No. 829,406. PATENTED AUG. 28, 1906.

H. W. LARSSON.

THREAD TENSIONING AND REGULATING DEVICE.

APPLICATION FILED SEPT. 10, 1903.

Fig. 1.

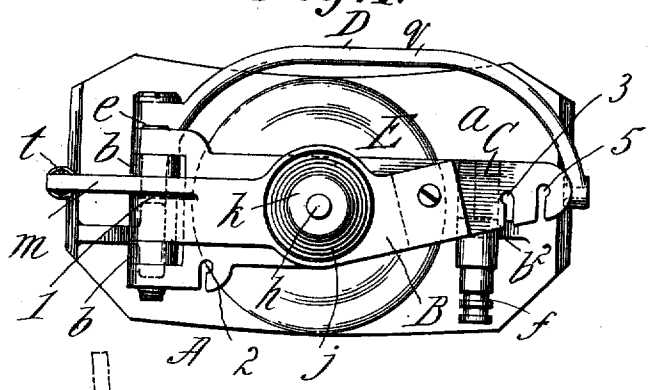


Fig. 2.

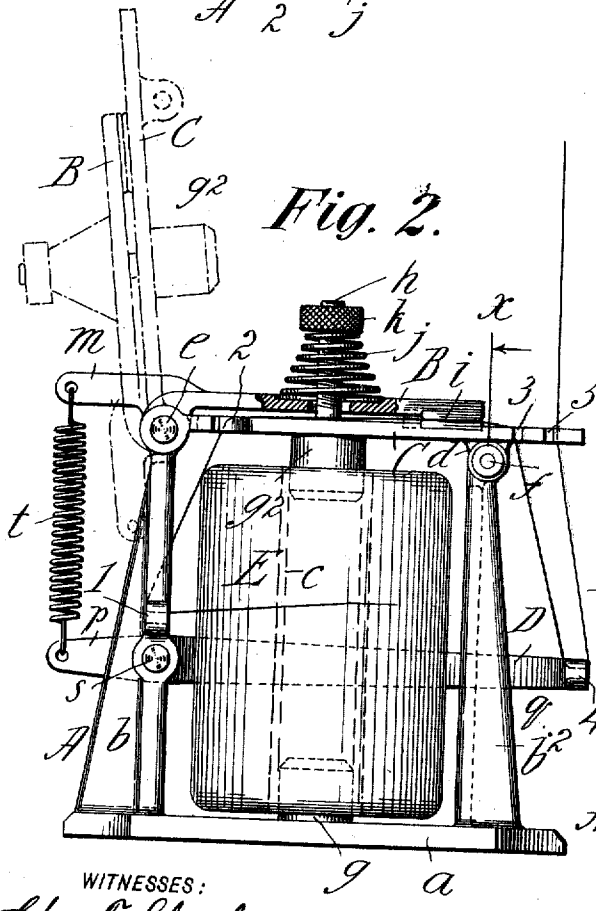
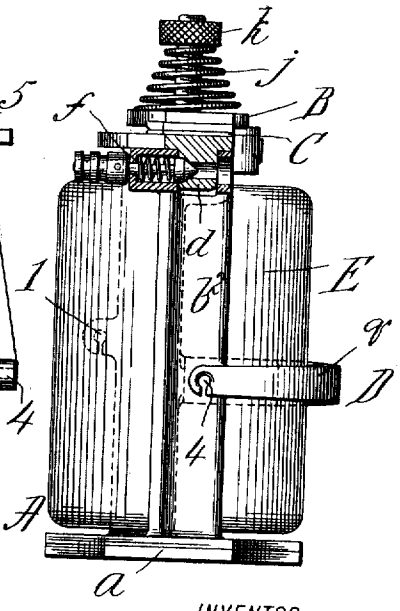


Fig. 3.



WITNESSES:

Chas. F. Schuelz

J. D. Garfield

INVENTOR,

Henry W. Larsson,

BY

Wm. J. Dillon,

ATTORNEY.

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY W. LARSSON, OF SPRINGFIELD, MASSACHUSETTS.

THREAD TENSIONING AND REGULATING DEVICE.

No. 829,406. Specification of Letters Patent. Patented Aug. 28, 1906.

Application filed September 10, 1903. Serial No. 172,684.

To all whom it may concern:

Be it known that I, HENRY W. LARSSON, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Thread Tensioning and Regulating Devices for Braiding-Machines, of which the following is a full, clear, and exact description.

This invention relates to a device for tensioning and regulating a thread running from a ball, spool, bobbin, or other form of thread-supply to the place whereat it is utilized—as, for instance, at the braiding-point in a braiding-machine.

The object of the invention is to produce a device of the character indicated of such construction and nature that it will be efficient at all times in the performance of its work with little liability of derangement, the construction thereof involving but few parts, which are of simple character and susceptible of cheap production.

A peculiarity of the present improved device is found in clamping members, one of which is spring-pressed yieldingly against the other, and between which members the thread is drawn subject to the pressure thereof, together with a guiding and take-up lever for the thread additional to said clamping members, with which the running thread engages, and so operative relatively to the yielding one of said clamping members that in case of a lump or inequality in the thread running through its guiding-eye a greater or less degree of swinging movement will be imparted thereto, which through a proper manner of medium of connection between the thread-guiding and take-up lever and the movable one of the clamping members becomes effective on the said movable clamping member to reduce the pressure bearing thereof against the thread in proportion as the pressure bearing or tension of the thread on the guiding and take-up lever becomes increased, it being understood, on the other hand, that should a greasy or unusually smooth or thin portion of the thread be in passing engagement with and in tension on the guiding and take-up lever such tension reduction thereat will cause a correspondingly-increased clamping pressure or tension on the thread at its portion which is between the clamping members.

The invention consists, in a thread regulating and tensioning device, of two clamping members, between which the thread may be passed subject to the yielding pressure of the one against the other, a spring for imparting the yielding pressure of the one against the other, a thread guiding and take-up lever pivotally mounted adapted to swing against a medium of yielding resistance in one direction and operable when swung against its yielding resistance by reason of a variable tension imparted thereagainst by the running thread upon the spring-pressed thread-clamping lever to reduce the pressure of such lever against the thread running between it and its fellow member; and the invention furthermore consists in certain specific constructions and arrangements of the parts to constitute the tensioning and regulating device, as hereinafter described and specified.

In the drawings, Figure 1 is a plan view of the device. Fig. 2 is a side view of the same, an intermediate portion of the spring-pressed thread-clamping or pressure member being shown in section. Fig. 3 is an end elevation, some of the parts being shown in vertical section as taken on the plane indicated by the line *x*, Fig. 2.

Similar characters of reference indicate corresponding parts in all of the views.

In the drawings, A represents the supporting structure of and for the device, the same comprising a flat base *a* and separated uprights *b* and b^2.

B and C are the thread-clamping members.

D is the thread guiding and take-up lever, and E indicates a ball of thread in a form convenient for employment in conjunction with the present improved device, the thread making such ball being wound in approximately cylindrical form about a tubular core *c*, which may advantageously be of pasteboard.

The left-hand upright *b* has a thread-guiding eye *l* between its top and bottom. The member C is hinged at *e* to an upper portion of the upright *b*, and its opposite end portion has a depending ear *d*, adapted to fit down between bifurcated portions of the other upright b^2, such upright being provided with the spring catch-bolt *f*, adapted to engage and lock into a socket therefor horizontally in said depending ear *d* of the member C and to be disengaged to permit the said hinged

member C to be upwardly swung for the purpose of placing and confining the ball of thread in its place, as indicated.

The base *a* of the support has a centrally-located upstanding stud *g*, and the member C has a depending stud g^2 in position to aline with the stud *g*, both said studs engaging into the tubular core of the thread ball. The said member C is intermediately of its length constructed or provided with an upstanding screw-threaded post *h*.

The other member B of the thread-pressure device is shown as pivotally connected for a swinging movement against and away from the member C, the pivot in the present instance being shown as in axial coincidence with the hinge-axis for the part C. The said lever member B has at its free extremity the foot or bearing portion *i* of slight depth for bearing by its under face against the top of member C. Said lever member B is centrally apertured to enable the aforementioned threaded post *h* to protrude freely therethrough and upwardly above member B, said post being encircled by a spiral spring *j*, which is built up in conical form, its base resting on the top of the member B, while the nut *k* by being screwed down on the post more or less places the lever member B under the yielding resistance, which may be regulated by the positioning of the nut. The lever member B has the outwardly-extended arm *m*. The normally stationary member C of the clamping device has an eye for the thread guidance, as indicated at 2, between the hinged point and the bearing-foot *i*, and it has thread-guiding eyes 3 and 5 at its extremity beyond the bearing-foot *i* and relatively opposite from the location of the guiding-eye 2.

The thread guiding and take-up lever D is pivotally mounted at *s* in the upright *b*, the line of the pivot-axis being below and parallel with the axis of the hinge for the member C, said lever comprising the arm or member *q*, of considerable length and of bowed form, as shown, having the thread engaging and guiding eye 4 and the arm or extension *p* projecting outwardly beyond the pivot in the opposite direction from the general length of the bowed member *q* and under the lever extension *m* of the member B, and a spiral spring *t* is interposed between the lever extensions *m* and *p*, in tension by reason of being somewhat stretched and connected to said parts *m* and *p*.

In its normal condition the device has the spring *j* maintained by the nut *k* under a degree of compression which the slight reaction of the spring *t* will not overcome, whereby the bearing of the clamping member B against its companion member C will be continuous; but it will be understood that this degree of pressure bearing will be modified subject to stresses transmitted through the medium of connection between the thread guiding and take-up lever and the lever member B, constituted by the interposed and connected spring *t*. For instance, assuming that a thick, lumpy, or rough portion of the thread, the course of which from the ball is seen to be first through the guiding-eye 1 to and through the guiding-eye 2, to and along the top of member C, and under lever member B, and between member C and the bearing-foot *i* of member B, thence downwardly through guiding-eye 3 to engagement in and through the guiding-eye thereunder in the take-up lever, and thence returning upwardly through the guiding-eye 5 in the stationary plate C, which is located adjacent the aforementioned guiding-eye 3 therein, is in running contact through the eye-ended portion of the take-up lever, causing the long-bowed arm thereof to be upwardly swung more or less, the left-hand lever arm extension *p* will be correspondingly downwardly swung, drawing on the spring *t*, with a result to exert a stress against the thread-clamping member B in a direction tending to raise the thread-bearing foot from the member C and relieving the clamping pressure on the thread next thereunder proportionately to the increased tension operable on the take-up lever, it being understood that usually in practice the differences in tensions at the points *i* and 4 do not result in actually lifting the foot *i* away from its bearing against the thread running thereunder, but gradually varies the pressure of such bearing, and, on the other hand, in case the portion of the thread which is running through the eye 4 of the take-up lever is greasy, abnormally thin, or smooth, so that the tension on the take-up lever exerted by the running thread in the upward direction thereagainst becomes decreased, so that relatively the long arm swings downwardly, the lever extension-arm *p* will have a degree of movement upwardly, relieving the tension on spring *t* and lessening the stress exerted against clamping member B, opposed to its compression-spring *j*, resulting in enabling said spring *j* to exert its maximum reaction to cause the clamping-lever B to exert a more forcible pressure against the thread running thereunder, it being manifest that the device is automatically equalizing in its action at all times.

This device is particularly well adapted for employment, duplicated or in series, in conjunction with a revoluble thread-carrier and with thread-guides which have reciprocatory movements, in a braiding-machine—such, for instance, as the one shown and described in my application for Letters Patent of the United States, filed of even date with this application, under Serial No. 172,685—it being appreciated that the take-up lever D will acquire vibratory movements in rapid

succession in conjunction with the movements of the thread guides or carriers, which cause reversals or alternations in the braiding-machine of one set of the threads therein with the other set in the usual operation of plaiting or braiding, such lever D having the bowed arm thereof swinging downwardly every time the motion of the guiding thread-carrier of the braiding-machine has such movement as to cause a slackening in the thread at the portion thereof above the lever D.

By making the long arm *q* of the lever D of the bowed form shown ample space for occupancy of the thread ball or supply is insured without such thread-supply interfering with the freedom of movement of the lever.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a tensioning and regulating device for thread, in combination, a support for the spool or ball of thread, parts between which the thread passes subject to pressure, one of said parts consisting of a pressure-lever having a bearing against the other, and having means for imparting a yielding pressure thereto, another lever adapted to be engaged by the running thread, connected with the lever member of said thread-pressure parts, and swinging in one direction against a yielding resistance, and operative, when swung against such yielding resistance by the action of the running thread, to lessen the pressure of said pressure-lever against the part with which it coacts, for the purposes set forth.

2. In a tensioning and regulating device for thread, in combination, a support for the spool or ball of thread, having a thread-guide, members between which the thread passes subject to pressure, one thereof consisting of a lever pivoted to said support having a bearing against the other adjacent part, which other adjacent part has thread-guides at opposite points relatively to the thread-bearing place, and means for imparting a yielding pressure to said pivoted lever member, another lever having a t hread-guide, to be engaged by the running thread, having a connection with the lever member of the thread-pressure parts, swinging in one direction against a yielding resistance, and operative, when swung to lessen the bearing pressure between said pressure members, for the purposes set forth.

3. In a tensioning and regulating device for thread, in combination, members between which the thread may pass subject to a yielding pressure, one of said members consisting of a pivoted lever bearing against the other member and provided with an extension-arm, a spring reactive against said pressure-lever, for forcing it yieldingly against the member adjacent thereto, a second lever pivotally mounted, having a thread-guiding eye, and an extension-arm, and a spiral spring connected to the extension-arms of both said levers.

4. In a thread tensioning and regulating device, in combination, a support for a spool or ball of thread, having a thread-guide 1, two clamping members between which the thread may be passed subject to the yielding pressure of the one against the other, and a spring for imparting the yielding pressure of the one against the other, a thread guiding and take-up lever, having a guide 4 at its one extremity, having a spring connected at its other extremity and to the yieldingly-movable one of said clamping members, and operable on the spring-pressed clamping-lever by a variation of the thread tension to vary the pressure of the clamping-lever against the thread running between it and its fellow member, and the one of said clamping members against which its fellow member yieldingly coacts having thread-guides 2 and 3 oppositely located relatively to the thread-clamping point.

5. In a tensioning and regulating device for thread, in combination, members between which the thread may pass subject to a yielding pressure thereof, one of said members having a screw-threaded post, and the other of said members consisting of a lever pivotally mounted and having a portion thereof arranged for bearing against the post-provided member, and having an extension-arm, a spring embracing said post and bearing against the lever member, a nut on the post and regulating the compression of said spring, a thread guiding and take-up lever, pivotally mounted, and having an extension-arm, and a spiral spring connected to the extension-arms of both said levers, and normally under a less degree of tension than that exerted by the first-named spring to maintain the thread-clamping members the one yieldingly against the other.

6. In a thread tensioning and regulating device, two clamping members between which the thread may be passed subject to the yielding pressure of the one against the other, a spring for imparting a yielding pressure of one of said members against the other, a thread-guiding and take-up lever, pivotally mounted, means for imparting a yielding resistance thereto, and said take-up lever being connected with the spring-pressed thread-clamping member, for the purposes set forth.

7. In a thread tensioning and regulating device, in combination, a support comprising a base having an intermediately-located upstanding stud and having separated uprights, two clamping members, one thereof being hinged to an upper part of one of said uprights, and provided with a depending stud arranged for alinement with said upstanding

stud, and a catch for detachably locking the hinged member to the other of said uprights, and the other clamping member consisting of a lever pivotally mounted and arranged to swing relatively to the first-named clamping member and to bear thereagainst, a spring for imparting a yielding pressure thereto, and an outwardly-projecting extension-arm on said lever, a thread guiding and take-up lever, pivotally mounted on one of said uprights below said clamping members and having an outwardly-projecting extension-arm, and a spiral spring connected to and in tension between the outwardly-projecting arms of both of the levers, for the purposes set forth.

Signed by me at Springfield, Massachusetts, in presence of two subscribing witnesses.

HENRY W. LARSSON.

Witnesses:
WM. S. BELLOWS,
A. V. LEAHY.