4 Sheets—Sheet 1.

H. DUNHAM.

BOOT AND SHOE NAILING-MACHINES.

No. 184,281. Patented Nov. 14, 1876.

Fig. 1.

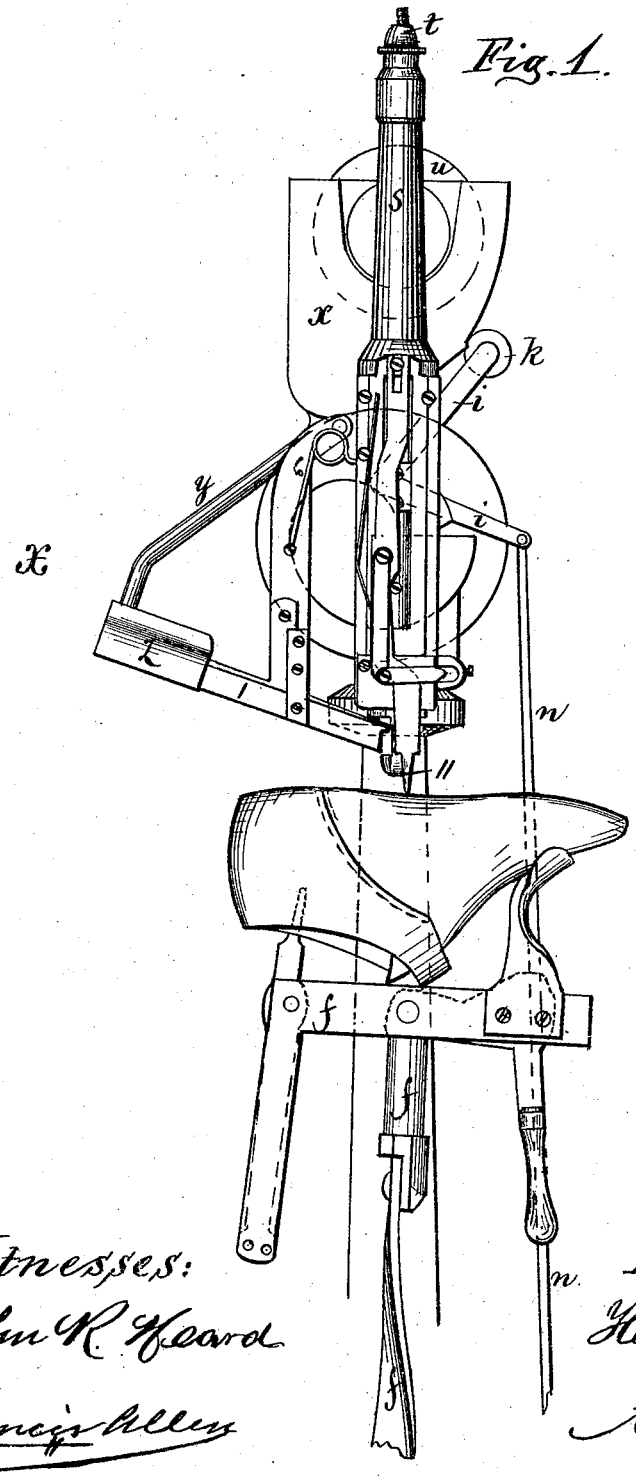

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Fig. 2.

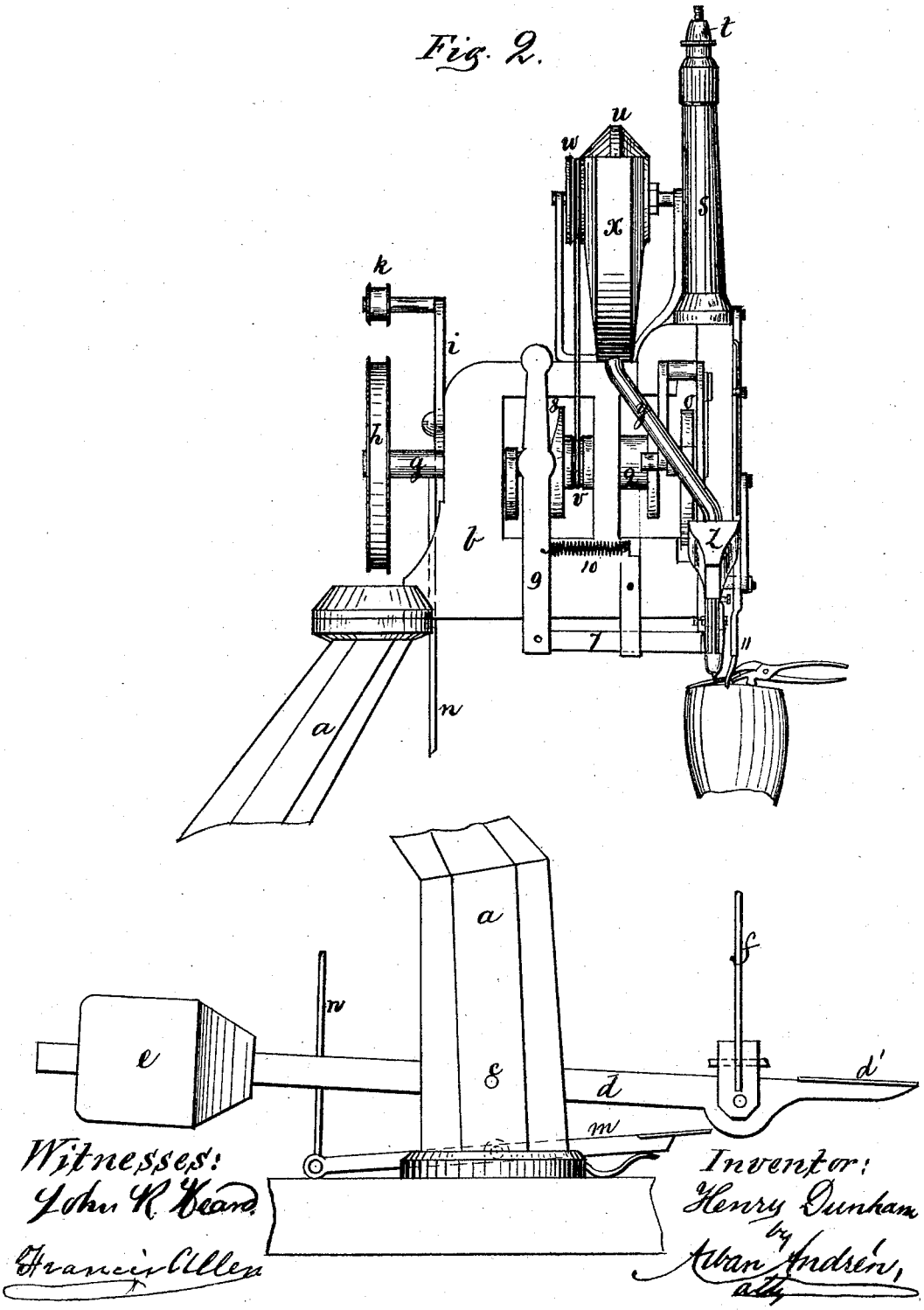

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Fig. 3.

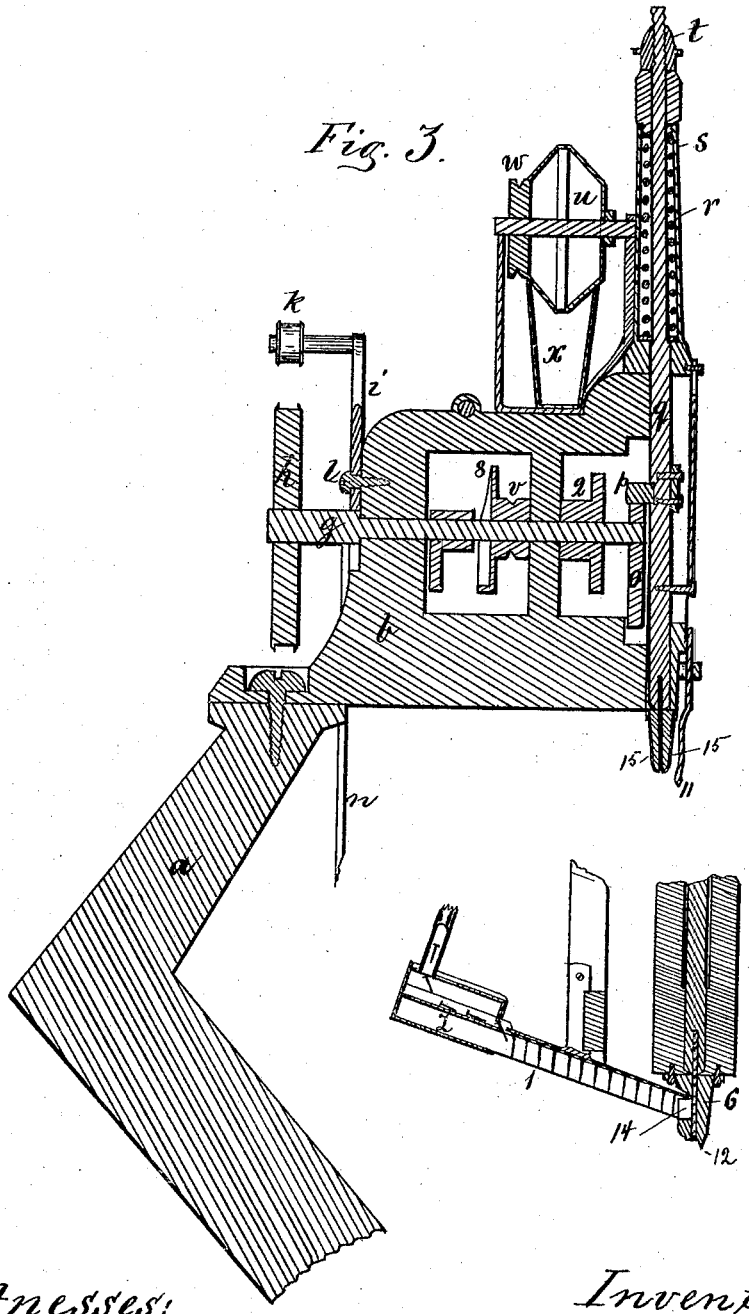

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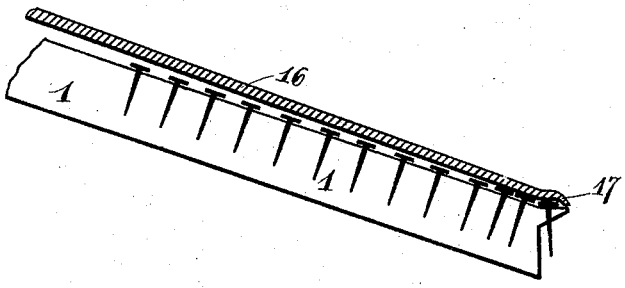
Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY DUNHAM, OF ABINGTON, MASSACHUSETTS.

IMPROVEMENT IN BOOT AND SHOE NAILING MACHINES.

Specification forming part of Letters Patent No. **184,281**, dated November 14, 1876; application filed August 10, 1874.

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 Method for Lasting Boots and Shoes; 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 pertains to make and use the same, reference being had to the accompanying drawings, and on the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in nailing-machines, and for improved method for lasting boots and shoes, consisting in the employment of a rotary shaft, with a cam, for the raising of the driver, and a spring, for the purpose of forcing the driver downward onto the nail, in combination with an automatically-operating nail-reservoir, and automatically-moved ways on which the nails are conducted to a side opening in the lower part of a stationary tube, through which the driver descends as soon as the nail has entered the tube. The side opening in the aforesaid stationary tube is closed by an automatically-moved picker as soon as the nail has entered the stationary tube, and a pair of elastic springs on each side of the stationary tube serve for the purpose of centering the nail previous to its being driven.

The boot or shoe that is to be lasted is placed on a last that is held firmly on a jack or suitable support, forced upward by means of a weight acting on a lever, or equivalent devices. The operator can remove the boot or shoe from its contact with the stationary nail-tube, s imply by pressing on a treadle-lever connected with the jack or support. A secondary treadle-lever is made to operate a belt-tightener, so that the machine will be set in motion as soon as the operator exerts a slight pressure on the secondary treadle, and the machine will continue in operation as long as the operator retains his foot on the treadle. In connection with this, my lasting-machine, I use a pair of ordinary pinchers for the purpose of stretching the upper on the last, and to hold it in position during the time when the driver drives the nails. From this it will be understood that the operation of lasting a boot or shoe, as described, is performed partly by hand, for the purpose of stretching the upper over the last, and partly by machine, for the purpose of feeding the boot or shoe forward, feeding the nails into position, and to drive the nails through the upper that is being held by the pinchers in the hand of the operator.

On the drawings, Figure 1 represents a front elevation of my invention. Fig. 2 represents a side elevation, seen from X, on Fig. 1. Fig. 3 represents a central longitudinal section, on the line A B, shown in Fig. 1, and Fig. 4 represents a cross-section on the line C D shown in Fig. 2. Fig. 5 represents a sectional elevation of the inclined ways for the nails.

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

a represents the standard, and *b* represents the head or upper frame of the machine. In the lower part of the standard *a* is a fulcrum, *c*, for the treadle-lever *d*, provided with the treadle *d'* and balance-weight *e*, in the ordinary way. The forward end of the treadle-lever *d* is jointed to the lower end of a jack or support, *f*, to the upper end of which the last is attached during the operation of lasting boots and shoes. *g* represents the driving-shaft, to which is secured the driving-pulley *h*. *i i* represent a belt-tightener, provided with the roller *k*, which belt-tightener is made to turn on a fulcrum, *l*, and is operated by means of a secondary treadle-lever, *m*, and connecting-rod *n*, as shown in Fig. 2. By the arrangement of the treadle-lever *m*, connecting-rod *n*, and belt-tightener *i i k*, the operator can start the machine simply by pressing his foot on the treadle *m*, when the machine will commence to drive nails, and continue so to do as long as the operator retains his foot on the said treadle. To the driving-shaft *g* is secured a cam, *o*, that acts upon a pin or stud, *p*, that forms a part of the driver, *q*, by which arrangement the said driver is raised upward during each revolution of the cam *o*. The driver *q* is faced downward by the action of a coiled spring, *r*, that is con-

fined between a collar on the driver, *q*, and the upper end of the cylindrical receptacle *s*. The upper end of the driver *q* is provided with a regulating-nut, *t*, by means of which the throw of the driver can be adjusted. *u* represents a revolving nail-reservoir that is set in a rotary motion around its axis by means of the cord-pulley *v* on the driving-shaft, the cord-pulley *w* on the nail-reservoir shaft, and a belt or cord connecting the two said cord-pulleys in the ordinary way. The reservoir *u* is perforated on its circumference, through which the nails drop into the stationary receptacle *x*, provided in its lower part with a conductor, *y*. From the latter the nails drop into the tapering box *z*, to which the ways 1 1 are attached. A lateral shock or concussion is given to the box *z* and ways 1 1, during each revolution of the driving-shaft *g*, by means of the cam-wheel 2, rocking-arm 3, supporting-arm 4, to the lower end of which the ways 1 1 are secured, and a spring, 5, as shown in Figs. 1 and 2. The object of imparting a lateral motion or a shock to the ways 1 1 is to insure the delivery of a nail to the stationary tube 6 for every revolution of the driving-shaft, and to prevent the nails from clogging together in the box *z* and ways 1 1. The nails are picked one by one from the ways 1 1 by means of the laterally-adjustable bar 7, that is operated by means of a cam-wheel, 8, on the driving-shaft *g*, and a rocking-lever, 9, the lower end of which is hinged to the bar 7, as shown in Fig. 2. A spring, 10, acts in connection with the cam 8 for the operation of the picker 7. 11 represents the feeder that is pointed in its lower end, and to which is imparted, by suitable intermediate mechanism from the driving-shaft, a vertical as well as lateral motion. During the upward motion of the aforesaid feeder it allows the boot or shoe to rest against a sharp projection, 12, on the end of the nail-tube 6, that is provided with a side entrance, 14, for the nails to enter the nail-tube from the ways 1 1. On two opposite sides of the nail-tube 6 are secured a pair of elastic dies, 15 15, for the purpose of centering the nail. On the top of the movable ways 1 1 is secured an adjustable cover, 16, (shown in Fig. 5,) the object of which is twofold, namely, first, to guide the nails or tacks properly in the movable ways; and, secondly, to hold the nail that is being picked in its proper position, so that the picker can take it easily, which is very important, as otherwise the nails would be apt to hang in positions in which the picker could not take them. The lower extreme end of the cover 16 (shown in Fig. 5) is provided with a yielding projection or lip, 17, that serves as a stop for the lowest nail that is nearest to the picker, till such time as the picker passes between it and the next nail. When the ways 1 1 recede from the nail-tube, the cover 16 yields to the nail and allows it to remain in the nail-tube, inclosed by the picker, in a proper position to be driven when the driver descends.

What I wish to secure by Letters Patent, and claim, is—

1. The automatically-operated intermittingly-reciprocating guideways 1 1, in combination with the nail-tube 6, substantially as and for the purpose set forth and described.

2. In combination with the driver *q*, its nail-tube 6, having the side opening 14 below the highest position of the driver *q*, and the picker 7, and movable ways or track 1 1, substantially as set forth.

3. In a nailing-machine, the combination with the ways or track 1 1, of the adjustable cover 16, as and for the purpose set forth.

4. In a nailing-machine, the combination of the movable ways or track 1 1 with the movable yielding stop 17, 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:

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JOHN R. HEARD.