

(No Model.)

H. DUNHAM, Dec'd.

3 Sheets—Sheet 1.

E. B. DUNHAM, Administratrix.  
BOOT OR SHOE NAILING MACHINE.

No. 356,107.

Patented Jan. 18, 1887.

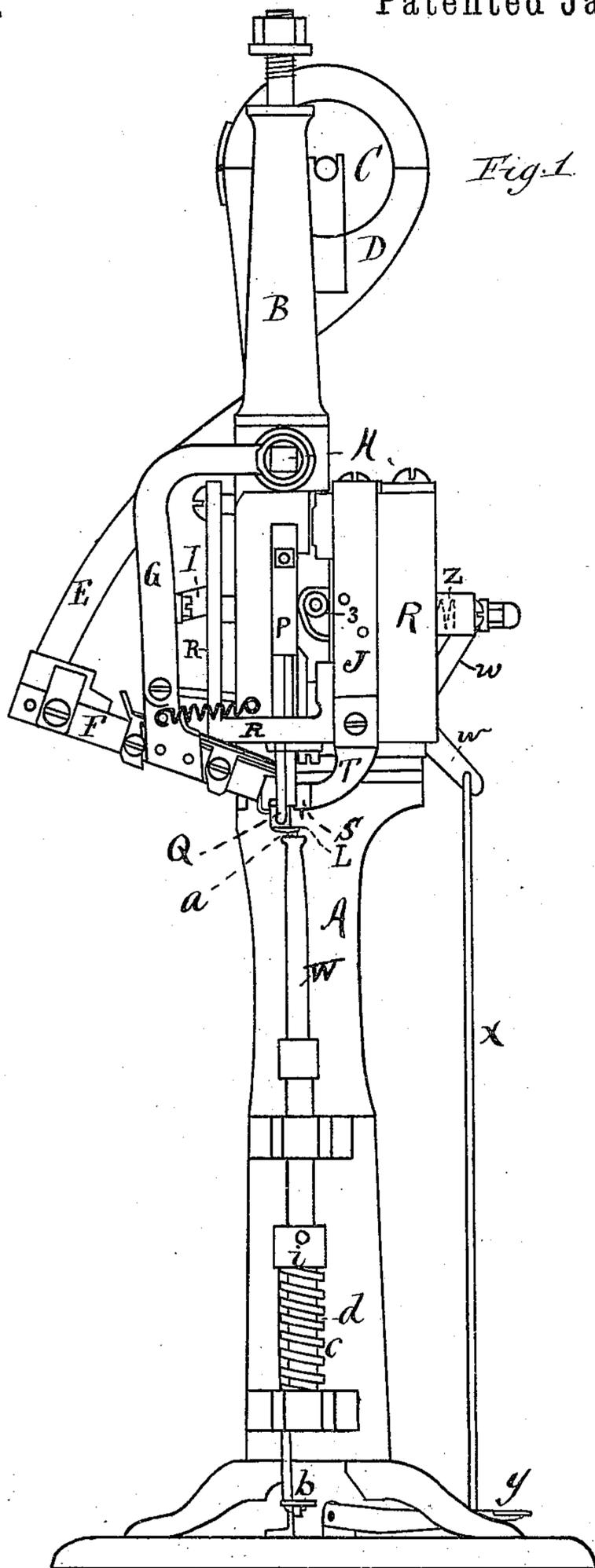


Fig. 1.

WITNESSES.  
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*Henry E. Cooper*

INVENTOR.  
*Henry Dunham*  
*by Charles Drew*  
*his attorney.*

(No Model.)

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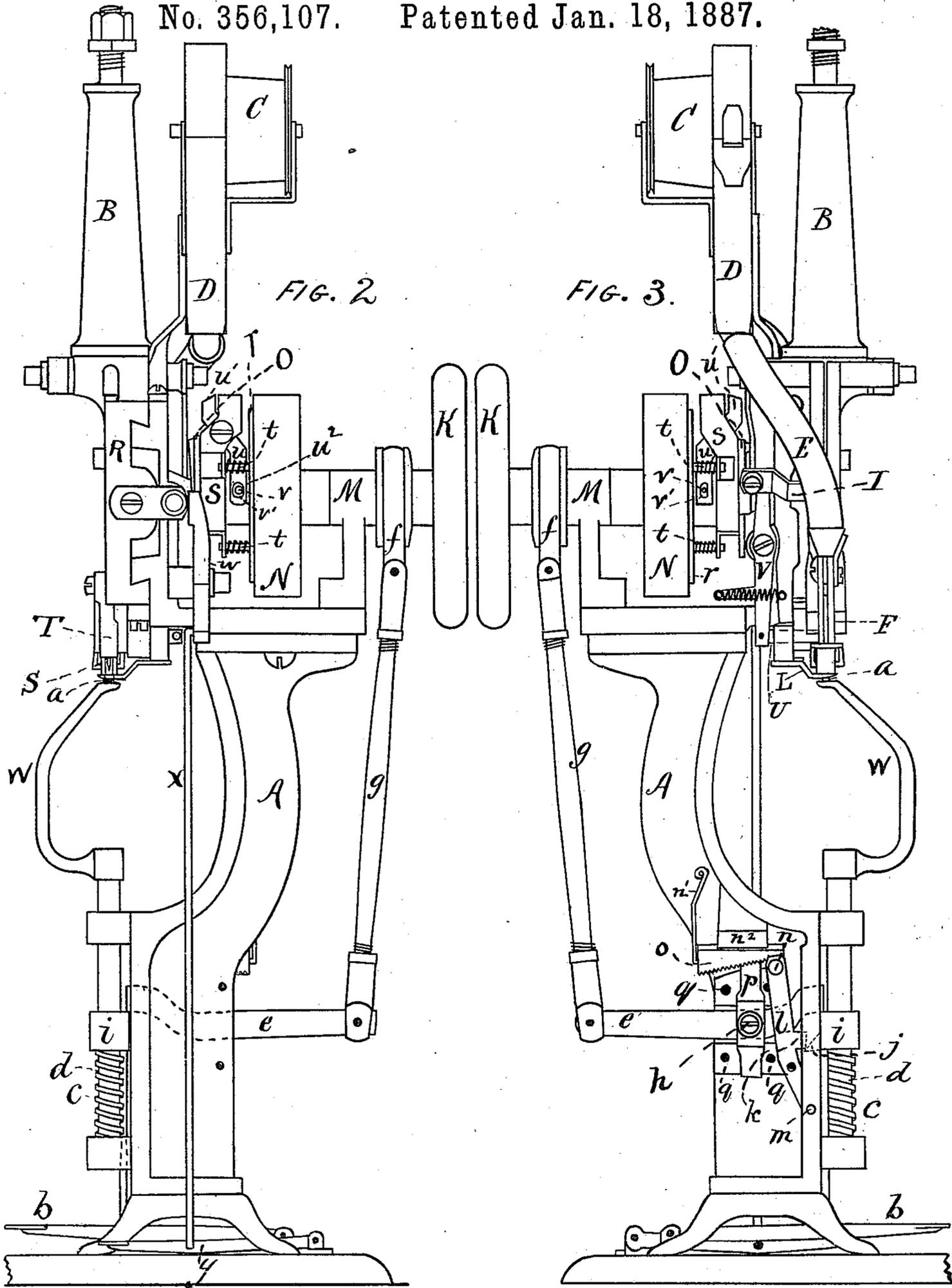
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Fig. 4.

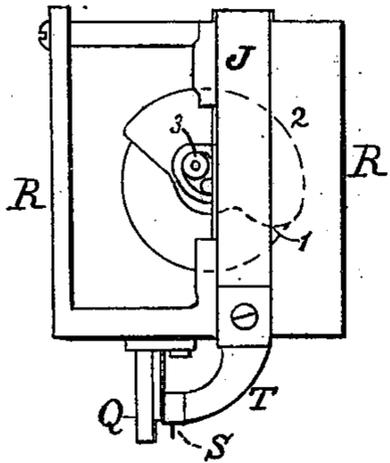


Fig. 5.

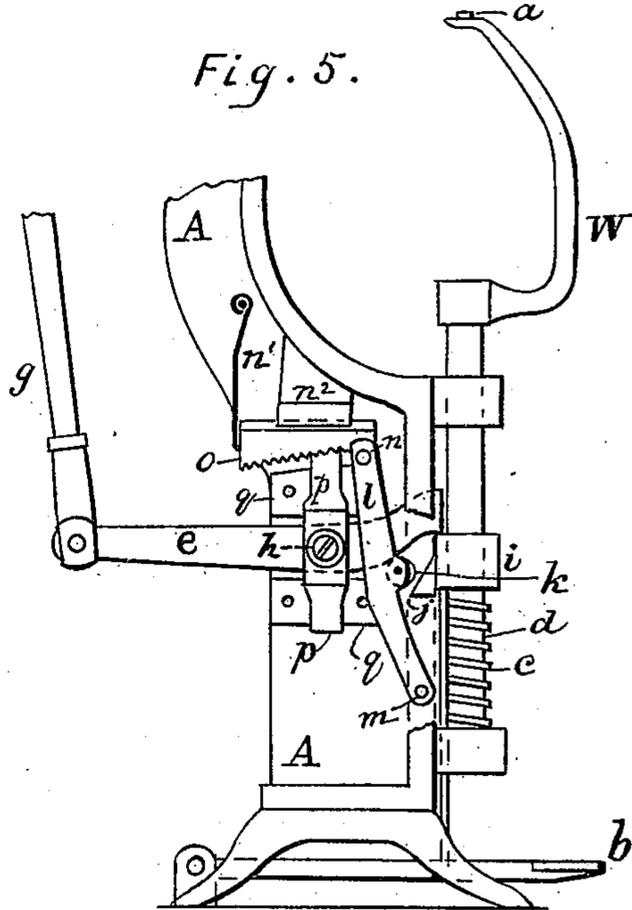
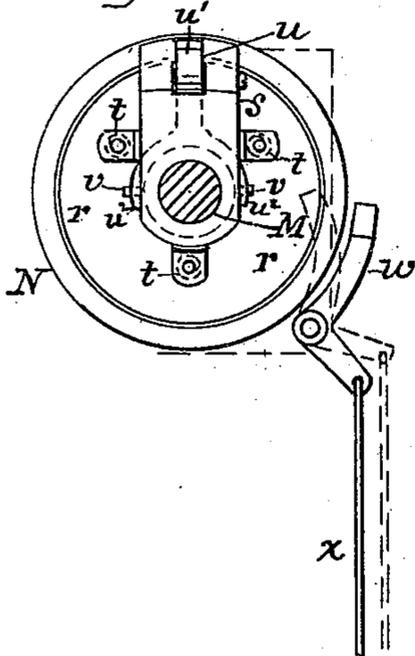


Fig. 6.



Witnesses

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Inventor:

Henry Dunham  
By W. H. Babcock  
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# UNITED STATES PATENT OFFICE.

HENRY DUNHAM, OF ABINGTON, MASSACHUSETTS; ELLA B. DUNHAM (ADMINISTRATRIX OF SAID HENRY DUNHAM, DECEASED) ASSIGNOR TO HENRY S. JENKINS, TRUSTEE, FOR THE CLINCHING SCREW COMPANY, OF BOSTON, MASSACHUSETTS.

## BOOT OR SHOE NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 356,107, dated January 18, 1887.

Application filed May 15, 1880. Serial No. 9,841. (No model.)

*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 Boot or Shoe Nailing Machines, of which the following is a specification.

My invention relates to boot or shoe nailing machines; and it consists in certain novel combinations of operative parts, specifically set forth in the claims, whereby the nail-holes are made, the nails driven, and the nail-points turned in a greatly improved manner, as will more plainly appear hereinbelow.

I accomplish the object of my invention by mechanism illustrated in accompanying drawings, in which—

Figure 1 represents a front elevation of a machine having my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a side elevation representing the side opposite to that shown in Fig. 2. Fig. 4 is a detached view of the moving frame holding the nail-tube and connecting parts. Fig. 5 shows the work-supporting horn and connecting mechanism, and Fig. 6 partly illustrates the unshipping mechanism.

A is the standard of the machine.

B is the head—that is, the part of the machine above the standard.

C is a reservoir for receiving and holding the nails, which pass to the tapering box D, and through the conductor E into the nail-way F, which is connected with the frame of the machine in such manner as to have imparted to it a slight forward and backward movement by means of a roller on the end of a small lever actuated by a cam, O. The pulley N is actuated by a belt when the machine is in operation.

At the end of the shaft is a cam having three operating-faces, (marked 1, 2, and 3,) which respectively actuate the driver P, the reciprocating throat or nail-tube Q, attached to the frame R, and the awl S, attached to the arm T. The arm T is bent in the direction of the work-feeding movement of the awl, and it has a stock, J, which slides up and down in the frame R, having the nail-tube Q attached to it at the bot-

tom. The driver P has no lateral motion, but moves in vertical guides of the main frame or standard, being raised by the cam and driven down by a spring on the head B. The feeding movement of the work by the awl is caused by a lateral movement of the frame R in one direction, while the movement of the nail-tube to a position under the driver is caused by a lateral movement of said frame in an opposite direction. Thus it will be seen that the triple cam causes the upward movement of the driver, the vertical movement of the awl, and the lateral movement of the frame R. Further, the awl and the nail-tube severally move from opposite directions to the line of the driver, this in practice being deemed an advantage.

The separator, which is actuated by the lever U, is composed of a flat piece of steel, which passes in front of the opening in the throat Q, and between the lowermost nail and the one next to it, and incloses the lowermost nail in the throat Q, so that it is carried inclosed in the throat under the driver, the separator remaining, closely covering the opening in the throat Q, until the nail is driven, when the separator recedes, leaving the throat open for the reception of another nail.

W is a work-supporting horn, which has a concavity, *a*, in its upper extremity, the shape of which is adapted to turn the point of the nail into the stock in the form of a circle. This concavity, operating in combination with the awl, is an element of vital importance in my invention. I have found in practice that the use of an awl with the concavity in the horn is essential to good work. The peculiar clinch caused by the concavity is due to the point of the fastening striking the inclined part of the concavity, forming its curvature, and then turning back into the work. It is therefore necessary that the fastening be directed to the inclined part of the concavity. If it should strike the bottom first, the fastening would be liable to be crippled. The degree of curve in the clinch of the fastening is determined by the distance from the bottom of the concavity at which the fastening strikes. I provide an awl for this purpose which is so operated and

adjusted that it makes the holes in the shoe-  
soleso that the nails driven therein will strike  
the incline in the concavity, thereby making  
a perfect curved clinch. Without this rela-  
5 tion of the awl and concavity the nails would  
be driven without any regularity whatever,  
sometimes not striking the horn at all, and  
not even penetrating the shoe-sole. The com-  
bination of the awl and the horn is adapted as  
10 well to other shoe-nailing machines as to the  
class in which loose nails are driven. It is  
adapted to machines in which a fastening is  
driven which has any kind of a clinching-  
point. The horn is supported by a rod, *d*,  
15 adapted to work vertically in suitable guides.  
This rod *d* is provided with a collar, *i*, which  
rests upon a coiled spring, *c*. This spring sus-  
tains the weight of said rod and horn, and  
yields sufficiently to allow said horn to move  
20 downward a greater or less degree, according  
to the thickness of the stock fed to or placed  
upon it. The horn also may be depressed by  
a treadle, *b*, attached to the rod *d*. The object  
of this automatic depression and rising is, that  
25 the horn shall be withdrawn from the stock  
after every stroke of the awl sufficiently to al-  
low the awl to move the stock without im-  
pediment under the driver *P*, and that as soon  
as this movement is effected the horn shall be  
30 restored to its former position, pressing the  
stock against the head in such manner as to  
clinch the nail when driven by the driver.

If in its passage through the stock the awl  
should be deflected by striking a hard place in  
35 the stock, or from any other cause, when the  
stock is released from pressure between the  
head and the horn, the awl will spring back  
into position and point to the exact place in  
the concavity on the horn where it is desirable  
40 the nail should strike, the stock being held on  
the awl, and there being nothing to prevent it  
from taking a straight position.

When it is desired to make the pivotal point  
or fulcrum *h* higher or lower, it is effected as  
45 follows: The fulcrum *h* of the lever *e* is fastened  
to the vertical piece *p*, which has a slight up-  
ward-and-downward movement in guides *q*.  
Collar *i* has a wedge-shaped projection, *j*,  
which, when the collar rises, presses against  
50 the projection *k* on the lever *l*, pivoted at its  
lower end to the standard *A*, and pivotally  
connected at its upper end, *n*, to a toothed wedge-  
shaped piece, *o*, which receives pressure from  
the spring *n'*, operating in the reverse direc-  
55 tion from the action of the projection, and  
guided by a track or guide, *n''*. Its teeth en-  
gage with similar teeth on vertically-moving  
piece *p*. It will be seen that the pivotal point  
or fulcrum *h* is placed higher or lower auto-  
60 matically in accordance with the thickness of  
the stock.

In many cases it is very desirable to give the  
horn a fixed depression instead of a variable  
one, as above described, for the purpose of  
65 making a hole entirely through the thickest  
part of a shoe-sole, and it is accomplished as  
follows: After having set the horn for any given

thickness by placing the stock upon it and  
clamping it between the head and the horn,  
the screw at the upper end, *n*, of the lever *l* is 70  
to be tightened, so as to make the wedge *o*  
rigid. The piece *i* may be swung around so  
that it is no longer in contact with the projec-  
tion *k*. This done, the horn has a definite and  
75 fixed amount of depression, regardless of the  
thickness of the stock.

The following-described mechanism is pro-  
vided for instantaneously stopping the ma-  
chine. The pulley *N* is made hollow, being 80  
open at the inner side toward the main part of  
the machine. Attached to its outer end is a  
sleeve, through which the shaft *M* passes, and  
it fits closely between a collar attached to the  
shaft and the rear bearing of the shaft. Closely  
85 fitting into pulley *N* is a smaller pulley, *r*, hav-  
ing on its inner face a sleeve, through which  
passes the shaft to which it is keyed, so that  
the shaft when it revolves causes the pulley *r*  
also to revolve, the pulley *r* also having a lat-  
90 eral motion on said shaft for the purpose of  
connecting it with the pulley *N*. Attached to  
the shaft, and between the sleeve of the pulley  
*r* and the cam, is an arm, *s*, attached to the in-  
ner pulley, *r*, by springs *t* upon rods. This  
95 arm is keyed and fastened by a set-screw to the  
shaft, and it has through its extremity an open-  
ing, through which passes one end, *u''*, of a lever,  
*u*, the inner end of which is bifurcated and fits  
over one-half the circumference of the sleeve  
of the inner pulley, *r*, being connected with the 100  
sleeve by pins *v v*, working in slots *v'*, some-  
what larger than the diameter of the pins.  
The outer end, *u'*, of the lever *u* is so arranged  
that when the lever *w*, which is attached to a  
105 rod, *x*, and treadle *y*, is raised a short distance,  
as shown in Fig. 6, the part *u'* impinges against  
the upper end of the lever *w*, and the inner  
end, *u''*, of the lever *u*, bearing against the pins  
*v v* in slots *v'*, forces out slightly the inner pul-  
110 ley, *r*, against the retraction of the springs *t t t*,  
which have heretofore held the pulley, so as to  
revolve with the larger pulley *N*, in which it  
is placed, and as a result the inner pulley no  
longer revolves with the pulley *N*, which con-  
115 tinues to revolve without turning the shaft,  
and the machine stops at once.

The operation of my machine is as follows:  
A boot or shoe to be nailed is placed upon the  
horn *w*, and as the shaft revolves the horn de-  
scends, making a hole in the shoe to receive 120  
the nail, the same being pressed by the horn  
closely against the foot-piece *L*, so as to facili-  
tate the making of the hole. By the operation  
of the lever *l*, as explained above, the horn  
then recedes automatically, and the shoe is 125  
held up by the awl, by which it is fed forward,  
the awl having a forward movement imparted  
to it equal to the desired space between the  
successive nails. At the end of this move-  
130 ment the hole for the reception of the nail is  
directly under the driver; the awl, now rising  
and leaving the shoe, returns to the first posi-  
tion. With the forward movement of the awl  
the nail-tube *Q* has moved toward the nail-

way F, which itself has also a movement toward the nail-tube. The separator U moves forward and separates the lowermost nail in the nailway from the next one, and it is brought  
5 into the nail-tube, and is inclosed there by means of the separator. The nail-tube then recedes, taking the nail directly over the hole made in the shoe by the awl, and at the same  
10 time the concavity *a* has been brought automatically directly under the nail, pressing the stock against the foot-piece L. The driver now descends and drives the nail, the point of which strikes in the concavity *a* and is turned  
15 back into the stock, the point of the nail forming a circle in the stock.

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

1. In a machine for uniting the soles and uppers of boots or shoes, a work-supporting  
20 horn having in its upper extremity a concavity for turning the points of the nails back into the stock, in combination with an awl, substantially as described.

2. In a boot or shoe nailing machine for  
25 feeding and driving loose nails, substantially as above described, the nail-tube Q, the awl S, and the driver P, in combination with a work-supporting horn having a concavity for clinching the nail, as set forth.

30 3. In a boot or shoe nailing machine, guide-

ways adapted to support the nails by the heads, a nail-tube through which the nails are driven into the shoe, and mechanism to separate the nails one at a time, an awl, a driver, and a  
35 work-supporting horn having a concavity for clinching the nail, as set forth, in combination, substantially as described.

4. The tracks F, the separator, the throat, and the driver, in combination with the awl arranged to feed the stock, and horn having a  
40 concavity for clinching the nail, as set forth, substantially as described.

5. In a nailing-machine, in combination, a work-supporting device having on its upper  
45 extremity a concavity and awl, substantially as and for the purpose specified.

6. In a machine for uniting the soles and uppers of boots and shoes, the awl for making the holes for the nails, in combination with a  
50 horn having a concavity for clinching the nail, as set forth.

7. The pulleys N and *r*, driving-shaft M, and springs *t t*, in combination with suitable mechanism to connect and disconnect said pulleys, as shown and described.

HENRY DUNHAM.

Witnesses:

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