Oct. 28, 1930. M. C. MILLER 1,779,554

NEEDLE BED AND METHOD FOR PRODUCING THE SAME

Filed Dec. 10, 1926

Fig. 1.

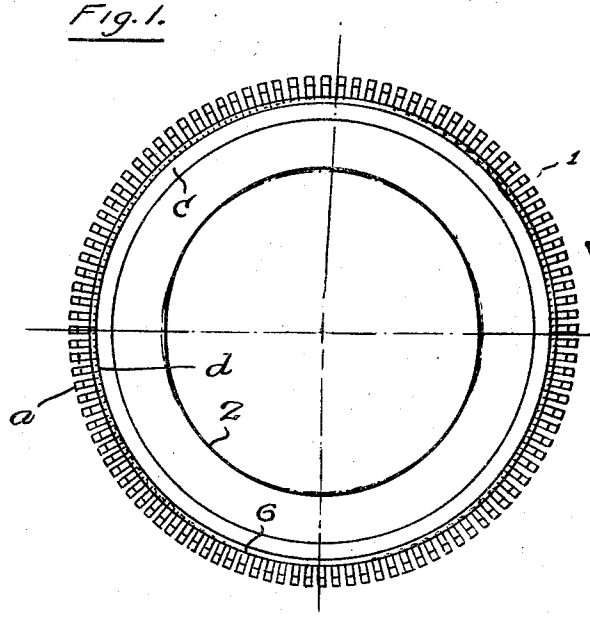


Fig 2

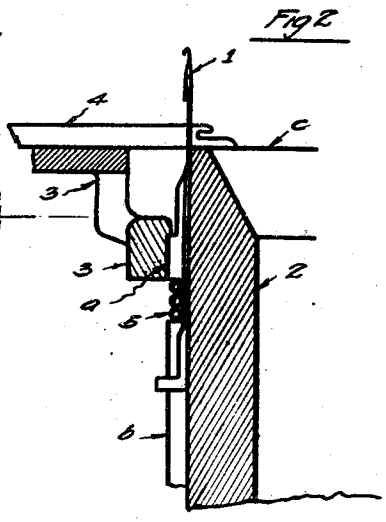


Fig 3

Fig 3a

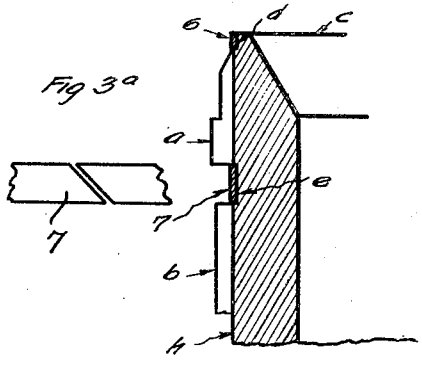
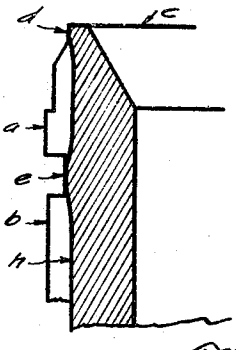


Fig 4



Inventor:

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UNITED STATES PATENT OFFICE

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NEEDLE BED AND METHOD FOR PRODUCING THE SAME

Application filed December 10, 1926. Serial No. 153,836.

The invention relates to needle beds for knitting machines and to a method for making the same and is herein disclosed as embodied in a circular knitting machine of ordinary construction.

The object of the invention is to produce a knitting machine with a method for building the same of novel and improved construction which will knit more even and regular appearing fabric and will at the same time be relatively inexpensive to build.

More specifically, one object of the invention is to insure in a circular knitting machine that the backs of the needles are lined to form a true circle concentric with the dial supporting the knitting elements which cooperate with the needles.

With these objects in view, the principal feature of the invention consists in the provision of means for positioning the needles in their slots so that the back line of the needles is trued with relation to the knitting elements cooperating therewith to secure the proper coordination of these elements.

In present day practice, cylinders, more particularly fine gauge cylinders, are slotted and then hardened. As in hardening, it is necessary to heat the cylinder and quench it, it invariably follows that the cylinder goes out of round assuming any shape but a true circle. After hardening, certain of the surfaces are ground, including a surface to carry the web holder or sinker dial and while this latter operation of grinding, provided the bore and outside diameter of the dial are concentric with each other, does ensure that the supplementary web holders and sinkers run in a true circle, the backs of the needles can not, under the present day methods, be caused to assume a true circle, concentric with the web holder or sinker circle.

After hardening and before grinding, such cylinders as are very much out of round are brought back to a more true circle by being put under a press, but it is impossible to bring back the bottom line of the slots into a true circle within the limits necessary.

When a cylinder, in which the backs of the needles do not stand in a true concentric circle with their co-acting elements, is placed in a knitting machine, and fabric is produced thereon, varying types of loops will be produced, those needles standing closer to the center producing an entirely different appearing loop from those needles standing further away from the center. Cutting of the yarn also results. Under such conditions, it becomes necessary to set the co-acting elements so that they are not operating correctly for either of the two extremes. The resultant fabric shows great variations, and it is further impossible to knit upon such a cylinder as tight a fabric as is at times desirable, for to knit the highest quality of fabric, it is absolutely necessary that the back lines of the needles stand in a true concentric circle with the co-acting sinkers or web holders.

A cheap practical method is here disclosed of realigning the needles into a true circle after hardening the cylinder so that they will be concentric with the circular path of their co-acting elements.

The several features of the invention together with the advantages obtained thereby will be readily understood by those skilled in the art from the following description taken in connection with the accompanying drawings which disclose as much of a circular knitting machine embodying the invention as is necessary to show the connection of the present invention therewith. Fig. 1 is a diagrammatic plan view of the needle cylinder which has gone out of round after hardening, but whose co-acting element carrying diameter has been ground into a true circle. Fig. 2 is a cross section of a present day cylinder and web holder or sinker dial attached thereto. Fig. 3 is a cross section of the top of a cylinder illustrating one embodiment of the invention. Fig. 3ª is a view in elevation of a portion of the split band therein used, while Fig. 4 illustrates another construction embodying the ideas disclosed in this invention.

Referring to the drawings, the needles are indicated at 1, the cylinders at 2, the web holder dial at 3, the web holders at 4, and the spring bands holding the needles in their slots are indicated at 5. The bands which are placed in the grooved portions of the cylinder

to position the needles in their slots concentrically with the web holder dial 3, are indicated at 6 and 7.

The plan in Fig. 1 clearly shows that the cylinder has gone out of round. In this particular instance, its shape has become elliptic, although this shape may be anything. It is clear that if the cylinder through heating and quenching assumes any shape which is not a true circle, the needle line as shown in this plan will also assume the same shape. As such a cylinder can not carry the dial 3 on its out of round surface (*a*), and since the cylinder can not be used in the correctly fitting cam box unless the surface (*b*) is made circular, these two surfaces are now ground to true circles, the surface (*c*) and the bottom of the cylinder, not shown, being also ground. However, with present day practice, no provision is made to bring the bottom of the needle grooves back into a true circle concentric with the diameters (*a*) and (*b*).

It is, therefore, proposed at the time the surfaces (*a*), (*b*), (*c*), and cylinder bottom are ground, to grind the surfaces (*d*) and (*e*) Fig. 3, so that the needles may be supported in their slots concentrically with the web holder dial. The bands 6 and 7 are then placed in the grooves thus formed.

These bands may be of any thickness depending upon the depth of the grooves, but I would prefer to make them of very thin, preferably spring tempered, stock, split preferably diagonally as shown in Fig. 3ª. The band 6 may be soldered in place if thought desirable, although this is not necessary for if this ring is made of thin stock, the needles will hold it tightly against the cylinder while the web holders will hold it from rising.

It will be noticed in Fig. 3 that the bottom of the slot (*h*) is nearer the center of the cylinder than the outer diameter of the bands 6 and 7. This would be so at all portions of the cylinder where the slots are nearer the center, due to having gone out of round, than those slots that are farther from the center. Needles placed in such slots would be supported at their backs at their upper ends entirely by the outside diameters of the bands 6 and 7. At their butt ends, due to the flexibility of the needle shanks, the backs of the needles would no doubt ride in the bottom of the slot, such action being not at all detrimental to the operation of the machine.

While I have shown this invention in a small cylinder, it is not at all limited thereto, as it is applicable to all types of cylinders that have for any reason whatsoever gone out of round. The invention can also well be adapted for straight machines wherein which, after the needle beds are finished, it often happens that the beds are bowed or are not truly straight.

It is also conceded that it would not be necessary to insert separate bands or strips, for by stopping the slotting as shown in Fig. 4, unslotted surfaces could be left, these surfaces later being ground into true circles concentric with the other grinding.

To further ensure the entire cylinder running true in the machine, the entire grinding operation could take place in the actual knitting machine, in this manner effectively taking care of the possible out of round of the cylinder driving means. The invention is believed to be broad in scope and is not to be limited to the specific structure herein disclosed except as defined by the claims.

The apparatus embodying the invention and a method for producing the same having been described and illustrated, what is claimed is:

1. A method for making a needle cylinder which consists in slotting and hardening the same, grinding the cylinder to receive the dial carrying the elements cooperating with the needles and in further grinding the cylinder to receive bands for positioning the needles in their slots concentrically with the dial.

2. The method of making a knitting element bed which comprises slotting and hardening the bed and thereafter grinding a true surface transversely to the slots to permit the elements to be supported in true alignment in the slots.

3. The method of making a knitting element bed which comprises slotting and hardening the bed and thereafter in grinding a true surface transversely to the slots, to receive a band or bands to support the elements in true alignment in the slots.

4. The method of making a needle cylinder which comprises slotting and hardening the cylinder and thereafter in grinding a true cylindrical surface in the periphery of the cylinder transversely to the slots to provide a true surface in the bottom of each slot.

5. A method for making a knitting element cylinder which comprises slotting and hardening the cylinder and thereafter grinding into a true circle certain portions of its peripheral surface including a portion of the bottom of each slot for the purpose of aligning in a true circle the elements carried therein.

6. The method of making a needle cylinder which comprises slotting and hardening the cylinder, grinding a portion of the cylinder to a true circle to receive the dial carrying the elements cooperating with the needles, and in grinding a true surface in the periphery of the cylinder transversely to the slots to receive a band or bands for positioning the needles in their slots concentrically with the dial.

7. A knitting element bed slotted and hardened to receive knitting elements, said bed having a true surface ground transverse-

ly to the slots to provide a true surface in the bottom of each slot.

8. A knitting element bed slotted and hardened to receive the knitting elements, said bed having a true surface ground transversely to the slots to receive a band or bands to support the elements in true alignment in the slots.

9. A knitting needle cylinder slotted and hardened to receive the needles, said cylinder having a true surface ground in the slotted and hardened cylinder to receive a dial carrying elements cooperating with the needles, and a true surface ground in the periphery of the cylinder transversely to the slots to provide a support for the needles in the slots concentrically with the dial.

10. A knitting needle cylinder slotted and hardened to receive the needles, said cylinder having a true surface ground in the cylinder to receive a dial for supporting the cooperating knitting elements and a surface ground in the periphery of the cylinder transversely of the slots to provide a true surface in each slot for positioning the needles to form a circle concentrically with the dial.

11. A knitting needle cylinder slotted and hardened to receive the needles, said cylinder having a true surface ground in the hardened cylinder to receive a dial for supporting the cooperating knitting elements, and a true surface ground in the periphery of the cylinder transversely to the slots to receive a band or bands forming raised portions in the slots to position the needles concentrically with the dial.

12. A knitting needle cylinder slotted and hardened to receive the needles, said cylinder having a true surface ground in the hardened cylinder transversely to the slots to receive bands for positioning the needles in a true circle in their slots.

13. A knitting needle cylinder slotted and hardened to receive the needles, said cylinder having slots transversely to the needle slots to receive spring bands for holding the needles in place, a true surface ground in the hardened cylinder to receive a dial for supporting the cooperating knitting elements, and a true cylindrical surface ground in the periphery of the cylinder transversely to the needle slots to receive a band or bands forming raised portions in the slots to position the needles concentrically with the dial.

In testimony whereof I have signed my name to this specification.

MAX C. MILLER.