

(No Model.)

2 Sheets—Sheet 1.

S. W. WARDWELL, Jr.

THREAD CONTROLLING DEVICE FOR SEWING MACHINES.

No. 371,648.

Patented Oct. 18, 1887.

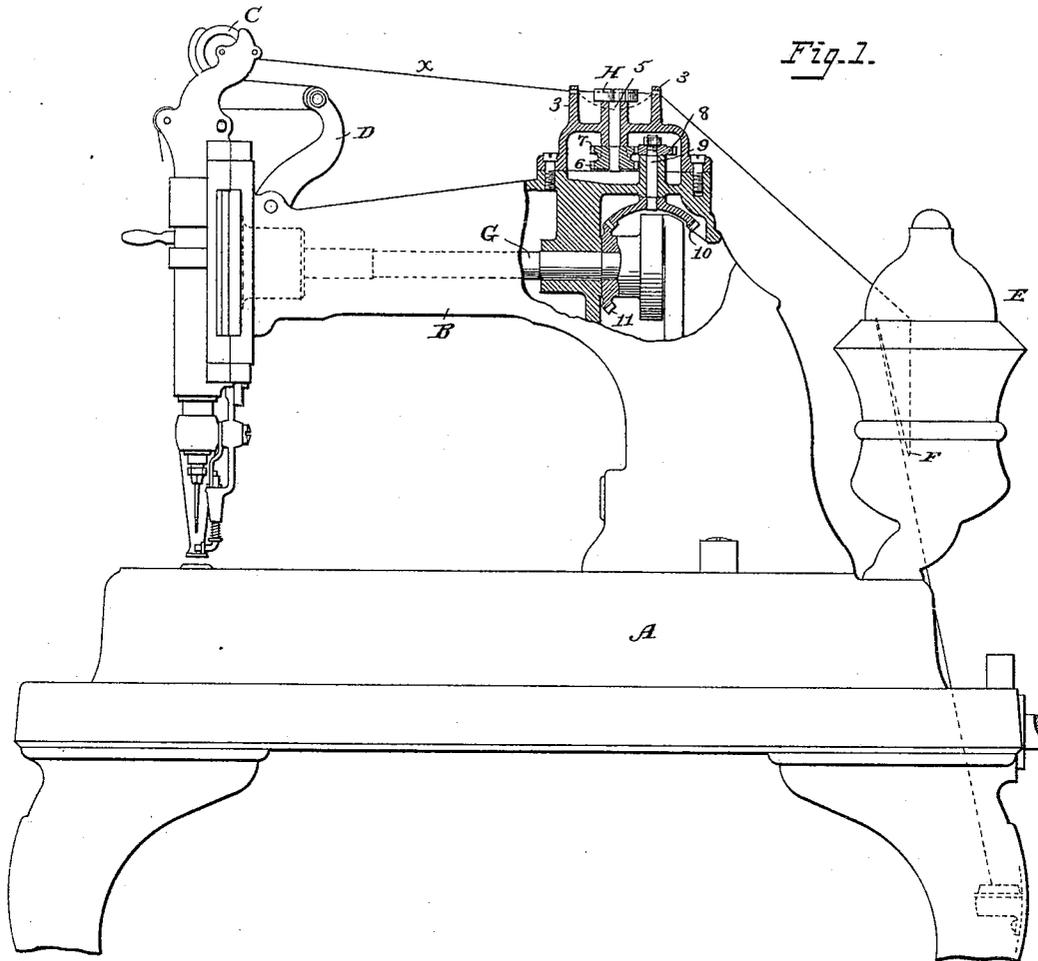
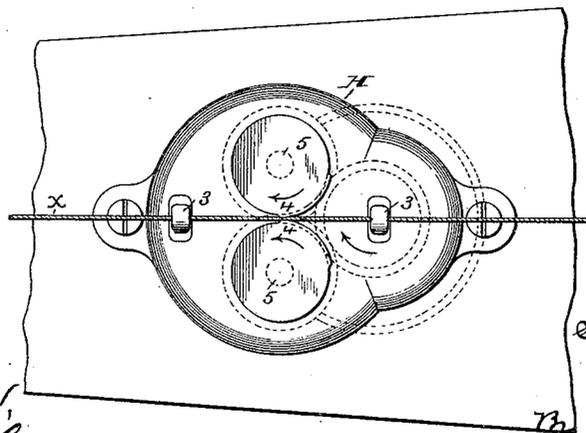


Fig. 1.

Fig. 2.



Attest:

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W. A. H. Knight

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Inventor.

Foster & Freeman  
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(No Model.)

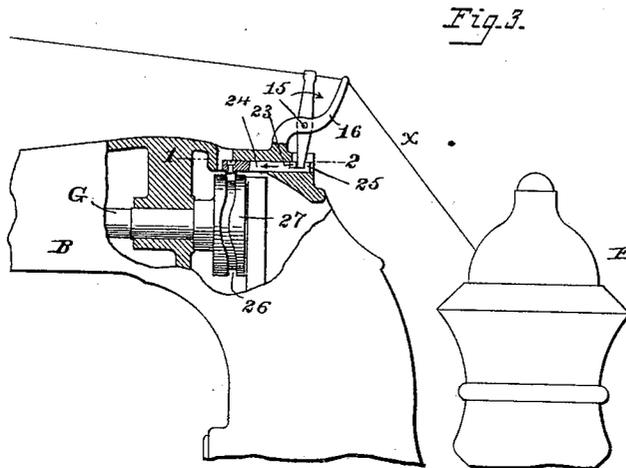
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S. W. WARDWELL, Jr.

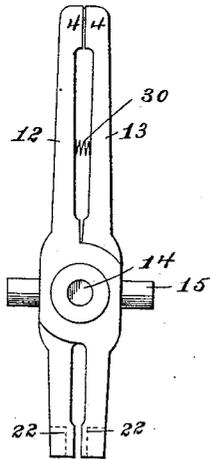
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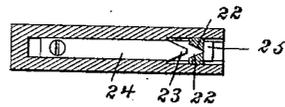
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*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

SIMON W. WARDWELL, JR., OF WOONSOCKET, RHODE ISLAND, ASSIGNOR  
TO THE WARDWELL SEWING MACHINE COMPANY, OF NEW YORK, N. Y.

## THREAD-CONTROLLING DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 371,648, dated October 18, 1887.

Application filed July 12, 1886. Renewed September 20, 1887. Serial No. 250,257. (No model.)

*To all whom it may concern:*

Be it known that I, SIMON W. WARDWELL, Jr., a citizen of the United States, residing at Woonsocket, Providence county, Rhode Island, have invented certain new and useful Improvements in Thread-Drawing Devices for Sewing-Machines, of which the following is a specification.

My invention consists of the combination, with a sewing-machine, of a device for positively seizing, gripping, and feeding forward the thread, and in the combination of such a device with the wax-pot and stripper and with the gripper of a wax-thread sewing-machine, as fully set forth hereinafter, so as to relieve the other parts of the machine from the irregular strains resulting in drawing the thread from the wax-pot or bobbin to secure a uniform placing of the lock and a more even and regular stitch than would otherwise result.

My invention further consists in the particular construction of the thread-feeding device.

In the drawings, Figure 1 is a side elevation, in part section, of a Wardwell wax-thread sewing-machine, showing my improvement in connection therewith. Fig. 2 is a part plan of the devices shown in Fig. 1. Fig. 3 is a sectional view illustrating a modified form of feed device. Fig. 4 is a rear view of the feed device illustrated in Fig. 3. Fig. 5 is an enlarged sectional plan on the line 1 2, Fig. 3.

In the lock-stitch sewing-machine, and especially in wax-thread sewing-machines of that class, it is of the first importance that the lock be drawn uniformly to the middle or to any given distance uniformly from the under or upper surface of the material sewed.

The irregular resistance incidental to the process of waxing and stripping the thread in its course from the ball through the wax-pot to the sewing mechanism causes variations in the stitch of the thread during the distention of the loop for the passage of the shuttle, resulting in a corresponding variation in the position of the lock, commonly to the extent of exposing it on either of the two surfaces or both, alternately, of the material sewed.

To obviate this irregular resistance to the sewing mechanism is the primary object, and to relieve the thread-abrasive effect of this strain on the neck of the looping-hook at the

paying-out point a secondary object of my invention. To effect this result I feed the thread forward by a positively-operating feed device, which, when the wax-pot is used, draws the thread from the latter, so as to slacken the thread between the wax-pot and the friction and tension device of the machine, and, when desired, I construct the said thread-feed device so as to operate upon and draw forward the thread only as long as the thread is taut, or nearly so, the slackening of the thread resulting in throwing it out of action with the feed device, and when a machine provided with a gripper is used the thread-feed is so arranged as to feed the thread when the gripper is loose, a result which is not possible in connection with devices heretofore employed for drawing the thread from the wax-pot.

In Figs. 1 and 2 I have illustrated my invention in connection with a Wardwell wax-thread sewing-machine, in which A is the bed; B, the overhanging arm; C, the gripper; D, the positively-operated take-up, and E the wax-pot provided with the usual stripper, F the thread  $\alpha$  passing from the stripper to the gripper, then to the take-up, and thence to the needle. G is the upper shaft of the machine.

The thread-feeding device H (shown in Figs. 1 and 2) consists of two feed-rolls, between the contiguous edges of which the thread is guided by means of guides 3 3, and one or both of the said rolls is or are provided with biting projections 4 4, projecting beyond the periphery of the rolls in line with the said guides, so that as the rolls revolve in the direction of their arrow, Fig. 2, the thread will be left loose and free to move, regardless of the feed device, until it is pinched between the projections 4 4, when it will be carried positively forward to an extent depending upon the length of the said projection.

It will be obvious that one roll may be plain, and that the other may be provided with a projection for operating, with like effect.

So long as the thread remains taut, or nearly so, it will be fed forward at each revolution of the rolls; or when either roll is provided with two or more projections 4 the thread is fed forward two or more times during the revolution of the rolls; but should the feed device draw from the bobbin or wax-pot more thread

than is required to supply the stitches the thread will become so slack between its guides or bearings that it will fall below the vertical biting-faces of the roll, as shown in dotted lines, Fig. 1, when the feed device will cease to have any action in feeding the thread. As soon as the thread becomes taut, or nearly so, it will again be brought into operative position in respect to the feed device.

10 When a gripper is used, the feed device is so timed as to draw the thread from the pot or bobbin during the time that the thread is ungripped, which may be readily effected, owing to the positive and independent action  
15 of the feed device, which operates without the necessity of holding the forward end of the thread fixedly, as in devices heretofore used.

The feed device may be driven from any operating portion of the machine. For instance,  
20 when feed-rollers are used each roller may be at the upper end of a vertical shaft, 5, carrying at the lower end a toothed wheel, 6, gearing with a similar wheel upon the other shaft 5; and with one of the wheels 6, or with a supplemental toothed wheel, 7, upon one of the shafts, gears a wheel or pinion, 8, upon a shaft,  
25 9, carrying a bevel-gear, 10, that gears with a bevel-wheel, 11, upon the upper shaft, G, of the machine.

30 The feed device, consisting of revolving wheels, may be replaced by one in which the thread is seized between reciprocating jaws, so constructed that when the thread is slack it will fall below or free from the gripping-faces  
35 of said jaws. Such an arrangement is shown in Figs. 3, 4, and 5, in which 12 13 are two jaws hung between their ends to a pivot, 14, and supported by a transverse pin, 15, having its bearings in a bracket, 16, projecting from the frame  
40 of the machine, and perforated for the passage of the thread *x*, so as to constitute a guide for the latter and conduct it, when taut, or nearly so, between the vertical pinching-faces 4 4 of the jaws.

45 The lower end of the jaws 12 13 have inside beveled faces, 22 22, between which may be brought a wedge-shaped projection, 23, upon a slide, 24, provided with a lug fitting a cam-groove, 26, in a cam, 27, upon the upper shaft,  
50 G, the groove being of such form as to impart a reciprocating longitudinal movement to the slide 24. The slide 24 is provided at its end with a lug, 25, which strikes the lower ends of the jaws and carries them backward past the stationary thread when the slide moves in the  
55 direction of its arrow, Fig. 3. When the slide moves in the opposite direction, the wedge 23 is forced between and separates the lower ends of the jaws, thus bringing their upper ends  
60 together upon the cord, which is then carried forward as the jaws swing upon their pivot 15 under the continued backward movement of the slide. A spring, 30, may be placed between the upper ends of the jaws to insure  
65 their separation when the wedge is withdrawn on the forward movement of the slide.

It will be obvious that other forms of thread-

feeding devices may be used with like effect—that is, operating independently of any other part of the machine as the sole and positive  
70 means of intermittently drawing forward the thread, so as to relieve the needle or other parts of the machine from the irregular strain of the wax-pot or bobbin frictions and irregularities, and so as to prevent the abrasion of  
75 the thread and equalize the stretching of the same and insure regularity in the stitching. Such a positive feeding device will always keep sufficient slack thread in reserve for the longest stitch in the thickest material, provided it is proportioned to draw the maximum  
80 quantity of thread required at one movement, and when there is more thread than is needed the slackening of the thread causes it to fall below the pinching-surfaces, and will prevent a further quantity from being drawn from the  
85 pot or bobbin until sufficient has been used to bring it again into operative position between the pinching-surfaces, or, in other words, in operative relation to the feed.

Without limiting myself to the precise construction and arrangement of parts shown, I  
90 claim—

1. The combination, with the needle and thread-holder of a sewing-machine, of a feed  
95 device provided with surfaces between which the thread is positively gripped at intervals and then released, and mechanism for imparting an onward movement to said device while gripping the thread, substantially as described.  
100

2. The combination, with a sewing-machine, of a thread-feed device provided with traveling gripping-surfaces for positively seizing and drawing forward the thread, and means, substantially as described, for intermittently releasing the thread from the gripping action,  
105 substantially as set forth.

3. The combination, with a sewing-machine provided with a gripper, of a thread-feed and gripping device, actuating mechanism  
110 moving the gripping-surfaces intermittently in contact with the thread, and connections whereby the feed device is brought into operation to draw the thread positively when the gripper is loose, substantially as set forth.  
115

4. The combination, with thread-guides, of a positive thread gripping, drawing, and releasing device, arranged with the gripping-surfaces in line with the said guides and above  
120 the position occupied by the thread when slack, substantially as and for the purpose set forth.

5. The combination, with thread-guides, of a positively-traveling thread-feeder having vertical faces in line with said thread-guides and above the line of thread hanging loosely  
125 between said guides, substantially as described.

6. The combination, with a sewing-machine provided with a wax-pot and stripper, and with guides for conducting the thread from the stripper toward the needle end of the  
130 machine, of traveling thread-grippers in line with said guides to seize and feed the thread positively and intermittently when said thread is taut, substantially as set forth.

7. The combination, with a sewing-machine, of a thread-feeding device, consisting of feed-rolls provided with gripping projections between which the thread is intermittently gripped and drawn forward, substantially as set forth.

8. The combination, with a sewing-machine provided with a wax-pot and stripper, of a pair of feed-rolls having limited vertical gripping projections, and guides in line with said projections, substantially as set forth.

9. The combination, with the wax-pot and stripper of a sewing-machine, of traveling positive gripping and releasing devices for positively seizing and drawing forward the thread through the stripper and then releasing it, substantially as set forth.

10. The combination, with a sewing-machine, of a thread-gripper and take-up, a wax-pot and stripper, and a thread-feeding device provided with traveling faces between which the thread is intermittently gripped and carried from the pot toward the needle, substantially as set forth.

11. The combination, with the wax-pot and stripper of a sewing-machine, of a pair of feed-rolls arranged in line with thread-guides and with gripping projections, shafts geared together and carrying the said rolls, and a driving shaft geared with one of said roll-shafts, substantially as set forth.

12. The combination, in a thread-feed device for sewing-machines, of revolving shafts 5 5, carrying feed-rolls 1 2, provided with vertical gripping-faces, and thread-guides 3 3 in line with the gripping-faces, to conduct the thread, when taut, between the said faces, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SIMON W. WARDWELL, JR.

Witnesses:

JEFFERSON ALDRICH,  
R. W. SHERMAN.