(No Model.)

3 Sheets—Sheet 1.

P. A. & J. COUPAL.

SEWING MACHINE FOR CONNECTING SOLES AND UPPERS OF TURNED SHOES.

No. 332,642. Patented Dec. 15, 1885.

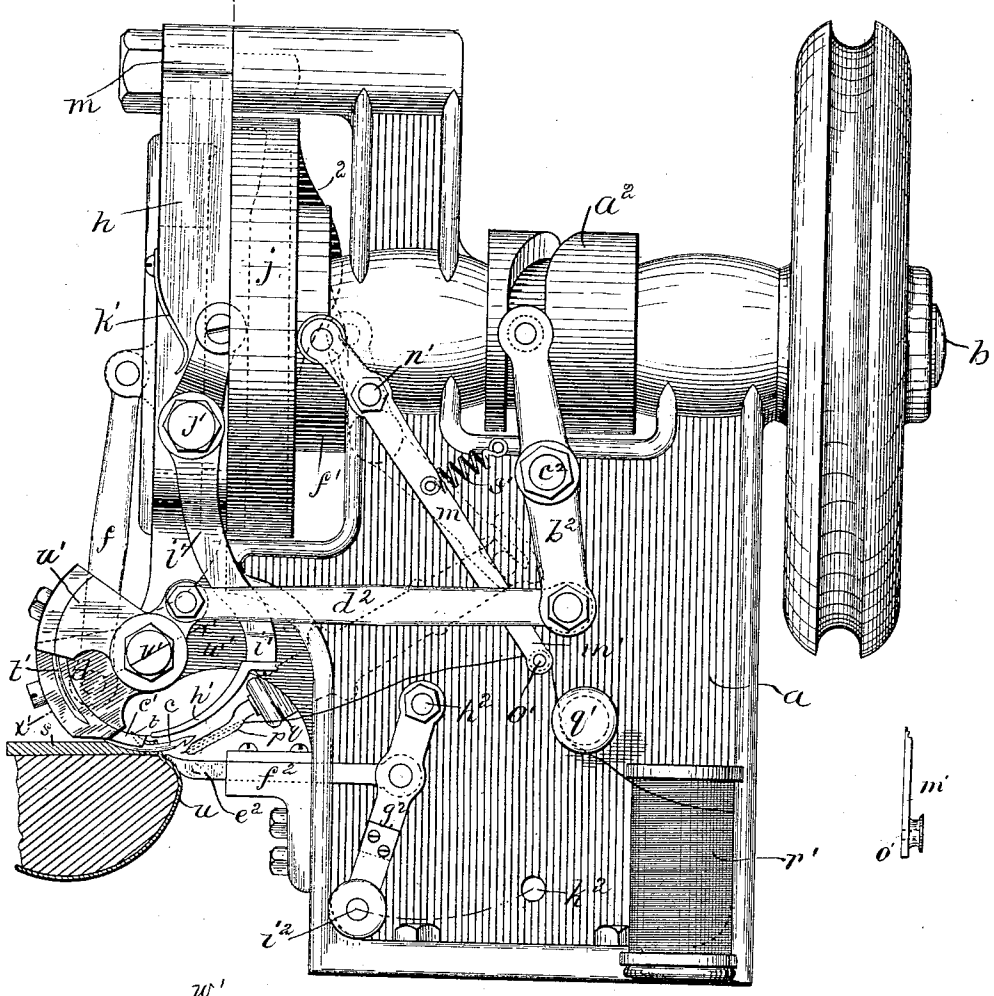

Fig. 1.

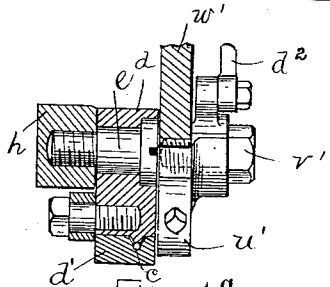

Fig. 1ª.

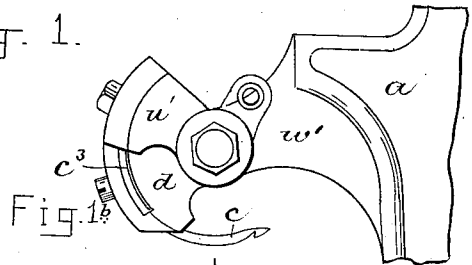

Fig. 1b.

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(No Model.)

3 Sheets--Sheet 2.

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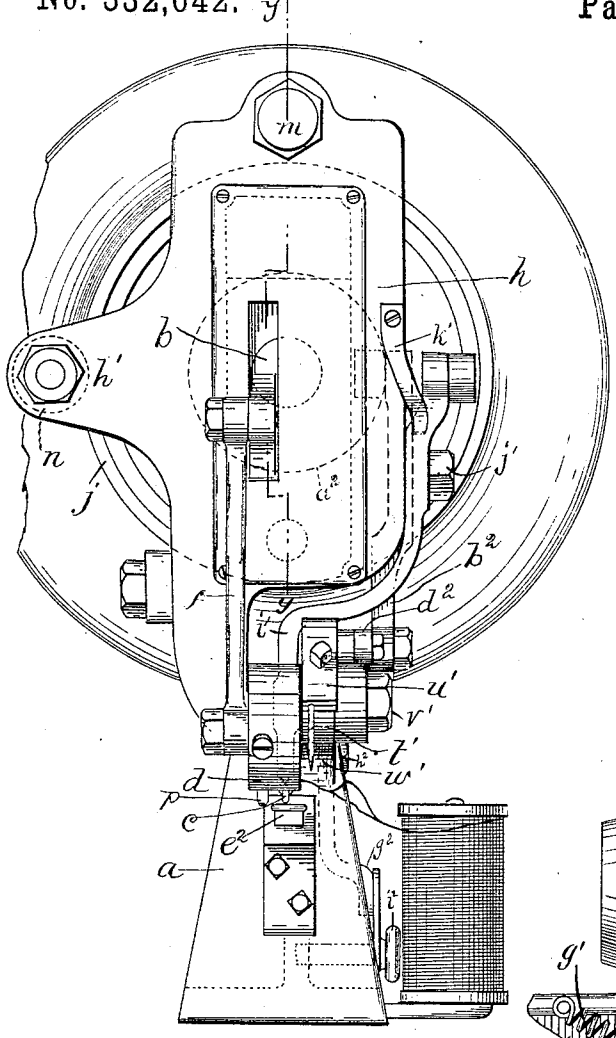

Fig. 2.

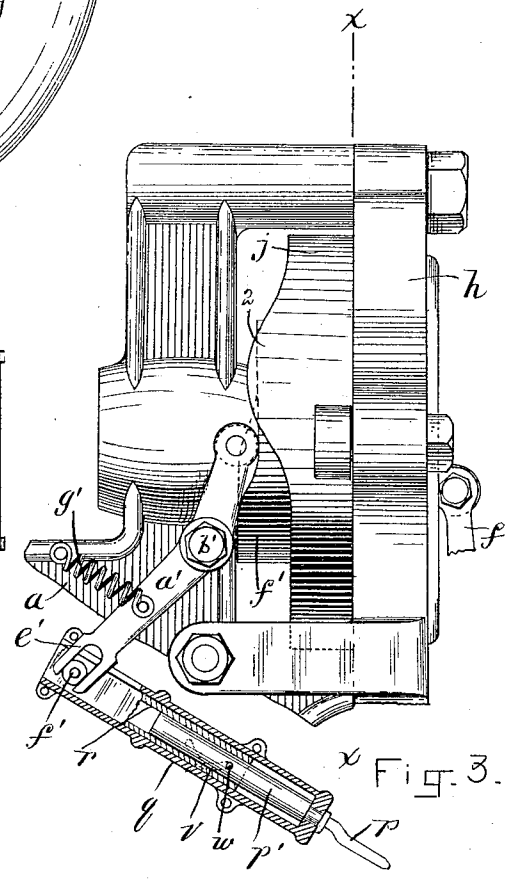

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

P. A. & J. COUPAL.

SEWING MACHINE FOR CONNECTING SOLES AND UPPERS OF TURNED SHOES.

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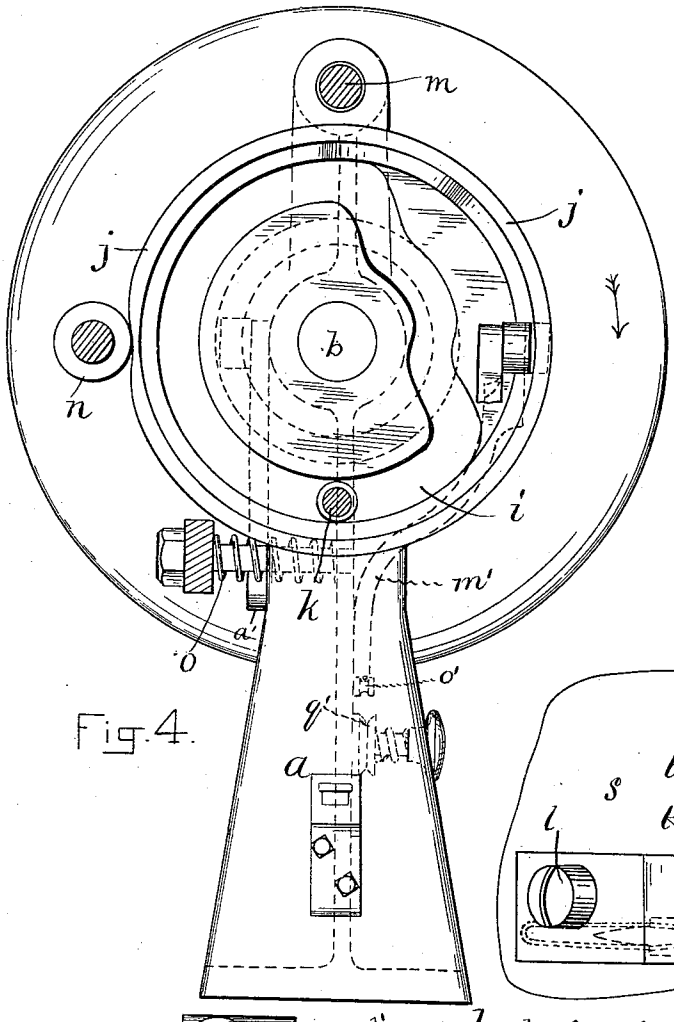

Fig. 4.

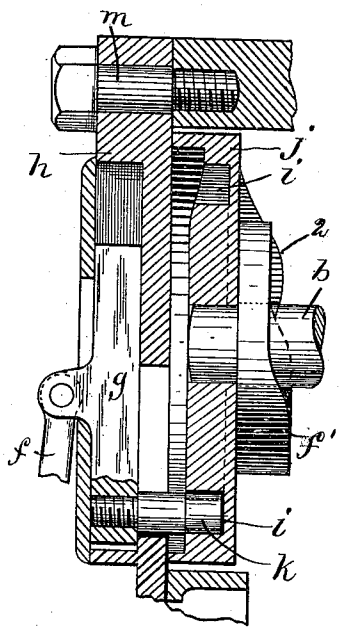

Fig. 5.

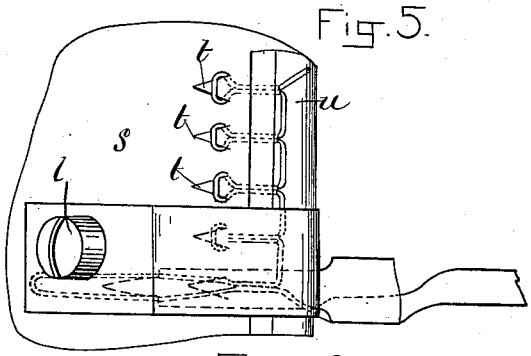

Fig. 9.

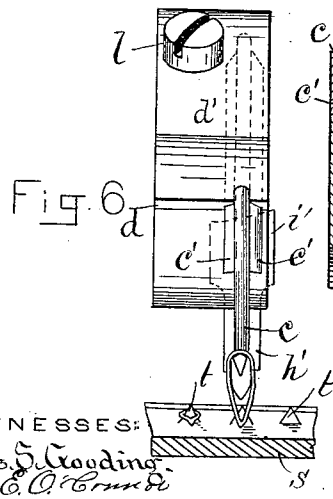

Fig. 6.

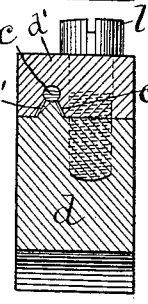

Fig. 8.

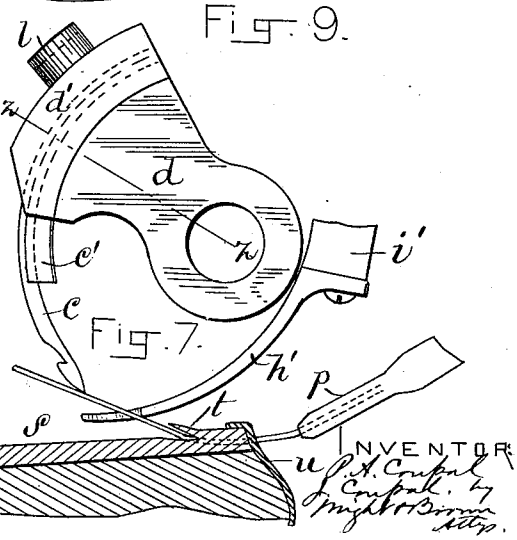

Fig. 7.

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UNITED STATES PATENT OFFICE.

PETER A. COUPAL, OF BOSTON, AND JOSEPH COUPAL, OF QUINCY, MASS.

SEWING-MACHINE FOR CONNECTING SOLES AND UPPERS OF TURNED SHOES.

SPECIFICATION forming part of Letters Patent No. 332,642, dated December 15, 1885.

Application filed July 3, 1885. Serial No. 170,572. (No model.)

To all whom it may concern:

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

This invention has for its object to provide a machine whereby the uppers and outer soles of turned shoes may be connected by loops of thread drawn inwardly through the edge of the upper and the edge of the sole, and engaged or locked on tongues cut on the upper surface of the sole, as shown in Letters Patent No. 242,328, granted to J. K. Keith, May 31, 1881.

The invention consists in a curved needle having knives formed to make incisions in a surface penetrated by the needle, and thereby form said tongues, and in the combination, with said needle, of a looper, cast-off, take-up, and awl, which parts co-operate with the needle, as 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 a part of the side opposite to that shown in Fig. 1. Fig. 4 represents a section on line *x x*, Fig. 3. Fig. 5 represents a section on line *y y*, Fig. 2. Figs. 6 and 7 represent, respectively, end and side views of the needle and needle-arm, showing also a part of the last and the shoe thereon. Fig. 8 represents a section on line *z z*, Fig. 7. Fig. 9 represents a top view of the matter shown in Fig. 7. Fig. 1^a represents a section on line *x' x'*, Fig. 1. Fig. 1^b represents a modification.

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

In the drawings, *a* represents the supporting-frame, having bearings, in which is journaled the shaft *b*, to which are affixed the operating-cams, hereinafter described.

c represents the curved needle, which is provided on its concave side with the curved blades or wings *c' c'*, which terminate a short distance back of the needle, and are sharpened at their ends to form cutting-edges, which enter the sole of a boot or shoe after the needle has penetrated it, and, by making two parallel incisions, form a tongue, *t*, of leather, over the inner end of the hole through which the needle passes, as hereinafter described. The needle is secured to an arm, *d*, which is mounted to oscillate on a stud, *e*, affixed to the swinging head or plate *h*, hereinafter described, and is connected by a rod, *f*, with a slide, *g*, Fig. 5, which is reciprocated vertically in a guide or way formed for it in a head, *h*, and thus, through the rod *f*, oscillates the needle-arm *d* and its needle, the latter being so arranged that when it is moved forward it will enter the upper surface of the sole *s* of a lasted boot or shoe presented to the needle in the manner shown in Fig. 1, and pass out through the edge of the sole and the portion of the upper *u*, that bears against the edge of the sole *c' c'*, following the needle-point and cutting into the upper surface of the sole from the point where the needle entered the sole part way, but not entirely, to the edge of the sole, thus forming a tongue, *t*, of leather, connected to the sole at a point near the outer edge of the latter, and having a free end projecting inwardly over the hole through which the needle passed in entering the sole. When the needle is moved backwardly, its barb draws a loop of thread through the edge of the upper and the portion of the sole penetrated by the needle, and above the upper surface of the sole and the tongue *t*, formed by the forward movement of the needle. After the loop is thus drawn out the needle moves slightly forward to release the loop, and then pauses while the loop is being drawn in and guided over the upper surface of the tongue of leather by the devices hereinafter described, the loop being drawn in until it closely surrounds the base of the leather tongue and is thus secured to the sole. The slide *g* is reciprocated to oscillate the needle, as described, by a cam-groove, *i*, in a cam, *j*, affixed to the driving-shaft *b*, the slide having a stud or roller, *k*, projecting into said cam-groove. The arm *d* has a curved rib or seat formed to fit between the knives *c' c'* of the curved needle, as shown in Fig. 8, the needle being clamped against said rib or seat by a curved clamping-plate, *d'*, grooved to re-

ceive the body of the needle and secured to the arm *d* by a screw, *l*. This construction permits the needle to be adjusted endwise to compensate for wear of the knives *c'*, the clamping-plate being loosened before and tightened after said adjustment.

The head which supports the needle and its operating-slide is connected to the frame *a* by a pivot, *m*, which permits the head to oscillate, so as to move the needle laterally and cause it to feed the work, as hereinafter described. The swinging head has an arm, *h'*, provided with a roller, *n*, which is pressed by a spring, *o*, (see Fig. 4,) against the perimeter of the cam *j*, said cam being formed to oscillate the head as required to cause the feeding movements of the needle.

The thread is presented to the barb of the needle, when the latter is projected, by a looper, *p*, which is an offset-arm having a thread-guiding orifice, and affixed to a stud, *p'*, which is journaled in a tube or casing, *q*, affixed to the frame *a*. Within said casing is a sleeve, *r*, which partially contains the stud *p'*, and is adapted to move longitudinally in the casing *q*. Said sleeve has a short oblique groove, *v*, which receives a pin, *w*, on the stud *p'*. (See Fig. 3) The sleeve *r* does not rotate, and when reciprocated lengthwise said groove and pin cause the stud *p'* and looper *p* to oscillate or rotate alternately in opposite directions, thus giving the looper the movements required to present the thread to the projected needle. The sleeve *r* is reciprocated by means of a lever, *a'*, pivoted at *b'* to the frame *a*, and engaged at one end by means of a slot, *e'*, and pin *f'* with the sleeve *r*, a cam, f^2, on the shaft *b*, and a spring, *g'*, which presses the opposite end of the lever *a'* against said cam.

h' represents a cast-off or curved finger attached to an arm, *i'*, which is pivoted at *j'* to the head *h*, and is pressed by a spring *k'*, so that its upper end bears against one side of the cam *j*, said cam having a recess or concavity in its edge, which at intervals permits the lower end of the lever, with the finger *h'*, to swing toward the needle. Said finger, when thus moved, enters the loop before it is drawn back by the take-up, and catches and holds the loop above the tongue on the sole while the loop is being tightened or drawn back, thus insuring the proper engagement of the loop with the tongue by preventing the loop from falling sufficiently to be drawn back under the tongue through the hole in the sole through which it was drawn by the needle. The projection *h'* is pointed at its outer end, so that it will readily enter the loop, and has shoulders (see Fig. 7) back of the pointed end, which arrest the loop and prevent it from slipping backwardly too far upon the finger. The take-up is here shown as an arm or lever, *m'*, pivoted at *n'* to the frame *a*, and provided at its lower end with a roller, *o'*, over which the thread passes from a tension device, *q'*, located between the lever *m'* and the supplying spool or bobbin *r'*. The thread passes from the lever *m'* directly to the looper *p*. The upper end of the lever *m'* is pressed by a spring, *s'*, against the cam *j*, which has a projection which cooperates with the spring *s'* in oscillating the lever *m'*.

t' represents a curved awl, which is affixed to an arm, *u'*, mounted to oscillate beside the needle-arm *d*, and upon a stud, *v'*, affixed to an arm, *w'*, formed on the frame *a*, so that the awl does not move laterally like the needle. The awl-carrying arm *u'* is oscillated by a grooved cam, a^2, on the shaft *b*, a lever, b^2, pivoted at c^2 to the frame *a* and engaged at one end with said cam, and a rod, d^2, connecting the other end of said lever with an ear on the arm *u'*.

The parts described are timed to operate as follows: The upper and sole of a boot or shoe placed on a last inside out, as usual in sewing turned shoes, are presented to the machine in the position shown in Fig. 1, the last being held by the operator against a gage, e^2, affixed to the frame *a*. The needle advances through a hole already formed in the sole and upper until its point has emerged from the edge of the sole and its knives have cut a tongue, *t*, as described, in the surface of the sole. While the needle is in this position it is moved laterally with the swinging head, and is thus caused to feed the work along. The looper then engages the thread with the barb of the needle, and the needle then moves backwardly, drawing a loop inwardly through the upper, the edge of the sole, and upwardly over the upper surface of the sole, as shown in Fig. 7. The needle then moves forward slightly to loosen the loop, and the cast-off *h'* advances into the loop, pushing it back from the needle. The take-up lever *m'* is then moved backwardly and pulls back the thread between it and the loop, thus drawing in the loop tightly over the leather tongue. (See Fig. 9.) The thread is passed around the roll *o'* on the end of the lever *m'*, (see Fig. 4,) said roll rotating and permitting the free longitudinal movement of the thread to the looper, but acting to hold the thread and prevent it from slipping when the lever *m'* is moved by the cam 2. The cast-off remains in the loop until it is partially drawn in, and thus keeps the loop sufficiently raised to prevent it from being drawn under the tongue *t*, the bight of the loop being caused to lie across the tongue when the loop is entirely drawn in or taken up, as shown in Fig. 9. The awl is moved forward to make the hole for the next loop, and is withdrawn from said hole before the needle is moved laterally to feed the work, so that when the needle is moved laterally to its starting position it will enter the hole formed by the awl, and its knives will form another tongue *t*. The needle is again moved to feed the work and draw a loop through the upper and sole, said loop being subsequently drawn in over the tongue last formed, and so on until the upper is connected to the sole by loops extending entirely around the edge of the sole, each loop being

engaged with a separate tongue, *t*. The boot or shoe is then taken from the last and turned, and provided, if desired, with an inner sole in the usual manner.

We do not limit ourselves to the details of construction shown, nor to the particular looper, and cast-off devices, and the mechanism for operating the awl and needle, as a curved needle having cutting wings or blades may be used with any suitable co-operating devices; nor do we limit ourselves to the formation of the tongue-cutting blades on the needle, for, if desired, said blades may be formed on the awl, or the awl may be dispensed with and a segmental blade, c^3, V-shaped in cross-section, may be secured to the arm *w'* in place of the awl, as shown in Fig. 1^b. In this case each tongue *t* will be formed while the needle is moved laterally to feed the work, and the needle, when it returns, will penetrate the sole under the tongue, the result being as already described.

The gage or rest e^2 is adapted to slide lengthwise in a guide, f^3, attached to the frame, and is pivoted at its inner end to a lever, g^2. Said lever is pivoted at h^2 to the frame *a*, and has a movable pin, i^2, at its swinging end adapted to enter either of two or more orifices, k^2, in the frame *a*, and thus hold the level and gage in different positions.

The movability of the gage e^2 enables it to be displaced at the end of the operation, to permit the removal of the work from either the awl or the needle, as under any circumstances one of said parts is projected and in the work, so that a lateral movement of the work is required to free it from the machine.

We claim—

1. A curved needle having knives alongside thereof, presenting their cutting-faces toward the point of the needle, combined with mechanism for oscillating said needle and knives, substantially as described.

2. A curved needle having knives alongside thereof, which present their cutting-edges in the same direction as the needle-point, mechanism to oscillate said needle and knives, a looper, a take-up, and mechanism for operating the same, all in combination, substantially as described.

3. A curved needle having attached cutting-knives with their edges in the direction of the needle-point, mechanism, substantially as described, for oscillating the same, and suitable mechanism, as described, for moving the needle laterally, and an awl and its operating mechanism, arranged as described, to perforate for the needle, all combined as set forth.

4. The combination, with the curved needle, of knives having their edges in the direction of the needle's point, mechanism, as described, for operating the same, a looper and its operating devices, the cast-off, and the take-up, all relatively arranged substantially as stated.

5. The combination, with the awl, the needle having cutting-wings with edges in the direction of the needle's point, operating devices for the awl and needle, the movable gage e^2, and devices for adjusting the same, all substantially as set forth.

6. The combination, with the curved puncturing device having a cutting-blade at each side thereof, the blades presenting their cutting-edges in the same direction as the puncturing-device point, of the needle and cutter-carrier and its oscillating mechanism, and the loop-engaging mechanism, substantially as described, all co-operating substantially as and for the purposes set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 30th day of June, 1885.

PETER A. COUPAL.
JOSEPH COUPAL.

Witnesses:
C. F. BROWN,
H. BROWN.