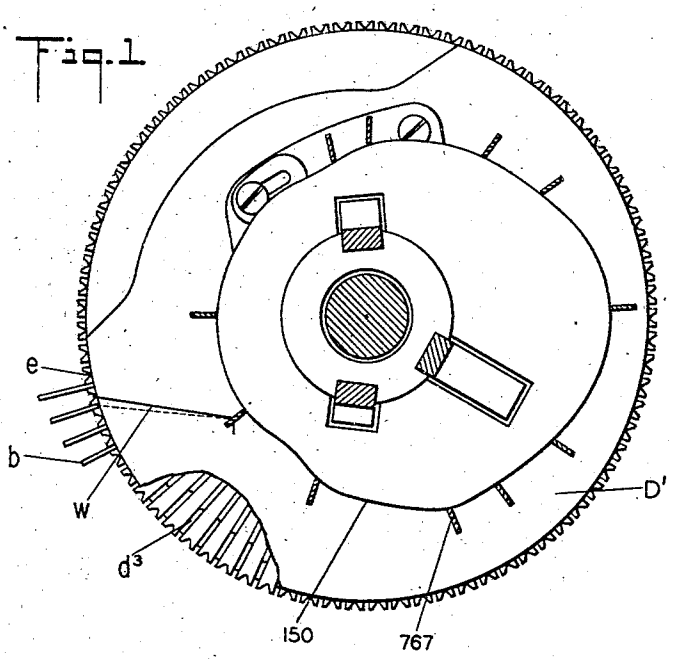
Jan. 7, 1936. I. W. GROTHEY 2,027,276

DIAL FOR KNITTING MACHINES

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Fig. 1



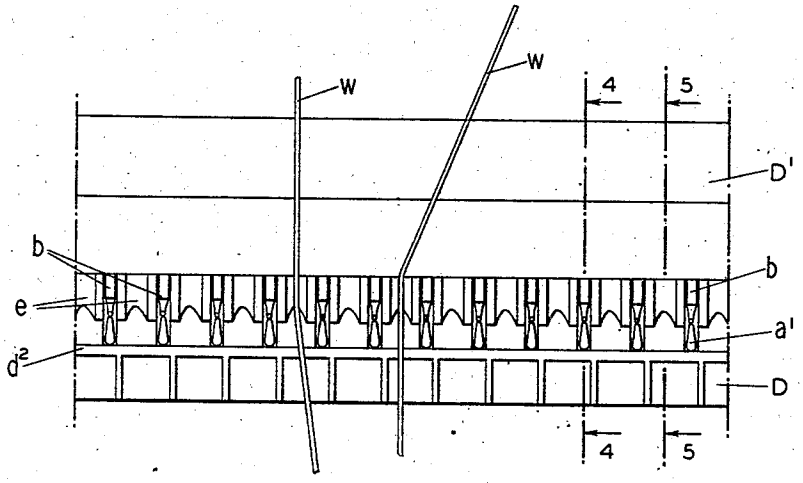


Fig. 2

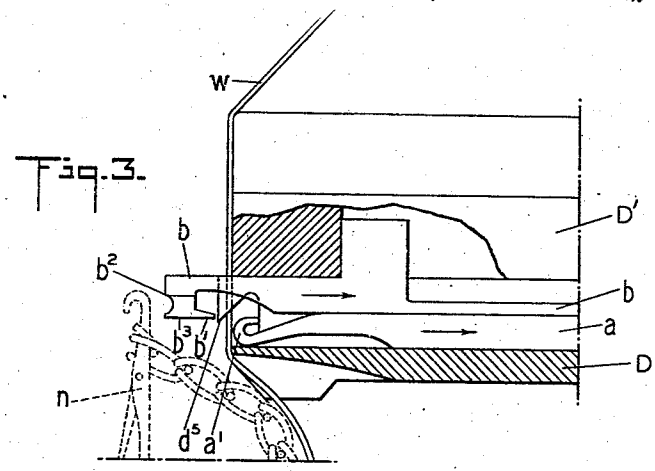
INVENTOR
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Fig. 3.



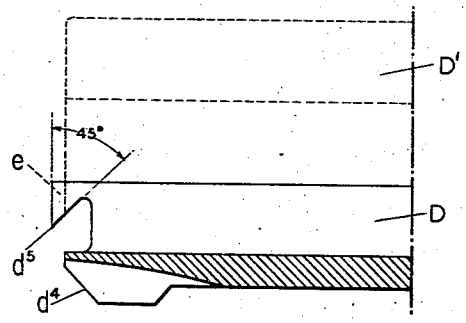


Fig. 4.

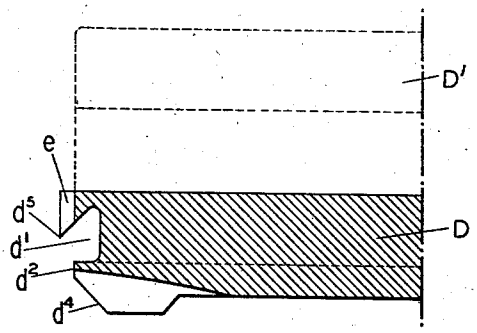


Fig. 5.

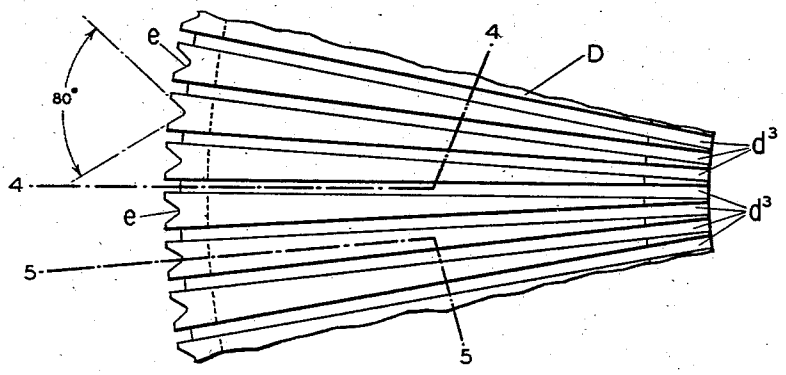


Fig. 6.

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UNITED STATES PATENT OFFICE

2,027,276

DIAL FOR KNITTING MACHINES

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Application June 2, 1934, Serial No. 728,779

15 Claims. (Cl. 66—115)

This invention relates to knitting machines and more particularly to circular rib knitting machines having a dial and means for forming embroidery patterns of wrap yarns and it is an object of this invention to provide in a knitting machine of the type described a dial of improved construction such that the wrap yarns are held free from engagement by the dial needles during rib knitting and transfer so that the wrap yarns are not drawn in by the dial needles and knit in the rib fabric or pinched in the dial needle grooves.

In the drawings—

Fig. 1 is a plan view of a dial constructed in accordance with this invention shown associated with the dial cam cap, wrapping yarn fingers and cam for guiding the wrapping yarn fingers, part of the dial cam cap being broken away to show the grooved upper face of the dial;

Fig. 2 is a development in the plane of the paper of a portion of the dial drawn to a larger scale and showing the dial needles and the relation of wrap yarns thereto;

Fig. 3 is a partial vertical section taken through one of the needle grooves of the dial shown in Fig. 1 and showing the relations of the dial needles, cylinder needles, fabric and wrap yarns after the loops have been cast off the dial needles;

Figs. 4 and 5 are partial vertical sections of the dial shown in Fig. 1 taken as on lines 4—4 and 5—5, respectively, of Fig. 6, the dial needles being omitted; and

Fig. 6 is a partial plan view of the dial shown in Fig. 1, the cop and needles being removed.

In the drawings the invention is shown in connection with a rib dial D, such as is shown in the patent issued August 30, 1927, to R. W. Scott, No. 1,641,101, having the dial needles or knitting instruments comprising hook portions a and cast-off portions b in the radial grooves d^3.

When such a dial is used in a knitting machine arranged for knitting wrapping yarns in addition to the usual body yarn or yarns to form embroidery patterns as shown in my co-pending application Ser. No. 690,492, filed September 21, 1933, the wrap yarns w when not being knit extend from the wrap yarn fingers 767 past the dial cam cap D' and the dial D and lie against the peripheral face of the dial. With the wrap yarns in such a position and with the machine knitting rib fabric the wrap yarns shift so as to bear against the dial needles and are drawn into the needle groove by the point b' of the cast off portion b of the dial needles causing the wrapping yarn to be caught by the dial needle hooks a' and knit in with the body yarns in forming the rib portion of the fabric. In the type of machine shown in my co-pending application referred to above, when the loops are being transferred from the dial needles to the cylinder needles the cast-off portions b are moved outwardly during each of several revolutions so as to ensure the transfer of all loops and when a wrap yarn is caught by a cast-off portion on its last inward movement during the transfer operation the wrap yarn is carried into the groove of the dial needle and held, preventing movement of the yarn downwardly with the fabric as it is knit. Inasmuch as the dial needles of this type of machine may not be operated again until rib knitting is started upon the next stocking, holding the wrap yarn causes the fabric to be held in the zone of the needles and prevents the proper movement of the fabric from the needles as the knitting of the fabric proceeds.

The needle dial shown besides being radially grooved, as at d^3, is peripherally grooved at d' to define a narrow circular rim d^2 an appropriate short distance concentrically within the circle defined by the backs of the cylinder needles n. The bottom surface of the dial slopes upwardly at d^4 to define the narrow rim d^2. In order to prevent the wrap yarns w being caught by the dial knitting instruments the portion of the dial D above the peripheral groove d' is extended radially so as to project beyond the circumference of the rim d^2 and between adjacent needle grooves the projecting portion is grooved vertically as at e, the depth of the groove being equal to the extent of the projection so that the bottoms of the vertical grooves lie in the same vertical plane as the vertical face of the rim d^2. The grooved vertical face portion of the dial D extends downwardly below the upper limit of the peripheral groove d' to bring its lower edge at d^5 slightly below the plane of the bottom face b^3 of the outer end b^2 of the cast off portion b to aid in keeping the wrapping yarns from being caught by the point b' of the cast-off portion b when the cast-off portion is moved outwardly to a position such as is shown in Fig. 3 either during rib knitting or during transfer.

In operation when the embroidery or wrap yarn fingers 767 are inactive they occupy a position within the area bounded by the dial circumference as shown in Fig. 1 and the wrap yarns extend from the fabric within the needle cylinder across the peripheral face of the dial to the fingers 767. At this time the wrap yarns are engaged in the vertical grooves in the dial and pre-

vented from travelling on the perimeter of the dial to a position in which they are liable to be caught by the dial needles. When the wrap yarns are being knitted into the fabric the wrap yarns tend to return to the grooves in the perimeter of the dial as the yarn fingers **767** are returned to their position against the cam **150** during the portion of each revolution they are inactive. Extending the peripheral face of the dial downwardly lessens the opening at the needle to such an extent that such yarns as are shifted from the vertical grooves are kept from being engaged by the points of the cast-off portions of the needles.

What is claimed is:—

1. In a machine for knitting body and wrap yarns, a needle dial having needle grooves, needles in said grooves, and yarn guiding grooves extending vertically in the peripheral face of said dial between adjacent needle grooves and preventing engagement of the wrap yarns by said dial needles.

2. In a machine for knitting body and wrap yarns, a needle dial having needle grooves, needles in said grooves, and yarn guiding means between said grooves and preventing engagement of the wrap yarns by said dial needle.

3. In a knitting machine for knitting body and wrap yarns, a needle dial having needle grooves therein and dial needles in said grooves comprising separate hook and cast-off portions, said dial having a peripheral groove with its upper edge portion as low as the bottom of the end of said cast off portions to prevent the cast-off portions engaging the wrap yarns.

4. In a knitting machine, a needle dial having needle grooves therein and dial needles in said grooves comprising separate hook and cast-off portions, said dial having a peripheral groove the upper edge of which is substantially in line with the bottom of the end of said cast-off portions and yarn guiding grooves between said needle grooves.

5. In a knitting machine, a needle dial having needle grooves therein and dial needles in said grooves comprising separate hook and cast-off portions, said dial having a peripheral groove with an upper edge substantially in line with the bottom of the end of said cast-off portions and a yarn guiding groove extending vertically in the peripheral face of said dial between adjacent needle grooves.

6. In a knitting machine for knitting body and wrap yarns, a needle dial having needle grooves therein and a groove for receiving the loops on the dial needles extending inwardly from the periphery of said dial and intersecting said grooves, the peripheral face of said dial partially closing said groove and having an edge preventing the dial needles engaging the wrap yarns.

7. In a machine for knitting body and wrap yarns, a dial having needle grooves therein and, needles in said grooves, said dial having vertical and horizontal grooves on its periphery preventing wrap yarns from engaging said needles.

8. In a knitting machine, a dial having needle grooves therein and, needles in said grooves, said dial having a peripheral groove with a downwardly projecting upper edge overlapping the dial needles for preventing said needles drawing wrap yarns into said needle grooves.

9. In a knitting machine, a dial having needle grooves therein and needles in said grooves, said dial having vertical grooves between adjacent needles and a peripheral groove with an edge overlapping the needles to prevent wrap yarns being engaged by said needles.

10. In a machine for knitting body and wrap yarns, a needle dial having needle grooves and a peripheral groove therein needles in said needle grooves, the upper edge of said peripheral groove extending below the inner upper portion of the groove and to a level with respect to said needles preventing said needles engaging the wrap yarns.

11. In a machine for knitting body and wrap yarns, a needle dial having needle grooves and a peripheral groove therein, needles in said needle grooves, the upper edge of the peripheral groove projecting beyond the lower edge and extending downwardly to prevent said needles engaging the wrap yarns and having vertical slots therein.

12. In a machine for knitting body and wrap yarns, a needle dial having needle grooves and a peripheral groove therein, needles in said needle grooves, the upper edge of said peripheral groove extending below the inner upper portion of the groove to a level with respect to said needles preventing said needles engaging the wrap yarns and projecting beyond the lower edge and having vertical slots therein.

13. In a machine for knitting body and wrap yarns, a needle dial having needle grooves and a peripheral groove therein, needles having hook and cast-off portions in said needle grooves, the upper edge of said peripheral groove extending below the inner upper portion of the groove to the level of the lower edge of the needle cast-off portion and projecting beyond the lower edge and having vertical slots therein extending inwardly to the vertical plane of the lower edge.

14. In a knitting machine for knitting body and wrap yarns, a needle dial having needle grooves therein and dial needles in said grooves comprising separate hook and cast-off portions, said dial having a peripheral groove with its upper edges extending to a position with respect to the bottom of the outer end of the cast-off portion of the needles which prevents said cast-off portions engaging the wrap yarns at the periphery of the dial.

15. In a knitting machine for knitting body and wrap yarns, a needle dial having needle grooves therein and dial needles in said grooves comprising separate hook and cast-off portions, said dial having a peripheral groove with its upper edge extending below the inner upper portion of the groove to a position in which it prevents the cast-off portions of the needles engaging the wrap yarns at the periphery of the dial.

IVAN W. GROTHEY.