J. O. McKEAN.

TENSION DEVICE.

APPLICATION FILED DEC. 26, 1911.

1,024,800. **Patented Apr. 30, 1912.**

Fig. 1.

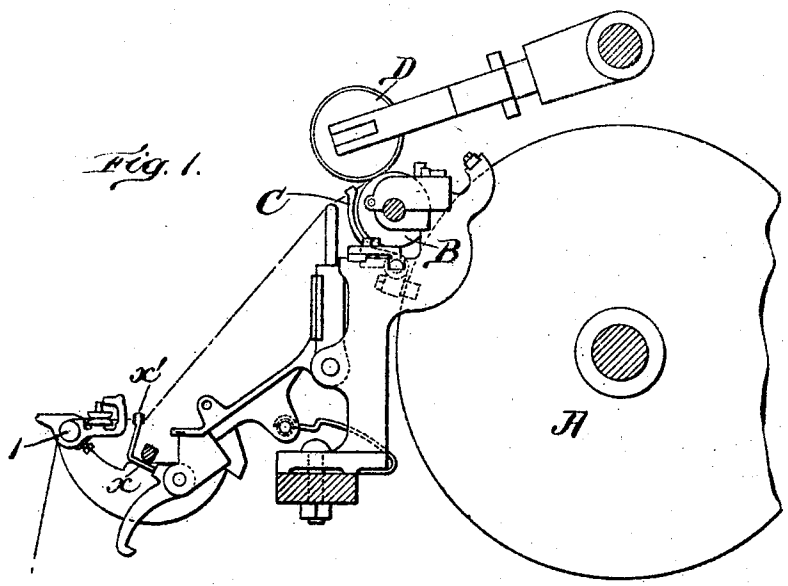


Fig. 2.

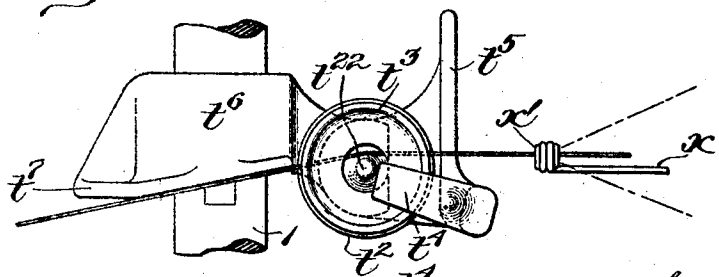


Fig. 4.

Fig. 3.

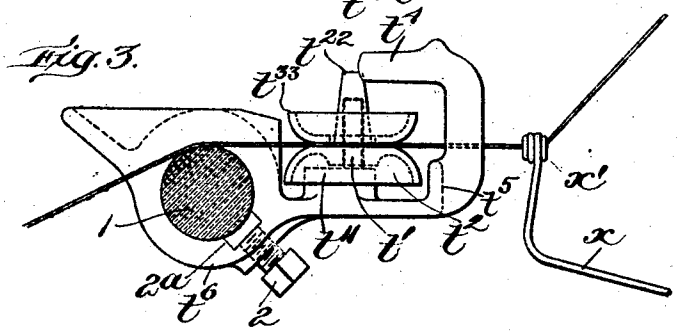
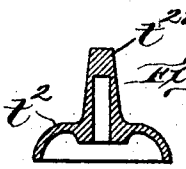


Fig. 5.



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UNITED STATES PATENT OFFICE.

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TENSION DEVICE.

1,024,800. Specification of Letters Patent. Patented Apr. 30, 1912.

Application filed December 26, 1911. Serial No. 667,854.

To all whom it may concern:

Be it known that I, JOHN O. McKEAN, a citizen of the United States, residing at Westfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Tension Devices, of which the following is a specification.

This invention is a tension device designed to give an appropriate tension to a quickly moving thread in a winding machine and consists essentially of a lower member, having an axial perpendicular projection, revolubly mounted, and an upper member in the form of a washer mounted upon the axial projection of the lower member.

In the drawings: Figure 1 shows my new tension device applied to a winding machine; Fig. 2 is a plan view on an enlarged scale of my improved tension device; Fig. 3 is a side elevation of the device shown in Fig. 2; and Figs. 4 and 5 are central longitudinal sections of the preferred form of the upper and lower tension members respectively.

In the practical working of tension devices several difficulties occur, among which are the cutting of the friction surfaces of the tension device by the rapidly moving thread, under pressure; the clogging of the device by the deposit of grease from the thread; the clogging of the device by the deposit of lint from the thread when the thread is a scoured or dry thread; and the difficulty caused by the suddenly increased drag upon the thread caused by knots or the like passing into the tension device, when the members are held in fixed relationship or with a steady pressure.

It is the object of my invention to produce a device which will have none of the defects above enumerated and which will be efficient in the performance of its tensioning function.

My device is applicable to various forms of winding machines and in the drawings I have shown it as applied to a winding machine such as is shown in my United States Letters Patent, No. 952,015. I have indicated, in order to show the organization and relation of the parts, the cam drum A, the driving drum B, the thread guide C and cop D of this machine.

Mounted upon the rod 1 in front of the machine is the tension device, which is adjustably secured upon the rod 1 by a set-screw 2 so that it can be moved, if desired, longitudinally of the rod. The rod 1 is preferably of glass or of metal with a surface of vitrified material, and when such a rod is employed a disk 2^a of leather, rubber or the like is interposed between the end of the set-screw 2 and the surface of rod 1. The tension device is made up of a table t^{11} and a pivot t^1, shown in dotted lines in Fig. 3, a lower tension member t^3, t^{22}, mounted thereon, an upper member t^2 mounted upon the part t^3, and in the preferred form shown in the drawings, a guard member t^4, and a guide member t^5. The parts are supported upon a casting t^6 bored to be mounted upon rod 1 and secured in place by set-screw 2 or other means. This casting is provided with the usual horn t^7 to guide the thread on its passage from the source of supply to the tension device. It will be observed that the tension device is set to one side of a direct line from the source of supply to the eye of the drop lever x, the object being to insure that the thread shall always tend to draw into the tension device (see Fig. 2).

The member t^2 is shown in Figs. 2 and 3, its inner surfaces being indicated by dotted lines and in section in Fig. 5. It will be observed that it is made up of a dished, hollow member having a conical, hollow, axial extension t^{22}.

The part t^3 is shown in Figs. 2, 3 and 4. Part t^3 is a dished hollow member having an axial perforation somewhat larger than the base of the conical part t^{22} and designed, in use, to be mounted upon a conical extension t^{22}, as shown in Figs. 2 and 3.

The supporting casting t^6 being mounted upon the rod 1 and secured in the desired position, the tension device is assembled by placing part t^3 upon the guard t^4 and then placing part t^2 over the table t^{11}, the dished lower part covering the table t^{11} and the member t^2 pivoting upon the upper end of a spindle t^1. The table t^{11} is designed to fit loosely within the hollow of the member t^2 when the member t^2 is pivoted on spindle t^1, so that any aberration in the motion of that part will bring its inner surfaces into contact with table t^{11} and check the swing by the frictional contact. The part t^2 is now shifted along the guard and deposited upon the part t^{22} with its convex side down. The thread is laid through the device, the horn

t^7 serving as a guide and the guide bar t^5 upon the other side guiding the thread between the disks. The guard t^4 projects close to the upper end of t^{22} so that the part t^3 cannot be accidentally displaced, nor the parts disassembled without the deliberate action of the operator by passing the disk t^3 onto the guard t^4 and then removing the part t^2 from the spindle, which being done, the part t^3 may be removed from the guard. The effect of this is that when the parts are assembled in the proper order as above directed, the guard serves to lock the parts in their proper organization.

The operation is as follows: The thread having been laid from the supply, through the tension device to the eye x' of drop bar x and thence to the thread guide C and cop D, the machine is started and the thread, owing to the fact that the tension device is a little to one side of the supply, draws toward the base of the conical extension t^{22}, the upper tension member t^3 resting on the thread and pressing it upon the lower member t^2. The draft of the thread will rotate the two tension members t^2 and t^3, and, if the draft on the thread tends to exceed the maximum desired (which is determined by the weight of the upper member t^3) the inward pull of the thread against the conical base of extension t^{22} will cause the thread to ride up slightly upon the conical base of extension t^{22}, thus wedging upward momentarily the upper tension member t^3 and relieving tension. The passage of a knot through the device does not increase tension on the thread to the breaking point, as the easy entrance to the device formed by the curved surfaces of the two tension members, permits the knot to wedge them apart and the knot passes without trouble. By the rotation of the parts the abrasive action of the thread is distributed equally over the tension surfaces and the formation of grooves prevented, while the same rotation prevents the laying of grease in ridges alongside the traveling thread as may happen in tension devices in which the lower member is fixed, since the thread by the rotation of the lower member continually sweeps and cleans every part of the upper surface of the lower member, thus cleaning and preventing the accumulation of grease in ridges to interfere with the pressure of the upper member upon the thread. When scoured or dry yarn is carried through the tension device, lint and the like which it carries, as it is removed from the yarn by the action of the tension members, collects upon the extension t^{22} and tends to wind about it as it revolves and owing to the conicity of extension t^{22}, this lint and fiber quickly works upward toward the small end of the taper, where it is easily removed by the attendant when it does not remove itself and thus does not accumulate in the tension device to clog and interfere with its action. The eye of the drop bar x is preferably formed with a porcelain bushing indicated at x'.

In the machine to which my tension device is shown as applied in the drawings, the bracket which carries the rod 1 and the tension device is designed when necessary to be dropped, and for this reason the feature of my device which prevents the escape of the part t^3 is especially useful, and it is further useful since the upper member cannot under any conditions of service or accident be thrown from its place.

I claim:

1. In a tension device, a support for the parts, a vertical pin mounted thereon; a tension disk having a hollow axial extension, extending upward, by which it is mounted and balanced upon the pin; a second tension disk having an axial perforation by which it is mounted upon the conical, axial extension, all combined and operating substantially as described.

2. In a tension device, a support for the parts; a vertical pin mounted thereon; a tension disk having a hollow outwardly conical axial extension extending upward by which it is mounted and balanced upon the pin; a second tension disk having an axial perforation by which it is mounted upon the conical axial extension, all combined and operating substantially as described.

3. In a tension device, a support for the parts; a vertical pin mounted thereon; a tension disk having a hollow outwardly conical axial extension extending upward by which it is mounted and balanced upon the pin; a second tension disk having an axial perforation by which it is mounted upon the conical axial extension and a guard extending over the conical axial extension to retain the parts against accidental displacement, all combined and operating substantially as described.

Signed by me at Westfield, Massachusetts, this 20th day of December, 1911.

JOHN O. McKEAN.

Witnesses:
LESTER CAMPBELL,
ALICE C. BREEN.