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Steichele

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[54] **YARN ROLLER GUIDES**

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[58] **Field of Search** .....29/116 R, 129.5

[56] **References Cited**

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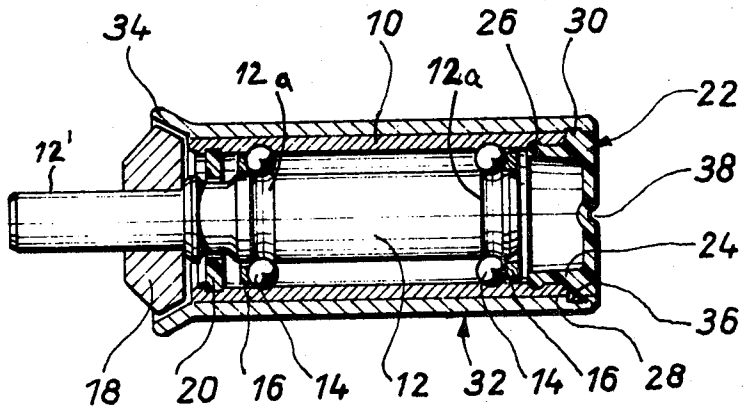
[57] **ABSTRACT**

A yarn roller guide having a fixed bearing shaft. A bearing housing is rotatably mounted on the shaft. A sleeve having an outer surface adapted to engage the yarn is removably mounted on the housing and retained thereon by releasable cap means holding the sleeve to the housing.

4 Claims, 1 Drawing Figure



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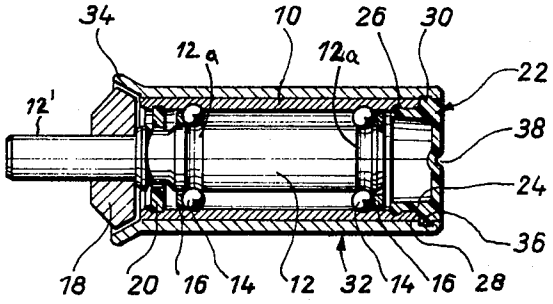

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YARN ROLLER GUIDES

BACKGROUND OF THE INVENTION

The present invention relates to yarn guiding rollers of the type used in machines for drawing fibers, slivers or the like into a roving and particularly to a roller which permits the simultaneous stretching, twisting and winding of the yarn.

When synthetic fibers are to be processed, the yarn receives the desired mechanical strength only by means of a streching process. The apparatus commonly employed for streching the yarn consists generally of two guide rollers with the yarn being trained in several turns about the outer surface of one of the guide rollers in order to permit the necessary pulling force to be produced in the yarn for performing the streching process.

In the U.S. Pat. No. 3,380,138 issued to the present inventor on Apr. 30, 1968, there is shown a yarn guide roller which has been quite satisfactory in meeting the needs of this art and which has found considerably commercial success. However, it has been found that the quality of stretch and the resultant tension of the yarn is dependent upon the interaction between the sliver, fiber or yarn itself and the condition of the surface of the roller. Depending on the particular synthetic fiber the surface must be made more or less rough. In fact the degree of roughness depends upon the type of fiber processed. Furthermore, the quality of the yarn depends upon the uniformity of the surface of the roller which deteriorates by continuous use. At present the manufacturer maintains a large stock of roller assemblies in order to have the required range of variable surfaces necessary to make quick replacement or to provide a new surface for a different fiber.

It is the object of the present invention to provide a yarn guide roller which is more versatile than present rollers and overcomes the disadvantages of the presently devices.

It is an object of the present invention to provide a yarn guide roller in which the roller surface is separably formed and which may be readily removed from the supporting bearing and interchanged with another without removal of the roller bearing assembly.

It is another object of the present invention to provide a yarn guide roller having an improved bearing structure, which may be mass-produced and supplied generally to all customers reducing the necessity of maintaining large stocks of complex equipment.

These objects, others as well as numerous advantages, will be observed from the following disclosure of the present invention.

SUMMARY OF INVENTION

According to the present invention a yarn guide roller is provided comprising a bearing shaft adapted to be fixed to the drawing machine. A bearing housing is rotatably mounted about the shaft. A removable sleeve having an exterior yarn engaging surface is mounted on the bearing housing and is releasably secured by means of the present axial movement of the sleeve.

In the preferred form, the bearing housing extends forwardly over the shaft and the sleeve forwardly of the housing. The releasable means comprises a cap adapted to fit into the housing and engage with suitable cooperating detent means with both the housing and sleeve.

Various features such as forward and rear sealing rings, lubricant inlet means and exit means and roller sleeve shapes for proper yarn guiding are also provided.

As an auxiliary feature the shaft and housing are provided with axially aligned cooperating races in which anti-friction roller bearings are secured in a unitized bearing assembly.

While full details will be set forth in the following description it will be now apparent that the present invention provides a device in which the roller surface is formed on a removable sleeve which may be readily stored and/or interchanged with another. The unitized bearing assembly permits the manufacture of uniform rollers which may be supplied generally to all customers: The interchangeable sleeves permit the preformation of roller surfaces having a predetermined frictional quality which can be chosen at the site of use for either new fibers or as a replacement for an old sleeve.

BRIEF DESCRIPTION OF DRAWING

The following description makes reference to the accompanying drawing which shows the device of the present invention in longitudinal section.

Before turning to the description of the present structure reference is again made to the aforementioned patent, and its disclosure is incorporated herein as if more fully set forth. The general construction and use of yarn roller guides is fully set forth in that patent and for the sake of brevity redundant disclosure is omitted here.

DESCRIPTION OF INVENTION

As illustrated the yarn guiding roller of the present invention comprises a unitized assembly formed of a bearing housing **10** rotatably supported about the free end of a shaft **12** by means of a plurality of anti-friction bodies such as ball bearings **14**. The housing **10** extends axially beyond the front end of the shaft while the rear end of shaft **12** extends rearwardly and is adapted to be held or fixed as by means of a suitable set screw, bolt, or other fastener, to a stationary support or frame part of the spinning, drawing twisting apparatus, in the manner shown in the aforementioned patent.

The anti-friction bodies **14** are mounted as a pair of rings in axial spaced circumferential races formed by grooves **12*a*** in the exterior surface of the shaft **12** and extend into corresponding aligned races formed by a pair of grooves **10*a*** in the interior surface of the housing **10**. Suitable bearing cages **16** are provided for locating and maintaining the anti-friction bearing bodies **14** in a conventional and well known manner.

In order to seal the bearing housing a frustroconical sealing disc **18** is located about the rear end **12'** of the shaft and is directed toward the stationary machine support (not shown). The sealing disc **18** is adapted to abut the machine support to provide a firm seal and additional support for the shaft and to terminate adjacent to the rear end of the housing **10**. The seal is formed with one or more radial ducts, or is spaced from the housing **10** to permit flow of lubricant from within the housing outwardly in an annular space between it and the housing. An additional sealing washer **20** is set within the bearing housing between the sealing disc **18** and the adjacent anti-friction ball ring. The disc **20** is held in corresponding inner circumferential groove of

the bearing housing by its own resiliency and may rotate with it.

A pot shaped closing cap, generally depicted by the numeral **22**, engages the free frontal end of the bearing housing. Both the housing and the cap **22** are provided with such grooves and detents. The closure cap **22** has a neck **24** which has an integral outwardly bulging annular rib **26** at its inner end which engages a corresponding groove in the internal circumference of the bearing housing **10**. The closure cap **22** also has an annular shoulder **28** which abuts against the free annular frontal face of the bearing housing **10** and a collar **30** on its circumference.

The sealing discs and closing cap are preferably formed of resilient material such as synthetic rubber compositions or plastic material. Natural rubber or other similarly resilient material or even aluminium or metal may be used. The structure of the cap and its material enables it to act simultaneously as the front end seal and as a releasable fastener for the bearing housing and sleeve.

Removably mounted over the housing **10** is a cylindrical roller sleeve **32**, formed of a single piece of seamless tubing so as to be readily adapted to engage the sliver, fiber or yarn to be worked. The sleeve is preferably formed with the desired predetermined surface roughness required for the particular operation and is slipped over the outer surface of the housing **10** into a force fit therewith. The roller sleeve **32** projects beyond the frontal end of the housing **10** to engage the collar **30** of the closure cap **22** in a corresponding circumferential inner groove **36** securing the sleeve against axial displacement relative to the housing **10**. The rear end of the sleeve **32** is flared outwardly in a frustoconical section **34** which projects partly beyond the correspondingly shaped sealing disc **18**. The conical projecting section **34** is spaced from the sealing disc to provide an annular passage for the lubricating fluid.

The cap **22** is provided with a central thin walled recess **38** formed by stamping, drilling or other known means to facillitate entry of a lubricating needle or thin nozzle by which supplemental lubricant can be supplied to the interior of the roller.

It will thus be seen that the present construction provides a yarn roller guide in which the roller surface (sleeve **32**) is easily removable and interchangeable with others similarly made. When it is desired to replace the sleeve **32** the latter is withdrawn from the free end of the bearing housing **10**. The closure cap **22** being held in the roller sleeve **32** by its circumferential collar **30** is simultaneously released from the bearing housing **10**. A new sleeve and a new cap are then inserted over the housing **10**. It is preferred to equip each roller sleeve with its own closure cap **22** comforming to it and which then engages by its own rib **26** to the bearing housing. In this manner firm and secure mounting of the sleeve is always assured. However, if desired, the cap **22** may be shaped to be used with any number of sleeves or may be modified in such a manner that the closure cap **22** remains permanently in the bearing housing **10** and that only the roller sleeve is capable of being released from the bearing unit.

The present invention enables the manufacturer of yarn to choose the most advantageous and suitable yarn guide roller surface for the particular fiber, yarn or sliver being processed without the need for maintaining a large stock of complete roller units. The choice of the particular surface enables the operator to maintain the tension of the yarn as close to the predetermined optimum condition as is possible. Furthermore, the user is able to simply and swiftly change sleeves so that he is no longer required to disassemble the entire apparatus to make a change or replacement of the roller.

A further advantage accrues from the unitized structure of the bearing assembly in that once the bearing assembly is mounted it need not be removed or replaced. Thus the assembly and its roller bearings are not disturbed, drained of lubricant or otherwise mishandled.

It will also be appreciated that the present invention provides the very high degree of stability, rotatability and manufacturing tolerances required. By forming the bearing assembly as a unit, the interchange of outer sleeves, does not result in any deformation of rotating axis or rotating surface, and bearing play is kept to a minimum. Manufacturing costs are low since the making of the outer sleeve can be easily done and does not interfere with the machining of the bearing races, or other parts of the assembly. Providing the seal means at both ends of the housing enables feeding the device with a lubricant such as oil to enable quick and efficient starts.

It will be appreciated that numerous modifications are possible. For example, the specific mating or retaining detent means between the cap **22**, the housing **10** and the sleeve **32** may be modified or replaced with other equivilant retaining means. Clips, mating keys and keyways are only two such substitutes. Accordingly, the present disclosure is intended as illustrative only of the present invention and not limiting thereof.

What is claimed:

1. A yarn guide roller for use in a machine for drawing slivers or fibers into rovings comprising a bearing shaft adapted to be fixedly secured at its rear end to said machine, a rotatable bearing housing, means for rotatably mounting said housing about said shaft, a sleeve removably mounted about said bearing housing having an outer surface adapted to engage yarn material to be worked, said housing extending over the forward end of said shaft and said sleeve extending over the forward end of said housing, and means for releasably securing said sleeve to said housing to prevent axial movement thereof comprising a closure cap insertable into the end of said housing, said cap, said housing and said sleeve having cooperating releasable detent means for securing said sleeve against axial movement and for sealing the end thereof.

2. A roller according to claim **1** wherein said closure cap is made of a resiliently yieldable material and has a neck engaging the bearing housing, the neck at its edge having an outer annular lip and a collar axially spaced from the lip, said bearing housing being formed with a circumferential inner groove engaging said lip and said sleeve being formed with a groove engaging said collar.

3. The roller according to claim **2** wherein said cap includes means for the insertion of a lubricating tool for supplying lubricant to the interior of said housing.

4. The roller according to claim 2 wherein the outer surface of said shaft and the interior surface of said housing are each provided with a pair of axially aligned circumferentially grooves forming a pair of opposed races, and said means for rotatably mounting said housing comprises a plurality of anti-friction bearing elements located in each of said races.

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