United States Patent [19]

Wüst

[11] **3,809,326**

[45] **May 7, 1974**

[54] **BOBBIN SUPPORT CHUCK**

[75] Inventor: **Olivier Wüst,** Seuzach, Switzerland

[73] Assignee: **Maschinenfabrik Rieter AG.,** Winterthur, Switzerland

[22] Filed: **Oct. 19, 1972**

[21] Appl. No.: **299,025**

[30] **Foreign Application Priority Data**

Oct. 22, 1971 Switzerland 15379/71

[52] **U.S. Cl.** ..... **242/19,** 242/18 A, 242/18 PW, 242/25 A

[51] **Int. Cl.** **B65h 75/32**

[58] **Field of Search** .... 242/19, 18 A, 18 PW, 25 A, 242/125, 125.1

[56] **References Cited**

FOREIGN PATENTS OR APPLICATIONS

2,048,416 4/1971 Germany ..... 242/18 A

1,097,204 12/1967 Great Britain ..... 242/18 A

Primary Examiner—Stanley N. Gilreath

Attorney, Agent, or Firm—Werner W. Kleeman

[57] **ABSTRACT**

Bobbin support chuck with a thread severing zone defined by a thread severing ring and a thread inserting ring. The thread severing ring has a ring-shaped arrangement of cutting elements on its face. The thread inserting ring is located between the end face of the bobbin tube and the thread severing ring and has a substantially conical thread guiding surface which extends at least partially under the cutting elements when the bobbin tube is placed entirely on the chuck, and at which location there is provided thread clamping means.

15 Claims, 10 Drawing Figures

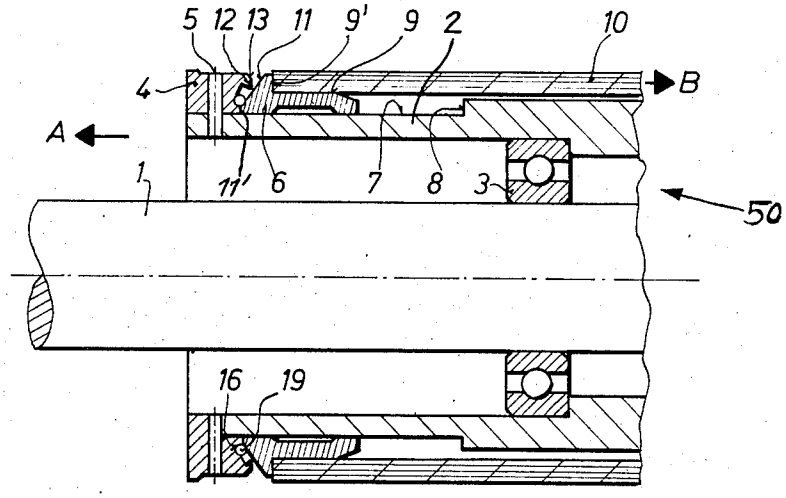
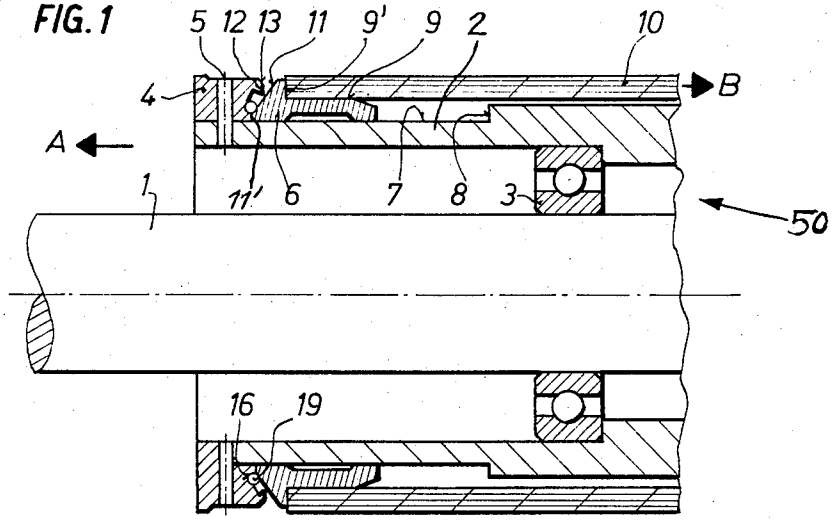


FIG. 1



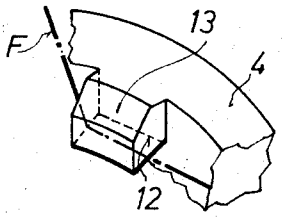


FIG. 2

FIG. 3

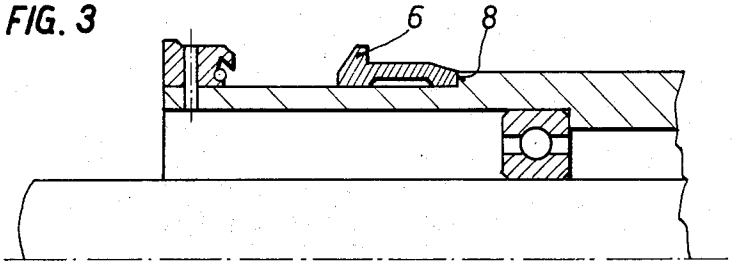


FIG. 4

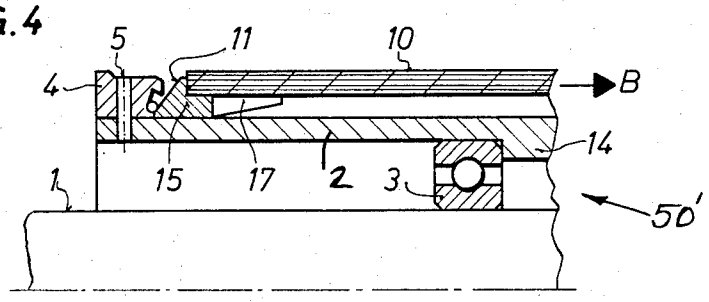


FIG. 5

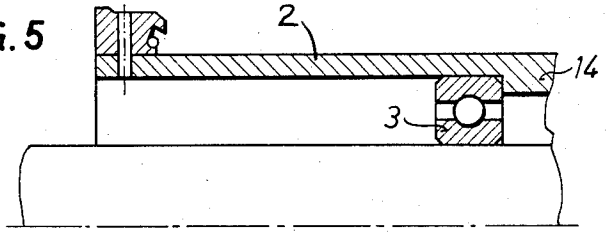


FIG. 6

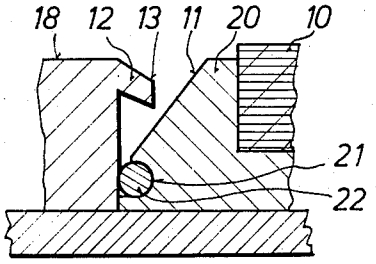


FIG. 7

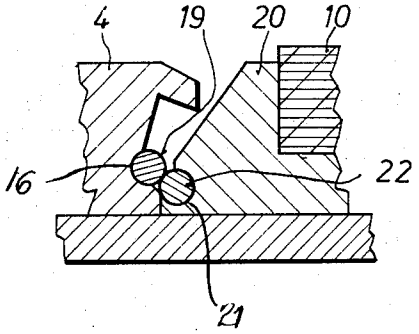


FIG. 8

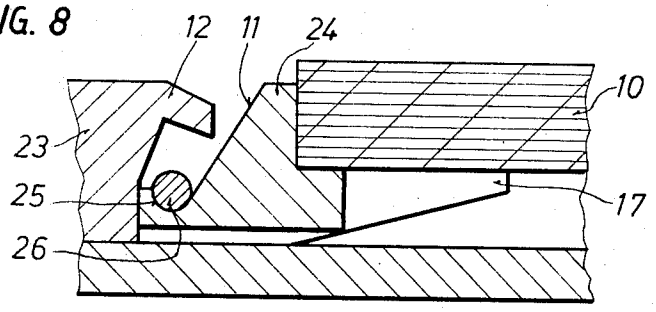


FIG. 9

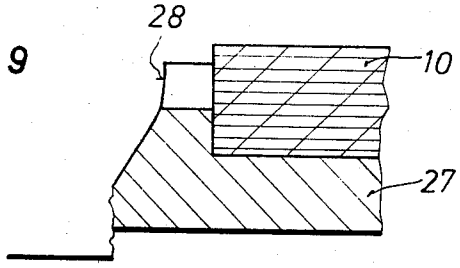
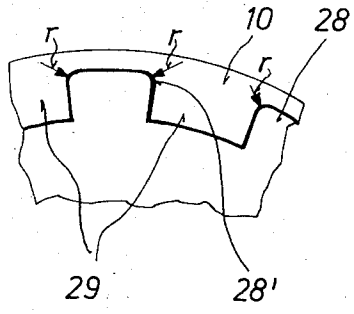


FIG. 10



BOBBIN SUPPORT CHUCK

BACKGROUND OF THE INVENTION

The present invention relates to a new and improved construction of bobbin support chuck or mandrel provided with a thread separating zone containing a thread separating ring arranged concentrically with, and at the face side of, the tube, such as for example used on winding devices for endless filaments or threads equipped with automatic bobbin change devices.

Winding devices for endless filaments or threads equipped with automatic bobbin change devices are already known in the art wherein two bobbin tubes or sleeves alternatingly take up the thread delivered at high speed and, as the desired bobbin diameter is reached, are moved from a winding position into an idle position, the thread simultaneously being transferred to the empty tube. The thread transfer is effected in that the thread, partially surrounding or wrapped about a thread separating ring and not being traversed during the thread transfer, owing to axial displacement of the bobbin chuck or mandrel is caught or seized by appropriate means, severed and wound onto the tube with a number of reserve wraps being formed. The thread separating ring rigidly connected to the chuck and provided with teeth arranged on its face side or end face together with the end face of the bobbin tube located at a distance from the teeth forms the thread catching zone. During the bobbin change the thread penetrates into the clearance space between the teeth and the end face of the bobbin tube and is intended to be caught and severed by the teeth. Within the teeth arrangement a cone tapered towards the outside, i.e., in the direction of the free tube end, and extending slightly beyond the teeth, on the one hand forms a stop for the bobbin tube and, on the other hand, the taper of the cone towards the outside permits easy removal of any thread wraps possibly remaining there during the doffing operation of the bobbin.

The disadvantage of such devices resides in the fact that the boundary or limiting surfaces of the thread catching zone, formed by the end faces of the teeth and by the tube end face, and which boundary surfaces extend parallel and at right angles with respect to the axis, as well as the cone tapering towards the outside within the ring arrangement of teeth, do not guide the thread with sufficient reliability into the cutting zone of the teeth. Severing of the thread is thus not positively ensured, which can result in undesirable disturbances during the thread transfer operation.

A further disadvantage of such devices is present owing to the strength requirements and that for the constructional design a given minimum height of the thread separating ring must be maintained. Thus, the tubes also must be chosen of a corresponding minimum wall thickness as their end faces form one of the boundary or limiting surfaces of the thread catching zone.

SUMMARY OF THE INVENTION

Hence, from what has been discussed above it should be apparent that this particular field of technology is still in need of bobbin support chucks or mandrels which are not associated with the aforementioned drawbacks and limitations of the prior art proposals. It is therefore a primary object of the present invention to provide a new and improved construction of bobbin

support chuck which overcomes the aforementioned drawbacks of the prior art proposals and effectively fulfills the need still existing in the art.

Another object of the present invention relates to an improved construction of bobbin support chuck which is relatively simple in design, economical to manufacture, and ensures for positive guiding of a thread to be severed into the operable zone of cutting elements.

Another object of the present invention relates to an improved bobbin support chuck which is provided with means so that after severing of the thread winding of the infed thread is carried out properly and there is ensured for reliable and positive start-up of winding of the bobbin or package.

Now in order to implement these and still further objects of the invention, which will become more readily apparent as the description proceeds, the invention contemplates the provision of a new and improved chuck or mandrel for a bobbin tube serving as bobbin support which comprises a thread severing or cutting zone embodying a thread severing or separation ring arranged concentrically with respect to the chuck. This thread severing ring is provided with a substantially ring-shaped arrangement of cutting elements at one face thereof. A thread inserting ring is provided between the end face of the bobbin tube and the thread severing ring. This thread inserting ring possesses a substantially conical thread guide surface which extends at least partially beneath the cutting elements when the bobbin tube is placed entirely on the chuck, and at which location there are also provided thread clamping means. The thread inserting ring can be moved away from the thread severing ring to facilitate removal of thread wraps which may possibly be located therebetween.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above, will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is a fragmentary longitudinal sectional view of a bobbin chuck or mandrel equipped with a bobbin tube;

FIG. 2 is a fragmentary perspective view of an enlarged detail of the thread severing ring employed in the bobbin support chuck arrangement of FIG. 1;

FIG. 3 illustrates the arrangement of FIG. 1 with the bobbin tube removed;

FIG. 4 is a fragmentary longitudinal sectional view of a further embodiment of bobbin chuck with a bobbin tube mounted thereat;

FIG. 5 illustrates the bobbin chuck arrangement of FIG. 4 with the bobbin tube removed;

FIGS. 6, 7 and 8 respectively show variant constructional embodiments of the thread inserting ring and thread severing ring;

FIG. 9 is a fragmentary sectional view of a modified form of thread inserting ring having nose-shaped projections; and

FIG. 10 is an end view of the thread inserting ring depicted in FIG. 9.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Describing now the drawings, in FIG. 1 there is

shown an exemplary embodiment of bobbin support chuck or mandrel **50** embodying a bobbin chuck shaft **1** at which there is supported by anti-friction bearing means **3** a bobbin chuck sleeve **2**. At the end of the bobbin chuck sleeve **2** facing the machine frame, indicated by the direction of the arrow A, a thread severing or separation ring **4** is rigidly connected with the bobbin chuck sleeve **2** by means of a pin **5** or any other suitable fastening expedient A thread inserting or insertion ring **6** is movably arranged upon a sliding surface **7** provided at the bobbin chuck sleeve **2** between the thread severing ring **4** and a stop member **8** likewise provided at such chuck sleeve. The thread inserting ring **6** is provided with a cylindrical rim or collar **9** and a stop member or shoulder **9'** for taking up a bobbin tube **10**. Continuing, it is to be understood that the thread inserting ring **6** further possesses a conical surface **11** which contacts or abuts against the thread severing ring **4** by means of a small end face **11'** when the bobbin tube **10** is placed entirely upon the bobbin chuck or mandrel **50**. The thread severing ring **4**, on its end face confronting the conical surface **11**, is provided with a substantially ring-shaped arrangement of a series of tooth-shaped cutting elements **12**. These cutting elements **12** are located at the region of the thread severing zone defined between the thread severing ring **4** and the thread inserting ring **6**, and furthermore, will be seen to partially protrude into the region of the conical surface **11**. Moreover, as best seen by referring to FIG. **2** each of these tooth-shaped cutting elements **12** embodies an inclined surface **13**. The thread severing ring **4** is also provided with a ring-shaped groove **16** into which is placed a rubber ring **19** of, for instance, circular cross-section. This elastic ring-shaped member **19** is pressed against a contacting surface and which is defined by the confronting situated conical surface **11** of the thread inserting ring **6**. Furthermore, it will be noted that when the bobbin tube **10** is placed completely onto the bobbin chuck **50**, as depicted in FIG. **1**, the part of the conical thread guiding surface **11** of smaller diameter extends beneath the cutting elements **12**.

FIG. **2** illustrates in an enlarged fragmentary view details of the thread severing ring **4** with one of the tooth-shaped cutting elements **12** which, as will be recalled, has an inclined surface **13**. There is also depicted therein a thread F, indicated by a dash-dot line, which is entrained or caught by such cutting element **12** and in the process of being severed.

FIG. **3** illustrates the bobbin chuck or mandrel **50** of the arrangement of FIG. **1** following the time where the bobbin tube **10** has been doffed, in which case the thread inserting ring **6** has been moved towards the right and contacts against the stop member **8** as shown.

FIG. **4** illustrates a modified form of bobbin support chuck or mandrel **50'**, there again being shown the bobbin chuck shaft **1** upon which there is mounted by the anti-fricting bearing means **3** the bobbin chuck sleeve **2**. There is also shown a thread inserting ring **15** which, in this case, is detachably connected with the bobbin tube **10** by means of a suitable connecting element **17**. Hence, as best seen by referring to FIG. **5** when the bobbin tube **10** is doffed the thread inserting ring **15** is pulled-off together therewith from the bobbin chuck sleeve **2**.

A different embodiment of thread severing ring **18** and illustrating one of its cutting elements **12** and the associated inclined surface **13** has been depicted in FIG. **6**. Also with this embodiment the thread inserting ring **20** possesses a conical surface **11** and here is shown to have a ring-shaped groove **21** containing an elastic or rubber ring **22** of circular cross-section.

In FIG. **7** there is shown a thread severing ring **4** and a thread inserting ring **20**, the latter of which is similar to the thread inserting ring of the embodiment of FIG. **6**. In this arrangement not only is the thread inserting ring **20** provided with a ring-shaped groove **21** containing the rubber or elastic ring **22** of circular cross-section, but also the thread severing ring **4** is likewise provided with a groove **16** containing an elastic or rubber ring **19**, similar to the previously discussed embodiment of FIG. **1**.

FIG. **8** illustrates a further embodiment of thread severing ring **23** equipped with the cutting elements **12**. A thread inserting ring **24** is arranged on the bobbin tube **10** and connected therewith by the connecting element **17**, similar to the embodiment of FIG. **4**. This thread inserting ring **24** also has a conical thread guide surface **11** and is equipped with a ring-shaped groove **25** into which there is inserted an elastic or rubber ring **26** of, for instance, circular cross-section.

In the embodiment of FIGS. **9** and **10** a thread inserting ring **27** is arranged on the bobbin tube **10** and is provided with nose-shaped protruding cams or dogs **28**, the upper edges **28'** of which are rounded with the radius being indicated by reference character *r*. Between the protruding cams or dogs **28** which are spaced from one another peripherally about the thread inserting ring **27** there are formed openings **29**.

Now, if during a bobbin change operation the thread is to be transferred from the full bobbin tube to the empty bobbin tube, then the thread is inserted into the notch-shaped opening formed by the inclined surface **13** and by the conical surface **11** and in radially inclined direction is brought along the conical thread guide surface **11** into the region located below the cutting elements **12** (FIG. **2**) and is clamped between the rubber ring **19** and the adjacent confronting surface. The same happens with the thread in the arrangement depicted in FIG. **6** by means of the rubber ring **22**, or, with the arrangement of FIG. **7** the thread is clamped between the rubber rings **19** and **22**, or with the arrangement of FIG. **8** the thread is clamped between the surface **11** and the rubber ring **26**. As the bobbin chuck rotates the thread still delivered to the full bobbin is severed or cut. Owing to the axial displacement of the bobbin chuck relative to the thread in the direction of the arrow A and the rotation of the bobbin chuck, the thread, as indicated in the embodiment shown in FIGS. **9** and **10**, is guided directly from the clamping point into one of the openings **29** and subsequently, owing to the rotation of the bobbin chuck, it lifted onto one of the edges **28'** and thus is lifted onto the protruding cam **28**, and subsequently is guided onto the bobbin tube **10**. Upon winding a number of reserve wraps onto the tube **10** at its edge or rim the thread traversing motion is restarted by any suitable means which are well known in this particular art and therefore not illustrated, particularly since they do not form part of the subject matter of this development nor is such necessary for understanding the underlying concepts of this development.

When the full bobbin is doffed in the direction of the arrow B (FIG. 1), or possibly with a subsequent separate movement in the event that the thread inserting ring 6 is not entrained, the latter is displaced up to the stop 8, or with the embodiments of FIGS. 4 and 8, the thread inserting ring 15 and 24 respectively is withdrawn or doffed together with the bobbin or package from the chuck, so that any thread wraps which might have possibly accumulated in the space between the thread severing ring and the operatively associated conical thread guide surface of the thread inserting ring can be easily removed or can be removed together with the thread inserting ring.

The described embodiments or inventive bobbin support chuck or mandrel afford the following noteworthy advantages in contrast to the prior art devices:

1. The thread is guided positively and realiably into the region of the cutting elements.

2. By using the thread inserting ring there is eliminated the initially mentioned disadvantage that a minimum bobbin tube wall thickness is required which is governed by the height of the thread severing ring. The bobbin tube wall thickness can be freely chosen and must merely meet the requirements of tube rigidity or strength.

3. The thread is reliably clamped at the bobbin chuck after severing, so that winding of the infed or delivered thread is carried out correctly and there is ensured for reliable start-up of bobbin winding.

4. The design is simple and manufacture of the equipment is therefore economical.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims. ACCORDINGLY,

What is claimed is:

1. A bobbin chuck device for a bobbin tube serving as a bobbin support, comprising a chuck sleeve, a thread severing ring mounted on said chuck sleeve and provided with a substantially ring-shaped arrangement of cutting elements, a thread inserting ring on said chuck sleeve arranged between an end face of the bobbin tube and the thread severing ring, said thread inserting ring being provided with a conical thread guiding surface which extends at least partially beneath the cutting elements when the bobbin tube is placed entirely on the chuck sleeve, and thread clamping means provided at the region of the conical thread guiding surface extending at least partially beneath the cutting elements.

2. The bobbin chuck device as defined in claim **1**, further including means for displaceably mounting the thread inserting ring for movement away from the thread severing ring.

3. The bobbin chuck device as defined in claim **2**, wherein said mounting means mounts the thread inserting ring so as to be axially movable.

4. The bobbin chuck device as defined in claim **3**, further including means for securing the thread inserting ring to the bobbin tube so as to be movable together with the bobbin tube.

5. The bobbin chuck device as defined in claim **2**, wherein the thread inserting ring includes means enabling the bobbin tube to be placed onto the thread inserting ring.

6. The bobbin chuck device as defined in claim **1**, wherein the conical thread guiding surface has a portion of smaller diameter which extends beneath the cutting elements when the bobbin tube is placed entirely onto the bobbin chuck device.

7. The bobbin chuck device as defined in claim **1**, further including thread entrainment means provided at the region of the outer circumference of the conical thread guiding surface.

8. The bobbin chuck device as defined in claim **7**, wherein said entrainment means comprises nose-shaped protruding cams substantially uniformly circumferentially distributed.

9. The bobbin chuck device as defined in claim **8**, wherein the protruding cams are arranged in substantially ring-shaped configuration.

10. The bobbin chuck device as defined in claim **1**, wherein said thread clamping means comprises an elastic ring-shaped element seated in a substantially ring-shaped groove provided at the thread severing ring and a contacting surface which is formed by the thread insertion ring against which circumferential contact is established.

11. The bobbin chuck device as defined in claim **1**, wherein said thread clamping means comprises an elastic ring-shaped element which is placed into a ring-shaped groove provided at the thread inserting ring and a contacting surface which is formed by the thread severing ring against which circumferential contact is established.

12. The bobbin chuck device as defined in claim **11**, wherein said elastic ring-shaped element is a rubber ring of substantially circular cross-section.

13. The bobbin chuck device as defined in claim **1**, wherein said thread clamping means comprises an elastic ring-shaped element which is seated in a substantially ring-shaped groove provided at the thread inserting ring and a contact surface which is defined by a second elastic element seated in a substantially ring-shaped groove provided at the thread severing ring.

14. The bobbin chuck device as defined in claim **13**, wherein said elastic ring-shaped element is a rubber ring of substantially circular cross-section.

15. The bobbin chuck device as defined in claim **10**, wherein said elastic ring-shaped element is a rubber ring of substantially circular cross-section.

* * * * *