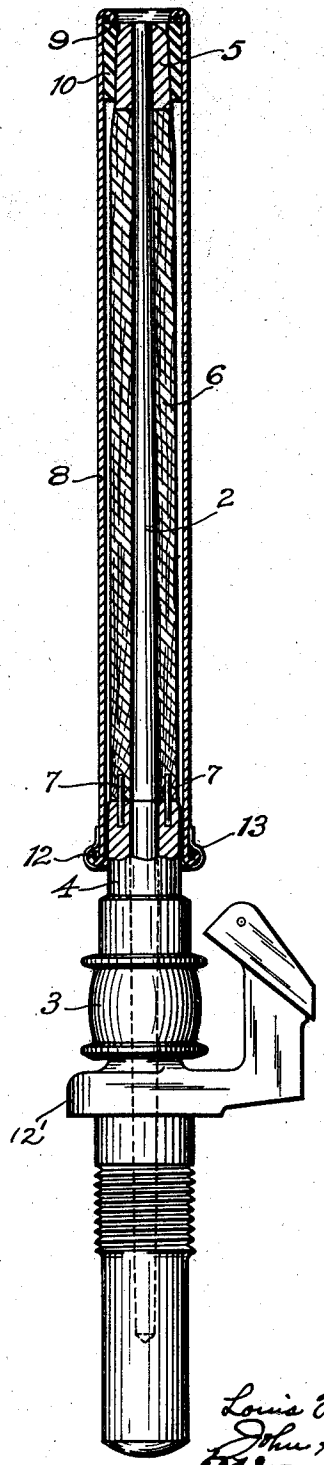
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BOBBIN FOR SPINNING FRAMES

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BOBBIN FOR SPINNING FRAMES

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8 Claims. (Cl. 242—122)

This invention relates to bobbins of the character used in spinning and twister frames. For convenience such bobbins will be hereinafter referred to as "spinning bobbins" or "bobbins for spinning frames."

It is the general object of the invention to devise a paper bobbin which will be a satisfactory substitute for the wood bobbins used practically universally in this country.

While it has been a common practice to use hollow conical forms made of cardboard, or similar material, as cores on which to wind twine, yarn, or the like, such devices are not at all suited to the requirements of bobbins for spinning frames. Also, it has been proposed to produce bobbins of essentially the same general form as those made of wood by molding, or otherwise shaping, sections of paper tubing. These constructions, however, have been expensive and, so far as we are aware, they have never gone into practical use.

In order for a paper bobbin to compete successfully with one made of wood, it must be capable of being manufactured on a comparable cost basis with wood bobbins; it must be as easily donned and doffed as a wood bobbin, and it must have a high degree of mechanical stability. To produce a construction which will satisfy these requirements has proved to be a difficult problem, and it is the chief object of this invention to devise a thoroughly practical solution for that problem. The invention involves both a new bobbin structure and also a novel combination of a bobbin and a spindle.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawing, and the novel features will be particularly pointed out in the appended claims.

The single figure of the accompanying drawing is a view, partly in side elevation and partly in vertical section, illustrating a preferred embodiment of the invention.

The spindle construction shown in the drawing comprises a spindle blade 2 which may be of any suitable form and may be mounted in any usual or convenient manner. That illustrated is a common commercial construction. The rotating portion of this structure includes a whirl 3 and an acorn 4 integral with the whirl, these parts being pressed on to a tapered section of the blade. In addition, the blade is equipped with a tapered tip 5 pressed on the blade and with a filler section 6 abutting at its opposite ends against the acorn 4 and tip 5, respectively. In the particular construction shown this filler piece is made of wood and it is connected with the acorn by means of two dowels 7—7. In some spindles, however, two or more of these parts 4, 5 and 6 will be made integral, depending upon the service required of the individual spindles, manufacturing expediencies, and the like. For example, in some constructions the acorn 4, tip 5, and filler section 6, are made in a single integral piece and are forced on to the upper end of a blade which is much shorter than that shown, the blade being supported in a bolster in the conventional manner. The blade is mounted for rotation in a spindle base 12' of a common form.

The bobbin comprises a straight tubular body portion 8 of paper, usually made by rolling a sheet or web of paper upon itself to form a cylindrical tube having the desired thickness of wall. Such a tube may either be made in lengths suitable for individual bobbins, or sections of such lengths may be cut from paper tubes made in indefinite lengths. In the construction illustrated, the upper end of the tube 8 is crimped over for the purpose of providing a smooth rounded surface at this end of the bobbin, to stiffen this part of the tube, and also to form an internal shoulder 9 against which to position the bushing 10. It is preferable, also, to reinforce the lower end of the bobbin, either by crimping it over, as shown at 12, or by means of a metal ferrule 13, or both. Such reinforcement of the ends, however, is not always necessary.

At some stage in the process of manufacture of the bobbin, the paper body preferably is impregnated with some such composition as those used in producing hardened or indurated paper or fiber products. These treatments consist of impregnation with drying oils and subsequent oxidizing of the oils, or with natural or synthetic resins, or with resinous materials which are applied in liquid form and subsequently are reacted as, for example, Glyptal, or Bakelite compositions. They serve to stiffen and harden the bobbin and to give it a high degree of mechanical strength and stability as well as to waterproof it.

After the treating and shaping operations have been completed, the bushing 10 is pushed through the lower end of the bobbin, abutted against the shoulder 9, and is cemented in that position. Preferably this bushing is made of rubber, either natural or synthetic, but it may be made of

other substances, such as wood or cork compositions.

Both considerations of manufacturing expense and of satisfactory operation have made it preferable to eliminate the drive of the bobbin from its lower end, as is customary with wooden bobbins. For this reason provision is made for supporting and driving the bobbin solely from its top. Accordingly, such drive is accomplished through the engagement of the bushing 10 with the tip 5, these two parts being tapered so that one fits tightly within the other. Below the bushing, however, the bobbin has a clearance with the spindle for its entire length. That with the acorn 4 should be somewhere between four and ten thousandths of an inch on a side, the clearance commonly used being five thousandths of an inch. From this point to the tip 5 the clearance increases to a maximum in the neighborhood of thirty thousandths of an inch.

These clearances and the degree of taper of the parts 5 and 10 are very important from an operating standpoint. If there is too little clearance, the spindle is likely to grab the tube during the operation of placing the latter on the blade and at a time before it gets down to its seat. This action may be sufficiently violent to snatch the tube out of the operator's hand. On the other hand, if the clearance is much greater than the figures given, then the bobbin will squall or squeal during the operation of putting on a new or an empty bobbin. Some clearance, also, at the lower end of the bobbin is desirable in order to provide good running conditions.

The taper of the tip 5 and bushing 10 must be sufficient to prevent slip of the bushing on the tip under the driving effort transmitted by the latter. Such a condition naturally calls for a very low degree of taper—something approaching a sticking taper. This, however, would not be satisfactory from an operating standpoint for two reasons:

(1) Because it would be difficult for the operator to pull the bobbin off the spindle in doffing; and

(2) Because the tolerance necessary to practical manufacturing conditions would result in too great a variation in the vertical position of different bobbins placed on the same spindle.

While some tolerance in this position must be expected, the ideal condition would be to have every bobbin bottom in precisely the same vertical relationship to every spindle in the frame. Thus the maximum length of each bobbin could be utilized for yarn supporting purposes. If the taper of the parts 5 and 10 were made sufficiently great to produce this result, it would also greatly increase the tendency of the bobbin both to slip circumferentially and also to work upwardly off the tip 5 due to vibration of the machine. A long series of experiments has demonstrated that a taper of between sixty and one hundred thousandths of an inch per inch of axial length satisfactorily meets the requirements of driving, doffing, and positioning of the bobbin. The preferred figure is midway between the limits just given, and these limits afford a reasonable manufacturing tolerance. Also, the dimensions of the tip should be such as to afford ample frictional driving surface. While these dimensions necessarily will depend somewhat upon the diameter of the bobbin, typical dimensions of the tip are a length of in the neighborhood of three-quarters of an inch and a diameter of between three-eighths and three-quarters of an inch at the larger end. Usually this diameter runs nearer the latter figure than the former.

A slight taper is given to the filler section 6, as indicated by the clearance above referred to, since such a taper is of material assistance to the operator in removing the few turns of yarn wound around this intermediate portion of the spindle. Usually these turns will come off with the bobbin in doffing, but if they do not, they must be removed by hand. As a rule the lower portion of the blade below the whirl is gradually reduced in diameter to the lower end of the blade, this lower taper being like that common in spinning spindles.

It has been demonstrated in actual practice that this invention provides a paper bobbin which is highly satisfactory in commercial operation. At the same time it can be manufactured at costs which enable it to compete successfully with wooden bobbins. And in some respects it is superior to the latter.

While we have herein shown and described a typical embodiment of our invention, it will be evident that the invention may be embodied in other forms without departing from the spirit or scope thereof.

Having thus described our invention, what we desire to claim as new is:

1. A spinning frame spindle comprising a spindle blade provided with an acorn and a tip, both larger in diameter than the blade and rigid therewith, and a base in which said blade is mounted for rotation around its own axis, said spindle also including a tapered film section between said acorn and said tip, the outer surface of which section approximately merges with those of said acorn and said tip, the smaller end of said tapered section being uppermost.

2. The combination with a spinning frame spindle including a spindle blade provided with a tapered tip, an acorn and a filler section extending from said acorn to said tip, of a bobbin mounted on said spindle and comprising a substantially cylindrical waterproof paper body with a bushing in the upper end portion of said body, said bushing fitting on said tip, said tip and the internal surface of said bushing engaged therewith being so tapered as to drive the bobbin without substantial slip but permitting free removal of the bobbin from the tip during doffing and supporting the bobbin in substantially a predetermined position lengthwise of said blade, the portion of said body below said tip being of such diameter as to provide a clearance between the inner surface thereof and the outer surfaces of said acorn and said filling section, whereby the bobbin is supported on the spindle solely by the engagement of said bushing with said tapered tip.

3. A combination according to preceding claim 2, in which said tip and said bushing have a taper of between sixty and one hundred thousandths of an inch per inch of axial length.

4. A combination according to preceding claim 2, in which the clearance between the inner surface of said bobbin and the outer surface of said acorn is between four and ten thousandths of an inch all around the acorn.

5. A combination according to preceding claim 2, in which the clearance between the inner surface of said bobbin and the outer surface of said acorn is in the neighborhood of five thousandths of an inch and the clearance with the filler piece is between about five and thirty thousandths of an inch.

6. A combination according to preceding claim 2, in which said tip has a taper of between sixty and one hundred thousandths of an inch per inch of axial length and has a diameter of between three-eighths and three-quarters of an inch at its larger end.

7. A bobbin for spinning frames comprising a waterproof paper tube of substantially cylindrical shape provided with an inwardly crimped upper end and an outwardly crimped lower end, and a bushing in the upper end portion of said bobbin, said bushing having an internal tapered surface adapted for driving engagement with a spindle tip, the upper end of said bushing bearing against said inwardly crimped portion of the tube.

8. A bobbin for spinning frames comprising a waterproof paper tube of substantially cylindrical shape provided with an inwardly crimped upper end and an outwardly crimped lower end, and a bushing in the upper end portion of said bobbin, said bushing having an internal tapered surface adapted for driving engagement with a spindle tip, the taper being between sixty and one hundred thousandths of an inch per inch of axial length.

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CERTIFICATE OF CORRECTION.

Patent No. 2,320,965. June 1, 1943.

LOUIS M. COTCHETT, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 34, claim 1, for "film" read --filler--; line 56, claim 2, for "filling" read --filler--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of June, A. D. 1943.

Henry Van Arsdale,

(Seal) Acting Commisssioner of Patents.