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3,354,628

SPINNING AND TWISTING RING

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7 Claims. (Cl. 57—119)

ABSTRACT OF THE DISCLOSURE

A twisting ring having a traveler engaging inner surface with a median radius of curvature of its median area equal to about one-half of the vertical dimension of the inwardly extending flange, a lower radius of curvature of its lower area equal to about three times that of the median radius with its center of curvature located generally vertically above the outer surface of the ring, and an upper radius of curvature of its upper area equal to about two thirds times that of the median radius with its center of curvature located generally in a horizontal plane extending through the center of curvature of the median plane, the lower and upper radii of curvature joining the median radius tangentially. Preferably, the upper medial surface of the ring flange includes a first surface forming a yarn abutment extending downwardly adjacent the traveler engaging inner surface and a second surface extending from the first surface to said outwardly extending flange end portion, whereby an enlarged yarn passageway is formed in said upper medial surface of the ring flange, the first surface forming the yarn abutment being positioned from the inner flange a distance of less than one-half the width of the flange.

This application is a continuation-in-part of my earlier co-pending application, Ser. No. 438,544, filed Mar. 10, 1965, now U.S. Patent No. 3,323,300.

The present invention relates to the art of spinning and twisting yarns and more especially to an improved traveler and a novel twisting ring for accommodating the traveler. Although the ring shall be hereinafter described as a twisting ring, it should be understood that such term is employed in its broadest sense and is intended to include spinning rings as well.

As set forth in said earlier application, various attempts have been made to control and stabilize the position of travelers during their flight, but these have been only partially successful inasmuch as the final position of the traveler was still subject to a balancing of various forces such as, for example, the tension of the balloon formed by the yarn or the tension exerted when winding the yarn onto the bobbin. A change in any one of such forces results in the traveler repositioning itself to a different stable position. This has a deleterious effect on both the ring and traveler resulting in increased wear on each and increased breakage of the traveler. Further, due to such shifting of the traveler, it has been impractical to employ a traveler that would fit closely to the profile of the ring.

The invention of the earlier application endeavored to overcome the above difficulties by providing a novel twisting ring having a web and a top flange provided with an enlarged inner bearing portion on which the traveler bears located in a plane generally above the plane of the outer flange portion whereby the longitudinal axis of the traveler will decline downwardly and outwardly thus providing a low center of gravity of the traveler with respect to the inner bearing area so as to ride on the outer flange portion in one of two running positions thereby providing a positive contact with the ring at two separate points and thus assuring that the traveler will run

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in a predetermined fixed position, not affected by variation of the abovementioned forces. This was quite effective, but did not prove to be the entire solution to the problem.

5 Accordingly, it is a major object of the present invention to provide a further improved novel twisting ring by providing a greatly increased inner flange bearing area by means of a unique traveler-engaging radii—a median radius of about half the vertical dimension of the flange; a lower radius of about three times that of the median radius, and an upper radius of about two-thirds that of the median radius.

10 It is also an object of the invention to employ a traveler having a short developed length thereby providing a closer fit to the twisting ring than was possible heretofore thus insuring full employment of the inner bearing portion of the present invention.

15 It is a further object of the invention to provide a twisting ring having an enlarged area between the separated bearing surfaces for easy passage of the yarn between the close fitting twisting ring and traveler as well as to permit unwanted lint accumulation on the traveler to pass to the outer leg of the same for removal, as by a lint clearer. The employment of such an enlarged area 20 between the bearing surfaces is important in that it permits the use of a short traveler which permits full utilization of the bearing surfaces by eliminating the necessity of cutting away a portion of the same for passage of the yarn therebetween.

25 Other objects and advantages will become apparent as the description proceeds, when taken in conjunction with the accompanying drawings in which:

30 FIG. 1 is a transverse section of the ring and associated parts with the bobbin and traveler being shown in 35 elevation;

FIG. 2 is an enlarged diagrammatic perspective illustration, in section, of a traveler and ring according to the invention;

40 FIG. 3 is an enlarged detailed section of a ring according to the invention illustrating the traveler in its running position.

Referring more particularly to the drawings, the spinning or twisting ring generally indicated by the numeral 20 is mounted on a holder 21 which is in turn secured in the upper face of the ring rail 23 of a spinning or twisting 45 frame and has a substantially C-shaped traveler 22 slidably mounted thereon between which the yarn Y passes prior to be wound on the bobbin B.

Referring more particularly to the drawing, the twisting or spinning ring of the invention includes a substantially vertically disposed annular web 24 and a top flange on said web having an inwardly extending flange portion, generally designated 26, and an outwardly extending flange portion, generally designated 32, said inwardly and 55 outwardly extending flange portions being substantially semicircular in cross-section.

According to the present invention, the inwardly extending flange portion is provided with a traveler engaging inner surface of unique configuration having three 60 differing radii. Of these, the central or median area 31 of inner flange portion 26 is provided on a median radius of curvature R_2 of said surface equal to substantially three-eighths to five-eighths and preferably one-half of the vertical dimension of the inwardly extending flange 65 portion 26. The lower area 33 of flange portion 26 is continuous therewith but has a much greater radius of curvature R_3 equal to substantially two to four and preferably three times that of the median radius R_2 which it tangentially joins, extending from that junction to the 70 inner side of web 24. Its arcuate extent is substantially equal to that of median area 33. Preferably, the center C_3 of lower radius R_3 is located generally vertically of

the inner surface of web 24, as shown in FIG. 3. The upper area 35 of flange portion 26 is also contiguous with median area 31, but has a much smaller radius of curvature R_1 , equal to substantially one-half to five-sixths and preferably two thirds times that of said median radius R_2 which it tangentially joins, extending from that junction to the upper rounded corner 37 of inner flange portion 26, in the specific embodiment shown, throughout an arcuate extent of about 75 degrees. Preferably, the center C_1 of upper radius R_1 is located generally in a horizontal plane extending through the center of curvature C_2 of the median radius R_2 .

The radially outwardly extending portion 32 is of reduced thickness and includes a generally semi-circular flange surface 34 formed by radius r , which may be approximately one-quarter to one-half, but preferably about one-third of the median radius R_2 . A straight undersurface 36 extends between the flange surface 34 and the outer side of web 24.

The upper surface of the flange is preferably shaped such that it generally declines downwardly and outwardly from the termination of the inner bearing surface at 37 to the outer flange surface 34. More specifically, the upper surface of the flange is preferably provided with an enlarged recess between the bearing surfaces providing ample clearance for passage of the yarn Y between the traveler and the ring. This recess is desirable in that, in addition to providing ample clearance for passage of the yarn, it also permits full utilization of the inner flange surface as a bearing area for the traveler. Such recess also permits undesirable accumulations of lint on the traveler to move outwardly along the traveler due to centrifugal force in order that the lint may be removed by a clearer or other conventional means which are not illustrated. The recess is formed by a first surface 38 forming a yarn abutment which slopes abruptly downwardly from the inner flange bearing surface at 37 at a substantial angle which may be approximately 45 degrees as illustrated, although the exact angle may vary dependent upon the range of yarn counts being processed. It has been found, for example, that fine counts require an angle considerably less than 45 degrees. The surface 38 merges with a second surface 40 which preferably slopes at a small angle toward and adjoins the outer flange surface 34, however, the same may be horizontal if desired. The yarn abutment surface 38 is preferably located less than half the radial width of the top flange from the inner bearing surface 26. The specific location of this surface may be varied as desired, however, it has been found that best results are obtained when the upper extremity 37 of the surface 38 is located along the radial width of the flange less than one-half the width thereof, preferably 15-25 percent of said width from the inner bearing surface 26.

Although the yarn passage recess has been defined as being formed by two intersecting surfaces 38 and 40, it should be understood that the same may be formed in other ways as by an arcuate configuration wherein a portion of the arcuate surface functions as an abutment for the yarn Y.

The substantially C-shaped traveler 22 includes an inner arcuate leg portion 42 so shaped as to bear on each of the contiguous inner flange surfaces 31, 33 and 35 preferably throughout the entire arcuate extent thereof, and a similar opposed arcuate outer leg portion 44 which preferably is spaced from outer flange surface 34, with the leg portions 42 and 44 terminating in opposed horns 46 and 48, respectively, which are spaced from the web 24. The developed length of the traveler is hence relatively short and the conformation of leg portion 42 is substantially equal to that of the radii R_1 , R_2 , R_3 of inner bearing surfaces 31, 33 and 35, thus assuring a substantially conforming fit between these surfaces. Preferably, the mass of the traveler is increased in order to provide additional stability and to assure that it will assume the desired running contact with the ring clear of outer flange

portion 32 substantially as illustrated in FIG. 3. Other advantages of increasing the mass of the traveler are increased heat transfer and increased cross-section resulting in greatly extended traveler life.

Although the traveler 22 has been described as being of increased mass wherein the same will assume a low operating position, so that its outer leg portion 44 does not contact outer flange portion 34, one may, if desired, employ a traveler of decreased mass in order that upon reaching operating speed, the mass of the traveler will be overcome by centrifugal force. At this time, the traveler will attempt to level itself from its downwardly inclined position of FIG. 3 and will rise to an operating position with its outer leg portion 44 in contact with the lower surface of outer flange portion 34, as shown in dotted lines in FIG. 3.

The employment of the single, uniquely large, three radii inner flange bearing surface of the invention provides a marked improvement in operation over prior art arrangements. As was pointed out earlier, such prior arrangements were quite unstable and were subject to tipping about a number of various axes as a result of a variation in the forces acting upon the traveler. Upon a change in any of the forces acting upon the traveler, it would become unstable and tip about the above identified axes until a point of equilibrium was reached, at which time the traveler would once again become stable. My present invention overcomes the above disadvantages since it eliminates tipping movement.

Another advantage of my ring and traveler arrangement resides in the fact that due to the stability of the traveler, a build-up and retention of natural fiber waxes on the ring is permitted, thus serving as a lubricant which assists in running at high speeds. Due to the ever changing operating position of the traveler in earlier arrangements, the retention of such a build-up in the amounts desired was not possible.

Having described the preferred embodiment of my invention, it is understood that other constructions and configurations, obvious to those skilled in the art, are incorporated within the spirit of the invention as defined in the following claims.

I claim:

1. A twisting ring having a substantially vertically disposed annular web and a top flange on said web having inwardly and outwardly extending flange portions said inwardly extending flange portion having a traveler engaging inner surface with a median radius of curvature of the median area of said surface equal to substantially three-eighths to five-eighths of the vertical dimension of said inwardly extending flange portion a lower radius of curvature of the lower area of said surface equal to substantially two to four times that of said median radius and an upper radius of curvature of the upper arc of said surface equal to substantially one-half to five-sixths times that of said median radius said lower and upper radii of curvature being contiguous with said median radius.
2. A twisting ring as claimed in claim 1 wherein said inner flange portion is larger and substantially higher than said outer portion, the upper medial surface of said flange including a first surface forming a yarn abutment extending downwardly adjacent said arcuate inwardly extending portion and a second surface extending from said first surface to said outwardly extending end portion, whereby an enlarged yarn passageway is formed in said upper medial surface of said flange, said first surface forming said yarn abutment being positioned from the innermost surface of said in-

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wardly extending portion less than one-half the width of said flange.

3. A twisting ring as set forth in claim 2 wherein the upper extent of said first surface is positioned from the innermost surface of said inwardly extending portion approximately 15 to 25 percent of the width of said flange. 5

4. A twisting ring having a substantially vertically disposed annular web and a top flange on said web having inwardly and outwardly extending flange portions said inwardly extending flange portion having a traveler engaging inner surface with a median radius of curvature of the median area of said surface equal to substantially one-half of the vertical dimension of said inwardly extending flange portion 15

a lower radius of curvature of the lower area of said surface equal to substantially three times that of said median radius and an upper radius of curvature of the upper area of said surface equal to substantially two thirds times that of said median radius 20

said lower and upper radii of curvature joining said median radius tangentially thereto.

5. A twisting ring as claimed in claim 4 wherein the center of curvature of said lower radius is located generally vertically of the outer surface of said web. 25

6. A twisting ring as claimed in claim 4 wherein the center of curvature of said upper radius is located generally in a horizontal plane extending through the center of curvature of said median radius. 30

7. A twisting ring having a substantially vertically disposed annular web and a top flange on said web having inwardly and outwardly extending flange portions said inwardly extending flange portion being larger and substantially higher than said outer portion, said inwardly extending flange portion having a traveler engaging inner surface with 35

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a median radius of curvature of the median area of said surface equal to substantially one-half of the vertical dimension of said inwardly extending flange portion, a lower radius of curvature of the lower area of said surface equal to substantially three times that of said median radius,

the center of curvature of said lower radius being located generally vertically of the outer surface of said web, and

an upper radius of curvature of the upper area of said surface equal to substantially two thirds times that of said median radius

the center of curvature of said upper radius being located generally in a horizontal plane extending through the center of curvature of said median radius, said lower and upper radii of curvature joining said median radius tangentially thereto and

the upper medial surface of said flange including a first surface forming a yarn abutment extending downwardly adjacent said arcuate inwardly extending portion and

a second surface extending from said first surface to said outwardly extending end portion, whereby an enlarged yarn passageway is formed in said upper medial surface of said flange,

said first surface forming said yarn abutment being positioned from the innermost surface of said inwardly extending portion less than one-half the width of said flange.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

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It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 23, for "plane" read -- radius --;
column 2, line 65, for "poriton" read -- portion --; column 4,
line 57, for "are" read -- area --.

Signed and sealed this 3rd day of December 1968.

(SEAL)

Attest:

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Commissioner of Patents