

(No Model.)

9 Sheets—Sheet 1.

P. A. & J. COUPAL.

SEWING MACHINE FOR CONNECTING SOLES AND UPPERS.

No. 381,987.

Patented May 1, 1888.

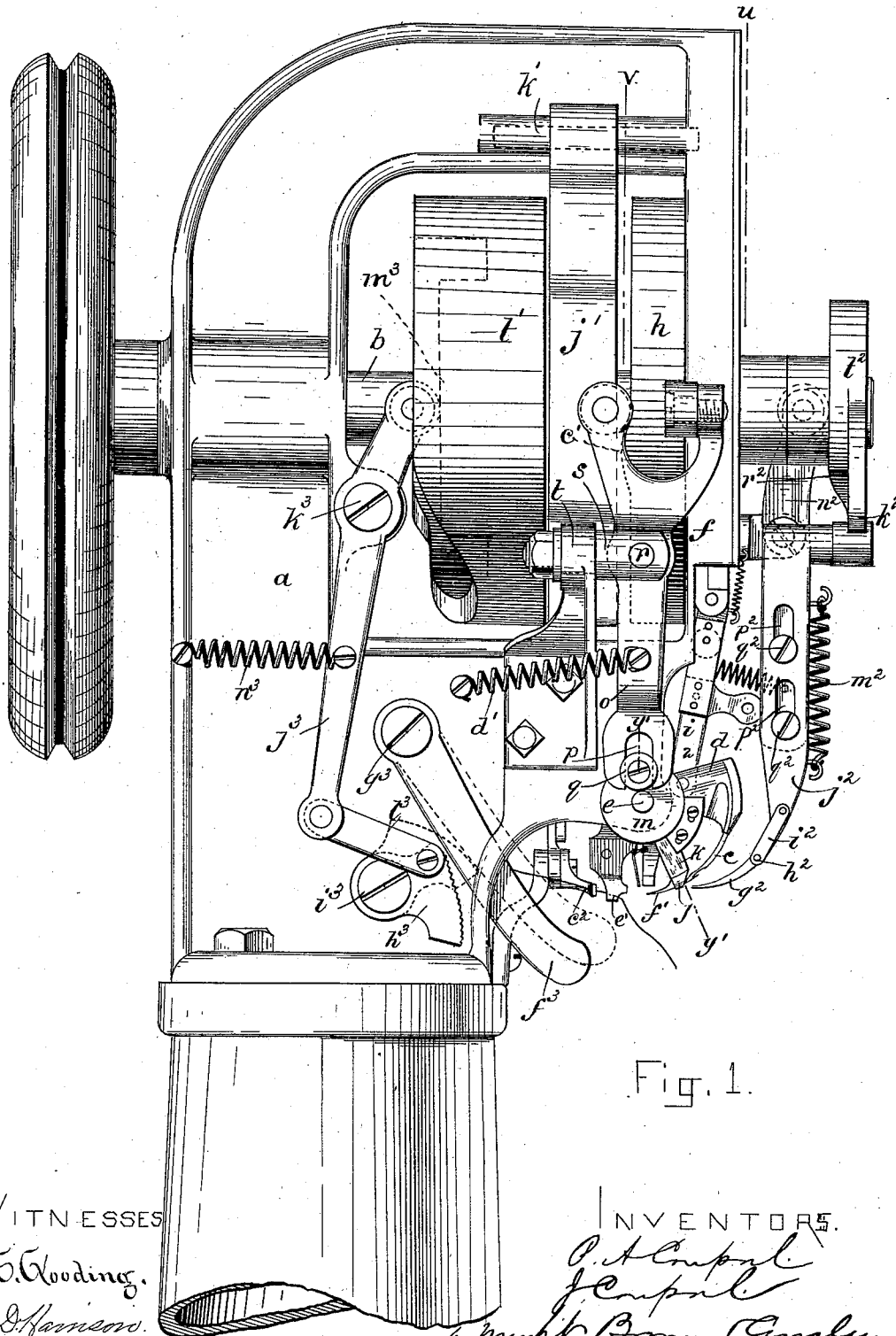


Fig. 1.

WITNESSES

C. S. Wooding.

A. S. Harrison.

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P. A. Coupal  
J. Coupal

by Myself, Brown & Cooley,  
Atty.

(No Model.)

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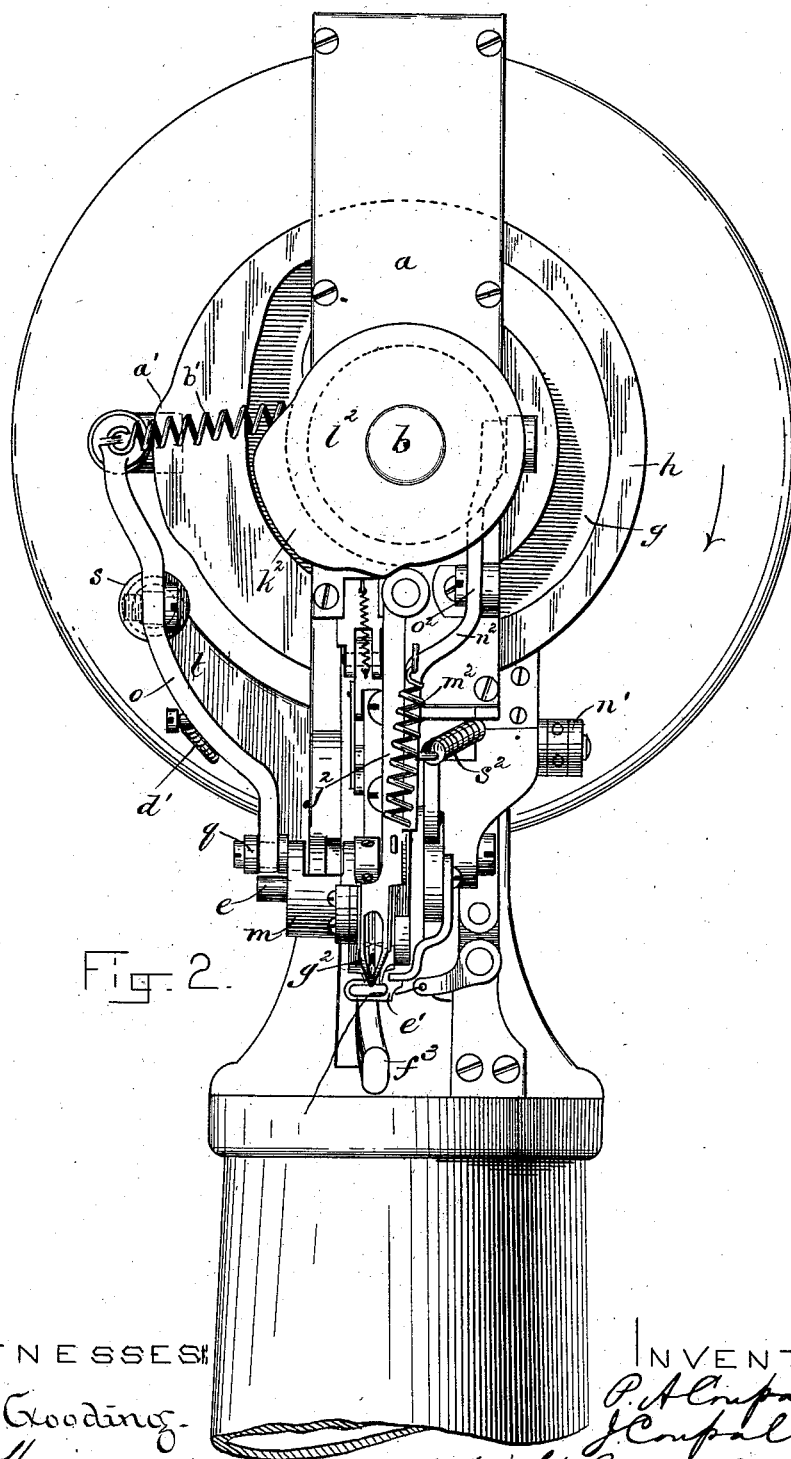


FIG. 2.

WITNESSES:

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(No Model.)

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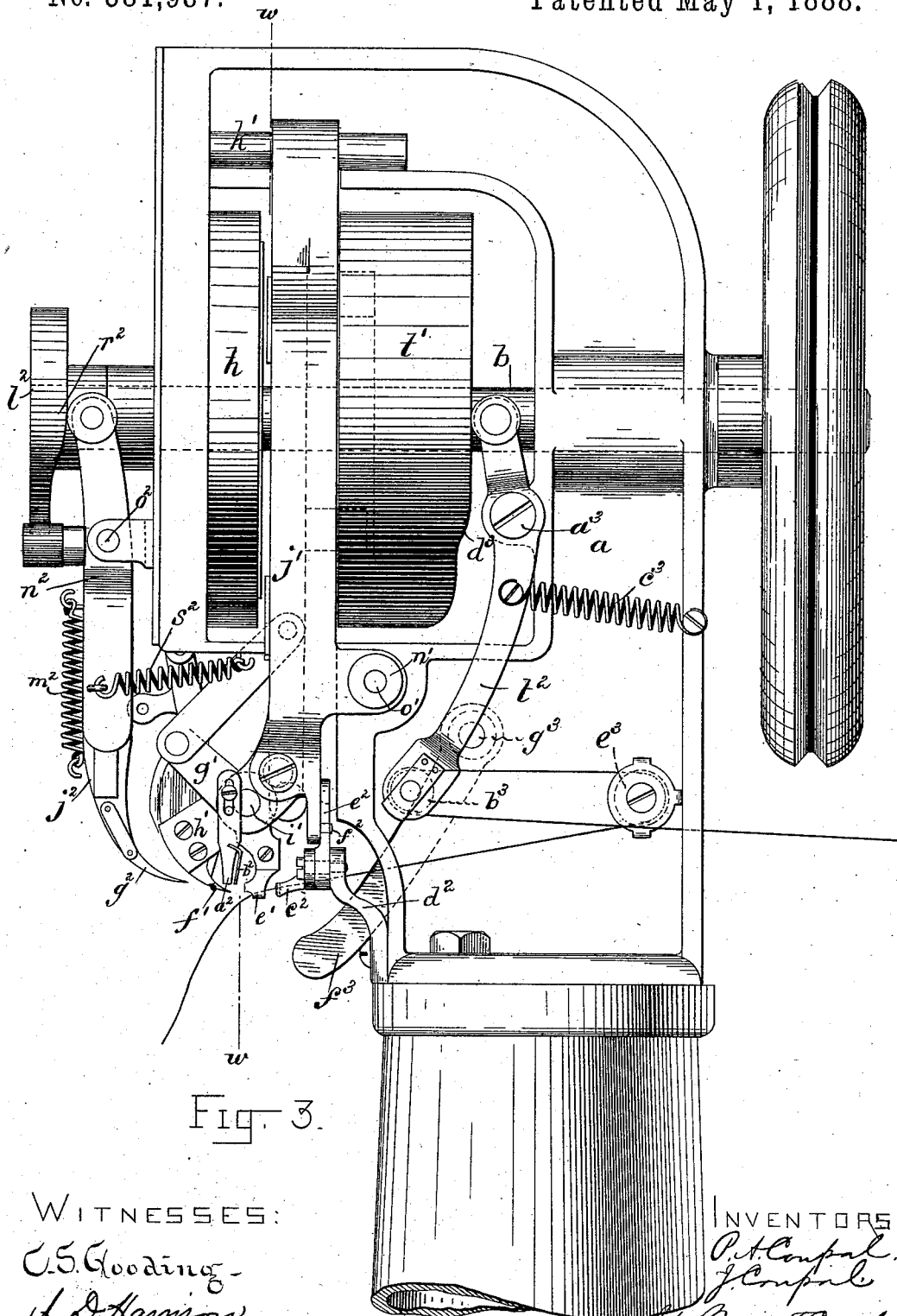


FIG. 3.

WITNESSES:

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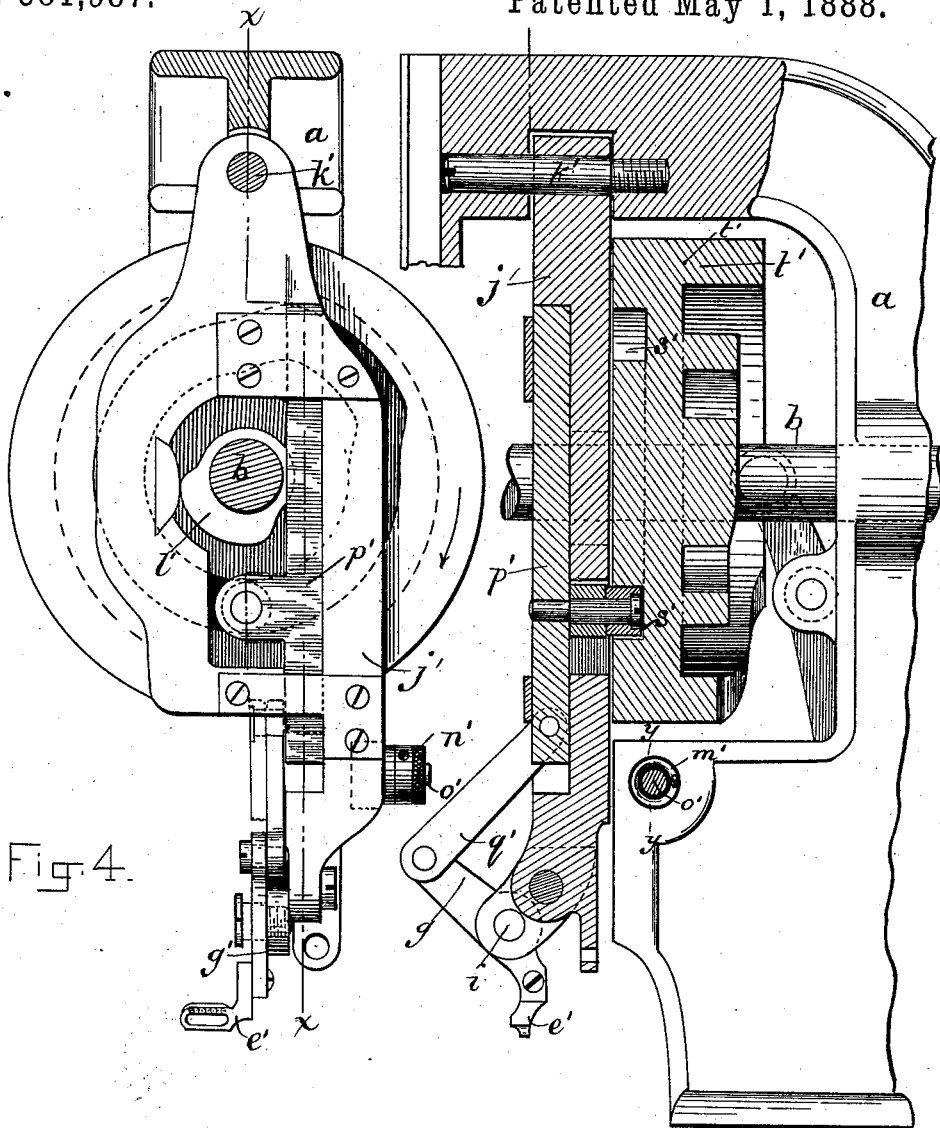


Fig. 4.

Fig. 5.

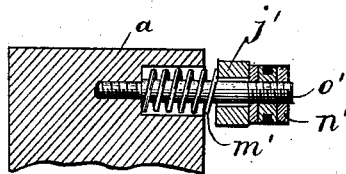


Fig. 6.

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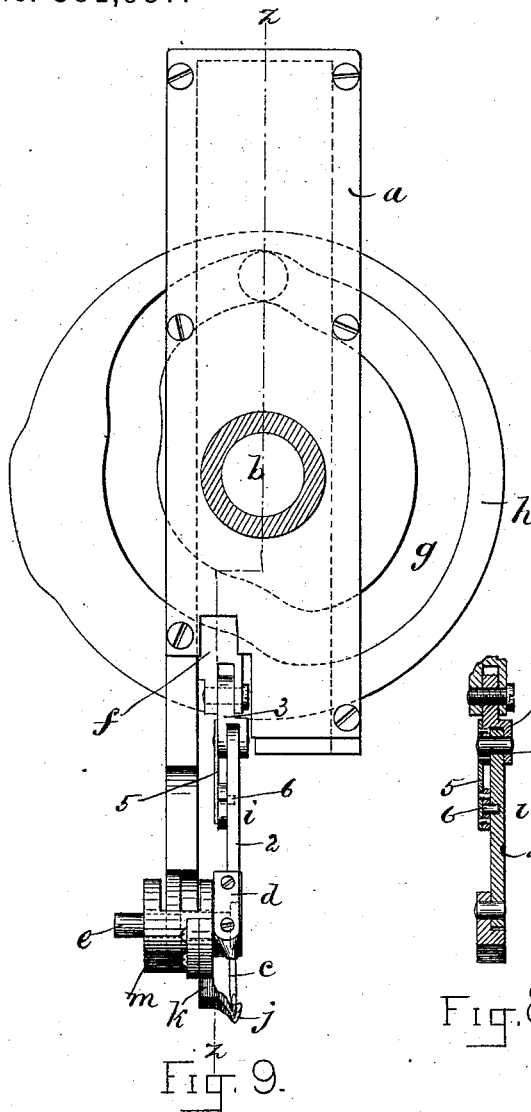


FIG. 9.

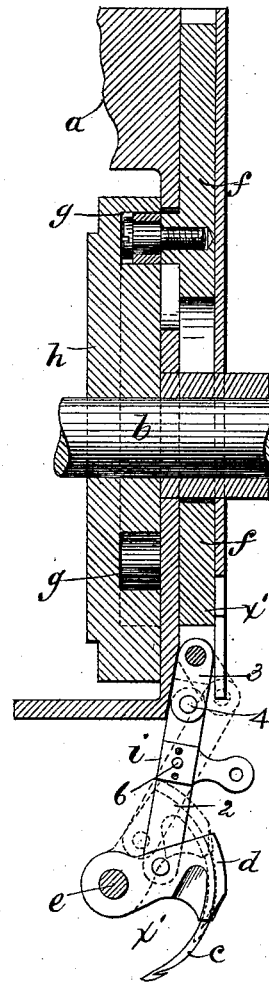


FIG. 7.

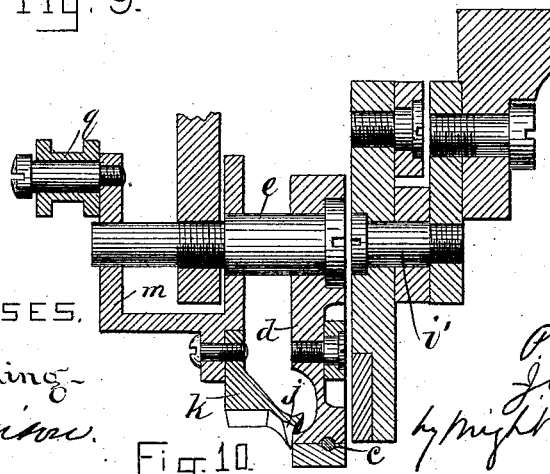


FIG. 10.

WITNESSES.

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(No Model.)

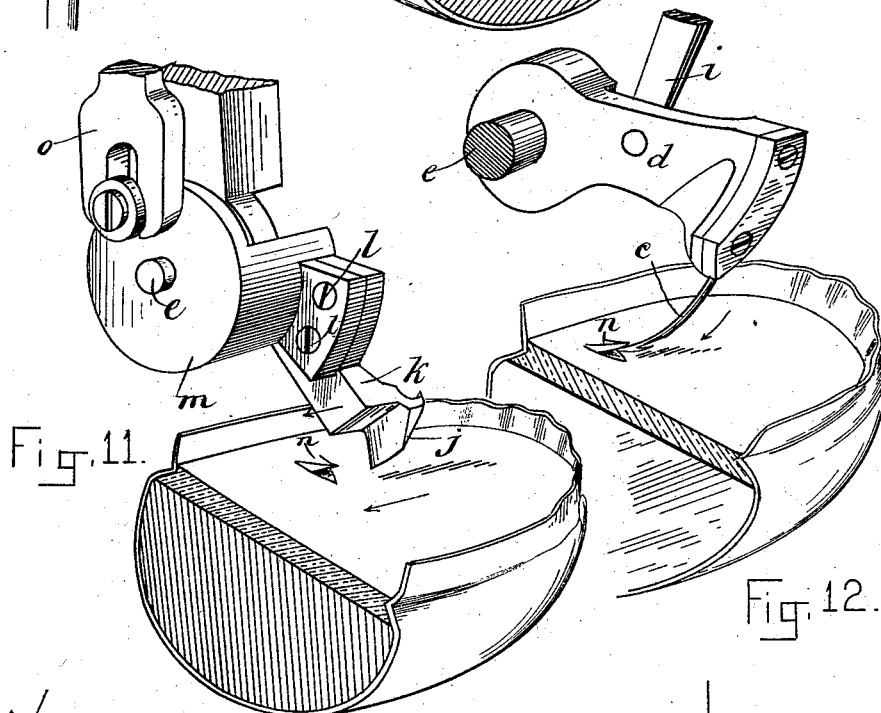
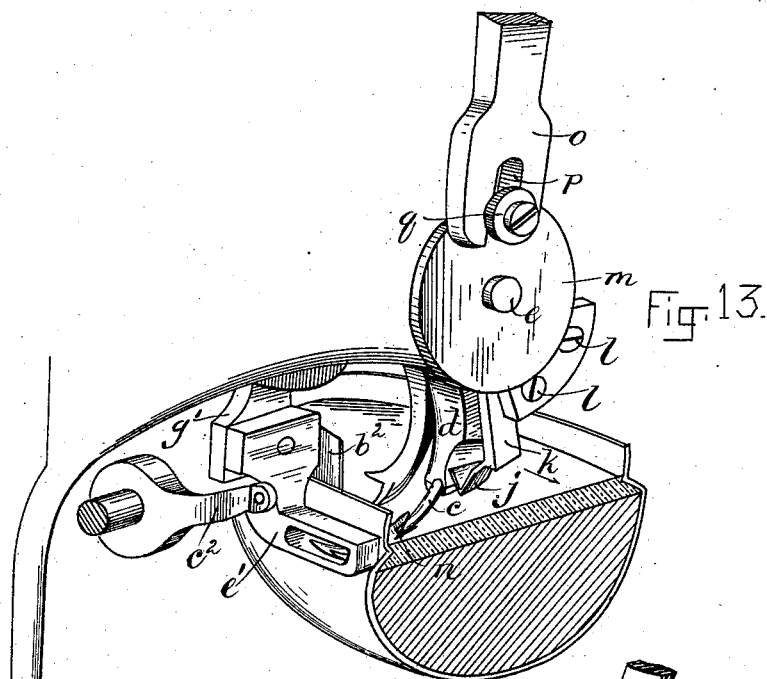
9 Sheets—Sheet 6.

P. A. & J. COUPAL.

SEWING MACHINE FOR CONNECTING SOLES AND UPPERS.

No. 381,987.

Patented May 1, 1888.



WITNESSES:  
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A. D. Hanson.

INVENTORS:  
P. A. & J. Coupal  
by *Wm. B. Brown* Atty.

(No Model.)

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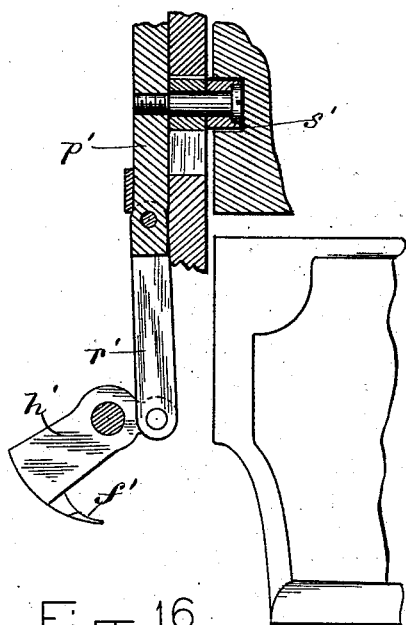


Fig. 16.

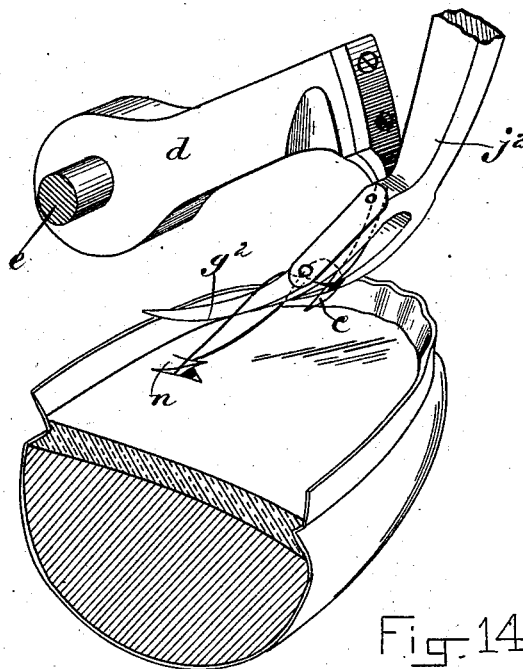


Fig. 14.

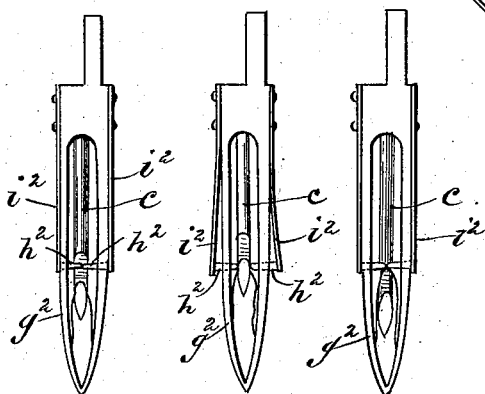


Fig. 17.

Fig. 18.

Fig. 19.

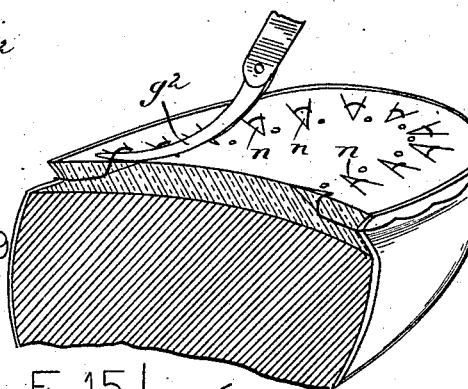


Fig. 15.

WITNESSES:

C. S. Gooding,  
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P. A. Coupal.  
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(No Model.)

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P. A. & J. COUPAL.

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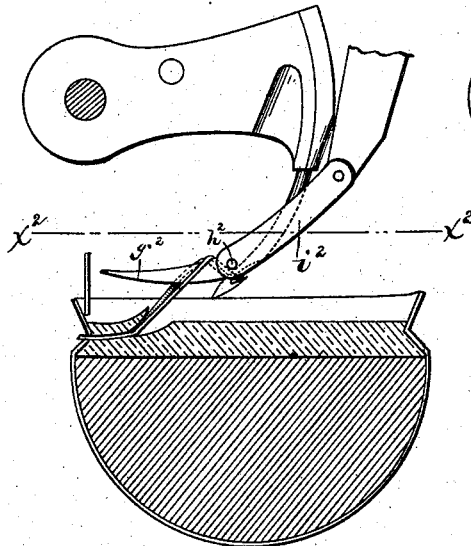


Fig. 20.

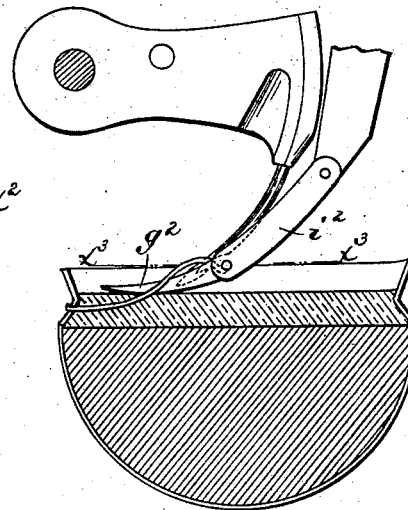


Fig. 22.

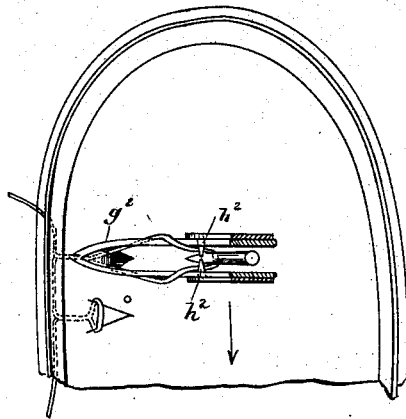


Fig. 21.

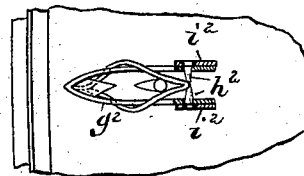


Fig. 23.

WITNESSES.

C. S. Gooding.  
A. D. Hanson.

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(No Model.)

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P. A. & J. COUPAL.

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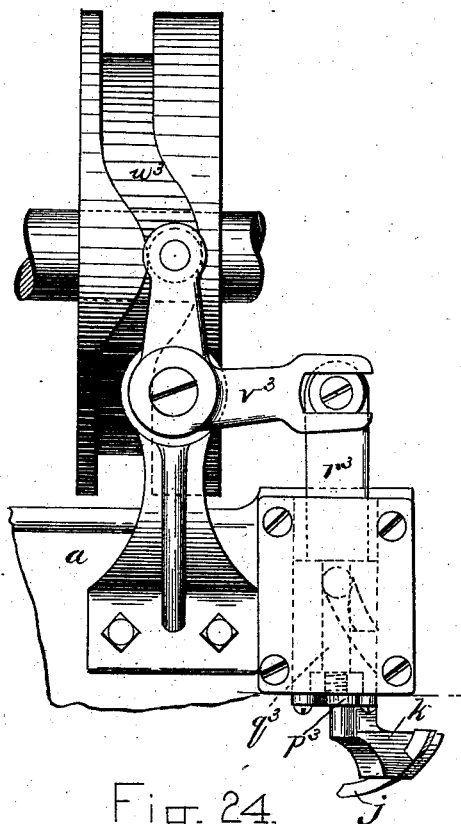


Fig. 24.

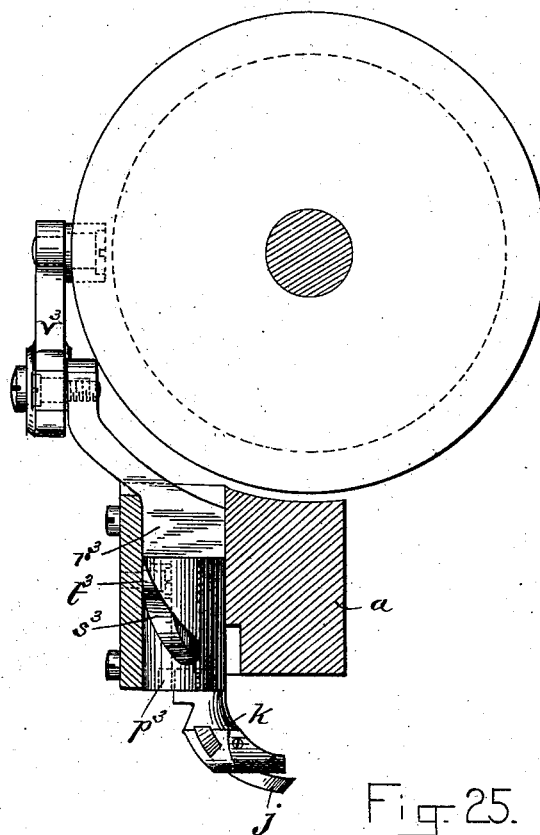


Fig. 25.

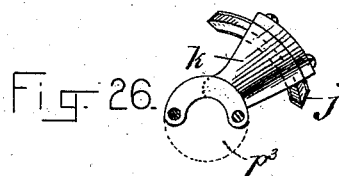


Fig. 26.

WITNESSES:  
C. S. Gooding.  
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J. Coupal.  
by Wright, Brown & Cusley.  
Atty.

# UNITED STATES PATENT OFFICE.

PETER A. COUPAL, OF BOSTON, AND JOSEPH COUPAL, OF QUINCY, MASSACHUSETTS, ASSIGNORS TO THE LEATHER LOCK SEWING MACHINE ASSOCIATION, OF PORTLAND, MAINE.

## SEWING-MACHINE FOR CONNECTING SOLES AND UPPERS.

SPECIFICATION forming part of Letters Patent No. 381,987, dated May 1, 1888.

Application filed April 30, 1886. Serial No. 200,674. (No model.)

*To all whom it may concern:*

Be it known that we, PETER A. COUPAL, of Boston, in the county of Suffolk, and JOSEPH COUPAL, of Quincy, in the county of Norfolk, both in the State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines for Connecting Soles and Uppers, of which the following is a specification.

This invention has for its object to provide improved mechanism for securing uppers to soles of turned shoes by stitches or loops of thread passed through the upper and through a portion of the sole and locked by tongues of leather cut in one of the sides of the sole, as shown in Letters Patent No. 242,328, granted to T. K. Keith May 31, 1881.

The present invention consists, first, in the combination, with a curved oscillating needle and devices co-operating therewith to form, release, and take up or tighten loops of thread, of an independent knife adapted to form tongues of leather on the sole of a turned shoe presented to the machine and mechanism whereby the knife is moved alternately into and out of the path in which the needle moves, the arrangement being such that the knife advances to the sole and cuts a tongue therein while the needle is raised, the needle in entering the work passing under said tongue and in leaving the work drawing out a loop which is afterward cast off and interlocked with the tongue.

The invention also consists in certain improvements in the mechanism for casting off and taking up the loops and for supporting and feeding the shoe, all of which we will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a machine embodying our invention. Fig. 2 represents a front elevation of the same. Fig. 3 represents an elevation of the opposite side of the machine from that shown in Fig. 1. Fig. 4 represents an elevation of a portion of the machine at the left of the line *v*, Fig. 1. Fig. 5 represents a section on line *x x*, Fig. 4. Fig. 6 represents a section on line *y y*, Fig. 5. Fig. 7 represents a section on line *z z*, Fig. 9. Fig. 8 represents

a section on line *x' x'*, Fig. 7. Fig. 9 represents an elevation of a portion of the machine at the left of the line *u*, Fig. 1. Fig. 10 represents an enlarged section on line *y' y'*, Fig. 1. Figs. 11, 12, and 13, 14, and 15 represent perspective views of parts of the machine and a portion of a turned and lasted shoe presented thereto. Fig. 16 represents a side elevation of the feed-dog and its supporting-arm and a sectional view of a part of its operating mechanism. Figs. 17, 18, and 19 are bottom views of the cast-off and needle. Fig. 20 represents a side view of the needle and cast-off in the position they occupy just before the loop is cast off. Fig. 21 represents a section on line *x<sup>2</sup> x<sup>2</sup>*, Fig. 20, looking downwardly. Fig. 22 represents a side view of the needle and cast-off in the position they occupy after the loop has been cast off. Fig. 23 represents a section on line *x<sup>3</sup> x<sup>3</sup>*, Fig. 22. Figs. 24, 25, and 26 represent a modification.

In the drawings, *a* represents the supporting-frame of the mechanism to be described. Journaled in bearings in said frame is a driving-shaft, *b*, to which are affixed the cams that give motion to the operative parts of the machine.

*c* represents the curved needle, which has a hook or barb and is curved in the arc of a circle, and is oscillated on a center or axis which is the center of said arc, as usual in machines for sewing turned or welted shoes. The oscillatory needle-arm *d*, which carries the needle, is mounted on a fixed stud or bearing, *e*, affixed to the frame *a*, and is oscillated on said stud by a slide, *f*, adapted to move vertically in a guide in the frame *a* through the action of a cam-groove, *g*, in a disk, *h*, affixed to the driving-shaft *b*, said groove receiving a stud or roller on the slide *f*, and a connecting-rod, *i*, pivoted to the lower end of the slide *f* and to the needle-arm *d*, and communicating the movements of the slide to the needle-arm.

*j* represents a V-shaped knife or cutter, which is formed on or attached to a shank, *k*. Said shank is attached by screws *l*, Fig. 11, to a hub, *m*, which is journaled on the stud *e*, on which the needle-arm *d* is also journaled, and is capable both of oscillating and of moving

laterally on said stud, so that the knife can be first moved laterally into the path through which the needle moves, (but while the needle is elevated or drawn back,) then moved forward in the arc of a circle and in the same path in which the needle afterward moves in entering the work, thus striking and cutting a tongue, *n*, in the side of the sole of the shoe being acted on by the machine, then withdrawn from the sole by a backward movement in the arc of a circle, and finally moved laterally away from the path in which the needle moves. All this takes place while the needle is elevated or drawn back from the work, so that when the needle descends it will follow the knife and enter the incision formed by the knife in cutting the tongue in the sole, and in returning will draw a loop of thread through the sole and under said tongue, said loop being afterward cast off and interlocked with the tongue, all as explained more fully hereinafter.

The described movements are imparted to the hub *m* and knives *j* by the following devices, viz: First, a lever, *o*, having a slot, *p*, engaged with a stud, *q*, on the hub *m*, and pivoted at *r*, Fig. 1, to a stud, *s*, which is journaled in a bracket, *t*, on the frame *a*, the lever *o* being adapted to oscillate on the pivot *r* in a plane parallel with the path in which the needle moves, and with the stud *s* in a plane at right angles with said path; secondly, a cam, *a'*, on the periphery of the disk *h*; thirdly, a spring, *b'*, which holds one arm of the forked upper end of said lever in contact with said disk, the cam *a'* and spring *b'* conjointly giving the hub *e* and knife *j* the described lateral movements; fourthly, a cam, *c'*, Fig. 1, on the rear edge of the disk *h*; and, fifthly, a spring, *d'*, which presses the other arm of the forked upper end of the lever *o* against the rear edge of the disk *h*, the cam *c'* and spring *d'* co-operating to give the hub *e* and knife *j* the described oscillating movements. It is obvious that the movements of the lever may be produced by positive means, as by cam-grooves engaging studs on the forked end of said lever.

*e'* represents a rest or gage against which the shoe is held during the stitching operation, and *f'* represents a pointed feed-dog or short awl, which co-operates with the gage or rest in feeding the work. The rest and dog are attached, respectively, to arms *g'* *h'*, which are mounted to oscillate independently on a stud or center, *i'*, common to both. Said stud is attached to an ear forming a part of a plate or swing-piece, *j'*, which is pivoted at *k'* to the frame of the machine, and is oscillated in a plane parallel with the direction of the feed-movement of the work by a cam, *l'*, on the driving-shaft *b*, (said cam being within an aperture in the swing-piece, as shown in Fig. 4,) and a spring, *m'*, Fig. 6, interposed between the frame *a* and an ear on the swing-piece *j'*, said spring pressing the swing-piece outwardly against an adjustable nut, *n'*, on a pin, *o'*, af-

fixed to the frame *a* and passing through the spring *m'* and an orifice in the swing-piece. The nut *n*, therefore, serves as an adjustable stop to limit the movement of the swing-piece by the spring *m'*.

The rest *e'* and dog *f'* are oscillated in opposite directions on the stud *i'*, and are thus caused to alternately approach and recede from each other to grasp and release the work by a slide, *p'*, Figs. 4 and 5, adapted to move vertically in a guide in the swing-piece *j'*, two links, *q'* *r'*, connecting the lower end of said slide, respectively, to the upper ends of the arms *g'* *h'*, supporting the rest and dog, and a cam-groove, *s'*, in a disk, *t'*, on the driving-shaft, said groove receiving a stud on the slide *p'*. The slide *p'* is reciprocated vertically by the rotation of the disk *t'*, and through the links *q'* *r'* oscillates the arms *h'* *g'*, and thus causes the rest *e'* and dog *f'* to approach and recede from each other.

Between the dog *f'* and rest *e'* is a rest, *a''*, Fig. 3, which supports the work against the upward pressure, and thus keeps it down at the proper point. To the rest *a''* is attached a plate or flange, *b''*, which keeps the edge of the upper from being turned over onto the sole.

*c''* represents the looper, which consists of an arm pivoted to a bracket, *d''*, in the frame *a*, the swinging end of said arm having an orifice, through which the thread passes. To the pivoted or inner end of the arm *c''* is rigidly attached a lever, *e''*, having a slot, which receives a pin, *f''*, on the swing-piece *j'*. The oscillations of said swing-piece cause the pin *f''* to oscillate the arm *c''* and the looper thereto attached, and thus cause said looper to swing the thread against the needle when the latter is advanced, as hereinafter described.

The cast-off is composed of an arm, *g''*, having a longitudinal curvature approximating that of the needle and slotted longitudinally so that it can pass over the needle, as hereinafter described, and provided with two fingers or jaws, *h''* *h''*, which are pressed through holes in its sides into its needle-receiving slot by springs *i''* *i''*, attached to the outer sides of the cast-off, said jaws passing through holes in the sides of the cast-off and co-operating to grasp the thread on the needle when the latter is within the cast-off.

The devices which operate the cast-off are as follows, viz: a slide or plate, *j''*, to which the cast-off is attached, a cam, *k''*, on a disk, *l''*, on the driving-shaft *b*, a spring, *m''*, which presses the upper end of said slide upwardly against the disk *l''*, a lever, *n''*, pivoted at *o''* to an ear on the frame *a*, (the slide *j''* being supported by said lever and adapted to slide thereon by means of slots *p''* *p''* in the slide, and screws *q''* *q''* on the lever,) a cam, *r''*, on the rear edge of the disk *l''*, and a spring, *s''*, which presses the upper end of the lever *n''* against the rear edge of the disk *l''*. The lever *n''* is oscillated by the cam *r''* and spring *s''* in a plane parallel with that in which the needle moves,

and the slide  $j^2$ , with the cast-off thereon, oscillates with the lever  $n^2$ , besides being independently moved by the action of the cam  $k^2$  and spring  $j^2$ .

5 The take-up is composed of a lever,  $t^2$ , pivoted at  $a^3$  to the frame  $a$ , and having at its lower end a roller,  $b^3$ , around which the thread passes to and through the looper  $c^2$ . The upper end of the lever  $t^2$  is pressed by a spring,  $c^3$ , against a cam,  $d^3$ , on the edge of the disk  $t'$  on the driving-shaft. The thread passes from the supplying spool or ball over the roller  $b^3$ , and from thence over a roller,  $e^3$ , journaled on a fixed bearing, and from the roller  $e^3$  to the looper  $c^2$ . The oscillations of the lever  $t^2$  are caused by the cam  $d^3$ , and spring  $c^3$  moves the roller  $b^3$  toward and from the roller  $e^3$ . The movement of the roller  $b^3$  away from the roller  $e^3$  causes a backward pull on the thread, and thus takes up the loops after they are disengaged from the needle by the cast-off as hereinafter described.

$f^3$  represents a rest or support, which is arranged to bear against the upper at a point below the sole, and is operative or rigid only when the needle is entering the work, the said rest being unsupported and allowed to yield when the work is being fed. The rest  $f^3$  is composed of an arm or lever pivoted at  $g^3$  to the frame  $a$ , its lower or swinging end projecting outwardly to a point below the path in which the needle moves. The lever  $f^3$  is intermittingly supported in position to cause its swinging end to act as a rest for the work by a cam,  $h^3$ , which is pivoted at  $i^3$  to the frame of the machine, and is alternately raised and lowered by lever  $j^3$ , pivoted at  $k^3$  to the frame  $a$ , and connected by a rod,  $l^3$ , to the cam  $h^3$ , a cam,  $m^3$ , on the rear side of the disk  $t'$ , and a spring,  $n^3$ , which forces the upper end of the lever  $j^3$  against the cam.

The cam is raised by the described devices, as shown in dotted lines in Fig. 1, and thus caused to hold the lever or rest while the needle is moving forward, and the cam is depressed and caused to release the lever or rest  $f^3$  while the work is being fed. The spring  $n^3$  enables the cam to be arrested at any desired point in its upward movement by the contact of the work with the lever or rest  $f^3$ , so that the rest conforms to the shape of the shoe and projects more or less when supported by the cam, according to the part of the shoe that is presented to it. The cam is serrated or roughened, so that it will not slip or yield under the pressure exerted on the rest by the shoe.

The operation is as follows: The lasted shoe is held by the operator against the gage or rest  $e'$  and the top rest,  $a^2$ . The needle after its backward movement remains briefly at rest in the position shown in Figs. 1, 14, and 20. Just before the forward or work-penetrating movement of the needle the hub  $m$ , with the knife thereto attached, is moved laterally until the knife stands directly in front of the point of the needle, and is then given quick forward and backward movements in the arc of a cir-

cle, thus causing the knife to move through the path in which the needle afterward moves, and first make a V-shaped incision of gradually-increasing depth in the sole, thus forming a tongue,  $n$ , and then withdraw from the sole. The hub and knife are then moved laterally to withdraw the knife from the path through which the needle moves. Next the needle advances, and, entering the incision formed by the knife, penetrates the sole and upper, thus making a hole from said incision through the edge of the sole and the portion of the upper laid thereon. After the completion of the forward movement of the needle, the looper  $c^2$  swings upwardly and presses the thread against the barbed side of the needle. The needle then moves backwardly and draws a loop of thread through the upper and sole and through the incision made by the knife in the sole. Just before the close of the backward movement of the needle the cast off  $g^2$  swings forward and upward until its forward end passes into the loop, and its slot or opening receives the needle, as shown in Fig. 20. The spring fingers or jaws  $h^2$   $h^2$  of the cast-off being thus caused to cross the needle and stand at the upper side thereof, as shown in Fig. 20. The needle is then slightly depressed to loosen the loop, and then the cast-off is depressed until its spring fingers cross the needle, grasp the loop at a point close to the barb of the needle, as shown in Fig. 22, and move the loop sufficiently to clear it from the barb. The take-up then acts and draws in the slack portion of the loop. The point or forward end of the cast-off projects over the tongue and throws or guides the loop over said tongue, so that the loop when taken up lies across and is locked by said tongue, as shown in Fig. 15. The gage or rest  $e'$  and dog  $f'$ , which were separated and moved to the right in Fig. 1 by the swing-plate  $j'$  and slide  $p'$ , are now moved toward each other and caused to grasp the work while the needle is withdrawing therefrom, the dog  $f'$  penetrating the exposed surface of the sole and pressing the edge of the sole and the upper laid thereon toward the gage or rest. After the loop has been cast off and interlocked with the tongue, as last described, and before the needle again enters the work, the gage or rest and dog while grasping the work are moved by the swing-plate to the left, and are thus caused to feed the work. At the close of the feed-movement the knife operates and is followed by the needle, as above described. While the needle is entering the work the gage  $e'$  and dog  $f'$  separate and move back to their starting position, the work being at this time supported by the rest  $f^3$  and the cam  $h^3$ . The operation is thus continued until the attachment of the sole to the upper is completed.

To enable the operator to throw back the needle so that it will not interfere with the application and removal of the work, we make the rod  $i$ , which connects the needle-arm  $d$  with the operating-slide  $f$  in two sections, 23, jointed

together at 4. When the rod *i* is in operative condition, the sections 2 3 are rigidly connected by a spring-arm, 5, attached to the section 3, and a pin, 6, on the free end of said arm entering an orifice in the section 2. (See Figs. 8 and 9.)

When it is desired to draw back or raise the needle farther than it is raised in its operative movements, the spring-arm 5 is disengaged from the lower section and the two sections are thrown out of alignment, thus raising the needle arm and needle, as shown in dotted lines in Fig. 9.

In Letters Patent of the United States No. 332,642, granted to us December 15, 1885, we have shown a machine in which a curved needle or a curved awl is provided with cutting wings or blades moving with the needle or awl, for the purpose of forming tongues on the surface of the sole penetrated by the needle or awl.

It will be observed that in our present invention the knife is a device which is entirely distinct from the needle and moves independently thereof, the knife first standing outside of the path through which the needle moves, and then moving to cut the sole and retreat therefrom before the needle enters the sole. The depth of the cut made by the knife is therefore not dependent on the needle, and the knife can be made of any desired form and size.

We do not limit ourselves to the described mechanism for operating the knife. In Figs. 24, 25, and 26 we have shown means whereby the knife is move to and from the sole by a movement produced by swinging the shank supporting the knife on a vertical axis, and at the same time giving said shank a vertical movement on the said axis, the vertical movement being downward when the knife is moving toward the sole and upward when the knife is withdrawing. The knife is thus given a winding or spiral motion from its point of rest outside of the path in which the needle moves into said path at the point where the needle enters the sole. In this modification the shank *k* of the knife is attached eccentrically to the lower end of a cylindrical sleeve, *p*<sup>3</sup>, which is journaled on a vertical stud or pin, *q*<sup>3</sup>, affixed to a slide, *r*<sup>3</sup>, which is reciprocated vertically by means of a bell-crank lever, *v*<sup>3</sup>, pivoted to the frame, and a cam-groove, *w*<sup>3</sup>, in a disk on the driving-shaft, said groove receiving a stud or roller on the lever *v*<sup>3</sup>. In the sleeve *p*<sup>3</sup> is a spiral slot, *s*<sup>3</sup>, which receives a stud, *t*<sup>3</sup>, affixed to the frame *a*. The oscillations of the lever *v*<sup>3</sup> cause the slide *r*<sup>3</sup> and the knife supporting sleeve *p*<sup>3</sup>, journaled therein, to reciprocate vertically, and at the same time the engagement of the spiral slot in said sleeve with the fixed stud *t*<sup>3</sup> gives the sleeve a rotary motion while it is moving vertically, the result being a winding or spiral movement of the knife, which is eccentrically attached to the sleeve *p*<sup>3</sup>.

In another pending application filed August

20, 1887, Serial No. 247,445, we have claimed certain combinations of parts shown and described but not claimed in this application.

We claim—

1. The combination, with the curved oscillating needle and loop releasing and taking-up devices co-operating therewith, of an independent tongue-forming knife and mechanism whereby said knife is moved alternately into and out of the path in which the needle moves, substantially as and for the purpose specified.

2. The combination of the curved needle, mechanism to oscillate it, cast-off and take-up devices and operating mechanism therefor, an independent tongue-forming knife, and mechanism alternating in its action with the operative mechanism of the needle, whereby the knife is moved alternately into and out of the path in which the needle moves, as set forth.

3. The combination, with the needle, the cast-off and the take-up, and their operative mechanism, of the knife, the oscillatory and laterally-movable hub supporting the knife, the stud supporting said hub, and mechanism, substantially as described, whereby the hub and knife are successively moved laterally and oscillated, as set forth.

4. The combination of the needle, the independent tongue-forming knife, and the take-up and their operating devices, of the cast-off composed of the slotted arm having the spring-pressed fingers or jaws *h*<sup>2</sup> *h*<sup>2</sup>, and mechanism, substantially as described, whereby said arm is inserted in the loop formed by the needle and moved upwardly to receive a portion of the needle in its slot, and then depressed to cause its fingers to grasp the loop and separate it from the barb of the needle, as set forth.

5. The combination, with the curved oscillating needle, of the looper-arm pivoted to a fixed support and provided with the arm *e*<sup>2</sup>, and the oscillating swing-piece *j*<sup>2</sup>, pivotally connected to the arm *e*<sup>2</sup>, as set forth.

6. The combination, with the curved reciprocating needle and the loop casting-off and taking-up devices, of the swinging rest *f*<sup>3</sup>, the cam *h*<sup>3</sup>, supporting said rest, and the cam *m*<sup>3</sup>, lever *j*<sup>3</sup>, spring *n*<sup>3</sup>, and connecting-rod *l*<sup>3</sup>, whereby said cam is oscillated and supported with a yielding pressure, whereby it is adapted to support the rest *f*<sup>3</sup> at various points, as set forth.

7. The combination, with the tongue-forming cutter and the loop-forming mechanism, of the edge gage or rest, *e*<sup>1</sup>, the pointed dog *f*<sup>1</sup>, the oscillatory levers supporting said gage and dog, and mechanism, substantially as described, whereby the dog and gage are moved toward and from each other to grasp and release the work and laterally to feed the work, as set forth.

8. The combination of the curved needle, its arm, the reciprocating slide *f*, and the rod *i*, connecting the needle-arm and slide and composed of the jointed sections having a locking device, as set forth.

9. The combination of the tongue-forming  
knife, mechanism for oscillating the same,  
the needle, looper, and cast-off, and their op-  
erative mechanism, the loop-spreader, and  
5 operative mechanism therefor, substantially as  
described, whereby the spreader is moved for-  
ward under the needle into the loop, and then  
downward and held upon the tongue while the  
loop is being tightened, as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 24th day of April, 1886.

PETER A. COUPAL.  
JOSEPH COUPAL.

Witnesses:

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