

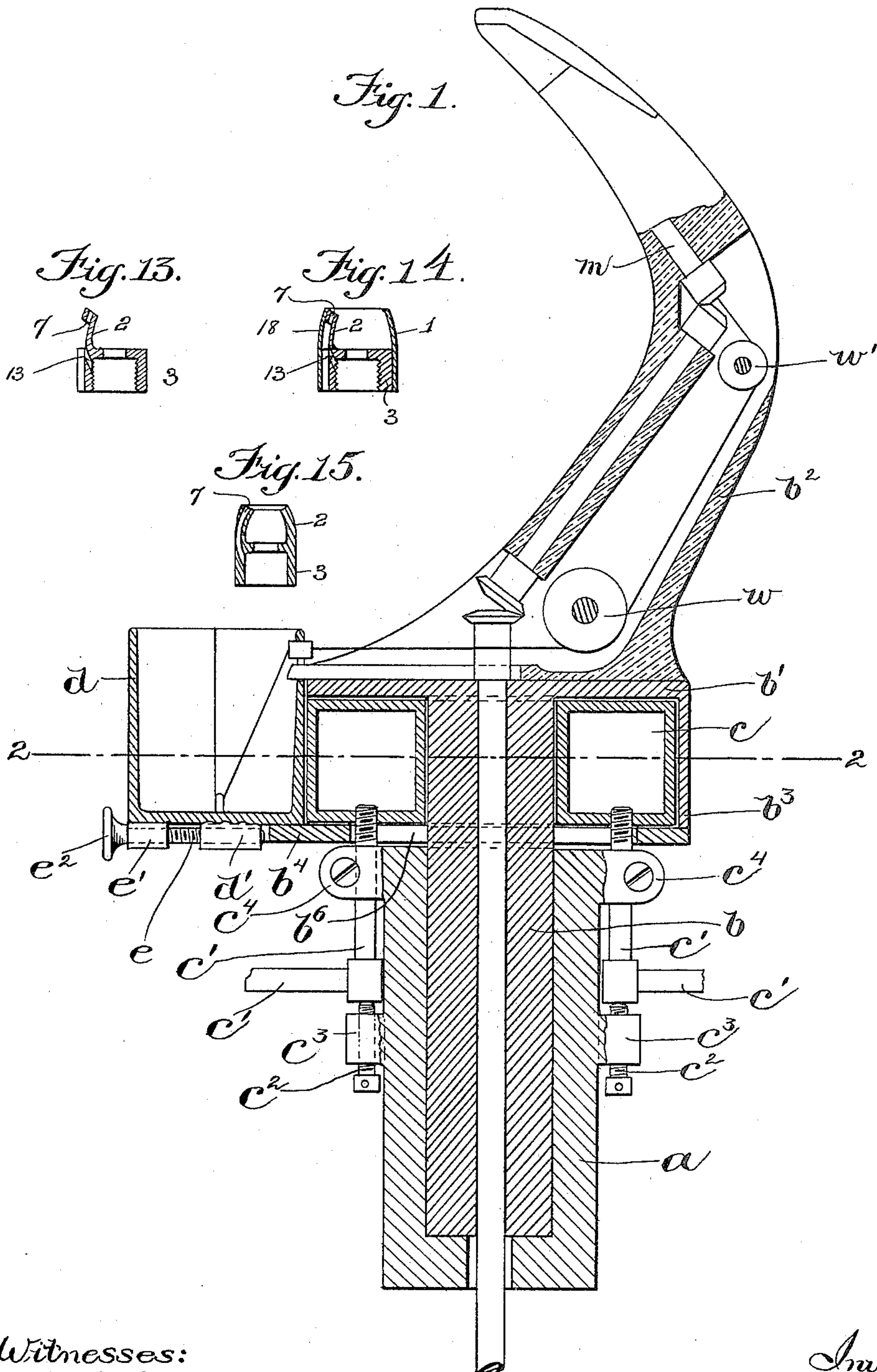
(No Model.)

2 Sheets—Sheet 1.

E. P. RICHARDSON.  
SHOE SEWING MACHINE.

No. 599,253.

Patented Feb. 15. 1898.



Witnesses:  
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Inventor:  
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

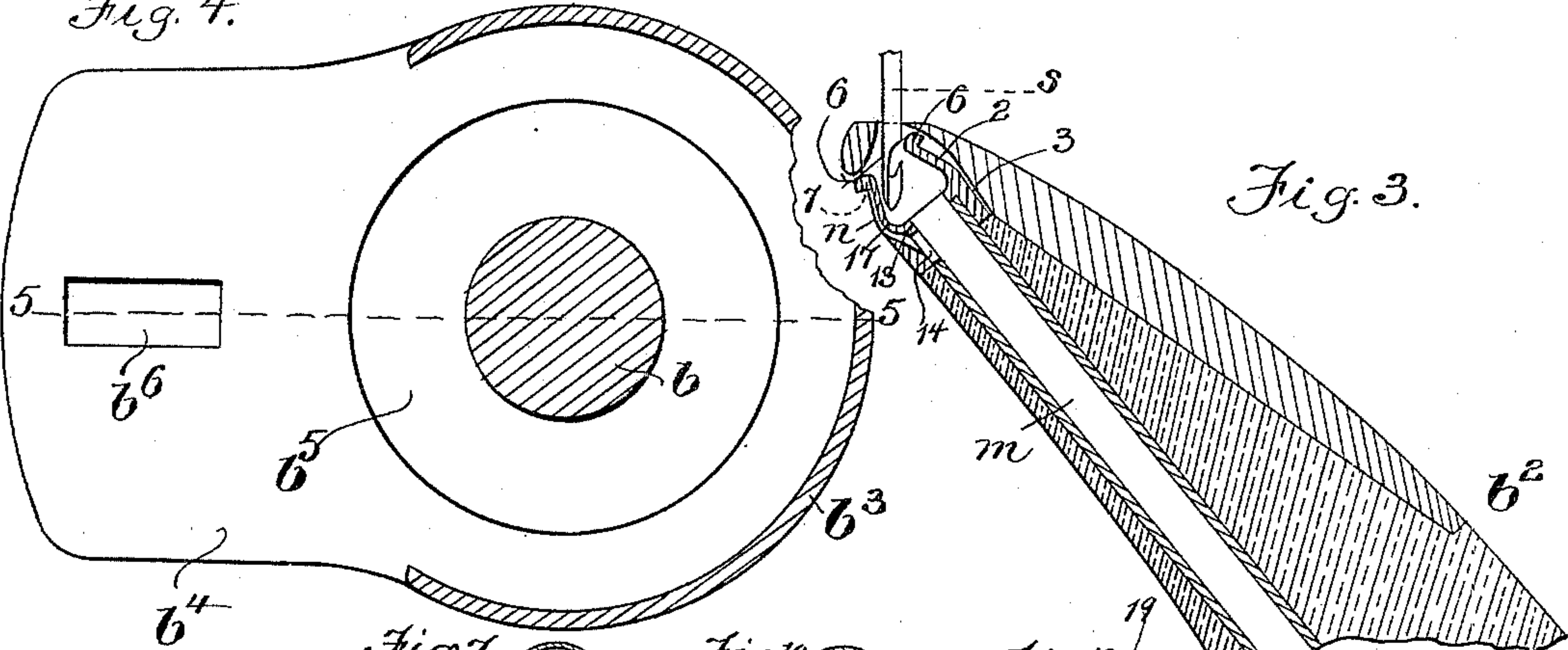


Fig. 3.

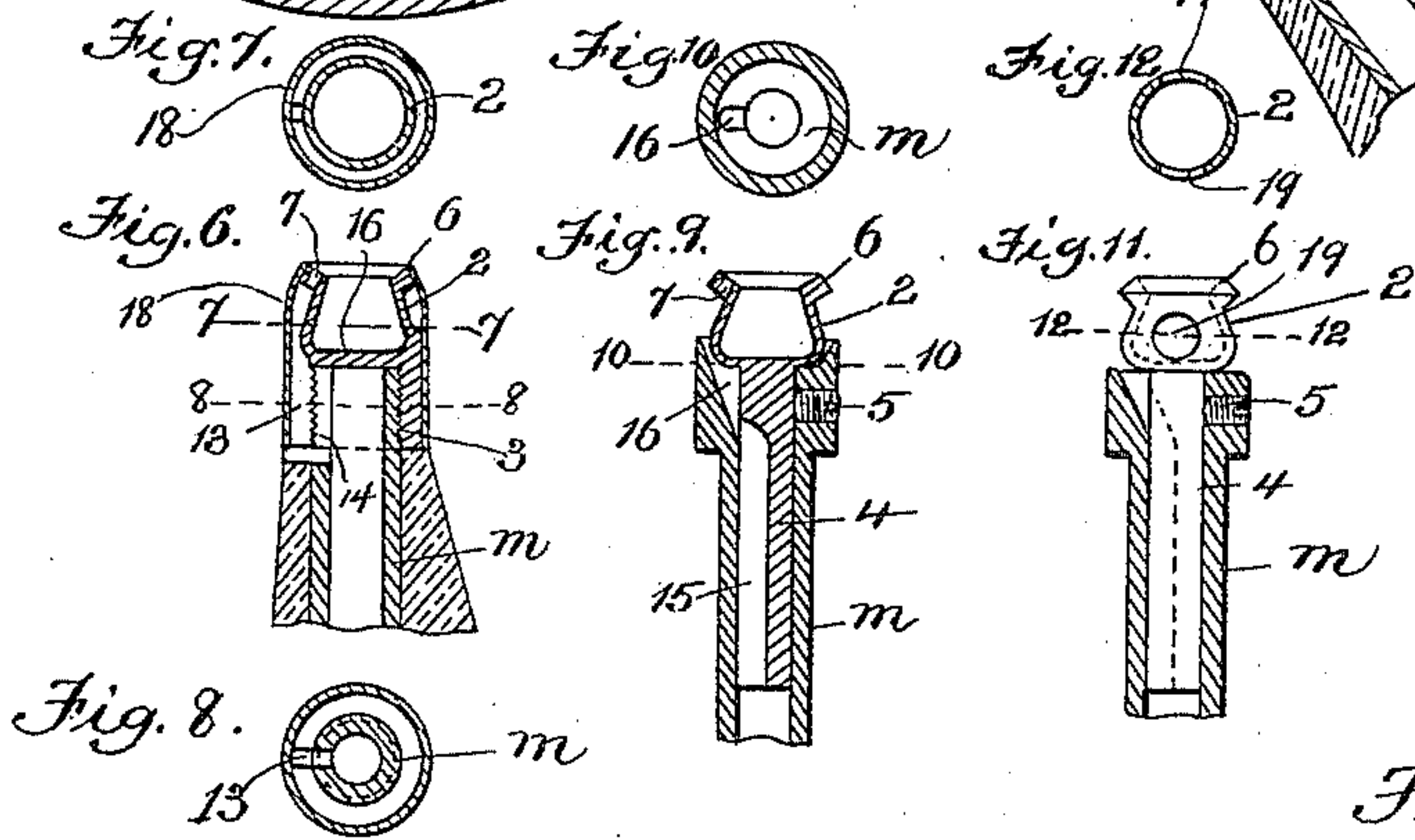
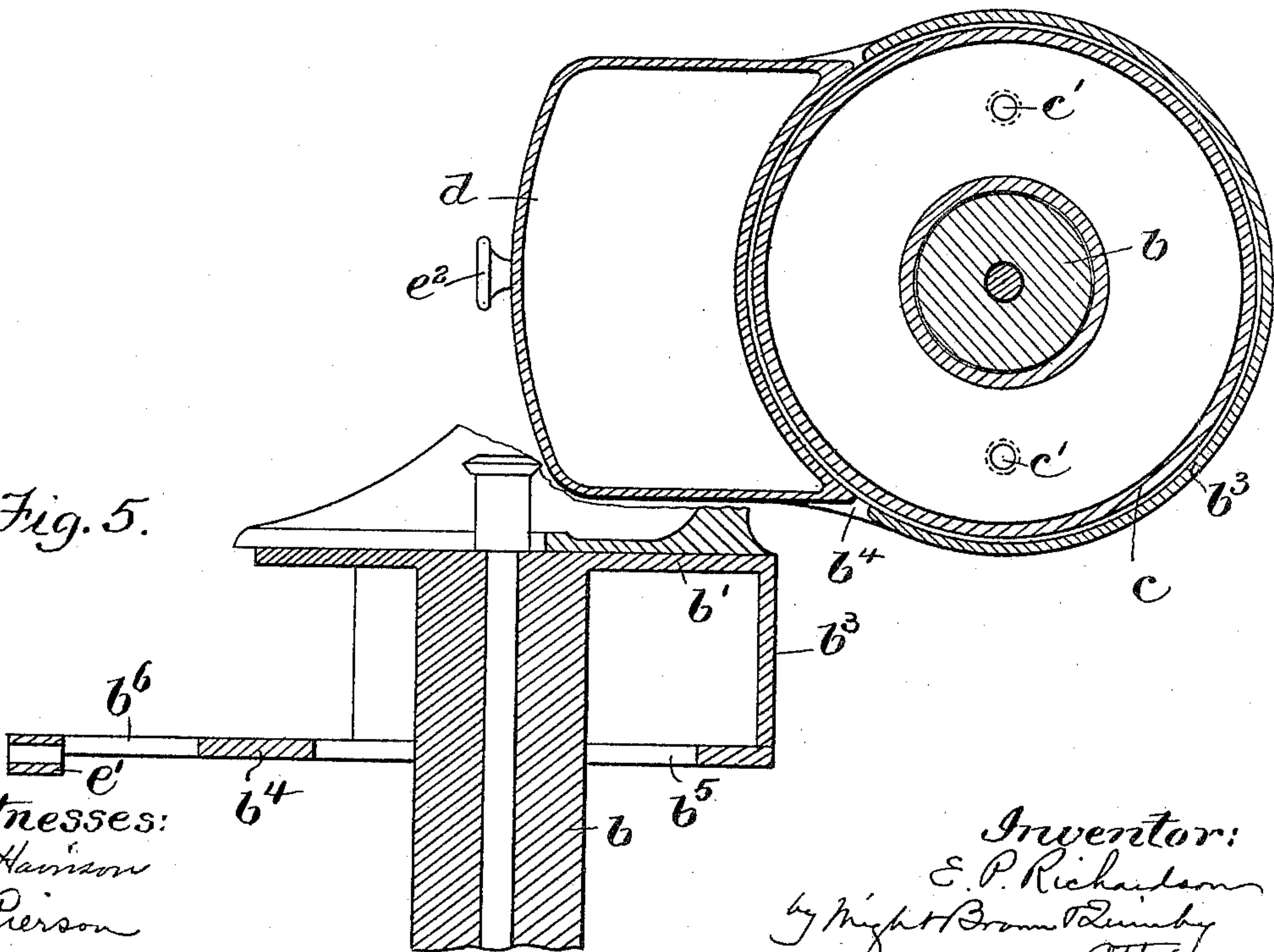


Fig. 2.

Fig. 5.



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# 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. 599,253, dated February 15, 1898.

Application filed July 27, 1897. Serial No. 646,093. (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  
5 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  
10 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  
15 of the horn and there receives the waxed thread from a thread-presenting device.

The invention consists in certain improvements relating to the looper of a machine of this character and to the wax-pot and means  
20 for heating the wax-pot and horn, all of 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  
25 horn provided with my improvements. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents a sectional view of the upper portion of the horn. Fig. 4 represents a view similar to Fig. 2, the heating device and  
30 wax-pot being removed. Fig. 5 represents a section on line 5 5 of Fig. 4. Figs. 6, 9, and 11 represent views of different forms of looper embodying my invention. Fig. 7 represents a section on line 7 7 of Fig. 6. Fig. 8 represents a section on line 8 8 of Fig. 6. Fig. 10  
35 represents a section on line 10 10, Fig. 9. Fig. 12 represents a section on line 12 12, Fig. 11. Fig. 13 represents a sectional view of a looper embodying certain features of my invention, as hereinafter described. Figs. 14  
40 and 15 represent modifications hereinafter referred to.

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

45 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 spindle mounted to rotate in said bearing and supporting the horn *b*<sup>2</sup>, said spindle being pro-

vided at its upper end with a horizontal flange or head *b*<sup>1</sup>, to which the base of the horn is affixed.

*c* represents an annular steam-chamber which surrounds the upper portion of the  
55 spindle *b* above the bearing *a* and is located under the flange *b*<sup>1</sup>. Said chamber may be supported in a fixed position in any suitable way, and is here shown as supported by means of steam-pipes *c*<sup>1</sup> *c*<sup>1</sup>, which are suitably at-  
60 tached to the bearing *a*, one of said pipes connecting a source of steam-supply, while the other conducts away the exhaust-steam. The pipes *c*<sup>1</sup> *c*<sup>1</sup> are preferably vertically adjustable by means of screws *c*<sup>2</sup> *c*<sup>2</sup>, engaged with tapped  
65 lugs *c*<sup>3</sup> *c*<sup>3</sup> on the bearing *a*, the upper portions of the pipes being movable in ears or guides *c*<sup>4</sup> *c*<sup>4</sup> on said bearing. The vertical adjustability of the pipes *c*<sup>1</sup> *c*<sup>1</sup> enables the chamber *c* to be raised into contact with the head *b*<sup>1</sup> at  
70 the commencement of the operation of the machine, thus quickly heating the horn, it being a fact that the horn is heated more quickly when the chamber *c* is in contact with the head *b*<sup>1</sup> than when the chamber is sepa-  
75 rated from said head. After the horn is sufficiently heated the chamber *c* may be lowered to remove it from contact with the head *b*<sup>1</sup>, sufficient heat being radiated from the chamber across the intervening crevice to keep the  
80 horn at the desired temperature.

The flange *b*<sup>1</sup> has a depending skirt or extension *b*<sup>3</sup>, to the lower edge of which is attached a horizontal plate or shelf *b*<sup>4</sup>, hereinafter referred to as the "wax-pot holder." As  
85 here shown, the plate *b*<sup>4</sup> has an enlarged opening *b*<sup>5</sup> (see Figs. 4 and 5) surrounding the spindle *b*, the pipes *c*<sup>1</sup> *c*<sup>1</sup> passing through said opening, so that the horn rotates freely without obstruction by the steam-pipes. The  
90 plate or shelf *b*<sup>4</sup> projects considerably from one side of the annular heating-chamber, and on its projecting portion is located a wax-pot *d*, which is movable upon the shelf or holder *b*<sup>4</sup> toward and from the chamber *c*, so that  
95 the wax-pot, the inner side of which is preferably recessed to conform to the curvature of the chamber *c*, can be moved toward and from said chamber to vary the heat of the wax. Means are provided for adjusting the wax-pot  
100



in its holder and for positively securing it at any point to which it may be adjusted. Said means, as here shown, comprise a projection  $d'$  on the bottom of the wax-pot, extending downwardly through a slot  $b^6$  in the wax-pot holder, said projection being adapted to receive an adjusting-screw  $e$ , which is journaled in a socket  $e'$ , formed on the plate or holder  $b^4$ . By turning the milled head  $e^2$  of the adjusting-screw the wax-pot can be moved toward or from the chamber  $c$ , as will be readily seen. The wax-pot may be adjusted inwardly into contact with the chamber  $c$  until the wax is sufficiently heated and then outwardly to prevent rubbing contact between the wax-pot and the chamber  $c$ . The shelf  $b^4$  is heated by the chamber  $c$  and conducts heat to the wax-pot. By making the wax-pot movable toward and from the heater I am enabled to adjust the wax-pot first into actual contact with the heating device for the immediate melting of the wax and then to a position more or less distant from the heating device to regulate the heat continuously supplied to the wax-pot during the operation of the machine. It is desirable to melt the wax quickly when preparing for operation; but the degree of heat which is desirable to quickly melt the wax is undesirably high for continuous use thereafter, because of the liability of overheating the wax and causing it to boil over.

$m$  represents a tubular shaft journaled in bearings in the upper portion of the horn and arranged in an inclined position at an obtuse angle with the path of the needle  $s$ . The shaft  $m$  may be rotated by any suitable mechanism, and the rotating mechanism may be the same as that shown in Letters Patent No. 577,397, dated February 16, 1897—namely, a plurality of shafts, one journaled in the horn-spindle and another in the horn, the shafts being connected by gears.

The thread which passes through the wax-pot is suitably guided to the lower end of the shaft  $m$  and passes through said shaft to the looper  $n$ , which is affixed to the upper end thereof. I have here shown a tension-wheel  $w$  and an idle pulley  $w'$ , journaled in the horn and arranged to guide the thread, as shown in Fig. 1.

The looper, which is an important part of my invention, is constructed with three general ends in view—namely, first, to guide the thread outwardly from the shaft  $m$  below and around the point of the needle and protect it from contact with said point; secondly, to allow the thread to pass from the looper to the needle in a direction which is approximately parallel with the path of the needle or so nearly parallel as to enable the thread to pass easily through the looper with the minimum of frictional resistance and strain; thirdly, to reduce to the minimum the diameter of the circular path of the looper where it revolves around the needle, so that the horn may be made of the smallest practicable cross-sectional area at this point. Another end which

I have had in view in constructing the looper in the preferred form shown in Figs. 3, 6, 9, and 11 is to give the looper such form as that injurious contact between the looper and the needle in case of the springing or displacement of either part will be practically impossible, and the catching or engagement of the looper with the lining of the boot or shoe will also be impossible.

I will first describe the preferred construction of the looper as shown in Figs. 3, 6, 9, and 11. Said construction embodies an annular arm 2, which is concentric with the shaft  $m$  and is provided at its inner portion with means for engagement with said shaft, such means being, for example, a sleeve 3, formed to surround the outer end of the shaft, as shown in Figs. 3 and 4, or a shank 4, formed to enter the shaft and engaged therewith by a set-screw 5 or other suitable means. The arm 2 has its maximum diameter at its inner portion and is contracted or tapered from its inner to its outer portion, so that the longitudinal section of the annular arm is inclined relatively to the axis of the shaft  $m$ , the arm surrounding a cavity adapted to receive the point of the needle, as shown in Fig. 3, the cavity being enlarged at its inner end to permit the entrance of the needle and contracted at its outer portion to reduce to the minimum the width of the opening required in the horn for the reception of the outer portion of the arm. On the outer portion of the annular arm 2 is formed an annular end face 6, which is of sufficient width to permit the formation in it of a thread-guiding eye 7, located outside of the needle-receiving cavity, the form and arrangement of the end face being such that the said eye extends at an angle to the axis of the shaft  $m$  and in a direction approximately parallel to the path of the needle when said eye is in its lowest position, as shown in Fig. 3.

In the construction shown in Figs. 3 and 6 the collar 3 of the looper is provided with a thread-guiding channel 13, communicating with a slot 14 in the shaft  $m$ , said slot and channel permitting the thread to pass from the interior of the shaft  $m$  to the exterior of the arm of the looper at a point below the point of the depressed needle. The channel 13 is arranged so that the thread passes directly from it along the exterior of the arm of the looper through the eye 7.

In the construction shown in Fig. 9 the shank 4 of the looper is provided with a longitudinal thread-channel 15, which communicates with a slot 16, formed in the outer portion of the shaft  $m$ , the channel 15 and slot 16 constituting a thread-guide from which the thread passes to the delivering-eye 7. The shank 4 is a more efficient conductor of heat to the looper than the open sleeve 3, said shank practically filling the interior of the shaft  $m$ . For this reason I prefer the shank as a connection between the looper and its shaft. It will be seen that in each of the



above-described constructions the thread passes from the shaft *m* at a point below the needle-receiving cavity in the looper.

It will be seen that the formation of a thread-guiding eye outside the cavity of the looper permits the thread to be deflected outwardly from the axis of the shaft *m* at a point below the extremity of the depressed needle and then inwardly toward said axis and toward the needle to the end face 6 and to pass from the latter to the needle at such an angle as will reduce to the minimum the frictional strain on the thread, the thread being protected from contact with the point of the needle. In Figs. 6 and 9 said cavity has a closed bottom, which in Fig. 6 is a diaphragm or partition 16, while in Fig. 9 it is a continuation of the shank 4.

In Fig. 3 I show a groove 17, formed in the outer surface of the arm of the looper, extending from the channel 13 to the thread-eye 7 for the partial reception of the thread passing along the exterior of the arm.

In Fig. 6 I show a removable casing 18, surrounding the sleeve, arm, and lip of the looper and separated from the arm by an annular space through which the thread passes from the slot 13 to the guiding-eye 7, said casing serving to prevent any possible contact between the lining of the boot or shoe and the thread.

In Figs. 11 and 12 I show the annular arm provided with orifices or outlets 19, formed to permit the escape from the needle-receiving cavity of lasting-tacks, which are occasionally forced downward by the needle. Said outlets 19 are formed above the closed bottom of the looper-cavity, so that they permit the tacks entering said cavity to escape laterally, the said closed bottom preventing the tacks from finding their way into the thread-passage of the looper-operating shaft. The tacks are thus prevented from contact with the sticky surface of the waxed thread, so that they cannot adhere to said thread and pass upwardly with it.

The annular form of the looper-arm and lip, whereby a needle-receiving cavity is formed, so that when the needle is depressed it is surrounded by the looper, not only prevents the possibility of injurious contact between the looper and needle in case either part, and particularly the needle, is deflected or sprung out of its intended position, but also prevents the looper from catching or engaging the lining of a boot or shoe being operated upon, as it might do if the looper were a narrow arm revolving about the needle instead of being of annular form and surrounding the needle. The inward inclination of the shank of the looper from the end of the shaft *m* toward a prolongation of the axis of said shaft locates the lip *n* at the minimum distance from the axis of the shaft and from the path of the needle, which path intersects the axis of the shaft within the cavity of the looper.

My invention is not limited, however, to the annular form of looper above described, as some of the advantages above enumerated may be secured by the use of a looper such as would be made by cutting away the annular arm until, instead of being of annular form, the said arm would simply project from one side of the device by which it is connected with the shaft *m*, as shown in Fig. 13. A looper thus constructed is similar to the looper previously described in that it is adapted to guide the thread outwardly from the shaft *m* below and around the point of the needle and protect it from the point of the needle.

The looper formed as shown in Fig. 13 may be provided with a casing 18, as shown in Fig. 14.

I do not limit myself to the formation of the end face 6 on a lip projecting from the arm of the looper, as the arm may be thickened, as shown in Fig. 15, so that its outer end forms an annular end face of sufficient width to surround the thread-guiding eye.

I claim—

1. In a sewing-machine of the character specified, the combination of a fixed support, a horn rotatively mounted thereon, a wax-pot revoluble with the horn, and a fixed heating device arranged to act simultaneously on the horn and wax-pot, whereby continuous fixed connections may be employed between the heating device and its source of supply, the wax-pot being revoluble with the horn and in a path adjacent to the fixed heating device.

2. In a sewing-machine of the character specified, the combination of a fixed support, a fixed annular heating device thereon, a horn having a spindle rotatively connected with said support and passing through the annular heating device, and a wax-pot holder located at one side of the heating device and a wax-pot movable on said holder toward and from the heating device.

3. In a sewing-machine of the character specified, the combination of a fixed support, a steam-chamber thereon, a horn rotatively mounted on said support and provided with a wax-pot holder, a wax-pot adjustably mounted on said holder, and means for adjusting the said wax-pot relatively to the steam-chamber, and for positively holding the wax-pot at any position to which it may be adjusted.

4. In a sewing-machine of the character specified, the combination of a fixed support, a fixed annular heating device thereon, a horn having a spindle rotatively connected with said support and passing through the annular heating device, and a shelf located at one side of the heating device, a wax-pot movable on said shelf and having a projection on its bottom, and an adjusting-screw on the shelf engaged with the said projection.

5. In a sewing-machine of the character specified, the combination of a fixed support, a horn rotatively mounted thereon, a movable



steam-chamber below the horn, and means for adjusting said steam-chamber relatively to the base of the horn, and for holding it at any position to which it may be adjusted.

5 6. In a sewing-machine of the character specified, the combination of a fixed support, a horn rotatively mounted thereon, a fixed heating device, a heat-conducting wax-pot holder revoluble with the horn and arranged  
10 to receive heat from the heating device, and projecting therefrom, and a wax-pot supported by the projecting holder and acted on by heat conducted through the holder.

15 7. In a sewing-machine of the character specified, the combination of a rotary horn, a looper-operating shaft within the horn arranged at an obtuse angle with the path of the needle, and a looper engaged with said shaft and having an internal enlargement, a  
20 contracted portion above said enlargement, and a thread-guide formed to deflect the thread outwardly from the axis of the shaft below the point of the needle and below the internal enlargement in the looper, and then  
25 inwardly toward the said axis and toward the shank of the needle at the said contracted portion, the deflected portion of the thread being positively held by the looper out of contact with the point of the needle.

30 8. In a sewing-machine of the character specified, the combination of a needle, a horn, and a looper supported in the horn and having its axis arranged at an obtuse angle with the path of the needle, the portion of the  
35 looper below the point of the depressed needle extending outwardly from the axis while the portion above the point of the depressed needle extends inwardly toward said axis, the looper having means for directing the thread  
40 first outwardly and then inwardly toward its axis, said looper having an end face in which is formed a thread-delivering orifice located in close proximity to the barb of the needle.

45 9. In a sewing-machine of the character specified, the combination of a needle, a horn, a thread-guiding looper-operating shaft located in said horn and at an obtuse angle to the needle, and a looper on said shaft having a portion below the point of the depressed  
50 needle extending outwardly from the axis, and a portion above said point extending inwardly toward said axis, said looper having also a partition or barrier whereby the admission of tacks to the shaft is prevented.

55 10. In a sewing-machine of the character specified, the combination of a needle, a ro-

tary horn, a thread-guiding looper-operating shaft within the horn arranged at an obtuse angle with the path of the needle, and an annular looper formed to receive and surround the point of the needle, said looper being contracted at its outer end and having an annular end face provided with a thread-delivering eye which is located in close proximity to the barb of the needle by the contraction of the end of the looper, the looper having means for directing the thread first outwardly from and then inwardly toward its axis.

11. An annular looper having a needle-receiving cavity closed at its inner end, and also having one or more tack-outlets.

12. An annular looper contracted at its outer end and having an annular end face provided with a thread-delivering eye, and provided at its inner end with means for engagement with an operating device, said looper being formed to receive and surround the point of the needle.

13. A looper supported by a thread-guiding shaft and formed to guide the thread outwardly from the axis of the shaft below the point of the needle, and then inwardly toward said axis, and toward the shank of the needle, combined with a removable annular casing formed to cover the exterior of the looper and extending from below the point where the thread passes outwardly from the axis of the shaft and above the point where the thread passes inwardly toward the shank of the needle, whereby contact between the thread and the work is prevented, the removability of the casing facilitating the threading of the looper.

14. In a sewing-machine, the combination with a steam-chamber heater, of a wax-pot support, and a wax-pot adjustably mounted thereon and movable toward and from the heater, and means for positively holding the wax-pot in adjusted position whereby the wax-pot may be adjusted first to position for the immediate melting and heating of its contents, and then to position for maintaining the wax in a suitable condition for use without continuous overheating.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 20th day of July, A. D. 1897.

EVERETT P. RICHARDSON.

Witnesses:

C. F. BROWN,  
A. D. HARRISON.