

APPLICATION FILED JULY 13, 1910.

Patented July 8, 1913.

2 SHEETS--SHEET 1.



G. P. Kramer

INVENTOR:
Class Ryden
 BY *Foster Freeman Watson & Co.*
 ATTORNEYS

1,066,849.

WITNESSES

C. S. Brown,
 & P. K. Kinner

INVENTOR:
Clas Ryden
 BY *Foster Furman & Co*
 ATTORNEYS

UNITED STATES PATENT OFFICE.

CLAES RYDEN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO UNIVERSAL WINDING COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE.

TENSION DEVICE.

1,066,849.

Specification of Letters Patent.

Patented July 8, 1913.

Application filed July 13, 1910. Serial No. 571,763.

To all whom it may concern:

Be it known that I, CLAES RYDEN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Tension Devices, of which the following is a specification.

My invention relates to improvements in tension-devices for applying tension to running yarns or threads, and particularly to such devices having comb- or grid-shaped members provided with series of fingers or bars across which the thread draws in a sinuous course to apply resistance to its draft.

The object of my improvement is to provide a device of this sort which will be proof against wear or deterioration from the effect of the constant friction of the thread drawing across the tension-members. With this object in view I make the fingers or bars of the members of vitreous material, such as porcelain or glass, for instance, and my invention discloses a novel method of applying the wear-resisting material to the tension elements.

The invention is fully set forth in the following specification, illustrated by the accompanying drawings, in which:—

Figure 1 is a side elevation of my improved device assembled on its bracket; Fig. 2, a plan view of the same; Fig. 3, an end elevation looking in the direction indicated by the arrow *x*, Fig. 1, part sectional on the line *z-z*; Fig. 4, a plan view of one of the tension members removed from the device.

As shown in the drawings the tension-device consists essentially of two grid-like elements or members T and T', each constructed with a series of parallel bars *t* and *t'* and arranged opposite each other with the bars disposed alternately, see Fig. 3. Preferably, the tension-member T is hinged on its bearings in the bracket B to adapt it to swing toward and away from the member T', which is fixed on its bearings, and suitable means are provided to apply pressure to the swinging member to adapt it to bear on the thread or yarn *y* as the latter draws between the two members.

The grid-members T and T' are formed with parallel uprights *t*², *t*³ and *t*⁴, *t*⁵ constructed of sheet metal and arranged to support the horizontal bars *t* and *t'*. The rear

uprights *t*² and *t*⁴ have ears *t*⁶, *t*⁷ and *t*⁸, *t*⁹ at the top and bottom, preferably formed by bending back the stock at right angles to the main portions. These ears are pierced with holes *t*¹⁰ through which extends a rod *r* supported in the lugs *b*, *b'* of the bracket B. The ears *t*⁶ and *t*⁷ serve as hinges for the member T, to adapt it to swing on the rod *r*, and the upper ear *t*⁸ is formed with an extension or arm *t*¹¹, see Fig. 4, which serves as a lever through which pressure is applied to operate the member. Any suitable means might be used to exert pressure on the member T, but I have preferred to show a cord *c* secured to the arm *t*¹¹, and led over the roll or pulley *p* on the bracket B. Fastened to the end of this cord is a rod *d* on which are mounted weights *w*, a suitable number of the latter being applied to give the proper pressure on the member T.

The ears *t*⁸ and *t*⁹ of the member T' are also held on the rod *r*, and to secure the member T' rigidly on the bracket B I provide a median support *t*¹² formed as an extension of the upright *t*⁴. The extension *t*¹² is slotted at *t*¹³ and a screw *s* extends through said slot and into the bracket B, see Fig. 1.

The outer uprights *t*³ and *t*⁵ of the members T and T' are bent or folded longitudinally in angle form, as shown particularly in Fig. 2. This V-shaped section gives strength and rigidity to the structure and also provides a further advantageous feature as follows: When the two members are assembled on the frame B the outer wings *t*¹⁴ and *t*¹⁵, see Fig. 2, flare out away from each other and form a V-shaped trough or guideway, which serves to assist the thread or yarn in entering between the members.

An auxiliary guiding member *g* for the yarn is also provided at the bottom of the bracket B. Preferably this is formed of wire with two prongs *g*¹ and *g*² driven into holes in the lug *b'*, see Fig. 2. The loop of the wire is bent back upon itself with a comparatively long slot or threadway *g*⁴ having diverging extensions *g*⁵ and *g*⁶ which form a flaring opening in continuation of the opening between the upright sides of the tension members. The movable tension-member T is also provided at its lower end with a thread-retaining finger *t*¹⁶ which extends across and adjacent the loop of the guide *g*, see Figs. 1, 2 and 4. This is preferred.

erably formed from the stock of the upright t^3 and extends backward in line with the flaring wing t^4 . It is then bent back upon itself and terminates in the crook or elbow t^{17} , the crotch t^{18} of which crosses and lies adjacent the slot g^2 of the guide g . When the thread or yarn y is introduced between the flaring sides of the tension-members it will draw along the finger t^{16} and, acting thereon, serve to wedge the movable member T away from the fixed member T' until it passes beyond the end of the finger. After the yarn rides over the end of the finger t^{16} the movable tension-member T swings back automatically and the yarn locates in the crotch t^{18} . As the thread or yarn is drawn rapidly upward through the tension-device it will swing out in a circle or "balloon" away from the spool, bobbin or other supply located below and the finger t^{16} prevents it from whipping out from between the tension members.

Usually the cross-bars of the tension-members are formed of metal, extending from the uprights and struck up with rounded sides to present a smooth surface to the yarn. While such a structure is adaptable for use with soft yarns and threads it has been found that hard threads, like linen, silk and other similar materials, will cut into the metal and wear grooves across the faces of the bars. The continuous friction of the hard fiber drawing across the metal bars soon wears a groove deeper than the diameter of the thread itself so that thereafter the thread will not receive the proper pressure between the bars. Besides this, these grooves will have sharp edges which are apt to abrade and injure the finish and impair the strength of the thread so as to render it useless for the purpose for which it is intended.

Various attempts have been made to coat or enamel the bars with wear-resisting materials, but these have not given entirely satisfactory results. The coating is apt to crack and chip off and in time wears through so that the bars are very little, if any, more durable than those not coated. In some cases the fingers or bars have been made entirely of porcelain and attached to the tension frames, but heretofore such structures have not been practical because the porcelain or glass being brittle, and easily broken, would not stand the jar and strain in shipment or the hard usage in the mills. It is also difficult to mold the fingers and have them retain their proper form and relation after the glazing or hardening process and if the bars cannot be kept in proper alinement the efficiency of the device is impaired. Furthermore, in previous devices when one finger or bar is broken it requires replacing the whole set to repair the device. To overcome these insufficien-

cies and defects I have devised a novel method of applying the wear-resisting material to the bars of the tension-members so that if any one bar is broken it may be easily and readily replaced independently of the other bars; and, furthermore, the bars can be set in proper alinement and held permanently in their correct relation. A still further improvement of my new device provides means for adjusting the bars to present new bearing surface to the yarn or thread so that even if wear occurs the device may be easily renewed without applying new parts so that it will last almost indefinitely. My new device is also more staunch and less liable to breakage or injury than other arrangements heretofore used.

The essential feature of the new improvement consists in making the bars or fingers of the tension members of tubular form and supporting them on pins or studs secured to the frames. Preferably they are formed cylindrical and slightly concaved from end to end and the walls are made of sufficient thickness to prevent cracking or breaking. The concaved form tends to cause the thread or yarn to draw down to its seat midway of the bars and the enlarged ends add strength and prevent the material chipping off where the supporting frames are attached.

In Fig. 1 one of the bars is shown in section to illustrate the method of fastening it between the uprights of the tension-member. For this purpose I make use of the headed pins or studs f which project through holes in the uprights t^2 and t^4 and pass through the bores of the tubular bars t and t' . The ends of the studs f screw into the uprights t^3 and t^5 and the two upright parts of the frame are thus clamped tightly against the ends of the bars t and t' . The holes in the bars are shown as slightly larger in diameter than that of the studs so as to provide for any irregularities in their form. The bars being constructed of porcelain, glass or similar vitreous material are liable to warp out of shape in hardening, but by providing this slight clearance they will slide easily over the studs f and are thus readily interchangeable without fitting. If any one of the bars should crack or break it may be easily replaced by removing its stud and substituting a new bar. Furthermore, if the bars become worn after continued use they can be adjusted to present new bearing surface to the yarn by simply loosening the studs and turning them slightly. It will be observed that such adjustments can be made many times before the bars will be worn or scored throughout their entire circumferences, and eventually new bars may be applied so that the device is practically indestructible.

It will be noted from Fig. 3 that when the

tension members are in operative position the bars t and t' overlap each other slightly, that is, their inner faces are not in the same plane. This causes the yarn y to bend slightly as it passes across the bars to give it a more or less tortuous course and apply resistance to its draft. The rear uprights t^2 and t^4 are scalloped or cut away along their abutting edges to conform to the outline of the bars and provide a clearance between the two members T and T'.

The amount of overhang of the bars may be regulated or adjusted by means of a set-screw h passing through a lug t^{20} on the member T and bearing on a similarly disposed lug t^{21} on the member T'. A check-nut h' serves to hold the screw against accidental displacement. By screwing the set-screw in the member T will be moved out away from the member T' so that the bars will overlap to a less extent and therefore the path of the yarn y will have less sinuosity. This relieves the tension on the yarn and by adjusting the screw in the reverse direction an opposite effect is secured; that is, the tension-members will set closer together and a greater degree of tension is applied to the yarn.

It will be noted that the bars on the two tension-members are set closer together vertically at the top of the members than at the bottom. This is for a purpose now explained: As the thread whips and "balloons" off of the supply it creates a pressure against the opposed bars of the two members which tends to cause them to vibrate and chatter. By placing the bars farther apart at the bottom of the tension members the thread is allowed to travel in a straighter course, and therefore there will be less tendency for the whipping action to exert a pressure on the bars. After the thread passes between the first few bars its tendency to whip and balloon out is overcome and its course is then made gradually more sinuous toward the top of the members to apply the maximum degree of tension required.

My invention provides a practical and efficient means for applying wear-resisting material to the tension-members to secure greater durability and less liability to damage or breakage. It also contemplates the improvement of adjustability of the bars for wear, and replacement of the separate bars or fingers at slight expense so that the device is practically indestructible.

The bars t and t' might be attached to the rear uprights t^2 and t^4 without the use of the other upright members t^3 and t^5 to form comb-shaped members with the bars

projecting as teeth. This is a familiar form of tension-members and is adequate for use where it is not required to thread the tension device automatically. The arrangement shown in the drawings is preferable, however, because the outer uprights serve as guides, and when the thread or yarn is drawn up through the guide g and along the flaring edges of the members it will act to swing open the movable member and draw down on to its proper seat on the bars.

Various other modifications might be made in the structure and arrangement of my device without departing from the spirit and scope of the invention.

Therefore, without limiting myself to the precise construction shown, what I claim is:

1. In a tension-member, the combination with a frame having upright members t^2 and t^3 , of a plurality of studs f projecting through one of the uprights and screwed into the other upright, and hollow bars t mounted on the studs with their ends clamped between the uprights.

2. In a tension-device, the combination with a frame having parallel side pieces t^2 and t^3 , of a plurality of bars of vitreous material extending between said side pieces, and means to clamp the side pieces against the ends of the bars.

3. In a tension device, the combination of two frames having uprights t^2 and t^4 provided with hinges at the top and bottom, co-acting parallel uprights t^3 and t^5 bent in angle form with flaring guiding edges t^{24} and t^{25} , cross-bars t and t' supported between each set of uprights, and means to clamp the uprights against the ends of the bars.

4. In a tension-device, the combination of a grid-shaped member T having uprights t^2 and t^3 , and cross-bars t supported on said uprights and arranged with the bars spaced progressively nearer together from bottom to top of the member in a direction corresponding to the direction of travel of the yarn.

5. An improved grid-member for tension-devices having a series of parallel bars across which the yarn draws, said bars spaced progressively nearer together from one end of the grid to the other in a direction corresponding to the direction of travel of the yarn.

In testimony whereof I affix my signature in presence of two witnesses.

CLAES RYDEN.

Witnesses:

ARTHUR A. ANINGTON,
EUGENE H. VAUGHN.