S. W. WARDWELL.

TENSION FOR BRAIDING CARRIERS.

APPLICATION FILED MAY 3, 1909.

981,958. Patented Jan. 17, 1911.

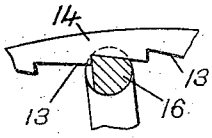

Fig. 3.

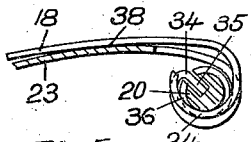

Fig. 5.

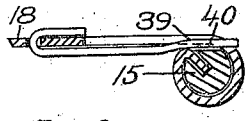

Fig. 6.

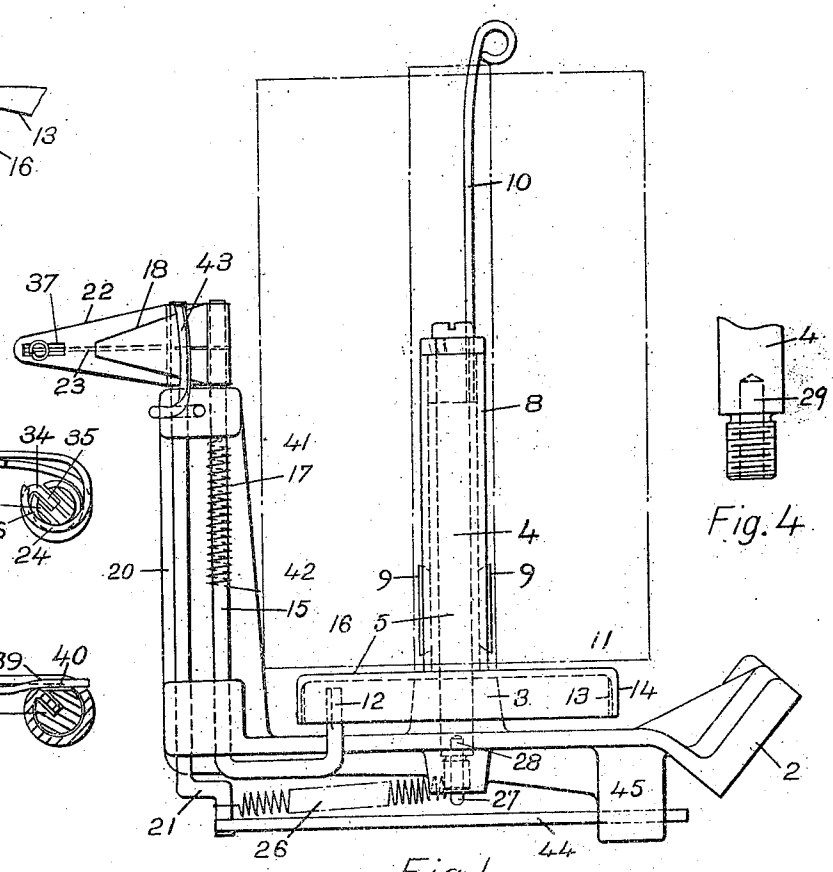

Fig. 1.

Fig. 4.

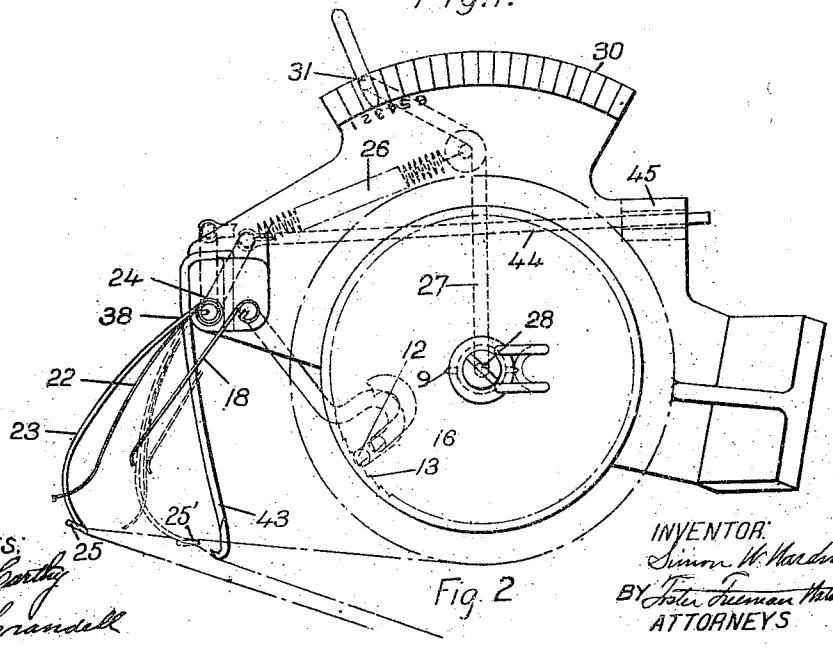

Fig. 2.

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TENSION FOR BRAIDING-CARRIERS.

981,958. Specification of Letters Patent. Patented Jan. 17, 1911.

Application filed May 3, 1909. Serial No. 493,717.

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, 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 Tensions for Braiding-Carriers, of which the following is a specification.

My invention is an improved tension device for braiding machines and its purpose is to provide for a wide range of tension variation, a wider range than usual of take-up action before releasing the supply to deliver yarn and protection to the parts in case the yarn is entangled on the supply or has been tied to the cop tube or bobbin at winding.

The novel and meritorious features of my invention are fully disclosed in the following specification and accompanying drawings, which latter show respectively:

Figure 1, a front elevation of my device; Fig. 2, a plan view of the same; Figs. 3, 4, 5 and 6, details of construction.

The tension device comprises a bracket 2, having a hub 3 in which is secured a stud 4, on which is mounted the yarn supply holder 5. The latter consists of a stem 8 with blades or spurs 9 to rotatively secure the supply, a spring latch 10 to secure the yarn supply from longitudinal displacement, and a base 11, preferably of inverted cup form. The supply holder is restrained from turning in a direction to deliver yarn by a pawl or detent 12 which engages teeth 13 of the base 11. Preferably these teeth are within the interior of the base, the pawl 12 extending below and beneath the rim 14 of the latter and up, within the base to engage the teeth. The pawl is preferably integral with the rock shaft 15, made of round wire and journaled in bearings in the standard 2ª of the bracket 2, and constitutes an arm of the rock shaft. The toe 16 is appropriately formed to engage the teeth 13—see Fig. 3, and a spring 17 tends to hold the pawl 12 in engagement with the supply holder teeth 13.

At the upper end of the rock shaft is secured an arm 18, made of thin sheet metal in behalf of lightness and strength. Adjacent the rock shaft 15 is a parallel rock shaft 20, whose bottom is formed as a crank 21, and at the upper end of which is an arm 22, also of thin, elastic metal. Adjacent the arm 22 is a spring take-up or guide 23, an end of which is formed as a hub 24 for the rock shaft, and the extremity is formed as an eye 25 to receive the yarn from the supply. The arm 22 is curved and the guide arm 23 extends substantially tangent thereto, so that, in yielding to the pull of the yarn it gradually conforms to the curve of the arm 22, the degree of such conformation depending upon the resistance opposed by said arm. The resistance is supplied by the spring 26 which is anchored to the adjustable arm 27. The latter is preferably formed of round wire with a trunnion portion 28 which enters a socket bearing 29 in the end of the stud 4—see Fig. 4. From this bearing the arm 27 extends to the edge 30 of the bracket, which edge is concentric with the hub 3, and is formed over said edge as an index 31. The upper surface of the bracket at the edge 30 is formed with graduated notches with which the index 31 engages. The arm 27 is so formed that it must be sprung upward, elastically, in order to engage the index 31 with the edge 30, and the elastic resistance to such up-springing holds the index 31 down, in engagement with the notch to which it is adjusted sufficiently to resist the pull of the spring 26.

The arms 18 and 22 are secured in position on their respective rock shafts by novel means. Referring to the arm 22 which, with respect to the mode of fastening, is like the arm 18, it is, in development, of substantially triangular form, and the base end is formed at a sharp right angle to the body to constitute a key 34, while the metal adjacent is formed cylinder-wise about the rock shaft to form a hub. In the rock shaft 20 is a key-way 35 to receive the key portion 34 of the arm and also a peripheral cut 36. Through an opening 37 in the arm, the guide arm 23 extends, its hub portion 24 engaging the cut 36 in the rock shaft and being held therein by the elastic lever action of the arm 23, its point of contact 38 with the arm 22 serving as a fulcrum, and engagement under spring tension with the extremity of the arm

22 maintaining the engagement, Fig. 5. The arm 18 is similarly secured by keying to its rock shaft 15 and is secured from longitudinal displacement by the spring tongue 39 which engagse a transverse cut 40, Fig. 6.

The spring 17 which holds the pawl 12 in normal engagement with the supply holder is secured by one end 41 passing through the rock shaft 15, while the other end bears against the standard 42 in which the rock shafts 15 and 20 have bearings.

Secured in the top of the standard 42 and extending close to the path of movement of the guide 25 near its terminus of extreme tension is a knife 43. The purpose of this knife is to sever the yarn in case it is so strong as to jeopardize the tension and take-up parts. Occasionally it occurs that in winding a cop or bobbin the operator has tied or otherwise secured the yarn to the tube or bobbin. Where a large, strong yarn is used, and especially where a fasciculation of such yarns is employed as is usual, the sensitively responsive elements of the take-up and tension are endangered by such an event. Therefore, the knife 43 is supplied so that in case the tendency of the yarn is to deflect the take-up 23 too much it is encountered by the knife and cut before the parts are unduly strained.

Connected with the crank 21 is a rod 44 which extends through a bearing 45. This rod appertains to stop devices which are made the subject of another application and therefore will not be here considered.

The dominant characteristic of my improved tension is that the spring 17 is only just sufficient to maintain engagement of the pawl 12 with the supply holder, while the take-up and tension devices are entirely separate and apart from the pawl release and are therefore not dependent for their range of action on the depth of engagement of the pawl with the ratchet teeth. Where tension adjustment is made at the pawl or directly affects the pawl, the range of take-up action by the yarn is limited by the extent of pawl engagement with its ratchet teeth. To secure necessary range of such yarn action deep engagement of ratchet and pawl is necessary, and consequently the ratchet teeth must be of large pitch. In case the pawl, in returning to engagement with its ratchet, just misses a tooth, then a needless and undesirable excess of yarn is given off to the extent of one tooth, or a proportional amount dependent on the relative diameters of the ratchet and of the yarn mass of the supply. This irregularity of yarn release causes irregular tension and proportionally imperfect braiding. By divorcing the tension and take-up adjustment from the pawl release, much finer ratchet teeth may be employed, and tension irregularities can be more closely differentiated and reduced.

By varying the tension of the spring 26 the take-up effect may be variously modified. Set with a very light tension the arm 22 may be moved with scarcely any deflection of the guide arm 23 whatever, in which case the arm 22 would ride relatively close to the arm 18 and a slight variation of tension would cause release of the pawl. On the other hand, the spring 26 may be set at its extreme tension under which the resistance of the arm 22 to movement would be so great that the arm 23 would conform entirely to it before it would yield. But the great advantage lies in the fact that the adjustable variability of the spring 26 is made available over all the range of movement of the guide 25 rather than to that small portion measured by the extent of engagement of the pawl 12 with the ratchet teeth 13.

Without limiting myself to the precise form of construction, I claim:

1. In a tension device for braiding machines, the combination with a rotatable supply holder, a detent to restrain the supply holder from rotation and a spring therefor of substantially uniform resistance, of an arm movable by the yarn to release the detent, a spring to oppose the movement of the arm and means to vary the intensity of such opposition.

2. In a tension device for braiding machines, the combination with a rotatable supply holder, and a detent pivoted to move away from the axis of the holder to restrain the supply holder from rotation, movable but slightly to relinquish such restraint, of an arm to release the detent movable by the yarn through a substantial range before effecting such release.

3. In a tension device for braiding machines, the combination with a rotatable supply holder, and a detent to restrain the supply holder from rotation, of an arm moved by the yarn to release the detent and means to vary the range of movement of said arm before acting on the pawl.

4. In a tension device for a braiding machine, the combination with a rotatable supply holder, and a detent therefor, of means, exclusive of the detent, to control the tension and when the latter exceeds a prescribed limit, to disengage the detent from the supply holder, and means to vary the limit at which such disengagement shall occur.

5. In a tension device for braiding machines, the combination with a rotatable supply holder, a detent to restrain the supply holder from rotation and an arm connected with the detent, of a curved arm adjacent the arm aforesaid, a spring arm having a yarn eye, adjacent the curved arm movable

by the yarn to shift the curved arm into contact with the first arm to release the detent, and means to oppose the curved arm to the action of the spring guide arm.

6. In a tension device for braiding machines, the combination with a rotatable supply holder, a detent to restrain the supply holder from rotation and an arm connected with the detent, of a curved arm adjacent the arm aforesaid, a spring arm having a guide, adjacent the curved arm, movable by the yarn to shift the curved arm into contact with the first arm to release the detent, a spring to oppose the curved arm to the action of the spring guide arm, and means to adjust the degree of resistance opposed by the curved arm.

7. In a tension device for braiding machines, the combination with a rotatable supply holder having ratchet teeth within its base, a rock shaft having a pawl extending below and beneath the rim of the base and engaging the ratchet teeth aforesaid within the supply holder base, a spring to engage the pawl with the teeth, and an arm 18 secured to the rock shaft, of an adjacent rock shaft 20, an arm 22 secured to said arm, and a spring guide arm acted upon by the yarn to engage the arm 22 with the arm 18 to release the pawl.

8. In a tension device for a braiding machine, the combination with a rotatable supply holder having ratchet teeth within its base, a rock shaft having a pawl extending below and beneath the rim of the base and engaging the ratchet teeth aforesaid, a spring to engage the pawl with the teeth and an arm 18 secured to the rock shaft, of an adjacent rock shaft 20 having a crank 21, divergent arms 22 and 23, secured to the rock shaft 20, one of which has a guide engaged by the yarn, a spring 26 engaging the crank 21 to maintain the arms 22 and 23 away from the arm 18, and oppose to the guide arm the resistance of the arm diverging therefrom, and an arm 27 to which the spring 26 is anchored and by which action is varied.

9. In a tension device for braiding machines, the combination with a rotatable supply holder, a detent to restrain the supply holder from rotation, and an arm connected with the detent, of divergent arms adjacent the first arm, one of which has a guide engaged by the yarn and movable to engage the arm diverging therefrom with the detent connected arm to release the detent, and means to oppose that one of the diverging arms having no guide to the one which has a guide for the purpose specified.

10. In a tension device for a braiding machine, the combination with a rotatable yarn supply holder with a base of inverted cup form having interior teeth, a rock shaft having a pawl, a spring to act on the rock shaft to engage the pawl with the teeth and an arm secured to the rock shaft, of a second arm adjacent the first, and means whereby the two arms are engaged by the yarn from the supply holder to shift the pawl.

11. In a tension device for braiding machines, the combination with a rotatable yarn supply holder and a detent to control the action of the supply holder, of an arm 18 connected with the detent, a second arm 22 adjacent the first and normally away from it, a guide-arm 23 for the yarn given off by the supply holder and means actuated by movement of the guide-arm 23 with the varying tension on the yarn to cause engagement of said arms 18 and 22 and consequent action of the detent to permit and prevent delivery of yarn by the supply holder.

12. In a tension device for braiding machines, the combination with a rotatable yarn supply holder and a detent to control the action of the holder, of an arm connected with the detent, a second arm adjacent the first, a resiliently mounted yarn guide adjacent the second arm, elastically susceptible to slight variations in tension of the yarn, and a spring to permit movement of the second arm with the guide to engage the first arm to actuate the detent.

13. In a tension device for braiding machines, the combination with a rotatable yarn supply holder and detent to control the action of the holder, of an arm and connections to control the detent, a second arm controlled in position by the action of the yarn given off by the cop holder, and having range of action sufficient to engage the first arm, and a resiliently mounted guide having a degree of movement independent of both arms and a range of movement sufficient to engage the second arm with the first and move both for the purpose and in the manner specified.

14. In a tension device for braiding machines, the combination with a rotatable cop holder, and detent to control the cop holder acting within the base of the latter, of an arm and connections to control the detent and a second arm moved by the yarn to engage and cause action of the first arm.

15. In a tension device for braiding machines, the combination with a supply holder, a detent to control the delivery of yarn from the supply holder and a knife to sever the yarn in case of uncontrollable resistance to delivery of the latter.

16. In a tension device for a braiding machine, the combination with a supply holder, a detent to control the delivery of yarn from the supply holder and a take-up to maintain the yarn taut, of a knife adjacent the path

of movement of the take-up to sever the yarn should uncontrollable resistance to delivery occur.

17. In a tension device for braiding machines, the combination with a supply holder, a detent to control the delivery of yarn from the supply holder and a take-up engaging a loop of the yarn to keep it taut, of a knife extending within the loop of yarn to sever the latter before it can move the take-up unduly.

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

SIMON W. WARDWELL.

Witnesses:
GRACE W. BROWN,
JAMES F. MCENERY.