

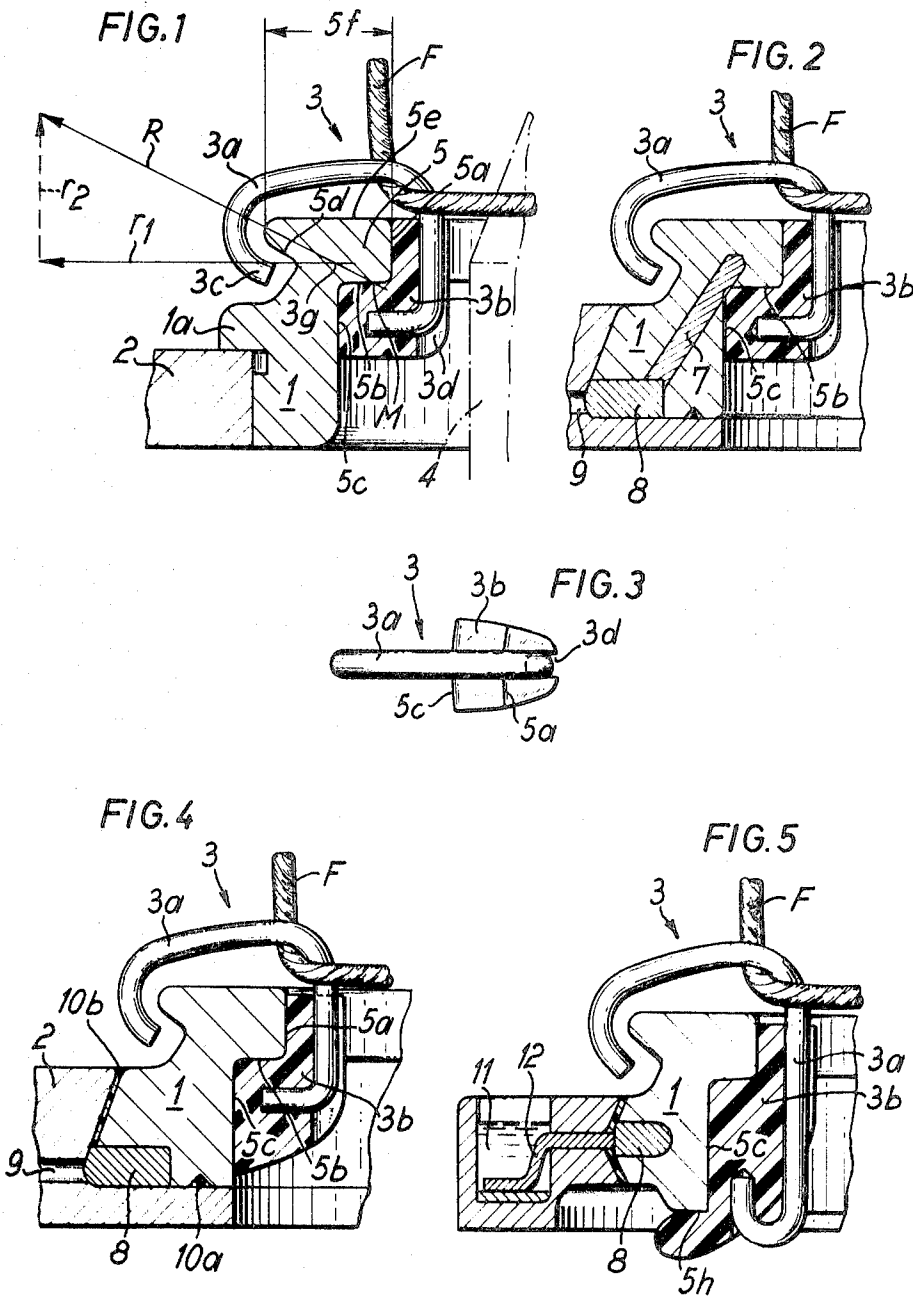
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RING AND TRAVELLER FOR RING SPINNING MACHINES AND THE LIKE

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ABSTRACT OF THE DISCLOSURE

The ring of a ring and traveller assembly for a ring spinning or twisting machine has an annular and substantially horizontal flange along which the travel path of a generally C-shaped traveller extends. The appertaining traveller has a foot of synthetic plastic engageable with the ring and a thread guiding eye of wear resistant material, such as steel wire, joined with the foot. The main contacting contour of the foot has an angular shape whose upper leg portion extends vertically toward the top of the ring flange. The lower leg of the angular shape extends substantially in a horizontal direction. Preferably the contacting contour has a further substantially vertical portion below the horizontal leg portion.

My invention relates to rings and appertaining travellers for ring spinning and ring twisting machines. In a more particular aspect, the invention concerns ring and traveller assemblies in which the ring has a horizontal flange and the appertaining traveller has a foot portion of synthetic plastic and a thread guiding eye or loop portion made of wear resistant material such as steel.

The rings for ring spinning and ring twisting machines are classified in two large groups, namely those having a vertical ring flange and those having a horizontal flange. The so-called vertical flange, however, may be somewhat inclined, and a horizontal flange need not accurately extend horizontally. Classified with the group of vertical-flange rings are the so-called ear-shaped travellers. The travellers used for rings with horizontal flanges are generally C-shaped. The present invention exclusively relates to rings with a substantially horizontal flange and correspondingly to generally C-shaped travellers, and has for its general object to improve the running properties of such ring and traveller combinations.

It is known to improve the running properties of the travellers by having the traveller party consist of synthetic plastic, preferably of a polyamide, such as the material available in the trade under the name Perlon, the plastic material being provided at least at the locality of the traveller where it engages the ring at a main contacting contour. To avoid the guided thread from cutting into the plastic material, it is further known to arm such travellers in the region of the thread guiding eye or loop portion with wear resistant material, for example steel. Similar running and wearing properties are attained by having the traveller mainly consist of wear resistant material such as steel wire and covering it with polyamide or other synthetic plastic only at the locality where the traveller forms the so-called main contacting zone. This main contacting zone extends about the inner periphery of the ring flange and is situated opposite to the so-called auxiliary contacting zone or area which extends peripherally along the radially outer side of the ring flange so as to be engageable by the traveller during starting-up performance. It has been proposed to also cover the traveller with synthetic plastic, such as a polyamide, at the auxiliary contacting zone, but this is of appreciable advantage only with

travellers that are rather frequently subjected to starting-up conditions.

In the ring and traveller assemblies heretofore known, the main contacting contours extend either beneath the inner periphery of the ring flange or they straddle the radially inner portion of the flange. If the main contacting contour is situated beneath the inner flange portion of the ring, the traveller tends to be top heavy and to tip so that the other end of the traveller will contact the radially outer portion of the flange where it may cause intensive local heating of the steel material of the traveller. If the traveller straddles the inner portion of the flange, the eye space in the eye or hook portion of the traveller to be traversed by the yarn path tends to become so small as to incur the danger that the yarn may become clamped thus rendering the use of such an assembly impractical. In all heretofore known C-shaped travellers made of steel and covered with polyamide synthetic, the area of engagement between the polyamide portion and the ring has very small dimensions so that a very high pressure per unit area is incurred with the consequence of a correspondingly intense heating and an excessive amount of wear.

It is a more specific object of my invention, therefore, to minimize or virtually obviate the above-mentioned disadvantages heretofore encountered with ring and traveller assemblies having a horizontal ring flange and having the traveller consist of a ring-contacting foot of synthetic material and of a thread-guiding eye of wear resistant metal.

Another specific object of the invention is to greatly reduce tipping of the traveller due to heaviness, on the one hand, and to increase the area of engagement between ring and traveller thus reducing the wear imposed upon the synthetic material.

Still another object, akin to those mentioned above, is to minimize the pressure per unit area occurring between traveller and ring, thus also minimizing the amount of heating and the resulting wear.

It is also an object of my invention, in conjunction with one or more of those already mentioned, to afford a particularly advantageous and simple manufacture of travellers composed of a foot of synthetic plastic and an eye or hook portion made of metal such as steel.

An object of the invention further is to have in such a traveller the metal portion removable from the foot and to secure a good connection between the eye portion of metal and the foot of plastic material while nevertheless permitting readily an exchange of one foot for another.

The invention also pursues the object to improve the lubrication at the contact areas between the ring and the traveller foot, and to minimize the amount of frequency of attendance needed for maintaining good lubrication.

To achieve these objects, and in accordance with a feature of my invention, I provide the travellers for horizontal-type flange rings with a ring-engageable foot of synthetic plastic, preferably a polyamide such as Perlon, and with an eye portion of wear resistant material such as a loop-shaped wire of hardened steel, and I give the foot portion a cross-sectional main contacting contour of angular shape, having an upper angle-leg portion extending substantially vertically upward toward the top side of the ring flange, and having a lower leg extending substantially in a horizontal direction.

According to another feature of the invention, the main contacting contour of the traveller foot is given another substantially vertical portion extending downwardly from the horizontal leg.

According to still another feature of the invention, it is further of advantage to have the length of the main contacting contour at least equal to the horizontal width of the ring flange. Depending upon the kind of the yarn being used or upon the size of the traveller employed,

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it is in some cases also preferable to have the cross-sectional main contour extend up to the horizontal top face of the ring flange.

The above-mentioned and further objects, advantages and features of the invention, said features being set forth with particularity in the claims annexed hereto, will appear from the following description in conjunction with embodiments of the invention illustrated by way of example on the accompanying drawing in which:

FIG. 1 is a diametrical cross section through part of a ring and an appertaining traveller;

FIG. 2 shows a similar cross section of a modified ring and traveller according to the invention;

FIG. 3 is a plan view of a traveller as shown in FIG. 1 or FIG. 2;

FIGS. 4 and 5 show, by a cross-sectional representation similar to that of FIG. 1, two further embodiments respectively.

The same reference numerals are applied in all of the illustrations for corresponding components respectively.

Referring to FIG. 1 there is shown a ring 1 coaxially surrounding a spinning cop 4 being supplied with thread F. The ring 1 has its base mounted in the circular opening of a carrier or bank 2. Glidably seated on the ring is the traveller 3 so that it can travel along the ring periphery about the axis of cop and ring. The traveller serves to guide the thread F toward the cop 4 and for this purpose possesses a wear resistant eye 3a made, for example, of hardened steel which is joined with a foot 3b of synthetic plastic located at the inner periphery of the ring and forming an engaging area which, seen in cross section, forms a main contacting contour 5a-5b-5c along which the traveller and the ring are in engagement with each other during the travelling motion of the traveller. During standstill or starting-up, the traveller 3 places its other end 3c into contact with an outer peripheral contacting area whose corresponding auxiliary contacting contour 5d is formed by the flange 5.

It will be seen from FIG. 1 that the main contacting contour, in cross section, constitutes a substantially angular configuration whose upper leg 5a pointing toward the top 5e of the flange extends substantially in a vertical direction, whereas the adjacent leg 5b of the angular shape extends substantially in the horizontal direction.

The horizontal leg merges with another contour portion 5c which extends substantially in the vertical direction. Although the portions 5a, 5b and 5c of the main contour need not be accurately vertical or horizontal and may each exhibit a slight curvature, they should essentially extend in the general directions mentioned, the mergers of the predominantly horizontal with the predominantly vertical portions being preferably rounded as shown.

For obtaining good running properties it is preferable if the entire cross-sectional length of the main contacting contour 5a+5b+5c is at least equal to the horizontal width 5f of the flange. It is further preferable to have the vertical leg portion 5a of the main contacting contour extend up to the horizontal top face 5e of the flange, also as shown in FIG. 1. This provides the wear resistant metal part 3a of the traveller with a more stable support and reduces the bending stress to which part 3a may be subjected.

Schematically denoted by 3g in FIG. 1 is the gravity center of the traveller. The resultant R of all of the forces acting upon the traveller when the latter travels along the ring periphery has its point of attack coincident with the gravity center 3g. This resultant force R has a horizontal component r1 and a vertical component r2. The main contacting contour 5a+5b+5c is given such a length that the resultant R passes approximately through the middle M of this contour. In this manner the tipping tendency of the traveller is reliably obviated.

In the plan view shown in FIG. 3, the portions 5a and 5c of the main contacting contour on the traveller are apparent. It will be seen that the engaging area of the

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traveller foot which forms the main contacting contour has a curvature approximately corresponding to that of the adjacent ring surface, the width of this foot area being approximately three to five times the width of the wear resistant part 3a. This preferred dimensioning of the width of area engagement constitutes a good compromise between the largest possible area of contact engagement and a reliable curved guidance of the traveller on the inner side of the ring.

The sizes of the vertical and horizontal contacting areas between ring 1 and traveller 5 are so dimensioned as to be approximately proportional to the horizontal and vertical components of the total resultant R. This is tantamount to having the sum of the areas 5a+5c related to the contacting area 5b in approximately the same ratio as the horizontal component r1 to the vertical component r2 of the resultant R. In this manner a uniform wear of the contacting areas of the traveller is secured.

For joining the wear resistant part 3a, preferably steel wire, with the foot 3b of the traveller, the bottom of the foot made of synthetic plastic is provided with a bore and the inner peripheral side of the plastic part 3b with an upwardly directed guide slot 3d into which the eye 3a extends upwardly and, if desired, can be clamped fast.

A particularly simple manner of making this junction results from the fact that according to the embodiment shown in FIG. 1 the bore in the bottom portion of the foot points in the direction toward the ring 1.

It will further be seen from FIG. 1 that the bottom side of the ring flange at the auxiliary contacting contour 5d is located at a higher elevation than at the main contacting contour 5b. Due to this shape of the ring, it merges beneath the flange 5 with the ring base 1a without requiring or forming a narrow bridge, the base 1a being the ring portion that is fastened to the carrier 2 or the ring bank.

In the ring and traveller assembly shown in FIG. 2 the traveller is identical with the one according to FIG. 1 and the ring structure is similar to that of FIG. 1 but provided with a lubricating system. This lubricating system is constituted by a wick 7 which issues lubricant from a storage space or retainer 8 to the locality of contact between the horizontal portion 5b and the vertical portion 5c of the contacting areas between ring and traveller. Lubricant is supplied to the storage 8 through a pressure duct 9. By virtue of the system all of the contacting areas are well lubricated.

In the embodiment according to FIG. 4, the external shapes of ring and traveller are also essentially the same as in FIG. 1. However, the lower vertical contacting area 5c is somewhat longer and the upper vertical contacting area 5a is somewhat shorter. In this embodiment the ring 1 consists of sintered steel which, due to its porosity, issues lubricating oil to the contacting areas 5a, 5b and 5c. Lubricant is supplied to the sintered ring 1 through a duct 9 and a lubricant storer 8. Conventional seals 10a and 10b at the contacting areas between the ring 1 and the carrier or bank 2 prevent undesired escape of the lubricant.

In the embodiment shown in FIG. 5, the ring 1 also consists of porous sintered steel to which the lubricant is supplied from a lubricant storage space 8 which receives the lubricant from a container 11 through a wick 12. The traveller of this embodiment is modified by receiving the steel wire 3a in a bore which is situated in the bottom of the foot and points upwardly rather than radially. Furthermore, the traveller is downwardly extended and its main contacting contour has a further horizontal portion 5h downwardly adjacent to the lower and substantially vertical portion 5c of that contour. By virtue of these features, which are applicable conjointly or individually, particularly on relatively heavy travellers, the gravity center of the traveller is placed at a still lower point so that a reliable guidance is secured even under most unfavorable operating conditions.

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It will be recognized from the embodiments illustrated and described herein, that due to the angular shape of the main area of engagement between ring and traveller, the size of this area relative to that of the traveller is considerably increased thus reducing the amount of wear imposed upon the synthetic material while also reducing any tilting tendency of the eye portion.

By giving the cross-sectional contour of the main contacting area another substantially vertical portion 5c located beneath the horizontal leg 5b of the angular shape, a further improvement in running properties is achieved on account of the fact that the stability of the traveller against tilting is further increased together with the size of the main contacting area between traveller foot and ring.

Tipping, clamping or edging of the traveller are also more reliably prevented by giving the total length of the main contacting contour such a dimension that the total resultant R (FIG. 1) of all forces acting upon the travelling traveller is directed approximately through the middle M of the contour line. A considerable improvement in running properties can also be obtained, in conjunction with all or some of the above-mentioned features, by providing the traveller foot with a ring-engaging surface portion which comprises the above-mentioned main contacting contour and whose shape substantially corresponds to that of the inner peripheral surface of the ring. The contacting contours of the travellers heretofore known and of the type equipped with a foot of synthetic plastic, exhibit a round or ball-shaped configuration so that the engagement at the ring is substantially point- or line-shaped. This leads to a high pressure per unit area and a correspondingly large amount of wear. By making the main contacting contour part of a more expansive area engagement according to the invention, the occurring pressures are very slight by comparison, so that the amount of heating and wear is considerably reduced. Ideally the engaging area of the traveller foot could be accurately matched to the inner contour of the ring. It is desirable, however, to avoid the need for using a particular traveller for each ring size, but rather to permit one and the same size of traveller to be employed for several mutually sequential ring sizes. This is the reason why it is preferable to give the contacting area of the traveller foot a width about three to five times the width of the steel portion 3a. If further, as described, the sizes of the horizontal and vertical engaging areas on the traveller foot are approximately proportional to the horizontal and vertical components respectively of the resultant of the forces acting upon the traveller during its travel, a virtually uniform wear at all wear-subjected contour portions of the traveller is secured.

It is known to join the metal eye of the traveller, for example a wire of hardened steel, with a foot portion of synthetic plastic by casting the plastic in liquid condition onto the wear resistant metal. A particularly favorable manufacture of travellers with a foot of plastic material, however, is obtained by fastening the wear resistant eye 3a, such as the illustrated hook-shaped steel wire, in a bore which is located in the bottom portion of the foot and from which the wire extends upwardly through a guide slot 3d of the plastic structure. The foot 3b may thus simply be stuck together with the eye portion 3a, or the two parts can be additionally fastened to each other by cementing, or by deforming the guiding slot. Furthermore, the slot 3d may be undercut in such a manner that the metal eye, when being inserted into the slot, will removably snap into the slot. This not only provides a good junction between the metal part and the plastic part but also permits readily exchanging one or the other, for example if the eye is made of steel wire plated with hard chromium so as to be particularly resistant to being worn by friction with the yarn. In this case the plastic part can be exchanged from time to time to permit further use of the more valuable, hard-chrome plated eye wire.

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The described embodiments of the invention further afford the possibility of placing the outer bottom side of the ring flange where the auxiliary contacting contour is situated at a greater height than the horizontal portion of the main contacting contour. This permits merging the ring beneath the flange with the ring-supporting base so that both constitute a single integral structure. This improves the dissipation of heat from the ring flange into the lowermost regions of the ring and into the ring-supporting carriers or banks as compared with rings whose flange is joined with the base by long and narrow bridges as heretofore employed. Besides, when using porous ring materials, the supply of lubricants, for example sintered metal, into the ring flange can be intensified because of the larger cross section made available for the transfer of lubricant.

In conjunction with traveller feet of polyamide synthetic, porous ring materials of sinter metal as shown in FIGS. 4 and 5 have been found particularly advantageous because the pores of this ring material are not clogged by metallic particles resulting from frictional wear. Due to the relatively large cross section of the ring, additional recesses for lubricant supply can be provided beneath the ring flange without excessively weakening the ring structure. As exemplified by FIG. 2, the lubricant openings or bores leading to the inner surface of the ring can thus be placed within the substantially vertical and substantially horizontal contacting areas between ring and traveller, and the lubricant will then reach the horizontal as well as the vertical contacting contours.

It has been mentioned above that individual features illustrated and described in this disclosure can be modified in various respects. Accordingly, the invention is not limited to the embodiments described and illustrated herein but can be given numerous other modifications, for example features shown in one of the illustrations can be applied to an embodiment otherwise as shown in one or more of the other illustrations. Upon a study of this disclosure, it will be obvious to those skilled in the art that such and further modifications are available without departure from the essential features of my invention and within the scope of the claims annexed hereto.

I claim:

1. Ring and traveller assembly for ring spinning and twisting machines, comprising a ring having an annular and substantially horizontal flange, a traveller having a foot forming a contacting surface engageable with the ring and having a thread guiding eye joined with said foot, said contacting surface having a main contacting contour of angular cross-sectional shape with an upper leg of the angle extending substantially vertically toward the top of said flange and a lower leg lying adjacent to said upper leg and extending substantially in a horizontal direction, said main contacting contour of said foot having at least one other substantially vertical portion (5c) below said substantially horizontal leg (5b).

2. In an assembly according to claim 1, said thread guiding eye being formed of wear resistant metal.

3. In an assembly according to claim 1, said main contacting contour of said foot having a total length (5a+5b+5c) at least equal to the radial width (5f) of said ring flange.

4. In an assembly according to claim 1, said main contacting contour of said foot extending up to the horizontal top face (5e) of said ring flange.

5. In an assembly according to claim 1, said main contacting contour of said foot having a total length at which the resultant of all forces acting upon the traveller when travelling passes through the middle of said length.

6. In an assembly according to claim 1, said foot of said traveller having said contacting surface glidingly engageable with the ring at the inner periphery of said ring flange as well as below said flange, said surface and said main contour thereof having a cross-sectional configuration mating that of said ring.

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7. In an assembly according to claim 6, said contacting surface of said traveller foot having a substantially angular shape corresponding to that of said contour so as to form substantially vertical and substantially horizontal contacting areas, the size of said vertical (5a, 5c) and horizontal (5b, 5d) areas being approximately proportional to the horizontal (r1) and vertical (r2) components of the resultant (R) of the forces acting upon the traveller when travelling along the ring.

8. In an assembly according to claim 1, said foot having a bottom portion with a bore and having a slot extending upwardly from said bore to the top of said foot, said eye of said traveler consisting of a hook-shaped steel wire and being fastened to said foot by engaging said bore and extending through and upwardly out of said slot.

9. In an assembly according to claim 8, said bore in said foot extending in a substantially radially outward direction.

10. In an assembly according to claim 1, said ring having an annular auxiliary contacting area extending along the outer periphery of said flange and being engageable with said eye portion of said traveller at the eye end remote from said foot, said auxiliary area being situated above the outer peripheral bottom face of said flange.

11. In an assembly according to claim 10, said ring having below said flange an annular base coaxial to said flange and radially protruding outwardly beyond said flange, said flange and said base jointly forming an integral structure.

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12. In an assembly according to claim 1, a ring structure, said flange protruding in a radially inward direction from said ring structure, said structure and said flange forming an inner peripheral area engageable with the traveller foot at said main contacting contour, said flange having a portion protruding in a radially outward direction from said ring structure, said outwardly protruding flange portion having a peripheral bottom face which forms an auxiliary contacting contour engageable by the eye of the traveller.

13. In an assembly according to claim 12, said bottom face and auxiliary contacting contour being located at an axially greater height than said horizontal leg of said main contacting contour.

14. In an assembly according to claim 13, an annular and coaxial base which forms an integral body with said structure and said flange.

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