Nov. 1, 1949 C. A. BERG 2,486,730

TEXTILE SPINNING AND TWISTING SPINDLE

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Fig. 1.

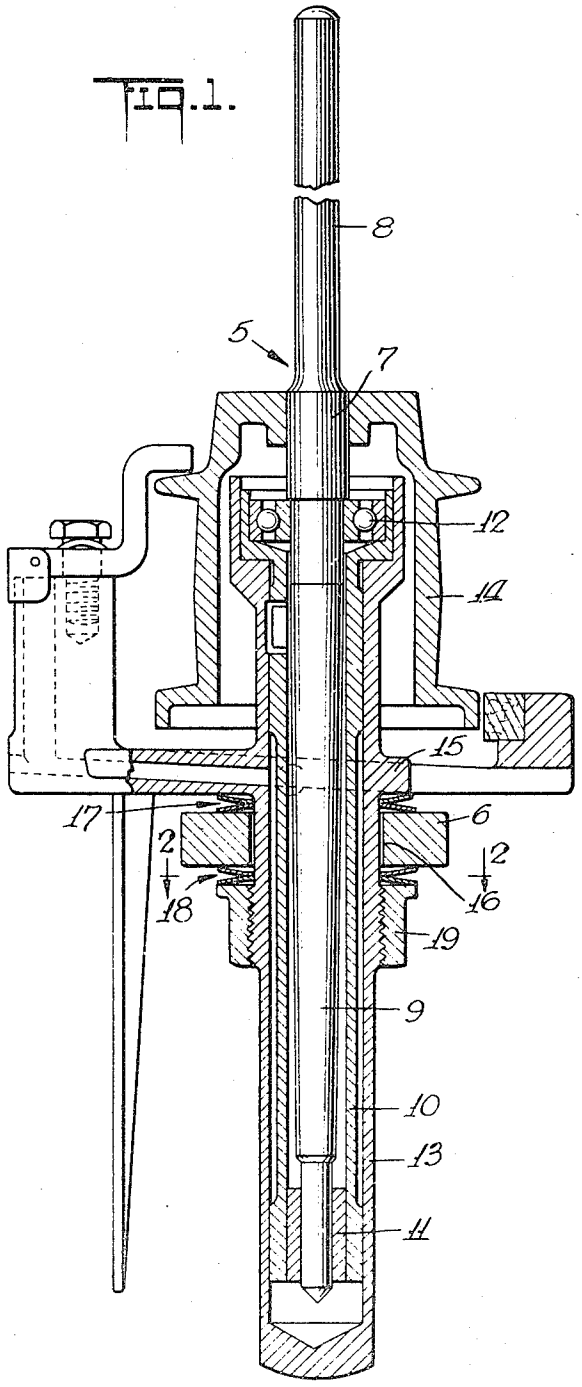
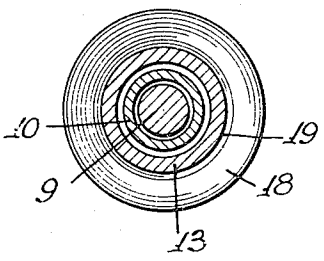


Fig. 2.



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TEXTILE SPINNING AND TWISTING SPINDLE

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1 Claim. (Cl. 57—135)

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My invention relates to spinning spindles and in particular to those which must be run at relatively high speeds of rotation.

In spinning assemblies of conventional construction the spindle is revolubly supported in a base member extending a substantial portion of the length of the spindle. The base member is formed with a flange or other radially extending projection, which is seated on the ring rail and securely held there by means of a nut threadedly engaging the portion of the base member which extends below the rail. Bearing support for the spindle in the base member is provided at spaced points spanning the rail, and the driving whorl is mounted on the spindle blade so as to extend over the upper part of the base member, whereby driving forces may be applied to the whorl below the upper point of bearing support for the spindle.

Unfortunately, with the higher speeds of rotation called for in certain applications, axial balance of the rotating parts becomes a matter of extreme importance, and spindle assemblies of the kind described exhibit a tendency to fail principally at the points of bearing support. Attempts have been made to remedy this difficulty with higher speed spindles by inserting resilient means, such as a coil spring, between the nut and the lower surface of the rail. This improvement provides a medium of resiliency in permitting the spindle to attain an axis more nearly normal to an unbalanced load, but it is not necessarily the answer to the demand for larger heavy packages of yarn spun at higher speeds. Spindles mounted in this manner also fail at the points of bearing support.

It is, accordingly, an object of my invention to provide an improved spinning-spindle assembly.

It is another object to provide a spinning spindle which will carry heavier packages of yarn at higher spinning speeds and with a reduced probability of mechanical failure.

It is a further object to provide means of mounting a spinning spindle whereby the spinning axis may readily assume an orientation essentially normally to the load.

It is also an object to provide a method of mounting a spinning spindle, whereby the axial unbalance characteristic of much-used bobbins may be effectively minimized, with a resultant extension of the lifetime of the spindle.

In general, it is an object to provide a spinning spindle assembly permitting improved over-all economy of operation.

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Other objects and various further features of the invention will appear from a reading of the following specification in conjunction with the accompanying drawings, in which:

Fig. 1 is a vertical sectional view of a spinning-spindle assembly incorporating features of the invention; and

Fig. 2 is a section taken substantially in the plane 2—2 of Fig. 1.

Broadly speaking, my invention seeks to extend the life of high-speed spinning spindles by permitting the rotating parts freely to seek and to assume an axis of rotation. The improved mounting means provides a "floating" suspension for at least the rotating parts. In the specific form to be described, the base member, the spindle bearings, and the spindle are freely suspended as a unit although the base member does not rotate. The base member is supported on the ring rail by means acting resiliently to oppose both up and down axial displacements; preferably, however, the resilient means offers substantially no opposition to slight angular displacement of the spindle axis with respect to the rail.

Referring to the drawings, my invention is shown in application to a ball-bearing equipped, bolster-type, spinning-spindle assembly 5 resiliently mounted in accordance with the invention upon a ring rail 6. The spinning assembly comprises a spindle 7 having a blade portion 8 and a bearing-support portion 9. The bearing-support portion 9 is receivable in a bolster 10 having bearings including a ball bearing 11 and a plain bearing 12 at preferably widely spaced points of support. The bolster and spinning assembly is nested within a base member 13, and driving energy for the rotating parts is applied by belt means (not shown) to a whorl 14, fixedly carried on the spindle 7 just above the upper point of bearing support. The parts thus far described are of conventional construction and are, therefore, well known.

As indicated above, it is a principal feature of the invention to provide a resilient mounting for the spindle assembly whereby the latter may "float" in its mounting on the ring rail. In the form shown, the base member 13 is formed with a flange portion 15 extending radially to provide a stop against which the spindle assembly 5 may rest when the base member 13 is inserted through its generally cylindrical support aperture 16 in the ring rail 6. To permit the desired degrees of freedom of the spinning assembly 5 with respect to the rail 6, the walls of apertures 16

are preferably spaced from adjacent portions of the base member 13. In the form shown, springs comprising oppositely dished resilient frusto-conical washers 17 extend circumferentially about the base member 13 and compressionally abut the underside of the flange 15 and the upper surface of the rail 6. Preferably, the flange and rail surfaces which the springs 17 abut are essentially parallel to each other, whereby free resilient action is promoted, and further whereby this resilient action is substantially uniform in its circumferential application of support forces.

Conventionally, spinning-spindle assemblies are mounted to the spinning rail by means of a nut threadedly engaging a portion of the base member below the rail, the nut being tightened against the rail to provide permanency to the mounting. In accordance with the invention, further resilient means 18, which may again comprise oppositely dished resilient frusto-conical springs, are inserted between the nut 19 and the lower surface of the spinning rail 6. As with the case of the springs 17, it is preferable that the surfaces which the springs 18 compressionally abut be substantially parallel.

It will be clear that I have described a spindle mounting offering substantial freedom for the rotating parts to assume a variety of substantially freely gyroscopically determined axes. Correctly designed, the springs 17 and 18 may function to allow the rotating mass to assume an axis more nearly normal to an unbalanced load. The restoring forces tending to maintain the spindle axis perpendicular to the rail 6 are relatively light and symmetrically distributed, while at the same time relatively stout resistance is offered to tendencies for axial displacement. For utmost freedom in assumption of a cocked axis of rotation, it is preferred that the spring coefficients of resilient means 17 and 18 be so related to each other that rocking of the spindle axis is substantially unaccompanied by axial displacements (up or down with respect to the rail 6) of the spindle assembly 5.

While I have shown my novel spindle-mounting means particularly in connection with a ball-bearing equipped, bolster-type assembly, it is clear that the new technique is equally applicable to other constructions, for example, to those in which the bolster is omitted and in which the bearings are provided between the base and the spindle. The latter construction may be desirable in some instances in which the diameter of the whorl must be kept to a minimum and in which it is therefore necessary to reduce to a minimum the diameters of all parts within the whorl.

Although preferred forms of the invention have been described in considerable detail, it should be understood that various modifications may be made without departure from the invention as defined in the claim which follows.

I claim:

In a textile-spindle assembly, a rail having an opening therein, a spindle base member extending through said opening and in peripheral clearance relation therewith, whereby said base member may be variously tilted from a normal to said rail without contacting said rail, a radial flange on said base member on one side of said rail, a nut threaded to said base member on the other side of said rail, a first pair of oppositely dished resilient washer discs between said rail and said flange, and a second pair of oppositely dished resilient washer discs between said nut and said rail, said discs being circumferentially continuous at both their inner and their outer edges, the discs of said pairs contacting each other at their inner edges, whereby their outer edges may assuredly span the clearance at said opening in order to obtain circumferentially continuous disc seating on said rail and on said flange and nut, whereby upon rotating a spindle supported by said base there may be a balanced and compact resilient suspension of said spindle more or less regardless of the inclination that the rotational axis of said spindle may seek to assume.

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