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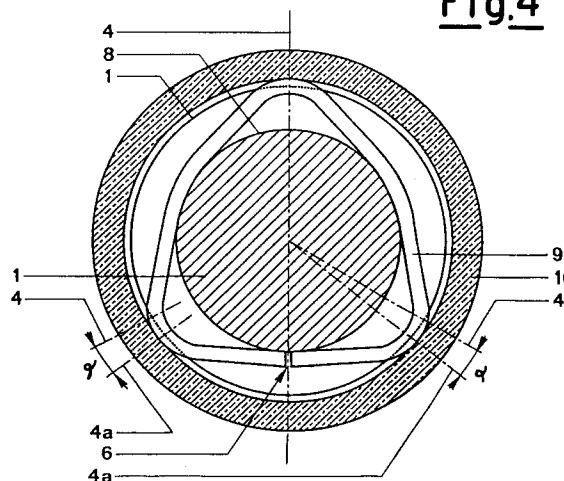
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**AT BE CH DE DK ES FR GB GR LI LU MC NL
PT SE**(71) Applicant: **SAVIO S.p.A.****Via Udine 105
I-33170 Pordenone(IT)**(72) Inventor: **Mirri, Alessandro****Via Emilia Ponente, 9
I-40026 Imola (Bologna)(IT)
Inventor: Sassatelli, Gastone****Via Gramsci, 11/A
I-48010 Bagnara Di Romagna (Ravenna)(IT)**(74) Representative: **De Carli, Erberto et al
ING. BARZANO' & ZANARDO MILANO S.p.A.
Via Borgonuovo, 10
I-20121 Milano(IT)**(54) **Element for centering and locking a tube on a ring-spinning spindle.**

(57) This invention relates to a tube centering and locking element for incorporation into a spinning spindle of a ring-spinning machine, said element consisting of a simple filiform elastic element (9) of steel, preferably harmonic steel, housed and supported in a thin annular groove (3) formed in proximity to the upper end of the spindle, said elastic locking element (9) having a substantially polygonal geometrical shape in the form of a ring which is sufficiently open to allow circumferential elastic deformation of its projections (12).

Fig.4**EP 0 517 341 A1**

This invention relates to a centering and locking element provided on the spindle to receive a tube thereon, this centering element being an open elastic ring of polygonal shape connected to the spindle by means of a thin annular groove which contains said elastic ring.

In spinning machines, such as ring-spinning machines, the operating faces comprise a plurality of spindles carrying the tubes on which the spun yarn is wound. Each spinning spindle comprises a rotating part which receives and retains the tube and rotates it during operation. As is well known to the expert of the art, when the yarn winding is complete the tube together with the bobbin which has formed on it is withdrawn for transfer to subsequent operations.

Normally in known spindles the rotating part is approximately as long as the tube and is provided with elements to retain the tube during the winding of the spun yarn.

It is well known that the tubes (frusto-conical tubes of plastics or any other material) used for supporting the yarn wound during spinning must be mounted rapidly on the bare spindle in a secure position as they have to allow spun yarn deposition without the minimum vibration and without allowing any even slight relative movement between them and the connected spindles, such that their axes of rotation perfectly coincide during the entire deposition of the wound yarn.

It is well known in the textile industry to lock in position and rotate the winding supports such as bobbins, tubes etc. by centering prongs via radial cavities enclosing plinths, these resting under the action of associated springs or centrifugal force against the inner wall of the winding support tubes.

These centering prongs have to be of very exact dimensions and are therefore often of metal and fairly costly because of the production costs associated with machine tools.

Usually said centering elements, which are suitably fixed on the spindle for centering and locking the tube thereon, are therefore excessively difficult to produce. Mainly because of this it is not always possible to justify the production cost for the results obtained. These known centering elements are also available in the form of balls and helical springs which cause the balls to rest elastically against the inner surface of the mounted tube.

Although the tube can certainly be satisfactorily fixed radially and axially with these devices, it is always possible for the axial and radial position of the tube on the spindle not to be perfectly maintained because of yielding of the fixing means used.

To obviate all this and at the same time overcome the considerable costs of these constructions

in view of the large number of spindles in a modern ring-spinning machine, a particularly advantageous solution which the applicant has conceived and tested is proposed.

In this respect, the present invention provides a spinning spindle which with simple low-cost construction provides reliable fixing of the tube while at the same time achieving a connection providing perfect centering in both a radial and axial direction between the two components. All this results in various advantages in terms of the construction and assembly of the spindles as the element for locking the tube on the spindle allows extremely simple and extremely precise mounting and withdrawal of the tube at each spinning cycle.

These and further advantages of the invention, which will be more apparent from the description, are attained by a centering and locking element for fixing the tube onto a spinning spindle of a ring-spinning machine, wherein said element consists of a simple filiform elastic element of steel, preferably harmonic steel, housed and supported in a thin annular groove formed in proximity to the upper end of the spindle, said elastic locking element having a substantially polygonal geometrical shape in the form of a ring which is sufficiently open to allow circumferential elastic deformation of its projections.

Before its elastic deformation, said polygonal elastic locking element has an inscribed inner circle of diameter greater than the diameter of the base of the annular groove, whereas after its elastic deformation, with the tube locked on the spindle, its inscribed inner circle presses against said base diameter of the thin annular ring, its configuration still being open-ring, ie with its ends not touching each other.

According to an advantageous embodiment, the polygonal elastic locking element has a right cross-section of substantially circular profile.

According to a further advantageous embodiment, the elastic locking ring is in the shape of a polygon with at least three projections or vertices, which are advantageously rounded for accurate centering between the spindle and tube, said projections being distributed substantially equidistant along the circumscribed circumference of said polygon.

With reference to the aforesaid, the accompanying figures show a preferred embodiment, which is not binding or limiting in terms of the relative positioning of the element of the invention and the spinning spindle and any consequent deriving simplifications.

Said embodiment is described hereinafter with reference to the following figures, in which:

Figure 1 is a schematic front view of the upper part of a spinning spindle of a ring-spinning

machine showing the centering prongs of the known art extendable within radial cavities under the action of springs;

Figure 2 is a schematic front view of the upper part of a spinning spindle of a ring-spinning machine showing the thin annular groove representing the housing and support seat for the centering and locking element of the present invention;

Figure 3 is a schematic cross-section on the line A-A of Figure 2, showing the polygonal elastic element of the present invention inserted into and supported within the thin annular groove provided in proximity to the upper end of the spindle, but before the tube is mounted on the spindle;

Figure 4 is a schematic cross-section on the line A-A of Figure 2, showing the polygonal elastic element of the present invention just when it has completed its deformation, with the tube locked onto the spinning spindle.

In the figures identical elements or those of identical or equivalent function carry identical reference numerals.

In the figures: 1 is the vertically extending spinning spindle well known to the expert of the art; 2 is the axis of rotation of the spinning spindle of the ring-spinning machine; 3 is a thin annular groove formed in proximity to the upper end of the spindle 1; 4 are the axes of the three advantageously rounded projections of the elastic polygonal element 9 according to the present invention.

Said projections or vertices 12 represent the locking portions for the tube 10 when mounted about the spindle 1; 5 is the already known centering prong extendable within a radial cavity under the action of a helical spring, this prong, of which usually three are provided, representing the known application in spinning spindles; 6 are the ends of the open-ring elastic element 9. Said ends 6 never make contact with each other; 7 is the inner circle inscribed within the polygon of the elastic element 9, said circle ⁷ having a diameter greater than the base diameter 8 of the thin annular groove 3 before the tube 10 is mounted; α is the rotation undergone by the axes 4 of the projections 12 by the end of elastic deformation of the element 9, ie when the tube 10 mounted about the spinning spindle 1 is locked.

The application of the element of the present invention shown in the figures of the accompanying drawings is apparent.

The polygonal elastic element 9 is inserted into the thin annular groove 3 by using the known pliers used for split rings. (SEEGER) Said elastic element 9 surrounds the base diameter of the groove 3 with sufficient clearance; in this respect its inscribed circle 7 is of greater diameter than the diameter 8

such that when it rests against the side of the groove 3 its rounded projections 12 extend outwards beyond the diameter of the spindle 1; whereas when in its open ring form its ends 6 are spaced substantially apart (see Figure 3).

The tube 10 is gripped for mounting about the spindle 1. As is well known in spinning practice, the tube 10, on which the wound spun yarn is to be deposited, is of frusto-conical shape both inside and outside and is mounted via the larger-diameter end.

As the tube 10 descends over the spindle 1 its frusto-conical shape circumferentially compresses the element 9 at the rounded portions of the projections 12 so that when totally mounted and locking is complete it embraces the base circumference 8 with pressing adherence while at the same time pressing said projections 12 against the inner surface of the tube 10, so locking this latter in a correctly centred position corresponding to perfect coincidence between the tube axis and the axis 2 of rotation of the spinning spindle 1. Again, when locking is complete the axes 4 of the projections 12 assume the position 4a after having rotated angularly through an angle α by elastic restriction. (See fig.4)

It is apparent that modifications can be made by the expert of the art to the constructional details of the polygonal element of the invention, for example its substantially circular right section can be of different profile without on this account deviating from the aforesaid general idea.

Claims

1. An element for centering and locking a tube on a spinning spindle for spun yarn production in a ring-spinning machine, said element being characterised by consisting of a simple filiform elastic element of steel, preferably harmonic steel, housed and supported in a thin annular groove formed in proximity to the upper end of the spindle, said elastic locking element having a substantially polygonal geometrical shape in the form of a ring which is sufficiently open to allow circumferential elastic deformation of its projections.
2. An element for centering and locking a tube on a spindle as claimed in claim 1, characterised in that before its elastic deformation, its polygonal form has an inscribed inner circle of diameter greater than the diameter of the base of the annular groove, whereas after its elastic deformation, with the tube locked on the spindle, its inscribed inner circle is sufficiently pressed about said base diameter of the thin annular ring.

3. An element for centering and locking a tube on a spindle as claimed in claims 1 and 2, characterised in that at the end of elastic deformation and with locking complete, its configuration is still open-ring, ie with its ends not touching each other. 5
4. An element for centering and locking a tube on a spindle as claimed in claims 1 to 3, characterised in that its right cross-section is of substantially circular profile. 10
5. An element for centering and locking a tube on a spindle as claimed in claims 1 to 4, characterised in that its polygonal form comprises at least three projections or vertices, which are advantageously rounded for accurate locking between the tube and spindle, said projections being distributed substantially equidistant along the circumscribed circumference of said polygon. 15 20

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Fig.1

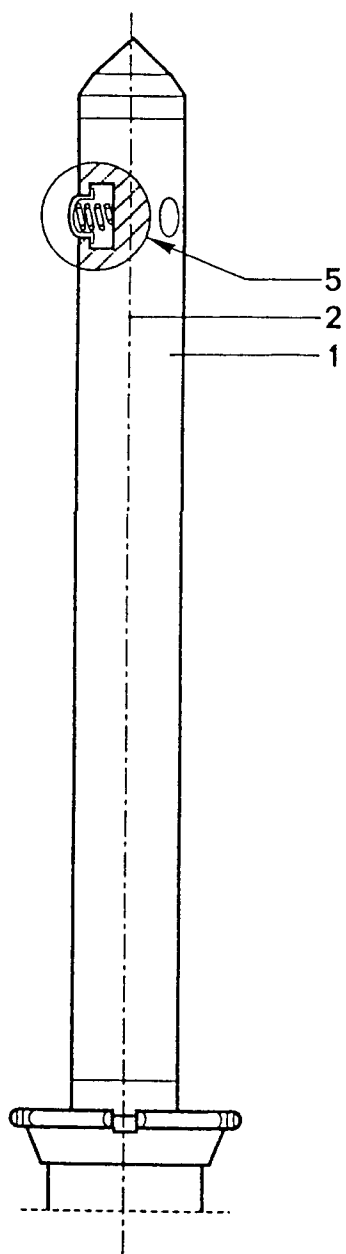
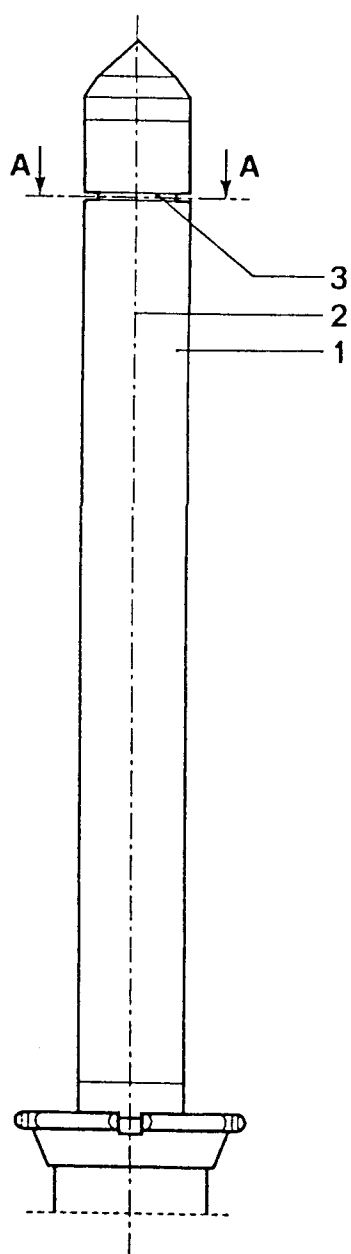
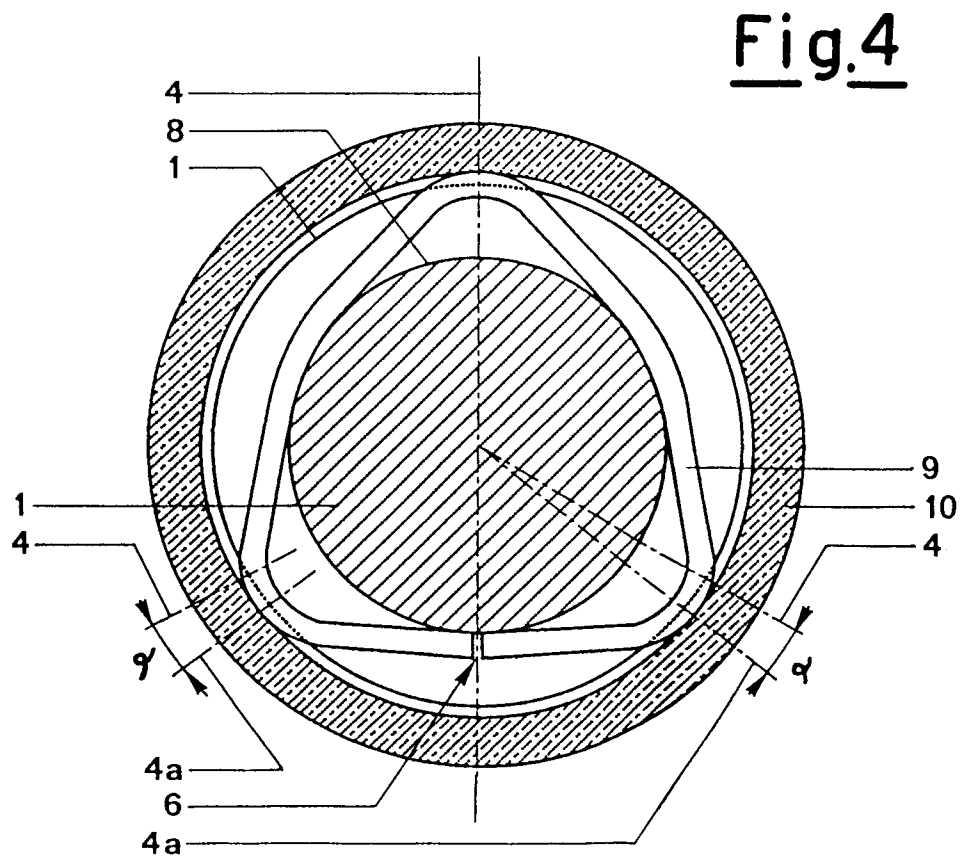
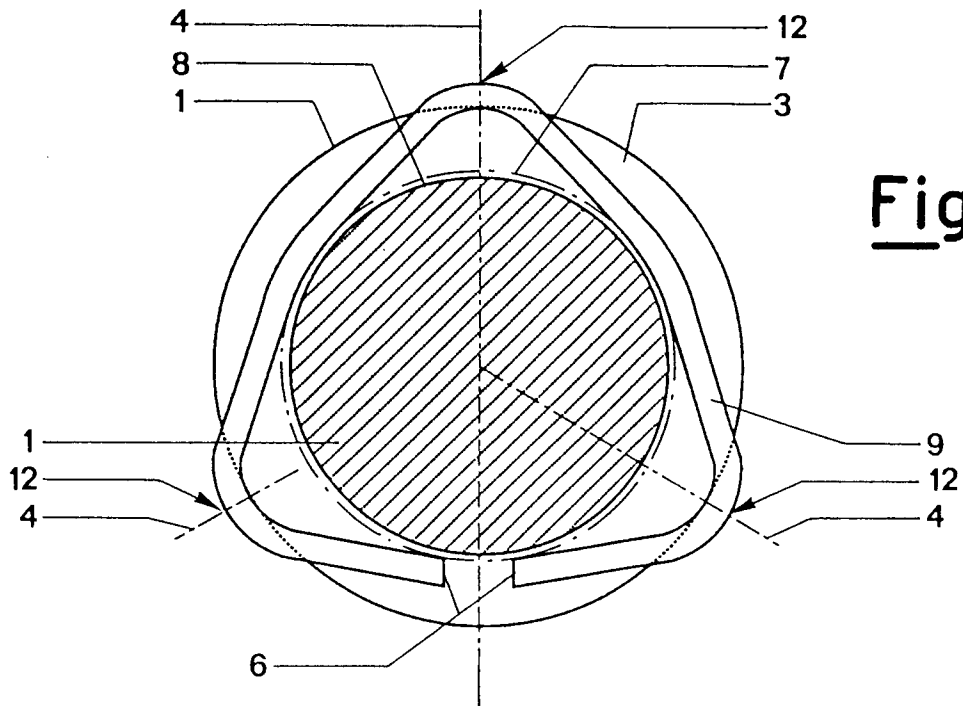


Fig.2







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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 1641

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	DE-C-732 545 (DEUTSCHE SPINNEREIMASCHINENBAU) * page 2, line 48 - line 51 * * page 2, line 59 - line 66; figure 2 * ---	1-5	D01H7/16
Y	DE-C-658 280 (NOVIBRA) * page 2, line 14 - line 18; figure 2 * ---	1-5	
A	FR-A-763 507 (NOVIBRA) * figures 4,12 * ---	1	
A	GB-A-653 739 (JOH. JACOB RIETER & CIE.) * figure 2 * ---	1	
A	GB-A-974 732 (MASCHINENFABRIK RIETER) * figures * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D01H B65H
Place of search THE HAGUE		Date of completion of the search 02 SEPTEMBER 1992	Examiner RAYBOULD B.D.J.
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