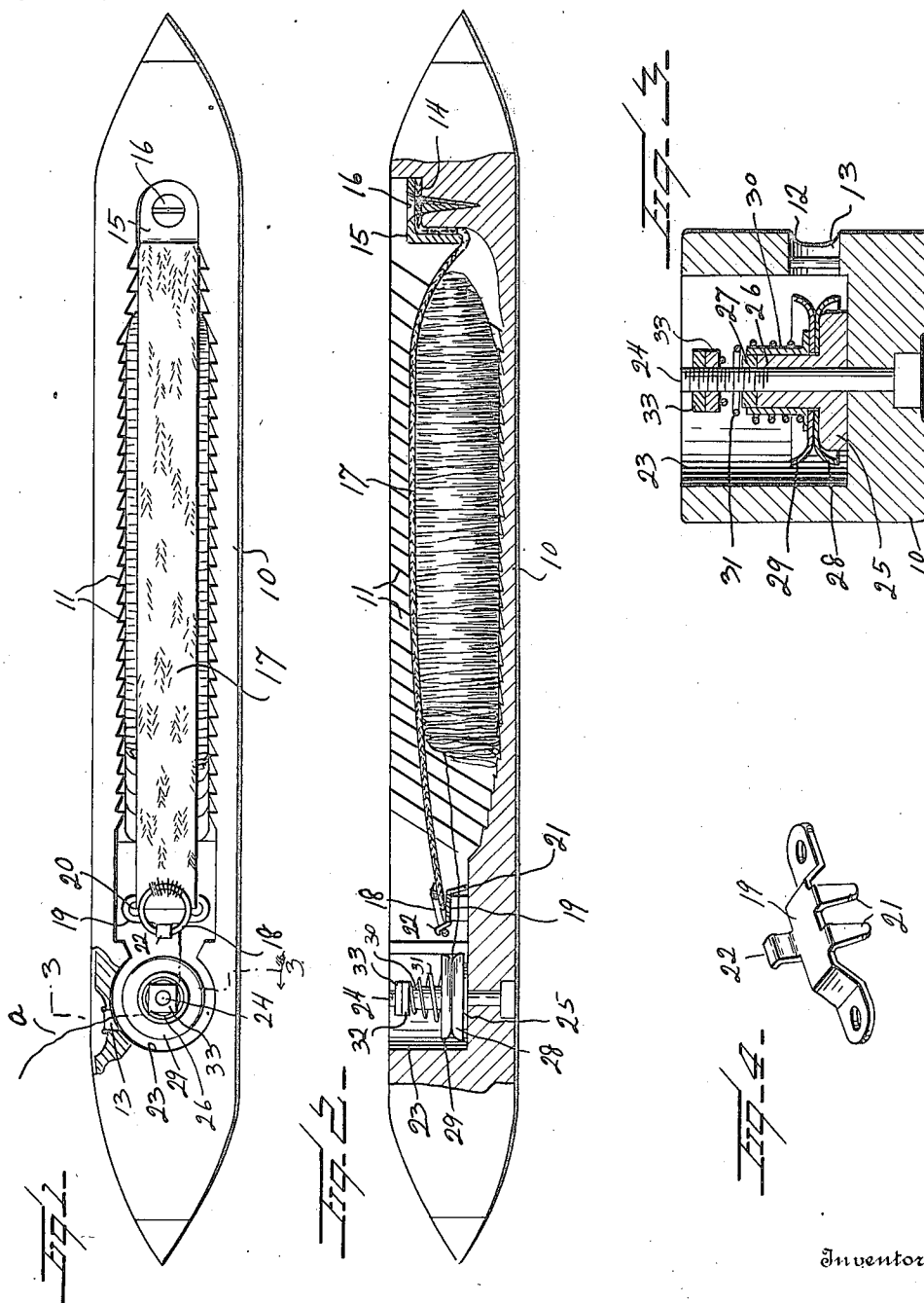


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YARN TENSIONING DEVICE FOR LOOM SHUTTLES.
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YARN-TENSIONING DEVICE FOR LOOM-SHUTTLES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, DAVID HERBERT FOGLE, a citizen of the United States, residing at New Brookland, in the county of Lexington and State of South Carolina, have invented certain new and useful Improvements in Yarn-Tensioning Devices for Loom-Shuttles, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to shuttles, and particularly to the yarn tensioning devices therefor.

The general object of this invention is to provide a tensioning device for heavy duck shuttles.

A further object is to provide means for placing such proper tension on the yarn that the yarn will not kink, lump or loop.

And a further object is to provide tensioning means so disposed within the shuttle that it will always be safe and will not cut the warp yarn by screws or iron pins, that the tension shall not knock loose or become reduced in operation, and that the shuttle shall not cut the steel reeds.

Another object is to provide a tensioning mechanism which can be used in connection with a corrugated shuttle, and provide a yarn tensioning device which may be used in connection with a tensioning strap disposed within the shuttle, the forward end of the strap being either hooked against the bottom of the shuttle or disposed in spaced relation to the bottom of the shuttle.

A still further object is to provide a tensioning device which will revolve freely and which will not choke up with any loose yarn.

A further object is to provide a shuttle with a tensioning strap attached at one end to one end of the shuttle and at its other end attached at a point adjacent the bottom of the shuttle so that the pressure of the elastic strap holds the yarn in the shuttle and keeps it from jumping off in loops.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a plan view of a shuttle embodying the improvements of my invention; Fig. 2 is a sectional side elevation thereof;

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a detail perspective view of a

hook plate employed and hereinafter specifically described.

Referring to these drawings, 10 designates the shuttle of usual or suitable form, the interior face of which is corrugated, as at 11. The side walls of the shuttle are longitudinally grooved, as at 12, and provided with the eye 13 disposed in said groove through which the yarn passes. The shuttle is supposed to be a heavy shuttle which is used for weaving duck, canvas, or other heavy cloths, and in which the yarn is not disposed within a spindle but is disposed more or less loosely within the shuttle and held from forward movement by the ratchet toothed corrugations 11. One end of the shuttle is formed as illustrated in Fig. 2 with a seat 14, and passing over the seat is the angular iron 15 held in place by a screw 16. Disposed upon the face of this seat beneath this iron 15 and extending downward to the bottom of the shuttle is the strap 17. This strap is of elastic material and has a width slightly less than the interior width of the shuttle, and at its forward end is provided with the ring 18. Attached to the bottom of the shuttle adjacent the opposite end thereof is a hook plate 19. This plate extends transversely of the shuttle, is somewhat arched at its middle, and is attached at its ends by screw 20. At its middle, the plate is formed with two downwardly extending lugs 21 spaced from each other to form an eye through which the yarn passes, and at its forward edge the plate is formed with an upwardly extending lug 22 constituting a hook and over which the ring 18 hooks. When the strap 17 is stretched and the ring 18 hooked over the lug 22, it is obvious that the strap will bear very tightly against the yarn *a* within the shuttle and will press the yarn firmly against the bottom of the shuttle while not impeding more than is necessary the passage of the yarn *a* through the eye 13 through the rotatable friction device which I will now describe.

The forward end of the shuttle is formed to provide a semi-circular chamber 23, as usual, with which the eye 13 communicates. Extending upward from the bottom of the shuttle and axially disposed in this chamber is a bolt 24. This bolt projects upward from the bottom of the shuttle and, as illustrated in Fig. 2, has its head embedded in the bottom of the shuttle so that no portion

of the head projects below the bottom of the shuttle and so that this head cannot work out accidentally and so project. Surrounding this bolt is a circular, somewhat convex base 25 having a sleeve 26 extending up therefrom which immediately surrounds and sheaths the bolt and which is held in place by a nut 27, the screw-threads of the bolt 24 projecting above the nut 27. Disposed upon the base 25 is a polished disk 28 which is concave on its under face and convex on its upper face so as to fit down over the base 25. The middle portion of this annular disk 28 is somewhat flattened. Disposed upon the disk 28 is a concavo-convex disk 29, the concave side facing the disk 28. The middle portion of this annular disk is somewhat flattened so as to provide two polished faces confronting each other. The disks 28 and 29 loosely surround the sleeve 26 and are free to rotate thereon.

Surrounding the sleeve 26 and bearing upon the upper face of the disk 29 is an annular cap 30 flanged at its lower end, and bearing against the flange of this cap and urging it against the disk 29 is a coiled compression spring 31, the convolutions of which grow gradually smaller toward the upper end of the spring. Bearing against the upper end of the spring is a nut 32 which engages the bolt 24, and also engaging this bolt is a nut 33. These nuts 32 and 33, it will be seen, together constitute jam nuts or lock nuts so that when they are turned down to any desired point, the nut 33 will hold the nut 32 from rotation. Thus the tension of the spring and the degree of pressure exerted by the spring against the upper disk 29 may be delicately controlled. The yarn *a* passes between these disks and around the polished outer surface of the sleeve 26 and then out through the eye 13. When the spring 31 is only slightly tensioned by the nuts 32 and 33, only a slight tension is placed upon the plate 29 to force it toward the plate 28, but as the tension of the spring 31 is increased by turning down the nuts 32 and 33, the tension of the plates upon the yarn will be increased to any desired extent.

Of course, it will be obvious that the disks 28 and 29 may revolve as the yarn passes between the disks and around the sleeve 26 and that the degree of resistance to this rotation offered by the spring 31 and the degree of pressure of the two disks upon the yarn can be adjusted by means of the lock nuts 32 and 33.

This tensioning device has been used under service conditions and it is found that with it the yarn will not kink, lump or loop, and that the tensioning device is perfectly reliable either on the filling yarn or on the warp yarn. Inasmuch as the tensioning device is disposed entirely within the shuttle, it is obvious that there will be no projecting

pins, screws, or other devices that would act to cut the warp yarn or cut the steel reeds by which the shuttle passes. It has been found that better cloth is made with less waste and with greater ease of operation by heavy duck shuttles having my improvement applied thereto than with the ordinary tensioning device.

It will be understood that the rotatable tensioning members 28 and 29 and allied parts may be used with a shuttle having a strap engaging device disposed adjacent the bottom of the shuttle or may be used with a strap engaging device disposed relatively distant from the bottom of the shuttle, and thus the device can be used in the spindle shuttle if desired. Where the hook lug 22 is disposed adjacent the bottom of the shuttle, it acts to hold the elastic strap 17 down close to the bottom of the shuttle and thus the strap pressure holds the yarn and keeps it from jumping off in loops. It will be seen that the yarn is guided between the prongs or lugs 21 to the tension disks.

The advantages of my improved duck shuttle over the shuttles ordinarily used for weaving duck, canvas and other heavy fabrics are many. In the ordinary duck shuttle, the tensioning devices are held in place by one or more transversely extending pins, and these pins being driven into the wood of the shuttle are very apt to work loose and when they work loose and work outward they cut the warp yarn and are very liable to cut the reeds. In the ordinary duck shuttle, too, the tension is regulated from the bottom by means of a screw-threaded tap and this screw is liable to work out while in use and thus cut out the warp yarn. In my device the head of the bolt 24 is embedded in the bottom of the shuttle so that it cannot possibly touch or cut the warp yarns and further, it will be noted that the spring 31 bearing as it does against the nuts 32 and 33 would resist any downward movement of the bolt which would cause its head to project below the bottom surface of the shuttle. By using the member 25, having the upwardly projecting central portion 26 a firm support is given to the lower disk 28 and to the sleeve 30. This sleeve 30 is necessary because thereby a firm pressure is secured upon the disk 29 concentrically to the center of the disk. It is to be particularly noted that as the top of the shuttle is open, the tension of spring 31 may be adjusted at any time without disassembling the shuttle and that if it is necessary to remove the disk 29, the sleeve 30 and the spring, this is readily accomplished by simply removing the nuts 33. It will be noted that in my shuttle, the member 19 which forms the hook for engaging the forward end of the strap has spaced prongs 12 which guide the yarn to the tension device. This tensioning device consists

ing of the disks 28 and 29 will not let the yarn kink in the cloth. This tensioning device consisting of the parts 28 and 29 may also be used on a spindle shuttle, particularly if the forward end of the strap 17 be raised above the position it takes in a duck shuttle. One of the chief advantages of my improved shuttle lies in its reliability and simplicity. Another advantage resides in the easy manner in which the tension may be adjusted.

I claim:—

1. In a shuttle, an elastic strap having a width nearly that of the interior width of the shuttle and attached to that end of the shuttle remote from the yarn eye, the strap extending toward the yarn eye, and a metallic strip having downwardly turned ends attached to the bottom of the shuttle, said strip on its side adjacent the yarn eye being formed with an upwardly and forwardly projecting lug and at its opposite edge with a pair of downwardly projecting lugs forming yarn guides, the free end of the strap having a ring engageable with said lug.

2. In a shuttle, an elastic strap having a width nearly that of the interior width of the shuttle and attached adjacent the bottom of the shuttle at that end of the shuttle remote from the yarn eye, the strap extending toward the yarn eye, and a member attached to the bottom of the shuttle formed to provide a guide for the yarn, and an upwardly and forwardly projecting lug, the free end of the strap having a ring engageable with said lug.

3. In a loom shuttle having a yarn eye at one end, and open upon its upper face, a yarn guide within the shuttle, a tension device for the yarn comprising a centrally disposed member, projecting upwardly from the bottom of the shuttle, two confronting disks mounted upon said member concentric

thereto and movable vertically upon the centrally disposed member, and between which disks the yarn passes to the eye, adjustable pressure means carried on said member above the disks, and means carried on said member above the disks for adjusting the pressure of said pressure exerting means, said pressure exerting means and adjusting means being entirely removable from the member through the open upper face of the shuttle.

4. In a loom shuttle having a yarn eye at one end, a yarn guide within the shuttle, a tensioning device for the yarn comprising a centrally disposed member, two disks disposed within the shuttle and rotatable upon said member, and between which disks the yarn passes to the eye, a spring bearing against one of said disks and urging it toward the other disk, and nuts engaging said member and bearing against the spring whereby the tension of the spring and the pressure exerted against the disks may be adjusted.

5. A loom shuttle having a yarn eye at one end and open upon its upper face, means for tensioning the yarn prior to its passage through said eye comprising a screw-threaded bolt extending upward from the bottom of the shuttle, a base mounted upon the bolt and having an upwardly extending sleeve immediately surrounding the bolt, a pair of confronting disks rotatably mounted upon said sleeve, a coiled compression spring disposed around the sleeve bearing against the upper disk and extending upward around the bolt, and nuts on the bolt bearing against the upper end of said spring whereby the tension of the spring may be adjusted.

In testimony whereof I hereunto affix my signature.

DAVID HERBERT FOGLE.