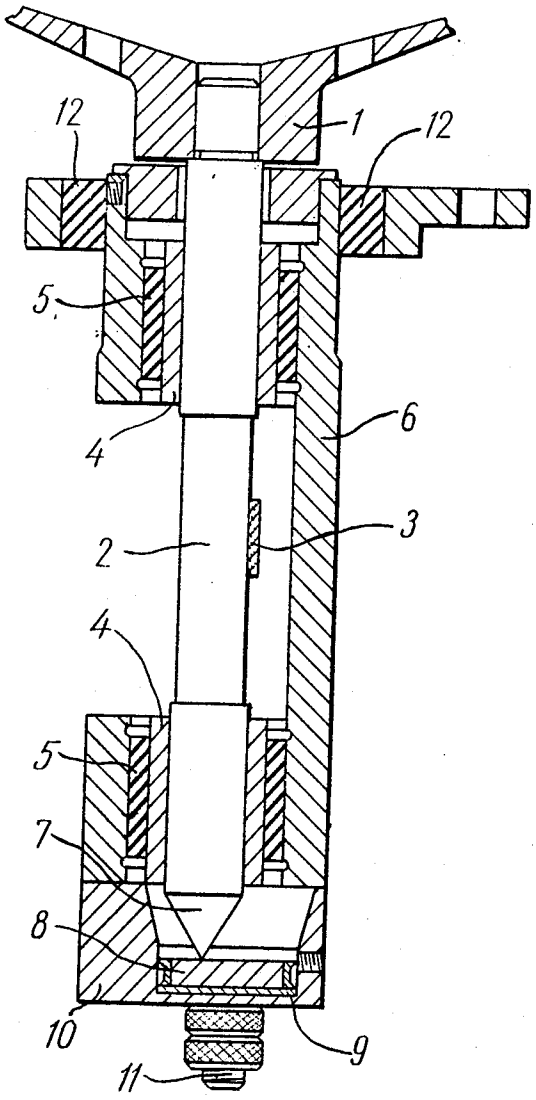
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TWISTING AND FORMING DEVICE FOR PNEUMATIC AND MECHANICAL SPINNING

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TWISTING AND FORMING DEVICE FOR PNEUMATIC AND MECHANICAL SPINNING

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ABSTRACT OF THE DISCLOSURE

A twisting and forming device is provided for pneumatic and mechanical spinning and comprises a driving spindle supporting a cup for yarn formation at one end and having a cone at the other end which rests on a flat journal of antifriction graphite so as to form a thrust bearing at this end. The spindle is supported for rotation by a plurality of radial sliding friction bearings with an air cushion, the bearings in turn being mounted in elastic dampers.

This invention relates to textile machines for pneumatic and mechanical spinning and more particularly to twisting and forming devices for these machines.

Already known are twisting and forming device comprising a cup for yarn formation fixed on a driving rotor which turns in radial sliding friction bearings with an air cushion and rests on a thrust bearing.

In twisting and forming devices known heretofore rotor vibration is eliminated by compressed air supplied at a pressure of 2–4 atm. through a system of grooves into the radial air cushion bearings. Air is supplied at the same pressure into the thrust bearing where it forms an air cushion between the journal and the thrust bearing thus reducing to a minimum the friction between them in rotation.

However the supply of compressed air at high pressure necessitates the use of special arrangements requiring high power consumption while interruptions in air supply inevitably result in breakdowns.

An object of the present invention is the provision of a twisting and forming device for pneumatic and mechanical spinning in which rotor (spindle) vibrations are eliminated and the friction between the journal and thrust bearing is materially reduced without using compressed air at high pressure.

In connection with the above mentioned and other objects of the invention, in the twisting and forming device comprising a cup for yarn formation fixed on the driving spindle rotating in radial sliding friction bearings with an air cushion and resting on a thrust bearing, according to the invention the radial friction bearings are mounted in elastic dampers, while the thrust bearing is formed by the cone at the end of the spindle and the flat journal preferably made of antifriction graphite.

The most efficient solution of the problem is to make the elastic damper of at least one ring and the flat journal of a disc fitted into a shell eccentrically disposed relative the spindle center line.

The use of this invention will increase the spinning speed on a pneumatic mechanical spinning machine up to

30,000–40,000 r.p.m. and higher, with better stability longer service life and noiseless operation of the twisting and forming device which is brought into action by a tape commonly used in usual ring spinning frames.

Other objects and advantages of this invention will be made more clear by the description of an embodiment with reference to the appended drawing diagrammatically illustrating the twisting and forming device in longitudinal cross-section.

The twisting and forming device is composed of a yarn forming cup **1** fixed on a spindle **2**. The latter rotates in radial sliding friction bearings **4** with an air cushion and rests upon a thrust bearing. The spindle is driven by means of tape **3** or a belt.

The radial sliding friction bearings **4** with an air cushion are mounted in annular elastic dampers **5** which in turn are fixed in the body **6**. A cutout is provided in the body **6** for the driving belt or tape.

The thrust bearing is formed by the cone **7** at the end of spindle **2** and the flat thrust journal **8**.

The flat journal **8** is made of antifriction graphite in the shape of a disk fitted in the shell **9**.

The shell **9** is eccentrically disposed relative the center line of spindle **2** in a socket **10** attached to the body **6**.

The shell is provided with a handle **11** for turning it in the socket **10**.

The body **6** is fixed on the machine stand by means of elastic damper **12** ensuring additional damping of vibrations, especially at high speeds. This allows a further increase in the rotation speed of the twisting and forming device.

The twisting and forming device operates in the following way:

As the spindle **2** comes in contact with the moving tape **3** or the belt it starts rotating.

In the radial sliding friction bearings **4** with an air cushion, a zone of excessive air pressure is created, as a result of which an air gap is formed between the spindle **2** and bearing **4** along the full length of the bearing and the spindle **2** is centered by the action of aerodynamic forces. When the spindle **2** oscillates, it presses through an air film (up to 1–2 kgs./force for 10 microns of the displacement of spindle **2** in the gap of the radial sliding friction bearing **4** with air cushion) upon the walls of bearings **4** and further on the elastic dampers **5** having a much lower rigidity. Thus, the vibration energy of spindle **2** is absorbed by the material of the elastic dampers and the spindle vibrations are damped.

Considering that the losses due to friction in the journal are low since the linear speed of the spindle cone point is small, the wear of journal **8** is inconsiderable. After the flat journal **8** has been worn at one point it is turned by means of the shell with handle **11** through a certain angle and fixed with a set screw in the new position. The length of the graphite bearing circumference is such that it accommodates 8–10 working points for the consecutive operation of the conical journal.

What is claimed is:

1. Twisting and forming device for pneumatic and mechanical spinning comprising a cup for yarn formation; a driving spindle having opposite ends and supporting said cup at one of said ends; a plurality of radial sliding friction bearings with an air cushion, said spindle being rotatably supported in said bearings; elastic dampers in which the radial sliding friction bearings are mounted; and a thrust bearing constituted by a cone at the other end of said spindle and a flat journal of antifriction graphite in contact with said cone.

2. A twisting and forming device according to claim 1 herein each elastic damper comprises at least one ring.

3. A twisting and forming device according to claim 1 herein said flat journal is a disk, the device further comprising a shell eccentrically disposed relative to the spindle and receiving said disk.

4. A twisting and forming device according to claim 3 herein said shell is rotatably adjustable to vary the location of contact of the disk with said cone.

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