

(No Model.)

E. P. RICHARDSON.  
SHOE SEWING MACHINE.

No. 577,397.

Patented Feb. 16, 1897.

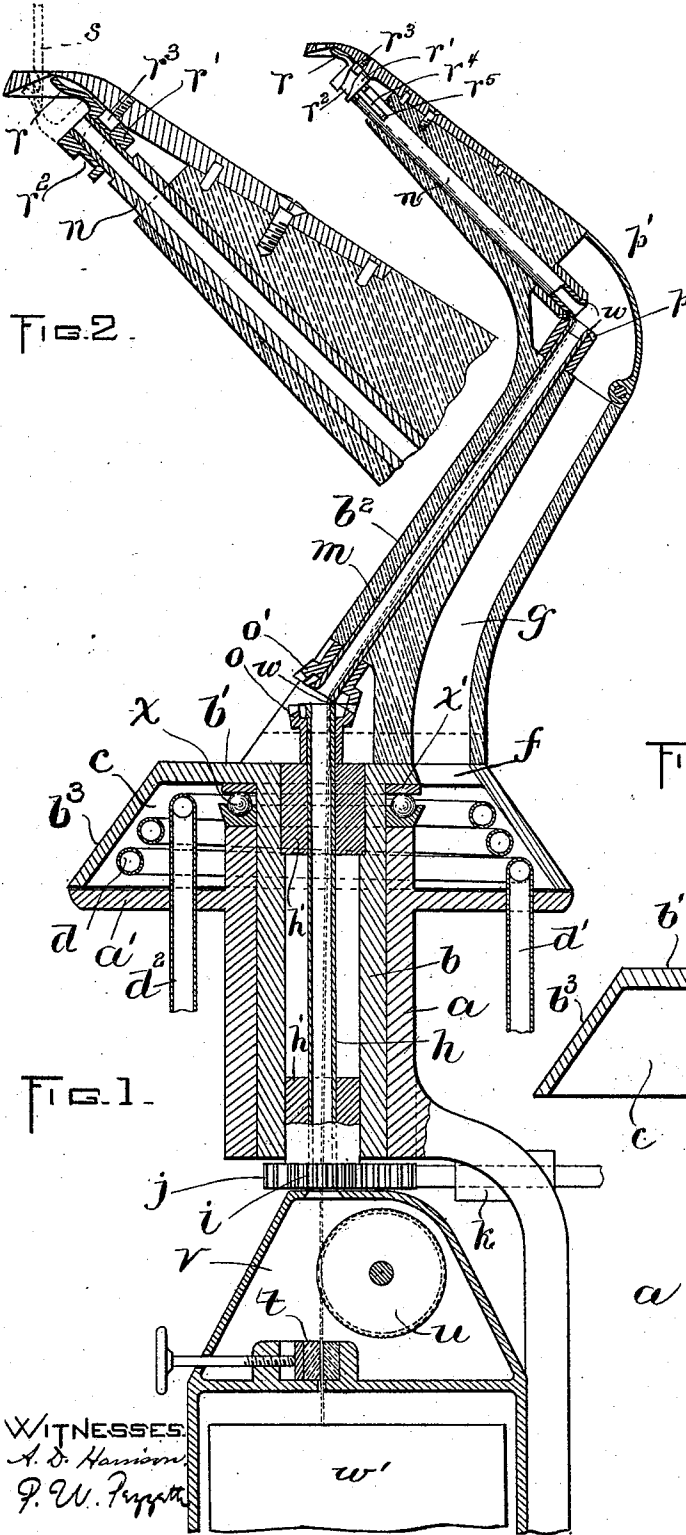


FIG. 2.

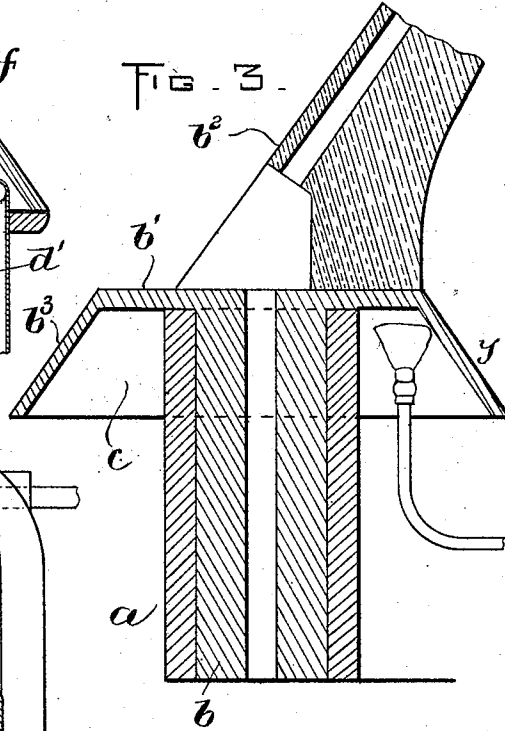


FIG. 3.

WITNESSES  
A. D. Harrison  
F. W. Pappas

INVENTOR:  
C. P. Richardson  
By Knight, Brown & Lundy  
Atty.

# UNITED STATES PATENT OFFICE.

EVERETT P. RICHARDSON, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO  
JOHN H. RICHARDSON, TRUSTEE, OF SAME PLACE.

## SHOE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 577,397, dated February 16, 1897.

Application filed July 27, 1896. Serial No. 600,687. (No model.)

To all whom it may concern:

Be it known that I, EVERETT P. RICHARDSON, of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Shoe-Sewing Machines, of which the following is a specification.

This invention relates to a wax-thread shoe-sewing machine employing a horn on which the shoe is supported while its outer sole is being stitched to the upper and inner sole, the needle passing through the outer sole from its exterior into the interior of the shoe, where it enters a chamber or cavity in the tip of the horn, and there receives the waxed thread from a thread-presenting device, which thread is formed into a series of chain-stitches.

The invention has for its object, first, to provide an efficient horn-heating apparatus, whereby the waxed thread may be kept in a suitably soft condition, and, secondly, to enable an oscillating looper to be employed as the thread-presenting device without necessarily confining the upper portion of the horn to any particular angle of inclination.

The invention consists in the several improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a vertical sectional view of a sewing-machine horn and its support or bearing embodying my improvements, the looper and portions of its attached shaft being shown in elevation. Fig. 2 represents an enlarged sectional view of the upper portion of the horn and looper. Fig. 3 represents a sectional view of a modification.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents a fixed tubular bearing which occupies a substantially vertical position on the frame of a shoe-sewing machine. *b* represents a tubular journal mounted to rotate in said bearing, said journal being formed on a flat horizontal base-piece *b'*, which supports the horn *b<sup>2</sup>* and constitutes the top of an annular hot-air chamber *c*, the bottom of which is a flange *a'*, formed on the exterior of the bearing *a*. The base-piece *b'* is pref-

erably provided at its margin with an inclined flange or extension *b<sup>3</sup>*, which forms the margin of the air-chamber *c*. For the sake of brevity I will hereinafter refer to the base-piece *b'* and its flange *b<sup>3</sup>* as a hood affixed to the base of the horn and rotating therewith, although it will be obvious that for the purposes of my invention the margin of the air-chamber *c* may be formed by a flange or wall affixed to the fixed flange *a'*, in which case the hood affixed to the horn would be simply a flat plate serving as a cover for the air-chamber.

The annular chamber *c* contains a heating device, which is preferably a steam-conduit *d*, arranged in helical form, one end of the conduit being connected with a steam-inlet pipe *d<sup>1</sup>* and the other end with a steam-outlet pipe *d<sup>2</sup>*, both of said pipes passing through orifices in the fixed flange *a'*. An air-outlet *f* is provided in the upper portion of the hood, said outlet communicating with an air-chamber *g*, extending upwardly into the body of the horn.

*h* represents a vertical tubular shaft journaled in bearings *h'* within the tubular journal *b*, said bearings being concentric with the said journal. To the lower end of the shaft *h* is affixed a pinion *i*, which meshes with a rack *j*, adapted to be reciprocated in a suitable guide *k* on the frame of the machine, there being a connection (not shown) between the rack and a suitable moving part of the machine whereby a reciprocating motion is imparted to the rack and a rocking motion to the shaft *h*.

*m* and *n* represent inclined tubular shafts journaled in bearings in the body of the horn, the inclination of the said shafts being such as to enable them to follow the general course of the horn, the shafts meeting at an angle at the central portion of the horn, as shown in Fig. 1. The shaft *h* is connected to the shaft *m* by bevel-gears *o o'*, and the shaft *m* is connected with the shaft *n* by similar bevel-gears *p p'*, so that the rocking motion of the shaft *h* is imparted to the shafts *m* and *n*. With the upper end of the shaft *n* is engaged a looper *r*, which is caused by the rocking motion of the shaft *n* to oscillate about the space in the tip of the horn which receives the needle *s* of

the sewing-machine, the looper and needle being relatively arranged so that when the needle is depressed and enters the tip of the horn the looper will present the waxed thread to the barb of the needle.

The shafts *n* and *m* meet at an angle in the upper portion of the air chamber or passage *g*, so that the lower end of the shaft *n* communicates with the upper portion of said passage, as shown in Fig. 1, the shaft *n* therefore constituting a portion of a flue or passage for hot air from the chamber *c* to the tip of the horn, the other portion of said flue being the passage *g*. It will be seen, therefore, that the heated air rises from the chamber *c* and passes entirely through the horn, keeping all parts of the same uniformly heated, so that the wax on the thread will remain soft throughout the entire length of the horn. The thread passes upwardly through the tubular shafts *h*, *m*, and *n* and is drawn through a wax-pot *w'*, located below the shaft *h*. The thread passes from the wax-pot through a stripping device *t* and around a tension-wheel *u*, both located below the lower end of the shaft *h*, the tension-wheel being arranged so that the thread passes from it through the center of said shaft.

It will be seen that the upper portion of the tubular bearing *b*, being surrounded by the hot-air chamber and the heating-conduit, is heated and partially heats the thread before it enters the horn. It will also be seen that the shafts *h*, *m*, and *n* are arranged so that any surplus wax that is melted by the heat and drops from the thread will be guided by said shafts back to the space or chamber *v*, in which the stripper and tension-wheel are located, the meeting ends of the said shafts being flared or enlarged, as shown at *w*, so that the upper end of the shaft *m* catches any wax that may drop from the shaft *n*, while the upper end of the shaft *h* catches any wax that may drop from the shaft *m*.

*x x* represent antifriction-balls which are located in an annular groove in the upper end of the fixed bearing *a* and support an annular plate *x'*, affixed to the journal of the horn, said balls permitting the horn to rotate freely in its bearing without lubrication, it being impracticable to lubricate the bearing *a* owing to the fact that it is constantly heated.

I have shown the looper *r* formed on a sleeve *r'*, which is free to move endwise independently on the shaft *n*, although rotatively engaged therewith. The sleeve *r'* is provided with a cam-shaped slot *r<sup>2</sup>*, which is engaged with a stud *r<sup>3</sup>* on the horn, the stud and slot causing the looper to move endwise while it is being rotated. The object of this provision is to give the looper an elliptical movement which will insure its passage around the needle, as indicated by full and dotted lines in Fig. 2. Without this provision it would be necessary to make the portion of the horn containing the shaft *n* more nearly vertical than is desirable, in order that the path of the looper may surround the path

of the needle. By providing for the longitudinal as well as the rotary movement of the looper I enable the upper portion of the horn to be disposed at any angle that may be desired. The collar *r'* is provided with a stud or finger *r<sup>4</sup>*, which is fitted to slide in a slot *r<sup>5</sup>*, formed in the shaft *n*.

The terms "vertical" and "inclined," as applied to the shafts *h*, *m*, and *n*, are used relatively, and I do not limit myself to an exact vertical arrangement of the shaft *h*.

In Fig. 3 I show a modification in which the fixed flange *a'* is omitted and a gas-burner *y* is shown as the heating device. In this case the heated air is confined in the bottomless chamber formed by the hood on the base of the horn sufficiently to heat the horn. The air-chamber *g* may be omitted, the heat conductivity of the metal of the horn being relied on. In Fig. 3 I show the horn without the said air-chamber.

I do not confine myself to an oscillating looper nor to a looper having an elliptical movement, as a rotary looper or any other suitable thread-presenting device may be used in connection with the other improvements herein described.

I claim—

1. In a sewing-machine of the character specified, the combination of a fixed support, a heating device thereon, and a horn rotatively mounted on said support and provided at its base with a hood or cover located over the heating device.

2. In a sewing-machine of the character specified, the combination of a fixed support, a heating device thereon, and a horn rotatively mounted on said support and provided at its base with a hood or cover located over the heating device, and with a heat-conducting flue extending upwardly from said hood.

3. In a sewing-machine of the character specified, the combination of a fixed support, a heating device thereon, a horn rotatively mounted on said support and provided at its base with a hood or cover located over the heating device, and above said hood with a chamber extending upwardly into the horn, and a tubular shaft extending from the upper portion of said chamber to the tip of the horn, said chamber and shaft constituting a flue which conducts heated air from the chamber to the tip of the horn, and a looper or thread-presenting device carried by said shaft.

4. In a sewing-machine of the character specified, the combination of a fixed support having a flange or projection forming the fixed bottom of an annular heating-chamber, a heating device above said flange, and a horn rotatively mounted on said support and provided at its base with a hood or cover located over the heating device and forming a movable top for said chamber.

5. In a sewing-machine of the character specified, the combination of a fixed support, a horn rotatively mounted thereon, said support and horn having the complementary parts

or sections of an annular chamber, and a fixed steam-conduit located in said chamber and supported by the fixed section of the chamber.

6. In a sewing-machine of the character specified, the combination of a rotary horn having a shoe-supporting tip, a looper within said tip, and a series of tubular shafts journaled in the horn and extending from the looper to a point below the spindle of the horn, said shafts forming a practically continuous thread-guide, and means for imparting motion to the shafts to actuate the looper.

7. In a sewing-machine of the character specified, the combination of a fixed support provided with an outwardly-projecting flange, a horn rotatively mounted thereon and provided at its base with a hood located over said flange, said hood and flange forming an annular heating-chamber, a vertical tubular shaft journaled in bearings which are concentric with the axis of the horn, inclined tubular shafts within the horn, a looper engaged with the upper inclined shaft and located in the tip of the horn, means for rocking the vertical shaft, connections between said tubular shafts, and means for delivering thread under tension to the lower end of the vertical shaft, the thread passing through the said vertical and inclined shafts to the looper.

8. The combination of a sewing-machine

horn, a support therefor, said horn having an elbow therein above the plane of the top of said support, a looper-operating shaft within the horn, said shaft extending from the tip of the horn to the elbow and provided with a thread-guiding passage extending through it from end to end, a looper engaged with the outer end of said shaft, means for guiding the thread to the inner end of the looper-shaft, and means for operating and heating said shaft.

9. The combination, in a shoe-sewing machine, of a horn-support, a rotating horn provided with an elbow above said support and with a chamber in its body extending from the elbow to said support, a hollow looper-operating shaft extending from the tip of the horn to said chamber, means for guiding the thread to the lower or inner end of said shaft, and means for rotating said shaft and for heating said chamber.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 23d day of July, A. D. 1896.

EVERETT P. RICHARDSON.

Witnesses:

WILBUR E. ROWELL,  
CORA E. HUTCHINSON.