No. 759,350. PATENTED MAY 10, 1904.

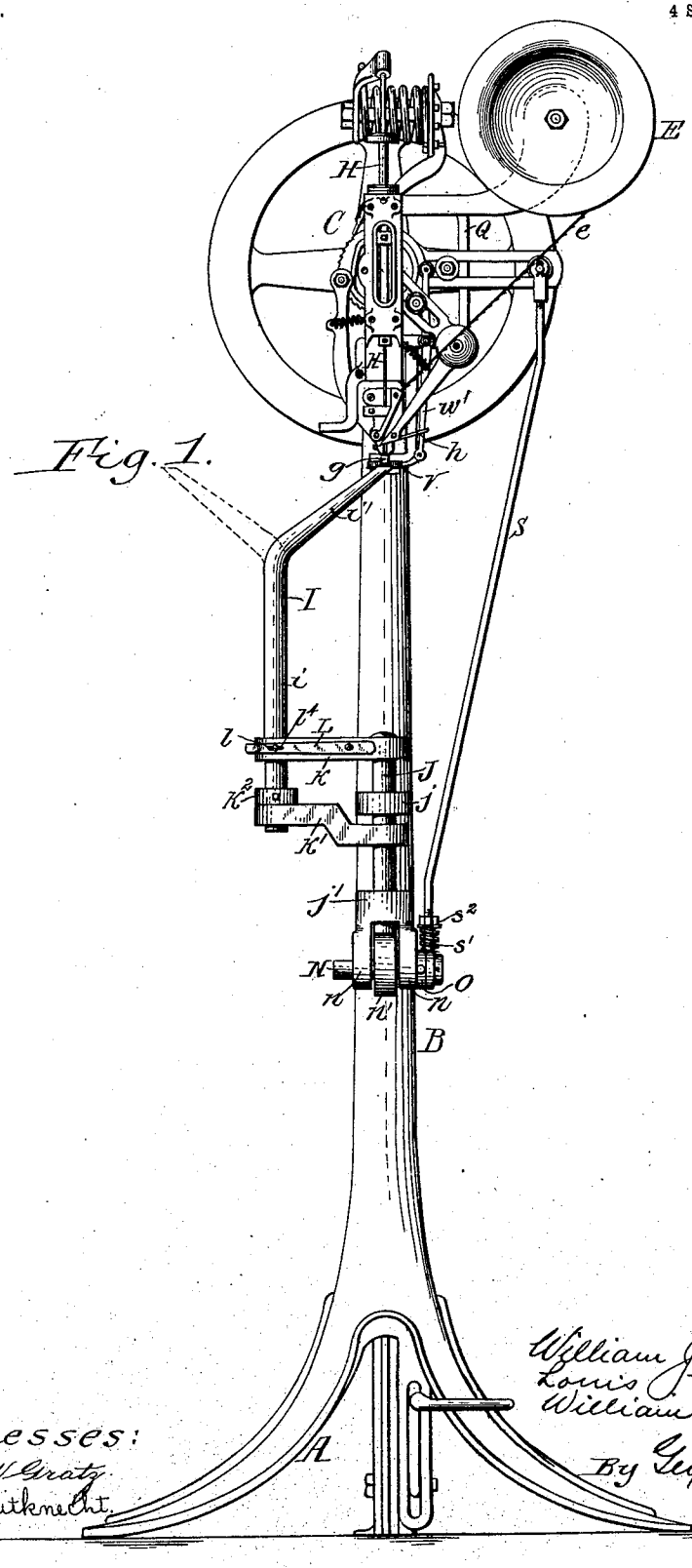
W. J. DARLING, L. GEYER & W. EVERS.

NAILING MACHINE.

APPLICATION FILED MAY 27, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.




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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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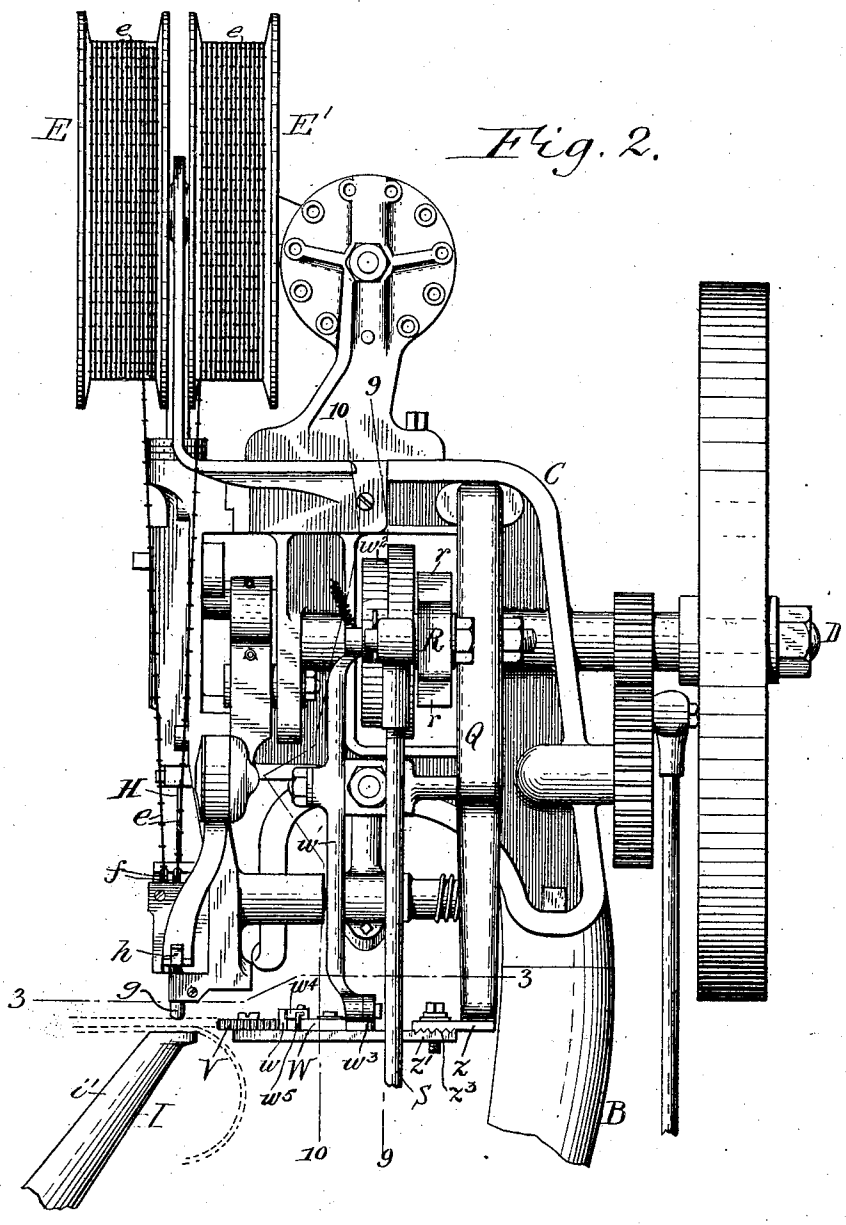
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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.




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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3.

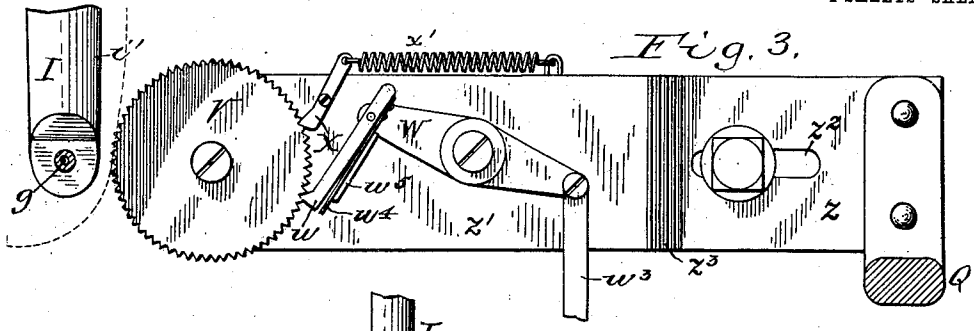



Fig. 4.

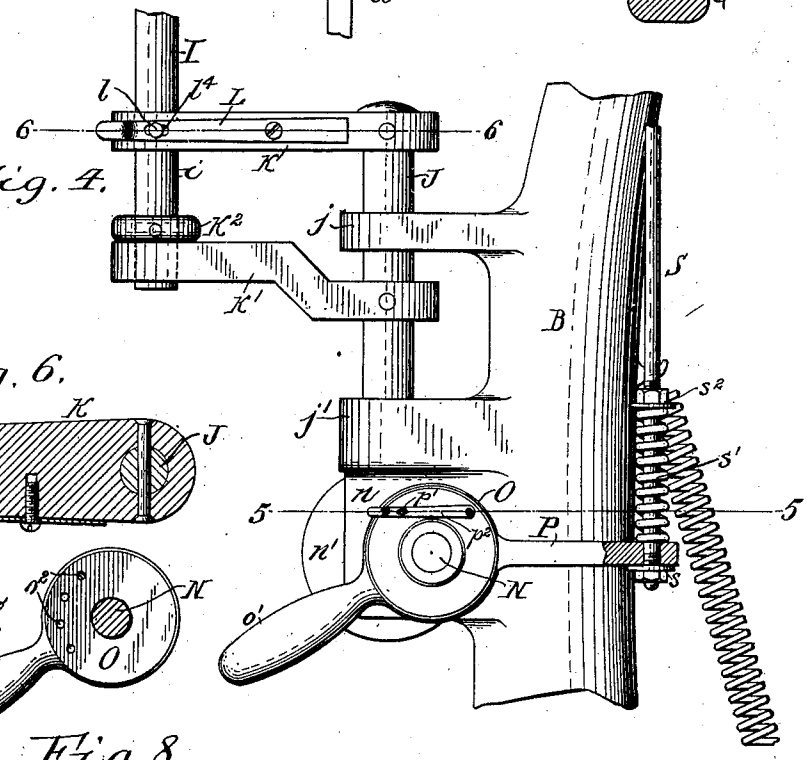



Fig. 6.




Fig. 7.




Fig. 8.

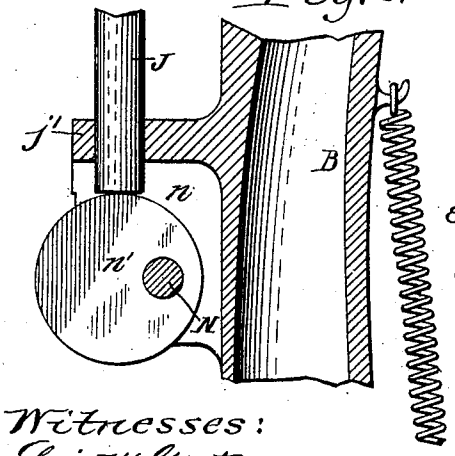
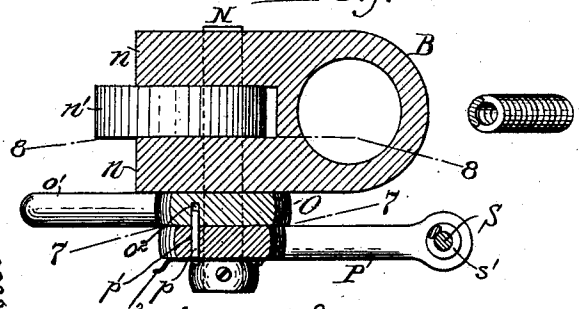



Fig. 5.




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No. 759,350. PATENTED MAY 10, 1904.

W. J. DARLING, L. GEYER & W. EVERS.

NAILING MACHINE.

APPLICATION FILED MAY 27, 1903.

NO MODEL. 4 SHEETS—SHEET 4.

Fig. 9.

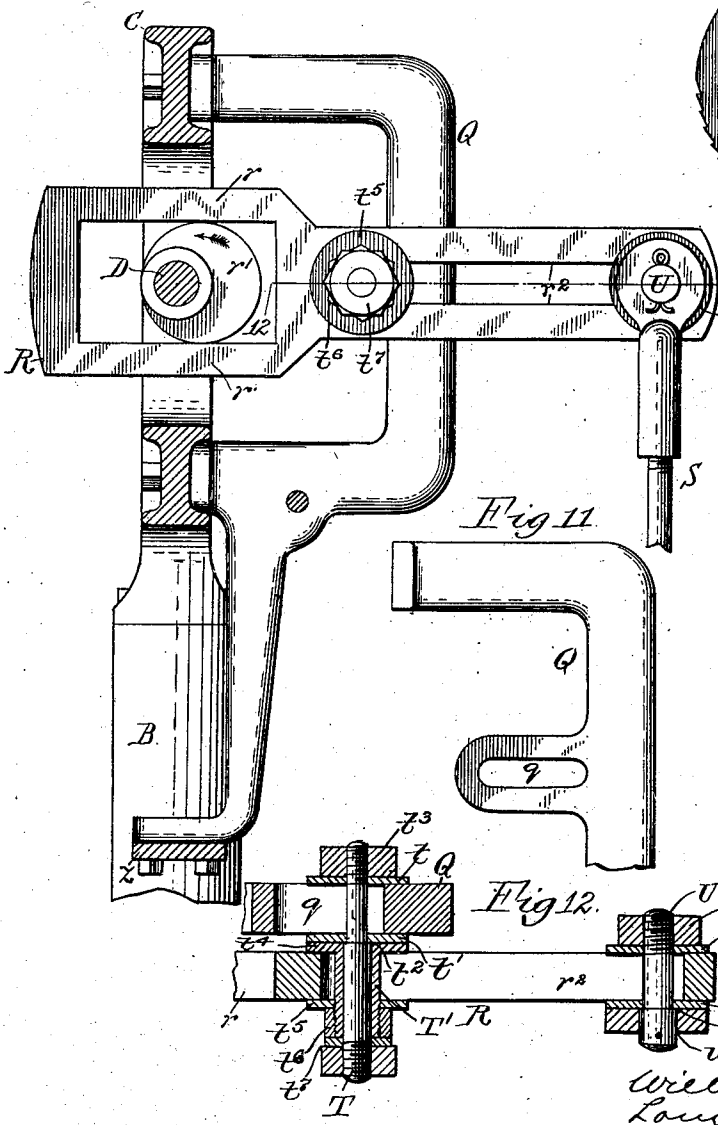



Fig. 10.

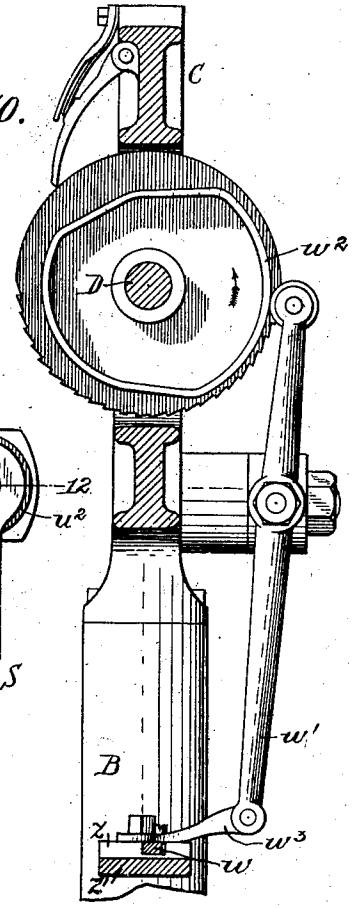



Fig. 11.

Fig. 12.




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No. 759,350. Patented May 10, 1904.

# UNITED STATES PATENT OFFICE.

WILLIAM J. DARLING, LOUIS GEYER, AND WILLIAM EVERS, OF BUFFALO, NEW YORK, ASSIGNORS TO W. J. DARLING MACHINE COMPANY, OF BUFFALO, NEW YORK.

## NAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 759,350, dated May 10, 1904.

Application filed May 27, 1903. Serial No. 158,966. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM J. DARLING, LOUIS GEYER, and WILLIAM EVERS, citizens of the United States, and residents of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Nailing-Machines, of which the following is a specification.

This invention relates to a nailing-machine which is more particularly designed for fastening the soles of shoes.

The object of this invention is to improve the means for feeding the shoes past the nailing device as the work progresses and also to provide means for holding the shoe in place, which are simple and durable in construction, reliable in operation, and which can be readily adjusted to suit shoes having soles of varying thickness and width.

In the accompanying drawings, consisting of four sheets, Figure 1 is a front elevation of a nailing-machine embodying our improvements. Fig. 2 is a side elevation of the upper part of the machine on an enlarged scale. Fig. 3 is a horizontal section, on an enlarged scale, in line 3 3, Fig. 2. Fig. 4 is a fragmentary side elevation, on an enlarged scale, of the standard and part of the means for operating the horn. Figs. 5 and 6 are horizontal sections in lines 5 5 and 6 6, Fig. 4, respectively. Figs. 7 and 8 are fragmentary vertical sections in lines 7 7 and 8 8, Fig. 5, respectively. Figs. 9 and 10 are vertical cross-sections in lines 9 9 and 10 10, Fig. 2. Fig. 11 is a fragmentary elevation of the supporting-bracket, mounted on the main frame. Fig. 12 is a horizontal section in line 12 12, Fig. 9.

Similar letters of reference indicate corresponding parts throughout the several views.

The main frame of the machine consists, essentially, of a base A, a standard B, rising from the base, and a head C, mounted at the upper end of the standard.

D represents the main driving-shaft of the machine, which is journaled lengthwise in the head and driven in any suitable manner, either by a motor or foot-power.

The nails employed for fastening the soles of the shoes are preferably supplied in the form of a continuous or connected series or string *e*, commonly known as "string-nails." Two sizes of such nails are usually supplied from reels E E′, mounted on the upper part of the head. From each of these reels the string-nails pass downwardly through a passage in a carrier *f*, thence downwardly through a guide or throat *g*, and thence downwardly into the sole of the shoe which is being nailed. The feeding of the string-nail from the reel through the carrier and into the throat is effected by means of a blade *h*, having a compound horizontally and vertically oscillating movement. At the beginning of the nail-feeding operation the blade first moves the string-nail downwardly through the carrier and throat and then cuts the same off between the carrier and throat. Thereafter the cut-off portion of the string forming the nail is driven by a vertically-movable driver H downwardly through the sole and upper of the shoe, which latter at this time are in a position to receive the same. This nail feeding, cutting, and driving mechanism forms no part of our improvements, the same being shown in Patents No. 215,116, dated May 6, 1879, and No. 217,868, dated July 29, 1879, to which reference may be had for a detail description of its construction and operation.

I represents the horn which supports the shoe during the nailing operation. This horn consists of a vertical spindle *i* and an oblique anvil *i′*, projecting laterally from the upper end of the spindle and normally arranged at its free outer end underneath the nail-guide or throat.

J represents a vertical shifting rod, which is arranged below the nail-guide or throat and in line therewith and which is mounted in lugs *j j′*, projecting forwardly from the central part of the standard, so as to be capable of sliding vertically and also rotating horizontally.

*k k′* represent a pair of supporting-arms, which are secured one above the other to the upper part of the shifting rod and which are provided at their outer ends with bearings in

which the lower end of the horn-spindle is journaled, so that the latter can turn horizontally on an axis, which is eccentric to the axis of the supporting-arms. The downward movement of the horn relatively to the supporting-arms is limited by a collar $k^2$, arranged on the lower part of the spindle and bearing against the upper side of the lower supporting-arm.

A locking device or catch is provided whereby the horn may be held against turning on the supporting-arms or permitted to turn relatively thereto. This catch preferably consists of a flat spring L, secured at one end to the side of the upper supporting-arm $k$, and a locking-pin $l$, passing transversely through an opening $l'$ in said arm, and a recess $l^2$ in the spindle, while its outer end is provided with a contracted neck $l^3$, which is arranged in a slot $l^4$ in the free end of the spring L. Preparatory to applying a shoe to the anvil of the horn the locking-pin is withdrawn from the horn-spindle, permitting the free end of its anvil to be swung laterally from underneath the nailing device, as shown by dotted lines in Fig. 1, thereby enabling the shoe to be applied to the horn more easily and conveniently. After thus applying the shoe to the horn the same is turned backwardly for bringing the free end of its anvil underneath the nailing device, in which position of the parts the locking-pin enters the recess of the horn-spindle and holds the horn rigid relatively to the supporting-arms. While the horn is thus held the same may be turned bodily with the supporting-arms on the axis of the latter for adjusting the shoe to the nailing device in a manner common to this kind of machine.

While the nail is being forced through the sole and vamp the latter are pressed firmly against the guide-throat by the horn, which at this time is moved upwardly, and the lower end of the nail is turned or clenched by engaging with the free end of the horn-anvil. After the nail has been thus driven the horn is lowered sufficiently to release the shoe and permit the same to be shifted for bringing another part of the sole and vamp into line with the nailing device. The means for effecting this vertical movement of the horn is constructed as follows:

N represents a horizontal rock-shaft, which is journaled transversely in bearings $n$, arranged on the lower guide-lug $j''$. Between its bearings the rock-shaft is provided with an eccentric or cam $n'$, which engages with the lower end of the shifting rod J. Near one of its ends the rock-shaft has secured thereto a collar or disk O, which is provided on its periphery with a forwardly-projecting handle $o'$ and on its outer side with a segmental row of openings or recesses $o^2$.

P represents a rearwardly-projecting rock-arm, mounted loosely on the rock-shaft adjacent to the outer side of the collar O. This arm is adjustably connected with the shaft for varying the relative position of the rock-arm and the cam $n'$. The preferred means for effecting this adjustment consists of a coupling or locking pin $p$, movable transversely in an opening $p'$ in the hub of the rock-arm and adapted to engage at its inner end with one or another of the recesses in the collar, and a flat spring $p^2$, secured at one end to the outer side of the rock-arm and loosely connected at its opposite end to the outer end of the coupling-pin. When the latter is withdrawn, the cam $n'$ may be turned into the required position by means of the handle $o'$, after which the coupling-pin is released and projected by its spring into the adjacent recess of the collar, thereby holding the parts in the shifted position.

Q represents a bracket, secured to one side of the head of the frame, and R is a rock-lever, pivoted between its ends on said bracket, so as to turn in a vertical plane. The inner end of the rock-lever is provided with a yoke $r$, which embraces a cam $r'$ on the main shaft, whereby the rock-shaft is oscillated. At its outer end the rock-lever is connected with the upper end of the connecting-rod S, which latter passes at its lower end through an opening in the rear end of the rock-arm P. Below the latter the connecting-rod is provided with a shoulder, consisting, preferably, of a washer and screw-nut $s$, and above said arm the rod is surrounded by a compensating spring $s'$, which bears at its ends against the top of said arm and a screw-nut and washer $s^2$ on the rod. As the rod moves upwardly with the outer end of the rock-lever the rock-arm is raised by the lower shoulder of the rod, and the cam $n'$ is turned in the direction for lowering the horn, while the downward movement of the rod and arm causes the cam to be turned in the direction for raising the horn. The downward movement of the rod S is preferably greater than that required for merely raising the shoe against the nail-guide, which causes the spring $s'$ to be compressed between the rod and rock-arm during the excess movement of the rod and its actuating device. By this means the shoe is held between the guide-throat and the horn with a yielding grip, and compensation is provided for any slight variations in the thickness of the material which is being nailed together. To permit of varying the effective throw of the rock-lever relatively to the connecting-rod S and the parts connected therewith, the pivotal connections between the rock-lever and the bracket and rod are made adjustable to suit the requirements. As shown in Figs. 9, 11, and 12, the bracket and rock-lever are provided with horizontal slots $q$ $r^3$, which extend in substantially the same direction. The fulcrum of the rock-lever consists of a screw or pivot bolt T, arranged at one end in the slot of the

bracket and adjustably secured therein by means of washers $t$ $t'$, interposed between opposite sides of the bracket and a shoulder $t^2$ and screw-nut $t^3$ on the bolt, a sleeve T', mounted on the other end of the bolt and extending through the slot of the rock-lever, a flange $t^4$ on one end of the sleeve bearing against one side of the lever, a washer $t^5$ pressed against the opposite side of the lever by a screw-nut $t^6$ on the sleeve, and a washer and screw-nut $t^7$ for confining said sleeve on the bolt. Upon loosening the screw-nuts the pivot-bolt may be shifted in the bracket and lever for varying the leverage of the latter. The pivotal connection between the outer end of the rock-lever and the connecting-rod S consists of a pivot-bolt U, one end of which passes through an eye $u$ at the upper end of said rod, while its opposite end is arranged in the outer end of the slot in the rock-lever and is adjustable therein by means of washers $u'$ $u^2$, interposed between opposite sides of the rock-lever and a shoulder $u^3$ and screw-nut $u^4$ on the pivot-pin.

By means of the adjustable coupling between the rock-arm and the cam $n'$ a coarse adjustment of the throw of the horn may be effected quickly; but if a fine adjustment is required intermediate of the space between two of the recesses in the collar O this can be obtained by adjusting the pivotal connection between the rock-lever and the bracket and rod.

As the nailing of the shoe proceeds the same is moved forward intermittently by a feed device, which is constructed as follows:

V represents a horizontal feeding-wheel having a toothed or serrated periphery. This wheel is arranged to bear at its front side against the edge of the sole and by its rotation to feed the same past the nailing device. The intermittent rotary movement of the wheel is effected by a horizontal swinging rock-lever W, provided on its front arm with an actuating or feed pawl $w$, engaging with the rear side of the toothed periphery of the wheel, and an upright rock-lever $w'$, having its upper arm engaging with a cam $w^2$ on the main shaft and its lower arm connected by a link $w^3$ with the rear arm of the horizontal rock-lever.

X represents a detent-pawl engaging with the rear side of the periphery of the feeding-wheel for preventing backward movement thereof.

Projecting forwardly from the lower end of the upright bracket Q is a horizontal bracket, which supports the feeding mechanism. The horizontal bracket is composed of a fixed rear section $z$, secured to the lower end of the upright section, and a front section $z'$, which is adjustably connected with the rear section by a bolt entering a screw-threaded opening in the front section and passing through a slot $z^2$ in the overlying part of the rear section. In order to prevent the vibrations of the machine from disturbing the relative position of the sectional bracket, the opposing faces thereof are serrated or ribbed, as shown at $z^3$, which are interlocked and securely hold the parts in place. On the upper side of the front section the feeding-wheel, actuating-pawl, lever, and detent-pawl are pivoted. The actuating-pawl is yieldingly held in engagement with the feeding-wheel by a flat spring $w^4$, secured at one end to the outer side of this pawl and bearing at its opposite free end against an abutment or pin $w^5$ on the adjacent part of the adjustable bracket-section. The detent-pawl is yieldingly held in place by a spring $x'$, connecting the same with the adjustable bracket-section, as shown in Fig. 3.

By rendering the feeding device adjustable in the manner described the same may be readily adapted to variations in the widths of the soles of shoes for placing the nails the proper distance from the edge.

The employment of but a single wheel for engaging the edge of the sole and also forming part of the ratchet mechanism renders the construction simple and compact.

We claim as our invention—

1. The combination of a nail-guide, a horn coöperating with said guide for clamping the article to be nailed between them, a lifting-cam for moving said horn toward the nail-guide, a rock-arm connected with said cam, an actuating-cam, a rock-lever operated upon by said actuating-cam, and a yielding connection between said rock-arm and rock-lever, substantially as set forth.

2. The combination of a nail-guide, a horn coöperating with said guide for clamping the article to be nailed between them, a lifting-cam for moving said horn toward the nail-guide, a rock-arm connected with said cam, an actuating-cam, a rock-lever operated upon by said actuating-cam, a shifting rod connected with said rock-lever and passing loosely through said rock-arm, and a compensating spring interposed between the rock-arm and shifting rod, substantially as set forth.

3. The combination of a nail-guide, a horn coöperating with said guide for holding the article to be nailed, and a shifting device for moving said horn comprising a supporting-bracket provided with a slot, a rock-lever having a slot arranged adjacent to the slot and the bracket, and a pivot arranged in said slots and capable of adjustment lengthwise thereof, substantially as set forth.

4. The combination of a nail-guide, a horn coöperating with said guide for holding the article to be nailed, and a shifting device for moving said horn comprising a supporting-bracket provided with a slot, a rock-lever having a slot arranged adjacent to the slot in the bracket, a sleeve arranged in the slot of the rock-lever,

and an adjustable clamping-bolt arranged in said sleeve and the slot of said bracket, substantially as set forth.

5. The combination of a nail-guide, a horn coöperating with said guide for holding the article to be nailed, a shifting-cam for shifting said horn, and a rock-arm adjustably connected with the cam, substantially as set forth.

6. The combination of a nail-guide, a horn coöperating with said guide for holding the article to be nailed, a shifting-cam for shifting said horn, a rock-shaft carrying said cam and provided with a collar having a segmental row of openings, a rock-arm mounted loosely on said shaft, and a catch mounted on said arm and constructed to engage with one or another of the openings in said collar, substantially as set forth.

7. The combination of a nail-guide, a horn coöperating with said guide for holding the article to be nailed, a vertically-movable slide-rod upon which the horn is mounted, a cam engaging with the lower end of said rod, a rock-shaft connected with said cam, a collar rigidly secured to said shaft and provided with a handle and a segmental row of openings, a rock-arm mounted loosely on said shaft and provided with a single opening, a catch comprising a spring secured to the rock-arm having a pin passing through the opening in the rock-arm and one of the openings of the segmental row, a rock-lever connected with said rock-arm, a cam for operating the rock-lever, and an adjustable pivot upon which the rock-lever turns, substantially as set forth.

Witness our hands this 21st day of May, 1903.

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