

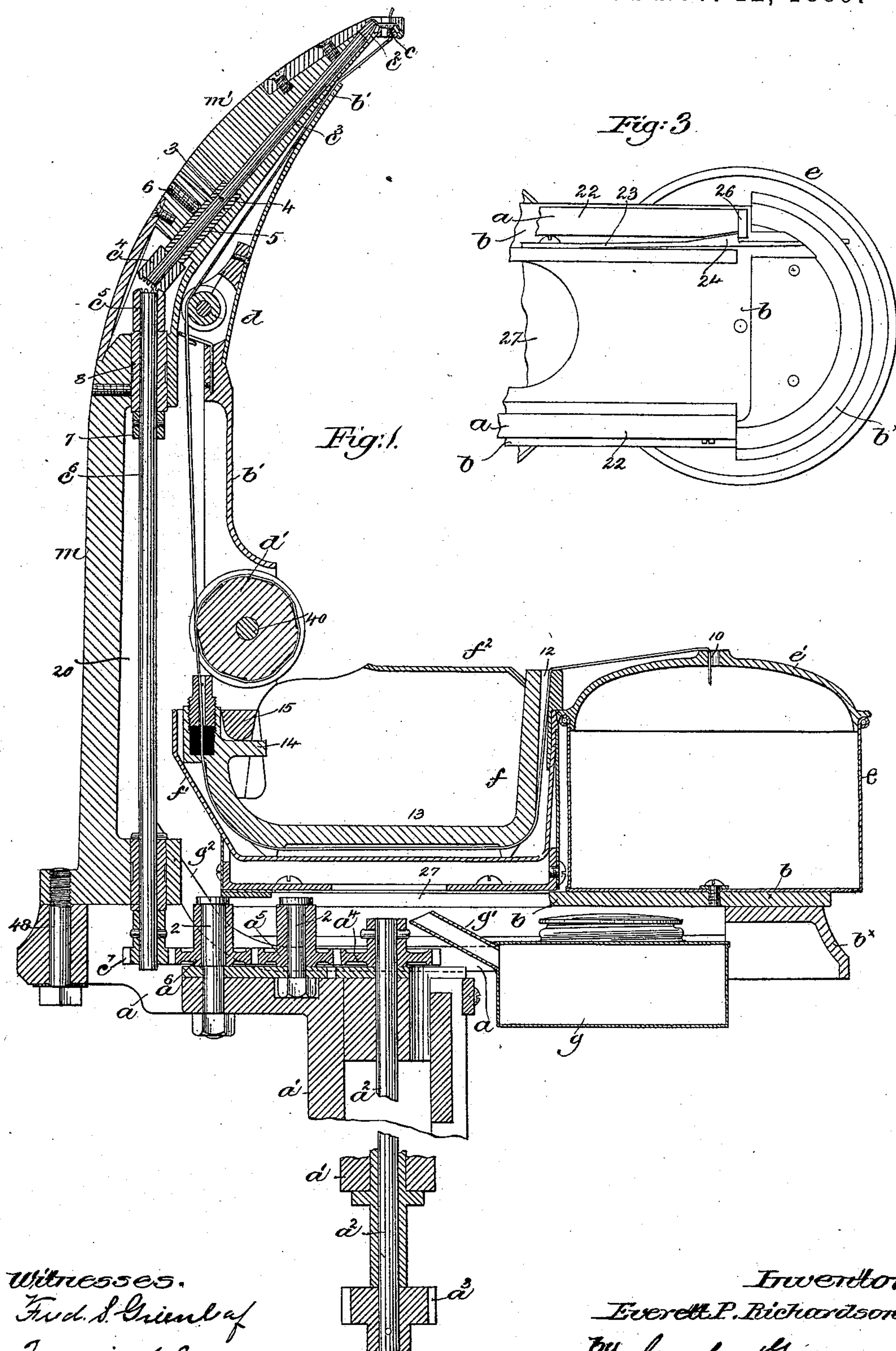
(No Model.)

2 Sheets—Sheet 1.

E. P. RICHARDSON.
SOLE SEWING MACHINE.

No. 415,064.

Patented Nov. 12, 1889.



Witnesses.
Fred. S. Grant of
Frederick L. Emery.

Inventor
Everett P. Richardson,
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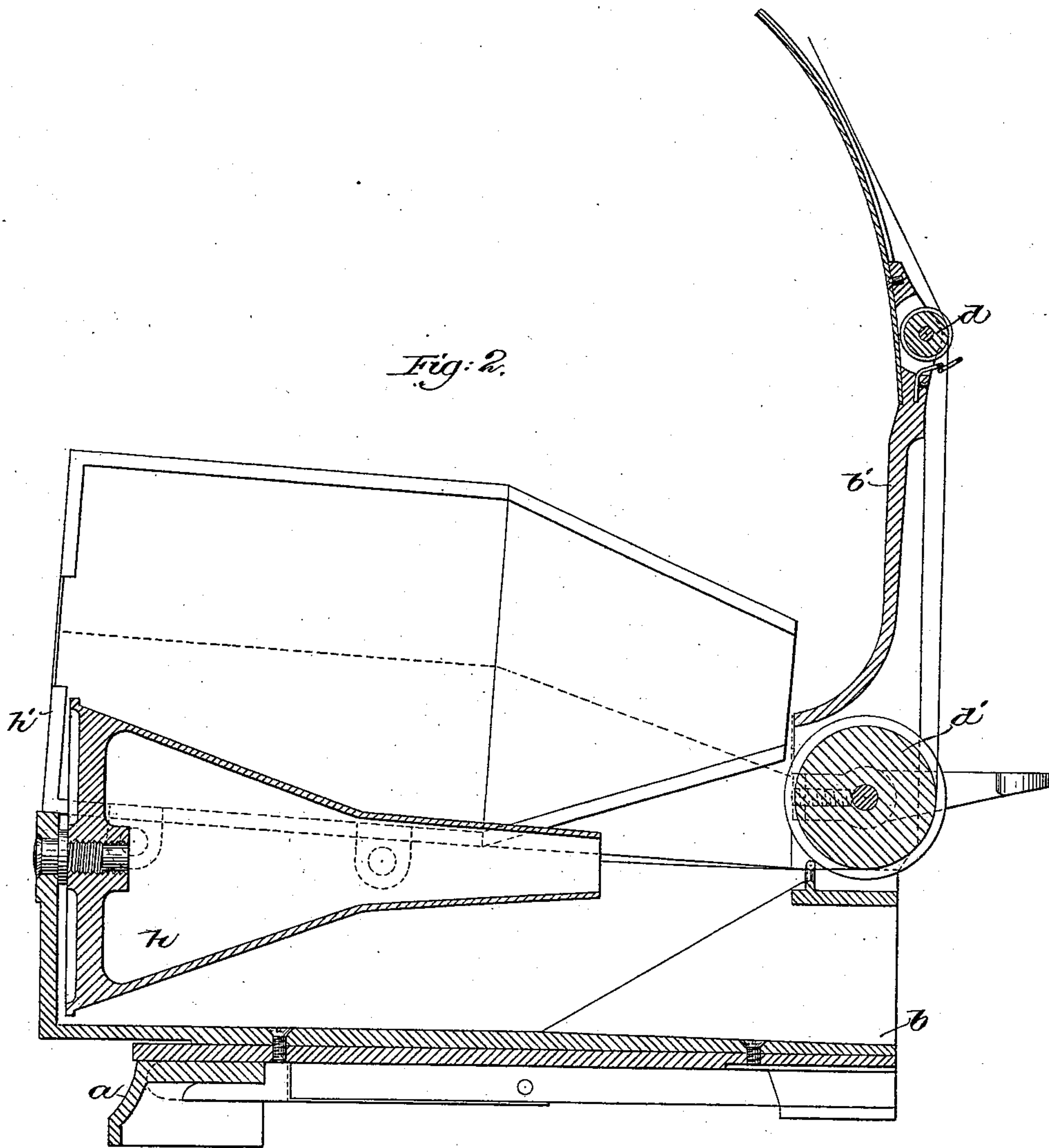
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Everett P. Richardson,

by Leroy & Gregory
Attys.

UNITED STATES PATENT OFFICE.

EVERETT P. RICHARDSON, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO
THE STANLEY MANUFACTURING COMPANY, OF PORTLAND, MAINE.

SOLE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 415,064, dated November 12, 1889.

Application filed March 30, 1889. Serial No. 305,374. (No model.)

To all whom it may concern:

Be it known that I, EVERETT P. RICHARDSON, of Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Sole-Sewing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 Prior to my invention in the so-called "McKay Sewing Machine," which is represented substantially in United States Patent No. 36,163, the inclined part of the horn has been inclined away from the tip of the horn
15 at a substantially-uniform inclination to a point considerably below that against which the counter-stiffened heel portion of the shoe bears when the tip of the horn is in the toe of the shoe. As a result of this long incline
20 in the horn the heel portion of the upper is frequently wrinkled, and to obviate such wrinkling the operator is called upon to lift the heel part of the shoe and bend the same in the shank, which is apt to distort the shoe
25 during the process of stitching and leave a permanent break or weakness in the shank, which is objectionable, and so, also, permanent wrinkles are frequently made in the heel portion of the upper. To obviate this difficulty,
30 a horn of the class referred to has been recessed at its upper side, as in United States Patent No. 304,689. So, also, prior to my invention sole-sewing machines have been made showing a horn the upright portions of which
35 are of V shape, or having two inclinations, as in United States Patent No. 272,409; but in such form of horn the point of junction of the two inclinations has been removed so far from the tip of the horn as to leave the upper
40 portion of the horn open to the objections stated to the usual McKay horn.

In accordance with my invention the head of the horn-spindle has erected upon it a horn-arm which for the greater part of its
45 length is substantially vertical, the upper part of the horn being, however, convexed, such convexed portion being of such length as to extend below the upper bearing of the vertical shaft used in the horn to actuate the
50 whirl, a horn of such shape readily entering

the shoe and enabling all parts of the shoe-sole to be stitched without wrinkling the heel portion of the upper, and without necessitating any action of the operator like bending the shank to enable the tip of the horn to lie
55 in the toe of the shoe while the toe is being stitched. The head of the horn-spindle supports a base or casting which, as represented herein, serves to sustain a shield which, when in place, closes the open inner side of the horn
60 to confine in the hollow space thereof the heat employed to keep it and the thread at the proper temperature. I have also shown this shield as carrying the guide-roll and tension device for the thread passing to the whirl,
65 such construction being a matter of very considerable convenience to the operator when threading up the machine.

My improved horn contains a substantially vertical and an inclined shaft, one being
70 driven by the other through crown-wheels, the pinion at the upper end of the inclined shaft directly engaging the whirl in usual manner. The vertical shaft in the horn-arm is shown as deriving its motion from a vertical shaft parallel to it located in the horn-spindle and at the center of rotation of the
75 horn, the said vertical shafts each having pinions of different diameter, between which are two intermediate pinions of like size, as will
80 be described.

To enable wear to be compensated for, I have provided both the vertical and the inclined shaft referred to each with a loose bushing, which is placed on the shaft between its
85 crown-gear and a collar, both fast to the shaft, the said bushing being held in adjusted position by means of a suitable set-screw.

The particular features in which my invention consists will be hereinafter described in
90 the specification, and set forth in the claims at the end thereof.

Figure 1 in vertical section shows a sufficient portion of a horn embodying my invention to enable the same to be understood, the
95 shank of the horn being broken out to save space upon the drawing, the said horn having attached to it a thread-holder, the shield referred to, and a heating contrivance. Fig. 2 is a modified form of my invention, and Fig. 100

3 is a partial under side view looking up from the right of Fig. 1.

The head a of the horn, its shank a' , and the shaft a^2 therein, having the gear a^3 at its lower end, by which to rotate the said shaft, are and may be all as common to the McKay machine referred to, with the exception of a slight difference in the shape of the said head, to be referred to, whereby it is adapted to receive the plate b , which is slid into a proper groove or guideway.

Secured to the head a by a suitable bolt or screw, as 48, is the horn-arm, composed, essentially, of a substantially-upright part m and a curved part m' , the latter being near the extremity of the horn, the curvature being herein so slight that when the shoe being stitched is applied to the horn the tip of the horn may enter fully into the toe of the shoe, without necessarily bringing the heel part of the upper in contact with the horn in such manner as to form wrinkles therein, or in such manner as to require the operator to lift the heel portion of the shoe and bend its shank before the tip of the horn can fully pass into the toe of the shoe.

The whirl c in the tip of the horn is of usual construction and operation, its beveled teeth being engaged by the teeth c^2 at the upper end of the inclined shaft c^3 , which is of less length than the curved part of the horn, the said shaft having fixed to it at its lower end a crown-gear c^4 , which engages a crown-gear c^5 , fast on the upper end of a vertical shaft c^6 , having at its lower end a pinion c^7 , which derives its motion from the pinion a^4 at the upper end of the horn-shaft a^2 , through, however, as herein shown, the two intermediate gears a^5 a^6 of like diameter, each mounted upon a suitable stud, as 2, secured to the head of the horn-spindle, the diameter of the gear a^4 being greater than of the gears a^5 a^6 , and the latter gears being both of greater diameter than the gear a^7 .

The shaft c^3 has fixed to it by a pin 3 or otherwise a collar 4, and between the said collar and the crown-gear c^4 the said shaft is surrounded loosely by a bushing or sleeve 5, the bushing, when the shaft c^3 has been adjusted into just the position desired for it, being confined in place by a suitable set-screw 6. I have provided the shaft c^6 with a like collar 7 and a like bushing 8, the bushing 8 in practice having co-operating with it a set-screw like the one 6. Adjustment of the collar 4 enables wear between the gear c^2 and the whirl to be compensated for, while adjustment of the collar 7 enables wear between the crown-wheels c^4 c^5 to be compensated for.

The plate b , as shown, has erected upon or made as part of it a shield b' , the upper end of which is carried well up toward the whirl, the shield fitting the inner concaved side of the horn and forming a removable cover, which, when in place, retains the heat in the hollow part of the horn. This shield, as here-

in represented, has a pin or stud upon which is mounted the thread-roll d , and another stud or pin 40, upon which is mounted the tension roll or wheel d' , it being a wheel which is held frictionally in any usual way.

As shown in Fig. 1, the plate b has secured to it a thread-holder e for a dry thread to be taken to the waxing contrivance f , it having co-operating with it a stripper f' .

As represented in Fig. 1, the thread-holder is of such form as to receive within it a ball of dry thread, (not shown,) which thread is led out through the hole 10 in the cover e' of the holder, and thence down through the groove or passage 12 of a foot-piece 13 of yoke shape, which rests in the wax-cup, the wax surrounding the said foot-piece penetrating freely the thread used, the excess of wax being removed by the stripper f' . This foot-piece is held in place, as herein shown, not only by the cover f^2 , but also by the action of the flange 14 of the foot-piece, against a projection 15, forming part of the wax-cup f .

The heating means shown in Fig. 1, consisting of a lamp, as g , located below the wax-receptacle and below the head of the horn, has two wick-tubes, as g' g^2 , one being adapted to present the flame against the under side of the wax-cup, while the other directs the flame into the hollow space 20 of the upright part of the horn-arm. Instead of the lamp g , however, I may use gas, and have each of the pipes g' g^2 provided with burners in usual manner.

In the modification, Fig. 2, I have shown the head a as having attached to it by suitable screws the plate b , the latter being, however, slightly altered in shape, so as to support the thread-holder h , shown as a metallic bobbin.

In Fig. 2 the thread-roll d is as in Fig. 1, as is also the shield part b' ; but the tension-wheel d' is of slightly-different shape.

In the use of the tension wheel or roll d' in the machine herein described it will be understood that the shaft or stud upon which the said wheel turns will be provided with some usual device by which to entirely relieve the wheel d' from friction when it is desired to draw off any portion of the thread or for other purposes, as now usually practiced in sole-sewing machines.

I do not desire to limit my invention to the exact form of thread-holder, as I may use any usual or well-known form of device to supply the thread to the horn.

To enable the plate b to be easily applied to or removed from the head a , I have grooved the said head longitudinally to receive the said plate, and to keep the plate from being drawn out longitudinally from between the side walls 22 of the said head I have provided the plate b (see Fig. 3) with a spring-latch 23, having a projection 24 near its outer end, which projection, when the plate b is pushed into position in the head a , engages a block 26 at the end of the head, the said block con-

stituting a stop. This plate *b* also has depending from it a sort of wing, as *b*^x, which, when the plate is inserted in the head, meets the end of the head to act as a stop to limit the extent of inward movement of the plate *b*.

The plate *b* is open at its central part, as at 27, to thereby enable the heat employed to readily reach the bottom of the wax-cup.

In the McKay class of machine and in the invention herein described it is essential that the thread-delivery orifice in the whirl *c* always occupies a position just back of the hook of the needle preparatory to the movement of the whirl in a direction to lay its thread in the hook of the needle, and this established position for the orifice in the whirl must be the same, notwithstanding the varying position of the horn during its rotation, as it will be understood the horn has to be rotated while the stitching is being done about the sole to secure the latter to the upper, and consequently the gearing between the shaft *a*² and the whirl must be such that the rotation of the horn does not rotate the whirl, the latter being actuated only through positive rotations imparted to the shaft *a*² by usual means.

The teeth of the gears *a*⁴ and *c*⁷ differ as four to seven, and this same proportional difference exists between the teeth of the pinion *c*² and the teeth of the whirl, the gears *a*⁶ *a*⁵ being simply intermediate gears to transfer the motion of *a*⁴ to *c*⁷.

The horn *a*⁵ has, it will be understood, to be kept warm in order to keep the wax upon the thread at the proper consistency, and in doing this the expansion of the shaft *c*⁶ by heat moves the gear *c*⁷ vertically; but as the gears *c*⁷ and *a*⁶ are spur-gears the change of position due to the expansion of the shaft *c*⁶ does not affect the proper engagement of the two gears; but should bevel-gears be used instead of *c*⁷ *a*⁶, then the expansion of the shaft would cause a binding of the gears, which would be objectionable, if not substantially fatal to the action of the machine.

I claim—

1. The combination, with the whirl, the inclined shaft *c*³, the vertical shaft *c*⁶, and gearing connecting them together and the shaft *c*³ to the whirl, of a horn consisting, essentially, of a spindle, a head *a*, and an arm *m* *m'*, the upper portion *m'* of the arm being convexed from at or near the whirl to a point below the upper bearing for the vertical shaft *c*⁶, substantially as described.

2. In a machine for sewing boots or shoes, a horn to support the sole to be stitched, the said horn being curved for a portion of its length from its tip toward its lower end, combined with a movable cover or shield for the inner or concaved side of said horn, substantially as and for the purpose described.

3. In a machine for sewing boots or shoes, the head *a*, the horn-arm *m* *m'*, the part *m'* being shaped substantially as described, and the whirl, and the inclined and the vertical

shafts in the said horn-arm, combined with the movable shield for the inner or concaved side of the horn-arm and with the guide-roll *d*, to operate substantially as described.

4. The combination, with the horn-arm *m* *m'*, of the shield *b'* and the guide-roll *d*, carried and covered by the said shield, and with the tension device, also carried by the said shield, to operate substantially as described.

5. The combination, with the spindle and head *a* of the horn and the horn-arm, of the plate *b*, the shield *b'*, the roll *d*, carried thereby, and a tension device of a thread-holder mounted on the said plate, substantially as described.

6. The horn-arm, its shaft *c*⁶, having a gear *c*⁵, the whirl, the inclined shaft *c*³, having the collar 4, and the gear attached to it, combined with the loose bushing 5 and with means to hold the said bushing in adjusted position, substantially as described.

7. The horn-arm, the whirl, the inclined shaft *c*³ to rotate it, and the pinion *c*⁴, fixed to the said shaft, combined with the vertical shaft *c*⁶, its pinion *c*⁵, and collar 7, attached to the said shaft, and with the loose bushing 8 and means to hold it in adjusted position, substantially as described.

8. The spindle, its attached head *a*, the shaft *a*², having the pinion *a*⁴, the horn-arm convexed from at or near its upper end to a point below the upper bearing for the shaft *c*⁶, the whirl, the shaft *c*³, having teeth at its end to directly engage the teeth of the whirl, the shaft *c*⁶, standing vertically within the horn-arm and parallel to the shaft *a*², gears to connect the shafts *c*³ and *c*⁶ operatively, and the pinion *c*⁷, fast on the shaft *c*⁶, combined with the two intermediate gears *a*⁵ *a*⁶, to operate substantially as described.

9. The combination, with the head *a* of the horn and the horn-arm *m* *m'*, shaped substantially as described, of the removable plate *b*, having the attached shield *b'*, to fit the inner concaved side of the horn-arm, and a locking device to retain the said plate and head together, substantially as described.

10. The horn, the whirl therein provided with teeth, the inclined shaft *c*³, having teeth at its upper end to engage the whirl, the shaft *c*⁶, gearing to connect it with the shaft *c*³, and the spur-gear *c*⁷ upon the said shaft *c*⁶, combined with a shaft *a*², located at the center of rotation of the horn, its attached gear *a*⁴, of greater diameter than the gear *c*⁷, and the two intermediate gears *a*⁵ *a*⁶, each of like diameter, located between the said gears *a*⁴ and *c*⁷, whereby the horn may be rotated and yet not rotate the whirl *c* in the horn, substantially as described.

11. The combination of a hollow horn having a closed space or chamber extending substantially from its lower end to its tip, said horn being provided at its tip with a whirl and at its base with a thread-receptacle and a wax-receptacle, with a heater having a burner and located below the wax-recep-

tacle and below the head of the horn which supports the horn-arm, and thread-guides contained within the closed space in the horn, whereby the thread is enabled to pass from
5 the base to the tip of the horn through the interior of said closed space, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EVERETT P. RICHARDSON.

Witnesses:

BERNICE J. NOYES,
FREDERICK L. EMERY.