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T. F. O'BRIEN.

SAFETY REGULATOR FOR BRAIDING MACHINE BOBBINS.

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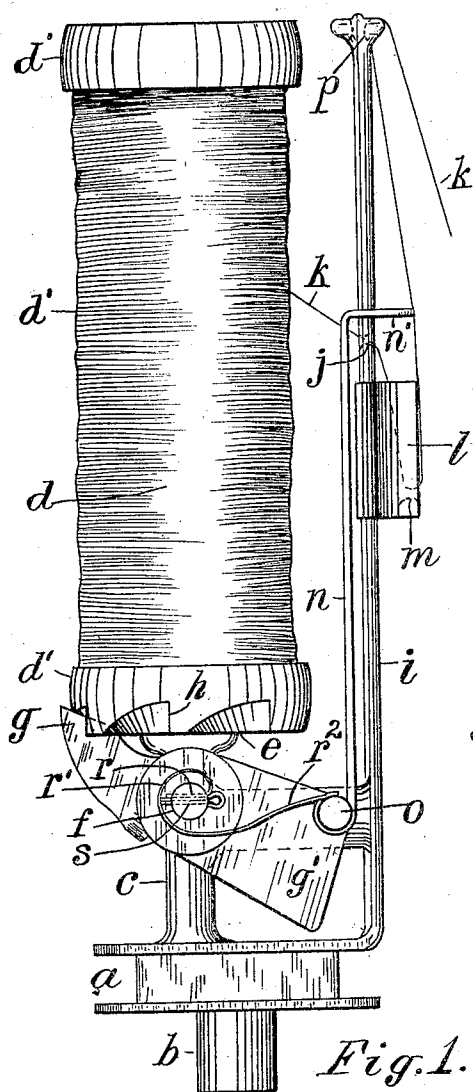


Fig. 1.

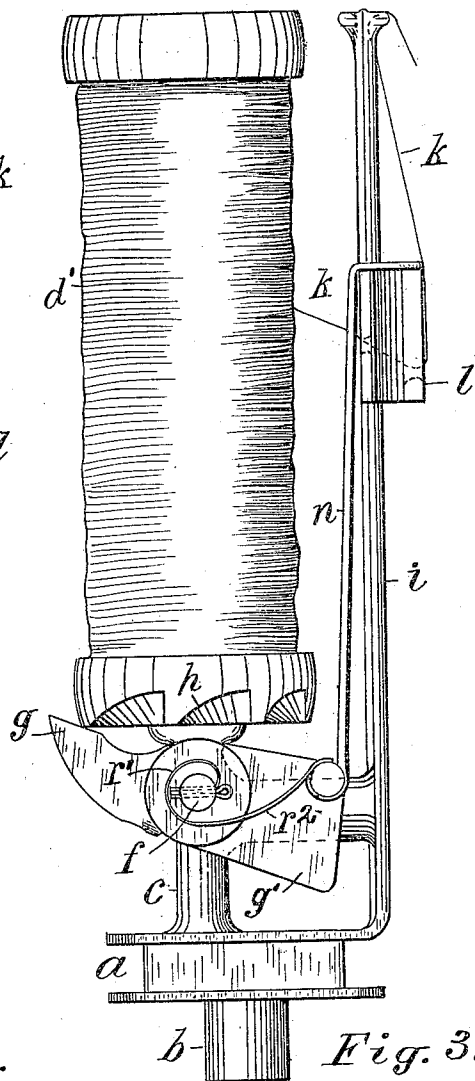


Fig. 3.

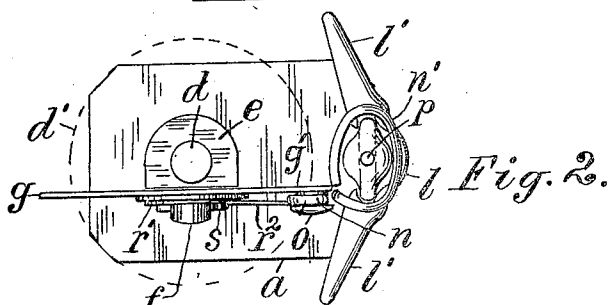


Fig. 2.

Witnesses  
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# UNITED STATES PATENT OFFICE.

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## SAFETY-REGULATOR FOR BRAIDING-MACHINE BOBBINS.

No. 897,648.

Specification of Letters Patent.

Patented Sept. 1, 1908.

Application filed May 23, 1907. Serial No. 375,205.

*To all whom it may concern:*

Be it known that I, THOMAS F. O'BRIEN, a citizen of the United States, residing at 71 Broad street, Perth Amboy, county of Middlesex, and State of New Jersey, have invented certain new and useful Improvements in Safety-Regulators for Braiding-Machine Bobbins, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to an improved means of regulating the draft of the thread from the bobbin of a braiding machine, and consists in the application, to a gravity latch upon the bottom of the bobbin, of a spring which can be adjusted at pleasure to regulate the tension of the thread in proportion to its strength or size.

Braiding machines are furnished with movable carriers, upon any of which a bobbin may be placed, and on such carriers it is common to provide a pawl to engage a ratchet on the end of the bobbin to control its rotations as the thread is withdrawn. If the pawl be pressed toward the bobbin with a uniform force, whether of gravity or a spring, it is obvious that its operation upon the bobbin is uniform; although bobbins with threads of various sizes may be placed upon the carrier which threads require a very different tension to operate properly. Heretofore, variable weights have been used in connection with the pawl to vary the tension upon the thread; but weights do not operate with the same promptness as a spring, and I have therefore devised a spring fitted to the pawl in a particular manner so that it can be readily adjusted to vary the tension. Loose weights for varying the tension are also objectionable on account of their liability to be lost; while the spring which I employ is permanently attached to the pawl and cannot therefore be detached or lost.

The invention will be understood by reference to the annexed drawing, in which

Figure 1 is a side elevation of a bobbin carrier provided with my improvement, the latch being shown in engagement with the ratchet upon the bobbin, and the tension weight suspended upon the thread, as during the normal operation of the weight. Fig. 2 is a plan of the carrier with the bobbin removed and my improvement applied to the gravity latch; and Fig. 3 is an elevation, like Fig. 1, with the latch shifted by the contact

of the tension weight with the lifter, as occurs when the thread is momentarily drawn from the bobbin.

*a* designates the foot of the bobbin-carrier which in a braiding machine is carried through a tortuous channel by suitable gearing operating upon the driver-pin *b*.

The carrier supports a standard *c* having the spindle *d* mounted thereon above a shoulder *e* which normally supports the bobbin *d'*. The gravity latch is pivoted upon a pin *f* upon the side of the standard, below the bobbin, and has a pawl *g* which engages the ratchet-teeth *h* upon the bottom of the bobbin, and it has a weight *g'* which overbalances the weight of the pawl and presses the pawl into the ratchet-teeth with a certain degree of force.

A guide-post *i* is extended upward from the foot *a* at the side of the bobbin, and is formed opposite to the middle of the bobbin with an eye *j* for the passage of the thread *k*. A tension weight *l* is fitted to slide upon the guide-post and formed with an eye *m* for the passage of the thread, and with sloping wings *l'* for working the stop-mechanism of the machine. A lifter-rod *n* is jointed to the heel or counterweight of the latch by a rivet *o* and formed at its upper end with a loop *n'* to loosely embrace the post *i*.

The thread, as shown in Fig. 1, is carried from the bobbin through the eye *j* in the post, thence downward through the eye *m* in the tension weight and then upward through an eye *p* upon the top of the post, from which it passes to the cord or wire around which it is braided.

The parts just described are of usual construction, and when in operation the slack of the thread, while such slack is being braided upon the cord or wire, is taken up by the weight *l*, which thus hangs below the loop *n'* of the lifter-rod, but when such slack is entirely absorbed the weight is lifted into contact with the loop and operates to raise the counterweight *g'* and draw the pawl *g* temporarily from the ratchet of the bobbin. A partial rotation of the bobbin results, which furnishes more thread and instantaneously allows the tension weight to drop, thus relocking the bobbin until the fresh supply of thread is exhausted. The tension weight is thus slowly rising during the consumption of the thread and then dropped again after its contact with the loop *n'*, which gives off the additional supply of thread. The weight *l*

also performs the function, if the thread be broken from any cause, of causing the stoppage of the machine, by dropping to the bottom of the post; with the sloping wings  $l'$  of the weight (shown in Fig. 2), operating upon suitable stop-mechanism to arrest the movement of the entire braiding machine and all of its bobbins.

The apparatus so far described has been extensively used, but has the grave defect that the counterweight upon the gravity latch, if of unvarying character, is not adapted to resist the rotation of the bobbin in the variable manner that is desirable in drawing off threads of different sizes.

A fine thread necessarily operates under a very light tension, as a heavy tension would cause a breaking of such thread, and if the weight of the gravity latch and the tension weight  $l$  are suitably proportioned or designed to operate with such a light thread, they are unsuitable for operation with a heavier thread, which requires a heavier tension to prevent the spool from turning too rapidly.

It is found in practice that where the gravity latch operates under the sole influence of its counterweight it often allows the spool to turn faster than the thread could be consumed in the braiding operation, thus producing a slack in the thread which permits the tension weight  $l$  to drop and cause the stoppage of the whole machine. The present invention rectifies this defect, by a particular construction for a wire spring which permits it to be attached securely to the stud of the pawl and to operate upon the pawl by means of a free end which can be manipulated at pleasure, and readily bent to increase or diminish its pressure upon the pawl. To secure the spring wire to the stud, it has its end  $r$  inserted in the hole in the stud  $f$  through which the linch-pin or cotter  $s$  is inserted to hold the latch in place. This secures it upon the stud, and from the side of the stud it is extended more than half a circle in a coil around the stud, and its free end  $r^2$  extended to the rivet  $o$  upon the heel of the latch. It will be noticed that the end  $r$  of the spring wire is projected from the hole in the stud  $f$  upon the side nearest the counterweight  $g'$  and the stud or rivet  $o$  upon which the lifter-rod  $n$  is jointed. This enables the wire to be bent in a coil around the stud away from the rivet  $o$ , and then extend toward the rivet to rest upon the same, thus securing a much greater length for the wire than if it were extended directly from the stud to the rivet.

The spring is made of suitable sized wire, and bent before its application to the rivet, so as to produce a downward pressure thereon, which increases the resistance of the pawl  $g$  to the rotation of the bobbin. Such a spring I have found may be proportioned to use safely with the lightest thread commonly employed in braiding machines, and at the

same time capable, by opening the coil  $r'$  in a suitable degree, of producing an increased pressure upon the rivet  $o$  and an increased resistance to the movement of the latch when using larger thread.

The application of such an adjustable spring to the gravity latch constantly regulates the movement of the spool in the proportion that the thread is used, thus keeping a uniform tension upon the thread and preventing the formation of any slack to permit the dropping of the weight and the consequent stopping of the machine.

It is evident that, as a considerable number of bobbins is used in a braiding machine, the operation of all is arrested whenever a stoppage is caused by the dropping of a weight upon a single one of the carriers; and experience has shown that this is of such constant occurrence in the use of braiding machines, that the work which such machines could turn out is materially curtailed.

Braiding machines furnished with my improvement can, by avoiding the stoppage heretofore common and by the regulation of the tension, be run at a speed materially greater than the machines unprovided with the invention, and my improvement thus enables a machine to turn out one-third more output.

The invention is applicable to all braiding machines for whatever purpose they are used, if they are provided with the gravity latch shown herein, as the spring wire can be made of suitable strength and its coil bent in a suitable manner to produce exactly the tension required for any size of thread.

Adjustable means have been used to vary the weight  $l$ , but such weight does not act directly upon the pawl like my adjustable spring, and does not produce the same effect, as it produces an increase of the tension, without increasing the resistance of the pawl to such tension.

I have found in practice, that where my wire spring is adjusted for the lightest thread, it operates to regulate the tension of a somewhat larger thread without any different adjustment, and this is due to the fact that a spring operates instantaneously in reacting against any movement, which is not the case with a weight, and the latch therefore drops quickly into the succeeding tooth of the ratchet and controls the movements of the bobbin effectively. Such quick action of the latch is of equal benefit whatever the size of the thread.

I am aware that a spring has been used to retain the latch in either an operative or inoperative position; but operating otherwise merely to hold the pawl in a working position and not furnishing any means of varying the tension, as with the spring which I have devised. My spring permits adjustment by its possession of the free end  $r^2$  applied loosely

to the counterweight, which permits the operator to remove the free end from the counterweight and to slightly bend the spring when it is desired to increase or diminish the  
5 tension.

The degree of bending which is necessary is readily acquired by practice, as in the use of all special machinery. The formation of the spring with the coil  $r'$  enables it to exert a  
10 very elastic and uniform pressure upon the pawl, while it also affords a means by bending the wire, of varying its tension in the desired degree.

Having thus set forth the nature of the invention what is claimed herein is:

1. In a braiding machine, the combination, with the carrier and the bobbin having ratchet-teeth  $h$ , the stud  $f$  upon the carrier below the bobbin, the gravity-latch fitted to  
20 the stud and having the pawl  $g$  to engage the ratchet-teeth, and the counterweight  $g'$  to actuate such pawl, of the wire spring secured upon the stud  $f$  and extended in a coil  $r'$  around the same and said coil terminated in  
25 the free end  $r^2$  applied to the said pawl for increasing its effect upon the latch, the detachability of the free end enabling the wire to be

removed and bent at pleasure to vary its tension.

2. In a braiding machine, the combination, with the carrier and the bobbin having ratchet-teeth  $h$ , the stud  $f$  upon the carrier below the bobbin provided with linch-pin hole across the end, the gravity latch fitted to the stud and having the pawl  $g$  to engage the  
35 ratchet-teeth and the counterweight  $g'$  to actuate such pawl, of the wire spring having its end  $r$  inserted in the hole with the linch-pin and extended from the hole toward the counterweight end of the latch, thence bent  
40 in a coil  $r'$  around the stud and having its free end  $r^2$  applied detachably to a stud or rivet  $o$  upon the counterweight, the detachability of the free end enabling the wire to be  
45 removed and bent at pleasure to vary its tension.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS F. O'BRIEN.

Witnesses:

L. LEE,

THOMAS S. CRANE.