(No Model.)

F. FOWLES & E. HARPER.

TENSION DEVICE FOR LOOM SHUTTLES.

No. 540,730. Patented June 11, 1895.

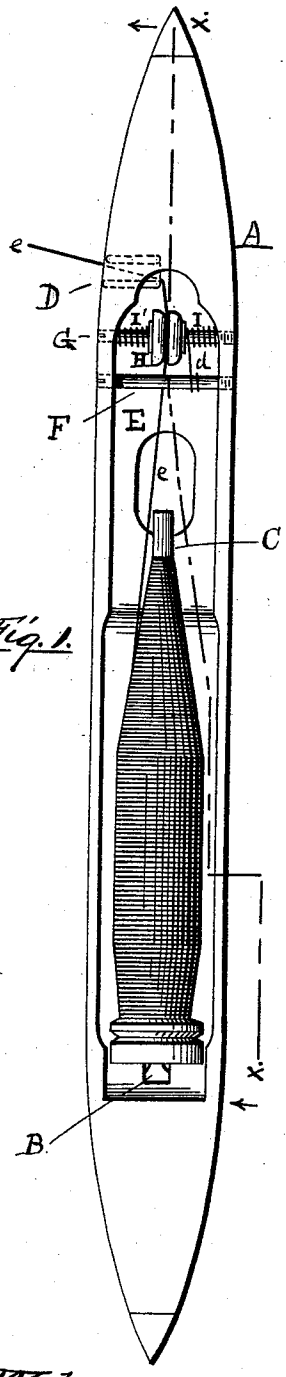

Fig. 1.

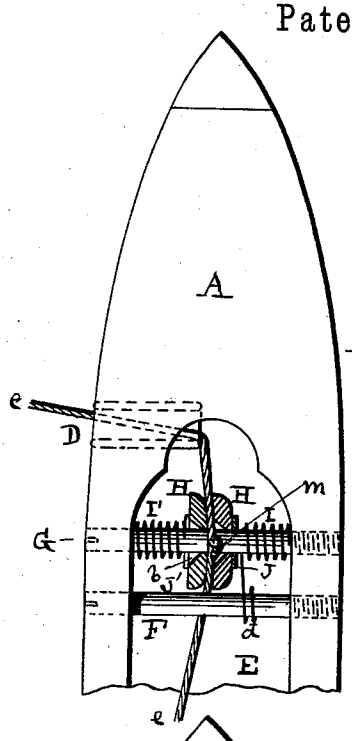

Fig. 3.

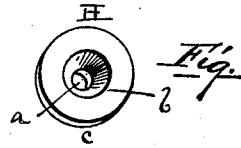

Fig. 6.

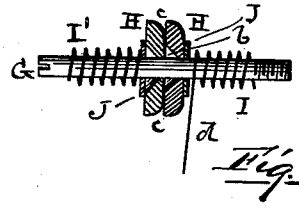

Fig. 5.

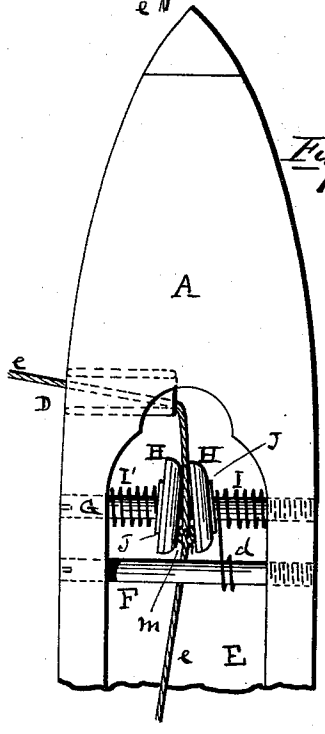

Fig. 2.

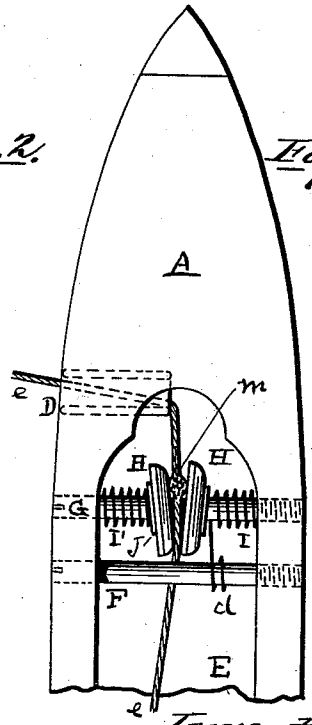

Fig. 4.

Witnesses.

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FRANK FOWLES AND EDWARD HARPER, OF PAWTUCKET, RHODE ISLAND.

TENSION DEVICE FOR LOOM-SHUTTLES.

SPECIFICATION forming part of Letters Patent No. 540,730, dated June 11, 1895.

Application filed July 3, 1894. Serial No. 516,410. (No model.)

To all whom it may concern:

Be it known that we, FRANK FOWLES and EDWARD HARPER, of the city of Pawtucket, in the county of Providence, in the State of Rhode Island, have invented a certain new and useful Improvement in Tension Devices for Loom-Shuttles; and we declare the following to be a specification thereof, reference being had to the accompanying drawings.

Like letters indicate like parts.

Figure 1 is a top plan of a shuttle embodying our invention. Figs. 2, 3, and 4 are each an enlarged top plan of the same to illustrate the action and movement of the friction-disks when a knotted piece of yarn is passing between them, the friction-disks being shown in section in Fig. 3. Fig. 5 shows the friction-disks in diametrical section as mounted upon the cross-pin, the latter, as also the spiral springs, being shown in side elevation. Fig. 6 is a perspective view of one of the friction-disks.

Our invention is a device to cause a tension upon the yarn as it passes from the shuttle-bobbin and shuttle in weaving.

It consists of the combination with a loom-shuttle, having the usual spindle, bobbin and eye, of a guide pin and cross-pin, on the latter of which are loosely mounted two movable friction-disks, which are made with a beveled edge and with a central, conical countersink, and two spiral springs upon said cross-pin, adapted to force said friction-disks against the yarn, as hereinafter particularly specified and set forth in the claims.

In the drawings A represents the body of the shuttle, B the spindle, C the bobbin upon the spindle and D the eye through which the yarn passes from the shuttle. All these are of the usual construction. Across the chamber E in the shuttle a guide-pin F passes from side to side. A cross-pin G also passes across said chamber E from side to side. The friction-device consists of two disks H, H, each having a central aperture *a*, a central conical countersink *b* and beveled edge *c* and mounted loosely upon the cross-pin G, whereon they are kept in forcible contact with each other by spiral springs I I′, which surround said cross-pin G and bear respectively against the walls of the chamber E and against washers J, lying in contact with the exterior sides of the friction-disks H. The spring I is extended as shown at *d* to the guide-pin F, around which its end is wound.

The action of the device is as follows: The yarn *e* passes from the bobbin C, under the guide-pin F, over the cross-pin G, between the friction-disks H and out through the eye D. The pressure of the friction-disks H upon the yarn *e*, while passing between them, prevents the yarn from "paying out" too freely in weaving. The pressure of the springs I I′ in forcing the friction-disks H against the yarn causes a constant and even tension upon the yarn, but not sufficient to impede the proper delivery of the yarn, because the pressure of the springs is comparatively slight; but while a uniform tension of the yarn in paying out is necessary, it is of utmost importance that the tension should not be so much as to interfere with the passage of knots or thickened portions of the yarn and so to cause breakage. Our device is adapted to maintain the uniformity of the tension and yet to allow the free passage of such knots or lumpy portions of the yarn. This is fully illustrated in Figs. 2, 3 and 4 of the drawings. In these it will be seen that the yarn is knotted as shown at *m*. In Fig. 2 this knot is shown as just entering between the friction-disks, the beveled edge *c* facilitating such entrance. The knot *m* presses outwardly the disks H on the side where it enters, and compresses the spiral springs I I′. At this same time however the pressure of the disks H at a point diametrically opposite the entrance of the knot is increased by the wabbling movement of the disks, caused by the entrance of the knot. In Fig. 3 the knot *m* is seen halfway through its passage between the disks H. In this position it has entered the central space of the countersink *b*, while the tension pressure of the disks is still upon the yarn itself between the countersink and the edges of the disk. In Fig. 4 the knot is seen passing out of the disks H, which open on that side to let it pass, while the pressure at the diametrically opposite point is increased. Thus the knot gets through without causing a breakage and the wabbling or vibrating action of the disks accommodates them to the obstruction while constantly maintaining the friction upon the yarn, which is necessary for

its proper tension. The end *d* of the spiral spring I serves to give steadiness to this vibratory motion by bracing the spring upon the guide-pin F. As said end *d* is extended on that side of the disks which is opposite to the side of the shuttle where the eye D is located, it counteracts the tendency of the yarn in passing out through the eye to tip the disks in that direction.

The damage caused by breakage of the yarn is considerable both in loss of time and of material. In weaving colored patterns, if the filling thread of a certain color breaks, it is necessary to stop the loom and to pick out and remove all the filling of that color back to the point where that color came in and weave that portion of the pattern over again. As breakage of the filling is to a large degree prevented by our invention more cloth can be woven in a given time than is possible when the imperfect tension device, above described as common, is used in shuttles.

The use of our improved tension gives a better selvage because the filling threads are drawn tight. If the filling is loose or unevenly drawn, the edges of the cloth are rough and irregular. Again, our device gives the same tension on the filling that the cloth beam gives to the warps. Therefore there is an evenness of texture and a uniformity in color in pattern goods, while an uneven or imperfect tension on the filling results in unevenness of texture and color.

The too free paying out of the yarn from the shuttle causes "side-lashing," which is entirely prevented by our invention; and the clearing of the yarn by passing between the friction-disks, removing foreign substances therefrom saves the necessity of "burling" to a considerable degree. So too, in weaving silk-mixed cloths, if our device is used it is not necessary to steam the goods to take out the kinks of the twist, which is often the cause of the color running from the silk threads. Our tension prevents such kinking of the silk and the operation of steaming is not required.

When the friction surfaces of the disks H are worn too much to be further effective they can be changed in position, so as to bring their other (formerly outer) surfaces together, as the countersink *b* is upon the plane instead of the beveled side.

We claim as a novel and useful invention and desire to secure by Letters Patent—

1. The combination with a shuttle body, having a chamber and an eye and provided with a spindle and a bobbin, of the guide pin F and the cross pin G, crossing said chamber from side to side, the friction disks H, each having the beveled outer edges *c* and mounted loosely upon said cross pin G and having a central conical countersink *b*, whereby it is adapted to rock sidewise on said cross pin, and the spiral springs I I′, surrounding said cross pin and having their bearings against the inner walls of the shuttle body and the outer surfaces of said disks H one end of one spring being attached to the guide pin, substantially as and for the purpose specified.

2. The combination with a shuttle body having a chamber and an eye and provided with a spindle and a bobbin, of a guide pin and a cross pin arranged laterally of said chamber, and a tension device on said cross pin comprising a friction disk arranged loosely thereon, said disk having one flat face provided with a central countersunken portion and a second face having beveled edges, and a second similar disk arranged also loosely on the pin and with its flat face opposing the second face of the first disk, and helical springs surrounding said cross pin and exerting pressure between the disks and their respective chamber walls to maintain forcible mutual contact of the disks.

3. A tension device of the class described comprising a pin having a friction disk arranged loosely thereon said disk having one flat face provided with a central countersunken portion and a second face having beveled edges, and a second similar disk arranged also loosely on the pin and with its flat face opposing the second face of the first disk, and helical springs surrounding said pin and exerting yielding pressure against the disks to allow of mutual wabbling thereof.

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