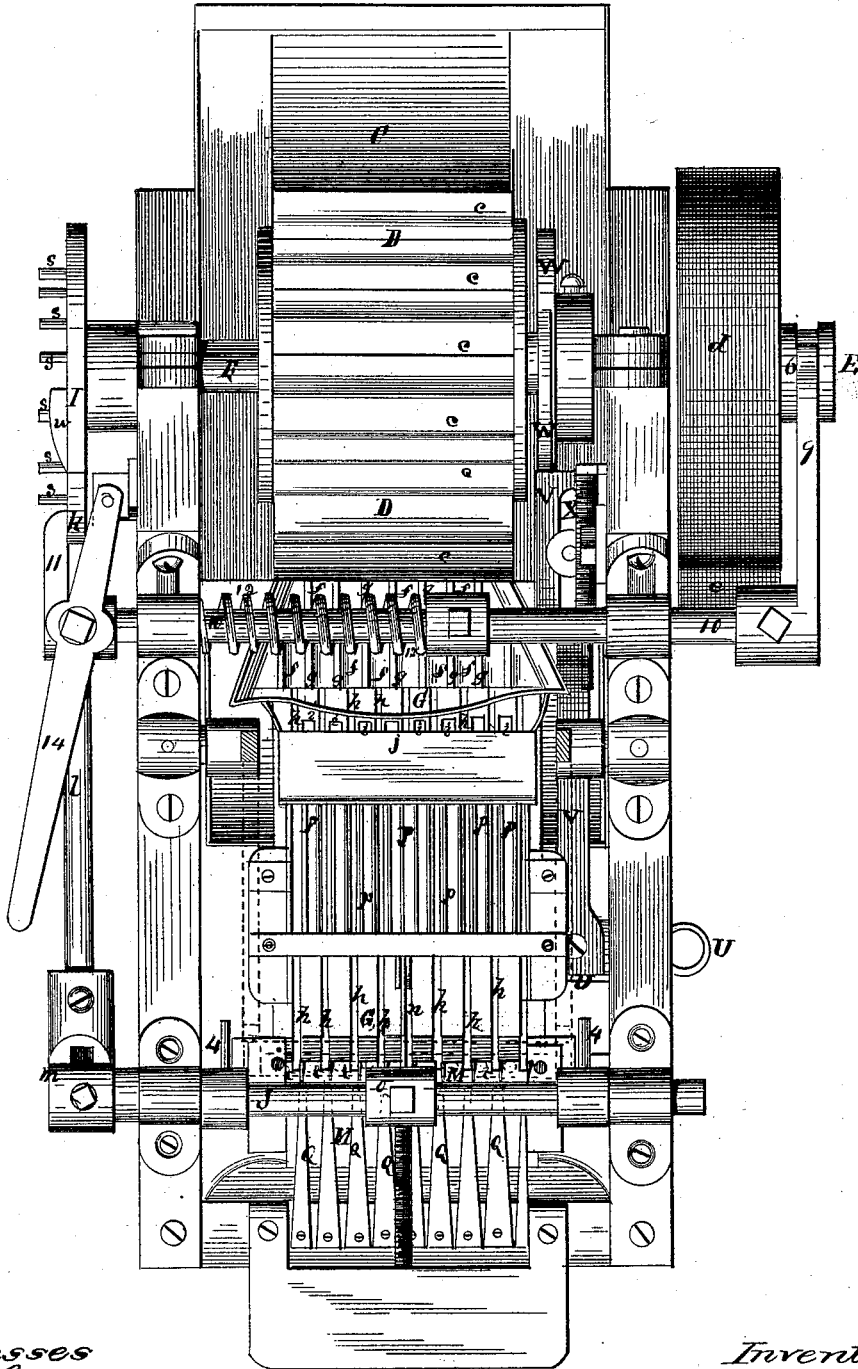


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Machines for Feeding Nails to Boot and Shoe Heeling
Devices.

No. 210,528.

Patented Dec. 3, 1878.



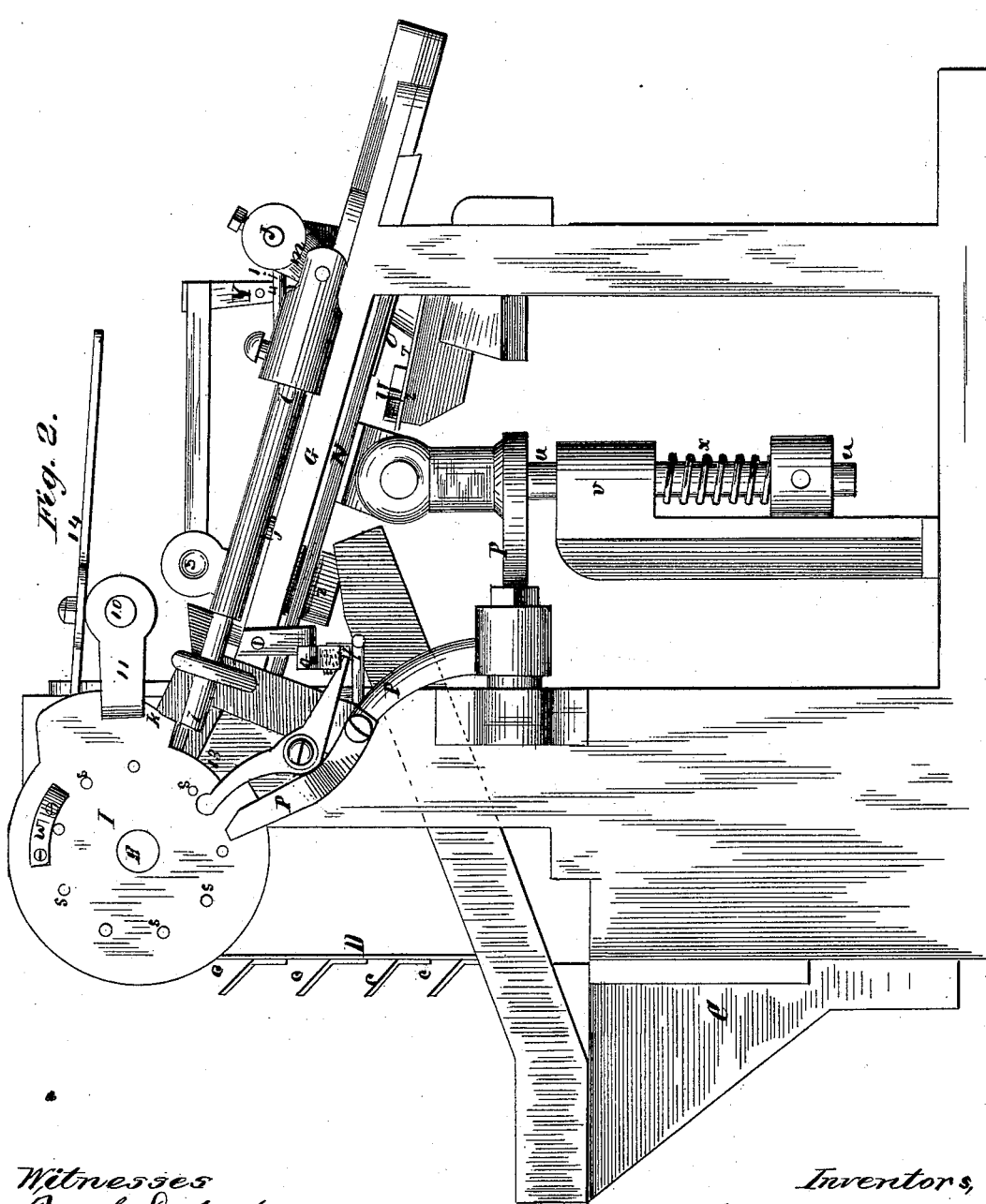
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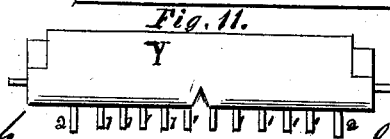
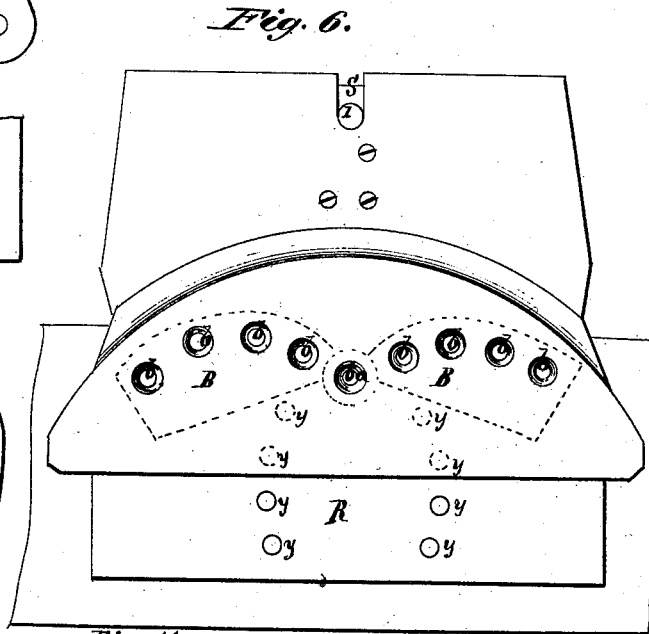
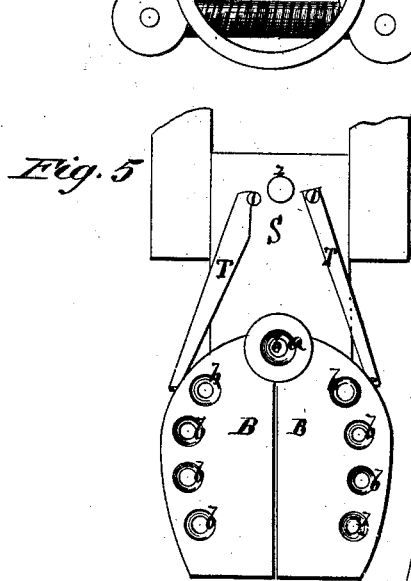
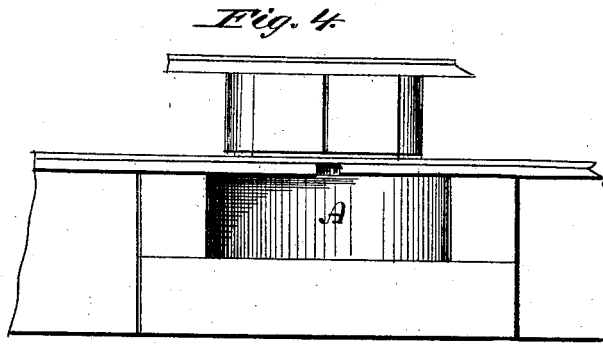
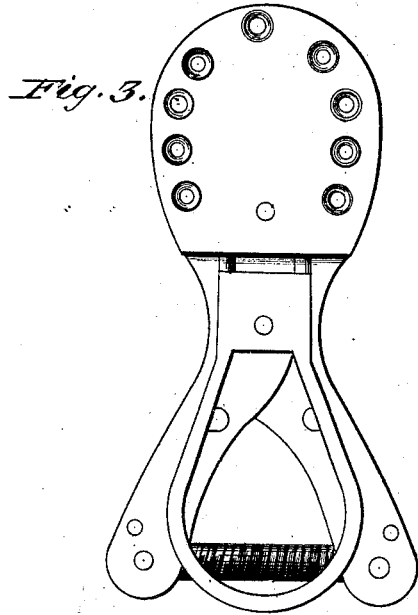
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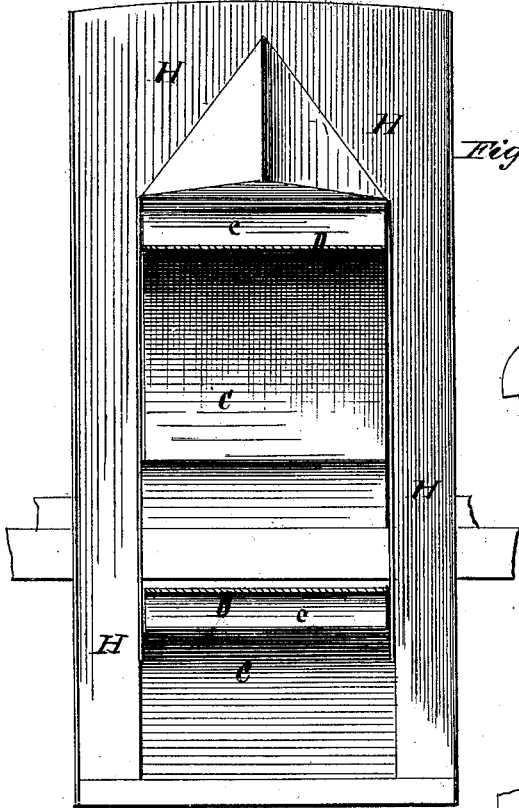


Fig. 7.

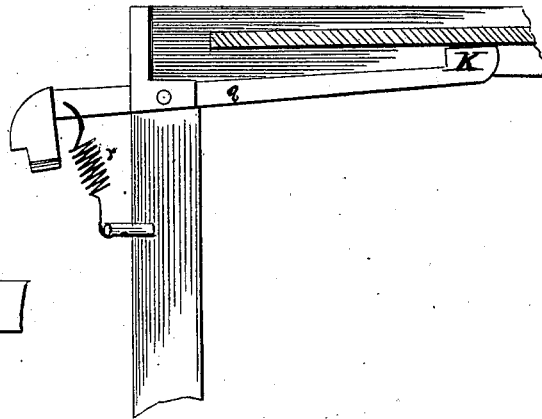


Fig. 8.

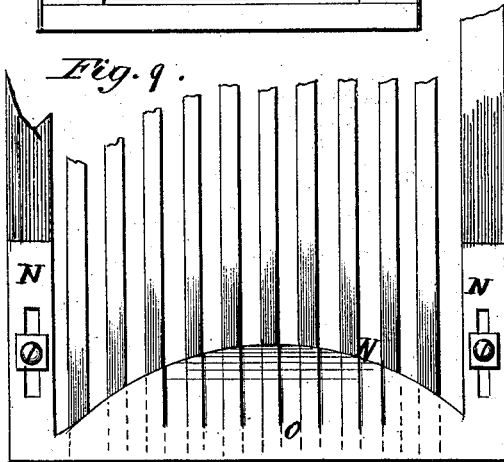


Fig. 9.

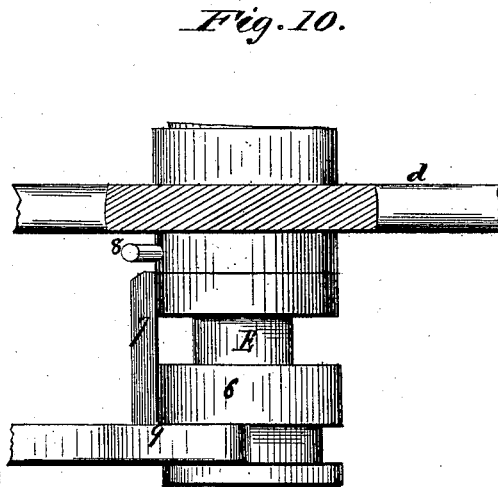


Fig. 10.

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UNITED STATES PATENT OFFICE.

SAMUEL HARRIS, JR., OF BOSTON, MASS., AND SAMUEL SHEPHERD, OF NASHUA, NEW HAMPSHIRE, ASSIGNORS OF ONE-THIRD THEIR RIGHT TO H. L. HAZELTON, OF BOSTON, MASSACHUSETTS, AND SAID HARRIS ASSIGNOR OF HIS REMAINING RIGHT TO SAID HAZELTON.

IMPROVEMENT IN MACHINES FOR FEEDING NAILS TO BOOT AND SHOE HEELING DEVICES.

Specification forming part of Letters Patent No. 210,528, dated December 3, 1878; application filed July 9, 1878.

To all whom it may concern:

Be it known that we, SAMUEL HARRIS, JR., of Boston, in the county of Suffolk and State of Massachusetts, and SAMUEL SHEPHERD, of Nashua, in the county of Hillsborough and State of New Hampshire, have invented a Machine for Automatically Inserting Nails into "Skimmers" employed in Nailing Boot and Shoe Heels; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a top view of the machine; Fig. 2, a side view of the same; Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, views of parts thereof detached.

Like letters designate corresponding parts in all of the figures.

In the manufacture of boot and shoe heels, the lifts of which are united by nails, the nails for an entire heel are first placed in an instrument called a "skimmer," which holds them in the right position to be driven into a heel all at the same time by a suitable machine or mechanism.

Heretofore the nails have been first placed one by one in the holes of the skimmers by children—a tedious and expensive process compared with the expedition and economy with which other parts of the manufacture are conducted with the improved machinery in use.

The subject-matter of our invention is a machine which automatically performs this work in a rapid manner, and avoids the tediousness and expense of the old hand method. The machine is represented in the accompanying drawings, and its construction and operation are substantially as follows: A skimmer, represented in Fig. 3, has as many holes therein as the number of nails required for each heel, arranged around in curves corresponding with the curved lines nearly parallel with the outer curves of boot or shoe heels in which the nails to be driven into a heel are arranged.

In order to insert nails into these holes of the skimmer, it is to be placed in a suitable receptacle, A, Fig. 4, in the machine, where it

will always have a fixed and exact position, and into and out of which it may be slid with quickness and ease. This, of course, is effected without difficulty, the receptacle having a form which the skimmer exactly but freely fits when inserted therein.

The immediate instrument composing a part of the machine for inserting the nails in the skimmer is a receiving and transferring carrier, B, Fig. 5; which is made in two parts, hinged together at *a*, and when the parts are closed together has the general form of the skimmer, and has holes *b b* therein exactly corresponding in position with the holes in the skimmer, and large enough to allow the nails for driving into the boot and shoe heels to pass freely through, so that by bringing the carrier into exact position over the skimmer in its receptacle a set of nails previously introduced into the holes of the carrier will drop automatically through the said holes into the holes of the skimmer. The carrier has a swinging movement on its pivot *a*, so that after it has deposited a set of nails in the skimmer it may be swung open into a position represented in Fig. 6, where the nail-holes *b b*, part in one half and part in the other half thereof, are arranged in a double-curved line in one general direction across the machine. It is in this position that the carrier receives the nails to transfer to the skimmer; and it is the function of the principal parts of our machine to take the nails from a hopper or receiver, arrange and convey them automatically to the holes of the carrier, one always for each hole, at each complete movement of the machine.

First, a hopper or receiver, C, is provided, being suitably placed at the end of the machine opposite to that in which the carrier and skimmer are arranged, in order to obtain sufficient intervening space for the successive operations of the machine between the hopper and carrier. In this receiver the nails, as fast as required, are simply deposited in quantity. To take from this receiver the nails successively, as wanted, an elevator, D, is employed, the simplest construction of which is with an

endless belt and a set of buckets or projecting plates, *c c*, thereon at short intervals, which take up from the hopper or receiver, and elevate to the uppermost position of the belt, the nails in continued succession. The lifting-plates are somewhat inclined to the belt, as shown, to properly seize and surely retain the nails. The endless belt is driven by a revolving shaft or drum, *E*, at the top, on which shaft a pulley, *d*, is secured at one end thereof, and around this pulley a driving-belt, *e*, runs from a driving-shaft or pulley located on the machine, or in any other convenient place. The lower turn of the endless belt may pass around a loose drum or shaft. As the endless belt ascends over its driving-shaft at the top and begins to descend on the front side thereof, it projects the nails caught by the lifting-plates forward and downward upon the upper end of a platform, *G*, inclined forward, where a set of guideways or troughs, *f f*, is arranged, the several ways being separated by partitions *g g*. The distance between these partitions is, in general, equal, or thereabout, to the distance between the nail-receiving holes in the carrier from center to center of each when the said carrier is in position to receive the nails.

All the nails that are caught in the guideways are forced to assume a longitudinal position therein, since the distance between the partitions *g g*, as above described, is always considerably less than the length of any nails used in the machine, and a portion of the nails, at least, will always fall into the bottoms of the ways, centrally hollowed out to more surely lay the nails in a central and properly-directed position, these hollows leading directly forward into longitudinal slots *h h* in the platform, reaching forward respectively from the guideways to the lower front end of the said platform. All the nails that reach these slots longitudinally fall into the same, the thin end of these wedge-shaped nails used for this purpose falling downward, while the thick or head end thereof cannot quite fall through the slots, which are so gaged in width that more than half the weight or leverage of the nails will pass through them, so that they will assume a vertical position and hang suspended in the slots, points downward. All the nails which are caught in the guideways and do not fall into the slots *h h* descend upon the surface of the platform, and finally reach and fall into and through vertical tubes or openings *i i*, extending down through the platform, between and alternate with the slots *h h*, and a little forward of the guideways. In these tubes or openings (which are oblong) there are stops *j j*, all attached to a frame above, that have a reciprocating movement forward for a moment, and then backward, by which all nails in position to fall through the openings or tubes are allowed thus to do, but all the others which are in cross-positions are thrown back upon the platform at the re-

turn backward movement of the stops. Thus sooner or later all the nails which do not fall into the slots finally escape through these openings or tubes, and are then caught by a chute-plate, *H*, Fig. 7, below, which divides, and extends on both sides of the elevator *D* in a backwardly-inclined plane, and delivers the nails into the hopper or receiver *C*, so that they are automatically returned to the place of starting, to be again elevated and deposited in the guideways.

The forward-and-backward movement of the frame of stops *j j* is communicated thereto at each revolution of the driving-shaft *E* by means of a cam-wheel, *I*, on the said shaft, there being a cam, *k*, on the periphery thereof, which acts against the end of a longitudinally-sliding connecting-rod, *l*, that is pivoted to a crank-arm, *m*, on a transverse rock-shaft, *J*, near the forward end of the machine, there being another connecting-rod, *n*, pivoted to another crank-arm, *o*, on the said rock-shaft, in a central position over the machine, the said connecting-rod reaching directly back to the said stop-frame, which extends forward some distance from the stops themselves, and bears guide plates *p p* parallel with and close to the sides of the guide-slots, and absolutely prevents the forward descent of any nails that do not fall into these slots. The nails thus thrown into the guideways by the elevator, and either directed into the slots *h h* or upon the platform, are moved gradually forward in the slots or upon the platform to the openings *i i* by vibrating or jarring the platform *G*, which, for this purpose, is attached only at its lower forward end, while its rear upward end is free to vibrate up and down, though, when at rest, supported by a cross-bar or any support. It is also properly made of thin elastic material to facilitate the vibratory or jarring motion, which may be effected by any convenient means, whether as represented in the drawings or otherwise.

As represented, the device consists of a hammer, *K*, mounted on a pivoted lever, *q*, so as to strike up against the bottom of the platform, as shown in Fig. 8, and forced upward against the same by a downwardly-drawing spring, *r*, the outer end of the said lever being repeatedly raised, thereby depressing the hammer by means of another lever, *L*, the forward end of which reaches under the said lever *q*, and the rear end of which is successively struck by a set of pins, *s s*, on the face of the cam-wheel *I*. The nails, by this or equivalent means, are in numbers gradually moved forward and downward in all the slots *h h* in vertically-suspended positions to the forward end of said slots, one nail pushing after another in each slot, so that so fast as the foremost nails are taken away others take their places, thus keeping up a continual supply of nails in all the slots at the front end of the platform. Then, forward of the platform, in the same plane and joining close to the forward end of the same, there is a slide-plate,

M, which has a reciprocating movement, forward and back, conveniently effected by being pivoted to the crank-arm *o* on the rock-shaft J. In the upper rear edge of this slide-plate are notches *t t*, which, when the plate is in contact with the platform, are accurate continuations of the respective slots *h h* in the platform, as shown in Fig. 1, and are deep enough from front to rear to hold each one nail, and never more at one time. At one side of each notch is a spring, as shown, serving to yield, if necessary, to allow the free discharge of the nails therefrom at the proper time. After this slide-plate is brought into position against the front end of the platform, in each movement of the machine, a few jars of the platform by the hammer K moves the foremost nails in the slots *h h* into these notches, one in each. This movement is assisted and made sure in each case and every time by a lifter, N, (Fig. 9, under-side view,) which consists of a secondary slotted platform, situated under the principal platform, G, and has its slots in the forward end, directly under the slots *h h* in the said principal platform, and in these slots of the secondary platform the lower ends of the nails may reach; but just at the front end of this secondary platform or lifter, and under it, is attached a thin flexible lifting-plate, *o*, which inclines somewhat backward to insure all the nails going over it, and is slit into divisions, so that each nail rides over one division, and the latter, by its flexibility and elasticity, yields separately whenever necessary. When the time arrives, in each movement of the machine, to transfer the foremost nails from the slots *h h* to the notches *t t*, this lifter is automatically raised a little, and lifts the nails in the slots, thereby freeing them, so that they will, without hindrance or fail, move forward into the notches as the platform G is jarred.

The lifter N is mounted on a vertical rod, *u*, which slides in a suitable bearing or bracket, *v*, and is lifted at the proper moment by means of a pivoted lever, P, which embraces the rod *u* at one end, and at the other end is acted on by a lateral cam, *w*, on the face of the cam-wheel I. The downward motion of the lifter is or may be assisted by a spring, *x*, on the rod *u*.

After the notches in the slide-plate M are severally filled with nails, the plate has a sliding movement forward under a series of spring-fingers, Q Q, which reach backward over and press close down upon the said slide-plate a finger just in front of each notch *i* therein. The rear ends of these spring-fingers reach respectively back to positions precisely over the several holes *b b* in the transferring-carrier B, when the two parts thereof are separated and swung back in position to receive the nails. As the slide-plate, therefore, moves forward, the nails in its notches, one after another, strike the respective spring-fingers Q Q, and are swept thereby from the notches and drop through guide-apertures beneath

down into the holes in the said transferring-carrier, which, as before stated, is a principal function to be performed by our machine.

After the nails are thus deposited in the transferring-carrier B its two parts have a swinging movement forward and toward each other around their fixed pivot *a*, to bring the holes *b b*, containing a set of nails, over the holes in the skimmer, resting in its receptacle, and deposit them finally therein. The carrier has this movement immediately upon a plate or plane surface, R, which is provided with guide-holes *y y*, Fig. 6, leading directly down into the skimmer.

A block, S, is located back of the carrier B, and connecting-rods T T connect the parts of the carrier therewith, so that on communicating a sliding motion to the said block in proper ways, if forward, the parts of the carrier are thrown forward, closed together, as just above described, and if backward, the parts of the carrier are again separated and drawn back into position to receive another set of nails. This movement of the sliding block S is effected by pivoting one end of a swinging arm, U, to a pin, *z*, on the block, and pivoting to the said arm or lever, at nearly right angles thereto, a slide-rod, V, which reaches back to a cam, W, on the driving-shaft E, which, at each revolution of said shaft, drives the slide-rod forward, to be retracted by a counter-spring, X.

The nails immediately back of the foremost nails, which are taken into the notches of the slide-plate M, are prevented from moving forward and dropping from the slots *h h*, while the said slide is performing its forward movement to deposit a set of nails in the carrier B, by means of a pressure-stop, Y, in which is a set of drop-pins or weights, 1 1, Fig. 11, one exactly over the forward end of each slot *h*, and each freely and separately yielding and pressing downward by its own individual gravity. It is these slight-weight pins that stop the forward movement of the nails in the slots *h h*, each pressing lightly and separately on the platform. The downward movement of this pressure-stop Y is limited by side pins 2 2, resting on the platform, the stop having a hinge-movement on pivots 3 3, farther back on the machine. The stop is lifted out of the way, after the return of the slide-plate M, by pins 4 4 on the rock-shaft J, the backward vibration of which not only moves back the said slide-plate, but also continues a little farther to allow its pins 4 4 subsequently to lift the said pressure-stop to the extent required.

It is required that only one movement of the machine shall be made at a time, complete for filling a skimmer with a set of nails, and then to stop the motion of the machine long enough to remove the skimmer and replace it for the next filling. This single complete movement is determined by one complete revolution of the driving-shaft E, and the stopping of the machine at the close of each revolution is effected automatically, while the

starting of the same again is effected by the attendant.

The means for these operations, as shown in the drawings, is as follows: The shaft E receives its motion through the pulley *d* thereon, which receives the belt *e* coming from the primary driving-shaft. This pulley is loose on the shaft E, so that when not coupled thereto it does not move the machine. It is coupled to the shaft by a sliding clutch, G, which cannot turn on the shaft, but has a longitudinal movement thereon. There is a stud, 7, on the clutch, projecting inward toward the pulley; and when the clutch is brought up to the pulley this stud strikes a projection, 8, on the hub of the pulley, as shown in Fig. 10, thus coupling the pulley to the shaft. The clutch is embraced by an arm, 9, projecting from a rod, 10, which extends across the machine, and has a longitudinal sliding movement in its bearings or ways. Another arm, 11, on the other end of the rod, reaches outside of the cam-wheel I, when the rod is slid to its limit in that direction, to hold the clutch to the pulley *d*. Therefore as long as the arm 11 remains outside of the cam-wheel I the machine is kept in motion. A spring, 12, on the slide-rod 10 constantly exerts itself to push the rod to the clutch side of the machine, and to uncouple the pulley on its shaft. The cam-wheel I, holding the arm 11 against its outer face, ordinarily prevents the sliding movement of the rod 10 to uncouple the pulley; but there is a notch, 13, at the proper place in the edge of the cam-wheel, and of the proper form and size to allow the end of the arm 11 to enter it, so that the moment the cam-wheel comes around and brings the notch opposite to the said arm the spring 12, acting on the rod 10, instantly draws the arm into the notch, thereby giving sufficient movement to the rod to uncouple the pulley Z on its shaft and stop the machine. This, then, is effected automatically at the desired moment. Then, when the machine is to be started again, the attendant, by moving laterally a lever, 14, pivoted to the rod 10 and to the frame of the machine, slides the rod back till the arm 11 becomes disengaged from the notch in the cam-wheel, thereby again clutching the pulley *d* on its shaft and starting the machine for another movement. Thus the movement is repeated at each revolution of the shaft E, filling a skimmer with a set of nails each time.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of the hopper or nail-receiver C, elevator D, and platform G, substantially as and for the purpose herein specified.
2. The guideways *f f* on the platform G, constructed, arranged, and operating substantially as and for the purpose herein specified.

3. The inclined platform G, provided with nail-conveying slots *h h*, and arranged to have its upper end free to be raised, as set forth, in combination with a vibrating hammer or lifter, K, to repeatedly raise the free end of the platform, for the purpose of gradually moving the nails forward in the said slots, substantially as herein specified.

4. The tubes or openings *i i* in the platform G, between the slots *h h* thereof, in combination with the reciprocating stops *j j*, substantially as and for the purpose herein specified.

5. The chute-plate H, in combination with the tubes or openings *i i* and hopper C, substantially as and for the purpose herein specified.

6. The reciprocating slide-plate M, provided with notches *t t*, and arranged and operating substantially as and for the purpose herein specified.

7. The lifter N, operating substantially as and for the purpose herein specified.

8. The spring-fingers Q Q, in combination with the slide-plate M, substantially as and for the purpose herein specified.

9. The presser-stop Y, constructed and operating in combination with the slotted platform G, substantially as and for the purpose herein specified.

10. The hinged transferring-carrier B, constructed and operating substantially as and for the purpose herein specified.

11. A device for automatically stopping the machine at the close of each complete functional movement, consisting of the loose pulley Z, clutch 6, spring sliding rod 10, with its projecting arms, and the notched cam-plate I, substantially as and for the purpose herein specified.

12. A machine for automatically inserting nails into skimmers or nail-holders, organized with a device for lifting the nails from a hopper or receiver and placing them in arranging guides or ways, a conveyer for arranging and conveying the nails in lines or rows, a device for taking them singly from the rows and depositing them each in a determinate position, and a carrier for transferring them in determined and relatively-arranged positions to the holes of the skimmer, substantially as herein specified.

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