2 Sheets—Sheet 1.

W. E. FORSTER.

MACHINES FOR STICKING NAILS IN HEEL BLANKS.

No. 184,363. Patented Nov. 14, 1876.

Fig: 1.

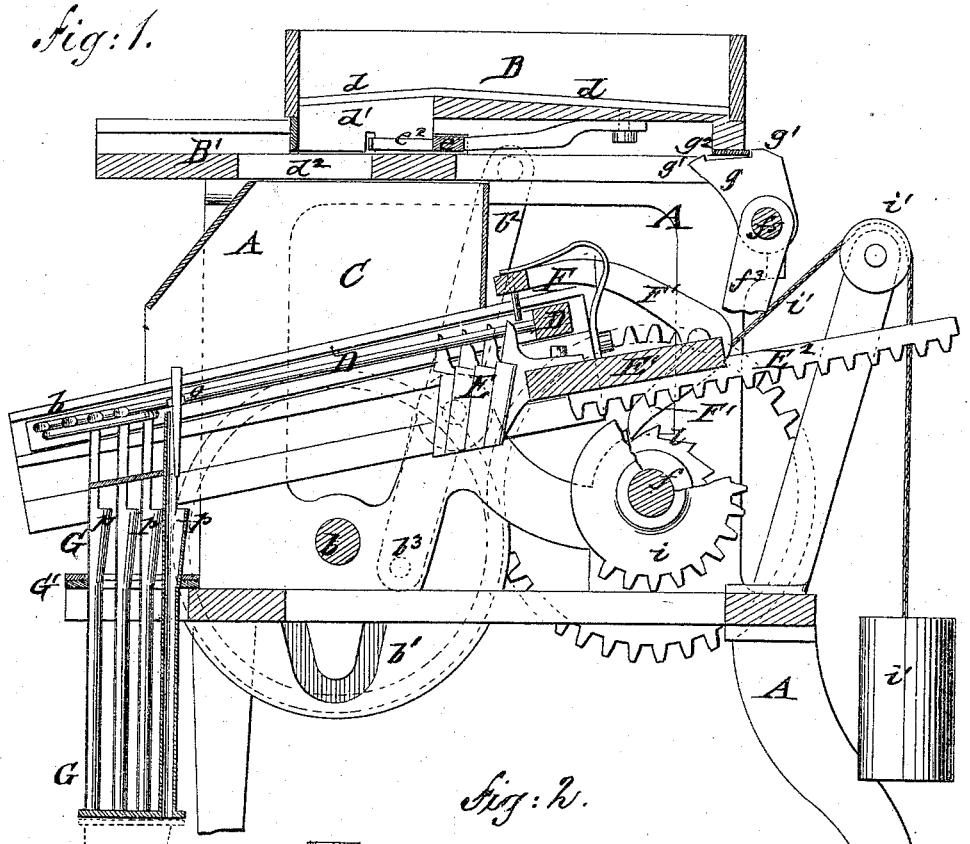
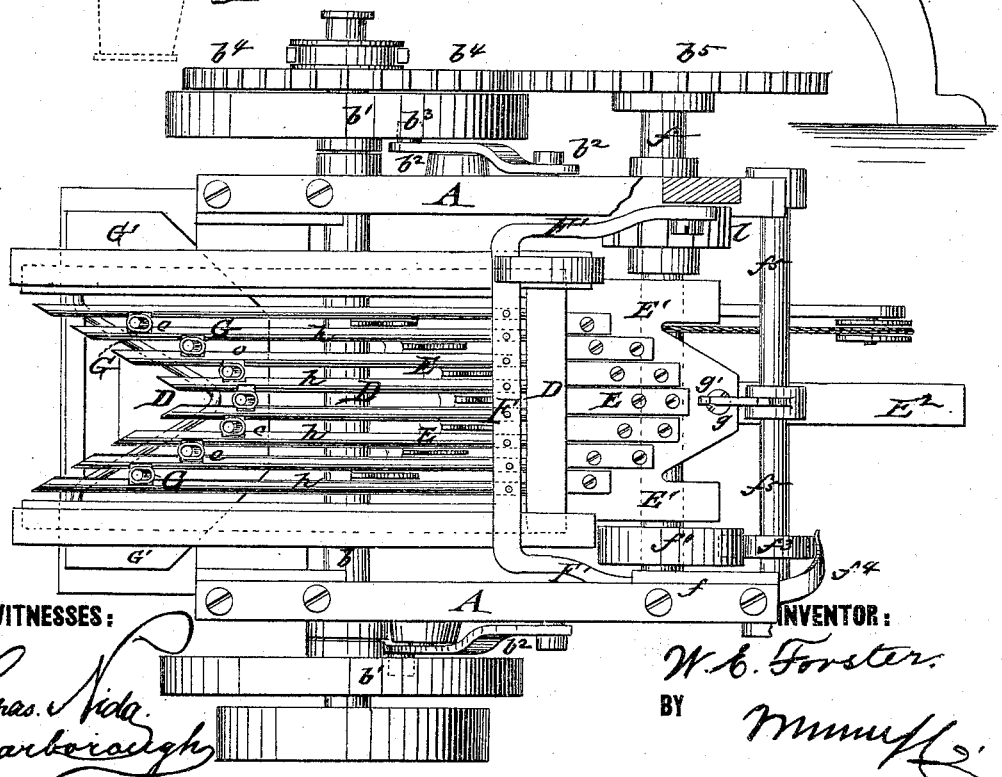


Fig: 2.



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2 Sheets—Sheet 2.

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MACHINES FOR STICKING NAILS IN HEEL BLANKS.

No. 184,363. Patented Nov. 14, 1876.

Fig: 3.

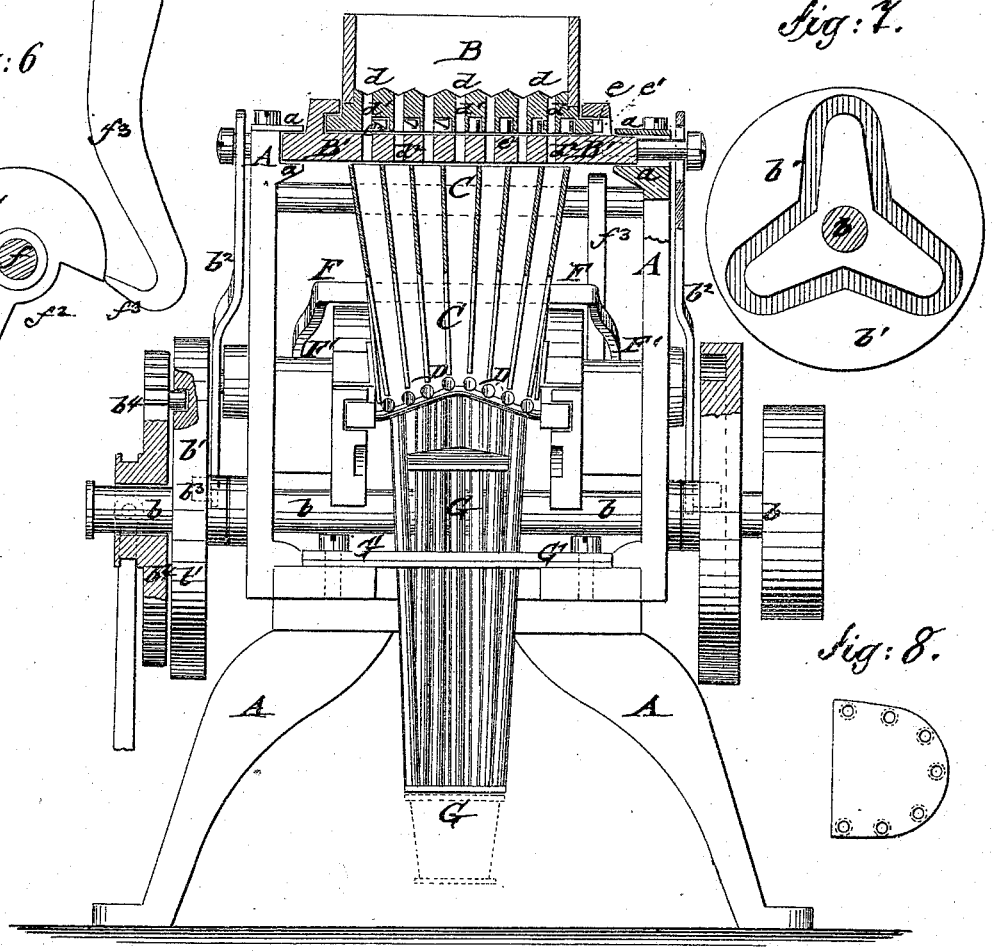

Fig: 6

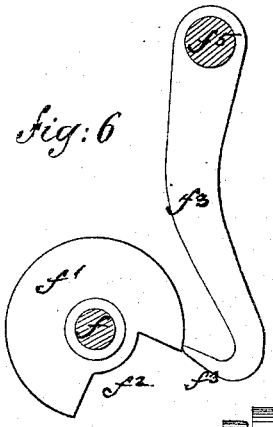

Fig: 7.

Fig: 8.

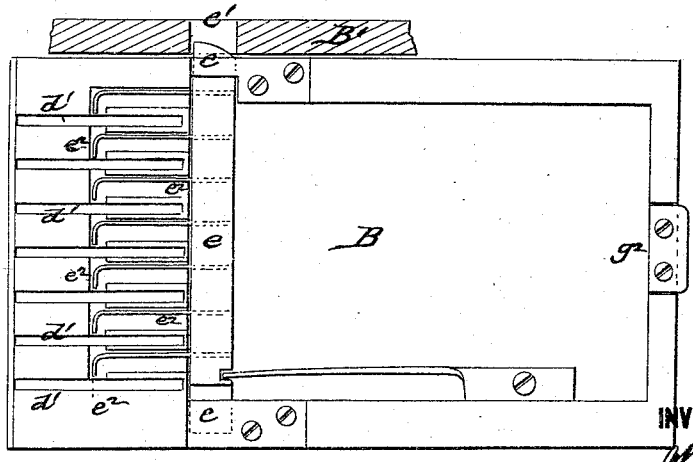

Fig: 4.

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UNITED STATES PATENT OFFICE.

WILLIAM E. FORSTER, OF NASHUA, NEW HAMPSHIRE, ASSIGNOR TO HIMSELF AND ALBERT H. SAUNDERS, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR STICKING NAILS IN HEEL-BLANKS.

Specification forming part of Letters Patent No. **184,363**, dated November 14, 1876; application filed October 14, 1876.

To all whom it may concern:

Be it known that I, WILLIAM E. FORSTER, of Nashua, in the county of Hillsborough and State of New Hampshire, have invented a new and Improved Machine for Sticking Heel-Nails, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a vertical longitudinal section of my improved machine for sticking heel-nails; Fig. 2, a plan view, and Fig. 3 an end view, of the same, partly in section. Fig. 4 is a detail bottom view of the upper slide-box of the shaker. Figs. 6 and 7 are detail views of some of the actuating mechanisms, and Fig. 8 is a bottom view of a heel punched for receiving the nails.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish to manufacturers of boots and shoes an improved machine for sticking nails into the former or heel in rapid manner, so as to dispense with the slow sticking in of the nails by hand, and produce a considerable saving in time and labor by the almost instant operation of the machine in sticking the required number of nails into any size of heel.

The invention consists, mainly, of a reciprocating shaker for arranging and dropping the nails, a funnel-shaped partitioned conductor or guide-casing for conveying the nails, an inclined and notched grate with vibrating rapper and clearers for tipping up and sliding the nails in forward direction, and of converging conducting-tubes for dropping the nails into the former or heel.

Referring to the drawing, A represents the supporting-frame of my improved nail-sticking machine, which supports, on horizontal top guide-rails *a*, the reciprocating shaker B B′. The shaker B B′ is actuated, from the driving-shaft *b*, by groove-wheels b^1 (shown in detail in Fig. 7) and fulcrumed levers b^2, that are pivoted at the upper ends to the sides of the shaker, and connected with the groove-wheels or cam-wheels *b* by a pin, b^3, at the lower ends, so as to impart a rapid reciprocating motion to the shaker.

The shaker is composed of two parts—an upper slide-box, B, and a lower slide, B′. The heel-nails are placed into the upper slide-box B, and arranged therein to assume a position parallel to the longitudinal axis of the machine by the reciprocating motion of the shaker, the nails settling in V-shaped longitudinal grooves or channels *d* of the bottom of the slide-box, the grooves acting as feed-channels for supplying the nails to the machine.

The channeled bottom of the slide-box B is provided at the front part of the same, at the lowest point of the grooves, with slots or recesses d^1, of sufficient width and length to admit the ready dropping of the nails through the bottom of the box on the front part of the lower slide B′. The slide-box B is locked to the lower slide by a laterally-guided and spring-acted bolt, *e*, that projects into a recess, e^1, of the lower slide, the end of the bolt being curved or tapering from the rear toward the front, for the purpose of admitting the release of the slide-box from the lower slide, when retained in suitable manner.

The slotted front part of the channels *d* has a slight downward inclination from the highest point at the end of the slots, and also the longer rear part of the channels a similar rearward inclination.

The inclined channels impart to the nails a tendency to move forward to the highest point, pass over the same, and drop then into the slots or recesses at the front of the slide-box, which are thus kept continually filled with nails, without regard, however, to the relative position of head or point of the same.

The lateral bolt *e* is provided with as many fingers e^2, extending at right angles therefrom in recesses at the under side of the slide-box B, and sidewise of the slots or recesses of the channels. The ends of the fingers e^2 are about midway of the slots d^1, but at an angle of ninety degrees, and tapered or pointed, so as to project over the slots when the locking slide-bolt is forced back by the retention of the slide-box, to produce the separation of the lowermost nail of each slot from those above. The upper nails are thereby retained, while the lower set is ready to be dropped through slots d^2 of the lower slide. The slots d^2 are arranged vertically below the slots of

the slide-box, but at about the length of the nails back of the front edge of the lower slide. When, therefore, the rear end of the slide-box is locked by suitable mechanism, the forward motion of the lower slide B′ brings the set of nails below the fingers over the slots of the slide, and drops them into the conductor C, arranged below the same.

The locking of the slide-box for the purpose of dropping the nails is accomplished by a treadle or lever mechanism, operated by the attendant, which throws, by a clutch mechanism, a sliding gear-wheel, b^4, into connection with the groove-wheel b^1, and into gear with a cog-wheel, b^5, of a revolving shaft, f, at the rear part of the machine. A cam, f^1, with recess f^2, is keyed to the shaft f, and connected with a hook-shaped arm, f^3, that is firmly pressed by a strong band-spring, f^4, against the cam, so as to pass along the circumference and recess of the same, as shown in detail in Fig. 6. The arm f^3 is keyed at the upper end to a shaft, f^5, which engages, by a cam or lock-plate, g, with central recess and end lugs or teeth g^1, the stop-plate g^2 at the rear part of the slide-box B.

The shaker continues to reciprocate as long as the cog-wheels are not thrown into gear by the clutch mechanism, the slide-box and slotted rear part of the lower slide passing over the lock-plate g onto the rear tooth and back of the same; but as soon as treadle and clutch are operated the spring-pressed hook-arm is thrown into the recess of the cam, and thereby the front tooth g^1 of the lock-plate raised, so as to engage the stop-plate of the slide-box B at the moment when it arrives at the extreme end of its motion. The slide-box is thereby released and locked, while the lower slide is carried forward again, so as to produce the dropping of the nails from the slots of the slide-box. As soon as the hook-arm leaves the recess of its cam the lock-plate is lowered at its front part and raised at the rear part, so that the lower slide may, on its return motion, engage the spring-bolt of the slide-box, and carry the same along, ready for dropping the next series of nails on being engaged again at the end of the backward motion by the oscillating lock-plate g. The nails are taken up, when dropped through the slots of the lower slide, by a conductor or guide-casing, C, which is divided by longitudinal partitions into as many channels as there are slots. The divisions of the conductor C correspond with the slots, and are wider or funnel-shaped at the upper part and narrower at the lower part, where they open onto the inclined grate D, so as to deposit the nails thereon. The conductor C is secured to the inclined supporting-frame of the grate by fastening-screws, or otherwise, being readily detached, if desired, to obtain access to the grate, and the parts back of the same.

The inclined grate D consists of a number of round grate-bars, h, arranged parallel to each other and to the longitudinal axis of the machine. The grate-bars h are secured to a fixed cross-piece at the rear end, and a V-shaped bar at the front end, being at such a distance from each other that the nails may not drop between the bars, but are retained by the same near the head, at such a distance below the same that the lower part is heavier than the upper, and secures the tipping or setting up of the nails into vertical position. At whatever position the nails are deposited on the grate, whether with heads in forward or backward direction, they are all tipped up into vertical position as soon as they come in contact with the round grate-bars.

To assist the setting up of the nails between the grate-bars, a spring-acted rapper, F, keeps them, by successive strokes on the rear ends, in vibration, so as to prevent any possibility of the sticking of a nail and choking of the slots between the bars. The rapper F has as many pins as there are grate-bars, and is operated by a ratchet-wheel, l, of shaft f, that raises the lower arm of the fulcrumed elbow-levers F′, to the upper arms of which the lateral rapper-bar is applied. The rapper F accelerates the tipping of the pins for the purpose of being carried forward by the reciprocating clearers E. The clearers E are secured to a slide-piece, E^1, that is guided by side rails in grooves of the inclined grate-frame, being moved in forward direction by a mutilated pinion, i, of shaft f engaging an extension rack-bar, E^2, of slide-piece E^1, and carried back again by a weight, pulley, and cord, i'. The clearers E are concaved or channeled at the face parts below the grate-bars, and extended by tooth-shaped projections or pins upward between and above the grate-bars. The upper parts serve to carry the nails forward in the grooves, the lower parts to take up the nails and conduct them into the conducting-tubes G at the front end of the grate-bars.

The grate-bars D are provided near their front ends with notches O, which are so arranged that the notches of two adjoining grate-bars face each other and form together an enlarged recess of square or round shape. These recesses are disposed on the grate in the shape of a V, having its apex at the center, and legs extending forward to both sides, as shown clearly in the top view, Fig. 2.

The clearers E, as well as conducting-tubes G, are also arranged in V shape, for the purpose of feeding and dropping the nails simultaneously from the notched grate-bars to the conducting-tubes G. These tubes are placed vertically below the notches o, and cut off or recessed at the rear part to a distance below the grate-bars equal to the length of the clearers, which form a tubular space therewith when carried into forward position.

The tubes G are provided with backward-projecting pockets or funnels p, Fig. 1, below the ends of the clearers, so as to take up the nails dropping through the notches of the grate-bars, and preventing any possibility of missing the conducting-tubes, in case one

or the other of the nails should have moved ahead of its clearer.

The tubes G are secured to a plate, G′, which is attached by fastening-screws to frame A. They are converging toward each other, and adapted at their lower ends exactly to the shape and size of the heel or former into which the nails are intended to be inserted. As the number of nails varies with the size of the heel, a special set of converging extension-tubes is required for each size and number of nails, which is secured to the lower end of the conducting-tubes G. The machine, however, is made with as many slots in the shaker, divisions in the conductors, grate-bars, and clearers as are required for the largest size of heel and greatest number of nails.

Whenever it is desired to stick a smaller heel, requiring a less number of nails, the slots of the slide-box of the shaker are closed symmetrically at both sides by suitably-fitting pieces, and the corresponding extension-tubes attached to the main conducting-tubes, so that only the exact number of nails required is dropped and fed forward on the grate to the conducting-tubes G and heel.

The V-shaped disposition of the notches, clearers, and tubes admits the convenient arrangement of the converging tubes, and adapts them to be used for any size of heel, enabling thereby the machine to stick any size of heel or former with great rapidity and facility, as long as the clutch mechanism is thrown into gear with the actuating parts, the working of the machine being interrupted, with the exception of the motion of the reciprocating shaker, by releasing the clutch by the lever or treadle.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a machine for sticking heel-nails, the combination of a reciprocating shaker and dropper, B B′, connecting conductor or guide-casing C, inclined and vibrated grate D, reciprocating clearers, and converging guide-tubes, constructed and operated substantially as and for the purpose set forth.

2. The combination of a continually-reciprocating lower slide and an upper slide-box locked thereto, and released intermittently for dropping of nails, substantially as described.

3. The upper slide-box, provided with longitudinal channels, having front slots arranged at different inclination to the rear or feed channels, substantially as specified.

4. The combination of the upper slide-box, having bottom channels with front slots, with a lateral spring-bolt having fingers with bent pointed ends, to drop one nail for each slot and retain those above, substantially as described.

5. The combination of slotted upper slide-box, having lateral spring-bolt, and reciprocating lower slide, having corresponding slots, with oscillating cam or lock-plate, to release bolt and retain slide-box for dropping of nails, substantially as set forth.

6. The combination of a reciprocating feed mechanism with a partitioned conductor or guide-casing, C, having divisions, wider at the top and narrower at the bottom, to conduct nails from shaker to grate, substantially as set forth.

7. The combination of the inclined grate-bars with a vibrating rapper for tipping up the nails deposited on the guide-bars, as described.

8. The combination of the inclined grate-bars, notched near the front end, reciprocating clearers, and converging conducting-tubes, for feeding nails to heel or former, substantially as specified.

9. The clearers E, having concaved or channeled lower parts and tooth-shaped upper parts extending above guide-bars, substantially as set forth.

10. The grate-bars being notched at both sides in such a manner that the facing notches of two adjoining bars form recesses which are disposed to approximate the shape of a heel, substantially as described.

11. The converging and conducting tubes, being recessed at the upper rear parts, and provided with extension pockets or funnels, to take up the nails from the notched grate-bars and clearers, substantially as specified.

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Witnesses:

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ALEX. F. ROBERTS.