April 21, 1925. 1,534,264

R. L. HANSON

TENSION DEVICE FOR SEWING MACHINES

Filed Jan. 4, 1923

Fig. 2.

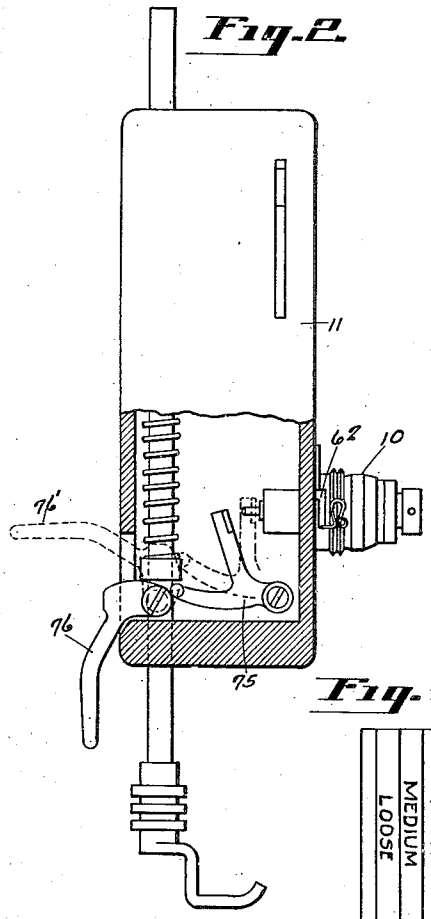


Fig. 1.

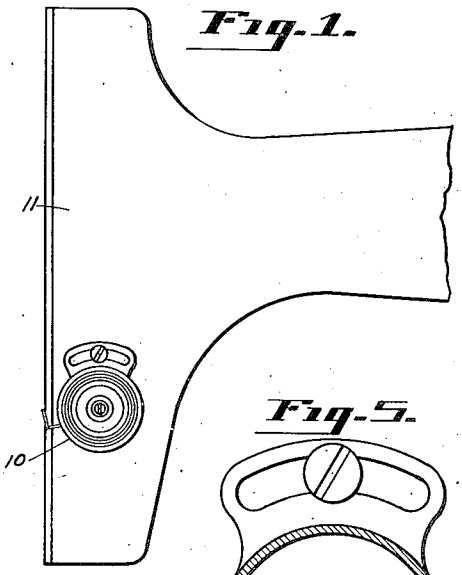


Fig. 5.

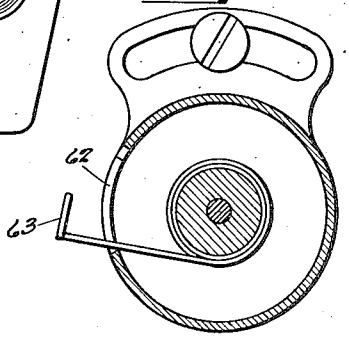


Fig. 4.

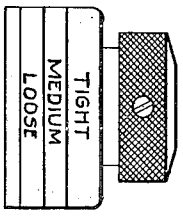


Fig. 3.

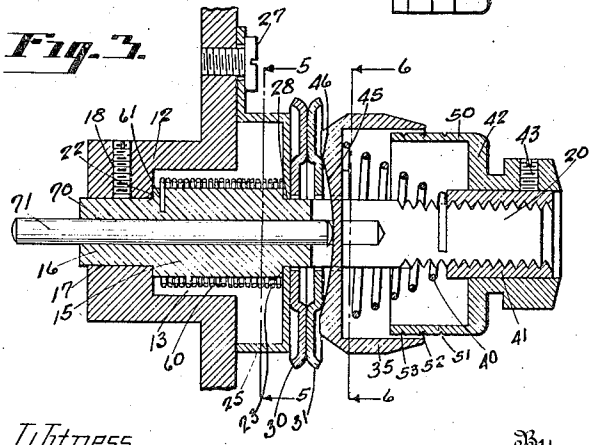
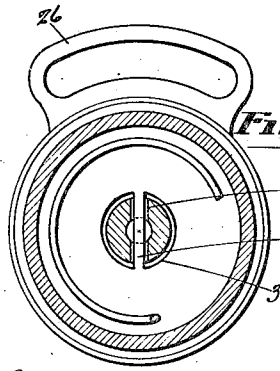


Fig. 6.



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Patented Apr. 21, 1925. 1,534,264

UNITED STATES PATENT OFFICE.

RODNEY L. HANSON, OF DAYTON, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NATIONAL SEWING MACHINE COMPANY, OF BELVIDERE, ILLINOIS.

TENSION DEVICE FOR SEWING MACHINES.

Application filed January 4, 1923. Serial No. 610,645.

To all whom it may concern:

Be it known that I, RODNEY LEO HANSON, a citizen of the United States of America, residing at Dayton, county of Montgomery, and State of Ohio, have invented certain new and useful Improvements in Tension Devices for Sewing Machines, of which the following is a full, clear, and exact description.

This invention relates to an adjustable tension device for sewing machines and the like.

In sewing different kinds of materials, over the ordinary range of work, threads of varying sizes are used. In order that the work may be properly done it is necessary that threads of different sizes be subjected to different tensions, and likewise it is necessary that in sewing materials of varying thickness and quality, different tensions shall be used.

One of the principal objects of this invention is to provide a tension device with means whereby it may be quickly and certainly adjusted to give a tension best suited for the particular class of work which is to be done; and which, when given a predetermined setting, will automatically accommodate itself to the varying conditions usually encountered over the ordinary working range of materials, etc.

Another object of the invention is to provide a device of this character which is so constructed that it may be always adjusted to give a predetermined tension.

Still another object of the invention is to provide a device of this kind which is simple and durable in construction, which may be readily assembled, and which, when assembled, is substantially dust and lint proof.

Other objects and advantages will be apparent from the description thereof set out below when taken in connection with the accompanying drawing.

In the drawing in which like characters of reference designate like parts throughout the several views thereof;

Fig. 1, which is diagrammatic in character, shows in side elevation a sewing machine head, having attached thereto the tension device forming the subject of this invention;

Fig. 2 is an elevational view, at right angles to the view of Fig. 1, with certain parts thereof shown in section to more clearly illustrate the invention;

Fig. 3 is a sectional view through the tension device;

Fig. 4 is an elevational view of one element of the tension device;

Fig. 5 is a sectional view along the line 5—5 of Fig. 3, looking in the direction of the arrows; and

Fig. 6 is a sectional view along the line 6—6 of Fig. 3 looking in the direction of the arrows.

As illustrated in Figs. 1 and 2 the tension device, which is designated generally by the numeral 10 is applied to the head 11 of the sewing machine. As shown it is mounted on the front of the head, but it may be mounted on the face plate or in any other suitable position. The front wall of the head of the machine, which receives the tension device, is extended inwardly, as shown in Fig. 3 by the numeral 12, to provide a socket, or pocket, adapted to receive the tension stud 15, the inner end 16 of which is of reduced diameter and is positioned within the passage 17 in the inwardly extending wall 12; being held in position by means of a set screw, or the like, 18. The outer end 20 of the tension stud 15 is also of reduced diameter, and is split, or slitted, throughout the greater part of its length to provide a slot designated by the numeral 21. As a result of the reduced diameter of the inner end 16 the tension stud has an abutment shoulder 22, which, when the device is assembled, rests against the bottom of the socket 13. And as a result of the reduced diameter of the outer end 20 the tension stud is provided with an abutment shoulder 23, against which rests an adjustable cup-shaped member or adjustment disc 25 which is provided with a slotted arm or extension 26, adapted to receive a set screw 27, which is threadedly mounted within the head of the machine. The construction and arrangement of these various parts is such that when the set screw 27 is adjusted to clamp the sleeve or adjustment disc 25 in any predetermined adjusted position, this sleeve will preferably seat against the shoulder 23.

This sleeve 25 of course has a centrally arranged opening 28 therein which will slidably receive the outer end 20 of the tension stud.

Mounted upon the outer end 20 of the tension stud are two tension discs 30 and 31, each of which has a centrally arranged opening or passage therein to receive the outer end of the tension stud. Each of these discs is substantially dish-shaped, their middle portions being bent away from each other to leave a recess between them when their opposite faces are engaged, while their peripheral portions are also bent in opposite directions so as to form a peripheral groove to readily receive the thread and guide it between these two members. Slidably mounted upon the outer end 20 of the tension stud is the tension sleeve 35, which is, as shown, cup-shaped and is provided with a centrally arranged passage 36, constructed to receive the outer end of the tension stud. A bar or pin 37 is diametrically arranged across the passage 36 and is of such proportions as to be readily received within the slot 21 in the outer end of the tension stud and to prevent relative rotation of the tension stud and the tension sleeve when the device is in assembled position.

As stated the tension sleeve is cup shaped, and is adapted to receive a helical spring 40, one end of which rests against the bottom of the socket or depression in the tension sleeve, while the other end is bent over to fit within the slot 21 and rests against one end of the sleeve 41, which is threadedly mounted upon the outer threaded end of the tension stud, and which, together with the member 42, which rotatably receives the sleeve 41, constitutes the tension stud nut. A set screw 43 is provided for locking the sleeve 41 and the member 42 in any desired positioning relative to each other, and when locked in position by means of the set screw 43 these two members together function as an adjusting nut for varying the tension of the spring 40, to in turn vary the pressure of the discs 30 and 31 upon each other. By rotation of the adjusting nut to move it along the tension stud the tension of the spring 40 may be varied as desired. The inner face of the tension sleeve 35 is provided with a concave socket 45, the depth and curvature of this socket being such that line contact is secured between the tension sleeve and the tension disc 31, as indicated by the numeral 46, this construction permitting slight rocking of the tension discs under very light tension to insure proper feeding of the thread. This construction is not absolutely essential but is preferable. The member 42 is provided with a rearward extension or circular flange 50, which is of such dimensions that it extends rearwardly into the open end of the socket within the tension sleeve 35. This extension or flange is provided with a plurality of circumferential lines or grooves, which cooperate with the free end of the tension sleeve to serve as indicating marks. Preferably, as shown, three of these indicating lines or grooves are provided which are designated respectively by the numerals 51, 52, and 53, and as shown in Fig. 4, the outer of these lines, that designated by the numeral 51, preferably has as an indicating mark accompanying it the word "Tight," while the lines 52 and 53 preferably have the words "Medium" and "Loose" accompanying them, respectively, as indicating marks.

For ordinary work, with the usual weight of cloth, and the usual size thread, the tension device should be adjusted to the "medium" position, the position shown in Fig. 3. When thus adjusted the device will automatically take care of any ordinary variations in thickness of cloth and size of thread. If, however, the thread and material which are being used are such that the tension is too loose, then the adjusting nut should be rotated to move it inwardly along the tension stud to increase the tension upon the spring 40 and thus increase the pressure upon the tension discs 30 and 31. If the tension is too tight, then the adjusting nut should be rotated to move it outwardly along the tension stud to decrease the tension of the spring 40 and thus decrease the pressure upon the tension discs 30 and 31. After the various elements of the tension device are once properly adjusted for a given spring a given predetermined tension should always result from the same setting of the adjusting nut. But if the physical characteristics of the spring should vary, or if it should become necessary to put in a new spring then positioning the adjusting nut in a predetermined position might not give the desired tension upon the thread. Under such circumstances, by loosening the set screw 43, the member 42 may be adjusted upon the sleeve 41 so that the indicating marks 51, 52 and 53 will properly indicate the actual tension.

Mounted upon the tension stud, within the space formed by the socket 13, and the interior of the adjustment disc 25, is an intermediate take-up spring 60, one end of which is fastened to the tension stud, preferably by bending that end over and inserting it into a socket in the stud, as indicated by the numeral 61, the other end extending outwardly through an L shaped slot 62, in the adjustment disc, and having a loop 63 thereon, to receive the thread, and take up the slack in the thread that occurs during a certain part of the stitch. In order to effect proper adjustment of this take up spring, and secure proper tension thereof the adjustment disc 25 is provided with a slotted extension 26, which as described above, receives the set screw 27. By loosening the set screw 27 this disc may have its position varied to give any desired travel to the take

up spring. As shown the disc 25 is adjusted with the set screw at substantially midway position in the slot of the extension 26. Moving this adjustment disc so as to bring the set screw closer to the right hand end of the slot in the extension 26 would obviously decrease the travel of the take up spring while swinging it in the opposite direction would increase the travel of that spring. For adjustment of the take up spring tension, the set screw 18 may be loosened so that the tension stud may be rotated relative to the adjustment disc to effect the desired tensioning.

The tension stud is provided with an axially arranged passage 70 therein, within which is positioned a slidable pin 71, the outer end of which rests against the cross bar 37, while the inner end extends inside the head of the machine, and is positioned to cooperate with one end of the forked tension release lever 75, which is in the shape of a bell crank lever, the other end of which cooperates with the presser bar lifter 76, the construction being such that when the presser bar lifter 76 is moved upwardly, to the position shown in dotted lines and indicated by the numeral 76′ to lift the presser bar and release the work, then the lever 75 will be actuated to bring one end thereof against the inner end of the pin 71 and force the outer end forward, carrying the tension sleeve 35 with it, along the tension stud, to thus compress the tension spring 40 and relieve the tension discs 30 and 31 from all pressure, to freely release the thread.

The construction shown is such that the thread take up spring and the tension spring are both completely enclosed so that they are inaccessible to dust, lint and the like; and will therefore function freely.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A tension device, for sewing machines and the like, comprising a stud; a thread take up spring surrounding said stud, a cooperating adjustment disc mounted upon said stud and enclosing the said take up spring; cooperating tension discs loosely mounted upon said stud, one of which seats against said adjustment disc; a sleeve mounted on said stud and seating against the other of said tension discs, a nut adjustably positioned on the stud, said nut having a circular flange constructed to extend into the said sleeve, and a spring surrounding the stud and positioned within the said sleeve and the circular flange of the nut, the one end bearing against the sleeve and the other end against the nut, and tension indicating marks on the flange of the adjustable nut.

2. A tension device, for sewing machines and the like, comprising a stud; a thread take up spring surrounding said stud, a cooperating adjustment disc mounted upon said stud and enclosing the said take up spring; cooperating tension discs loosely mounted upon said stud, one of which tension discs seats against said adjustment disc; a sleeve slidably mounted on said stud and seating against the other of said tension discs, a nut threadedly mounted on the stud, said nut having a circular flange constructed to extend into the said sleeve, a plurality of circular indicating marks upon said nut positioned for cooperating with the outer end of the said sleeve; and a spring surrounding the stud and positioned within the said sleeve and the circular flange of the nut, one end of said spring bearing against the nut and the other against the said sleeve to exert pressure upon the cooperating tension discs, the construction being such that manipulation of the nut will cause varying of the pressure of the two tension discs one upon the other; the indicating marks upon the circular flange of the nut indicating the desired tension of the spring to give the desired pressure upon the tension discs.

3. A tension device, for sewing machines and the like, comprising a sewing machine head, a stud mounted upon the said head; a thread take up spring surrounding said stud, a cooperating adjustment disc mounted upon said stud and enclosing the said take up spring, said adjustment disc having an L shaped slot therein receiving one end of the take up spring, an extension carried by said disc and having an arcuate shaped slot therein, a set screw extending through said arcuate shaped slot and threadedly mounted within the sewing machine head, and constructed for positioning to lock the adjustment disc in desired position; cooperating tension discs mounted upon said stud one of which seats upon said adjustment disc; a sleeve mounted on said stud and seating against the other of said tension discs, a nut adjustably positioned on the stud, said nut having a circular flange constructed to extend into the said sleeve; and a spring surrounding the stud and positioned in the said sleeve and the circular flange of the nut, with one end bearing against the sleeve and the other end against the nut.

4. A tension device, for sewing machines and the like comprising, a sewing machine head; a stud adjustably mounted upon said head, means for locking said stud in position relative to said head; a thread take up spring surrounding said stud, a cooperating adjustment disc mounted upon said stud and enclosing said take up spring; cooperating

tension discs loosely mounted upon said stud, one of which seats against said adjustment disc; a sleeve mounted on said stud and seating against the other of said tension discs, the said sleeve and cooperating tension disc being in line contact with each other, to permit slight rocking of the discs during operation; a nut adjustably positioned on the stud, said nut having a circular flange constructed to extend into the said sleeve, and a spring surrounding the stud and positioned within the said sleeve and the circular flange of the nut, with one end bearing against the sleeve and the other end against the nut.

In testimony whereof I hereto affix my signature.

RODNEY L. HANSON.

Witnesses:
H. G. DUERR,
L. G. THOMASSEN.