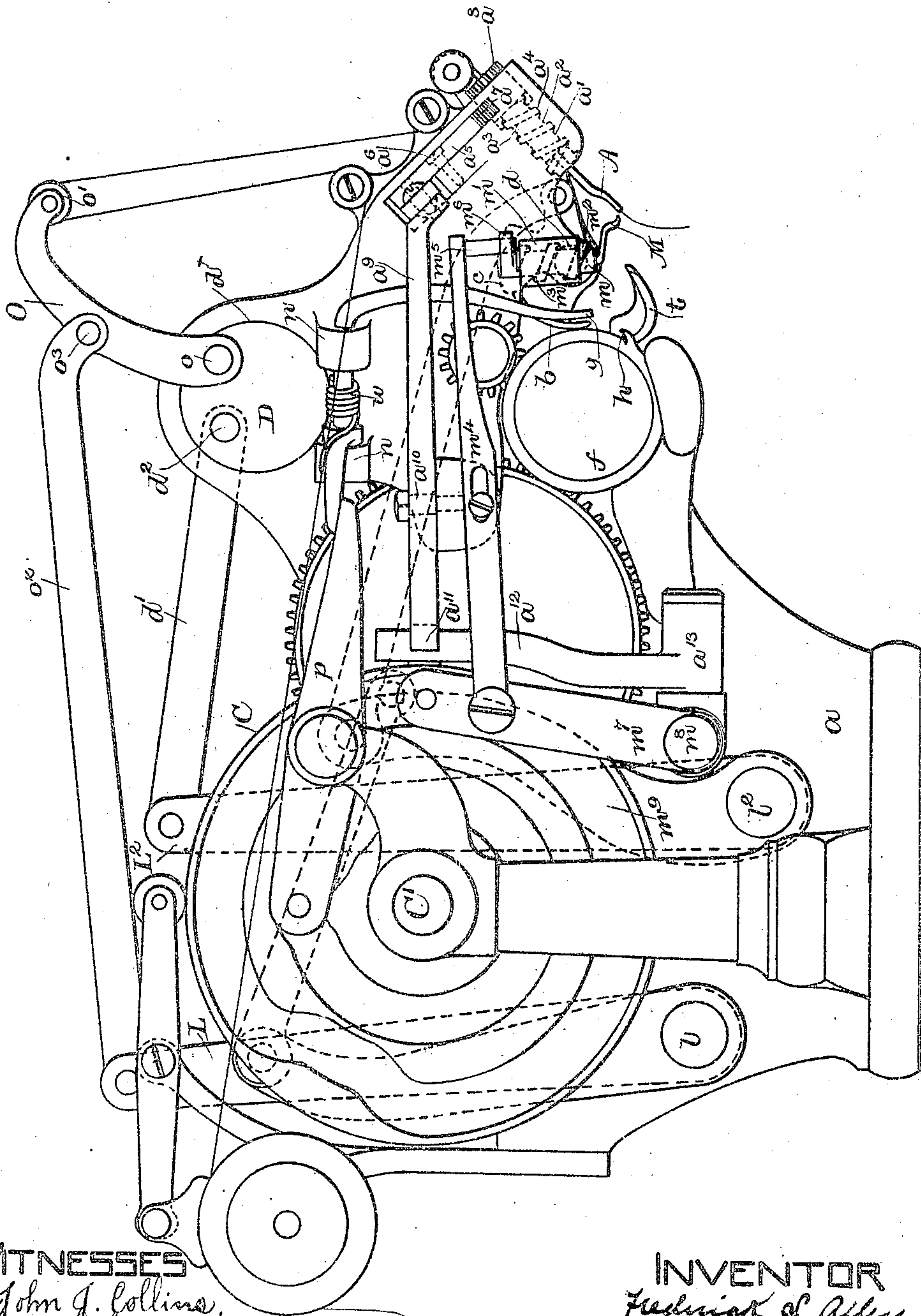


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F. L. ALLEY.
SHOE SEWING MACHINE.
APPLICATION FILED FEB. 16, 1897.



WITNESSES
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UNITED STATES PATENT OFFICE.

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SHOE-SEWING MACHINE.

No. 827,399.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FREDERICK L. ALLEY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Shoe-Sewing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to shoe-sewing machines, and more particularly to such machines which are designed to stitch the welt of a boot or shoe to the lasted upper and insole.

In a shoe-sewing machine the parts acting directly upon the thread to form the stitch and upon the material to accomplish the feed—such, for example, as the needle, looper, thread-finger, and awl—must perform their operations within a very limited space, and it has always been found difficult in this art to provide a simple and effective actuating mechanism therefor which shall cause them to perform their functions in due relative order and keep them out of the way of each other and out of the way of the shoe, which must frequently be held at varying inclinations by the operator to properly position the same. With a view of improving this class of machines as to the above stated-features I have provided a thread finger or measurer having a combined oscillating and reciprocating movement, a device which I believe to be new in the art, and have further combined such a device with a looper having a combined oscillating and reciprocating movement, which latter though not a novel device has never been combined with a thread-finger having the movements above referred to. By combining these two devices and providing suitable connecting mechanism said devices are brought into proper operative relation to each other and to the needle to perform their combined and separate functions and are retracted out of the way of the other operating parts and out of the way of the work in a simple and effective manner.

The drawing is a side elevation of a sewing-machine embodying the invention.

For the purposes of illustrating the present invention it is shown applied to the sewing-

machine disclosed in Letters Patent of the United States issued to the Goodyear Shoe Machinery Company of Portland, Maine, as the assignee of Felex Doucet, No. 507,530, of October 31, 1893, and except as hereinafter specified the parts may be and conveniently are the same as similar parts in said machine.

In the drawing, *a* is the head of the machine; *b*, the needle; *c*, the needle-segment pivoted at *d* to swing toward and from the work in an arc of a circle.

The letter *f* represents a rotary or oscillating shuttle, having hooks *h*, and *g* is the loop-spreader mounted in bearings *n n*, actuated by a lever *p* and spring *w*, and *t* represents the gage or work support.

All of the above parts may be formed and arranged and operated as in the machine of the patent hereinbefore referred to.

The improved looper is shown at A, and it is actuated so that its thread-carrying end, which is offset, as shown, will have longitudinal movement toward the needle *b* and an oscillating movement around the same to throw the needle-thread in the hook of the needle within an overhanging portion of the head *a*. The looper and its shank are bored out or provided with a passage through which the thread passes.

The shank *a'* of the looper is mounted in a bearing *a''*, and it is actuated within said bearing in such manner that it imparts to the looper A the movements above referred to.

Any suitable construction may be employed to secure the above-suggested results; but I prefer to form the shank *a'* of the looper A and the bearing *a''* with inclined guide-grooves and projections which will cause the looper-shank *a'* to travel longitudinally in its bearing as it is rotated or oscillated therein. As shown in the drawing, the inclined guide-groove and projection take the form of an external screw-thread *a'''*, formed upon the looper-shank *a'*, and an internal screw-thread *a''''*, formed in the bearing *a''*, the said screw-threads causing the looper-shank to move longitudinally as it is rotated or oscillated and to impart similar movement to looper A.

The looper may be oscillated by any suitable means, but in the machine of the drawing such means comprises a lever *a⁵*, which is pivoted at *a⁶* within the overhanging por-

tion of the frame a and is provided with a segment-gear a^7 , which meshes with a gear a^8 , connected to the shank a' of the looper A, the opposite end of the lever a^5 being pivotally connected to a lever a^9 , fulcrumed at a^{10} , the rear end a^{11} being acted upon by a lever a^{12} , which is fulcrumed at a^{13} and which has a cam-roll at its upper end acted upon by a cam-groove in the periphery of the cam C.

The above arrangement is such that a movement of the lever a^5 around its fulcrum a^9 will impart an oscillating movement or rotation to the looper-shank a' , which by means of the inclines a^3 and a^4 is caused to travel longitudinally in its bearing, thus imparting a combined oscillating and reciprocating movement to the looper A.

The gear a^8 is lengthened, as shown in the drawing, in order that it may move across the gear a^7 and still keep in mesh therewith.

It is of course clear that other equivalent mechanism may be employed in lieu of the segment a^7 and that equivalent devices may be employed to impart a longitudinal movement to the looper instead of the screw-threads a^3 and a^4 , also that the construction and relative arrangement of the gear a^8 and looper may be varied and equivalent results secured.

M represents the thread-measurer, which in the present invention has imparted to it an oscillating movement and a longitudinal reciprocating movement in order that it may be raised up out of the way to clear the surface of the shoe-sole while the shoe is held in an inclined position when sewing around the shank. This is accomplished in the machine of the drawing by forming the measurer M with a shank m , which is mounted in a bearing m' and which, as in the case of the looper, has inclined bearings m^2 and m^3 , arranged to impart a longitudinal movement to the shank m and thread-finger M as the said shank is oscillated.

Any convenient mechanism may be employed to impart to the shank the oscillating movement, that shown in the drawing comprising a link or bar m^4 , which is loosely connected by the stud m^5 to an arm m^6 of the shank m and which link or bar m^4 is loosely connected at its other end to a lever m^7 , fulcrumed at m^8 and actuated by a cam-groove m^9 in the face of cam C.

A rotation of cam C will cause a forward and backward movement of the link or bar m^4 , and a rotation or oscillation of the shank m , which by means of the inclined bearings m^2 m^3 will be moved up and down, thus imparting to the thread-finger M an oscillating movement and a vertical reciprocation, and thus when retracted after measuring off the thread for the next stitch it will be lifted to clear the work, as before stated.

The take-up illustrated in connection with the present invention is actuated in such a

manner that a great amount of thread may be pulled from the thread-supply without the necessity of compounding the thread-rolls or employing what is generally known as a "compound take-up," and this is accomplished by moving said take-up in a curved path for a limited distance and at the same time lifting the fulcrum or center around which said take-up moves, to thus augment the thread-pulling capacity of said take-up.

In the machine of the drawing the take-up O is pivoted at o and carries a suitable thread-roll o' . Any suitable means may be employed to move the take-up O around its fulcrum o , that shown in the drawing comprising a link o^2 , one end of which is pivotally connected to the take-up at o^3 and at its other end pivotally connected to a lever L, which is fulcrumed at l to frame a and which carries a suitable cam-roll, (not shown,) actuated by a cam (not shown) on the cam-shaft C'.

In order to raise the fulcrum o of the take-up O at the same time that said take-up is moved around its fulcrum in the machine of the drawing, said fulcrum o is mounted upon a disk D, which is mounted to oscillate in a suitable bearing d^x in the frame a , said disk D being oscillated by a link d' , which is pivotally connected at d^2 to said disk D, and which at its other end is pivotally connected to a lever L^2 , which is fulcrumed at l^2 to the frame a , and which is actuated by a cam-roll (not shown) and a cam (not shown) mounted upon the cam-shaft C'.

The above-described arrangement is such that as the lever L and link o^2 are retracted to raise the take-up O the lever L^2 and link d' are also retracted to move the disk D, and thus raise the fulcrum o and the take-up O, increasing the pull of said take-up without increasing the throw thereof around the fulcrum.

This take-up mechanism forms no part of the present invention, but is illustrated and described herein for the purpose of showing the preferred form of the sewing-machine embodying my invention.

The operation of the machine of the drawing in so far as the same is material to the present application is as follows: As the needle starts toward the work the take-up gives down slightly to allow the thread-measurer to draw off sufficient thread for the next loop drawn back by the needle, and the thread-measurer commences to rotate, its motion of rotation by means of its inclined bearings imparting to its thread-engaging end a motion across the line of thread outward and upward from the work to draw off the required amount of thread. During this operation the needle passes through the work and the looper is rotated, its motion of rotation by means of its inclined bearings causing its thread-carrying end to move downward and

around the needle to place the thread in the hook of the needle, the needle then beginning to recede and the thread-measurer to rotate in an opposite direction to that of its former rotation, and its thread-carrying end moves downward and inward toward the work, giving up its thread to the receding needle. In the meantime the looper begins to rotate in a direction opposite to that of its former rotation, its thread-carrying end moving upward, keeping in line with the pull of the thread by the receding needle. The loop of thread is then drawn through the work spread by the loop-spreader and passes over the shuttle in the usual manner. My improved take-up then acts to set the stitch, as already described.

Having thus described my invention and its mode of operation, I desire to say that I do not consider the same to be limited to the embodiment thereof herein illustrated and described; but

I claim as novel and desire to secure by Letters Patent of the United States—

1. A shoe-sewing machine, having, in combination, a curved hooked needle, a thread-measurer, located on the opposite side of the

work from the needle and acting to supply slack thread to the needle on the side thereof adjacent to the last preceding needle-hole, and means to impart a combined oscillating and reciprocating movement to the thread-measurer, substantially as described.

2. A shoe-sewing machine, having, in combination, a curved needle, a thread-measurer having a combined reciprocating and oscillating movement, a looper, also having a combined reciprocating and oscillating movement and connected mechanism for actuating the needle, thread-measurer and looper, acting to cause the looper to lay the thread in the hook of the needle while projected through the work and the thread-measurer to engage the thread between the needle and the looper to supply slack thread for the next retreat of the needle, substantially as described.

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

FREDERICK L. ALLEY.

Witnesses:

IDA B. WINGATE,
S. A. LORD.