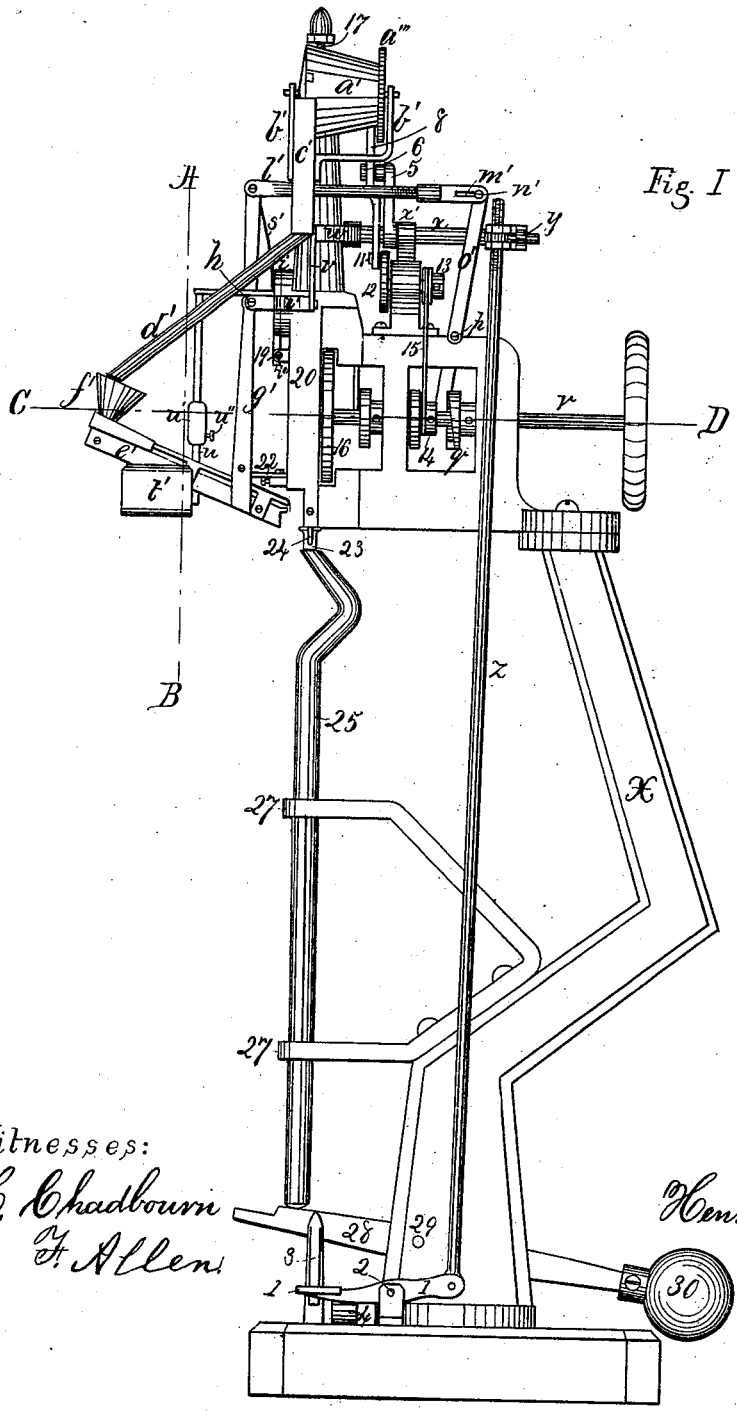
4 Sheets—Sheet 1.

# H. DUNHAM.

## Boot and Shoe Nailing Machine.

No. 207,956. Patented Sept. 10, 1878.

Fig. I




Witnesses:
H. Chadbourn
F. Allen

Inventor:
Henry Dunham,
by Allan Andrew
his atty.

# H. DUNHAM.

## Boot and Shoe Nailing Machine.

No. 207,956. Patented Sept. 10, 1878.

Fig. 2.

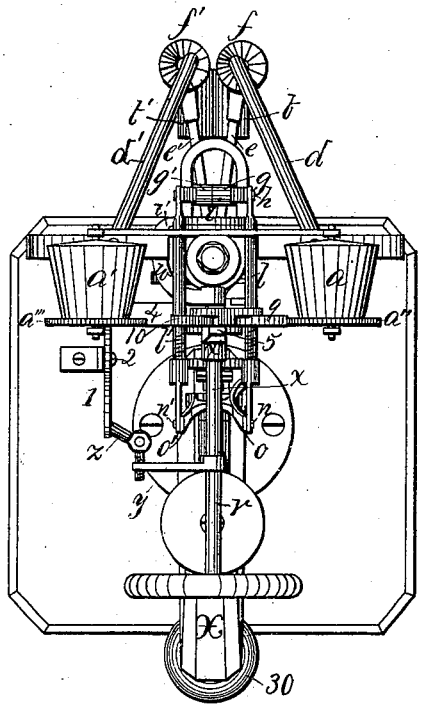
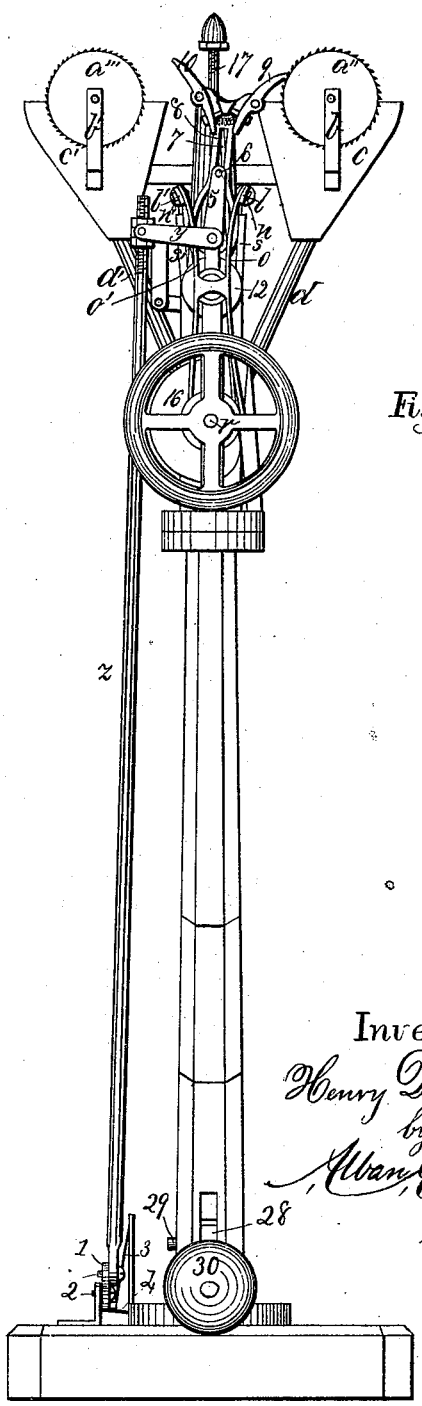


Fig. 3.



Witnesses:
Henry Chadbourn.
F. Allen.

Inventor:
Henry Dunham.
by
Alban Andrén
his atty.

4 Sheets—Sheet 3.

# H. DUNHAM.

## Boot and Shoe Nailing Machine.

No. 207,956. Patented Sept. 10, 1878.

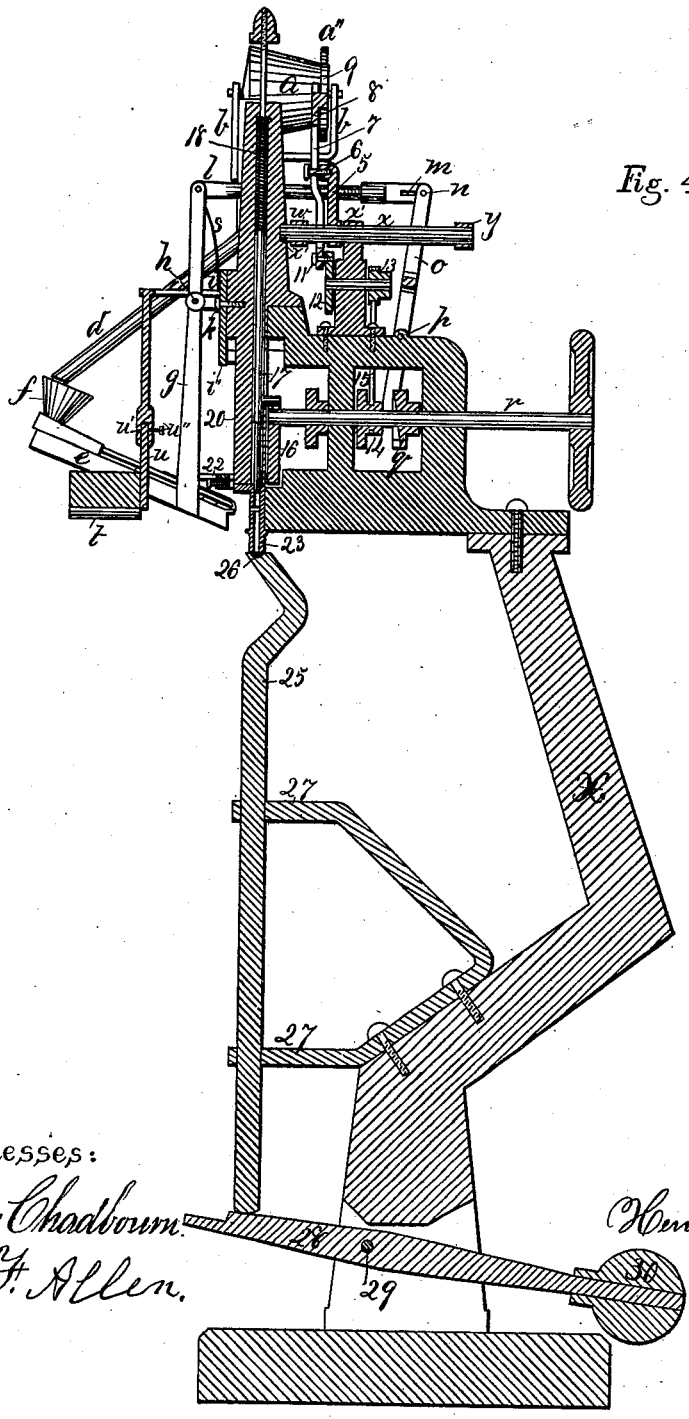


Fig. 4.

Witnesses:
Henry Chadbourn
F. Allen.

Inventor:
Henry Dunham
by
Uhan Andrén
his atty.

4 Sheets—Sheet 4.

# H. DUNHAM.

## Boot and Shoe Nailing Machine.

No. 207,956. Patented Sept. 10, 1878.

Fig. 7.

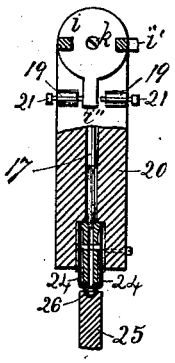



Fig. 6.

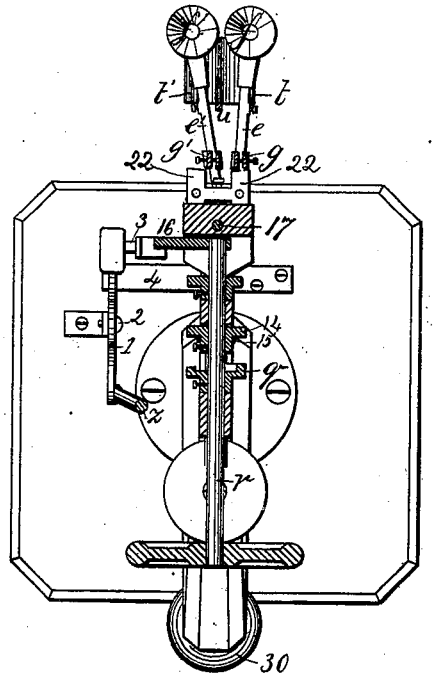
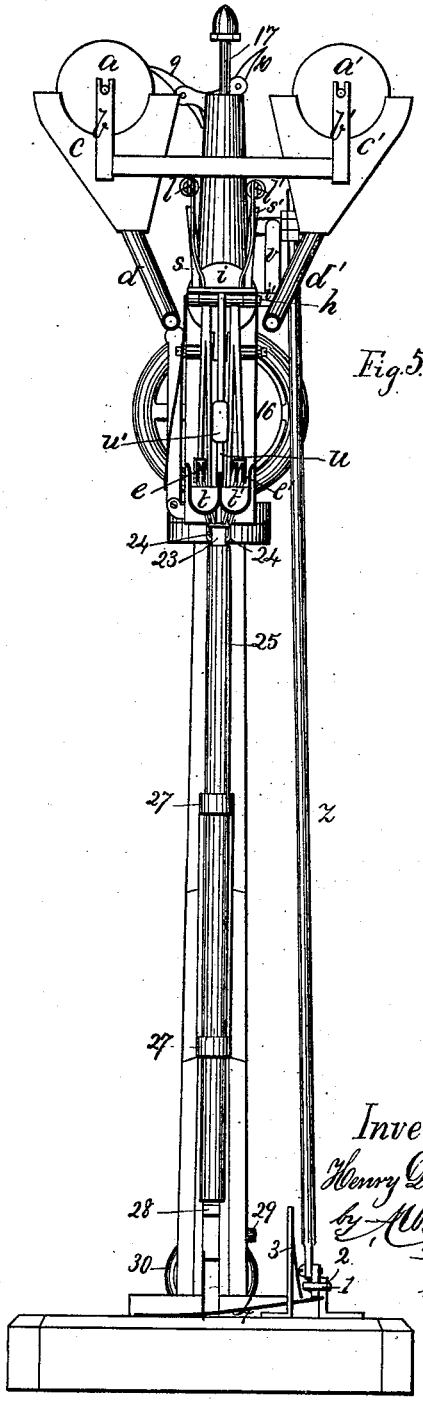



Fig. 5.




Inventor:
Henry Dunham
by Munn & Andrén.
his atty.

Witnesses:
Henry Chadbourn
F. Allen.

# UNITED STATES PATENT OFFICE.

HENRY DUNHAM, OF ABINGTON, MASSACHUSETTS.

## IMPROVEMENT IN BOOT AND SHOE NAILING MACHINES.

Specification forming part of Letters Patent No. **207,956**, dated September 10, 1878; application filed March 8, 1878.

*To all whom it may concern:*

Be it known that I, HENRY DUNHAM, of Abington, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Nailing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in nailing-machines for boots and shoes, &c.; and consists of two separate nail-reservoirs, for different lengths of nails; two inclined stationary ways, one from each of the nail-reservoirs; two automatic movable ways, having a forward and back as well as a side movement, so that the lower end of either of the ways may move directly into the nail-tube, according to the wish of the operator, by which either of the reciprocating ways is shipped in a line with the nail-tube. A pair of dishes or troughs are suspended beneath the reciprocating ways, and partake of the shipping motion of the latter, so as to catch the nails that drop out or fail to enter the reciprocating inclined ways.

When it is desired to work with nails from either of the reservoirs, such reservoir is automatically set in a rotary motion by means of a shipping device and intermediate conecting mechanism, that also acts upon the corresponding reciprocatory inclined way, placing it in a line with the nail-tube, and gives the said inclined way a forward and back motion. At the same time the other nail-receptacle and its corresponding inclined way remain stationary.

The reservoirs are set in a rotary motion by means of a pair of pawls and ratchets operated from the driving-shaft, in such a manner that while one pawl moves one of the reservoirs the other remains at rest, and vice versa, according to the wish of the operator.

Whenever a nail-track is not in use, and shipped out of line with the nail-tube, it is held back upon a rest, where it remains stationary during the operation of the other nail-track. This shipping can be done at the will of the operator while the machine is in motion, as the cam by which the nail-tracks are operated throws them out far enough to be deposited on the stationary shelf or rest during each revolution of said cam.

When the driving-shaft is set in a rotary motion, either of the nail-receptacles and its nail-track is put in operation simply by pressure upon a foot-lever acted upon at the will of the operator.

It is also very desirable and necessary that the reciprocating tracks or ways should be capable of lateral adjustment, so that when any of said tracks is shipped in working position it shall work in a line with the nail-tube without coming in contact with the rest or shelf or hitting on one side of the said nail-tube, and for this purpose I employ adjusting-screws on two opposite sides of the rocking head to which the track-supporting levers are hinged.

The reciprocating nail-tracks are operated by means of a cam on the driving-shaft acting upon a forked lever having two upper ends connected to horizontal connecting-rods, the forward ends of which are jointed to rocking levers that are capable of a swinging motion with the nail-tracks to which their lower ends are secured, as well as a lateral shipping motion, for the purpose of shipping either of the tracks in a line with the nail-tube.

The rear ends of the horizontal connecting-rods aforesaid are provided with slots, in which the screws on the forked cam-lever aforesaid are inserted, by which arrangement one track can be set in motion while the other is at rest.

Each nail-track is swung from the nail-tube by means of the cam above named, its forked cam-lever, horizontal connecting-rod, and rocking lever; and it is swung toward the nail-tube for the purpose of delivering the nails therein for the action of the driver by means of a suitable spring for each rocking lever.

The driver is set in motion upward by means of a rotary cam on the driving-wheel, and downward to drive the nail by means of a coiled or other spring in the usual manner.

The machine is shipped so as to operate either of the nail-receptacles and its corresponding nail-track by means of a treadle, having a spring beneath it and a suitable locking device on the top, by which the said treadle is automatically reshipped as soon as the op-

erator relieves the locking device from above the treadle.

The rear end of said treadle is jointed to an upright rod, the upper end of which is jointed to a rocking lever attached to a rock-shaft movable in bearings, from which rock-shaft extends a horizontal lever, jointed to a connecting-rod, the lower end of which is connected to a projection on the reciprocating fulcrum-head for the track-lever, by which either of the nail-tracks can be placed in working position in a line with the nail-tube. The said rock-shaft is also provided with a vertical lever, provided with a pin and roll, working in a slotted opening of a lever, the lower end of which is jointed to a rotary crank, and the upper end of which is provided with a pair of pawls acting upon ratchet-wheels on each of the rotary nail-receptacles, by which either of the nail-receptacles is set in a rotary motion, so as to deliver the nails into the desired nail-track.

The dishes that are suspended beneath the movable nail-tracks are made in two compartments, having a division-wall in the middle, and are made capable of lateral adjustment with the nail-tracks, being for this purpose attached to a rod, the upper end of which is secured to the reciprocating fulcrum-head for the nail-track levers. The said dishes can easily be removed from their support for the purpose of emptying the nails collected therein, as may be required.

Spring-dies are used on two opposite sides of the nail-tube for the purpose of holding each successive nail in its proper position until acted upon by the driver.

Any of the ordinary feed-motions may be used in connection with my invention; but I prefer to use a four-motion feed.

An important feature of my invention is the employment of a horn, upon which the shoe rests while being fed, and upon which the nail is clinched when driven. The upper surface of the said horn, where it comes in contact with the shoe resting thereon, is smooth, excepting on its center, or where the nail strikes it when it is clinched, where it is depressed or concaved a little, for the purpose of turning back the point of the nail. In this depression the nail follows the curve of the concavity, which directs it back into the leather, insuring a more perfect clinch. The said horn is automatically forced upward by means of a weighter treadle-lever or similar equivalent device.

On the accompanying drawings, Figure 1 represents a side elevation of my improved nail-machine. Fig. 2 represents a plan view. Fig. 3 represents a rear elevation. Fig. 4 represents a central longitudinal section. Fig. 5 represents a sectional front elevation on the line A B in Fig. 1. Fig. 6 represents a cross-section on the line C D, shown in Fig. 1; and Fig. 7 represents a sectional view of the nail-tube.

Similar letters refer to similar parts wherever they occur on the different parts of the drawing.

*a a'* represent the nail-receptacles, movable in bearings *b b'* secured to the tunnels *c c'*, the latter terminating as stationary conductors *d d'*, as shown. *e e'* represent the inclined nail-tracks, having tunnels *f f'* in their upper ends, into which the lower ends of the conductors *d d'* project. *g g'* represent the rocking levers, the lower ends of which are respectively secured to the inclined nail-tracks *e e'*. The levers *g g'* are supported on the fulcrum-pin *h*, secured in a suitable manner to the head or plate *i*, movable around the pin *k*. The upper ends of the levers *g g'* are respectively jointed to the horizontal connecting-rods *l l'*, having slotted openings *m m'* in their rear ends, by which they are respectively connected to the bolts or screws *n n'* in the upper ends of the forked rocking-lever *o o'*, that is movable on the fulcrum *p*, below which it extends, and is operated by the cam *q* on the driving-shaft *r*. *s s'* represent the springs secured to the fulcrum-plate *i*, for the purpose of automatically forcing either of the inclined ways *e e'* toward the nail-tube. *t t'* represent the dishes suspended below the inclined tracks *e e'*, for the purpose described. To the dishes or receptacles *t t'* is secured an upward-projecting rod, *u*, fitting into a hollow pipe or socket, *w'*, into which it is secured, and adjusted by means of the set-screw *w''*. The upper end of the pipe or socket *w'* is secured to the plate *i*, by which arrangement the said dishes are made to follow the lateral motion of the inclined nail-tracks *e e'* during the shipping of the same to and from the nail-tube.

The lateral shipping motion of the inclined tracks *e e'* and the dishes *t t'* is obtained by the following means. To the plate *i* is secured, or made in one piece, a projection, *i'*, jointed in its rear end to the connecting-rod *v*, having its upper end connected to the rocking-lever *w*, that is secured to the rocking-shaft *x*. Said rock-shaft is free to turn in bearings *x' x'*, and to its rear end is secured a rocking lever, *y*, the outer end of which is jointed to the vertical connecting-rod *z*. The lower end of the rod *z* is jointed to the rear of the treadle-lever 1, hung at 2 to the floor or sole-plate of the machine. 3 represents the spring-stop, by which the forward part of the treadle-lever is locked in position when pressed down. 4 represents the automatic spring beneath the treadle 1, by which it is forced upward as soon as the treadle is relieved from the locking device 3.

The receptacles *a a'* are rotated as follows: *a'' a'''* represent ratchet-wheels, secured, respectively, to the receptacles *a a'*. To the rock-shaft *x* is secured an upward-projecting lever, 5, having a pin and roll, 6, in its upper end, playing into the slotted opening 7 in the arm or frame 8. 9 10 represent the pawls for the operation of the ratchet-wheels *a'' a'''*, which pawls are jointed in a suitable manner to the upper part of the arm 8, the lower end of which is connected to a crank, 11, on the disk 12, that

is set in a rotary motion on its shaft by means of the pulleys 13 14, the latter secured to the driving-shaft *r*, and a strap or belt, 15, or in a similar manner. 16 represents the cam-wheel on the driving-shaft *r*, by means of which the driver-bar 17 is forced upward. Said driver-bar is forced downward to drive the nails by means of the spring 18, in the usual manner.

For the purpose of adjusting the shipping motion of the inclined ways *e e'* and the rocking disk *i*, to which they are hung, I provide said disk with a downward projection, *i''*, on each side of which are located stationary ears or lugs 19 19, secured to the head or frame 20, through which ears are inserted the adjusting set-screws 21 21, that are adjusted to serve as stops for the projection *i''*.

22 22 represent, in Fig. 6, the stationary rests, upon which that one of the levers for the movable tracks *e e'* rests that is not desired to be in operation, when the other lever is free to move properly between said rests 22 22, so as to deliver the nails from its inclined way to the driver or nail-tube 23.

24 24 represent spring-dies at the lower end of the nail-tube 23, for the purpose of holding each nail in its proper position previous to its being driven and while being driven by the driver-bar.

25 represents the horn on which the shoe rests, and 26 represents its concave clinching-surface in its upper end. Said horn is supported in suitable bearings 27 27, secured to the standard X, as shown.

28 represents the treadle-lever, upon which the lower end of the horn rests, which treadle-lever is hinged at 29, and provided in its rear with the weight 30, as shown.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent, and claim—

1. In a nailing-machine, the combination of the nail-tube 23, the driver 17, and the inclined ways *e e'*, capable of a forward and back as well as a lateral motion, as and for the purpose set forth.

2. In combination with the inclined nail-ways *e e'*, as described, the nail-catches *t t'*, for the purpose specified.

3. In combination with the inclined nail-ways *e e'* in a nailing-machine, the lever 1, for the purpose of moving said nailways laterally in one direction, and the spring 4, for moving them automatically back, and intermediate connecting mechanism, for the purpose herein stated.

4. In combination with the inclined nail-ways *e e'*, the rest 22 22, as and for the purpose set forth.

5. The combination of the driver 17, nail-tube 23, and the horn 25, having in its upper end a cup-shaped concavity, 26, as and for the purpose set forth.

6. In a nailing-machine, a horn, 25, having in its upper end a cup-shaped concavity, 26, as and for the purpose set forth.

In testimony that I claim the foregoing as my own invention I have affixed my signature in presence of two witnesses.

HENRY DUNHAM.

Witnesses:
ALBAN ANDRÉN,
HENRY CHADBOURN.