ABSTRACT
The improved pattern disc of the knitting machine of the invention, wherein a pattern disc is circularly operative about a central hub, comprises a pair of jacks positioned within each radially inclined slot of the disc and capable of being positioned in either working or idle position without removal of the jacks and repositioning the same.

The pair of jacks are superimposed to each other, the upper having an intermediate tappet and a lower discharge slot and the lower jack having an intermediate tappet in juxtaposition with said discharge slot and a terminal tappet. The greater length of the lower jack with respect to the upper one and the greater width of the discharge slot with respect to its opposite tappet permit the independent radial displacement of the jacks without need of removal when the weft of the knitting fabric is altered in design.

7 Claims, 4 Drawing Figures
PATTERN DISC FOR TUBULAR MULTIPLE-DROP KNITTING MACHINES

FIELD OF THE INVENTION

The present invention relates to knitting machines in general and to those of the tubular, multiple-drop type in particular. More specifically, it relates to an improved pattern disc used in conjunction with these machines.

BACKGROUND OF THE INVENTION

The conventional pattern discs employed in the tubular, multiple-drop knitting machines, generally, comprise a disc with radial, oriented millings or slots within which are individually positioned and fixed the jacks for controlling selectively the needles of the machine, these jacks being engaged on the heels of the needles. The jacks are normally of two types and are positioned one at a time within the slots of the disc in a predetermined order and in accordance with the weft which is to be obtained, while certain other slots of the disc, namely where the needles are to remain inoperative, are left without jacks of either type.

These conventional pattern discs display a limited, practical usefulness, because whenever the weft pattern is to be changed, it is necessary to disassemble the discs in order to get to the jacks and to remove them and then replace them in a different pattern, in conformity with the new design.

This disadvantage, obviously, results in a considerable loss of time and labor, with the ensuing high costs of manufacture.

SUMMARY OF THE INVENTION

It is, therefore, the main object of the present invention to overcome the disadvantages of the heretofore known pattern discs by providing an improved disc which comprises a plurality of radially oriented millings or slots therein, in each of which are positioned two jacks, one superimposed on the other, suitably shaped and positionable either independently of each other or cooperatively and radially, so as to act or co-act upon the heels of the needles when in working position and so as to remain idle when displaced toward the center or hub of the disc. These jacks are rigidly positioned in their respective working or idle positions by a special member provided with a lid or cover and secured to the disc and having special means cooperative with a tappet provided on each individual jack.

It is another object of the present invention to provide a pattern disc which allows the rapid positioning of the jacks to a working or idle position without removal of the jacks, but simply by radially displacing them to proper positions in their slots either toward the periphery or toward the center of the disc, depending on the sequential working pattern and design to be had.

THE DRAWINGS

These and other objects of the invention will become more apparent from the following detailed description thereof and from the accompanying drawings, in which:

FIG. 1 is a partial radial sectional view of the pattern disc of the invention; and

FIGS. 2, 3 and 4 illustrate schematically the three possible positions of a pair of superimposed jacks located in a slot of the disc of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

With reference to the accompanying drawings, the pattern disc of the invention comprises a disc 1 in which there is provided a plurality of radially oriented millings or slots 2. The disc is fixed by means of retaining screws 3 to a flange 4 of a central hub 5. Hub 5 has associated therewith, by means of interposed bushings 6, 7, a pivot 8 which guides the rotational movement of the disc 1 and has a terminal journal means 9 for setting the disc 1 on the supports of the knitting machine.

Within each radial slot 2 of the disc there are positioned two jacks 10, 11, superimposed to each other. The lower jack 10 is provided with an intermediate heel 12 and an inner terminal tappet 13 with chamfered upper end 14. The upper jack 11, on the other hand, is shorter than jack 10 and is provided with a slot or discharge 15 in its lower region, which slot 15 is juxtapositioned with the intermediate heel 12 of the lower jack, but is longer than said heel 12. The upper jack 11 also has an upper intermediate tappet 16 with chamfered extremity 17, similarly to tappet 13. The two jacks 10 and 11 are guided one on top of the other, but retain the ability to be displaced and positioned independently of each other.

Associated with the disc 1 and, therefore, with the various pairs of jacks 10, 11 is a lid member 18 which serves to block the jacks into position. The member 18 is engaged by a ring nut 19 threaded to an outer, threaded section 5' of the central hub 5 of the disc. On the inner surface of the lid 18 there are two channels, circular and concentric, 20 and 21. The radially channel 20 is in correspondence with the intermediate tappets 16 of the upper jacks 11, while the radially inner channel 21 is in correspondence with the terminal tappets 13 of the lower jacks 10.

In channel 20 there is a ring 22 which has a pair of circular and concentric seats 23, 24 corresponding to the shaping of the chamfered extremity 17 of tappet 16 of the upper jacks 11, so as to engage and secure the same. The ring 22 is urged by a spring 25, such as for example a laminar spring, to press against the tappets 16. Similarly, in the channel 21 of the lid 18 there is another ring 26, urged by compression spring 27, and having circular and concentric seats 28, 29 corresponding to the chamfered extremity of tappets 13 of the lower jacks 10, to secure the same.

Finally, on hub 5 of the disc there is mounted a ring-type retainer 30 to limit the axial displacement of the threaded nut 19 during the unblocking phase of lid 18 and to prevent the accidental exiting of the jacks from the slots.

With the disc of the invention, it is possible, by unthreading the nut 19 to unblock the lid 18, to rapidly position the jacks 10, 11 in the desired slots 2 of the disc, in cooperation with the requirements of the working needles of the machine.

After being positioned, jacks 10, 11 are secured therein by simply rethreading the nut 19 so as to block the lid 18 on the disc, to which operation corresponds the action of the rings 22 and 26 on the tappets of the respective jacks. In this manner, the two jacks 10, 11 may be displaced and positioned both toward the periphery — as shown in FIG. 2 — or so as to act upon the
heels of the needles to bring them in a working position; or, conversely, as shown in FIG. 3 — only the lower jack 10 may be displaced toward the periphery of the disc, so as to act on the heels of the needles, while the upper jack 11 is displaced toward the hub, so as to become idle.

Finally, both jacks may be displaced toward the hub — see FIG. 4 —, so as not to engage and act upon the heels of the needles, which as a result, remain idle.

Briefly, therefore, the positioning of the jacks may be effected without disassembling them from the disc, as it is the case in conventional machinery. The jacks, by being mounted in pairs and superimposed to each other, can determine individually or in combination the position (working or idle) of the needles.

It is to be understood that it is within the scope of the invention, of course, to position the jacks in pairs in any one of the slots of the disc, as long as they remain superimposed to each other.

What I claim and wish to secure by letters Patent of the United States is:

1. In a pattern disc for tubular, multiple-drop knitting machines which comprises a plurality of radially oriented slots and a central hub which has associated therewith a supporting pinion, the improvement comprising:
   a. a pair of superimposed jacks coupled to each other one above the other and positioned within a same one of the radially oriented slots; each of said jacks having a different length and being adapted to be independently of each other in radial directions;
   b. a tappet provided on each of said jacks, said tappets being radially offset with respect to one another in the assembled condition;
   c. a retaining covering means, superimposed over said pair of jacks and adapted to be affixed to the disc; and
   d. means in said covering means for cooperating with

and positioning said tappets in predeterminedly desired positions.

2. The improvement according to claim 1, wherein the lower of said pair of jacks has an intermediate heel extending in a radial direction and a terminal tappet chamfered at its upper extremity, and wherein the upper of said pair of jacks has a discharge slot extending in a radial direction in juxtaposition with said intermediate heel and an upper tappet chamfered at its upper extremity; said lower jack being longer in a radial direction than said upper jack.

3. The improvement according to claim 2, wherein said discharge slot of said upper jack is wider in a radial direction than said intermediate heel of said lower jack so as to allow one jack to be guided over the other jack for independent and separate radial displacement.

4. The improvement according to claim 1, wherein said cooperating means in said covering means is a pair of circular and concentric channels, the radially outer one of said channels cooperating with the tappet of said upper jack and the radially inner one of said channels with the tappet of said lower jack, each of said channels having a ring with circular seats therein corresponding to the chamfered extremity of the respective tappets.

5. The improvement according to claim 1, wherein said covering means engages a threaded nut, said nut being threaded onto the hub of the disc in an outer portion thereof, said nut tightening the said covering means in position over said jacks.

6. The improvement according to claim 1, wherein the hub has mounted thereon means for limiting the unthreading of said threaded nut.

7. The improvement according to claim 1, wherein pair of jacks are so positioned in the radial slot as to be superimposed over each other at least in correspondence with the area in which the heels of the needles of the machine are operative.

* * * * *