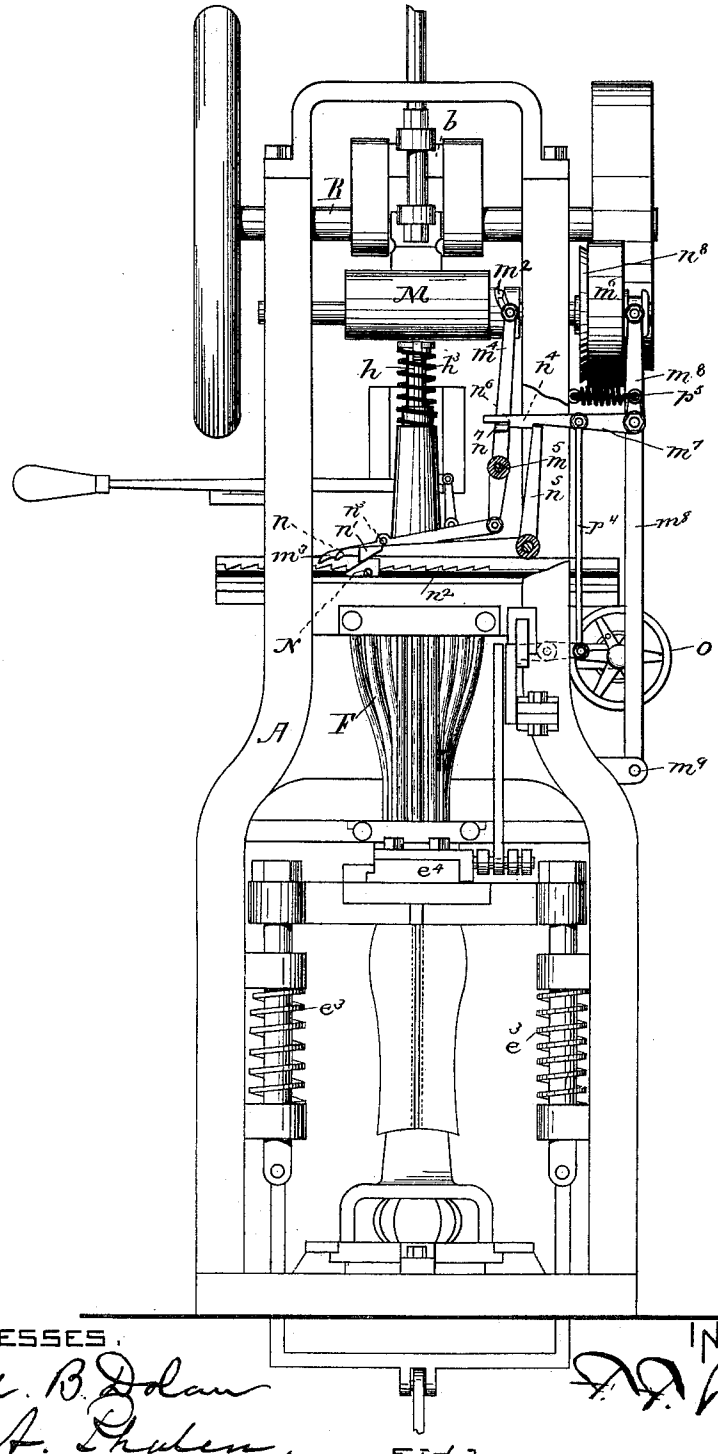
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F. F. RAYMOND, 2d.

HEEL NAILING MACHINE.

No. 410,676. Patented Sept. 10, 1889.



WITNESSES.
Fred. B. Dolan
E. A. Phelps.

INVENTOR.
F. F. Raymond 2d

FIG. 1.

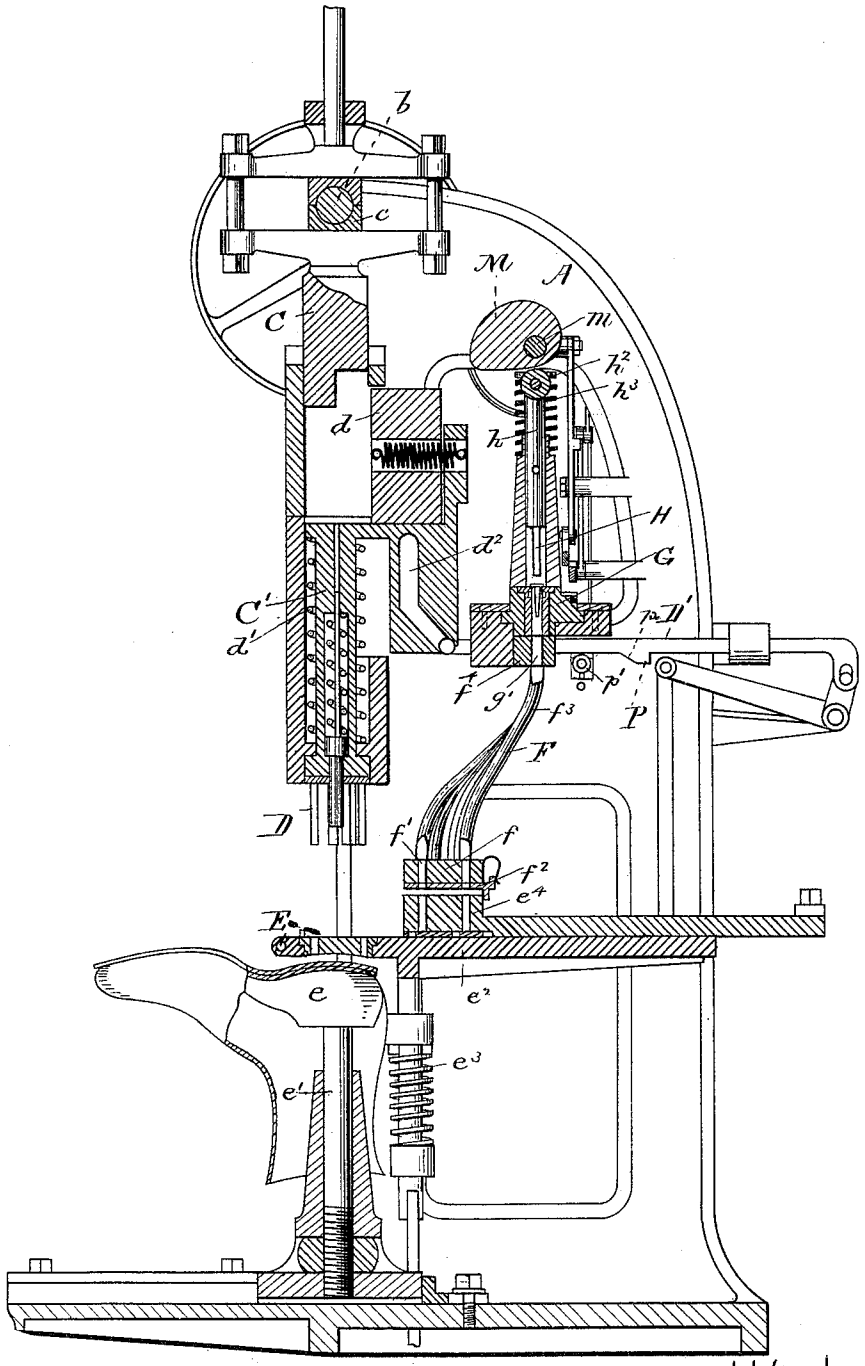
N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 4 Sheets—Sheet 2.

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FIG. 2.

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(No Model.) 4 Sheets—Sheet 3.

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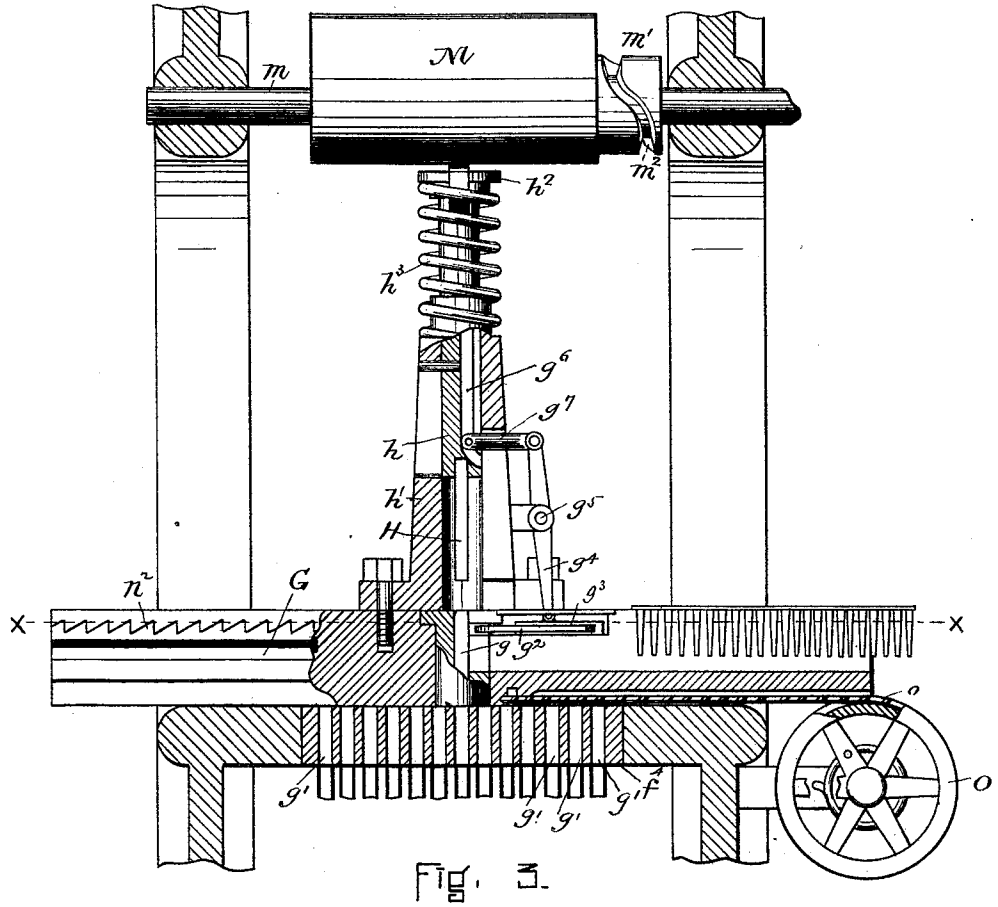


Fig. 3.

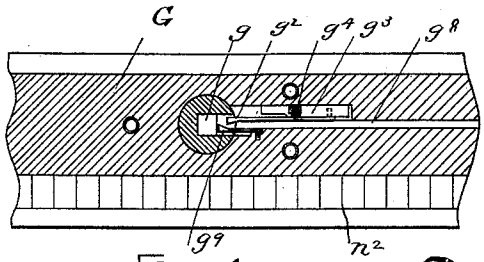


Fig. 4.

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(No Model.) 4 Sheets—Sheet 4.

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HEEL NAILING MACHINE.

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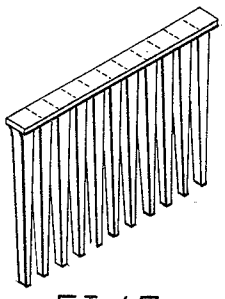


Fig. 7.



Fig. 8.

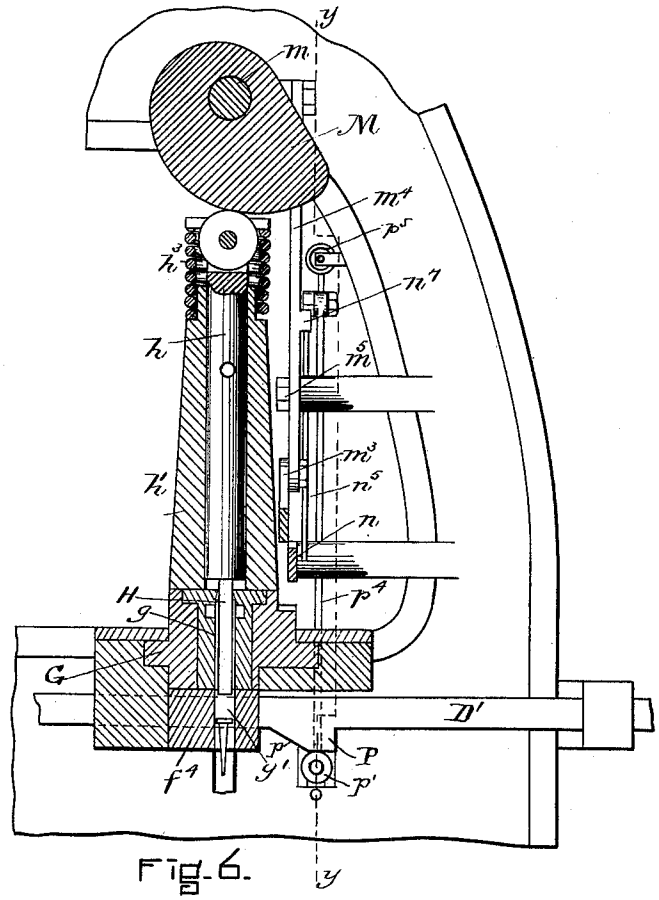


Fig. 6.

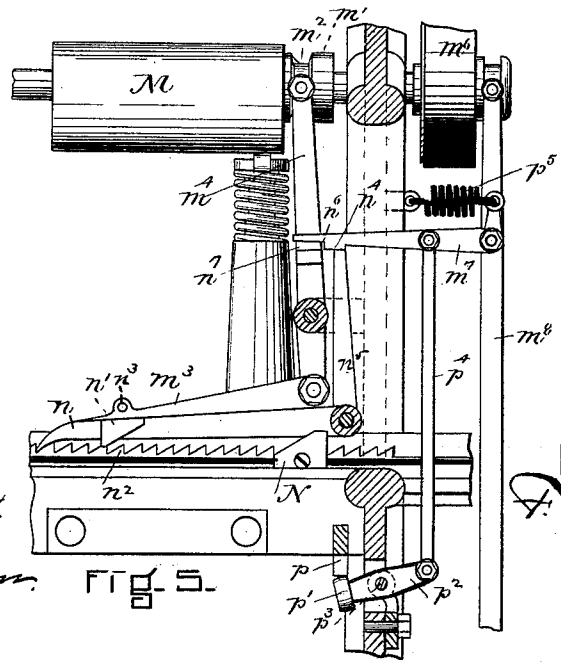


Fig. 5.

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UNITED STATES PATENT OFFICE.

FREEBORN F. RAYMOND, 2D, OF NEWTON, MASSACHUSETTS.

HEEL-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 410,676, dated September 10, 1889.

Application filed August 28, 1886. Serial No. 212,040. (No model.)

To all whom it may concern:

Be it known that I, FREEBORN F. RAYMOND, 2d, of Newton, in the county of Middlesex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Nail Distributing and Driving Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates especially to an automatic device or mechanism for feeding nails from tack-strips, or nails whose heads are integral or connected by paper or any other medium to a distributer.

It further relates to the combination of said feeding and distributing mechanism with nail-driving devices.

It also relates to various details of organization and construction, all of which will hereinafter be specified.

In the drawings, Figure 1 is a view in rear elevation of a nail distributing and driving machine containing the features of my invention. Fig. 2 is a view thereof in vertical central section. Fig. 3 is an enlarged view, part in rear elevation and part in vertical section, of the nail-distributing mechanism. Fig. 4 is a horizontal section on the line $x\ x$ of Fig. 3 of that part of the mechanism adjacent to the throat of the device. Fig. 5 is a detail view to illustrate the start-and-stop-motion mechanism of the nail-distributing devices. Fig. 6 is an elevation and vertical section of the parts represented in Fig. 3, and at a right angle to the view therein shown. Fig. 7 represents an enlarged view, in perspective, of a comb-strip of fastenings. Fig. 8 is a view in perspective of a nail or fastening severed therefrom.

The invention is represented as organized to supply nails to a heel or sole nailing machine; but this form of nailing-machine is shown merely for convenience, the invention being applicable to any machine adapted or arranged to drive a gang or group of fastenings.

The principal parts of the nail-driving devices are described in my Letters Patent No. 341,169, and I will but briefly enumerate those parts here. A is the frame of the machine. B is a short shaft which carries the crank *b*, which operates the reciprocating vertically-movable head C by means of a slide-block *c*. Below the reciprocating head C there is another head C′, which supports a gang or group of drivers D. This head C′ is moved downward by means of the slide-block *d*, which is arranged to be moved between the head C and the head C′ when it is desired to reciprocate the drivers, and the head C′ is moved upward by a spring *d*′.

E is the templet-plate. *e* is the last or work-support, which is mounted upon a jack *e*′. The templet-plate is supported by the table e^2, and has a downward vertical movement in opposition to the springs e^3. The table carries or supports a nail-carrier e^4, which is automatically moved from a position under the nail-distributer F to a position to deliver nails to the drivers and holes of the templet E by mechanism substantially as specified in said patent, and comprising two links or toggle, one link of which is pivoted to the table and the other to the nail-carrier plate, a bent lever, one arm of which is connected by a link with the toggle and the other of which is connected with a slide, moved by the cam d^2, formed in a projection or extension of the head C′. This cam is shaped to move the nail-carrier inward upon the downward movement of the head C and outward upon the upward movement of the head, and so that it shall be moved into position to bring its holes in line with the holes of the templet, and while the drivers are upon the upward part of their downward movement, and to then hold the carrier stationary, that the drivers may enter the holes and drive the nails therefrom into the work, and be lifted from the holes before the carrier is returned to its original position. The head C′ may of course be connected with the head C by a yoke or strap and pin, or in any other desired way, so that the head C shall act to draw the head C′ up positively, if desired. The distributer F comprises a block *f*, having the holes *f*′, of the same arrangement as the holes of the nail-carrier, which are adapted to be closed when the nail-carrier is moved from the block *f* by a slide-plate f^2. A series of tubes f^3 connect the holes in the block f^4 with the holes *f*′ in the block *f*. The holes in the block f^4 are

arranged in a straight line. Thus far the mechanism described is like that described in said patent.

To automatically supply the nail-driving devices with fastenings, I have mounted above the plate f^4 a traveling block G, which carries or supports a device for feeding a comb or nail-strip to a reciprocating punching or severing device or instrument. This traveling block G has a hole or throat g, which is adapted to be brought in line, as the block G is moved, in successive order with the holes g' in the block f^4. The block G is provided with an intermittent forward movement from one hole to another, and is held stationary during the feeding movements and while a fastening is being delivered to a hole g' by a detent. At the end of the forward feeding movement the block, with the nail-feeding devices carried thereby, is returned to its original position.

I have represented the nail plate or strip feeding mechanism as adapted to feed and separate into independent or separate fastenings a comb-strip of nails, such as is described in my patent, No. 315,069; but I would say that it is also applicable for feeding the tack or nail strip known as the "Copeland tack or nail strip," such as is described in Patents Nos. 197,609 and 333,709, or any nail or tack strip of a similar character.

The mechanism which I have shown for feeding the comb-strip and for severing complete or single nails therefrom comprises a feed-pawl g^2, (see Figs. 3 and 4,) which is supported by a block g^3, arranged to be reciprocated by means of the lever g^4, pivoted at g^5, and the vertically-movable cam g^6, formed in the driver-block and connected with the lever g^4 by the push-rod or slide g^7. The feed-pawl g^2 is formed from a thin plate of steel, so as to yield horizontally upon its backward movement to clear the shank of a nail or tack and then close behind it, and it feeds the strip forward to the throat by contact with the edge of the shanks. It is arranged to project into the feedway g^8, as represented in Fig. 4.

To hold the comb-strip or strip of tacks or fastenings after it has been fed forward by the feed-pawl g^2, I have arranged a detent or spring-stop g^9, (see Fig. 4,) to close into the feedway and behind the shank of a nail or tack. This is also made of spring-steel and so shaped or fastened as to yield outwardly on the forward movement of the strip as it is fed by the feed-pawl g^2 as the shank of a nail or tack comes in contact therewith, and to automatically close behind said shank after it has been moved by it into the throat g^3.

At the end of each forward movement of the strip of fastenings the first or advanced fastening is cut or severed from the remainder of the strip by the severing device or plunger H, which is arranged upon the plunger-bar h. This plunger-bar has a support within a post h', extending upward from the traveling block G, to which it is bolted, and it has a head h^2 and a coil-spring h^3, which surrounds said plunger-bar above the post h' and bears against the upper surface of the latter and the under surface of the head h^2. There is arranged immediately above the line upon which the head h^2 travels a long wiper-cam M, which is mounted upon the shaft m, and the office of this cam is to depress or move downward the plunger-bar h in opposition to the spring h^3. The cam M is made long enough to embrace or include the entire movement of the traveling block G, so that whatever the position of the block the plunger upon the rotation of the cam is caused to be moved downward. The shape of this cam in section is well represented in Fig. 2. The shaft m also carries the cam-cylinder m', which has the cam-groove m^2, which serves to operate the feed-pawl m^3 and the stop-motion mechanism, and it is connected with the feed-pawl by the lever m^4, which is pivoted at m^5, and with the driven pulley m^6, forming one member of a clutch, by means of the latch-bar m^7 and swinging rod m^8, which is pivoted at m^9, and which has a yoke that engages, by means of pins, the hub of the driven pulley m^6. The traveling block G also carries a tripping-block N, which is adjustable upon its side to trip the detent n and feed-pawl when any desired number of fastenings have been delivered through the throat g, and the detent n has a projection n', with which the block N comes in contact as the traveling block G is moved by the feed-pawl. These blocks N n' are so shaped that upon coming in contact with each other the detent n is lifted from engagement with the ratchet-teeth n^2 of the traveling block, and it in turn serves to lift the feed-pawl m^3 from contact with the ratchet-teeth, the arm of the feed-pawl having a pin or stud n^3, which projects over the detent-arm, and so as to be moved thereby upon the upward movement of the said arm. The upward movement of the detent-arm also brings into position the stop-motion latch m^7 by moving outward or away from the section n^4 of the said arm the arm n^5 of the detent, which serves to hold it lifted, while the detent acts as a stop. When the detent is moved upward, however, the arm n^5 is moved from the surface n^4, so that the arm n^7 is free to move downward to permit its shoulder n^6 to engage the projection n^7 upon the lever m^4, and this permits the cam m^2, upon its continued movement, to move backward or disengage the pulley member m^6 of the clutch from the fast member n^8, which is secured to the shaft m. At the same time a friction-pad (not shown, but like that shown in the Towns and Raymond patent, No. 346,137,) carried by an arm extending from the rocking arm m^8 is brought into contact with the surface of the fast member n^8 of the clutch and stops its rotation. The traveling block G upon the release of the detent-pawl is moved backward to its original position by a spring-operated drum

O and a connecting-cord *o*. (See Fig. 3.) This mechanism for moving the traveling block G forward with an intermittent motion and backward with a continuous motion, and for automatically stopping the mechanism, is more fully described in Patent No. 346,137, and need not be further described here.

It is of course desirable to automatically start the nail-plate feeding and severing mechanism, though this is not essential. To effect this I have formed upon the nail-carrier slide-bar D′, which is operated by the cam d^2, a shoulder or extension P, which has the inclined surface *p*, (see Figs. 2 and 5,) and I have arranged to project into the path of movement of this projection or cam P the roll p', carried at the end of a lever p^2, pivoted at p^3. (See Fig. 5.) This lever is connected by the rod p^4 with the latch m^7, (see Fig. 5,) and when the machine is at rest the roll bears against the under surface of the slide-bar D′ in front of the incline *p*, as represented in Fig. 2, and upon the starting of the machine the slide is moved inward or toward the head C′, bringing the incline *p* in contact with the roll and moving it downward, thereby lifting the rod p^4 and latch m^7 upward and the latch from its engagement with the lug or projection n^7 on the lever m^4. This permits the spring p^5 to draw the driven member of the clutch in contact with the fixed member, and also permits the detent to fall so as to engage the teeth of the ratchet n^2, and its arm n^5 to come under the section n^4 of the latch-bar, as represented in Fig. 5.

In operation the strip of connected fastenings is placed in the feedway of the machine, so that the first fastening shall be in the throat of the machine, and upon the starting of the machine the plunger H is moved downward, severing a fastening from the strip and forcing it through the throat into the first of the holes g' in the plate f^4. The severed fastening then falls through the hole g' and passage in the tube connecting said hole with one of the holes in the block *f* and comes to rest in said last-mentioned hole. Upon the upward movement of the plunger H the strip is fed forward by the feed-pawl g^2, another fastening brought into position in the throat, and the detent-pawl g^9 brought into position behind the shank of the fastening, and the traveling block, with the nail-strip feeding and severing devices, moved forward by the feed-pawl m^3 to bring the throat over the second of the holes g^4 in the plate f^4. The plunger H is again moved downward, severing another fastening and feeding it to the second hole g^4, from which it falls by gravity through the passage in the tube which connects that hole with another hole in the block in which the fastening finally comes to rest. Upon the upward movement of the plunger H the tack-strip-feed pawl g^2 is moved outward to engage the shank of the first fastening in order, and this intermittent operation of the tack-strip feeding and severing device and intermittent traveling movement of the block G carrying it continues until the throat *g* has been brought successively into line with as many of the holes g^4 as necessary to feed the tack-strip the number of nails or fastenings required, when the detent and feed pawls are tripped, the mechanism stopped, and the traveling block G returned to its original position.

I prefer that when an all-metal strip—such as described in my said patent, No. 315,069, or other comb-strip is used—to make the throat substantially square or rectangular in cross-section and the plunger H of similar shape in section. This will provide a nail or fastening having a flanged rectangular head shaped substantially as represented in Fig. 8, and when it is desired that these nails shall be delivered to the driving devices, so that their greatest diameter shall be substantially at a right angle to the line of the edge of the heel, I form each tube f^3 and the holes in the nail-holder block *f*, nail-carrier e^4, and the templet E, so that the nail is turned as it falls in the tube enough to bring its head into the proper or desired position. It is then held in that position by the holes in the block *f*, nail-carrier, and templet until driven. This is accomplished by making holes in the block *f*, nail-carrier, and templet oblong or rectangular in shape and of a size to prevent the turning of a fastening after it has been presented thereto. The turning of the fastenings is done entirely by the tubes, the tubes having passages so shaped as to turn the nail upon a vertical axis while it is dropping, which, as a rule, is not over a quarter of a revolution. This arrangement of nails in relation to each other so that the heads shall be uniformly arranged in relation to each other and adapted to have a predetermined relation to any given line is of course desirable only where the nails are driven so that their heads shall be left exposed, and it is especially desirable in flush-nailing heels.

I do not wish to be understood as limiting myself to the specific mechanisms herein shown and described for feeding the comb or fastening strip and for severing the fastenings therefrom, as my present invention does not relate particularly to the specific devices shown for performing these functions, and any well-known or equivalent mechanisms for those which I have shown for these purposes may be employed. The mechanism which I have described is probably as cheap and as effective as any which employs a comb-strip of fastenings or a strip of fastenings of similar character. The nail supplying and distributing devices, of course, may be used with any other nail-driving devices than those herein shown without departing from the essential features of the invention. I prefer that the throat *g* be somewhat increased in size from its upper end downwardly, and that the passages g' in the block

f^4 and in the connecting-tubes f^3 be enough larger than the throat to permit headed fastenings to drop freely therein. I also consider that the intermittent movement of the distributer, so as to bring its holes g' successively into position, or in register with the throat g, and so as to receive fastenings therefrom, whereby it is adapted to receive fastenings in successive order through the throat g and having a return or a reverse movement, is the equivalent for the intermittent forward movement and return movement of the block G, and the mechanism for providing the distributer with these movements in relation to the stationary block G would be similar in every material respect to that employed for moving said block.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a nail distributing and driving machine, the combination, with a nail-distributer having a series of nail receiving and distributing passages the upper ends of which are arranged in a row, of a traveling block G, having a single throat adapted to be brought successively over the said upper ends of said passages, and nail or fastening severing and supplying devices carried by and thus movable with said traveling block, substantially as set forth.

2. In a nail distributing and driving machine, the combination, with a nail-distributer having a series of nail receiving and distributing passages the upper ends of which are arranged in a row and the lower ends of which are spread to distribute the nails, of a traveling block G, having a single throat, feeding appliances for intermittingly advancing said traveling block to bring said throat successively over the said upper ends of said receiving and distributing passages, and a nail-supplying device carried by the said traveling block and comprising comb or nail strip feeding appliances, and a reciprocating plunger or severing device arranged above the said throat and serving to sever the nails from a nail-strip, and thus cause them to pass through said throat to said receiving and distributing passages, substantially as set forth.

3. In a nail distributing and driving machine, the combination, with a nail-distributer having a series of nail receiving and distributing passages the upper ends of which are arranged in a row and the lower ends of which are spread to distribute the nails or fastenings, of a traveling block having a single throat, feeding appliances for intermittingly advancing said block to cause said throat to be brought into register with the upper ends of said passages successively, nail or fastening severing and supplying devices carried by said block, a gang of reciprocating nail-drivers, and a reciprocating nail-carrier movable from beneath said distributer to a position beneath said drivers, substantially as set forth.

4. In a nail distributing and driving machine, the combination, with a nail-distributer having a series of nail receiving and distributing passages the upper ends of which are in a row and the lower ends of which are spread to distribute the nails or fastenings, of a traveling block G, having a single throat to be brought into register with the said upper ends of said passages successively, said block having also a rack or series of ratchet-teeth, a feeding-pawl for intermittingly advancing said block, a detent for locking the latter after each forward movement, and nail or fastening supplying devices carried by said block, substantially as set forth.

5. In a nail distributing and driving machine, the combination, with a nail-distributer having a series of nail receiving and distributing passages the upper ends of which are in a row and the lower ends of which are spread to distribute the nails or fastenings, of a traveling block G, having a single throat to be brought into register with the said upper ends of said passages successively, said block having also a rack or series of ratchet-teeth, a feeding-pawl for intermittingly advancing said block, a detent for locking the latter after each forward movement, automatic appliances for disengaging the feeding-pawl and detent and for returning said traveling block to its original position, and nail or fastening supplying devices carried by said block, substantially as set forth.

6. In a nail distributing and driving machine, the combination, with a nail-distributer having a series of nail receiving and distributing passages the upper ends of which are in a row, of a traveling block G, having a single throat to be brought into register successively with the upper ends of said passages, a nail-supplying device carried by said traveling block and comprising a reciprocating plunger or severing device to cause the nails to enter said throat and passages, a rotary shaft to operate said plunger, feeding appliances operated by said shaft, for intermittingly advancing said traveling block, a clutch, a stop-motion mechanism for disconnecting the parts or members of said clutch, and a tripping mechanism operated from said traveling block and serving to operate said stop-motion mechanism and disconnect the parts or members of said clutch, and thereby arrest the rotation of said shaft when a predetermined number of nails or fastenings have been supplied to said distributer, substantially as set forth.

7. The combination of a traveling block having a throat through which fastenings are adapted to be moved intermittingly in one direction, and fastening-supplying mechanism carried thereby, comprising a reciprocating nail plate or strip feeding device for feed-

ing the nail strip or plate to a nail-severing device or plunger, said nail-severing device or plunger being adapted to be reciprocated by a disconnected cam M as it is moved, and the spring h^3, substantially as described.

8. The combination, with the intermittingly-moving traveling block G, the support or post h', attached thereto, and thus moving therewith, and the severing device or plunger H, reciprocating in said support or post, of the extended cam M to operate said plunger in the different positions to which it may be moved, substantially as set forth.

9. The combination of the traveling block G, having a single throat, a rack carried thereby, a reciprocating pawl to engage said rack, and a cam for giving it an intermittent movement, a detent pawl, for locking it stationary, the comb or nail strip feeding and severing devices carried by said traveling block, comprising a reciprocating feed-pawl, a detent-pawl, and a movable plunger, and a cam and spring for reciprocating the plunger at given intervals, substantially as described.

10. The combination of the traveling block G, the feed-pawl g^2, its supporting-block g^3, the lever g^4, cam g^6, for operating it, the detent-pawl g^9, the plunger-bar h, the plunger H, the spring h^3, and cam M, substantially as described.

11. The combination of the cam d^2, the slide-bar D', having the incline p, and the latch m^7, controlling the position of the driven member m^6 of the clutch, with the rod p^4, a lever p^2, adapted to be moved by said incline to lift the latch and permit the spring to draw the driven member of the clutch into engagement with the fastenings, substantially as described.

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Witnesses:
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