(No Model.)

W. F. DIAL.

THREAD CONTROLLING MECHANISM FOR SEWING MACHINES.

No. 386,300. Patented July 17, 1888.

Fig: 1.

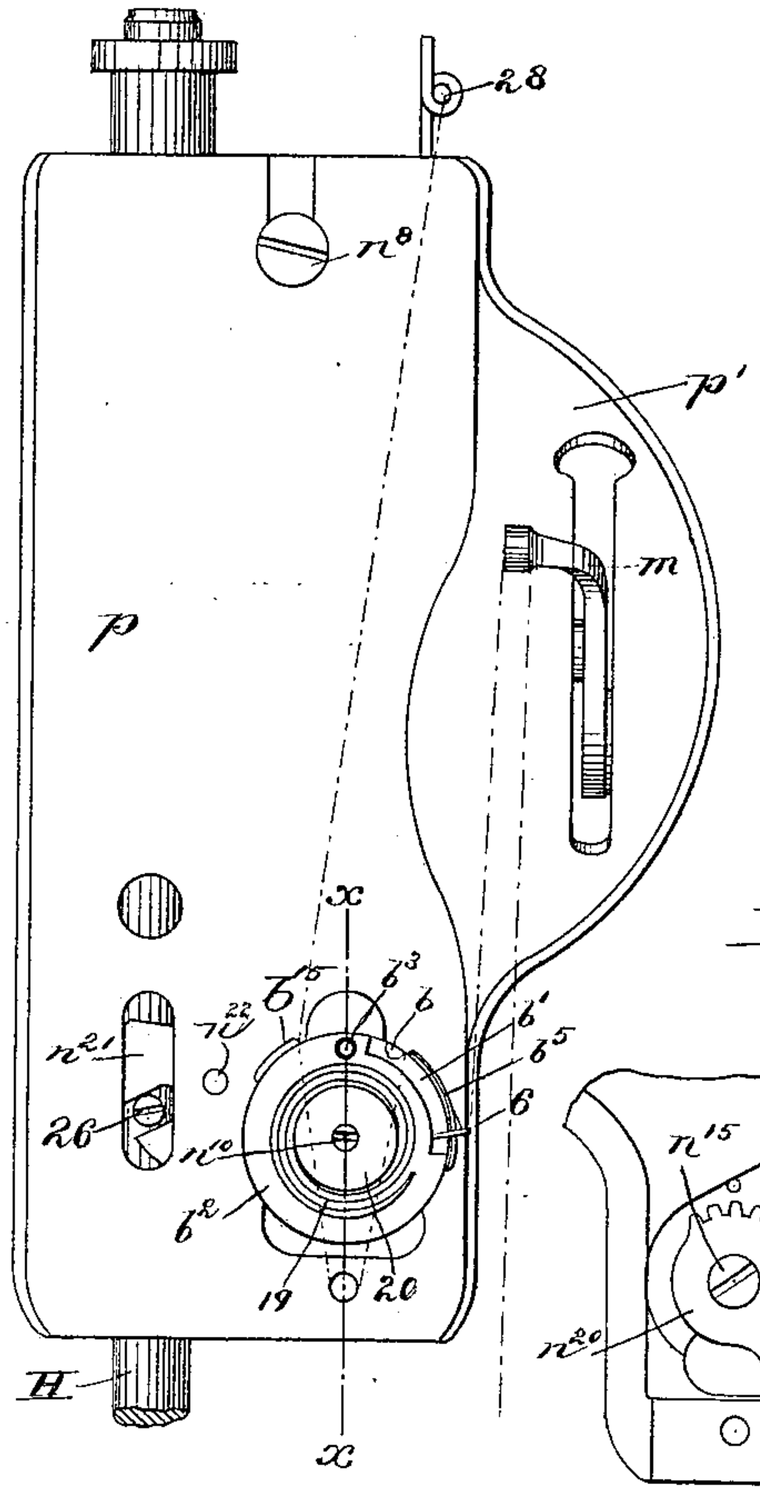


Fig: 7.

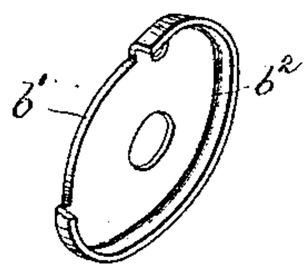


Fig: 5.

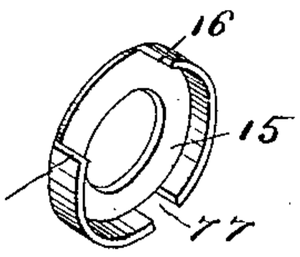


Fig: 4.

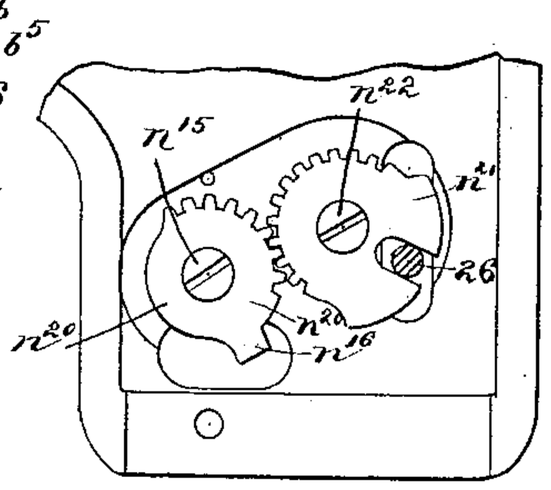


Fig: 2.

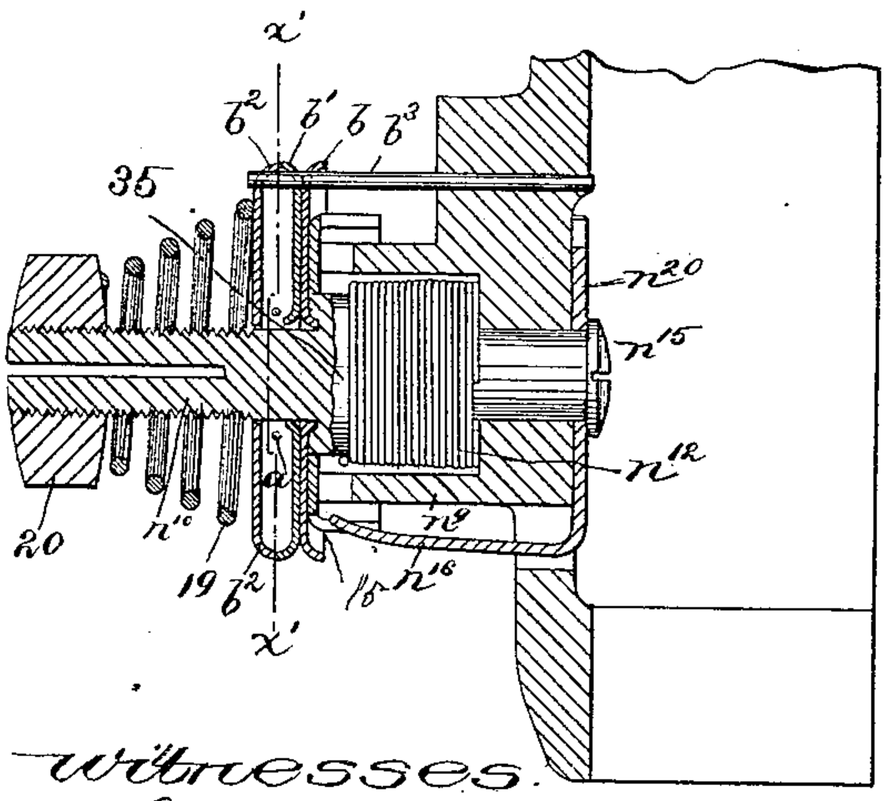


Fig: 3.

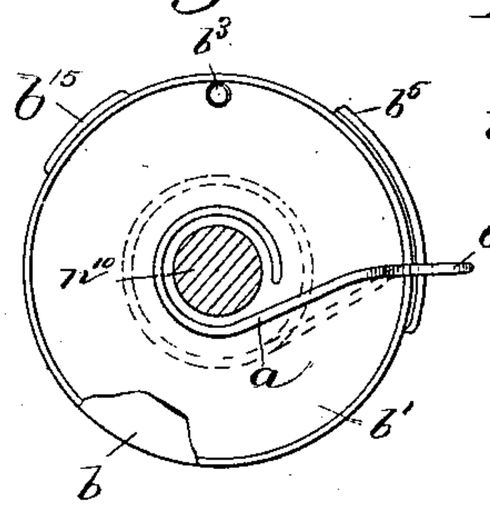
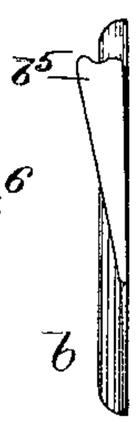


Fig: 6.



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UNITED STATES PATENT OFFICE.

WILBUR F. DIAL, OF BRIDGEPORT, CONN., ASSIGNOR TO THE WHEELER & WILSON MANUFACTURING COMPANY, OF SAME PLACE.

THREAD-CONTROLLING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 386,300, dated July 17, 1888.

Application filed August 15, 1887. Serial No. 246,996. (No model.)

To all whom it may concern:

Be it known that I, WILBUR F. DIAL, of Bridgeport, county of Fairfield, and State of Connecticut, have invented an Improvement in Tension and Thread Controlling Mechanism for Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve and simplify the tension and slack-thread controlling mechanism of sewing-machines, my invention being intended as an improvement on the apparatus described in United States application Serial No. 230,170, filed March 9, 1887.

In the practical use of the devices described in the said application difficulty has been experienced in the action, more especially of the slack-thread-controlling spring-arm, that arm when subjected to excessive strain, the wire of which it is composed being very light, being bent out of shape or drawn toward the face-plate, thus placing the eye of the thread-controlling spring out of its proper relation to the center line of the thread-tension mechanism which acts upon the needle-thread. To remedy this objection and prevent the possibility of straining the arm constituting the thread-controlling spring by the pull upon it of the needle-thread to such an extent as to alter the shape of the coiled part of the arm and thus impair its efficiency or alter its action upon the thread from what was intended, I have shaped the outer end of the said arm to embrace or engage a stud or projection located substantially in the line of the center of the coiled-spring portion of the arm, the outer end of the said arm co-operating with the said stud to form a "lock," as I determine it, for the outer end of the arm.

By confining the outer end of the arm the strain of the needle-thread upon the open loop or eye of the arm between its ends will not bend or strain out of position the coiled spring-like portion of the arm, and hence the arm acts uniformly.

Figure 1, in front elevation, shows the face-plate of a sewing-machine with my improved tension-device and slack-thread controlling-arm attached, the said figure also showing parts of the presser-bar and take-up. Fig. 2 is a section in the line x, Fig. 1; Fig. 3, a partial section in the line x', Fig. 2; Fig. 4, an inner side view of the lower end of the face-plate and attached parts, a pin supposed to be attached to the presser-bar being shown in section. Fig. 5 is a detail showing the stop 15 by itself. Fig. 6 is a view of one of the tension plates or disks with the lip, to be described. Fig. 7 shows by itself the spring-rest.

The face-plate p, held in place on the head of sewing-machines by a screw, as n^8, the presser-bar H, the extension p' of the face-plate slotted for the passage of the take-up m, the sleeve-like projection n^9 at the front side of the face-plate, the stud n^{10}, having an enlarged hub, as 35, the stud 26, projecting from the presser-bar and entering a slot in the toothed plate n^{21}, mounted loosely upon the screw-stud n^{22}, screwed into the rear of the face-plate, the toothed plate n^{20}, engaged by the toothed plate n^{21}, the screw-stud n^{15}, on which the toothed plate n^{20} is mounted, the finger n^{16}, extended from the toothed plate n^{20}, through a slot in the face-plate and entering a notch, 77, at the periphery of a stop, 15, having a shoulder, 12, the spring, and the nut 20 are all substantially as shown and described in the application referred to.

Instead of using a grooved wheel for part of the tension device, as in the said patent, I employ two independent thin plates or disks, b b', which are mounted loosely upon the screw-stud n^{10}, and are prevented from turning thereon by means of a pin or projection, b^3, herein shown as extended from the face-plate outwardly through holes made in the said plates or disks.

Outside the plate or disk b' is placed a concavo-convexed spring-rest, b^2, cut away for a portion of its periphery, as best shown in Fig. 7, so as not to interfere with the movement of the thread-controlling spring-arm, to be described. The plate or disk b^2 receives against it the inner end of the spring 19.

The tension on the needle-thread is regulated by rotating the nut 20. The application referred to shows a spring, n^2, which at its inner end is connected to a screw-stud, n^{10}, the opposite end of the spring being bent radially outward to form an arm, with a guide or eye

for the needle-threads, the normal tendency of the spring-arm being to bear against a shoulder of a stop, 15.

The needle-thread had to be introduced by a special operation into the said guide or eye, which special operation is herein avoided, for the needle-thread readily comes into the loop or eye of the thread-controlling arm on its way from the tension device to the take-up. Herein that portion of the wire n^{12} beyond its coiled portion resting upon the hub 35 is extended, as in the said application; but thereafter the said wire is bent to form and leave an open loop or eye, 6, and beyond said loop or eye the wire is carried back and bent about a stud located substantially at the center line of the coiled part of the said spring-arm to form a lock, the said backwardly-bent portions being represented as entering and moving in the open space between the outer concaved side of the plate or disk b' and the inner concaved side of the plate b^2. By this construction it will be seen that the thread-controlling arm is free to move under the strain of the thread; but the arm cannot be bent or strained toward the face-plate, so as to place the eye 6 out of its correct operative position, for the end of the wire of which the arm is made co-operating with the stud or screw referred to, prevents such strain of the spring-arm as to injure the coiled portion thereof.

The needle-thread, having been passed through the guide 28 at the top of the face-plate, is led down at the left-hand side of the tension device, between the flaring edges of the plates b b', and the operator, yet holding the thread between the fingers, pulls the same up at the right-hand side of the stud n^{10}, but between the tension-plates, until the thread bears against the under side of the loop 6 and carries it up until the thread slips into the groove in the top of the lip b^5. The strain on the thread is then relaxed, allowing the loop 6 to return to the position shown in Fig. 1. Thence the operator passes the thread into the usual eye of the take-up.

The lip b^5 may be omitted, if desired, for if the thread be passed directly from the tension-plates to the take-up the loop 6 will still exert a strain thereon; but preferably the thread will be passed over said lip in the manner described.

As the thread is passed about the tension device, as stated, and drawn up to the take-up, the thread also enters the loop or eye 6, thus leaving the spring-arm of the thread-controller bearing upon the needle-thread between the take-up and the tension device.

It is very desirable to have the needle-thread pass between the tension devices and emerge from between them under like circumstances, so I have added to the described mechanism a thread-arresting lip, b^5, (shown in Figs. 1 and 6,) the said lip applied to one member of the tension device projecting horizontally across the path of movement of the thread on its way to the take-up, the said lip being beveled, as shown in Fig. 6, so that as the needle-thread is drawn, as described, into the portion 6 of the thread-controlling spring-arm the needle-thread passes beyond and rests upon the said lip b^5, it serving as a point from which the thread-controlling arm draws upon the needle-thread on its way to the said arm forming the tension device.

The direction in which the spring n^{12} is coiled is such as to normally force the spring thread-controlling arm having the lip or eye 6 toward the shoulder 12 of the stop 15, the thread-controlling arm being drawn back from the said shoulder 12 more or less, according to the strain upon the needle-thread by the take-up, the latter being more or less according to the thickness of the material under the presser-foot.

Herein, as in the said application, as the material under the presser-foot increases in thickness the presser-bar is lifted, and through the pin or projection 26, toothed plates n^{21} and n^{20}, and finger n^{16} the stop 15 is turned to cause the shoulder 12 to lift the thread-controlling arm, more or less, thus winding the spring more closely upon the hub and limiting the length of the throw of the said arm.

I do not desire to limit my invention to a thread-controlling spring-arm shaped exactly as herein shown, for it is obvious that the outer end of the said arm might be otherwise constructed or shaped without departing from this invention, the gist of which is to confine not only the inner but also the outer end of the said spring-arm in place, so that the open loop part or eye 6 thereof, which receives the needle-thread, cannot be drawn upon with such force during the regular operations of the machine as to pull the outer end of the said spring-arm from the stud engaged by it in such manner as to materially alter the shape of the coiled part of the spring, and thus destroy its efficiency and change its action from that established for it.

Although I prefer to use the independent tension plates or disks b b', yet I desire it to be understood that the spring thread-controlling arm, constructed as herein described, might be used to advantage in connection with a solid tension-wheel, such as shown in the said application.

Referring to Figs. 1 and 3, the outermost disk or plate, b', is shown as provided with a lip, b^{15}, which extends across the path of the thread, the actuating end of the said lip b^{15} in practice keeping the thread descending from the eye 28 within definite bounds.

I claim—

1. The take-up for the needle-thread and a tension device, combined with a spring-actuated thread-controlling arm having an open eye, 6, between its ends, and at one end a lock, and a stud engaged by the lock to operate substantially as described.

2. The take-up for the needle-thread, a te-

sion device, and the lip applied to one member of the tension device, combined with the spring-actuated thread-controlling arm having an open eye, 6, between its ends, and at one end a lock, and a stud engaged by the lock to operate substantially as described.

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

WILBUR F. DIAL.

Witnesses:
ISAAC HOLDEN,
JOHN HOLDEN.