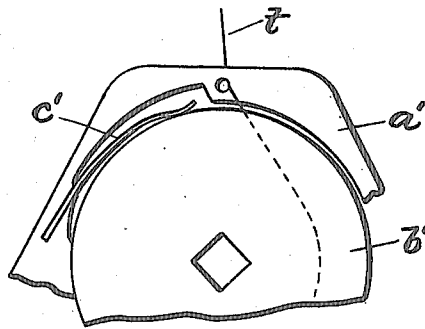
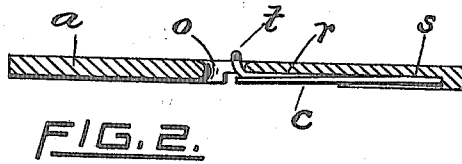
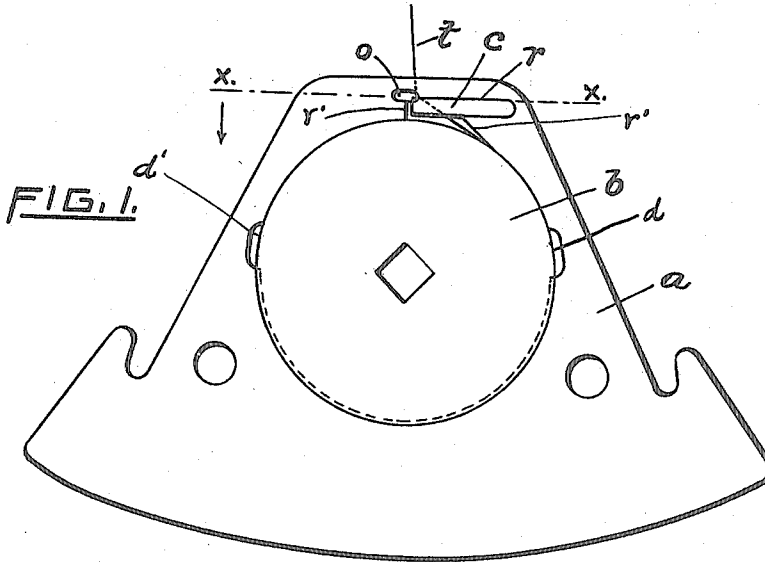


W. H. SMITH.
BOBBIN CARRIAGE FOR LACE MACHINES.
APPLICATION FILED MAY 22, 1916.

1,208,032.

Patented Dec. 12, 1916.



WITNESSES:

C. J. Hannigan.
Edith M. Bromley.

INVENTOR:

William H. Smith
By James R. Jenks
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM H. SMITH, OF PAWTUCKET, RHODE ISLAND.

BOBBIN-CARRIAGE FOR LACE-MACHINES.

1,208,032.

Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed May 22, 1916. Serial No. 99,091.

To all whom it may concern:

Be it known that I, WILLIAM H. SMITH, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Bobbin-Carriages for Lace-Machines, of which the following is a specification.

My invention relates to improvements in bobbin carriages for lace machines, net machines, curtain machines, and all machines using what are technically known as bobbins and carriages, and the purpose of my invention is to devise a bobbin carriage in which the bobbin will be wholly free to revolve without any brake or tension device whatever and also to provide a proper compensating tension for the thread from the bobbin, which tension will not be subject to variation but will be uniform regardless of the amount of thread on the bobbin.

I also aim to provide a carriage in which there will be a nearly unbroken contact between the bobbin and carriage throughout the entire circumference of the bobbin, thus eliminating the space between the upper portion of the perimeter of the bobbin and the inclosing carriage existing in the present type of carriages.

I obtain the objects aforesaid by the use of the devices shown in the accompanying drawing, in which—

Figure 1 is a plan view of my improved carriage. Fig. 2, a cross-section thereof on the line $x-x$ of Fig. 1, and Fig. 3, a cut of a portion of a carriage and bobbin of the present type in use prior to my invention.

The various parts of the invention are indicated by the same letters throughout the several views.

Fig. 1 is a plan view of my carriage with bobbin inclosed and consists of a body portion a , inclosing the bobbin b , said bobbin b being of the usual type. o is the threading hole of the carriage, which hole it will be noted, is oval in form. t is the thread passing from the bobbin b through the hole o . c is a thin steel spring inserted in the recess r in the upper portion of the carriage a , the relative depth of the recess and the thickness of the spring being such that when the thread passes under the spring, the outer surface of said spring will not project beyond the general outer surface of the carriage a , as shown best in Fig. 2. The recess

r is extended below the spring c to the top of the inner margin of the carriage as shown by the lines $r'-r'$. The spring c is fastened to the carriage a at the point s , Fig. 2, either by solder or some equivalent method.

$d-d'$ are small gaps cut in the carriage a for the purpose of admitting the bobbin b to its proper place within the carriage.

The thread t passes from the bobbin b under the spring c , thence through the hole o to the fabric, and it will be noted that the extremity of the spring c projects slightly over the edge of the hole o .

In order that some of the advantages of my improvement may be more easily appreciated I have made the drawing shown in Fig. 3 which represents a portion of a bobbin and carriage as in use at present.

In Fig. 3, a' represents the carriage, b' the bobbin, and t the thread. c' represents a spring inserted in a suitable notch cut in the body of the carriage a' , its free end bearing upon the outer periphery of the bobbin b' in order to provide the necessary tension thereon. It will be noticed in Fig. 3 that there is a considerable space between the bobbin b' and the adjacent wall of the carriage a' over a distance roughly equivalent to half the periphery of the bobbin, which space was thought necessary for the insertion of the bobbin b' into the carriage a' and also in order to give play to the spring c' . The style of carriage shown in Fig. 3 has been in use practically ever since bobbins and carriages were used in lace looms and the like, and one purpose of my invention was to avoid many of the faults existing in the type of carriage shown in this figure. Among these faults are the following, to wit:—In practice the spring c' often gets bent out of the plane of the carriage a' . In such cases on account of the space between the bobbin and the carriage above referred to, the bobbin itself is forced by the spring out of the plane of the carriage and the warp threads become entangled or caught by the projecting bobbins thus necessitating the stopping of the loom and serious injury to the fabric. The inspection of the carriages by the operator in order to detect such carriages before inserting them in the loom consumes much time which is wholly saved by my invention. Further, inasmuch as the bearing pressure of the spring c' upon the periphery of the bobbin b' was uniform, the

tension upon the thread t varied continually during the progress of the weaving operation from a full bobbin to an empty one, the leverage of the full bobbin by the pull upon the thread t being very much greater than that upon a bobbin half full or nearly empty.

In addition to the foregoing disadvantages, the pressure of the spring c' upon the bobbin resulted in very serious wear not only upon the spring itself, thus necessitating occasional replacement of springs, but also upon the edge of the bobbin as well as upon the inclosing carriage at a point diametrically opposite the bearing point of the spring upon the bobbin. Inasmuch, also, as the tension on the threads by the device shown in Fig. 3 is constantly varying, it was found necessary in practice to vary the weight on the warps or small beam-threads which considerably complicates the work of the weaver whose neglect in this matter frequently causes defective goods, whereas by the use of my device, the tension being uniform on all the bobbins, not only is a better and more even grade of work produced, but a considerable saving in the amount of yarn or thread used. This uniformity of tension is secured in my invention in the manner disclosed by the drawing, in which the bobbin is represented full of thread, that is, the unwinding thread is nearest to the circumference of the bobbin. It is evident that when the bobbin is nearly empty, the thread will pass directly from a point near the center of the bobbin to the threading-hole o , and it will be seen upon inspection that the tension of the spring c upon the thread when the bobbin is full is considerably greater than when the bobbin is nearly empty, because with a full bobbin the thread passes diagonally under the spring c , while with an empty bobbin it passes almost at right angles to the spring c . In other words, there is a greater length of thread under tension with a full bobbin than with a nearly empty one, thus rendering the flat spring a compensating tension device adapted to meet all conditions of the bobbin from full to empty, a result which cannot be accomplished by a round wire spring.

It is apparent from the foregoing that the tension upon the thread t by means of the spring c in my improved carriage is absolutely uniform and not varying according to the amount of thread upon the bobbin. Again the tension of the spring c upon the thread t may in my invention be lessened, if necessary, by the insertion of thin material, such as a strip of paper or the like, behind the spring near its fixed end. It will also be noticed that the recess $r'-r''$ projects beyond the free extremity of the spring c , and also that only a small part of the hole o is covered by the spring c .

The purpose of leaving a considerable portion of the hole o uncovered by the spring, as shown in Fig. 1, and of providing that the recess $r'-r''$ shall extend a considerable space beyond the free extremity of the spring c , is to facilitate the introduction of the thread through the hole and under the free end of the spring by means of the relation between the parts as described, and all that is necessary to effect such an introduction of the thread is to pass the thread through the opening o , and then pull the thread end t , which will automatically draw the thread under the spring c .

Instead of an oval hole, a round hole may be used of a somewhat larger diameter than the hole ordinarily used in carriages of this kind.

It is also much easier by my invention to insert and remove the bobbin inasmuch as in the old type the spring c' has to be lifted by the person operating the same in order to make room to insert or remove the bobbin, a process which is not necessary with my invention.

Having now described my invention, what I claim and desire to secure by Letters Patent is:—

1. A bobbin carriage for lace machines in which the inclosed bobbin is retained within the carriage so that its circumference is in close proximity to said carriage, said carriage being provided with small spaces in its inner circumference for the purpose of admitting the bobbin to be inclosed, substantially as described.

2. A bobbin carriage for lace machines adapted to receive the inclosed bobbin in such a manner as to leave relatively slight space between the circumference of said bobbin and said carriage with the exception of two diametrically opposed limited spaces $d-d'$ for the admission and removal of said bobbin, said carriage being also provided with a tension device consisting of a longitudinal flat spring fastened at one end to said carriage and free at the opposite end, and adapted to receive between its free end and the body of the carriage the thread from the bobbin and to exercise any desired tension thereon, without impeding the revolution of the inclosed bobbin, said carriage being recessed so that when the thread is in position, said spring will not project beyond the flat surface of the carriage, substantially as set forth.

3. A bobbin carriage for lace machines embodying a tension device consisting of a longitudinal flat spring fixed at one end to the body of the carriage and adapted to receive between its free end and the body of the carriage the thread from the inclosed bobbin, and to exercise the required tension thereon; said carriage being also provided with a threading-hole and a recess contain-

ing said spring, said recess extending beyond the free end of said spring, the relative positions of said threading-hole, recess, and spring being such that the free end of
5 said spring overlaps only a portion of said threading-hole and that tension upon the free end of the thread, after the same has passed through the threading-hole, will

draw the thread under the free end of said spring, substantially as described.

In testimony whereof I affix my signature 10
in presence of two witnesses.

WILLIAM H. SMITH.

Witnesses:

EDITH M. BROMLEY,
ROSCOE M. DEXTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."