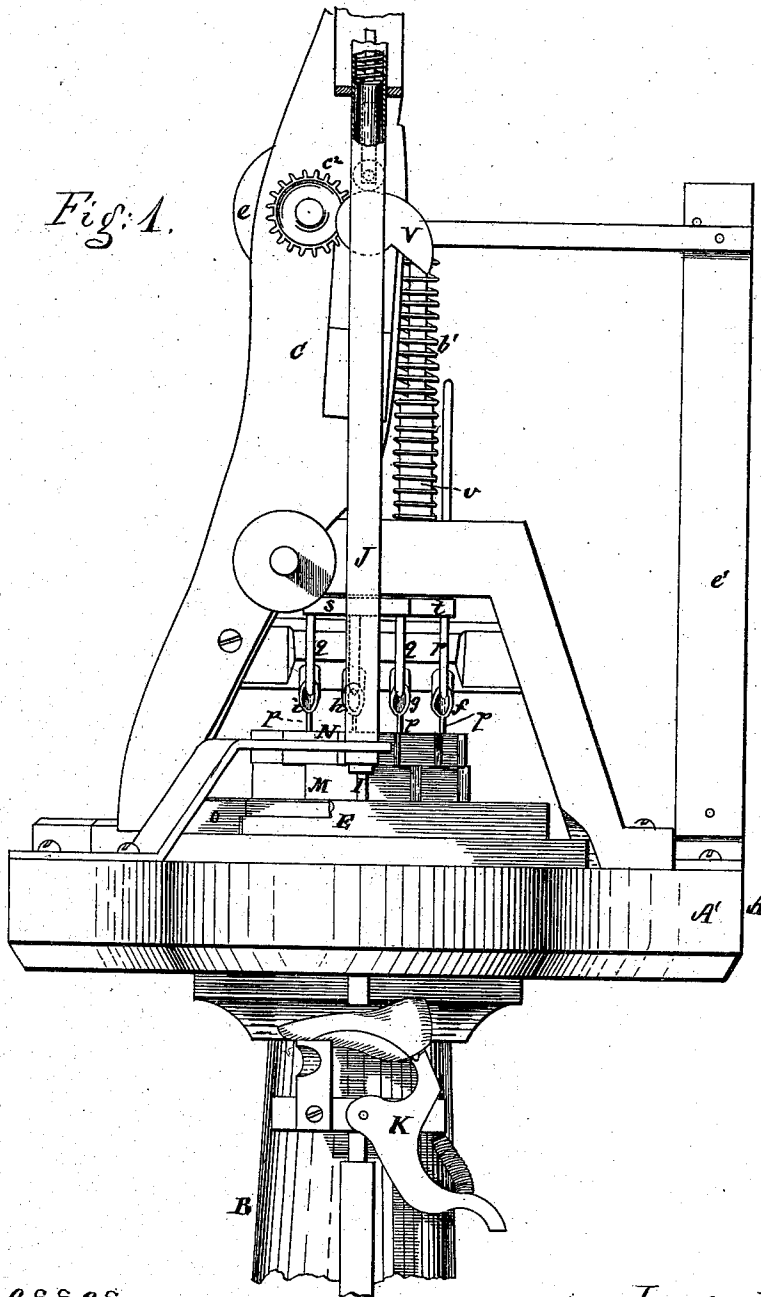


W. S. WATSON.
Nail-Driving Machines.

No. 158,763.

Patented Jan. 12, 1875.

Fig. 1.



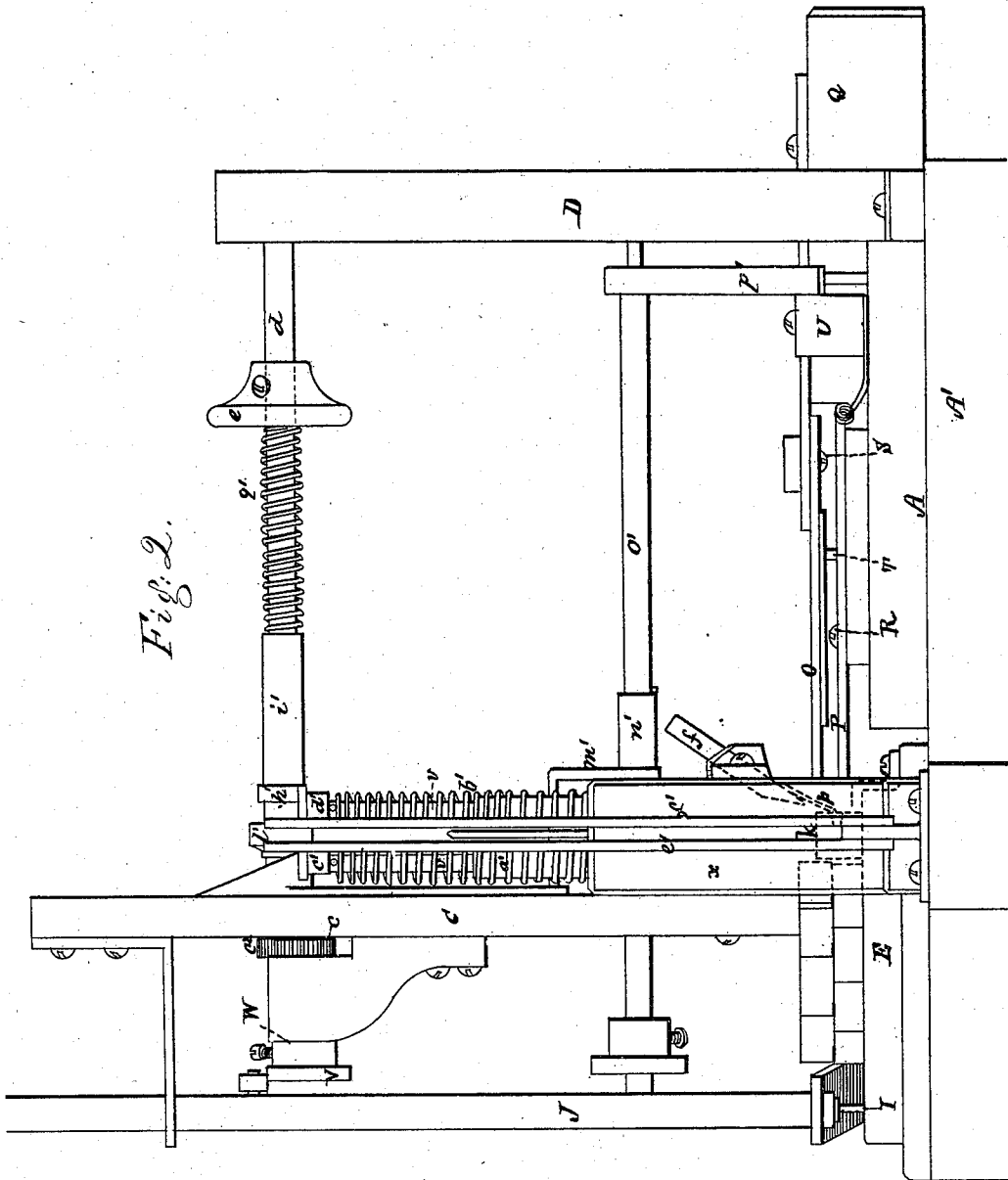
Witnesses.
Elliott Dick
Emma Masson

Inventor.
Walter S. Watson.
by F. Curtis. Atty.

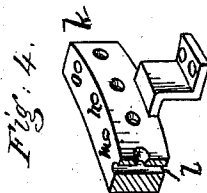
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UNITED STATES PATENT OFFICE.

WALTER S. WATSON, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN NAIL-DRIVING MACHINES.

Specification forming part of Letters Patent No. 158,763, dated January 12, 1875; application filed January 7, 1875.

To all whom it may concern:

Be it known that I, WALTER S. WATSON, of Boston, Suffolk county, Massachusetts, have invented certain new and useful Improvements in Nail-Driving Machines, of which the following is a specification:

This invention relates to improvements in machines for presenting and driving nails in the soles of boots and shoes, such machines to be used in connection with a proper separating-machine, which separates and delivers loose nails; my improvements relating to mechanism for using loose nails, as distinguished from those which employ a strip or comb, from which the nails are severed as they are driven.

My present improvements relate to means for enabling two sizes of cut or loose nails to be driven in the same machine, and to enable either size to be driven as occasion requires, or the machine to be adapted instantly to one or the other size.

Details by which I carry out my object, and which constitute part of the invention, will be duly explained.

The drawings accompanying this specification represent, in Figure 1, a front elevation, in Fig. 2 a side elevation, and in Fig. 3 a plan, of a machine embodying my improvements.

These drawings represent at A the frame of the machine, as composed in the main of a horizontal table or base-plate, A', mounted upon a pedestal, B, and provided with upright standards C D. Within the upper face of the plate A' I create a well, E, to receive a circular disk or wheel, F, which is capable of rotating within such well, and in the periphery of this disk I create a series of upright grooves or pockets, G G, &c., in number and disposition as hereinafter stated, these pockets being of such size and length as to easily receive each a nail, such as is employed in attaching the soles of boots and shoes. H represents a hole or passage bored through the front part of the table A', which constitutes, at certain times, a prolongation of such one of the pockets G as may pass over and coincide with it; and over this said passage, and in axial alignment with it, I dispose a driver-bar, I, which is a long vertical rod play-

ing loosely within a tubular guide or sheath, J, placed over the wheels F, and supported by the table A' and the standard C, the driver-bar serving to drive from such one of the pockets as may be coincident with it the nail contained therein, and force such nail downward into the sole of a shoe placed below such table.

I have represented at K a jack for receiving and supporting a boot or shoe while a nail is being driven into its sole, this jack being of any suitable construction, and requiring no especial description, since in itself it constitutes no part of my present invention.

As every other pocket G, say those marked 2 2, &c., is to contain a short nail, and the intermediate pockets 1 1, &c., long nails, it becomes necessary to provide mechanism for feeding the wheel F along intermediately in a circular path, and also to be able to bring one or the other of these sets of pockets into action, according to whether the long or short nails are to be driven. To accomplish this object I affix to the upper part of the disk F two ratchet wheels, M N, one over the other, the teeth of which are like size and number, while in order to operate these wheels and the disk I employ two push pawls or dogs, O P, which are disposed upon the top of a horizontal slide or carriage, Q, disposed upon the top of the table A', and driven in reciprocating rectilinear movements by a crank or other suitable motor. The upper dog, O, is on a plane with the upper ratchet-wheel, N, and so as to engage its teeth, and the lower dog, P, placed in a like relation to the lower ratchet-wheel, M, the last-named dog being fulcrumed at about its middle to the carriage, as shown at R, while the upper dog, O, is pivoted at its rear end to such carriage, as shown at S, and is also pivoted to the lower dog, P, at a point somewhat in advance of the pivot S, by a pivot, T. A yoke or two-armed lever, U, is fulcrumed at its center to the carriage Q, somewhat in rear of the pivot S, and its two arms *a b* are connected with opposite sides of the rear end of the lower dog, P, in such manner that when the lever U is turned to one side, obliquely of the plane of the carriage Q, the upper dog is thrown into engagement with the upper ratchet, and the lower dog is removed from contact

with the lower ratchet, and vice versa when the inclination or position of the lever is reversed. The carriage Q is to have imparted to it, by any suitable means, reciprocating alternations in a right line, these movements being timed to the length of the teeth of the ratchet-wheels, in order, with each reciprocation, to rotate the latter to the extent of one tooth of such wheels. The driver I is lowered by the stress of a coiled spring, which encircles it, and is contained within the tube or sheath J; and such driver is elevated by a wiper-cam, V, which is affixed to the outer end of a short horizontal shaft, W, supported by a box or bracket, X, affixed to the standard C, said cam wiping against a stud, Y, projecting laterally from the rear side of the driver. The shaft W is rotated by means of a gear, c , affixed to its rear end, which engages a second gear, c^2 , of double diameter or number of teeth, affixed to the outer end of a long horizontal shaft, d , which is supported in the upper part of the standards C D, and is provided with a pulley, e , for rotating it. f, g, h , and i represent a series of upright tubes or chutes to guide the nails in their descent into the pockets G, and these tubes are to be connected with any suitable nail-distributing mechanism, by which they are to be supplied with nails. Two alternate tubes—say f and g —are to contain long nails, and the other two short nails; and my purpose in employing two pairs of tubes is to insure at all times a sufficient supply of nails to the pockets G, which one distributing-machine to a pair may not accomplish. My object, also, in multiplying the gear c by the gear c^2 is to drive the driver-bar rapidly and enable the machine to accomplish a large amount of work. Immediately in rear of the ratchet-wheels M N, I erect upon the table A' a preliminary receiver composed of a block, k , (shown in dotted lines in Fig. 2 and detached in Fig. 4,) in which are created four vertical holes, $l m n o$, which coincide with the tubes $f g h i$ before named, the holes serving to receive the nails as they are precipitated from the distributing-machine, and prior to their entrance into the pockets G. In order to retain these nails in said pockets until they are driven thence by means hereinafter stated, I apply to the lower part of each tube a spring, p , which enters each hole, l, m, n , or o , by an aperture in the rear face of block k , as seen in Fig. 4, and presses against the nail therein, while, in order to drive from each hole the nail that may be in it, I employ two pairs of upright plungers, $q q$ and $r r$, which are disposed immediately over such holes and depend from carriers or blocks $s t$, each of which, in turn, is supported by and attached to the lower end of an upright bar, u or v , which is capable of sliding vertically within a bearing or standard, x , making part of the standard C of the machine-frame, each carrier s or t and its pair of plungers being elevated by a coiled spring, a' or b' , and lowered by a beam, c' or d' , the inner of which rests upon

the top of each bar, u or v , and whose outer end is pivoted to a post, e' or f' , erected upon the table A'. One or the other of the beams c' or d' is lowered by a stud, g' , projecting laterally from the end of a crank or arm, h' , which projects from the outer end of a tubular slide or sleeve, i' , which encompasses the shaft d before named, and is permitted to slide longitudinally, but not rotate upon the latter, by a suitable pin-and-slot connection.

The two sets or pairs of plungers are so arranged, with respect to the disk or wheel F, that one pair enters the one set of pockets, or those containing the short nails, and the other pair of plungers those pockets containing the long nails; and as it is requisite that but one pair of plungers shall be in operation at the same time, I have arranged the crank or arm h' to act upon but one at a time, and provided a mechanism by which this arm may be shifted from one to the other of the beams c' or d' , which mechanism consists of a furcated wedge, l' , pivoted to the upper end of a bent lever, m' , which makes part of a thimble, n' , encompassing a horizontal rock-shaft, o' , which is mounted within the lower part of the two standards C D, the rear end of this rock-shaft being provided with an arm, p' , for convenience of shifting its position. When the wedge l' is at its lowest position the stud g' of the arm h' coincides with the beam c' , and, when the shaft d is rotated, will wipe against and lower such beam. When the wedge is at its highest position, where it is forced, by rocking the shaft o' , to the left to the extent of about half a circle, the arm h' is forced rearward to such an extent that its stud g' coincides with, and when lowered will wipe against, the beam d' , the sleeve i being pressed toward or maintained against the wedge by a coiled spring, q' . The connection between the thimble or sleeve n' and the rock-shaft o' is a stud affixed to the latter, which abuts against a sectoral stud making part of the end of said thimble.

I would here call attention to the fact that the arm p' is of a length sufficient, when changed from one to the other of its lowest and operative positions, to intercept the adjacent end or arm of the oscillating lever U and shift the same, and reverse the position of the dogs N O. I would also call attention to the fact that the pockets of the wheel F, which operate in connection with the plungers $q q$ and blocks s , are marked 2 2 in the drawing.

The operation of this machine is as follows: Presuming as a starting-point that the wedge l' is at its highest point and the dog P in engagement with the lower ratchet-wheel, M, the stud of the arm h' resting upon and ready to depress the beam d' and the driver-bar I at its lowest position, with the wiper-cam V about to raise it, the proper series of holes 1 or 2 being immediately below the plungers, which are actuated by the said bar d' , and the two dogs and their carriage being at their extreme rearward position—the driving-shaft d is put in revolution in the direction of the arrow on

its pulley, and the arm *h'* depresses the beam *d'*, and consequently the two plungers, the result of which is that such plungers enter the orifices in the receiver or block below them, and drive therefrom and into each of two alternate pockets, 1 1 or 2 2, of the wheel F a nail from such receiver. Simultaneously with this descent of the two plungers the wiper-cam has raised the driver I to its highest point, and as the arm *h'* passes by the beam *d'*, and allows it and its plunger to rise to their highest position, the apex or point of the wiper-cam passes from beneath the stud of the driver, and permits the latter to descend and drive from the pocket below it the nail that is within such pocket, this nail, upon the full descent of the driver, being driven into the sole of the boot below.

While the arm *h'* is traveling through the half-circle, which is necessary before it again reaches and wipes against the beam *d'*, the wiper L has completed an entire revolution, owing to the differential gears *c'* and *c''*, as this double movement of the driver is requisite to expel the two nails delivered to the wheel at each descent of the pair of plungers. The mechanism which reciprocates the carriage and its dogs is so timed, with respect to the stations of the shaft *i'* and movements of the driver, that, during each ascent of the latter, the carriage advances, and its dog advances the wheel with which it may be in contact the extent of one pocket, and so that when the driver descends it shall expel from the pocket beneath it the nail that is therein.

My object in adding pairs of guide-tubes and plungers, as before premised, is to insure at all times a sufficient supply of nails to fill the pockets in the presenting-wheel F, as I have found it a matter of difficulty to obtain a separating-machine which will singly supply my machine, when driven rapidly, with a proper number of nails.

Should it be desirable to change the size of nail which the machine is driving, I have only to change the position of the arm or dog *p'* from one side of the carriage Q to the other, as this act effects nearly a revolution of the rock-shaft *o'*, reverses the position of the dogs O and P, throws the lower dog, P, out of engagement with the ratchet M, and brings the upper dog into engagement with the upper ratchet, N, and lowers the wedge *l'*, and permits the arm *h'* to move outward over the beam *c'*. A rotation of the driving-shaft now actuates the beam *c'*, plungers *q q*, and driver I in precisely the same manner as the beam, plungers, and driver were at first operated, and as will be readily understood.

I claim—

1. The combination of the presenting-wheel F and two or more guides or chutes, for directing two loose nails at a time to such wheel.

2. The combination, in a machine for presenting and dividing two sizes of loose or separate nails, of a wheel or its equivalent for receiving and presenting nails, one or more pairs or sets of guides or tubes to direct such nails to the wheel, and a driver to drive the nails from the wheel into the sole of a boot or shoe, all being arranged and operating substantially as set forth.

3. The combination of the wheel F or its substitute, one or more pairs or sets of guide tubes or chutes, *f h*, and the ratchet-wheels M N, and dogs O P or their mechanical equivalents, operated by the yoke U or other proper agent, the whole being arranged so as to instantly throw one set of plungers out of action, and bring into action the opposite, whereby the size of nail is changed, substantially as shown and set forth.

4. The combination of the pocketed wheel F, driver I, and dually-arranged nail-guides and plungers with a jack for supporting a boot or shoe, substantially as set forth.

5. The combination, with the rotating pocketed wheel F and dually-arranged nail-guides and plungers, of a driver actuated in such manner as to execute two descents to one descent of the plungers, substantially as set forth.

6. The combination, with the wheel F, of the two ratchets M and N and the dogs O P, the latter operating alternately upon the wheels, and being actuated or shifted by the arm *p'* and intermediate mechanism, or the substantial equivalent thereof, essentially as and for the purpose described.

7. The detailed mechanism herein explained for shifting the position of the arm *h'*, consisting of the furcated wedge *l'*, bent lever *n'*, and arm *p'*, the two latter being carried by the shaft *o'*, and the whole operating substantially as set forth.

8. The combination of one or more pairs of guide tubes or chutes with a series of nail-receiving pockets in a presenting-wheel, under such an arrangement that two pockets are provided for each pair of guide-tubes, substantially as set forth.

9. The combination of a nail receiving and presenting wheel, provided with two series of receiving and presenting receptacles, with feed mechanisms for presenting the nails of either series, substantially as set forth.

WALTER S. WATSON.

Witnesses:

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