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CIRCULAR RIB KNITTING MACHINE

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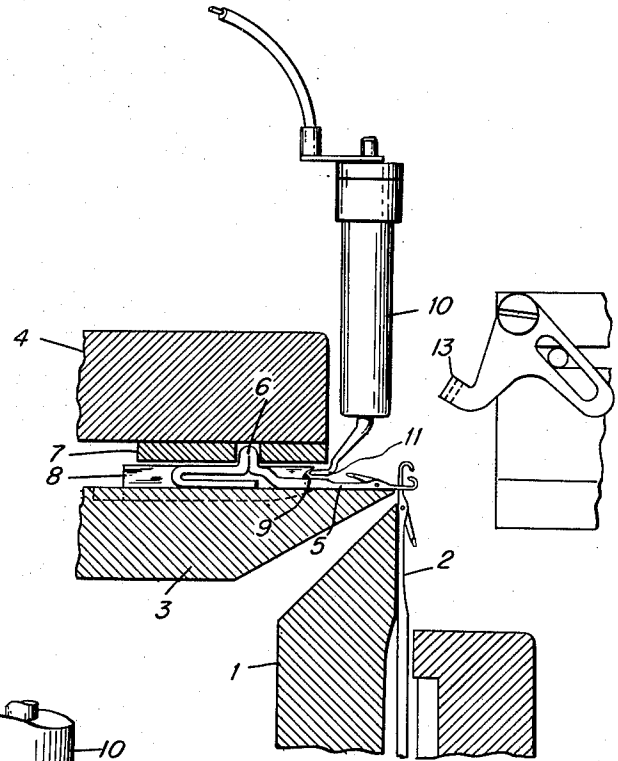



FIG. 1

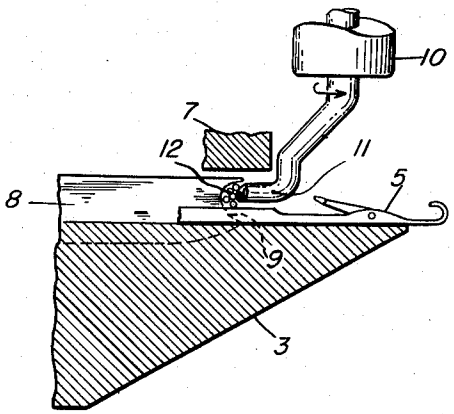



FIG. 2

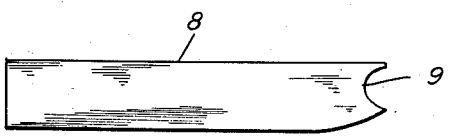



FIG. 3

Inventor
Maurice H. Felker
By his attorneys
Howson and Howson

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# CIRCULAR RIB KNITTING MACHINE

Maurice H. Felker, Lakeport, N.H., assignor to Scott & Williams, Incorporated, Laconia, N.H., a corporation of Massachusetts

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4 Claims. (Cl. 66—157)

This invention relates to a circular rib knitting machine and more particularly to means for trapping misplaced yarn. The invention will be shown and described in connection with a multi-feed rib knitting machine having a stationary needle cylinder but it should be understood this invention is not necessarily limited to a machine having a stationary needle cylinder, as it is equally useful in a revolving cylinder machine.

On circular rib knitting machines, when a yarn is taken out of action, it is customary to cut and clamp the yarn. Experience shows that if a yarn coming from the yarn finger should not become properly clamped and cut, trouble occasionally occurs in the following manner. When a yarn finger is swung out of action its feeding end is above the dial and as the yarn finger revolves in a stationary needle cylinder machine, the yarn tends to move radially in on top of the dial. The customary construction for a dial of an independent needle circular knitting machine involves locating the independent needles in radial slots between walls upstanding from the upper face of the dial. The operating butts of the needles project upward beyond the walls in order that they may be grasped by the dial operating cams and the needles moved radially as required. These operating cams are located on the lower face of the dial cap. There is slight clearance between these operating cams and the upper edges of the needle walls. Experience shows that a yarn coming from the yarn finger, if not caught in the yarn clamp and cut, tends to find its way into the space between the dial cams and the dial and to wrap itself around the outer edges of the operating butts of the needles. If not detected shortly, the yarn will be wound around those butts and tend to immobilize the needles. It is an object of the present invention to prevent inactive yarn going under the dial. It is characteristic of a knitting machine containing the invention that the outer ends of the needle walls are notched or undercut so that they will catch and hold any yarn which tries to go under the dial cap and to provide a yarn stop motion detector adapted to be operated by any accumulation or build up of wrappings of improperly fed yarn in the notches at the ends of the walls.

In the drawings,

Figure 1 is a vertical view in section through one edge of a dial cap and dial of a circular rib knitting machine built according to the invention showing a yarn stop motion detector ready to detect yarn in the notches of the walls.

Figure 2 is an enlarged view of the dial and stop motion detector of Figure 1 showing, in section, a quantity of yarn caught and wound in the recessed periphery formed by the notched walls. The yarn has built up sufficiently to move the detector counterclockwise, as shown by the arrow, and to operate the switch which stops the machine.

Figure 3 is a view in side elevation of one of the walls of the dial of the machine of Figures 1 and 2.

The invention will be shown embodied in a multi-feed circular hosiery machine adapted to make body garments



such, for example, as underwear or outer wear such as sweaters, and the embodiment in which it will be described is one in which the needle cylinder is stationary. Only so much of the machine as is directly concerned with the invention will be shown inasmuch as the rest of the machine is conventional. The machine has a needle cylinder 1 and independent needles 2 moving vertically therein as in any other circular knitting machine. The machine has a dial 3 and a dial cap 4, the latter being conveniently divided into sections. Of course there is relative rotation between the dial and the cap. Adapted to move radially in and out on the upper face of the dial are independent latch needles 5 having operating butts 6 located toward their radially inner ends as they lie in the machine. These upstanding butts 6 are adapted to be engaged by needle-operating cams 7 mounted face downward on the lower face of the dial cap 4. Near the periphery of the dial mounted in a radial manner are thin upstanding needle walls 8 adapted to guide the needles and keep them properly spaced as they move back and forth radially. The form of dial shown is one in which there are inserted walls but it should be pointed out that machines are also built without inserted walls and the invention is equally applicable to them. The outer ends of the walls 8 terminate at a point just radially inward of the outer edge of the dial cap. The outer end of each wall 8 is notched or undercut at 9. In the example shown the notch comprises or occupies the entire end of the wall. This open notch, facing radially outward, performs a function in connection with the trapping of improperly fed yarn as will be hereinafter described.

There is an electric stop motion unit 10 with a pivoted detector 11 adjacent the dial cap 4. The detector is adapted to pivot about a vertical axis and has a tip 12 projecting laterally into an operative position in the notches 9 of the walls 8. The tip is rounded at the end to approximate the shape of the notches and to permit it to roll on the yarn when the detector is operated. This detector unit 10 being carried by the dial revolves past all the needle walls 8.

Any inactive yarn coming from the yarn finger 13 (Figure 1) which is not trapped in a yarn clamp (not shown) becomes misplaced and is liable to be drawn toward the center of the knitting machine if left free. Since the idle yarn finger is above the level of the dial, the inactive yarn tends to go in above the needle walls 8, and below the dial cap 4. However, experience shows that any such idle yarn will sooner or later present itself at the level of the needle walls. The needle walls terminate at their outer ends adjacent or slightly inside the periphery of the dial cap with the result that any yarn located at the level of the needle walls becomes laid in the notches 9. The catching of the yarn in the notches 9 serves to place and start the misplaced yarn so that an accumulaton 12 of yarn is begun. This accumulation 12 is of value because the build up formed by the accumulation will sooner or later cause the yarn detector 11 to revolve and trip the stop motion unit 10 in the conventional manner. After the improperly fed yarn has been removed from about the dial, the yarn from the supply package or cone (not shown) may be properly threaded and clamped, and the stop motion detector reset preparatory to starting the machine in operation again.

It will be seen that by means of this invention the yarns are prevented from getting in above the needles, immobilizing them, and causing a "smash." Furthermore, the turns of the misplaced yarn thus kept away from the needle butts are placed so close together that their build up can be detected more promptly.

The invention is of particular usefulness in multi-feed circular rib knitting machines.

What is claimed is:

1. A circular rib knitting machine having a dial, independent needles therein, upstanding operating butts on the needles, a cap above the dial, and operating cams on the cap for the needle butts, in combination with needle walls for the needles on the dial having undercut notches in the outer ends thereof just inward of the outer edge of the dial cap, and a yarn stop motion detector on the cap adapted to detect accumulation of yarn in the notches; whereby any misplaced inactive yarn above the dial will be caught in the notches and detected.

2. A circular rib knitting machine having a stationary dial, independent needles therein, upstanding operating butts on the needles, a revolving cap above the dial, and operating cams on the cap for the needle butts, in combination with needle walls for the needles on the dial having undercut notches in the outer ends thereof, said outer ends terminating radially inward of the outer edge of the dial cap, yarn feeding means located above the dial when in inactive position, and a yarn stop motion detector on the cap adapted to detect accumulation of yarn in the notches; whereby any misplaced inactive yarn above the dial will be guided into the notches and detected.



3. A circular rib knitting machine having a dial, independent needles therein, a dial cap, there being relative rotation between the dial and cap, upstanding operating butts on the needles located under the cap, operating cams on the cap for the needle butts, a pivoted yarn finger located above the level of the dial and needle walls upstanding from the upper face of the dial; there being undercut notches in the outer ends of the walls near the periphery of the cap, said outer ends terminating just radially inward of the outer edge of the dial cap; in combination with a yarn stop motion detector having rotary motion relative to the dial adapted to detect accumulation of yarn in the notches; whereby any misplaced inactive yarn above the dial will be guided into the notches and detected.

4. A circular rib knitting machine according to claim 3 in which the end of the detector conforms in shape to the notches whereby the detector will be tripped sooner than otherwise.

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