

[54] **ROTATING SPINNING RING**

[72] Inventors: **Anthony Netti**, Methuen, Mass.; **Douglas Bussiere**, Plaistow, N.H.

[73] Assignee: **Davis & Furber Machine Company**, North Andover, Mass.

[22] Filed: **Aug. 11, 1970**

[21] Appl. No.: **62,851**

[52] U.S. Cl. ....57/120, 57/124

[51] Int. Cl. ....D01h 7/56, D01h 7/62

[58] Field of Search .....52/119-124

[56] **References Cited**

**UNITED STATES PATENTS**

660,627 10/1900 Draper.....57/124

792,141 6/1905 Lovejoy.....57/124  
921,031 5/1909 Walton.....57/124

**FOREIGN PATENTS OR APPLICATIONS**

489,465 1/1954 Italy.....57/124

*Primary Examiner*—John Petrakes

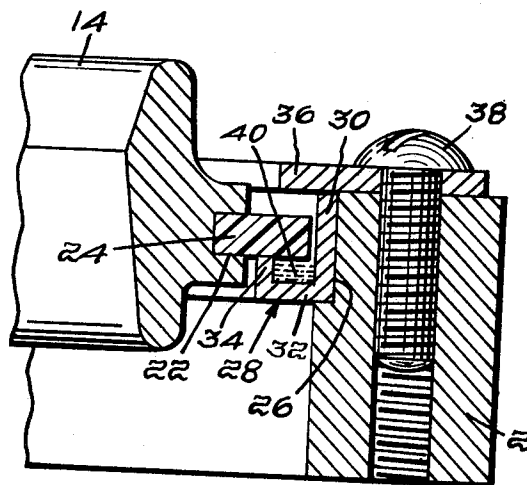
*Attorney*—Chittick, Pfund, Birch, Samuels and Gauthier

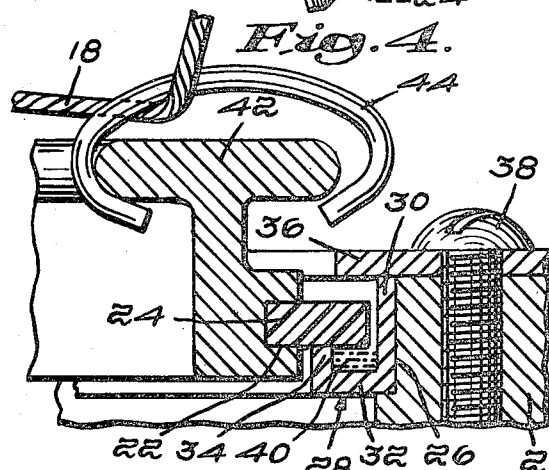
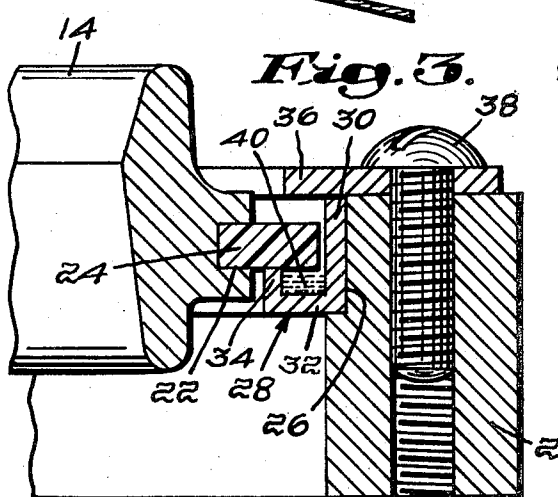
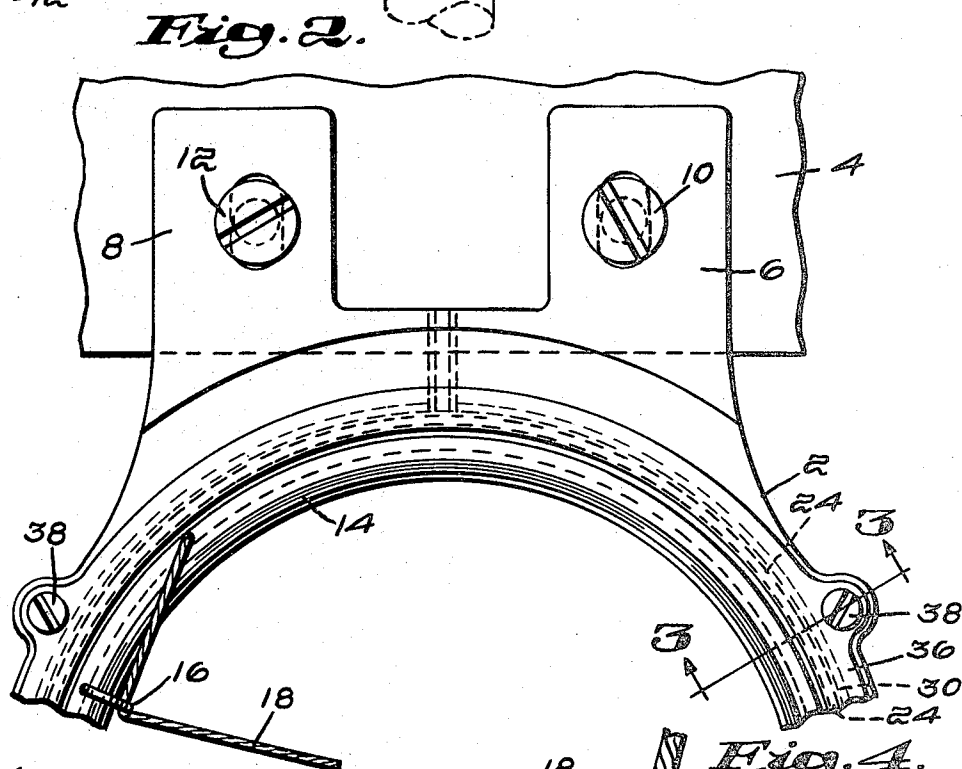
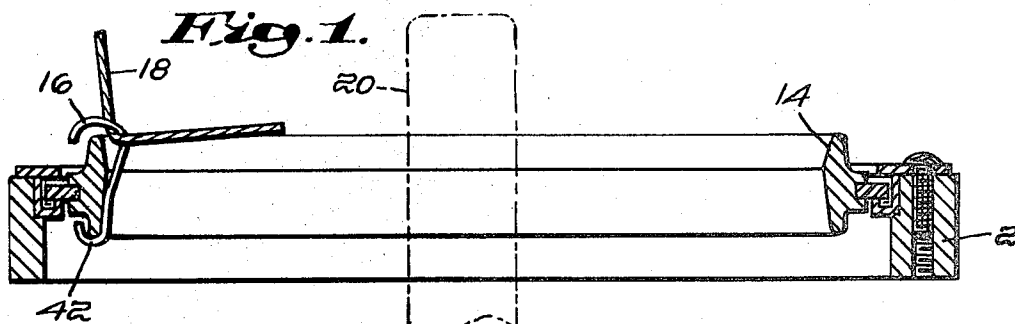
[57]

**ABSTRACT**

A rotatable spinning ring whose rotation is induced by the friction of the rotating traveler thereagainst during the spinning operation with the ring having a circular bearing portion made of non-metallic bearing material which slidably rotates on a circular metallic bearing surface. The non-metallic bearing material acts as an insulator to prevent effectively the transfer of heat generated at the sliding bearing surfaces to the ring.

**11 Claims, 4 Drawing Figures**





**Inventors:**  
**Anthony Neñi,**  
**Douglas Bussiere,**  
 by *Chittick, Pfund, Bick, Samuels and Gauthier*  
**Attorneys**

## ROTATING SPINNING RING

## BACKGROUND OF THE INVENTION

The concept of rotating spinning rings has long been known in the textile art. An early form is shown, for example, in the patent to Draper No. 741,777 and a somewhat more recent construction is shown in the patent to Pennati U.S. Pat. No. 2,563,187. Other pertinent constructions can be found in the patents to Culver U.S. Pat. No. 597,176, Kuwada U.S. Pat. No. 2,017,313, Kuwada U.S. Pat. No. 2,034,762 and Rooney U.S. Pat. No. 2,725,712.

The prior art discloses that rotating spinning rings have been mounted on various types of antifriction bearings permitting such ease of movement that the friction between the traveler and the spinning ring will be great enough to cause the ring to rotate. The principal reason for having a rotating spinning ring is to decrease the movement of the traveler relative to the ring so that the life of the traveler will be increased. It is further well understood that in the operation of conventional spinning rings and travelers thereon, the traveler is the element that wears away relatively quickly and must be repeatedly replaced. If the life of the travelers can be increased, as is the case when a rotating spinning ring is used, the downtime of a spinning frame and the individual spindles thereof can be decreased. Lubrication of the traveler on a rotating ring is unnecessary. Hence, there is no possibility of soiling the yarn which often occurs when a lubricant is used.

However, in spite of the obvious advantages of a satisfactorily performing rotating spinning ring, such rings have not come into use in the industry because of other disadvantages that outweigh the possible saving in travelers. Such disadvantages are, for example, the high cost of bearings, increased maintenance expense, increased cost of the spinning rings themselves, and the gradual improvement in the quality of travelers at relatively less cost.

## SUMMARY OF THE INVENTION

The present invention relates to details of construction and the use of novel materials which together make it feasible both operatively and economically to utilize the well-known desirable principles of a rotating spinning ring in which the relative movement of the traveler thereon is small. Additionally, in the present construction, there is interposed between the ring per se and the supporting structure, a supporting band which serves two purposes: first, it carries the spinning ring in rotatable relationship to the ring holder; and, secondly, it insulates the ring from the circular supporting surface so that heat generated in the bearing areas is transmitted to the holder for dissipation instead of to the ring. Thus, the ring does not increase in temperature during operation to an undesirable degree, and the resulting friction between the traveler and the ring, which is rotating almost as fast as the traveler, is so small that the total increase in temperature of the ring is negligible. These operative conditions reduce automatically the amount of wear occurring in the traveler. Means may also be provided for introducing lubrication between the supporting band and its supporting structure to further reduce the resistance to rotation of the ring.

## BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

FIG. 1 is a vertical cross section through the ring and related holder.

FIG. 2 is a somewhat enlarged plan view of a portion of the spinning ring and holder.

FIG. 3 is a still further enlarged vertical section taken on the line 3—3 of FIG. 2.

FIG. 4 is a vertical section similar to FIG. 3 showing the invention used with a horizontal type spinning ring as distinguished from the vertical type shown in FIGS. 1, 2 and 3.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIGS. 1, 2 and 3, there is shown a holder 2 which is adapted to be mounted in any convenient manner on a ring rail 4. As shown in FIG. 2, the holder may include extension 6 and 8 which are secured by screws 10 and 12, respectively, to the ring rail. The holder 2, which is representative of any and all spinning ring holders that may be mounted on a ring rail, is circular and arranged to carry thereon a rotatable spinning ring 14. The spinning ring illustrated in FIGS. 1, 2 and 3 is of the so-called vertical type and carries thereon a conventional traveler 16 under which the yarn 18 that is being twisted passes on its way to the bobbin suggested by the dot and dash line 20 in FIG. 1. Those familiar with this art will understand that the bobbin 20 is rotated by a vertical spindle that is aligned with the axis of the spinning ring. There is relative vertical movement between the ring rail and the spindle, so that the twisted yarn produced by the spinning operation is wound in a satisfactory pattern on the bobbin to produce the required package.

The ring 14 has about its outer periphery a circumferential groove 22 in which is positioned a circular band 24. This band is preferably made of a suitable synthetic material, such as polytetrafluoroethylene or its equivalent, which has a low coefficient of friction.

The holder 2 is circumferentially recessed as at 26 to receive therein a ring supporting element 28. This element comprises a circular U-shaped member having an outer wall 30, a bottom 32, and a shorter inner wall 34. The upper circular surface of wall 34 is smooth and horizontal and on it rests the flat undersurface of band 24. Because of the smoothness of upper surface wall 34 and the low coefficient of friction of band 24, the ring 14 may be easily rotated.

In order to prevent any upward dislodgement of the ring from holder 2, there is a removable circular lock ring 36 which may be conveniently held in position by the screws 38 of which two are shown in FIG. 2.

The outer and inner walls 30 and 34, and the connecting bottom 32 of the supporting element 28 define an oil reservoir 40 which when filled is capable by capillary attraction of lubricating the engaging surfaces of band 24 and wall 34.

When the spindle 20 is put in operation in the normal manner so that the yarn 18 passing under traveler 16 commences to be wound thereon, the traveler 16 instantly commences to rotate about the ring 14. However, the friction between the lower part 42 of traveler 16 and the lower part of ring 14 is somewhat greater than the friction between band 24 and the supporting element 34. The result is that ring 14 commences to rotate in the direction of movement of traveler 16. Within a matter of seconds, the ring 14 will reach a rotational speed only slightly below the absolute speed of traveler 16. The difference in RPM between ring 14 and traveler 16 in the ordinary case will be less than 10 percent of the spindle speed. The differential in RPM between the ring and the traveler will vary somewhat according to the weight of the traveler being used. Generally speaking, the weight of the traveler is related to the weight of the yarns being spun. If a light traveler is in use, the differential in RPM between the traveler and the ring will be greater than if a heavy traveler is being used.

Preferably, travelers made of nylon are used because of their better wearing characteristics with respect to the ring. On the other hand, any type of traveler may be used, such as conventional steel travelers, or the combination type in which the part engaging the ring is of nylon and the part engaging the yarn is of steel, so long as there is enough friction between the traveler and the ring to induce the ring to rotate and to bring it up to speed. With the spindle 20, traveler 16 and ring 14 all up to speed, the area of maximum friction is between the band 24 and the upper surface of wall 34. At this position, heat is, of course, generated but the heat will travel through the supporting element 28 into the holder 2 to be dissipated to the room atmosphere rather than through the insulating polytetrafluoroethylene band 24 to the ring 14. Thus, the tem-

perature of the ring stays close to room temperature in spite of the small heat generated by the lower speed of movement of traveler 16 along the rotating ring 14.

Since the ring 14 is of uniform cross section and weight, it rotates about its vertical axis with negligible lateral movement in spite of the changing angular pull of the traveler 16. However, it is desirable to limit any lateral motion of the ring and this is accomplished by having relatively small clearance between the outer periphery of band 24 and the inner surface of wall 30.

When the spindle 20 is being stopped for doffing with the elimination of the rotating force applied to the ring 14 by the traveler 16, it has been found desirable that the ring come to a stop before the traveler stops its circular movement thereon so that the yarn 18 may free itself from the package. This result is accomplished by the present construction.

The modification shown in FIG. 4 differs from FIGS. 1, 2 and 3 only in that the ring 42 is of the horizontal type and the traveler 44 correspondingly shaped for use thereon. All of the other structures of the holder supporting element oil reservoir, and band are generally the same as in FIGS. 1, 2 and 3 and the parts have been similarly numbered. The operation of the spindle, traveler and ring is the same in both forms.

It is intended to cover all changes and modifications of the examples of the invention herein chosen for purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

We claim:

1. A rotatable spinning ring unit comprising a metal ring, a circular band of non-metallic material surrounding and connected to said ring, said band having a relatively low coefficient of friction and low heat conductivity, means for supporting said band in rotatable sliding engagement, said means comprising a circular element having its upper surface lying in a horizontal plane, and a holder supporting said element, said holder adapted to be secured to the ring rail of a spinning frame.

2. A rotatable spinning ring unit as set forth in claim 1, said ring being circumferentially grooved about its exterior and said band having its inner periphery located in said groove, the band engaging surface of said circular element being of less width than that part of the band extending beyond said ring.

3. A rotatable spinning ring unit as set forth in claim 1, said circular element being of metal of good heat conductivity.

4. A rotatable spinning ring unit as set forth in claim 1, said band being made of polytetrafluoroethylene or the like.

5. A rotatable spinning ring unit as set forth in claim 1, and a circular wall adjacent the outer periphery of said band to limit the lateral movement of said ring during operation.

6. A rotatable spinning ring unit as set forth in claim 1, the friction between said band and element being less than the friction of a traveler on said ring as said traveler is rotated about said ring by normal operation of a spindle, whereby said ring will rotate on said element at a speed somewhat less than said traveler speed.

7. A rotatable spinning ring unit as set forth in claim 6, said friction between said band and element being great enough to cause said ring to stop rotation before said traveler when said spindle slows to a stop.

8. A rotatable spinning ring unit as set forth in claim 1, the engaging surfaces of said band and element being horizontal, narrow and annular.

9. A rotatable spinning ring unit as set forth in claim 1, a removable lock ring, means for securing said lock ring to said holder, the outer peripheral portion of said band underlying said lock ring, said lock ring acting to prevent dislodgement of said spinning ring from said holder during normal operation.

10. A rotatable spinning ring unit as set forth in claim 1, said ring being made of steel, said band being made of polytetrafluoroethylene or the like, and said supporting means and holder being made of metal of good heat conductivity.

11. A rotatable spinning ring unit comprising a metal ring, a circular band of non-metallic material surrounding and connected to said ring, said band having a relatively low coefficient of friction and low heat conductivity, means for supporting said band in rotatable sliding engagement, said means comprising a circular element having its upper surface lying in a horizontal plane, an oil reservoir adjacent said circular element, the outer periphery of said band being of greater diameter than the exterior diameter of said circular element whereby part of said band will overlie said reservoir, and a holder supporting said circular element and reservoir, said holder adapted to be secured to the ring rail of a spinning frame.

\* \* \* \* \*

45

50

55

60

65

70

75