Nov. 1, 1938. R. H. LAWSON ET AL 2,135,187

NEEDLE BED FOR KNITTING MACHINES

Filed Feb. 9, 1937 2 Sheets-Sheet 1

FIG. 1.

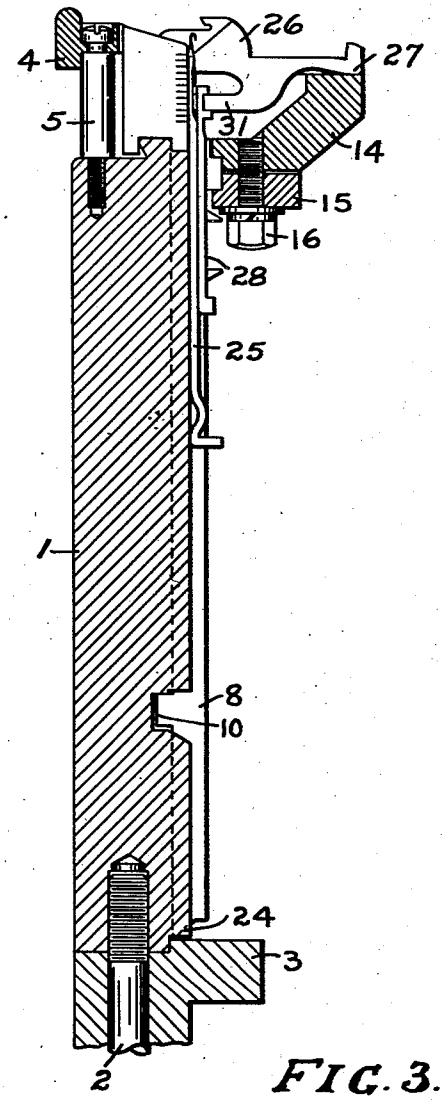


FIG. 2.

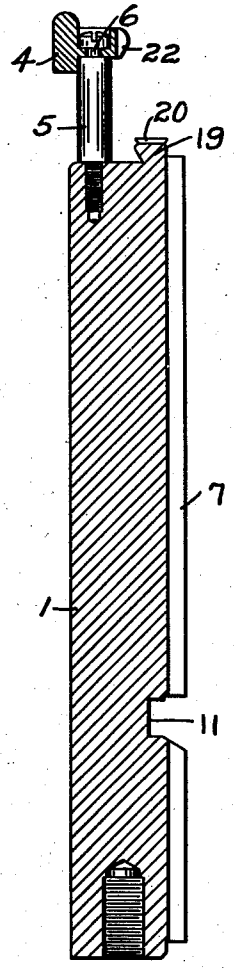
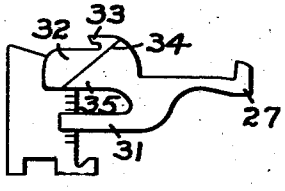


FIG. 3.



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Filed Feb. 9, 1937 2 Sheets-Sheet 2

FIG. 4.

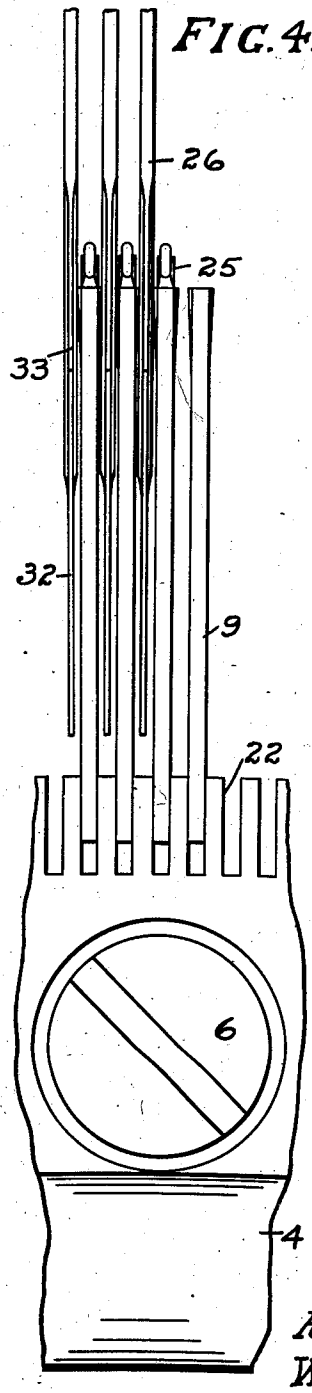


FIG. 5.

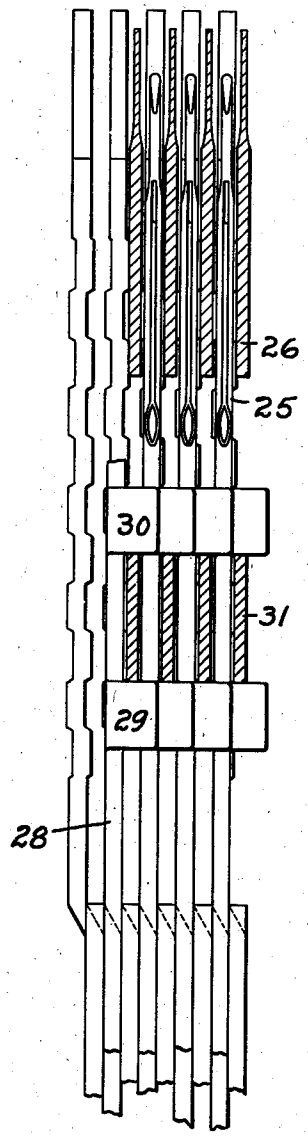
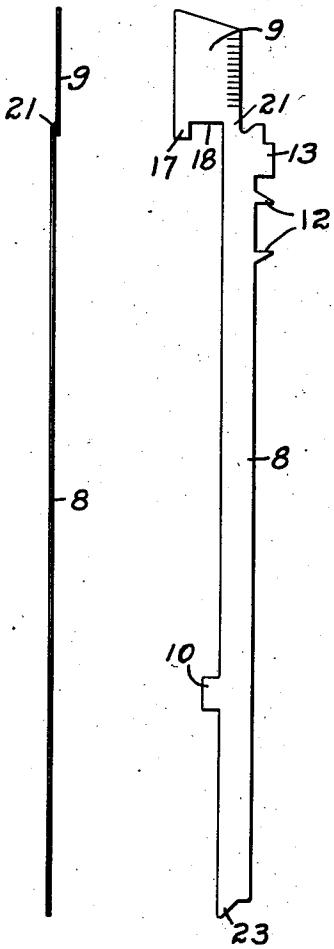


FIG. 6. FIG. 7.



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Patented Nov. 1, 1938 2,135,187

UNITED STATES PATENT OFFICE

2,135,187

NEEDLE BED FOR KNITTING MACHINES

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Application February 9, 1937, Serial No. 124,844

12 Claims. (Cl. 66—115)

The invention is concerned with a new construction for needle beds in independent needle knitting machines and more particularly with beds of built-up construction wherein hardened inserts are used for needle supporting guiding walls, these inserts being of novel construction.

In the figures of drawings:

Fig. 1 is a section showing the invention applied to a cylinder, a sinker, needle and jack being shown in their respective positions;

Fig. 2 is a section of the cylinder within which the inserts are to be placed, also showing the fabric ring and the method and means by which it is attached;

Fig. 3 shows a sinker in detail and the manner in which it is guided by the supporting extensions on the inserts;

Fig. 4 is a plan of a fragment of the sinker assembly, greatly enlarged;

Fig. 5 is a corresponding, enlarged view taken on a section through the sinkers and showing how they are guided; and

Figs. 6 and 7 are elevations showing one of the inserts in detail.

In some knitting machines, especially so-called body machines of large diameter, it is common practice to construct the needle bed or cylinder assembly by inserting a plurality of hardened strips in an annular cylinder element, the strips serving as needle walls. In such constructions the annular cylinder within which the strips are inserted may be of unhardened metal, or in this particular instance, more preferably of metal hardened to a degree to resist wear. In previous constructions the inserts have been used to support needles and/or jacks only; the present invention provides inserts which serve effectively to support needles, jacks and also the inner ends of sinkers. A fabric ring is employed which takes the place of the usual stitch ring in so far as it has the function of guiding the fabric over the top of the cylinder and down through the opening therein, but said ring does not play any part in the guiding of the sinkers themselves. With the construction of this case it is possible to build up a cylinder of very simple construction and one which may be manufactured at a substantial saving in cost. The needles, jacks and sinkers each move within hardened walls and are permanently guided in a manner to allow less deviation from the intended path than would be possible with other types of cylinder construction. The strips used herein are very rigidly maintained in place and since each strip constitutes a guiding wall for needles and jacks and also for cooperating sinkers, and is constructed in accordance with precision methods, there is no particular difficulty experienced in aligning sinkers between needles such as has been experienced in constructions where needle walls have been formed from inserts designed for guiding needles only and sinkers have been guided within slots cut in a stitch ring. It will be obvious that in this latter method considerable difficulty must be experienced in aligning the sinker slots exactly between the needle slots, especially about a large diameter machine having a great number of fine gauge instrumentalities therein.

The invention herein disclosed has application to all circular knitting machines employing needles and sinkers, but is especially useful with types of machines wherein the sinkers move not only in a radial pathway for casting off stitches, but also in a vertical direction for the purpose of participating in the stitch drawing movement itself. Such sinkers are difficult to align and are difficult to maintain in perfect alignment, but obviously must be centered between their respective needles and must move in a single plane between those needles in order to avoid the knitting of different sized or uneven loops such as would lead to vertical streaks in the fabric.

Now referring to the figures of drawings, a cylinder shell is shown at 1 maintained by connecting bolts 2 on a support or driving element 3 and having attached at its upper end a fabric guiding ring 4 employed for guiding the fabric over the top of the cylinder as it is cast off the needles, and has the further function of maintaining the upper ends of the hardened inserts rigidly in position. This ring is maintained at a proper distance above the top of the shell 1 by means of spacers 5 and attaching screws 6. The annular shell has a plurality of tricks or slots 7 cut vertically thereof and spaced apart the proper distance to receive the hardened inserts or strips 8. These strips 8, shown in detail in Figs. 6 and 7, consist of an elongated needle and jack guiding portion and an offset sinker guiding part 9 which is offset an amount equal to one-half the distance between adjacent strips or inserts. Each strip has a projecting lug 10 which is received within a recess 11 in the cylinder and at the upper end thereof, is provided with a pair of nibs 12 within which needle and jack retaining springs are to be held in proper vertical position. Just above these nibs a projection 13 serves to support the sinker carrying ring 14 clamped in position by a clamping member 15 and a series of bolts 16. The outer ends of sink-

ers are guided within slots cut in said sinker supporting ring 14. The widened sinker guiding part of the strip 9 has a projection 17 between which and the elongated needle guiding part is formed a recess 18 which fits over a correspondingly dimensioned part of the cylinder shell 19 which is also grooved or slotted to provide slight projections 20 to embrace either side of the strip at the upper end of the recess 18. It is to be observed that the offset between parts 8 and 9 of the strips occurs at 21 so that the slots cut at the top of the projection 19 will fall between the vertical slots 7 cut in the outside of the cylinder shell. The upper ends of these sinker guiding parts of the strips are also retained in proper alignment and are rigidly positioned as they are held between corresponding slots 22 cut in the ring 4.

As the cylinder is built up, each strip is inserted in the proper slots 7, 20 and 22 as the recess 18 is pushed down over the projection 19, the lower end of the strip at this time being slightly outward away from the cylinder until the lug 10 registers with slot 11 whereupon the lower end of the said strips may be pushed in to the full depth of slot 7. Retaining rings or flanges may be used to restrain the lower ends of the strips and to prevent displacement of them, or more preferably, each strip is provided with a downwardly inclined extension 23 and the lower parts of the walls 24 may be peened over to lock each strip in position.

A particular difficulty experienced on fine gauge machines of this type is that the slots cut in the stitch ring could not be cut to a dimension small enough for guiding the sinker which is considerably thinner than a cooperating needle, without providing an excess of clearance for that sinker. Obviously, in any machine sinkers must be guided in a vertical plane central of the needles at either side, and should not have more than a reasonable amount of working clearance. With the present construction no limitations are imposed as to the size of sinker slots since they are not cut but are provided by either side of the sinker guiding portions 9 of the hardened strips. These sinker guiding portions are to be corrugated or raised as shown more clearly in the enlarged views 4 and 5 so as to present a proper amount of space therebetween to limit the movement of sinkers to one which would be necessary for proper working but not to allow any excess such as would result in the knitting of streaky fabric. For different gauges of machines these corrugations may be correspondingly varied in size.

Other ways of thickening this sinker guiding extension may be apparent, such as by turning the edge over and rolling to proper thickness, attaching a separate piece of proper thickness, swaging or by any other suitable means.

In the particular example of the invention illustrated needles 25 are to draw stitches in cooperation with sinker 26 these sinkers being movable radially as is the common practice for holding down the fabric and for casting off completed loops. In addition the sinkers are each movable in a vertical direction by being rocked from a fulcrum 27, this vertical movement being imparted by means of suitable cams functioning on jacks 28. Each jack has nibs 29 and 30 which embrace a projection 31 below the stitch forming part of the sinker to convey vertical movements of the jack to the inner end of the sinker. Preferably, selecting jacks are to be used beneath the needles, these jacks not being shown since they form no particular part of the present invention. The stitch forming edge 32 and the nib 33 of the sinker are rolled to a dimension much thinner than the remaining parts of that sinker, this rolling being along a diagonal line as shown in Fig. 3, so that the projection 31 and a portion of the sinker not rolled at 35 are always bearing within the sinker guiding extension 9. Thus the sinker is maintained in vertical alignment and any rocking of the same is prevented due to the substantial bearing provided over an extended part of the guiding element. The corrugations are flattened at their outer or bearing surfaces and the space between corrugations is much less than the width of the supported portions 31 and 35 of the sinker so that the sinker moves within its support without interference.

The needles 25 are guided between corresponding strips 8 up to a position at about the offset 21, thereafter the offset parts of the strips 9 serve to support the backs of needles up to an extremely high position as shown in Figs. 1 and 4.

As the fabric is cast from the needles it passes over the noses of the sinkers up on to ring 4 which is slightly higher than the elevation at which the fabric is cast from the needles so that the weight of the fabric is carried by said ring and the upper inclined ends of the strips and is not carried on sinkers, thus allowing freedom and ease of movement to those sinkers as they participate in measuring and drawing loops.

Lint cannot accumulate at any part of the assembly since the sinker noses will push it through between extensions 9 whereupon it may easily fall through the extremely large opening beneath ring 4 and between spacers 5.

The invention has been described in more or less specific terms and with reference to one illustrative embodiment of the same, but this is not to be interpreted as a limitation since the principles of the invention may be applied to many machines for knitting varied types of work. The advantages which are apparent in machines wherein sinkers move in conjunction with needles to draw stitches are also apparent with machines wherein sinkers move radially only, although perhaps not to such a marked degree. The invention is not to be limited except by the scope of the appended claims.

We claim:

1. In a needle bed for knitting machines, a cylinder shell and strips inserted therein for guiding needles, said strips having offset extensions at their upper ends constructed to guide sinkers.

2. In a needle bed for knitting machines the combination of a cylinder shell, slots cut within said shell and hardened strips inserted and held within said slots, said strips being constructed for guiding needles and having an offset extension at their upper ends for guiding sinkers, the said extension being of a different thickness from the thickness of the strip at sections wherein it functions to guide needles.

3. A built-up needle bed for knitting machines including in combination a cylinder shell, a ring spaced from and attached above said shell, slots cut vertically of said shell, and other slots cut horizontally at the top of said shell and aligning with a series of slots cut in said ring, said horizontally disposed slots and slots in said ring being spaced intermediate those cut vertically of the shell, and hardened needle and sinker guiding strips inserted within the said vertical slots and having offset extensions at their upper ends to be

received and held by said horizontally disposed slots in the shell and those aligning therewith in the ring.

4. A needle bed for knitting machines having in combination a cylinder shell, slots cut within said shell and hardened strips inserted within said slots, said strips having offset extensions projecting upwardly therefrom to serve as guiding elements between which sinkers are to pass and a ring attached to and spaced from the upper end of said shell, said ring having spaced slots therein for fixing the position of the upper ends of said strips.

5. A needle bed for knitting machines having in combination a cylinder shell, slots cut within said shell and hardened strips inserted within said slots, said strips serving to guide needles and having offset extensions projecting at their upper ends and above the top of said shell, said extensions being corrugated at areas where the inner ends of sinkers are to be guided so as to present thickened sections whereby said sinkers may be inserted within a narrower space than provided for said needles.

6. A strip for insertion in needle beds including an elongated needle guiding portion and an offset extension for guiding sinkers.

7. A strip for insertion in a needle cylinder of the built-up type including an elongated needle guiding portion, an offset extension at the upper end thereof for guiding sinkers, said sinker guiding portion being corrugated to present a thickness greater than that of the said needle guiding portion.

8. A hardened strip for insertion in built-up needle cylinders including an elongated needle guiding portion, an extension for guiding sinkers, said extension being offset with respect to said needle guiding portion, and positioning means on said strip for locating it within a cylinder shell.

9. A hardened strip for insertion in built-up needle cylinders including an elongated needle guiding portion and an offset extension at one end thereof for guiding sinkers, said sinker guiding portion being preformed to a thickness greater than that of the said needle guiding portion, and positioning means for accurately locating said strip with respect to a cylinder shell.

10. A strip for insertion in needle beds of built-up type including an elongated needle guiding portion and an offset extension for guiding sinkers, said extension being of different thickness from that of the said elongated, needle guiding portion.

11. A needle bed for knitting machines having in combination a shell and hardened strips inserted therein, said strips projecting above said shell and having that portion which does project offset with respect to the remainder of the strip whereby needles may be guided by one part of said strips and cooperating sinkers by the offset, projecting parts thereof.

12. A needle bed for knitting machines having in combination a shell and hardened strips inserted therein adapted to guide needles and sinkers spaced intermediate the needles, said strips having elongated needle guiding portions and offset sinker guiding portions, the construction being such that the offset sinker guiding portions are of different thickness from the needle guiding portions and serve in addition to guiding sinkers as a means for supporting the backs of needles at those positions wherein the shell does not support them.

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