TOP DRAWING ROLL ON SPINNING MACHINE

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TOP DRAWING ROLL ON SPINNING MACHINE

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My present invention relates to improvements in top drawing-rolls on spinning machines, running on antifrictionbearings. Such rolls usually comprise an axle carrying antifric
tion-bearings at both ends, which bearings support sleeves having an axis. An example is a metal rod, rubber or some other material of similar properties. Such covering is subject to wear. The yarn causes corrugations, wrinkles or other unevenness on the surface of the covering, so that the latter must be reground from time to time. The antifrictionbearings of the sleeves must be periodically checked. The sleeves and their covering, therefore, must be removed from time to time from the axle journals. Such demounting has to be done readily and easily and without impairing the hold of the sleeve on the bearing. It has been proposed to circumferentially groove the middle of the sleeve so as to produce axial or thrust stops for the bearings.

When, in operation, one conventional top roll is winding yarn, the antifriction-bearing of the other top roll is set aside and the sleeve will readily lose its axial hold. It wanders off in a lateral direction, and the covering will be damaged. Such loose sleeves readily drop on the floor upon demounting the top-roll pair from the draw-head. This increases the work of attendance, results in loss of time and, eventually, in serious interruptions of operation. Further, due to the relatively large clearance or play between the sleeve mount and the antifriction-bearing, there results a substantial lateral wear of the annular sleeve groove so that the latter eventually has to be replaced. Conventional sleeves, having a circumferential groove at midlength, are expensive to manufacture and require very accurate machining.

In order to eliminate the aforesaid drawbacks, disadvantages and inconveniences, the top roll sleeve—on which the covering is mounted—is securely held in place, according to the present invention, on the outer race of the antifriction bearing by a radial pressure action produced by utilizing the elasticity of the top-roll material. The pressure action is advantageously derived from the resilience of the sleeve covering, but also may be derived from resilient parts or portions of the sleeve, e.g. from resilient longitudinal webs provided on the latter.

Various forms of my present invention are shown, by way of example, in the accompanying drawing, in which: Fig. 1 shows a first example, a pair of top rolls in elevation, with one roll in axial section, Fig. 2 is a cross-section of one of the rolls in Fig. 1, Fig. 3 shows a modified sleeve of a top roll in axial section, Fig. 4 illustrates a further example of a top roll in axial section, Fig. 5 is a longitudinal sectional view of a fourth modification of a top roll according to the invention.

In the first example (Figs. 1, 2), the two top rolls 1 are interconnected by an axle 2 which has a journal in the form of a flange 8 shown partly by dash lines at each end, the pins fitting tightly into corresponding axial bores at the ends of shaft 2. The inner race of the antifriction bearing 4 is rigidly mounted on each journal 3. Each top roll 1 comprises a roll shell including a metallic thin-wall sleeve 6 which has an end wall on the side opposite to the axle 2. The sleeve 6 is longitudinally slotted at 5 in its intermediate portion, and carries a suitable elastic cover-

ing 7 forming a unitary body with the sleeve 6. The inside diameter of the covering 7 is slightly less than the outside diameter of the sleeve 6 so that the covering exerts a radial pressure onto, i.e. is concentrically acting on the sleeve 6, as shown by the arrows in Fig. 2. The resilient webs 8 present between the longitudinal slots 5 in sleeve 6, therefore, are pushed inwardly and, thus, clampingly engage the outer race of the bearing 4. Inwardly pointing lips 9, provided at one end of the longitudinal slots 5, form axial or thrust stops for the outer race of the bearing 4.

For the purpose of protecting the bearing 4 from dust, the interior of sleeve 6 is closed at the end through which axle 2 extends, by a ring or roller 10 shrunk onto the latter. When the bearing 4 is in operation, the top rollers may swing slightly about their center at an angle to the radial center plane of the bearings, which movement is very advantageous for the spinning operation. In the example shown in Fig. 3, longitudinal strips 11 or strips 16 are formed by longitudinally slitting the wall of the sleeve 26, and the free ends of the tongues are bent inwardly. When mounting the axle 20 on axle 2, the tongues 16 due to the conical configuration of a portion of the bearing body 17—are temporarily urged into the yielding covering 27. When the top roll has been properly mounted, the free ends of the rotating parts 16 are engaged in an annular groove 18 in the roller bearing 17 which is thereby axially locked in position.

In all described forms of the top rolls, the resiliency of the covering 7 on the sleeve is utilized. Cloth, leather, cork, rubber and synthetically produced substances having similar properties are particularly suitable materials for the covering.

However, it is also possible to hold the top roll on the antifriction bearing merely by means of the resiliency of the sleeve alone. For this purpose, in the example shown in Fig. 4, the sleeve 19 is provided with webs 20 extending longitudinally thereof, which webs are pressed by slitting the sleeve, and merge at both ends into the material of the sleeve. The webs 20 are cambered somewhat inwardly in their longitudinal section. The arrangement is such that when the webs 20 are deformed, in course of being mounted on a roller bearing, the elastic limit of the material of the webs is not exceeded, so that, when the top roll has been mounted, the webs return to their original form and constitute stops on one side of the roller bearing 4. On the other side, the roller bearing 4 gives against inwardly directed abutments 14 in the sleeve 19.

It is further possible, as shown in Fig. 5, to lock the sleeve 19′ on the outer ring of a roller bearing 21 by means of the resiliency of the material of which the sleeve is made. To such end, a plurality of bulges 22 are pressed into the sleeve 19′ in the region of the roller bearing 21, the said bulges constituting together, when seen in section, an undulating line extending in the axial direction of the sleeve 19′. Alternatively, the configuration may be such that the bulges 22 are not immediately juxtaposed, but are formed by spaced impressions. The inside diameter of the antifriction bulges 22 is somewhat smaller than the outside diameter of the bearing 21 so that the bulges 22, in the mounted condition of the sleeve 19′ which carries a covering 23, exert a clamping action on the bearing 21. A shoulder 24 is provided on the outer bearing race, serves as axial stop between the bearing 21 and the sleeve 19′.

In the examples according to Figs. 4 and 5, no elastic covering is required.

Top rolls according to the present invention are distinguished by an extremely simple manipulation in cleaning. They are carried faultlessly by the anti-friction bearing, so that the pressure roll in operation will not wander off. A certain play is maintained for the pressure roller with respect to the stationary axle 2, which is desirable for spinning. A special advantage is the fact that any sliding friction between stationary and rotating parts is avoided. The completely encased antifriction bearing affords a maximum reliability of operation. Since no bearing grease contacts the sealing elements, no dust will settle thereon and the points of sealing remain always clean. Any dust which somehow has passed through the
sealings will be deposited in the space between the bearing and the sealing element, without detriment to the bearing.

The top-roll construction according to my present invention is of simple and cheap manufacture. These top-rolls may be used to equal advantage, at any rate without appreciable difference, both for top-roll axles guided at their ends or at their ends.

What I claim as new and desire to secure by Letters Patent is:

1. A top drawing-roll aggregate for drawing-heads of spinning frames and the like, comprising a stationary axle having two end portions, an anti-friction bearing individually connected with each of said end portions, a thin-walled sleeve adapted to be removable mounted on each of said bearings and a resilient member im movably secured on the outer surface of each sleeve so as to form an integral structure therewith and to subject the sleeve to a radial compressive action, each sleeve having a yieldable portion responsive to said compressive action to permit the mounting and demounting of each sleeve-and-covering structure onto and from its respective bearings, such the part having inwardly projecting stop means adapted to limit axial movement of the bearing in the sleeve, the whole combination being such that the said sleeve-and-covering structures individually may be yieldably slipped over and stripped from the said bearings.

2. A top roller assembly for a textile machine comprising a stationary axle, two anti-friction bearings secured on said axle, a thin-walled sleeve mounted on each of said bearings and a resilient member secured by resilient stress on the outer surface of each sleeve, said sleeves having axially disposed stops, so that when mounted on the bearings the sleeves elastically grip the outer radial bearing surfaces and stop means integral with said sleeves to limit axial movement of said bearings in said sleeves.

3. A top roller for drawing-heads of spinning frames and the like, comprising an axle, an anti-friction bearing mounted on said axle, sleeve means comprising a thin-walled sleeve member mounted on said bearing, said sleeve member having resilient means integral therewith for elastically gripping the bearing when the sleeve is mounted on the bearing to provide ready mounting and demounting of said sleeve onto and from said bearing, and stop means for limiting axial movement of said bearings in its sleeve.

4. A top roller for drawing-heads of spinning frames and the like, comprising a stationary axle having two closure collars spaced apart on opposite sides of the middle of said axle, an anti-friction bearing mounted on each end of said axle, two sleeve means individually removable mounted on said bearings, sleeve means individually comprising a thin-walled sleeve member having closed outer ends, the said closure collars being located on the axle in positions to substantially close the inner ends of said sleeve members, said sleeve members having means to limit axial movement of said bearings in their sleeve means, and said sleeve means comprising elastic means to hold same on their bearings.

5. A top drawing-roll aggregate for drawing-heads of spinning frames and the like, comprising an axle, an anti- friction bearing mounted on said axle, sleeve means mounted on said bearing, concentrically acting resilient means integral with said sleeve means for elastically gripping the bearing when the sleeve is mounted on the bearing to provide for ready mounting and demounting of said sleeve means on and from said bearing, and stop means for limiting axial movement with and inwardly protruding from said sleeve means for limiting axial movement of said bearing in said sleeve means.

6. A top drawing-roll aggregate as set forth in claim 5, said sleeve means comprising a thin walled sleeve member having longitudinal cuts leaving a narrow strip therebetween, said strip being yieldingly and inwardly protruded against the sleeve for gripping the bearing, and said stop means being formed by inwardly stamped portions of said thin walled sleeve member.

7. A top drawing-roll aggregate as set forth in claim 5, said sleeve means comprising a thin walled sleeve member having radially yielding portions, a resilient covering stretched around said thin walled sleeve member and pressing said yielding portions inwardly against the bearing for gripping same, and said stop means being formed by inwardly stamped portions of said thin walled sleeve member.

8. A top drawing-roll aggregate as set forth in claim 5, said sleeve means comprising a thin walled sleeve member having a corrugated portion whose corrugations extend circumferentially of the sleeve member and inwardly protruding crests of the corrugations gripping the bearing, said stop means being formed by a corrugation at one end of said corrugated portion, and said bearing having a collar axially abutting said stop means.

9. A top roll for spinning machines, comprising a shaft, a bearing on said shaft having a cylindrical outside surface portion and a surface portion of gradually increasing and subsequently gradually decreasing diameter, said bearing being axially and pressing said yielding portions inwardly against the bearing, said stop means being formed by inwardly stamped portions of said thin walled sleeve member and forming an annular recess thereat, a thin wall sleeve member having axial slits leaving a centrally spaced narrow strips therebetween, said strips being individually severed at one end from said sleeve member and having each an inwardly bent end portion extending into said annular recess when the said stop means are inwardly bent to permit said bearing to be inwardly bent against said bearing, and resilient means stretched around said sleeve member and affording outward pushing of said bent end portions when said surface portions of gradually increasing and decreasing diameter are axially pushed between said end portions.

10. A top drawing-roll aggregate for drawing-heads of spinning frames and the like, comprising an axle, an anti-friction bearing mounted on said axle, a resilient member axially slightly fitted on said bearing and having a radially yielding portion biased toward said bearing, and a resilient covering stretched around said sleeve and adapted to press said resilient portion against said bearing.

11. A top drawing-roll aggregate for drawing-heads of spinning frames and the like, comprising, in combination, an axle, a sleeve, an anti-friction bearing member coaxially connected with said axle, a yieldable member integrally with and having a portion extending into the interior of said sleeve, a recess in said bearing member adapted for receiving said resilient member retaining said sleeve in a predetermined position and a resilient covering stretched around said sleeve and adapted to press said portion against said bearing.

12. A top roll assembly for a textile machine comprising a thin-walled sleeve, a bearing adapted to be axially slipped into and out of said sleeve, a covering on said sleeve, said covering being supported by said sleeve substantially on the entire length of the covering, said sleeve comprising forming a unitary body, said sleeve means forming means integral part of said sleeve means and elastically gripping said bearing, said sleeve means comprising a thin walled sleeve member having longitudinal cuts leaving a narrow strip therebetween, said strip being bent inwardly against said sleeve member and forming said resilient means for gripping the bearing.

13. A sleeve means for a top drawing-roll having an axle and an anti-friction bearing mounted for rotation therewith, said sleeve means comprising a cylindrical member adapted to be disposed around and snugly fit the bearing for rotation therewith, said member having a radially inwardly acting resilient means adapted to press against the bearing, said bearing being engaged by a tightly fitting resilient covering, whereby said member, said bearing and said resilient means form a unitary body wherein the resilient covering assists the sleeve means in producing the elastic grip around the bearing to afford free radial movement and demounting of said body on and from the bearing and frictionally resisting rotation of said body on the bearing.

14. A sleeve means for a top drawing-roll having an axle and an anti-friction bearing mounted for rotation therewith, said sleeve means comprising a cylindrical member adapted to be disposed around and snugly fit the bearing for rotation therewith, said member having a radially inwardly acting resilient means adapted to press against the bearing, said bearing being engaged by a tightly fitting resilient covering, whereby said member, said bearing and said resilient means form a unitary body wherein the resilient covering assists the sleeve means in producing the elastic grip around the bearing to afford free radial movement and demounting of said body on and from the bearing and frictionally resisting rotation of said body on the bearing.

15. A sleeve as set forth in claim 14, comprising stop means inwardly protruding from said cylindrical member.
for limiting axial movement of the bearing in said sleeve means.

16. A sleeve means for a top drawing-roll having an axle and an antifriction bearing mounted for rotation therewith, said sleeve means comprising a cylindrical member adapted to be disposed around and snugly fit the bearing for rotation therewith, a tightly fitting resilient covering stretched around said cylindrical member, said member having a radially inwardly acting resilient means adapted to press against the bearing and to be engaged by said tightly fitting resilient covering whereby said member, said covering and said resilient means form a unitary body wherein the resilient covering assists the sleeve means in producing the elastic grip around the bearing to afford free axial mounting and demounting of said body on and from the bearing and frictionally resisting rotation of said body relatively to the bearing.

17. A sleeve means for a top drawing roll having an axle and an antifriction bearing mounted for rotation therewith, said sleeve means comprising a tubular member adapted to slidably surround the bearing, a web cut out of said member by two substantially parallel slots terminating within said member, said web being bent toward the longitudinal axis of said member, so as to apply pressure in radial inward direction when moved radially outward, said tubular member being adapted to frictionally engage the entire length of the bearing and to resist rotation of said member relatively to the bearing and to afford free axial mounting and demounting of said body on and from the bearing.

18. A sleeve as claimed in claim 17, said tubular member having an end wall integral therewith for closing one end of said tubular member.

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