(No Model.)

C. T. WARREN.

THREAD FEEDING MECHANISM FOR SEWING MACHINES.

No. 421,876. Patented Feb. 18, 1890.

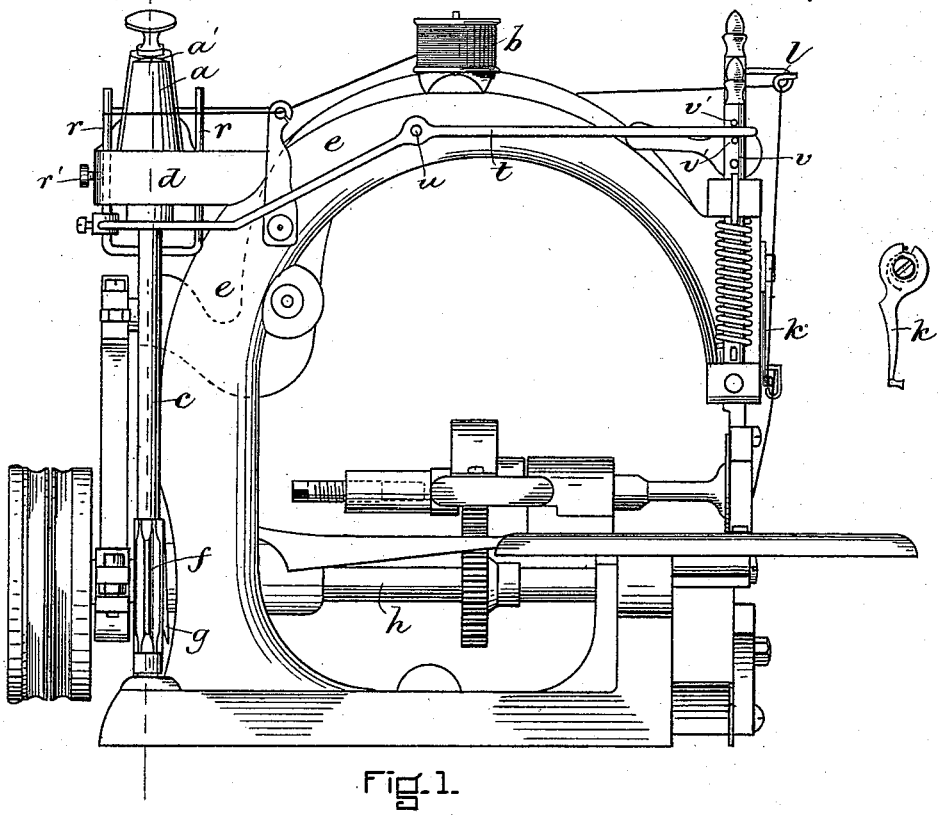

Fig. 1.

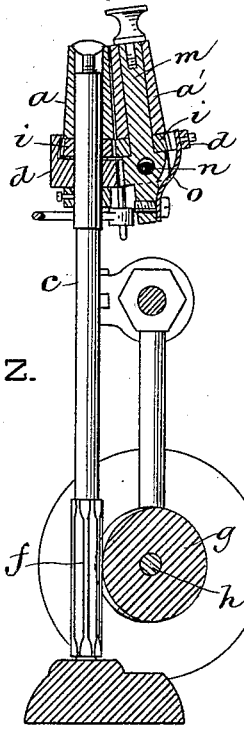

Fig. 2.

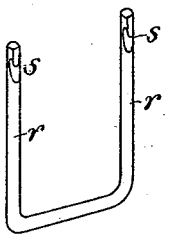

Fig. 3.

WITNESSES.

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THREAD-FEEDING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 421,876, dated February 18, 1890.

Application filed February 12, 1884. Renewed March 28, 1885. Again renewed March 22, 1886. Again renewed February 11, 1888. Serial No. 263,711. (No model.)

To all whom it may concern:

Be it known that I, CHARLES T. WARREN, of Boston, in the county of Suffolk, and State of Massachusetts, have invented certain Improvements in Thread-Feeding Mechanism for Sewing-machines, of which the following is a specification.

This invention has for its object to provide improved means for automatically pulling thread from the supplying bobbin or spool of a sewing-machine and feeding it forward to the stitch-forming mechanism at a rate directly proportioned to and governed by the speed of the machine.

The invention also has for its object to enable the rate of the feeding of the thread to be varied by the operator, and finally to provide means whereby the thickness of the work or material being stitched by the machine may be caused to regulate the rate of the feeding of the thread.

To these ends my invention consists in the provision of two rolls positively rotated by the power which drives the machine, and arranged to pull the thread from the supply-bobbin and feed it forward to the needle.

The invention also consists in the form of the rolls, whereby they are enabled to feed the thread faster or slower accordingly as the thread is adjusted between the grasping-surfaces; also, in the provision of an adjustable thread-guide, whereby the thread may be adjusted between the rolls; also, in providing one of the rolls with a yielding movement toward the other roll, whereby the rolls are enabled to grasp different thicknesses of thread; also, in the provision of means for varying the approach of the yielding-roll toward its companion, so that the rolls may be prevented from exerting their full pressure on coarser threads, and, finally, in the provision of means whereby the adjustable thread-guide is automatically adjusted by variations in the thickness of the material under the presser-foot, all of which I will now proceed to describe and claim.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a sewing-machine provided with my improvements. Fig. 2 represents a section on line $x\,x$, Fig. 1. Fig. 3 represents a perspective view of the adjustable thread-guide.

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

In the drawings, a a' represent a pair of feed-rolls located in any suitable or convenient relation to the bobbin or spool b, which supplies thread to the needle. The roll a is affixed to a vertical arbor c, which is journaled near its upper end in a bearing in a projection d on the arm e of the machine, while the lower end of said arbor is journaled in a step formed on the bed of the machine. The arbor c is provided with a pinion f, meshing with a worm-wheel g on the driving-shaft h of the machine. The arbor c and its roll are thus positively rotated at a rate of speed corresponding to the rate of rotation of the driving-shaft. The rolls are provided with intermeshing gears $i\,i$, so that the roll a' is positively rotated in direction opposite to the rotation of the roll a. Thread passing from the bobbin b between the points of closest approach; or, in other words, the grasping-points of the rolls $a\,a'$, will be steadily drawn from the bobbin and allowed to pass to the stitch-forming mechanism at a fixed rate corresponding to the rate of operation of said mechanism; hence the tension of the thread between the rolls and the needle will always be substantially uniform, and as the stitch-forming mechanism does not pull off the thread no variation in the tension will occur, excepting in case an oscillating hook is employed as a part of the stitch-forming mechanism, when a slight variation will occur, the thread being slightly slackened when the hook is in certain positions. To overcome this slight variation I provide a spring or spring-arm k on the face-plate or end of the arm e, the free end of said arm having a hook or orifice through which the thread passes, and being adapted to deflect the thread between the guide l, through which it passes from the rolls $a\,a'$, and the eye of the needle, and exert a constant yielding pressure on the deflected portion of the thread,

thereby preventing even the slightest variation in the tension. The arbor m of the roll a' is pivoted at n to the projection or support d, and is provided with a yielding movement toward the roll a by means of a spring o, secured to a part of the fixed support and to a shank formed on the arbor m and extending below the pivot n. The roll a' is thus caused to bear with a yielding pressure against the roll a, so that different sizes of thread may be grasped with equal facility. The roll a' may be prevented from pressing against the roll a along its entire length; or, in other words, the approach of the roll a' to the roll a may be regulated by any suitable means, so that when the rolls are used with coarse threads the roll a' may be prevented from meeting the roll a with the full pressure of the spring o, so that the thread will not be unduly compressed by the rolls. To this end the portion of the pivot n that passes through the arbor m may be eccentric to the part that passes through the support d, so that by turning said pivot the relation of the arbor m to the arbor c will be slightly varied, as will be readily understood. I prefer to make the rolls a a' tapering or frusto-conical in form, both tapering in the same direction, as shown in Figs. 1 and 2. This form of the rolls enables the thread to be fed more or less rapidly by causing it to pass between larger or smaller portions of the varying diameters of the rolls.

r represents an adjustable guide composed, preferably, of two connected arms having eyes s near their ends. One of said arms passes through a socket in the support d and is secured at any point to which it may be moved by a set-screw r'. The arms r are arranged at opposite sides of the grasping-points of the rolls a a'. The eyes s s receive the thread, and by adjusting the arms r in the sockets they can be caused to depress or elevate the thread between the rolls and cause larger or smaller diameters of the rolls to grasp and feed the thread. The rolls may thus be caused to supply the thread more or less rapidly, according to the requirements of the work. The thread-guide r may be adjusted by the operator as required; but if it is desired to give the guide an automatic adjustment a lever t may be employed, pivoted at u to the arm of the machine, and engaged at one end with the guide r and at the other end with the presser-bar v. The presser-bar is therefore caused to adjust the thread-guide r, so that when thick goods are under the presser-foot and the presser-bar is raised thereby the thread-guide will be correspondingly depressed and the thread will be supplied more rapidly than for thinner goods.

The engagement of the lever t with the presser-bar is effected, in the present instance, by means of two pins v' v' on the presser-bar, between which the end of the lever t projects. Said pins should be sufficiently separated to prevent the movements of the presser-bar, caused by the upward and downward movements of the feed-dog, from moving the lever t when work of ordinary thickness is under the presser-foot.

I do not limit myself to the details of construction described and shown, but may vary the same without departing from the spirit of my invention.

It is obvious that the described improvement is applicable to any kind of sewing-machine, either lock-stitch or single thread and to button-hole machines.

I claim—

1. In a sewing-machine, a pair of rolls adapted to pull the thread from the supplying-bobbin, a connection with the driving-shaft of the machine, whereby said rolls are positively rotated, and a pivoted bearing or support for one of said rolls, having a yielding movement toward the other roll, the elements in combination, substantially as set forth.

2. In a sewing-machine, a pair of rolls adapted to pull the thread from the supplying-bobbin, a connection with the driving-shaft of the machine, whereby said rolls are positively rotated, a pivoted bearing or support for one of said rolls, a spring whereby said pivoted bearing and its roll are pressed toward the other roll and adapted to yield, and means for limiting the movement of the yielding roll toward its companion, whereby the rolls are enabled to feed coarse threads without unduly compressing them, all combined and arranged substantially as set forth.

3. In combination with the driving mechanism of a sewing-machine, a pair of tapered rolls driven thereby, and an adjustable guide, whereby the thread may be caused to pass between the rolls at any desired point.

4. In a sewing-machine, the combination of a pair of tapered rolls adapted to pull the thread from the supplying-bobbin, an adjustable thread-guide, whereby the thread may be caused to pass between the rolls at any desired point, and automatic mechanism whereby said thread-guide is adjusted by the thickness of the material under the presser-foot, as set forth.

5. In combination with the driving mechanism of a sewing-machine, a pair of rolls driven thereby and adapted to pull the thread from the supplying-bobbin and feed it forward to the needle, and a spring whereby the thread between the feeding-rolls and the needle is kept at a uniform degree of tension, as set forth.

6. In combination with the driving mechanism of a sewing-machine, a pair of thread pulling and feeding rolls geared together, and an arbor secured to one of said rolls and geared to the driving-shaft of the machine, as set forth.

7. In a sewing-machine, the combination of a pair of thread pulling and feeding rolls geared together, a positively-rotated arbor affixed to one of said rolls, a pivoted arbor

supporting the other roll and its gear-wheel, a fixed support for the pivot of the last-named arbor, and a spring connecting the pivoted arbor and its fixed support, whereby the pivoted arbor and its roll are given a yielding movement toward the other roll, as set forth.

8. The combination, with the driving mechanism of a sewing-machine, of the positively-rotated thread pulling and feeding rolls having tapered peripheries, and the connected thread-guiding arms adapted to slide in a fixed socket and arranged at opposite sides of the thread-grasping points of said rolls, whereby the thread may be presented to any desired grasping portion of the varying diameters of said rolls and fed more or less rapidly, as set forth.

9. The combination of the positively-rotated thread pulling and feeding rolls having tapered peripheries, the connected thread-guiding arms adapted to slide in a fixed socket and arranged to present the thread to any desired grasping portion of the varying diameters of the rolls, and a pivoted lever engaged at one end with said adjustable arms and at the other end with the presser-bar, whereby changes in the thickness of the material under the presser-foot are caused to vary the position of the thread between the rolls, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 7th day of February, 1884.

CHARLES T. WARREN.

Witnesses:
C. F. BROWN,
A. L. WHITE.