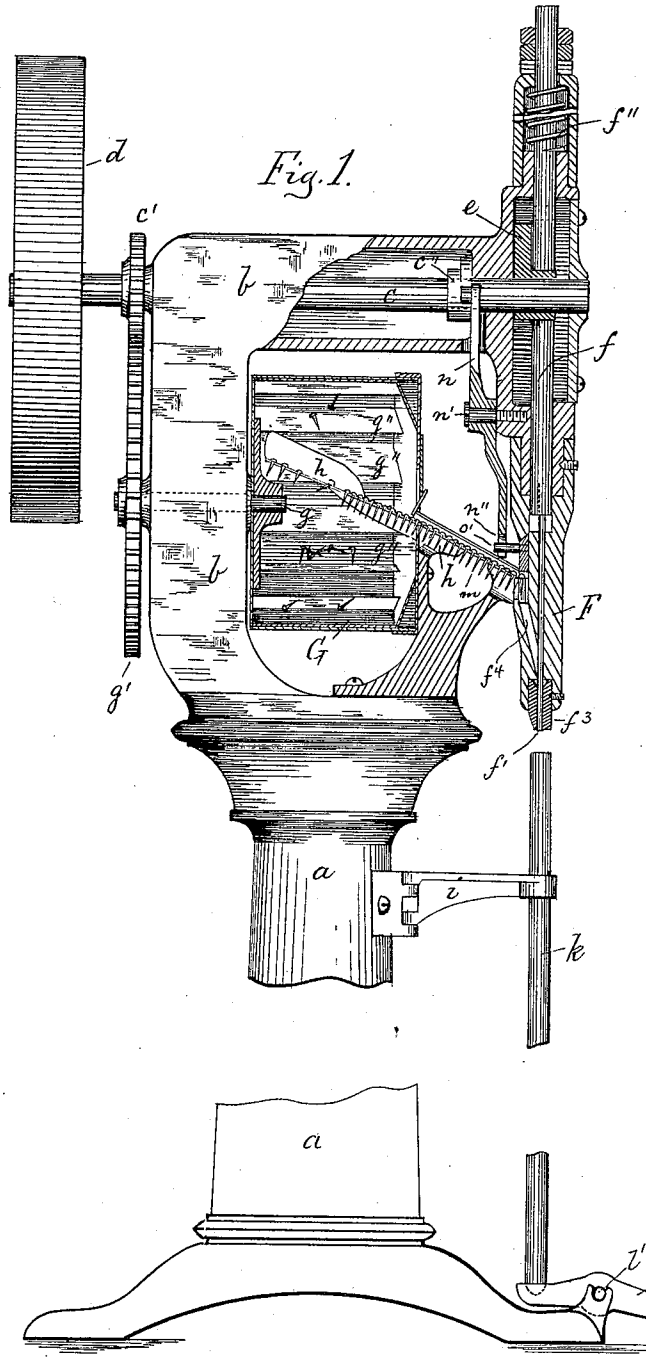


Fig. 2.

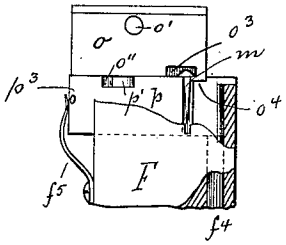


Fig. 3.

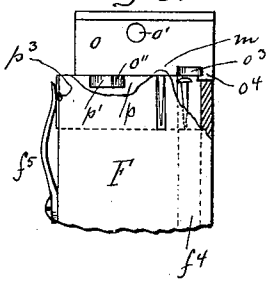
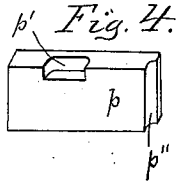


Fig. 4.



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his atty.

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(No Model.) 2 Sheets—Sheet 2.

T. E. SMITH.

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Fig. 5.

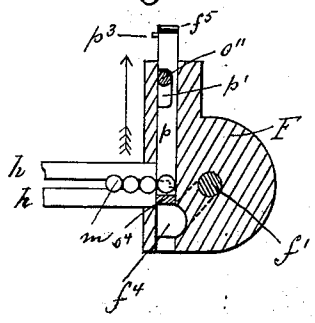


Fig. 6.

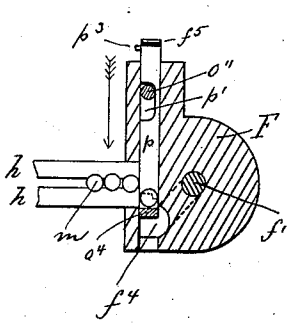


Fig. 7.

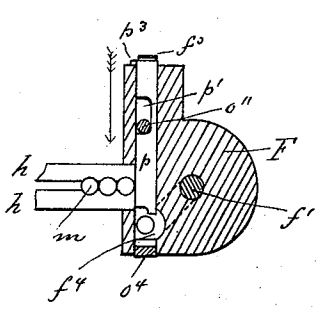


Fig. 8.

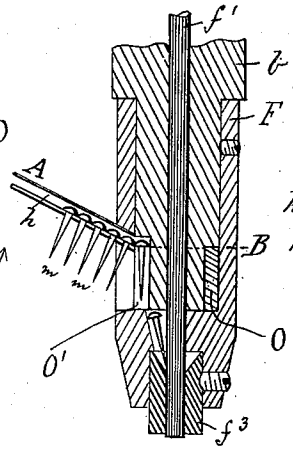


Fig. 10.

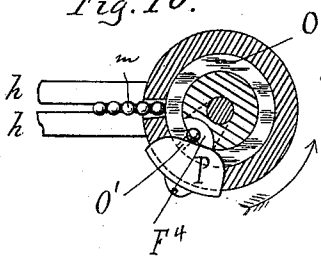
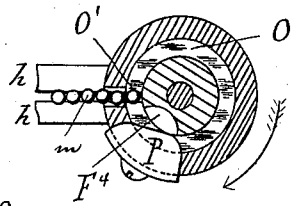


Fig. 9.



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UNITED STATES PATENT OFFICE.

THOMAS E. SMITH, OF LYNN, MASSACHUSETTS.

NAIL-DRIVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 323,081, dated July 28, 1885.

Application filed May 28, 1885. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. SMITH, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Nail-Driving Machines; and I do hereby declare that the same are fully described in the following specification and illustrated in the accompanying drawings.

This invention relates to improvements in nail-driving machines; and it consists of a new and useful device for picking the nails one by one from the raceway in which they are fed from the hopper, and to feed the nails into the driver-tube, as will hereinafter be more fully shown and described, reference being had to the accompanying drawings, where—

Figure 1 represents a sectional side elevation of a nail-driving machine provided with my improved nail picking and feeding device. Fig. 2 represents an enlarged detail rear view of the nail-picking device shown in position for receiving a nail from the raceways. Fig. 3 represents a similar rear view of the nail-picking device shown in position for delivering the nail into the channel leading to the driver-tube. Fig. 4 represents a perspective view of the lower movable part of the nail-picking device. Fig. 5 represents a sectional plan view of the device in position for receiving a nail from the raceways. Fig. 6 represents a similar plan view showing the end of raceways closed and the nail held by the picker on its way to the channel leading to the driver-tube, and Fig. 7 shows a similar plan view with the picker in position for delivering the nail into the said channel leading to the driver-tube. Fig. 8 represents a longitudinal section of the driver-tube with a modified form of the nail-picking device arranged in connection with it. Figs. 9 and 10 represent cross-sections on the line A B shown in Fig. 8, the former, Fig. 9, showing the nail as having entered the groove in the nail-carrier, and the latter, Fig. 10, represents the nail at or near the point of being fed into the channel leading to the driver-tube.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a, in Fig. 1, represents the standard of an ordinary nail-driving machine, to the upper end of which is secured the head *b* in the usual manner.

c is the driving-shaft, located in bearings in the head *b*, and provided with belt-pulley *d*, as shown in said Fig. 1.

To the forward end of shaft *c* is secured the usual cam, *e*, adapted to raise the driver-bar *f* upward against the influence of the spring *f''* once during each revolution of the shaft *c*.

f' is the driver secured to the lower end of the driver-bar *f*, such driver being guided in the hollow driver-tube F, as shown in Fig. 1, the latter being secured to the front of head *b* in the usual manner.

c' is a gear-pinion secured to the driving-shaft *c*, and gearing into the teeth of the spur-wheel *g'*, secured to the spindle *g*, that is located in a horizontal bearing in the head *b*, as shown in Fig. 1.

To the inner end of spindle *g* is secured the cylindrical hopper G, having scoops or wings *g'' g''* on its interior periphery, by means of which the nails within the hopper G are raised and delivered, points downward, between the raceways *h h* during the rotation of said hopper G, in the ordinary way.

f^3 is the nail-die, secured in a suitable manner to the lower end of driver-tube F in the usual way, such nail-die being centrally perforated to permit the nail and the driver *f'* to pass through it.

i is a bracket secured to standard *a*, its outer end serving as a guide and bearing for the vertically-adjustable work-supporting rod or jack *k*, the lower end of which rests in the recessed inner end of treadle-lever *l*, hinged at *l'* to the base of standard *a*, and provided in its outer end with a treadle, *l''*, which, when depressed, causes rod *k* to be moved upward to hold the work to be nailed firmly in position between the under side of nail-die f^3 and upper clinching-surface on rod *k*.

m m represent the headed nails, that are taken up on the wings *g''* during the rotation of the hopper G and delivered in the raceways *h h*.

The picking and nail-feeding device for taking the nails one by one from the outer end of the raceway to deliver them into the perforated nail-die is carried out as follows: On the rotary driving-shaft *c* is secured a cam or eccentric, *c''*, Fig. 1, that actuates the rock-le-

ver n in one direction, a spring (not shown in the drawings) is to return the rock-lever n to its original position after the cam or eccentric c'' ceases to act on it in the usual manner of conveying a reciprocating motion from a rotary shaft; or the cam c'' may be grooved on its face, and a pin and roll on the upper end of lever n arranged to project in such cam-groove, as is well-known in sewing and nail-driving machines. The rock-lever n is supported on the stationary fulcrum-pin n', secured to the head b, as shown in Fig. 1, and the lower end, n'', of said lever is forked to receive the pin o', secured to the block o, which is by these means set in a reciprocatory motion in a guide or recess on the rear side of the driver-tube F, as shown in Fig. 1. Below the block o, and in contact with its under side, is located the laterally-movable nail-carrying block p, (shown in Figs. 2, 3, and 4,) that is also guided in a suitable recess or bearing in the rear portion of driver-tube F. To the under side of upper block, o, is secured a pin, o'', that projects into an elongated slot, p', on the upper side of lower block, p, as shown in Figs. 2, 3, 4, 5, 6, and 7. The lower block, p, has in its right end, Fig. 4, a cut-away portion, p'', adapted to receive the shank of a nail when said block p is moved back by the lever n to the position shown in Figs. 2 and 5, when such nail-receiving space p'' on block p is opposite to the end of raceways $h\,h$, as shown in Fig. 5. There is on the under side of upper block, o, a recess, o^3, adapted to receive the head of the nail dropped into the receptacle or cut-away portion p'' in block p. The head of the nail, while being carried by the blocks o and p, rests on the upper edge of lower block, p, on one side, and on a projecting lip, o^4, on the under side of upper block, o, on the other side, as shown in Fig. 2.

f^4 is a side channel in the wall of nail-driver tube F, which channel has its upper end located on one side of the place where the lower ends of raceways $h\,h$ enter the rear side of driver-tube F, as shown in Figs. 2, 3, 5, 6, and 7, and its lower end communicates with the central perforation in the driver-tube F and its nail-die f^3, as shown in Fig. 1.

To the left side of driver-tube F (shown in Figs. 2 and 3) is secured a spring, f^5, the upper end of which lies in contact with and presses on the left end of the lower block, p, so as to cause the latter to move with the upper block, o, toward the right until the block p is brought to a stop by its stop-projection p^3 striking against the left side of driver-tube F, as shown in Figs. 3 and 7.

The operation is as follows: We will suppose that the lever n has moved the block o to its extreme left position, (shown in Figs. 2 and 5,) and during such motion to the extreme left the pin o'' on block o has touched the extreme left end of slot p' in block p and carried the latter against the influence of spring f^5 to a corresponding extreme left position. (Shown in said Figs. 2 and 5.) In this position of blocks o and p the head-receiving recess o^3 on block o, and shank-receiving groove p'' on block p, are held opposite to the slit in the raceways $h\,h$, thus permitting the advance nail to drop into recess p'' with the under side of its head resting on top of block p, as well as on lip o^4 on block o, as shown in Figs. 2 and 5. If, now, the block o is carried by means of lever n toward the right, the lower block, p, will be carried with it by the influence of spring f^5 and projection o'' bearing against left end of slot p' in block p, and during such motion to the right, or in the direction shown by arrow 8c in Fig. 6, the block p will close the opening from the raceways $h\,h$, thus preventing other nails from dropping out from end of said raceways. The motion of block p continues until the projection p^3 is brought against the side of driver-tube F, as shown in Figs. 3 and 7, when the nail is brought opposite to channel f^4, and the block o continues alone the motion to its extreme right, (shown in Fig. 3,) thereby causing the nail-head resting on upper edge of block p to be pushed off by the left end of recess o^3 in block o, when the nail is free to drop down through channel f^4, so as to lie against the side of driver f', and when the latter rises the nail drops into nail-die f^3, with its point resting on the work held between bottom of nail-die f^3 and top of rod k. The driver now descends and drives the nail through the work and clinches its point against the top of rod k. The block o is then carried back to its original position (shown in Figs. 2 and 5) by the action of lever n, and in so doing the pin o'' on block o, when brought in contact with end of slot p' on block p, causes the said lower block, p, to move with block o against the influence of spring f^5 to the position shown in Figs. 2 and 5, and its groove p'' is then in a position ready to receive another nail from the raceways, and so on.

The modification of my invention is shown in Figs. 8, 9, and 10; and in said modification O is the nail-carrier, by means of which a nail is taken and delivered to the perforated nail-die, such nail-carrier, instead of being a flat block, is made in the shape of an annular ring, as shown in Figs. 8, 9, and 10, located within the driver-tube F, and provided on one side with a slit or recess, O', in which a nail from the raceways is allowed to pass, as shown in Figs. 8 and 9, after which the ring O is turned a part of a revolution around its axis, and in so doing the head of the nail carried in the recessed ring O' comes in contact with a stationary incline, P, causing the nail to be pushed toward the center of the driver-tube and into the channel F^4, when it is free to drop down against the side of the driver f', as shown in Fig. 8, and when the latter ascends the nail drops into the perforated nail-die f^3, and is driven by the driver during its descent, as heretofore described. After the slit or recess O' in ring O has passed by the end of raceways $h\,h$ its solid part prevents any further nails to leave the raceways, as shown in Fig.

10, until the ring O is swung back in the direction of arrow shown in Fig. 9 to the position shown in said Fig. 9, when another nail is permitted to enter recess O′, and so on. The ring O may be swung to the right and left by any suitable connecting mechanism from the driving-shaft, such mechanism being, however, not shown.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent, and claim—

1. In a nail-driving machine, the raceways *h h*, having their lower ends entering the driver-tube F, the reciprocatory block *o*, with its recess o^3, for receiving the head of the nail, and block *p*, actuated by block *o* and spring f^5, and having groove *p″*, for receiving the shank of the nail for the purpose of carrying individual nails from raceways *h h*, and to deliver them one by one into channel f^4, leading to nail-die f^3, in a manner as set forth.

2. The reciprocatory block *o*, having pin or projection *o″* and recess o^3, with lip o^4, in combination with lower block, *p*, having slot *p′*, for receiving pin *o″*, recess *p″*, for receiving the shank of the nail, stop p^3 to limit its motion toward the delivery-channel f^4, and spring f^5, as and for the purpose set forth.

3. In a nail-driving machine, the rotary hopper G, having wings or scoops *g″ g″* and raceways *h h*, leading from it to the driver-tube F, in combination with the reciprocatory nail receiving and carrying blocks *o* and *p*, having the respective recess o^3, lip o^4, and recess or groove *p″*, as and for the purpose set forth.

4. In a nail-driving machine, the nail picking and delivery mechanism, as described, consisting of a pair of reciprocatory blocks, constructed substantially as shown—viz., a lower one for receiving and carrying the nail from the raceway to the delivery-channel and an upper block for ejecting the nail from the lower block into the driver-tube, as set forth.

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

THOMAS E. SMITH.

Witnesses:

ALBAN ANDRÉN,

BERTHA F. HAWES.