

[54] YARN GUIDE FOR CIRCULAR KNITTING MACHINES

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[58] Field of Search.....66/125, 136, 126 A, 111, 131, 66/137, 141; 242/157; 57/106

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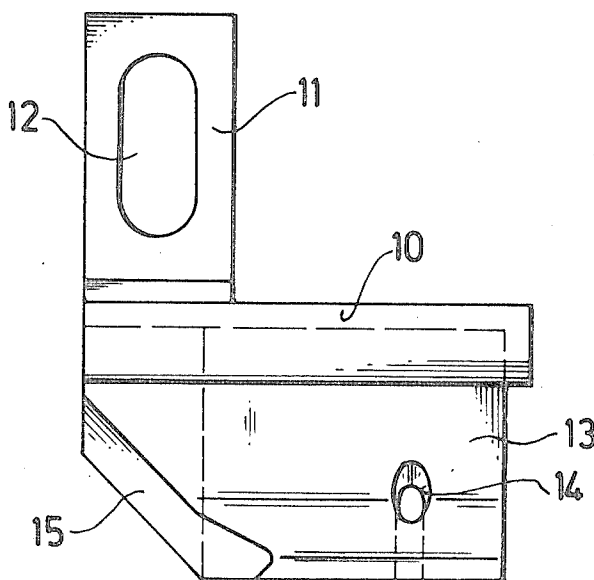
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[57] ABSTRACT

A yarn guide particularly for guiding the yarn of a knitting machine. The yarn guide includes a yarn-guiding member formed with at least one passage through which the yarn is guided. This member is composed at least in part of a ceramic material, and preferably it is in the form of a single body of pure ceramic material.

4 Claims, 2 Drawing Figures



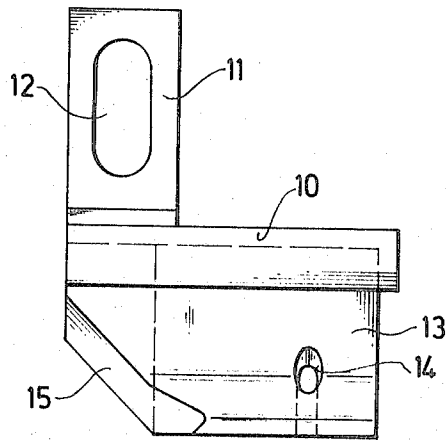


FIG. 1

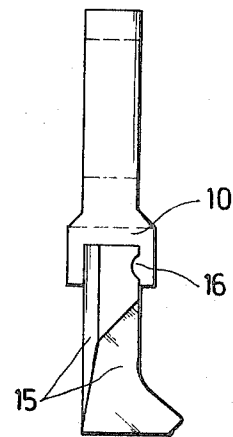


FIG. 2

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YARN GUIDE FOR CIRCULAR KNITTING MACHINES

BACKGROUND OF THE INVENTION

The present invention relates to knitting machines. In particular the present invention relates to yarn guides for these machines.

Yarn guides for knitting machines and for circular knitting machines, in particular, serve the purpose of directing the yarn which is to be knitted to the needles at the knitting location in such a way that the yarn will be properly engaged by the needles, such yarn guides have the additional purpose of causing the closing or opening of those needle tongues which become free of the old loops and are partly open.

Known yarn guides have been made up to the present time of high quality steel. During the knitting of synthetic yarns, experience has shown that such yarn guides are rapidly worn at the passages thereof through which the yarn moves. The synthetic yarn cuts into the yarn guide to form undesirable grooves therein. These grooves formed by the frictional rubbing of the synthetic yarn on the high quality steel result in damaging of the yarn and furthermore in stoppage of the yarn in the guiding passage as the result of buildup of fibers in the passage due to the friction of the yarn in the grooves which the yarn itself forms in the yarn guide. Moreover, the wearing away of the yarn guide during formation of grooves in which the yarn itself moves sometimes situates these grooves at lateral locations which shift the yarn undesirably from the proper position of the yarn where it is fed into the needles, so that as a result there is a defective formation of loops during the knitting operation.

Attempts have been made to avoid the above drawbacks by making use of steels which are always improved and harder, so as to attempt to eliminate wearing phenomena in this way, and the result, of course, is that the machining and other working of such yarn guides always create greater difficulties. Moreover, efforts in this direction have not resulted in any satisfactory solution to the problem. Thus, attempts have been made to improve the situation, by polishing of the yarn guide from time to time or by frequent exchange and readjustment of the yarn guides. However, these procedures have only resulted in substantial additional costs which result, if from nothing else, simply from the fact that the knitting machine must remain idle for an undesirably long period of time during which procedures of this latter type are carried out.

SUMMARY OF THE INVENTION

It is accordingly a primary object of the invention to provide a yarn guide structure which will avoid the above drawbacks.

In particular, it is also the object of the invention to provide a yarn guide which during knitting synthetic yarns, will have no noticeable wear of the yarn guide which could possibly result in formation of grooves in the passage or bore through which the yarn moves in the yarn guide.

In particular, it is the object of the invention to provide a construction of the above general type which is exceedingly simple and inexpensive while at the same time being capable of mounting on the knitting machine in a conventional manner.

Furthermore, it is an object of the invention to provide a construction which will reliably avoid any possible breaking of the yarn guide structure during the mounting thereof on the knitting machine.

In accordance with the invention the yarn guiding assembly includes a yarn-guiding member formed with one or more yarn-guiding passages and made of a material which is at least partly ceramic. Thus, while it is preferred to make the yarn-guiding member of a one-piece body of pure ceramic material, it is also possible to practice the invention with a yarn-guiding member made of a ceramic-containing material.

It is of course known to provide yarn-guiding eyes made of ceramic materials and such eyes have been used on textile-treating machines. Such porcelain eyes, however, do not lend themselves to use for yarn guides for knitting machines of the

above type since the extremely restricted space which is available at knitting machines for the yarn guides do not permit eyes or tubular yarn guides to be positioned at the knitting machines with a reliable accurate feeding of the yarn being assured with such structures. Moreover, ceramic materials have not been used for the entire yarn guide in knitting machines, at the location where the yarn is fed to the knitting needles, since these yarn guides must perform the additional function of covering the needle tongues which have been freed by the knitted loops and opening and closing the partly open needle tongues. It has always been felt by those skilled in the art that a ceramic material could not be used to engage and move the needle tongues because the latter components are made of metal, and it has been anticipated that the use of ceramics in connection with the displacement of needle tongues would only result in breaking away of parts of the ceramic yarn-guide material. However, it has been found, most unexpectedly, that there is no basis in fact for expecting any breakage of the pure ceramic material by engagement thereof with the needle tongues, if in accordance with the invention the ceramic yarn-guiding member is mounted on the knitting machine by way of metallic mounting member in a conventional manner.

The connection between the ceramic yarn-guiding member and the metallic mounting member with the required accuracy and with a reliable prevention of breaking of the ceramic material is brought about in accordance with the invention by providing for the ceramic yarn-guiding member and the metallic mounting member interlocking configurations in the form, for example, of an elongated groove of the metallic mounting member which receives an elongated portion of the ceramic yarn guide which mates in cross section with the cross section of the groove. The configuration of the groove of the metal mounting member and the elongated portion of the ceramic yarn-guiding member received therein is such that the assembly and disassembly of these components can only take place by longitudinal movement of the elongated portion of the ceramic yarn-guiding body along the groove of the metallic mounting member. Thus, a tight clamping of the ceramic yarn-guiding member to the metallic mounting member of the yarn guide by way of clamping screws or the like, which when being applied too strongly could result in breaking of the ceramic material, is completely avoided. However, it is possible for the ceramic component to be glued to the metallic mounting member.

As was indicated above it is preferred but not essential that the yarn-guiding member be made entirely of a pure ceramic material. Instead it is also possible to make the yarn-guiding member of a ceramic-containing material such as a metal alloy which contains ceramic ingredients. Such alloys are known as Cermet materials.

BRIEF DESCRIPTION OF DRAWINGS

The invention is illustrated by way of example in the accompanying drawings which form part of this application and in which:

FIG. 1 is a schematic side elevation of a yarn guide of the invention; and

FIG. 2 is an end view of the yarn guide of FIG. 1 as seen from the left of FIG. 1 at an angle of 90° with respect thereto in the direction of rotary movement of the needle cylinder of a circular knitting machine.

DESCRIPTION OF A PREFERRED EMBODIMENT

The yarn guide of the invention which is shown more or less schematically in the drawings is particularly designed for use in a circular knitting machine. This yarn guide has a mounting means in the form of a metal mounting member 10 made of steel and having a downwardly directed open groove at its bottom end. This mounting means 10 has a strong upwardly directed leg 11 formed with an elongated opening 12. The leg 11 and the lower grooved portion of the mounting means 10 form the metal mounting component of the yarn guide of the

invention. The leg 11 serves to fix the structure to the knitting machine, and it is for this purpose that the elongated opening 12 is provided. By way of this opening 12 an accurate location of the yarn guide at the unillustrated mounting location is brought about.

The operating part of the yarn guide of the invention includes the ceramic one-piece body 13 which is received at an upper elongated portion thereof in the bottom groove of the mounting means 10. It is this ceramic yarn-guiding member 13 which is formed with the yarn-guiding passage 14 which is illustrated. Of course, it is possible to provide a pair of yarn-guiding passages 14 when the guide is to be used, for example, for plaiting operations. Moreover, the yarn-guiding member 13 is provided, as in the case with conventional yarn-guiding members, at its front end with inclined surfaces 15 which facilitate opening or closing of partly open needle tongues. The one-piece yarn-guiding member 13 has its upper elongated portion received in the downwardly directed groove of the steel mounting member 10 in such a way that the connection between the components of the yarn guide of the invention will not permit them to be separated from each other except by longitudinal movement of the upper portion of the yarn-guiding member 13 in the lower elongated groove of the mounting means 10. Thus, any additional clamping or fixing means between the components 10 and 13 are not used, and in accordance with the invention it is only the mating configurations of the groove of mounting member 10 and the longitudinal portion of the yarn-guiding member 13 received therein which serve to interconnect the components. However, if desired, it is possible to glue the member 13 to the member 10.

In order to prevent removal of member 13 from member 10 except by longitudinal movement along the groove of the latter, in the particular example, the configurations of the cross section of the groove of member 10 and the part of the member 13 received therein includes at side surfaces of these components a tongue-and-groove connection. Thus, it will be seen that in the particular example illustrated the right side surface of member 13, as viewed in FIG. 2, is formed with a groove which receives an inwardly directed tongue formed at the right side surface of the elongated groove which is formed at the lower end of the member 10, so that in this way a tongue-and-groove connection 16 is provided between components 10 and 13 preventing removal of member 13 from member 10 except by longitudinal movement along the groove of latter. Thus, the member 13 can be received in the groove of the member 10 from the front end of the latter without any danger of the member 13 becoming separated from the member 10. At the same time, the member 13 can easily be exchanged for another member. In order to provide an even greater security in the connection between the components 10 and 13 these members may be glued to each other, if desired, as pointed out above.

The above-described structure of the invention has the advantage that in the passage 14 of the yarn-guiding member 13 there will be practically no wear resulting from the movement of yarn through the passage 14. Beside the extremely great

hardness of the ceramic material, the surface thereof which defines the passage 14 has an outstanding low friction or slidability with respect to the yarn. Thus, with the yarn guide of the invention an extremely accurate yarn feed which will remain unchanged can be achieved, and the yarn will not in any way be damaged and does not have any fibers thereof removed by rubbing on the yarn guide during movement through the passage 14 thereof. Thus, the operating life of the yarn guide of the invention is practically unlimited. By providing a proper configuration for the mounting means 10 and the yarn-guiding member 13, the structure of the invention can achieve a universal utility. If there is an exceptional case where due to impacts or the like the ceramic yarn guiding member 13 breaks, it is possible without any difficulty to replace such a broken yarn guide with a new one. By situating in the groove of the mounting member 10 the elongated upper portion of the guide 13 which has the corresponding cross section, the mounting means 10 provides lateral stop surfaces for the yarn-guiding member 13, and there is an assurance of an accurate guiding of the yarn and orientation of the components which guide the yarn.

Although the invention is illustrated and described with reference to a preferred embodiment thereof, it is to be expressly understood that it is in no way limited to the disclosure of such a preferred embodiment, but is capable of numerous modifications within the scope of the appended claims.

What is claimed is:

1. For use in a circular knitting machine, a yarn guide device, comprising a metallic mounting member having an elongated groove, a yarn-guiding member made of a single body of ceramic material, said yarn-guiding member formed with at least one guide passage through which yarn is guidingly fed to said circular knitting machine, said yarn-guiding member having an elongated portion substantially matching the cross section of said groove and being longitudinally movable therein for adjusting the position of said yarn-guiding member relative to said mounting member, and the configuration of the cross section of said elongated portion of said yarn-guiding member and said groove preventing removal of said yarn-guiding member from said metallic mounting member except by longitudinal displacement of said elongated portion of said yarn-guiding member along said groove.

2. A yarn guide device, as set forth in claim 1, wherein said metallic mounting member and said yarn-guiding member are glued to each other along said elongated groove.

3. A yarn guide device as set forth in claim 2, wherein said yarn-guiding member has a portion for acting on the tongues of knitting needles.

4. A yarn guide device as set forth in claim 1 wherein said metallic mounting member and said yarn-guiding member have a pair of side surface portions engaging each other at the groove of said metallic member, and said side surface portions having a tongue-and-groove engagement with each other to prevent displacement of said yarn-guiding member out of said groove except by longitudinal movement with respect thereto.

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