Dec. 11, 1956 R. L. CHILDS ET AL 2,773,346

TEXTILE SPINDLE

Filed May 18, 1953

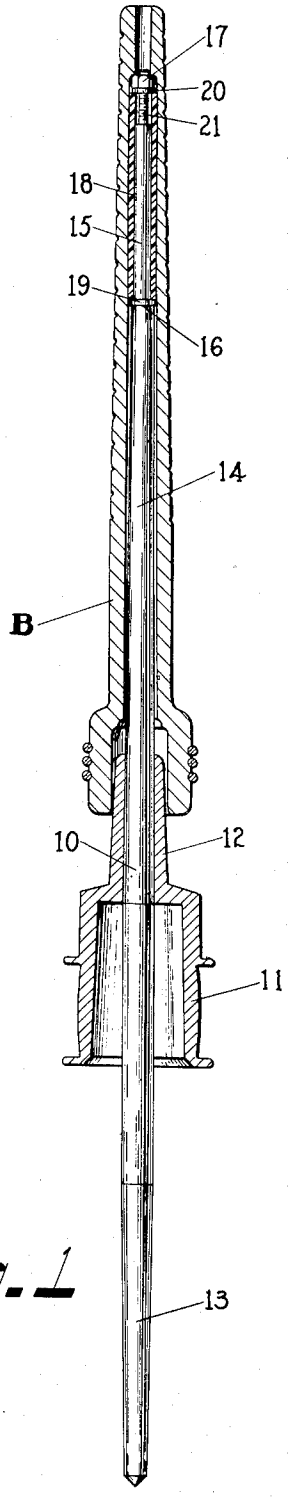


FIG. 1

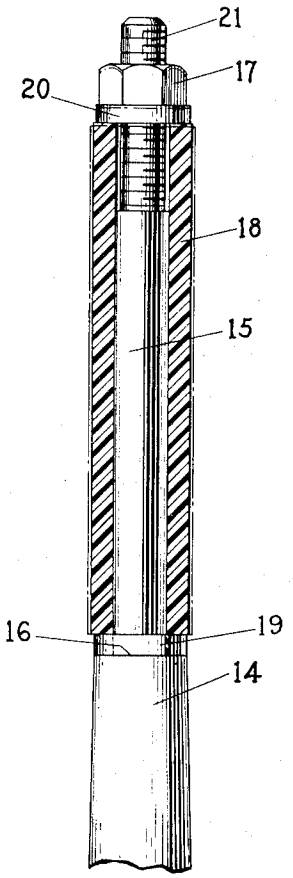


FIG. 2

INVENTOR.
RICHARD L. CHILDS
EDWARD CRANSHAW

BY Rodney C. Smethurst

ATTORNEY

United States Patent Office 2,773,346 Patented Dec. 11, 1956

2,773,346

TEXTILE SPINDLE

Richard L. Childs and Edward Cranshaw, Hopedale, Mass., assignors to Draper Corporation, Hopedale, Mass., a corporation of Maine

Application May 18, 1953, Serial No. 355,464

3 Claims. (Cl. 57—130)

This invention pertains to improvements in spindles such as spinning and twisting spindles, and more particularly to means forming a part of such spindles and adapted to support and drive a bobbin.

It is a general object of the invention to devise improved driving means for a spinning or twisting spindle which shall serve effectively to grip the interior of a bobbin carried on the spindle, to drive it as the spindle is rotated and which shall also permit easy donning and doffing of bobbins thereon.

It is a more specific object of the invention to devise such means which shall function at or adjacent the tip of a spindle such as a spindle of smaller diameter adapted to support and drive so-called filling bobbins and which may support the bobbin adjacent its tip and drive it at that general locality, thereby permitting the base or butt of the bobbin to have a slight amount of play at the acorn or adjacent part of the spindle and/or whorl thereby to permit self-alignment as shown and described in United States Patents 210,358 and 942,777.

Spinning and twisting spindles are rotated at very high rates of speed and generally comprise a blade of tapered steel on which is fixed a whorl, the blade extending above the whorl to support a bobbin in driving relationship with the spindle, and also below the whorl to be borne in suitable bearing structure within a bolster, the general arrangement and details of such mechanism being understood by those familiar with the textile art. Various schemes have been employed for causing the bobbin to rotate with and at the same speed as the spindle. Certain difficulties are experienced since such spindles are necessairily of relatively small diameter and contact the bore of wooden or other bobbins the dimensions of which are not capable of being maintained within extremely fine limits, and which are instable as the material from which the bobbin is made expands or contracts due to change in moisture content, and further, due to the wear occasioned by the repeated donning and doffing of the bobbin on the spindle as is necessary since it takes but a small period of time to spin or to wind a package. Furthermore, any driving means employed must, in addition to imparting the required torque from the spindle to the bobbin, permit the donning and doffing functions to be carried out with a minimum of effort, and especially without any sticking such as may require unnecessary effort on the part of the machine operator.

According to the invention hereinafter described in greater detail a spindle of more or less conventional design has been so modified as to provide for all of the necessary attributes required including easy donning and doffing and effective driving. The preferred form of the invention comprises a reduced end, that is, a turned down spindle blade end of fair length on which is mounted a hard resilient sleeve of a material such as one of the plastic compounds capable of being readily molded or extruded and which has comparatively great resistance to distortion of its dimensions, but which may

nevertheless, be compressed longitudinally by the application of a relatively severe compressive force applied longitudinally thereof, and which will show, in conjunction with such longitudinal compression, a proportionate amount of lateral expansion, that is, increase in diameter.

Since the sleeve fits tightly on the reduced end of the blade, any change of dimension laterally is exemplified as increased diameter which change of dimension is utilized to adjust the driving torque, that is, initially and also from time to time to take care of wear such as may be experienced over a period of time. The sleeve is actually compressed between a shoulder at the lower end of the reduced end of the blade and a threaded member such as a nut at the tip thereof, this threaded member being employed to hold the parts in position and also to develop that degree of compression necessary for adjustment as described.

The invention will be described in following paragraphs by reference to one particular embodiment thereof illustrated in detail in the accompanying figures of drawing, wherein:

Fig. 1 is a sectional view showing a spindle to which the invention has been applied, a typical filling bobbin being shown in driving relationship thereto.

Fig. 2 is an enlarged view of the driving portion of the spindle.

Now referring to the figures of drawing, a typical spindle to which the invention may be applied comprises a blade **10**, a whorl **11** having an acorn **12**, it being understood that the whorl is for the purpose of accommodating a tape or belt by which the spindle is to be driven. The spindle blade continues downwardly below the whorl to terminate in a tapered portion **13** which, as is well known to those skilled in the art, fits within a suitable bearing within a bolster, the details of such parts not being necessary of further description here. The blade continues upwardly beyond the whorl and acorn within which it fits tightly to continue as a tapered part **14** having a reduced or turned down end **15**. This reduced end joins or continues from the part **14** at a point defined by a shoulder **16**, this shoulder serving in conjunction with a nut **17** to clamp a sleeve **18** in position on the reduced end. While the same are not necessarily to be employed in all instances, it is preferred that washers **19** and **20** be positioned above the shoulder **16** and below the nut **17**, these washers preferably being of brass thereby to prevent rusting or other undesirable effects by which the parts might be caused to stick after a period of time.

The nut **17** is threaded onto a still further reduced end **21** of the blade, the latter being threaded for a sufficient extent to accommodate the longest sleeve which might conceivably be utilized and to provide a range of adjustment for the nut **17** such that any degree of compression desired may be effected.

It is to be understood that, as more clearly shown in Fig. 2, the sleeve **18** fits relatively tightly on the reduced end **15** and, of course, the threaded part of the blade tip is of greater extent than may normally be required, however, the additional amount of threading makes possible the use of sleeves of different length if so desired. It is to be understood that bobbins of different lengths are to be accommodated and in certain instances different sleeves might more desirably be employed.

The bobbin, one of which is shown at B, Fig. 1, may be made of wood, metal or plastic material and has a turned interior bore the upper end of which is relatively smooth being reamed out to the proper diameter for engagement with the exterior surface of sleeve **18**. The lower end of the bobbin of more or less conventional design has a larger bore which fits over the acorn **12**, and

preferably, as herein illustrated, only the upper part of the bobbin is actually in engagement with the spindle, or more correctly, with the sleeve 18 which forms an integral functional part thereof. For reasons well known to those skilled in the art, the lower end is adapted to fit loosely, i. e., with a few thousandths of an inch of clearance so that a tendency toward self-alignment may be provided.

In operation, the nut 17 is set up against the sleeve thereby compressing it longitudinally so that its outside diameter increases slightly as shown by the dotted lines, Fig. 2. Since the outside diameter of the sleeve is originally formed approximately to the actual diameter of material required for filling the cooperating bore of the bobbin, a slight amount of compression will be found quite effective in developing the exact driving force required. From time to time this adjustment may need to be changed slightly as the interior of bobbins becomes worn, or the exterior of the sleeve wears slightly. It is to be understood that the actual adjustment is a compromise to some extent in that the diameter of the sleeve and the driving force eventually utilized must make possible easy donning and doffing of a bobbin, but it has been found that by employing suitable materials along with the novel construction herein described, the required torque may be transmitted without imparting to any noticeable extent the donning and doffing functions. The doffing never requires any appreciable amount of effort on the part of the operator so long as the compression is not excessive and it does not need to be excessive since the driving force is rather easily developed.

The material from which the sleeve is made is preferably a resinous, molded or extruded plastic which is hard surfaced and resilient enough to wear well, yet compressible and expansible as described. One such material which has been successfully employed for the purpose is a synthetic, molded plastic known as tetrafluoroethylene resin and sold under the name "Teflon." Other materials displaying the same general characteristics may be utilized.

While washers preferably of copper are placed at either end of the sleeve, they are not entirely essential. As a modification, the nut 17 may be of a self-locking type, e. g., an elastic stop nut.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This invention is, therefore, not to be limited to the precise details described, but is intended to embrace all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

We claim:

1. A top drive type textile spindle for supporting and driving a bobbin, said spindle having a blade, a whorl and means at the blade tip for imparting torque to a bobbin supported on the spindle which comprises an elongated blade end of reduced diameter, a shoulder defining the juncture between said blade and blade end, a sleeve of hard, resilient material capable of longitudinal compression and correspondig lateral expansion when subjected to relatively great pressure directed against its ends, and threaded means forming a part of said blade end for retaining said sleeve on said reduced end and further, being effective in conjunction with said shoulder, for developing that longitudinal compression in said sleeve such that the lateral expansion therein will cause it to grip the bore of a bobbin effectively to drive the same.

2. A top drive type textile spindle for supporting and driving a bobbin, said spindle having a blade, a whorl and means at the blade tip for imparting torque to a bobbin supported on the spindle which comprises an elongated blade end of reduced diameter, a shoulder defining the juncture between said blade and blade end, a cylindrical sleeve of a hard, resilient, moldable synthetic resin capable of longitudinal compression and corresponding lateral expansion when subjected to relatively great pressure directed against its ends, and thread means forming a part of said blade end for retaining said sleeve on said reduced end and further, being effective in conjunction with said shoulder, for developing that longitudinal compression in said sleeve such that the lateral expansion therein will cause it to grip the bore of a bobbin effectively to drive the same.

3. A top drive type textile spindle for supporting and driving a bobbin, said spindle having a blade, a whorl and means at the blade tip for imparting torque to a bobbin supported on the spindle which comprises an elongated blade end of reduced diameter, a shoulder defining the juncture between said blade and blade end, a cylindrical sleeve of hard, resilient tetrafluoroethylene resin capable of longitudinal compression and corresponding lateral expansion when subjected to relatively great pressure directed against its ends, and threaded means forming a part of said blade end for retaining said sleeve on said reduced end and further, being effective in conjunction with said shoulder, for developing that longitudinal compression in said sleeve such that the lateral expansion therein will cause it to grip the bore of a bobbin effectively to drive the same.

References Cited in the file of this patent

UNITED STATES PATENTS

2,066,659	Templeton et al.	Jan. 5, 1937
2,485,959	Davies	Oct. 25, 1949
2,488,879	Pichette	Nov. 22, 1949
2,599,720	Prevost	June 10, 1952
2,639,576	Bay	May 26, 1953
2,647,701	Cannard	Aug. 4, 1953

FOREIGN PATENTS

471,019	Italy	May 2, 1952
523,972	Great Britain	July 26, 1940
562,849	Great Britain	July 19, 1944