S. W. WARDWELL.

BOBBIN HOLDER.

APPLICATION FILED OCT. 23, 1908.

941,595. Patented Nov. 30, 1909.

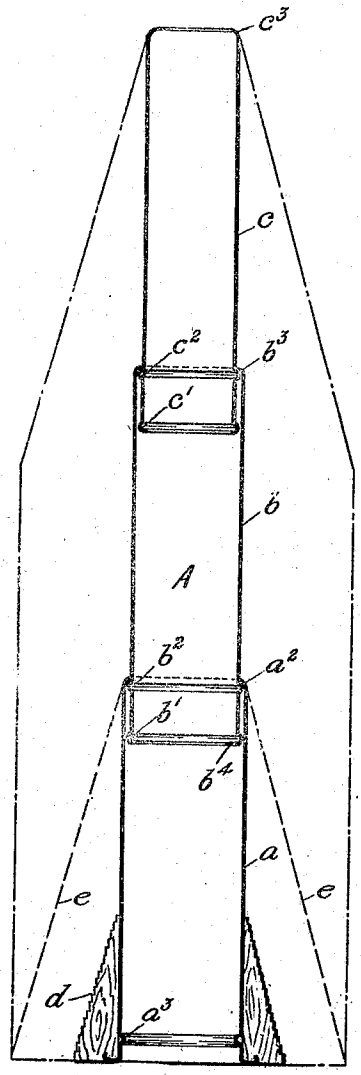

Fig. 1.

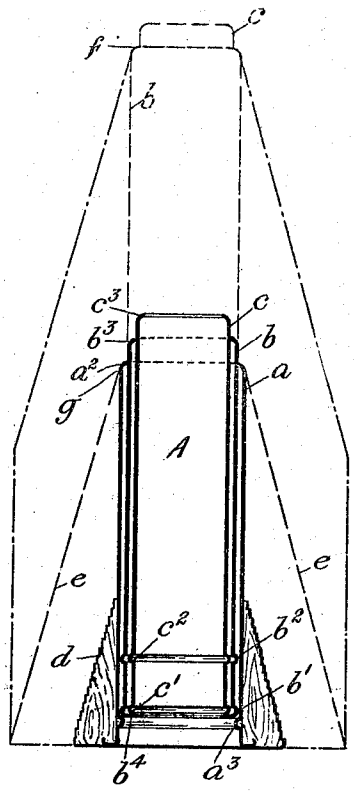

Fig. 2.

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BOBBIN-HOLDER.

941,595. Specification of Letters Patent. Patented Nov. 30, 1909.

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To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Bobbin-Holders, of which the following is a specification.

My invention relates to improvements in tubes or holders for bobbins or yarn packages.

The purpose of my improvement is to provide a sectional, telescopic tube which, when extended to its full length, provides a suitable support on which to wind bobbins of yarn or other textile materials, and which, when the yarn is unwound therefrom, automatically closes up and is shortened in length so that the yarn may deliver freely without dragging on the holder.

My improvement also provides a much lighter holder than those now in general use, and one which can be compacted in much less space, so that it is more convenient in handling and more economical for shipment.

My invention is fully set forth in the following specification illustrated by the accompanying drawings, in which:—

Figure 1 is a longitudinal sectional view showing the holder extended, and illustrating the form of the bobbin wound thereon by dot-and-dash lines; and Fig. 2, a longitudinal sectional view showing the holder contracted after the bobbin is partly unwound.

My improved holder is particularly adapted for use in supporting yarn wound into the form shown by dot-and-dash lines in Fig. 1 in which the bobbin has a substantially flat base, a cylindrical body and a tapered nose or delivery end. This form of bobbin is generally wound on wooden holders having frusto-conical bases and comparatively long shanks extending therefrom. The yarn is laid in conical layers starting on the tapered surface of the base with a traverse equal to the length of the taper; and as the winding continues the path of traverse is advanced gradually toward the opposite end of the holder, so that the bobbin has a uniform outside diameter equal to the extreme diameter of the base of the holder, and a pointed nose of the same taper as that of the base. Such bobbins are called knitting bobbins and are used to deliver yarn to knitting machines where it is essential that the yarn be unwound very freely, without hitch or drag which would be liable to break the needles and injure the fabric.

In my pending application Serial No. 432,450, filed May 12, 1908, I have shown an improved form of bobbin in which the bulky, heavy, wooden holder is dispensed with and a light tube substituted with only a comparatively small butt or form at its base end. With this form of bobbin a much greater amount of material can be compacted in the same space and the excessive weight and expense of the wooden holder is done away with. In the present invention I now show further improvement by providing for telescoping the tube portion of the holder.

Fig. 1 shows the tube A made in three parts *a*, *b* and *c*, but it will be obvious that it might be constructed of any number of sections. The lower or base section *a* has a butt or form *d* which may be of any suitable material such as wood or fiber. The butt is fastened to the tube-section by any suitable means, such, for instance, as here shown, with the tube flanged out at its end and bent over to indent and engage the material of the butt. The form of butt shown by full lines is adapted to be used with bobbins such as described in my pending application above referred to in which the base of the bobbin is composed principally of yarn, built up in layers of different lengths which overlap each other and form a conical heel on which subsequent layers of uniform traverse are laid. With the previously known and used form of bobbin the winding is initiated on a butt or form having a diameter at its base equal to the full diameter of the bobbin and all of the layers are of uniform traverse. To adapt the present tube to this latter form of bobbin a base of the dimensions illustrated by the dash lines *e*—*e* might be substituted, but the smaller butt is the preferred form.

The tube-section *a* is spun or formed in with a converging rim a^2 at its upper end and the second section *b* is of slightly less outside diameter than the inside diameter of the section *a*, so that it will slide freely through this contracted opening. At b^1 and b^2 the section *b* is formed with two annular enlargements or rings which fit the interior of the main portion of the section *a* with a slight clearance. The ring b^2 serves as a

stop adapted to be engaged by the contracted rim a^2 to prevent the section b from being pulled clear out of the section a. The ring b^2 also serves in combination with the ring b^1 to provide bearing points within the section a so that the section b, while sliding freely, will be held in proper alinement with the section a.

The section b is contracted at its upper end with a converging rim b^3, similar to the rim a^2 on the section a, and the section c is fitted to slide in this contracted opening in the same manner as the section b slides in the section a. The section c also has two annular enlargements c^1 and c^2 which provide a bearing against the interior of the section b and prevent its removal from the section b. The upper end of the section c also has its rim turned in at c^3 to provide a smooth edge for the yarn to draw across.

The section b is slightly shorter than the section c and its lower end is formed inward in the flange b^4 so that the section c cannot drop down through the section b, but will project slightly through the top when the tube is contracted as shown in Fig. 2. For the same purpose the section a is longer than either of the other two sections and is formed with an internal, annular projection or stop a^3 to prevent the sections b and c from sliding down through the base. It will be seen from reference to Fig. 2 that the several sections project slightly, one above another, when the tube is telescoped, so that their ends may be grasped by the fingers in extending the tube.

Having now described the structure of the device its mode of operation in use will next be explained: The tube is extended to its full length and applied to the spindle of the winding machine. When used with the small butt d, shown by full lines, the yarn is wound on to the conical face of the butt, starting with a traverse equal to the length of the taper of the latter. As the yarn is built up on the base of the tube the traverse of the guide which lays the yarn is gradually increased until the predetermined maximum diameter of the bobbin is reached. This method of increasing the traverse as the winding proceeds will cause the layers to overlap each other and the yarn will be built up in frusto-conical form. After the conical heel is completed the winding continues with all layers uniform in length and with the path of traverse of the yarn guide advancing gradually along the length of the tube. As the yarn is built up along the tube the coils of winding form a bond between the different sections of the tube, so that when the bobbin is completed to the dimensions illustrated by dot-and-dash lines, Fig. 1, the tube is held from telescoping. In other words, the mass of yarn wound tightly around the several sections of the tube hold the latter in their extended positions in relation to each other, making a practically rigid internal core or support.

In delivering the material to the knitting or other machine the bobbin is stood on its base end and the yarn unwound from the pointed delivery nose. As the yarn unwinds down the tube it will release the several sections of the latter, one after another, and as the yarn comes off of each section it will drop down into the next lower section. For illustration: when the yarn has been unwound down to the point f, shown by broken lines Fig. 2, the section c will be completely uncovered without any coils extending around it from the section b. There being no bond to hold the section c raised out of the section b, gravity will cause it to drop down or telescope into the lower section b, where it is held by the rim b^4. After the yarn has been unwound down to the point g the section b will be uncovered and will drop down into the section a carrying with it the section c. The stop a^3 prevents the sections b and c from dropping clear through the section a, as previously explained. It will thus be seen that the tube is automatically shortened as the yarn is unwound, the object being to prevent the delivering yarn from wrapping around the tube in unwinding or from dragging across its end. With the holders and tubes now in use, as the yarn is unwound it leaves the support projecting upward and there is a decided tendency of the yarn to wrap around this shank or tube and cause undue drag and resistance to the unwinding. It will be seen that the more yarn there is unwound, the greater the length of support there is left extending, and the greater will be the drag or resistance to the delivery. It is very desirable that the tension on the delivering yarn be maintained uniform from start to finish of unwinding so that the fabric produced by the machine will not be affected to vary its character.

My new improvement provides for automatically shortening the bobbin tube or support at intervals of the unwinding, so that the yarn is prevented from dragging on the tube and therefore the tension of delivery will remain practically constant.

It will also be seen that my new holder is much lighter than the wooden holders now in general use and is of considerably less bulk when telescoped.

Where a large number of holders are stored for use in the mill, as is a usual practice, the use of my invention will greatly economize space, and in shipment, the cost of boxing and freight will be greatly reduced on account of the saving in bulk and weight.

Having now described my device in detail, without limiting myself to the exact construction and arrangement shown, what I claim is:—

1. In a holder for bobbins, the combination of a plurality of tube-sections arranged to telescope, one within another, with means to limit the movement of the sections in relation to each other to prevent their separation.

2. In a holder for bobbins, the combination of a sectional, telescopic tube with means to limit the movement of the sections in relation to each other to prevent their separation and a butt secured to one of the sections.

3. In a holder for bobbins, the combination with a plurality of tube-sections of graduated diameters arranged to telescope, one within another, and a frusto-conical butt on the section of largest diameter.

4. In a bobbin holder, the combination with a tube formed in sections adapted to telescope, one within another, of a butt secured to the section of largest diameter, and means to limit the movement of each section in relation to the next section.

5. In a bobbin holder, the combination of a plurality of tube-sections of graduated diameters arranged to slide, one with another, with means to limit the movement of the sections in relation to each other, so that when the sections are telescoped each succeeding section will project slightly beyond the end of its adjacent section.

6. The combination in a bobbin holder, of a telescopic tube formed with sections arranged to slide one within another, each section having one end contracted, with the next inclosed section projecting through the contracted opening, and the sections formed with stops to prevent their ends from sliding out beyond the openings in the inclosing sections.

7. The combination in a bobbin holder, of a telescopic tube having sections with contracted openings, with one section fitted to the contracted opening of the next section, and annular projections on each inclosed section adapted to prevent the removal of one section from the next surrounding section.

8. The combination in a bobbin holder, of a telescopic tube having sections *a*, *b* and *c*, each section having a contracted opening at one end, the section *b* having an outside diameter adapting it to slide through the opening in the section *a*, and the section *c* adapted to slide through the opening in the section *b*; both sections *b* and *c* having annular enlargements adapted to the internal diameters of the sections in which they slide, the section *b* having a rim b^4 to prevent the section *c* from dropping down through it, and the section *a* having a stop a^3 on its interior to prevent the section *b* from dropping through.

9. The combination in a bobbin holder having a plurality of sections adapted to telescope one within another, each section having a bearing in its surrounding section which allows it to slide freely, and means to limit the movement of one section in relation to its inclosing section so that when the sections are withdrawn a sufficient length of bearing contact is provided between each two sections to hold the several sections in alinement.

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

SIMON W. WARDWELL.

Witnesses:

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