R. W. PORTER.

Shuttle-Bobbin.

No. 202,664. Patented April 23, 1878.

Fig1.

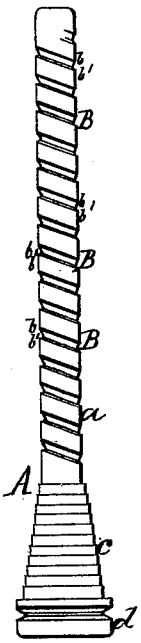


Fig2.

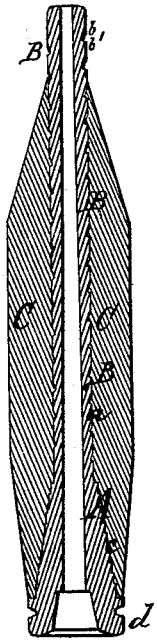


Fig3.

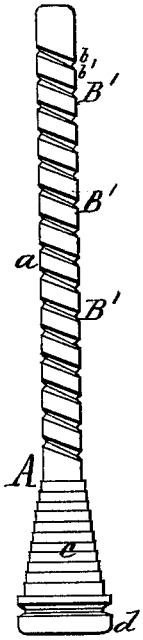


Fig4.

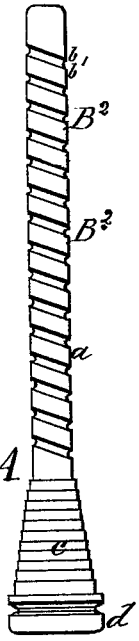


Fig5.

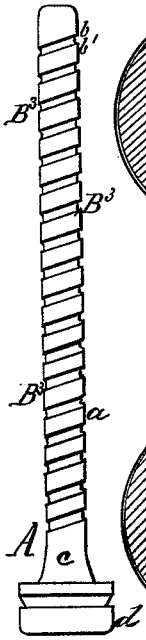


Fig6.

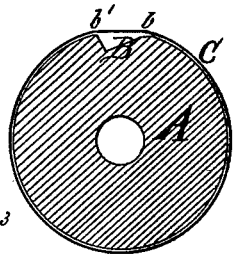


Fig7.

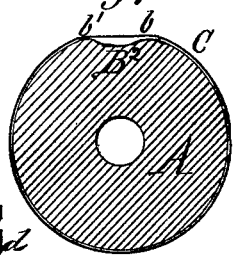


Fig8.

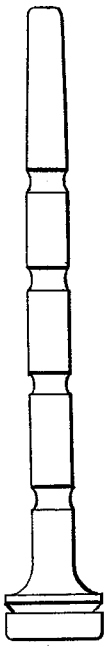


Fig9.

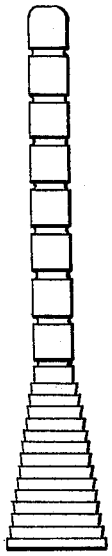


Fig10.

Fig11.

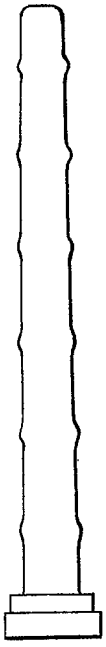


Fig12.

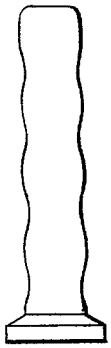
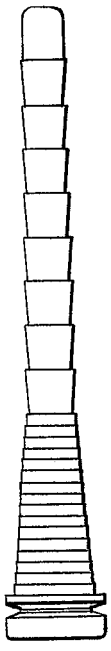


Fig13.



Witnesses:

James Martin Jr.

J. P. Theodore Lang.

Inventor:

Roger W. Porter

by

Mason, Fenwick & Lawrence

UNITED STATES PATENT OFFICE.

ROGER W. PORTER, OF NASHUA, NEW HAMPSHIRE.

IMPROVEMENT IN SHUTTLE-BOBBINS.

Specification forming part of Letters Patent No. **202,664**, dated April 23, 1878; application filed March 19, 1877.

To all whom it may concern:

Be it known that I, ROGER W. PORTER, of Nashua, in the county of Hillsborough and State of New Hampshire, have invented a new and useful Improvement in Shuttle-Bobbins, which improvement is fully set forth in the following specification and accompanying drawings, in which latter—

Figure 1 is an elevation of one of my improved bobbins. Fig. 2 is a vertical central section of the same as it appears with the yarn wound upon it. Figs. 3, 4, 5 are modifications of the same. Figs. 6 and 7 are enlarged cross-sections of the same, showing a single layer of yarn wound upon them. Figs. 8, 9, 10, 11, 12, 13 represent bobbins of different constructions as they are now in use, and I have added them to the foregoing drawings for the purpose of comparison with my improved bobbin.

The nature of my invention consists in a wooden-shuttle bobbin provided with a shoulder on its lower end, by which it is held in place when in the weaving-shuttle, and with a groove, in form of a screw-thread, beginning at the terminus of the ordinary grooved conical enlarged portion of the bobbin, and terminating at the upper end of the stem of the bobbin, all in such a manner that the yarn for forming a cop of a shuttle-bobbin is wound in the spinning-frame upon the bobbin across the spiral grooves therein, and, when thus wound, has a constant abutment presented to it, which abutment prevents the cop becoming loose on the bobbin, and finally being knocked off from the same by the movements of the shuttle while the weaving operation is going on; and, further, the unwinding yarn is guided off and prevented from hanging to the bobbin, the spiral groove serving to produce this effect in the most perfect manner, as the yarn follows its course unerringly.

In the drawings, A represents a shuttle-bobbin, Figs. 1 and 2, consisting of the stem *a*, grooved conical enlarged portion *c*, and a shoulder, *d*, on its lower end. The said shoulder *d* is grooved, and into this grooved portion the end of a retaining-spring is received when the bobbin is placed within the shuttle, for the purpose of holding the bobbin in place and preventing the bobbin from revolving upon the spindle of the shuttle. The shuttle-bobbin A has a spiral crease, B, of triangular form, cut in and around its stem *a*, above the base or conical portion *c*. The corner *b* of the said crease is slightly rounded, as more plainly shown in Fig. 6, and the corner *b'* is more abrupt, and need not be rounded.

In Fig. 3 the spiral crease B^1 is of **V** shape, which will do well when the yarn wound upon it is of less thickness.

The spiral crease B^2 (shown in Fig. 4) is of rounded shape, and may be made very shallow, as seen in the enlarged section, Fig. 7.

The shape of the spiral crease B^3 in Fig. 5 is trapezoidal and very shallow; and it may be made very broad, to suit coarser or thicker yarn. The said crease represents a left screw-thread, and the yarn is wound thereon in a left-hand direction.

In Figs. 6 and 7 the yarn C is shown stretched across the creases B B^2. The edge *b* of the respective creases above described serves as an uninterrupted abutment to the straight part of the first layer of yarn, whereby it is prevented from slipping off the bobbin. The length of the abutment thus secured is ordinarily four or five times that of the length of the bobbin, which is sufficient to cause the yarn-bobbin to adhere to the wood bobbin as though they were one solid body.

In Figs. 8 and 9 bobbins are shown with parallel annular grooves, which are objectionable, for the following reasons: The equal tension of the yarn is interrupted, and thereby the body of the yarn becomes somewhat loose near the said annular grooves, and liable to disarrangement of the different layers, and finally to be knocked off the bobbin, and in unwinding the yarn is continually chafing against the corners of the said grooves, which often causes its breakage, while in my improved bobbin the yarn is wound up in the same direction that the spiral crease runs, and consequently, when unwound, follows the crease and is guided by it to the end of the bobbin.

The same objections exist against the bobbins shown in Figs. 10, 11, 12, 13; and, besides this, those made with annular grooves are weakened considerably, while a spiral groove causes only a very small reduction of sectional area, as seen in Figs. 6 and 7, and therefore

does not materially, if at all, weaken the bobbin. In Figs. 10, 11, and 12 the bobbins are made with annular swells, with a view of avoiding the weakening of the bobbins; but these are objectionable, on account of the disturbance of the equal tension of the yarn, as previously described.

The bobbins shown by Figs. 12 and 13 are also objectionable, because the tension of the wound-up yarn is unequal, and the yarn-bobbin is not properly secured to the wood bobbin in consequence thereof. As the shape of the wound-up yarn is at every section of the bobbin the same, so is the tension the same; and under these circumstances a disarrangement of the yarn-layers, and a consequent loosening of the yarn-bobbin, is impossible.

It might be practicable to make a series of separated spiral grooves along the bobbin-stem, and thereby in a measure effect the result produced by the continuous groove or crease.

To sum up the advantages of my improved bobbin over the bobbins known and used at present, they are the following: First, my improved bobbin is stronger than that with annular grooves, which latter is reduced all around, while mine has solid wood opposite the cut; second, my improved bobbin allows the yarn to be wound up with even or equal tension, which cannot be done with the other bobbins exhibited in the drawing; third, the spiral crease gives the unwinding yarn a lead and guides it off the bobbin, which has not been done by any other bobbin yet. The yarn is, therefore, not subject to breakage from chafing against the corners of the crease; fourth, the hold upon the yarn is equal and continuous, as at every revolution around the bobbin the yarn must cross the retaining-crease.

I am aware that a spirally-corrugated cop-tube is shown in the English patents numbered, respectively, 512 and 899, and dated, respectively, 1861 and 1859; but a cop-tube is not a bobbin-spindle. A cop-tube is a small tube which is placed upon the mule-spindles to build upon, and its purpose is to remain in the bottom of the cop to keep the hole perfect, so that the spindles in the shuttle can be inserted into it. Without this tube the cop would become so snarled by handling that it could not be put upon the spindle, and would have to be thrown away into the waste-basket. These cop-tubes were formerly made of metal, ard were sometimes fluted or corrugated to prevent them from dropping out. They are now almost entirely made of paper, being cheaper thus made, and not injured by stepping on them. The metallic cop-tubes would easily get bent, and it was a trouble and expense to straighten them. The cops which I am speaking of are spun upon mules, and to this kind of spinning only are cop-tubes adapted. Bobbins, such as I have described and shown, are used upon spinning-frames, and are placed upon the spindles, and the yarn is spun upon them, remains upon them, and the respective bobbins are placed in the shuttle and there woven off. My improvement is merely a spiral crease or groove around the bobbin to prevent the yarn being knocked off while the shuttle is in motion, and I think I have the advantage over concentric-creased bobbins, inasmuch as the spiral crease will assist rather than retard the yarn in weaving off.

I do not claim cop-tubes corrugated spirally or in any manner; nor do I claim a sheet-metal cop-tube closed at its top and strengthened by wire wound spirally upon it, as in the patent of Essex, granted in 1876; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The within-described shuttle-bobbin, having the spiral groove cut in its periphery, for the purpose of securing the cop against longitudinal movement and determining the lay or direction of the cotton or yarn as it passes off from the bobbin, and also having the grooved shoulder at its lower end, by which, in conjunction with the ordinary latching-spring of the shuttle, the bobbin can be fastened in the shuttle and prevented from turning while the shuttle is moved back and forth and the yarn or cotton unwound, all as described.

Witness my hand in the matter of my application for a patent for an improved bobbin this 16th day of March, 1877.

ROGER W. PORTER.

Witnesses:

E. H. PARMENER,

FREDERIC KELSEY.