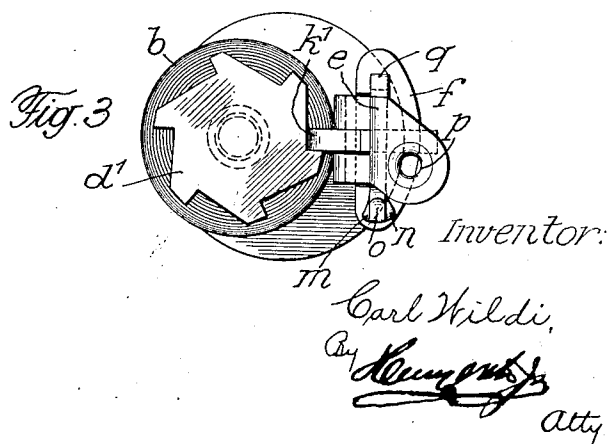
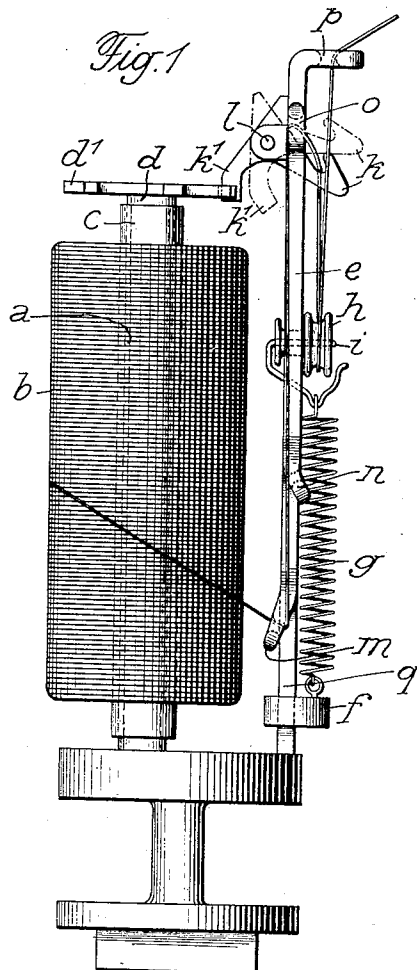
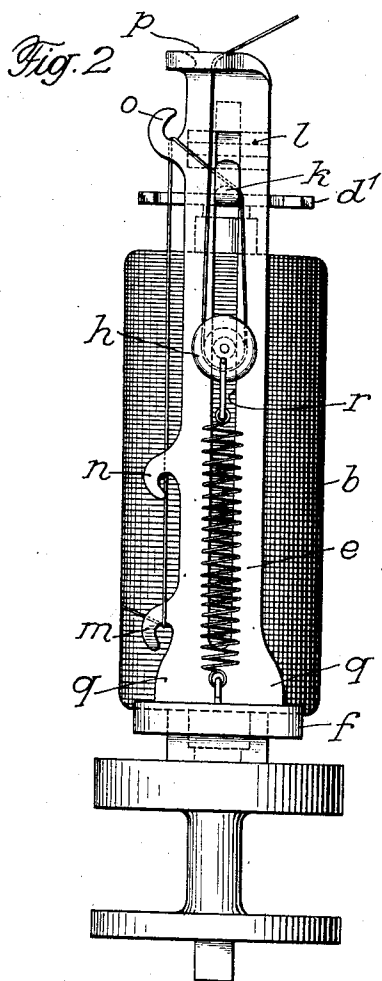


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APPLICATION FILED SEPT. 11, 1919.

Patented Sept. 28, 1920.
2 SHEETS—SHEET 1.

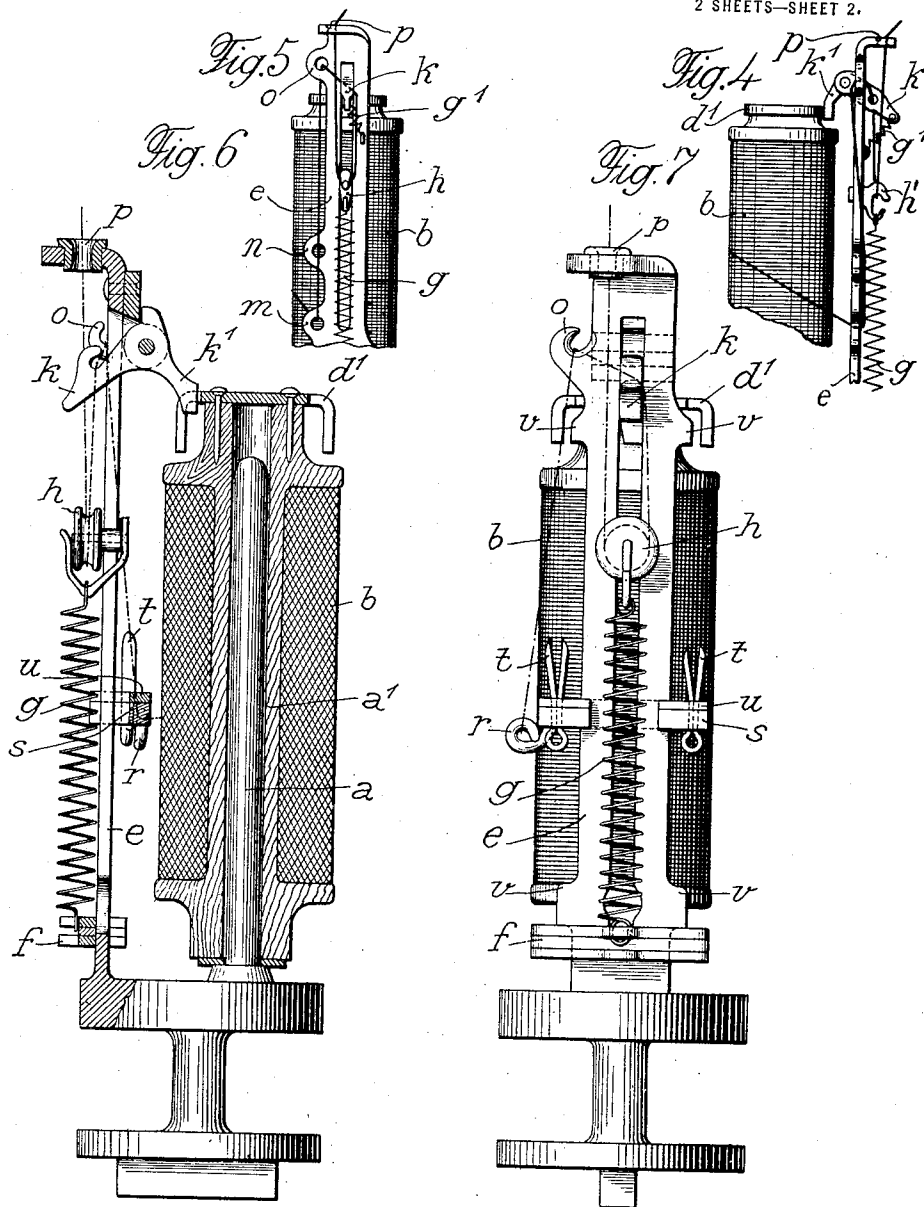


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UNITED STATES PATENT OFFICE.

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BOBBIN FOR BRAIDING-MACHINES.

1,354,084.

Specification of Letters Patent. Patented Sept. 28, 1920.

Application filed September 11, 1919. Serial No. 323 217.

To all whom it may concern:

Be it known that I, CARL WILDI, a citizen of the Republic of Switzerland, residing at Wohlen, Aargau, Waltenswilerstrasse, Switzerland, have invented certain new and useful Improvements in Bobbins for Braiding-Machines; and I do hereby declare the following to be a clear, full, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In some braiding machines in which the bobbins are caused to travel along sinuous guide curves the yarn holder carrying the yarn or thread rotatably mounted thereon is designed as a tube or quill, and the tension device is a weight or spring, usually mounted on said tube. This arrangement presents disadvantages when the thread has to be pulled off, and the quantity of yarn that can be wound on the tube or quill is considerably reduced owing to the large diameter that has to be given to said tube or quill.

In another kind of bobbin of the type referred to the thread is wound on a solid core or spindle provided with locking teeth at its bottom. The locking mechanism is thus arranged beneath the yarn so that the latter has to be shifted vertically to an amount corresponding to the space taken up by the locking mechanism. The result of this is a considerable increase of the height of the whole bobbin and a more complicated design of the locking mechanism.

In a further type of bobbin of the class referred to the tube or spool for the yarn projects upwardly beyond the yarn and is used for the mounting of the locking mechanism; this involves either a too great diameter of the tube or spool or it renders the removal of the empty tube or spool and the putting on of a full bobbin more difficult.

Finally, in a fourth type of bobbin the mechanism for the gradual delivery of the thread, as well as the thread guard, are arranged wholly outside the diameter of the bobbin. The locking member of this bobbin engages into the toothed portion of the bobbin spool but is moved in vertical direc-

tion. As a result of this the spool cannot be designed so as to pass through the whole bobbin, and a very complicated arrangement has to be provided in order to allow the bobbin to swing sidewise, or, in case the spool passes through the whole bobbin and serves only as a bearing for the latter, very inconvenient steps, involving a great loss of time, have to be carried out for exchanging bobbins, as a portion of the bobbin has to be wholly removed therefrom or at least turned up.

Moreover, the design of all the above-mentioned constructions meets only the requirements occurring at low speeds, and will not do for very high speeds of braiding machines, as the single parts of the bobbins referred to cannot resist the very high stresses occurring when the machine runs at a very high speed, (for instance at 300 revolutions of the fly-wheel per minute).

The object of this invention is to provide a bobbin for braiding machines not presenting any of the above mentioned disadvantages.

To this end the bobbin according to this invention comprises a device for the gradual delivery of the thread having a locking lever pivoted on a tension standard which is arranged together with a thread guard and take-up mechanism at such a distance from the axis of the bobbin that it is situated beyond the periphery of the fully wound or loaded tube, quill or spool. The locking lever itself is engaged by the thread and is caused by the tension of the thread to engage from one side a member or ratchet for the gradual delivery of the thread provided on the yarn carrier, whether spool or quill, and this lever is so arranged as to swing beyond the maximum diameter of a fully wound bobbin to be placed on and an empty one removed from the bobbin carrier without manipulations of any kind.

The present invention also solves the problem of providing a bobbin for high speed braiding machines requiring very simple handling, with a very advantageous and very strong construction of all parts, whereby the number of the different parts is reduced to the smallest number.

The invention will now be particularly described with reference to the accompanying

drawings, which illustrate, by way of example, several modes of carrying the invention into effect. In these drawings—

Figure 1 illustrates a front view of a first construction according to this invention;

Fig. 2 is a side view of this bobbin seen from the right hand side of Fig. 1;

Fig. 3 is a corresponding top view;

Fig. 4 is a front view, drawn on a smaller scale, of a second embodiment according to this invention;

Fig. 5 is a corresponding side view seen from the right hand side of Fig. 4;

Fig. 6 illustrates partly in section a front view of a third construction according to this invention, and

Fig. 7 is a side view seen from the left hand side of Fig. 6.

Referring first to Figs 1-3, *a* designates the spindle for the bobbin *b* forming a storage of thread wound upon a yarn holder consisting of a thin tube or quill *c*. The latter, which may be made of card-board, is pushed onto and frictionally held on a second tube *d* provided at its upper end with a toothed disk *d'* formed integral with this tube. The disk *d'* as well as the tube *d* may be made of sheet metal. The tube *d* is so shaped that it securely maintains in proper position the quill *c* pushed on it by hand. The tube *d* is loose on the spindle *a*.

e designates a post carrying the locking lever or pawl *k* *k'* (forming a part of a mechanism for the gradual delivery of thread from the bobbin *b*) and the device for equalizing the tension or pull of the thread and the take-up. The post *e* also carries the thread guard or detector, consisting of a piece of metal *f* mounted on the lower end of the post *e* and vertically movable thereon. *g* is a take-up spring secured at its lower end to the thread guard *f* and serving to take up the thread. To this end said spring *g* may be elongated and contracted respectively by a take-up roller *h* and a shaft *i* carried by this roller when the pull of the thread increases or decreases, so that the thread remains always tensioned. One end of the shaft *i* is bent under the roller *h* in the form of a hook to which the upper end of spring *g* is attached. The locking pawl *k*, *k'* is pivotally mounted on a shaft *l* secured to the post *e*.

The described construction operates as follows:

When the quill *c* with the thread winding *b* thereon has been pushed onto the spindle *a*, the thread is drawn over one of the two hooks *m* or *n* of the post *e* and then over the hook *o* of said post *e* and the hook-shaped arm *k* of the pawl, whereupon it is passed around the roller *h* in order to be finally pulled through the hole *p* provided in the bent upper end of the post *e*. When this has been done, the threading is com-

pleted. The two hooks *m* and *n* arranged at different levels are provided for in order to prevent a lifting of the whole bobbin when it is acted upon by a vertical component of the thread-tension. Such a component appears when the thread is guided through the hook *n* and when the thread is unwound only from the lowermost portion of the bobbin *b*. When the upwardly directed vertical component of the tension of the thread is at this time greater than the weight of the bobbin the latter will be lifted upward, which causes irregularities in the gradual delivery of the thread and consequently in the pattern of the braiding work. The arrangement of the hooks *m* and *n* is such, that the hook *n* is advantageously used when weaker threads have to be worked up and a weak spring *g* is used, as in this case the vertical component of the thread tension referred to is less than the weight of the bobbin. When, on the contrary, strong or repeatedly twisted or plaited yarns have to be worked up, the yarn to be threaded is passed around the hook *m*, so that no upwardly directed vertical component of the thread-tension of any great value will be present, and consequently any lifting of the bobbin is avoided.

While the braiding machine is in operation the arm *k* of the double-armed pawl *k*, *k'* is continuously drawn downward by the tension of the thread, so that the locking arm *k'* of this pawl is caused to engage into the locking wheel *d'* provided in connection with the bobbin *b*. The thread is thus prevented from being drawn off. As soon as the bobbin starts to move away from the braiding point, the thread tension is increased, the take-up roller *h* moves upward in its guide-slot *r*, the spring *g* being thereby tensioned. In consequence of this the locking pawl is forced with continually increasing power into the locking wheel *d'* until the roller *h* strikes from beneath the arm *k* of the locking pawl, which arm upon a further increase of the tension of the thread is then forced upward, so that the arm *k'* is caused to disengage the locking wheel. This position of the pawl *k*, *k'* is shown in Fig. 1 in point and dash lines. At this moment the bobbin *b* is released, and in consequence of the tension of the thread, it is then caused to rotate to deliver a certain amount of thread. The take-up spring *g* then immediately contracts, and the arm *k* of the locking pawl very soon drops back into its initial position; the revolving bobbin being simultaneously arrested, so that only a quantity of yarn will be delivered upon a rotation of the bobbin corresponding to the pitch of the teeth of the locking wheel *d'*. In the meantime the whole bobbin is again approached to the braiding point. Owing to this, thread will be released and pulled

out in consequence of a contraction of the spring *g* so that a certain tension of the thread will be constantly maintained.

The thread guard *f* becomes operative as soon as the thread breaks, or upon exhaust of the thread supply. The weight of this thread guard *f* is so small that even when operating with very weak yarns it is still lifted upward to such an extent by the pull exerted by the spring as to engage the stops *g* provided on the post *e*. In the course of the braiding process it then remains in this uppermost position until the tension of the spring wholly ceases to act, which is the case when the thread breaks or the supply of thread becomes exhausted. The roller *h* together with the spring *g* and the thread guard *f* will then drop, the latter causing, in its lowermost position, in a well known manner, the stoppage of the machine.

The hereinbefore described arrangement involves several advantages. The height of the bobbin is reduced compared to the mass of yarn contained thereon, the attendance on the machine is rendered very simple and the thread can be drawn out very quickly. At the same time, the arrangement of the different parts of the bobbin is such that they can all be made so strong as to be able to resist the greatest strains to which they may be subjected, a condition which should always be fulfilled in view of the detrimental forces occurring at the very high speeds at which the machines provided with bobbins of the hereinbefore described type have to run. This is especially so with regard to the members *m n o p q* which are all very strong and formed integral with the post *e*. The roller *h* may be made of a material having a small specific weight in order to facilitate its rapid upward and downward movement.

The embodiment shown in Figs. 4 and 5 differs in so far from that first described as the roller *h* is replaced by a hook *h'* adapted to be displaced vertically along the post *e*. The hooks *m n o* are further replaced by eyes bearing the same reference letters as the corresponding parts of Figs. 1 and 2, and the arm *k* of the pawl *k k'* is also provided with an eye for the passage of the thread. The arm *k'* is urged by a spring *g'*, fixed at one end to the post *e* and at the other end to the arm *k*, against the circumference of the disk *d'* rigidly connected to the spool *d* carrying the bobbin *b* so that it is adapted to arrest said disk *d'* owing to the friction that it produces on the circumference of the latter. The remainder of the construction of this bobbin and the manner of its operation correspond to that of the first embodiment, corresponding parts being designated by the same reference letters.

In the hitherto described embodiments of

my invention two hooks or eyes are provided on the carrier constituted by the post *e*, one being arranged approximately in the middle of the coil of yarn and being destined to be used in connection with threads, while the other is provided near the lower end of the bobbin and is destined for pulling off strong yarns. In these embodiments a change in the direction of the thread occurs between the point at which the thread is drawn off at the time from the bobbin and the hook and eye, the thread being at one time strongly inclined relatively to the axis of the bobbin and at another time perpendicular to said axis. In the inclined position of the thread the tension of the thread resolves itself into a vertical and horizontal component of which only the latter has the tendency to rotate the bobbin on its spindle *a*.

The design of the embodiment illustrated in Figs. 6 and 7 is improved in this respect. In this construction *r* designates a hook fixed to a flat piece *s*. The latter is automatically adjustable longitudinally of the carrier *e* and two split pins *t* serving to keep two weights *u* (of which only one is shown in the drawings) in proper position, are passed through said piece *s*.

The thread pulled off the bobbin *b* passes over the hook *r* and the hook *o* fixed to the post *e*, and is guided from here to the hook-like arm *k* of the locking pawl *k, k'*, and then around the roller *h* in order to be finally guided away from the bobbin through the eye *p*.

The parts *g h k k'* act in the same manner as the corresponding parts of the first described embodiment. The hook *r* together with the flat member *s* slides along the post *e*. By putting a greater or less number of weights *u* on the flat piece *s* the weight of the latter can be so proportioned relatively to the spring *g* that it is kept, together with the hook *r*, by the thread tension, at such an elevation as to cause the thread to run off the bobbin at a right angle. The uppermost and the lowermost positions of the vertically adjustable weight, constituted by the flat piece *s* and the weights *u* put onto the latter, are determined by the stops *v*.

Owing to the provision of a vertically adjustable weight serving to guide the thread and causing the thread to run off the bobbin always at a right angle relatively to the axis of the bobbin, the stress exerted upon the thread is reduced to the lowest amount. In consequence of said pull of the thread directed at right angles to the axis of the bobbin, the whole pull of the thread acts as a circumferential force tending to rotate the bobbin.

It will be noted that the thread detector *f* is limited in its upward movement by the stops *g* and the take-up spring *g* is connected

at its lower end to the detector, so that the roller *h* will not by reason of high speed only, release the locking lever *h h'*.

I claim—

- 5 1. In a yarn carrier for braiding machines, a spindle on which the bobbin rotates, a post substantially parallel to said spindle, a thread guard slidable on said post, stops for said guard, tension means and
10 take-up mechanism on the post and connected to said guard, and a locking and releasing member for the bobbin mounted on said post and controlled by the yarn and the take-up mechanism.
- 15 2. In a yarn carrier for braiding machines, a spindle on which the bobbin rotates, a post arranged laterally of said spindle and having lateral stops, a weight slidable on said post and limited by said stops, tension and
20 take-up mechanism on said post and normally holding said weight against said stops, and a member on said post controlled by the yarn and said mechanism for locking and releasing the bobbin.
- 25 3. In a yarn carrier for braiding machines, a spindle on which the bobbin rotates, a post arranged laterally of said spindle and means on the post for changing the tension on the thread, stops on the post, a weight
30 slidable on the post, a take-up mechanism normally holding said weight against said stops, and a pivoted locking lever for the bobbin held in locking position by the yarn and released therefrom by the take-up.
4. In a yarn carrier for braiding machines, a spindle on which the bobbin is rotatably mounted, a post arranged laterally of said spindle and having a thread eye and a thread at its top, and a plurality of thread
40 guides at different elevations at its side, said post also having a longitudinal slot, a roller guided in said slot, a spring secured at one end to said roller and the other end fastened near the bottom of said post, a pivoted locking lever whose tail passes through the slot
45 and is arranged to lock and release the bobbin.
5. In a yarn carrier for braiding machines, a spindle on which the bobbin is rotatably mounted, a post arranged laterally of said spindle and having lateral stops near
50 its bottom and a longitudinal slot, a weight slidable on said post below said stops, a roller guided in said slot, a spring connected at one end to said roller and at the other end
55 to said weight, a locking lever for the bobbin pivoted on said post the tail of which passes through said slot and has a thread guide, said lever arranged to swing beyond the maximum diameter of the bobbin to permit
60 the ready exchange of bobbins.

In testimony that I claim the foregoing as my invention, I have signed my name.

CARL WILD.

Witnesses:

ARNOLD LEHNER,
TEAN SCHAAD.