

No. 731,761.

PATENTED JUNE 23, 1903.

F. DOUCET.
BOOT OR SHOE SEWING MACHINE.

APPLICATION FILED DEC. 19, 1902.

NO MODEL.

6 SHEETS—SHEET 1.

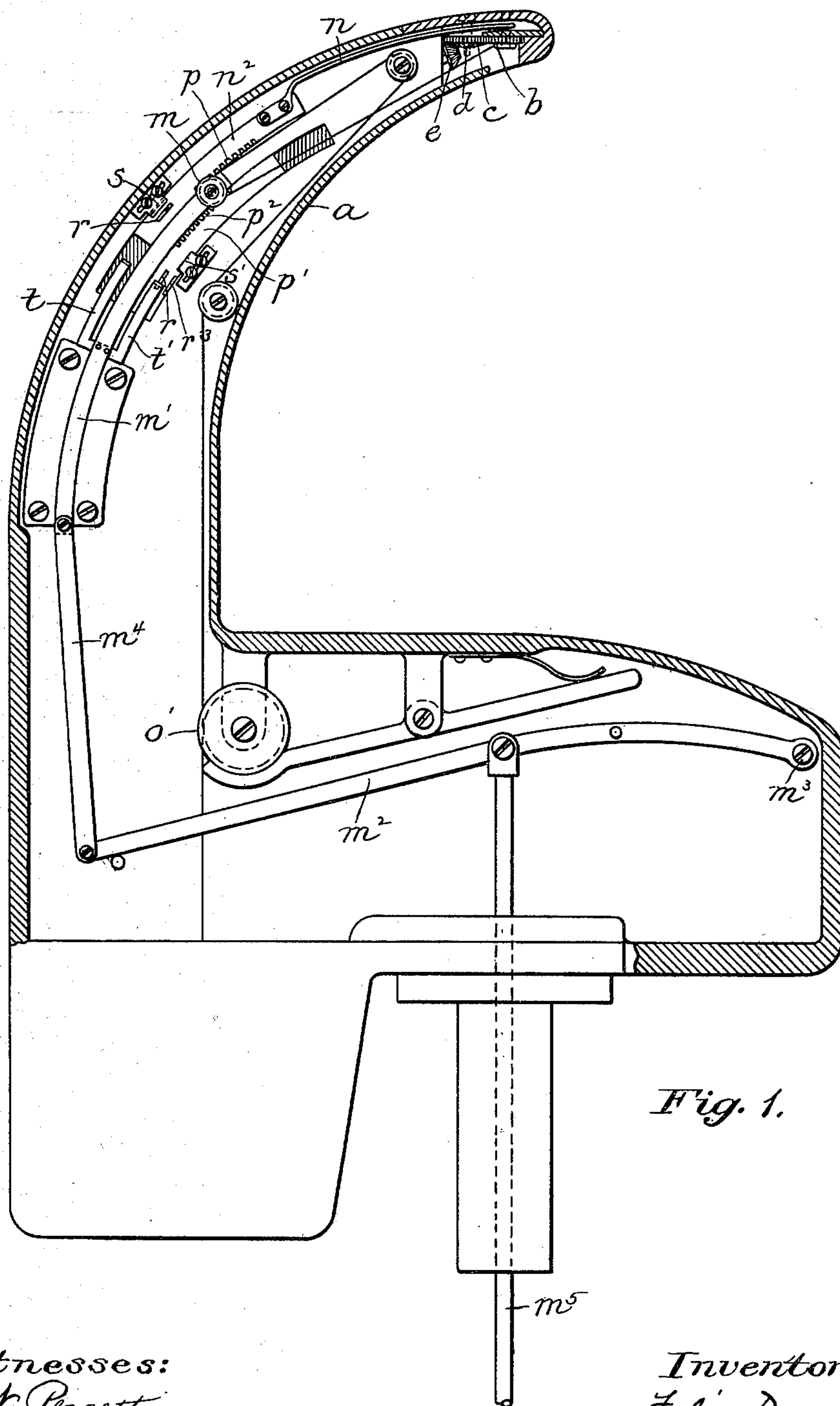


Fig. 1.

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Inventor:
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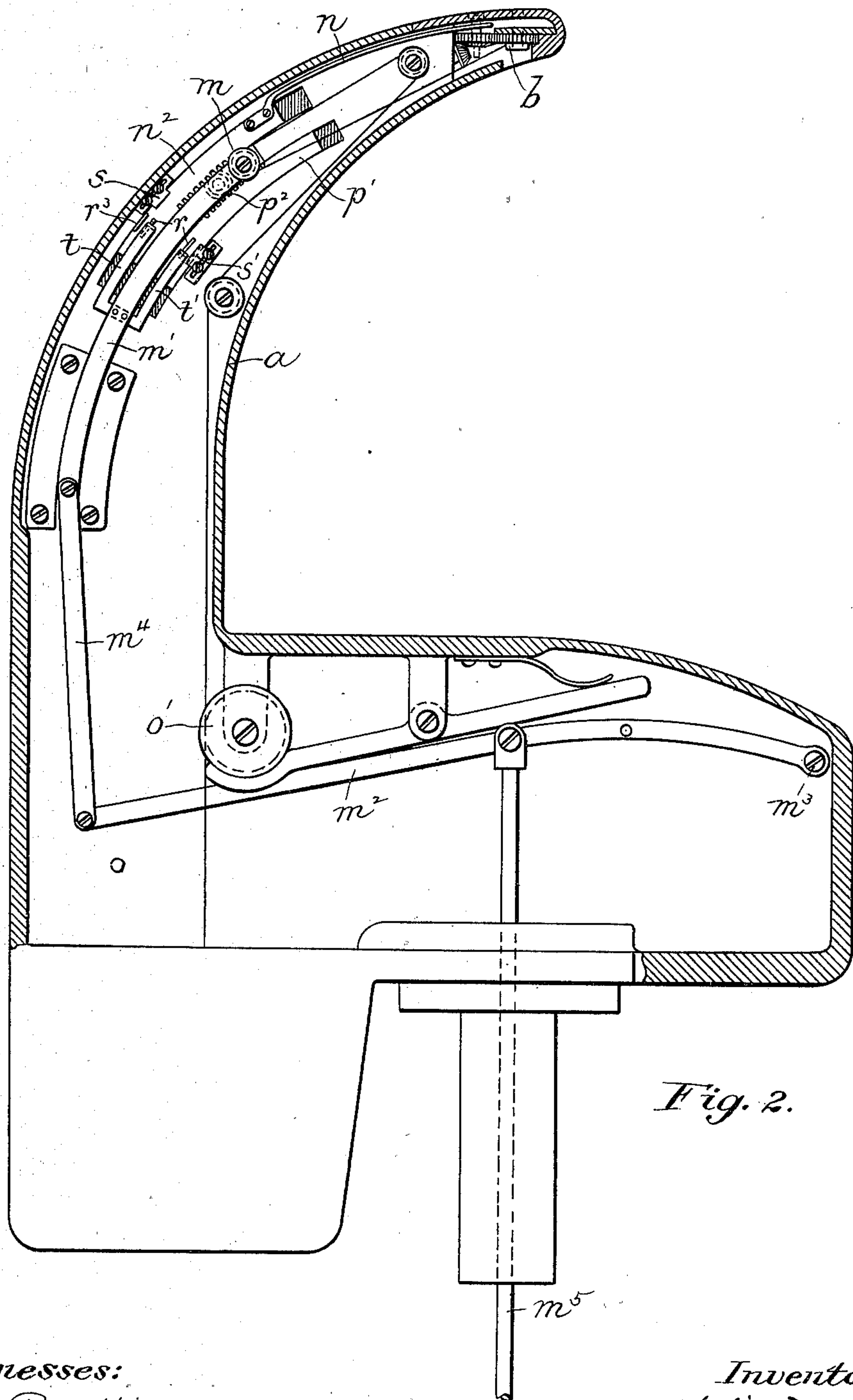


Fig. 2.

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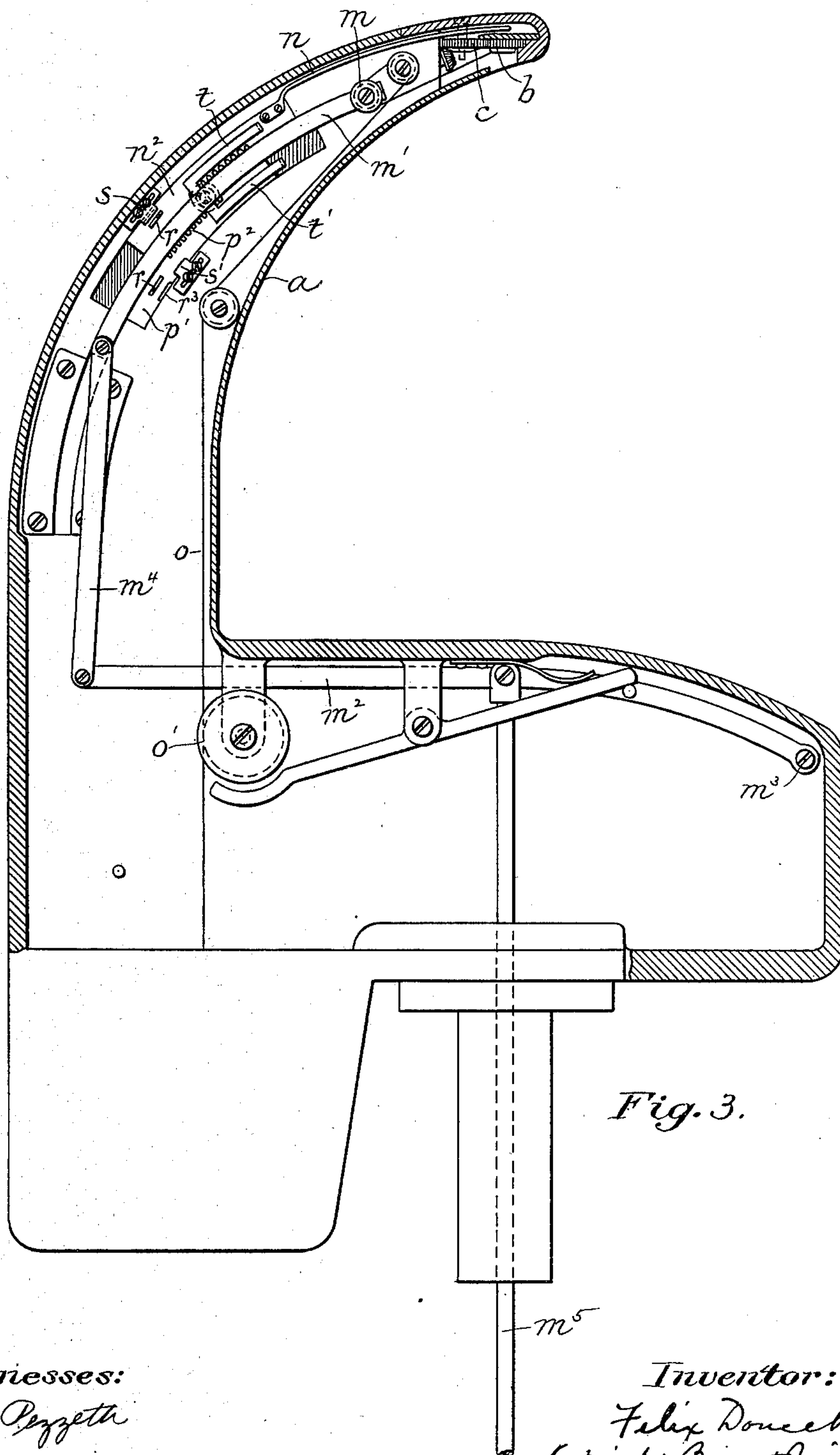


Fig. 3.

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6 SHEETS—SHEET 4.

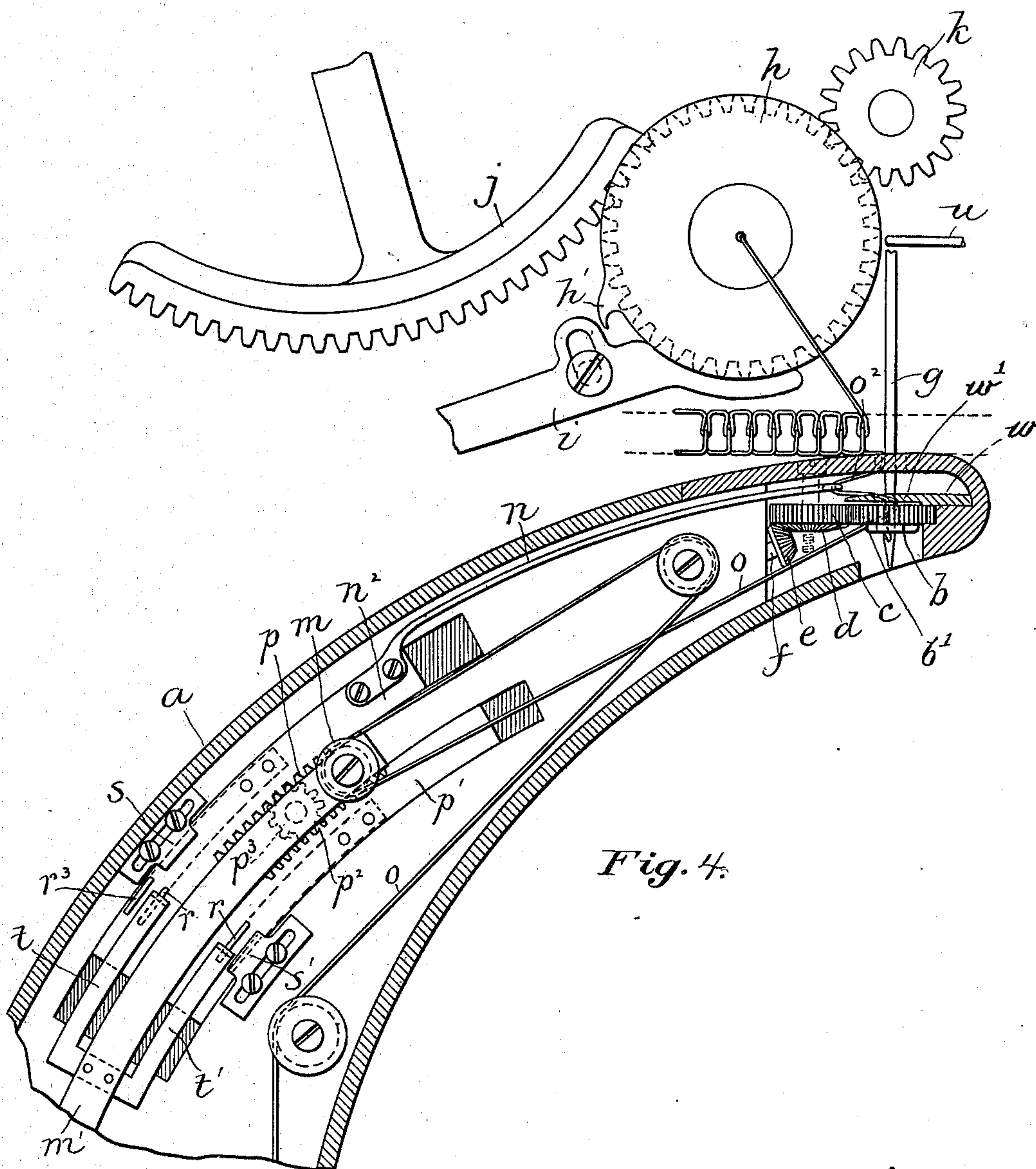


Fig. 4.

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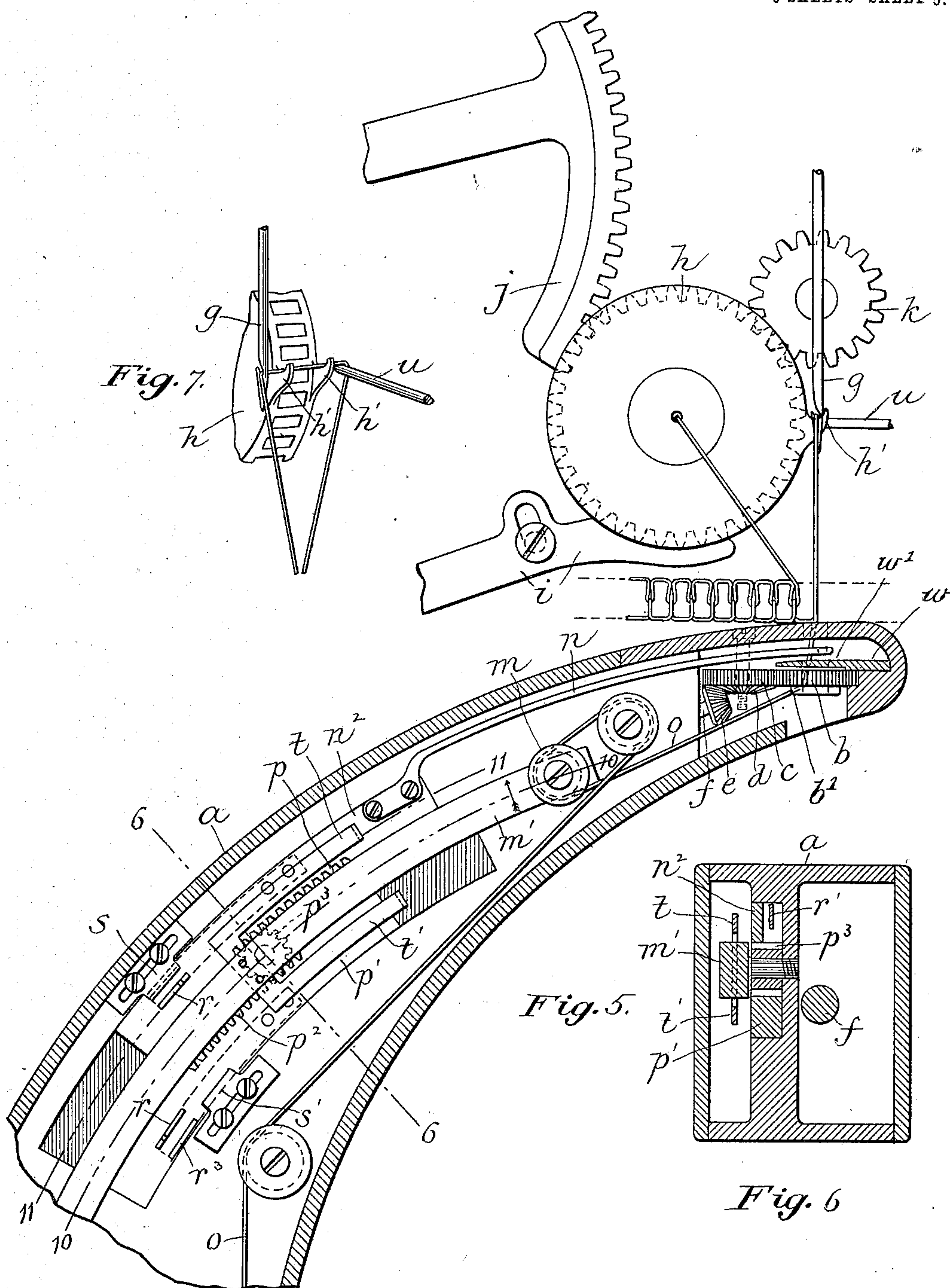
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6 SHEETS—SHEET 5.



Witnesses:
P. H. Pizzetti,
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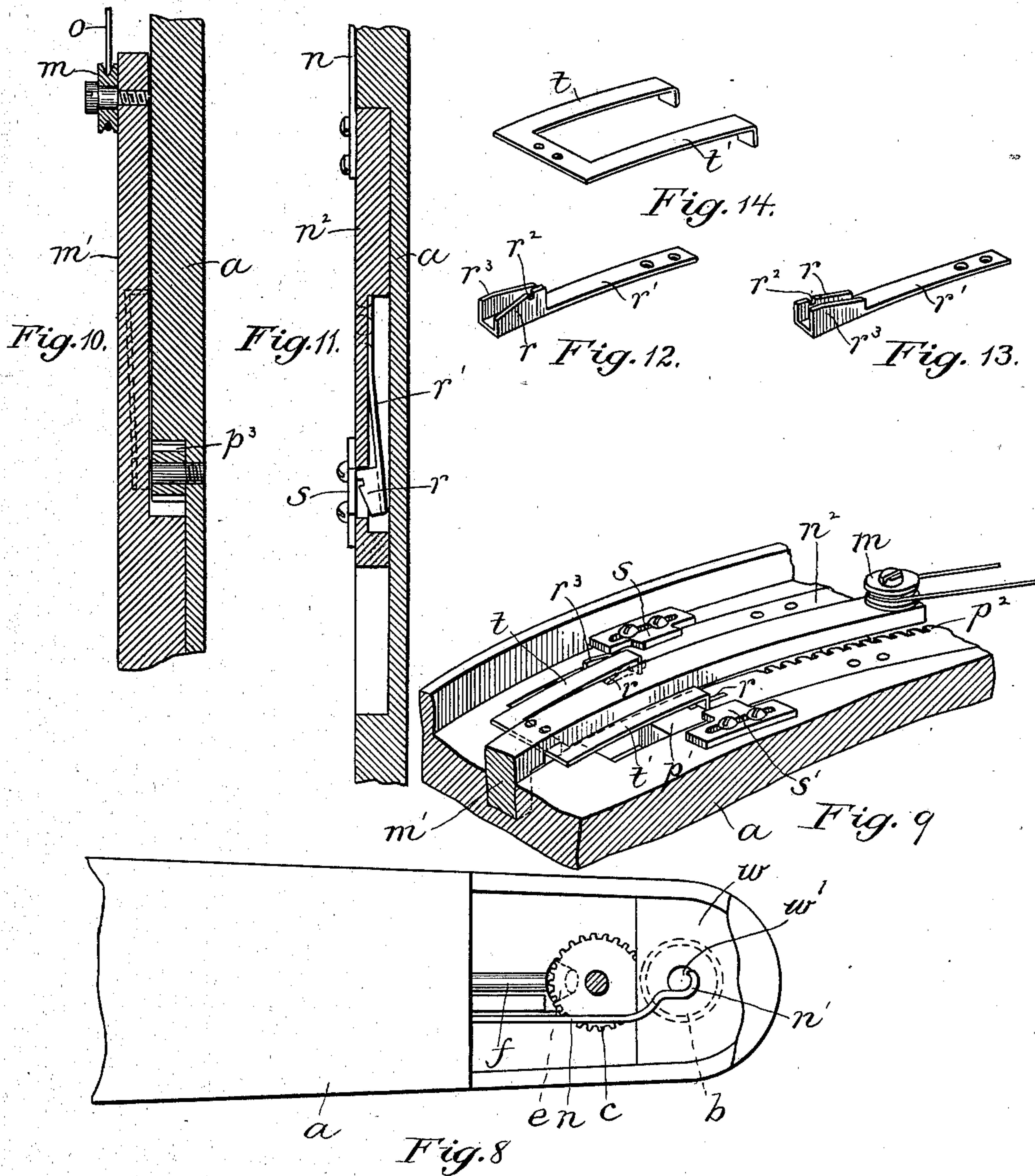
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APPLICATION FILED DEC. 19, 1902.

NO MODEL.

6 SHEETS—SHEET 6.



Witnesses:
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UNITED STATES PATENT OFFICE.

FELIX DOUCET, OF MELROSE, MASSACHUSETTS.

BOOT OR SHOE SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 731,761, dated June 23, 1903.

Application filed December 19, 1902. Serial No. 135,900. (No model.)

To all whom it may concern:

Be it known that I, FELIX DOUCET, of Melrose, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Boot or Shoe Sewing Machines, of which the following is a specification.

This invention relates to a boot and shoe sewing machine having a rotary horn adapted to be inserted in the interior of a boot or shoe upper and form stitches, uniting the outer sole, the upper, and the inner sole.

The invention has for its object to enable a machine of this character to form a double-thread lock-stitch without liability of the reeving or endwise movement of the needle-thread in the barb of the needle when the needle-loop is being formed.

The invention consists in the 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 embodying my invention. Figs. 2 and 3 are views similar to Fig. 1, showing certain of the movable parts in different positions. Fig. 4 represents an enlarged view similar to a portion of Fig. 2 and showing in addition a shuttle located above the horn and supporting and operating mechanism therefor. Fig. 5 is a view including the parts shown in Fig. 4, the mechanism within the horn being as indicated in Fig. 3. Fig. 6 represents a section on line 6 6 of Fig. 5. Fig. 7 represents a perspective view showing portions of the needle, loop-spreader, and shuttle, together with portions of the needle-loop. Fig. 8 represents a top view of a portion of the horn, partly broken away. Fig. 9 represents a perspective view showing parts of the mechanism within the horn. Fig. 10 represents a section on line 10 10 of Fig. 5. Fig. 11 represents a section on line 11 11 of Fig. 5. Figs. 12, 13, and 14 are perspective views of details hereinafter referred to.

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

a represents a shoe-sewing-machine horn which is provided in its upper extremity with the usual rotary whirl *b* and is adapted to be rotated on a vertical axis which coincides with the center of the whirl. Mechanism is

provided for rotating the whirl, the only portions of said mechanism here shown being the gear *c*, meshing with the toothed periphery of the whirl, and the bevel-gears *d e*, one affixed to the gear *c* and the other to the shaft *f*, the latter extending downwardly and being connected with other parts of the whirl-rotating mechanism.

g represents the hooked or barbed needle, which is straight and is reciprocated in a path coinciding with the axis of the horn, the barb of the needle passing through the whirl.

Above the horn is a suitable shuttle *h*, which coöperates with the needle in forming a lock-stitch, the shuttle here shown being circular and provided with thread-hooks *h'* on its periphery, as shown in Letters Patent of the United States No. 507,530, dated October 31, 1893. The said shuttle may be supported and operated by the means shown in said patent—that is to say, an arm *i*, having antifriction-rollers supporting the shuttle, and an oscillating gear-segment *j*, engaged with gear-teeth formed on the periphery of the shuttle, said segment imparting a back-and-forth rotary movement to the shuttle. An idle gear *k*, journaled on a fixed support, engages the teeth of the shuttle, the arm *i*, segment *j*, and gear *k* holding the shuttle in its proper position relatively to the path of the needle. The means for oscillating the gear-segment *j* and for supporting the gear *k* may be the same as shown in the above-mentioned patent.

I do not show the needle-operating mechanism, the means for supporting the horn, nor the mechanism for imparting motion to the whirl-rotating shaft *f*, these parts being so well known as to require no illustration.

In carrying out my invention I adapt to the interior of the horn the following instrumentalities—viz., first, a reciprocating take-up *m*, adapted to give out the needle-thread to the needle and shuttle and to take up the thread and set the stitch; secondly, a reciprocating thread-retainer *n*, adapted to store up a portion of the needle-thread between the stitch last set and whirl before the ascent of the needle and to give out the thread thus stored up during the ascent of the needle for the purpose of preventing the thread from reeving or slipping in the barb of the needle and thus becoming chafed or frayed, and,

thirdly, mechanism common to said take-up and thread-retainer for operating said parts. The take-up m is a roll or pulley mounted on a slide m' , which is movable endwise between
 5 suitable guides in the horn. The needle-thread o passes, as here shown, from the source of supply through a wax-pot (if waxed thread is used) around a tension-wheel o' ,
 10 over suitable guide-pulleys within the horn to the take-up m , and from the latter to and through the whirl. The take-up is reciprocated by suitable mechanism, which in this
 15 embodiment of my invention comprises a lever m^2 , pivoted at m^3 to the base portion of the horn, a link m^4 , connecting the swinging end of the lever with the slide m' , and a rod
 20 m^5 , connected with the lever and with mechanism (not shown) for reciprocating the rod, oscillating the lever, and reciprocating the
 slide m' and take-up m .

The thread-retainer n is an elongated slender arm having a hook n' , Fig. 8, at its outer end and movable endwise in a path which is
 25 close to the upper wall of the horn, the hook being movable from a thread-delivering position over the whirl, as shown in Figs. 1 and 5,
 to a thread-storing position at one side of the whirl, as shown in Figs. 2 and 4.

The thread-retainer is affixed to a slide n^2 ,
 30 which is movable endwise in a path parallel with the path of the take-up slide. Mechanism is provided whereby each forward or outward movement of the take-up slide toward
 35 the tip of the horn for the purpose of giving out thread while the needle is rising causes two movements of the thread-retainer. The first of these movements is from the thread-releasing position, Fig. 5, to the thread-storing
 40 position, Fig. 4, and occurs during the first part of the forward movement of the take-up slide. The second movement is from the thread-storing position back to the thread-releasing position and occurs during the latter
 45 part of the forward movement of the take-up slide. The said mechanism includes a rack p , formed on or affixed to the thread-retainer slide, a slide p' , parallel with the thread-retainer slide and hereinafter referred
 50 to as the "operating-slide," a rack p^2 , formed on or affixed to the operating-slide p' , and a pinion p^3 , located between the slides n^2 and p' and meshing with the said racks, the pinion being journaled on a stud affixed to the
 55 horn, so that when one of the racks is moved endwise in one direction the other rack necessarily moves endwise in the opposite direction. Each of the slides n^2 and p' is provided with a latch r , said latches normally projecting yieldingly above the slides
 60 through slots therein. Each latch is preferably an ear or flange formed on a spring r' and having in its upper edge a recess r^2 . Beside each latch and affixed to the same spring is a latch-depressing flange r^3 . One
 65 of said flanges coöperates with the fixed ear s and the other with a fixed ear s' , as hereinafter described. To the take-up slide are

affixed two spring-dogs t, t' , arranged at opposite sides of the slide. The dog t' is arranged
 70 to engage the latch on the thread-retainer slide, while the other dog t is arranged to engage the latch on the operating-slide p' , the dogs riding up the inclined upper edges of the latches and engaging the recesses r^2
 75 therein. When either dog is engaged with the corresponding latch by a movement of the take-up slide, the latch and the slide to which it is attached are moved in the same
 80 direction, and the opposite slide is moved through the pinion p^3 in the opposite direction. These movements continue until the latch-depressing flange r^3 of the engaged latch
 85 encounters the corresponding fixed ear s or s' , the depressing-flange moving under the ear and being depressed thereby with the latch, which is thus disengaged from the dog, whereupon the slides n^2 and p' stop.

The parts of the above-described thread-retainer operating mechanism are relatively
 90 arranged so that when the take-up slide commences its outward movement the dog t' is in engagement with the latch of the operating-slide p' , the latch of the thread-retainer slide n^2 being then at a considerable distance from
 95 the dog t , all as shown in Fig. 1. The first part of the outward movement of the take-up slide therefore causes a movement of the operating-slide p' in the same direction and an inward movement of the thread-retainer slide
 100 and the thread-retainer attached thereto, as shown in Figs. 2 and 4. This movement carries the thread-retainer inwardly to its thread-storing position and causes its hook to draw out a bight o^2 , Fig. 4, of the needle-thread
 105 between the whirl and the top of the horn. The inward movement of the thread-retainer slide carries the latch on said slide toward the dog t and causes the engagement of said
 110 latch and dog just after the latch on the operating-slide p' has been depressed by the corresponding fixed plate s' , all as shown in Fig. 4. The engagement of the dog t and the latch on the thread-retainer slide causes
 115 the latter to move outwardly with the take-up slide until the thread-retainer reaches its thread-releasing position, said latch being then depressed by the movement of the accompanying depressing-flange under the fixed plate s . The thread-retainer slide therefore
 120 stops, and with it the operating-slide p' , which has now been moved inwardly by the outward movement of the thread-retainer slide, thus bringing its latch in position to engage the dog t' when the take-up slide next reaches
 125 the inward extreme of its movement.

The operation is as follows: The needle
 descends until its hook passes through and below the whirl, and the whirl then moves to
 130 throw a bight of thread into the barb of the needle. The needle now commences to rise, engaging the thread and drawing it up to form the needle-loop. The take-up slide commences to move forward when the needle
 commences to rise, and thus releases thread

to the needle, this releasing movement of the take-up continuing until the needle-loop has been engaged by the shuttle-hooks, carried beyond the highest part of the shuttle, and is ready to be taken up, the take-up slide being then moved backward and the take-up m thus caused to take up the needle-loop and set the stitch. When the take-up slide commences its forward movement, its dog t' is engaged with the latch of the operating-slide p' , so that the thread-retainer first moves backwardly far enough to form the bight o^2 . Before the take-up slide reaches the outward extreme of its movement the movement of the slides $p' n^2$ is stopped and then reversed, as above described, to give the thread-retainer its forward or thread-releasing movement, this causing the release of sufficient thread above the barb of the needle to prevent the thread from slipping or reeving in the barb. The extent of the forward movement of the thread-retainer is determined by the adjustment of the plates $s s'$, which depress the latches on the respective slides, said plates being adjustably secured by screws passing through slots in the plates, as shown. The thread-retainer reaches the extreme of its forward movement before the take-up ceases to deliver thread to the needle and shuttle.

The machine is provided with a suitable loop-spreader u , which coöperates with the needle in holding the loop open to permit the hooks of the shuttle to enter and engage the loop. The partial rotary movements of the shuttle cause the hooks to carry the needle-loop over the top of the shuttle and release it at the back side of the shuttle, the take-up then acting to set the stitch.

It will be seen that my invention provides for the location in a sewing-machine horn of a take-up and a thread-retainer, thus enabling a horn-machine to form a lock-stitch without the liability of the chafing or reeving of the thread in the barb of the needle.

My invention is not limited to the details of mechanism here shown, and the same may be variously modified without departing from the spirit of the invention.

w represents a fixed plate, which is located in the top of the horn and has an orifice w' , which coincides with the needle-orifices in the top of the horn and in the center of the whirl, said plate being above and in close proximity to the top of the whirl. The needle-thread passes through the usual eccentric orifice formed in the whirl at one side of the needle-receiving orifice therein and from said eccentric orifice through the orifice w' in the plate w . The said plate not only holds the whirl in place, but also keeps the needle-thread above the whirl in a central position to insure its engagement by the hook n' of the thread-retainer. The under side of the plate w is recessed to permit the thread to pass freely between it and the top of the whirl.

I claim—

1. A sewing-machine horn having a whirl-seat, a whirl, means for holding said whirl in place, a thread-retainer having its free end movable in a plane above the whirl, and mechanism for reciprocating said thread-retainer longitudinally of the horn, a space being provided for the thread-retainer between the whirl-holding means and the top of the horn.

2. A sewing-machine horn having a whirl-seat, a whirl, means for holding said whirl in place, a take-up, a thread-retainer having its free end movable in a plane above the whirl, and mechanism common to said take-up and thread-retainer for reciprocating them longitudinally of the horn, a space being provided for the thread-retainer between the whirl-holding means and the top of the horn.

3. A sewing-machine horn provided internally with a take-up, mechanism for reciprocating the same, a longitudinally-movable thread-retainer, and intermediate mechanism having provisions for imparting successive movements in opposite directions to the thread-retainer.

4. A sewing-machine horn provided internally with a take-up slide, mechanism for reciprocating the same, a thread-retainer slide, an operating-slide, means for causing movement of either the retainer-slide or the operating-slide to impart an opposite movement to the other, means for engaging said slides successively with, and for successively disengaging them from, the take-up slide.

5. A sewing-machine horn provided internally with a take-up slide, mechanism for reciprocating the same, dogs carried by said slide, a thread-retainer slide and an operating-slide, each provided with a rack, a pinion engaging said racks, latches on said thread-retainer slide and operating-slide, adapted to engage said dogs, and means for successively disengaging the latches from the dogs.

6. A sewing-machine horn provided internally with a take-up slide, mechanism for reciprocating the same, dogs carried by said slide, a thread-retainer slide and an operating-slide, each provided with a rack, a pinion engaging said racks, latches on said thread-retainer slide and operating-slide adapted to engage said dogs, latch-depressing flanges connected with said latches, and fixed plates adapted to act successively on said flanges.

7. A sewing-machine horn having a work-support and containing a whirl, a fixed plate above the whirl having a thread-guiding orifice located in the path of the needle, a space being formed between said plate and work-support, and a reciprocating thread-retainer movable in said space.

In testimony whereof I have affixed my signature in presence of two witnesses.

FELIX DOUCET.

Witnesses:

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