

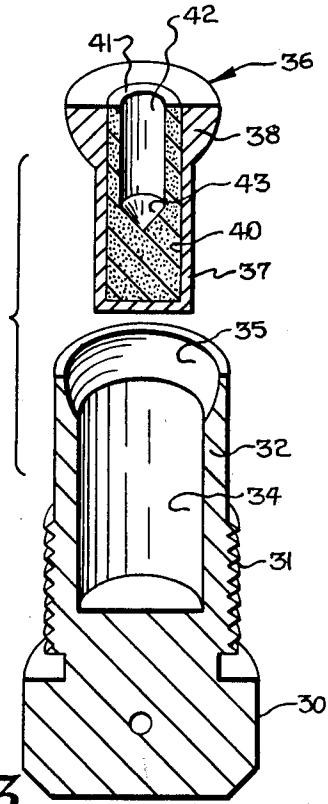
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BLADE MOUNTING FOR SPINNING AND TWISTER SPINDLES

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BLADE MOUNTING FOR SPINNING AND TWISTER SPINDLES

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5 Claims. (Cl. 57—135)

This invention relates to spinning and twister spindles and more especially to an improved mounting for the blade of a spindle wherein universal centering means is provided to maintain the blade in proper alinement with the spindle bearing during operation.

As is well known a spindle for a spinning or twister frame has heretofore been mounted in a conventional or old base having a well portion containing lubricant and bearing means for the spindle. The old type of base, often called a bolster case, had a bearing member called a bolster inserted therein which was usually made of cast iron and was provided with means to circulate oil therethrough to keep the spindle lubricated. The limited space in the well of the base for accommodating the bolster leaves only a comparatively small area for oil, since nearly all of the area inside the base is taken up by the bolster and spindle. Consequently, this type of spindle base must be oiled at least once a day and the friction load is great even in the presence of oil and, it quite often happens when oiling is neglected, that a spindle will generate so much heat that it becomes soft from loss of temper causing it to score both the spindle and the bolster. This necessitates frequent spindle and bolster replacement plus the fact that this high friction load contributes more to uneven spinning and "ends down" than any other known factor.

Various attempts have been made to overcome the difficulties of this type of spindle base and various types of anti-friction spindles have been provided which have improved the conditions mentioned above, but all of such anti-friction spindles, which are presently on the market, must be given much time and care with regard to cleaning, oiling and maintenance and their replacement is very expensive.

It is therefore the primary object of this invention to provide a new type of spindle base for spinning and twister spindles wherein means are provided in said base for accommodating the lower end of the spindle blade in such a manner as to provide a bearing surface for only the lower tip portion of the spindle blade and to act as centering means for properly alining the spindle.

It is another object of this invention to provide a spindle base of the type adapted to receive a spinning or twister spindle wherein said spindle is mounted in the upper portion of the base by a bearing intermediate its ends and wherein the lower end of the base is provided with a substantially hemispherical self-centering foot bearing for receiving the lower tip end of the spindle blade and for alining the same with the bearing intermediate the ends of the spindle.

It is still another object of this invention to provide a spindle base of the type described provided with a generally spherical floating spindle tip or foot bearing which is movable relative to the intermediate bearing to allow for any misalignment between the bearing intermediate the end of the spindle and the spherical floating bearing and to also compensate for the gyratory movement of the spindle while starting from a dead stop until

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it reaches its top speed, which is usually from eight thousand to twelve thousand revolutions per minute.

More specifically, it is an object of this invention to provide a spindle base of the type described with an upper or intermediate bearing for holding the spindle intermediate its ends, and a floating bearing comprising an insert for the lower end of the spindle base having a bore therein with an enlarged substantially hemispherical cavity or seat at the top of said bore. The body of a bearing housing, having a diameter smaller than the bore in said insert, is loosely fitted in said bore and the bearing housing is provided with an annular projection having a mating generally spherical or hemispherical surface adapted to fit in the hemispherical cavity in the upper end of said insert. Said bearing housing is provided with a suitable friction bearing material having a low coefficient of friction, such as graphite or nylon, adapted to receive the tip end of the spindle. Thus, upon rotation of the spindle the bearing housing will move about its hemispherical projection relative to the insert to maintain the tip end of the spindle in constant alinement with the upper bearing of the spindle and only the pointed end or tip of the spindle will be in bearing contact with the friction material during normal operation.

It is another object of this invention to provide a spindle foot bearing of the type described in association with a spindle base wherein the bolster is eliminated resulting in greater lubricant capacity.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which—

Figure 1 is a vertical sectional view through a spindle and spindle base embodying the improved self-centering bearing means;

Figure 2 is an enlarged sectional plan view taken along the line 2—2 in Figure 1;

Figure 3 is an enlarged exploded isometric section of the lower portion of the insert for the spindle base and the hemispherical self-centering bearing.

Referring more specifically to the drawings, the numeral 10 broadly designates a spindle base which is adapted to be mounted in the usual bolster rail of a spinning or twisting frame in a conventional manner as by means mounted on the threaded portion 11 thereof and which base 10 has a tubular well portion 12 in which the lower end of a spindle blade 13 is adapted to be rotatably mounted. The spindle 13 may be of conventional or other construction and preferably includes a light-weight metal body portion 14 and a steel whorl portion 15 provided with an enlarged bore 16.

The spindle 13 is rotated in a conventional manner by means of tapes, not shown, which engage the exterior surface of the whorl. The spindle 13 is mounted for rotation in the spindle base 10 by means of a bearing intermediate the ends of the spindle, which bearing is normally referred to as the upper bearing and, in the present instance, is shown in the form of a fixed friction bearing 18 suitably secured, as by a pressed fit, in an upper bearing extension 19 of the spindle base 10 which is suitably mounted, as by a pressed fit, in the upper portion of the spindle base 10. If desired, the bearing 18 may be of an anti-friction type and the portion 19 may be integral with the spindle base 10.

It will be observed that the spindle blade 13 extends through the upper bearing 18 into the oil well 12 of the spindle base 10 and the lower end of the spindle blade 13 is reduced as at 20 and is provided with a tapered or conical pointed tip 21. Now, in the present invention the conventional bolster, which normally surrounds the lower end of the spindle blade 13 for maintaining the same in proper alinement, is omitted and it will be ob-

served that conventional oil means such as an oil reservoir 22, is provided for introducing oil to the interior of the spindle well 12. A conventional doffer guard 23 may be provided, if desired.

Now, in order to maintain the lower end of the spindle 13 in proper alinement with the bearing 18, according to the present invention, an improved spherical self-aligning or universal bearing means is provided which comprises an insert 30 in the form of a plug having a reduced threaded portion 31 and a reduced cylindrical portion 32 adapted to fit within the lower end of the spindle well 12. If desired, the insert 30 may form a part of the spindle well 12, but it is preferred that it be a separate part as shown, and by this means the improved spherical bearing of the present invention may be utilized with new spindle bases and old spindle bases may be readily converted to accommodate the improved bearing.

It will be observed that the lower end of the bore in the spindle well 12 is preferably enlarged and threaded to accommodate the threaded insert 30 and associated parts and a suitable gasket 33 is provided to prevent leakage. The upper end of the insert 30 is provided with a blind hole or bore 34 which is enlarged adjacent the upper end about a radius from a common concentric point to provide a hemispherical seat 35 for a floating bearing housing 36 which is preferably formed of hard metal, such as steel. The bearing housing has a cylindrical body portion 37 provided with an enlarged upper portion 38 having a hemispherical annular projection or bearing concentric with and adapted to mate with the hemispherical bearing seat 35 in the insert 30.

It will be noted that the external diameter of the cylindrical body portion 37 of the bearing housing 36 is slightly less than the internal diameter of the bore 30 to permit the housing 36 to float freely within the bore 34, the housing 36 seating only at the substantially hemispherical enlarged portion 38. The body 37 of housing 36 is provided with a bore 40 in which a suitable friction bearing 41 is positioned, as by a pressed fit, the bearing 41, which may be termed a foot bearing, preferably being of graphite or nylon or any other suitable friction bearing material having a low coefficient of friction. Graphite is preferable as it will not score, seize or injure either the bearing or the spindle blade even in cases where no oil is present.

The rigid bearing 18 at the intermediate portion of the spindle blade 13 is preferably of the same type of material, as this arrangement provides an area for oil so great that it is only necessary to oil the unit once a year during normal operation. The bearing 41 is provided with a circular bore 42 having a tapered lower end 43 of substantially the same dimensions as the reduced portion 20 and the tapered end 21 of the spindle 13 so that the spindle tip 20 may rotatably fit within the bearing 41. The race 35, projection 38, and bore 42 are all concentric to insure proper alinement of the spindle.

In operation, the hemispherical portion 38 of the bearing housing 36 seats in the mating or female hemispherical seat in the top of the insert or plug 30, which allows the bearing to find proper alinement in any direction without binding the spindle blade against the side wall of the bearing 41, since the wall of bore 42 in bearing 41 should clear the spindle blade at all times and contact the blade 13 only at its point or tip portion 21. The point of the blade resting in the bearing at a point below the center point of the hemispherical bearing and seat will keep the seat of the floating bearing at the spindle point in correct axial alinement with the spindle at all times.

For example, assume that the spindle point 21 is resting in this bearing at a point above the lower portion of the hemispherical projection or at a point in the horizontal center line of the hemispherical projection; the up-

per portion of the bearing housing 36 would tend to flop over or shift laterally in one direction and then in another to cause the bearing material 41 on the walls of the bore 42 to induce unnecessary friction on first one side of the blade and then the other which causes compensatory movement of the bearing housing 36 until the bearing is in correct axial alinement and the spindle blade is properly seated and bears against the bearing 41 only at its tip 21.

It is thus seen that there is provided an improved foot bearing for spinning and twister spindle blades wherein the end of the blade is provided with a pointed tip and wherein the spindle base has an insert having a bore therein with an enlarged substantially hemispherical bearing seat at the upper end thereof serving as a seat for a bearing housing having a mating enlarged spherical upper portion and a lower portion of less diameter than the bore in said insert and wherein said bearing housing is provided with suitable bearing material having a pointed bore therein adapted to receive the pointed end of said blade whereby said bearing housing is movable universally to automatically hold the blade in proper alinement with an upper or intermediate bearing in which an upper portion of the spindle blade is mounted. This greatly reduces wear and down time on the spinning frame and obviates the necessity of frequent oiling of the same.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a spindle base for a textile spindle blade, said base having a tubular spindle well portion adapted to receive the spindle blade, improved bearing means comprising a first bearing positioned adjacent the upper end of said spindle well for rotatably supporting an intermediate portion of said spindle blade and a foot bearing disposed in the lower portion of said spindle well portion, said foot bearing comprising a removable metallic insert having a bore therein, the upper end of said bore being enlarged to form a hemispherical seat, a metallic bearing housing loosely mounted in said bore and having a hemispherical projection thereon axially concentric with the hemispherical seat in said insert and seated therein, said metallic housing having a cavity therein, low friction means in said cavity adapted to receive the lower tip portion of said spindle blade and said metallic housing being movable relative to said insert to maintain said blade in vertical alinement during rotation thereof.

2. In a spindle base for a textile spindle blade, said base having a tubular spindle well portion adapted to receive the spindle blade, said spindle blade having a conical lower tip, improved bearing means comprising a first bearing positioned adjacent the upper end of said spindle well for rotatably supporting an intermediate portion of said spindle blade and a foot bearing disposed in the lower portion of said spindle well portion, said foot bearing comprising a removable plug threadably secured in and closing the lower end of the spindle well and having a bore therein defining the lower end of the spindle well, self-centering means adapted to receive the lower tip portion of said spindle blade and maintain the same in vertical alinement with the first bearing during rotation of said spindle, said self-centering means comprising a tubular housing loosely disposed within the bore in said plug and having a generally hemispherical annular projection thereon, said plug having an annular generally hemispherical mating seat in which said projection is universally movable and said tubular housing having a bore therein lined with low friction material for reception of the lower portion of the spindle blade.

3. In a spindle base for a textile spindle blade, said

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base having a tubular spindle well portion adapted to receive the spindle blade, said spindle blade having a conical lower tip, improved bearing means comprising a low friction bearing positioned adjacent the upper end of said spindle well for rotatably supporting an intermediate portion of said spindle blade and a foot bearing disposed in the lower portion of said spindle well portion, said foot bearing comprising a removable plug adjustably mounted in the lower end of the spindle well and closing the same, said plug having a bore therein communicating with and forming the lower end of the spindle well, a universally movable self-centering tubular housing loosely mounted in the bore in said plug and adapted to receive the lower tip portion of said spindle blade and maintain said blade in vertical alinement during rotation thereof, low friction material positioned in said housing and having a spindle receiving cavity therein slightly larger in diameter than the diameter of the lower end of the spindle and said cavity having a conically shaped lower end in which the conical tip of the spindle blade bears.

4. In a spindle base for a textile spindle blade, said base having a tubular spindle well portion adapted to receive the spindle blade, improved bearing means comprising a first bearing positioned adjacent the upper end of said spindle well for rotatably supporting an intermediate portion of said spindle blade and a foot bearing disposed in the lower portion of said spindle well portion, said foot bearing including a universally movable self-centering tubular housing having an annular projection on the upper end thereof formed with a generally hemispherical contour, a removable tubular insert forming the lower end of the spindle well and having an annular seat formed with a generally hemispherical contour adapted to receive the generally hemispherical projection on the tubular housing when said housing is fitted

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into said insert, said housing having a bore therein, low friction material positioned in said bore and having a cavity therein extending to a point below the mating projection and seat and adapted to receive the lower end of the spindle blade, said cavity having a conical lower end in which the conical spindle tip bears and said cavity and said generally hemispherical projection and seat all being concentric about the spindle axis.

5. In a spindle base for spinning and twisting spindles and the like having a spindle well and upper bearing means adapted to rotatably support a spindle intermediate its ends, a floating self-centering foot bearing comprising a removable insert secured to the spindle well and closing the lower end thereof, said insert having a bore therein, the upper end of said bore being enlarged about a concentric radius forming a hemispherical seat, a bearing housing having an annular projection enlarged about a concentric radius forming a hemispherical surface and adapted to mate with the seat of said bore, the remaining portion of said bearing housing being of less diameter than said bore and freely movable therein, and low friction bearing material carried by said bearing housing and provided with a bore therein for receiving the lower end of the spindle.

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