July 14, 1936. H. McADAMS 2,047,279

PATTERN CONTROL ATTACHMENT FOR REVERSE PLATING CIRCULAR KNITTING MACHINES

Filed Dec. 15, 1930

Fig. 1.

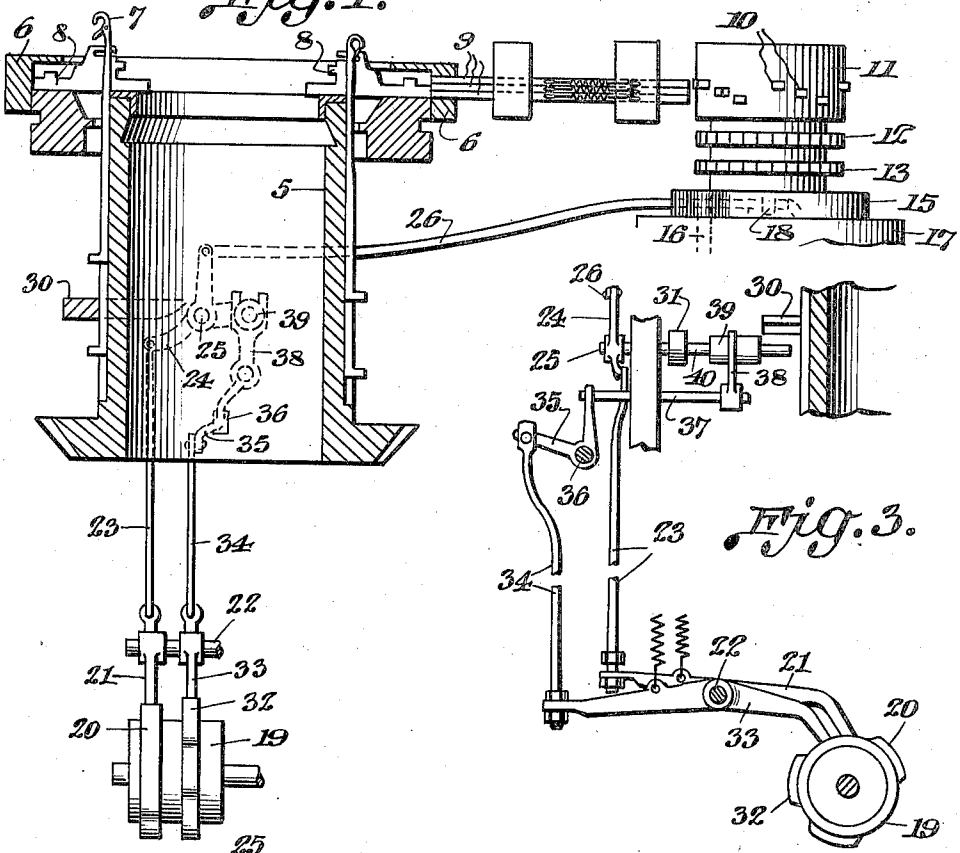
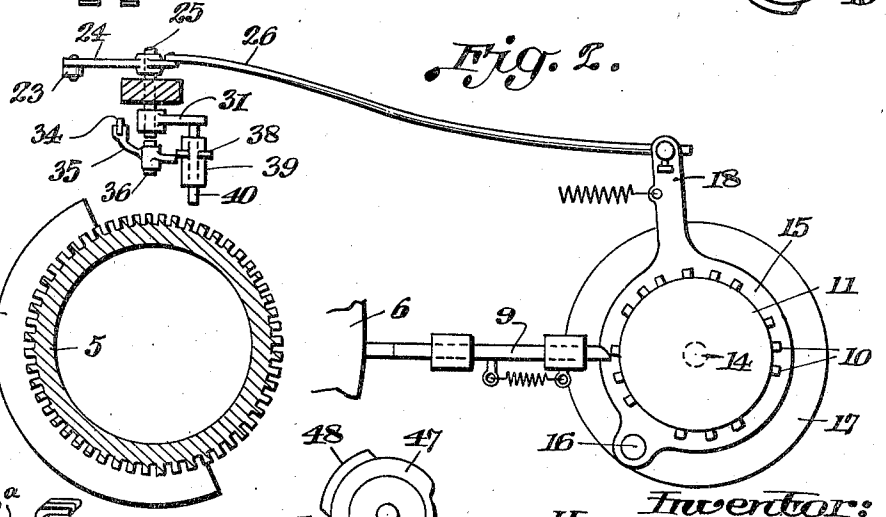


Fig. 3.

Fig. 2.



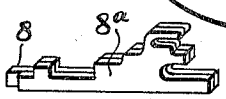


Fig. 5.

Fig. 4.

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PATTERN CONTROL ATTACHMENT FOR REVERSE PLATING CIRCULAR KNITTING MACHINES

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3 Claims. (Cl. 66—50)

My invention relates to circular knitting machines and particularly to those having special sinkers and pattern-control mechanism adapted to effect selected reverse plating of two threads for producing ornamental surface designs.

In machines of this type the pattern-control mechanism has commonly functioned throughout the circular or round and round knitting, with provision for its remaining idle only during reciprocative knitting. When thus employed in knitting stockings, the reverse plated design will appear throughout the leg and foot portions; and where such design is carried around the tube, it must necessarily appear in any high-splice heel area and in the sole of the foot, which is not always desirable.

My present object is to provide means for interrupting the reverse plating in portions of certain circular courses and to determinedly effect this omission by suitable automatic means, whereby selected areas, as the high-splice heel and sole of the foot aforesaid, may be made plain, when desired, without disturbing the reverse plated pattern design in the remainder of the leg and foot.

With this main object in view my present invention comprises the improved automatic means for modifying the action of such known reverse plating mechanism, as will be fully described in the following specification in connection with the accompanying drawing, the novel features thereof being pointed out in the subjoined claims.

Fig. 1 indicates diagrammatically certain parts of a known circular knitting machine sufficient to disclose an embodiment of my invention, the view being mainly a front elevation with the knitting cylinder and sinker ring shown in vertical section.

Fig. 2 is substantially a plan view of the parts shown in Fig. 1, the knitting cylinder being shown in cross section and only a fragment of the sinker ring indicated.

Fig. 3 is a diagrammatic partial side elevation showing the cam operated connections for oscillating the sinker-actuating pattern drum.

Fig. 4 is a detail of a modified cam for variedly positioning the sinker-actuating pattern drum.

Fig. 5 is a detail of a plurality of sinker-actuating connections of different lengths employed in connection with the cam shown in Fig. 4.

Reverse plating of two main knitting threads to produce pattern designs is well known in the art and usually is accomplished with the aid of special sinkers radially shifted at proper times to lay a determined one of said threads in the needle hooks so as to appear on the surface; and the radial movements of said sinkers to produce determined designs by such reverse plating has also heretofore been controlled by automatic selective means.

One form of knitting machine adapted particularly to produce pattern designs of reversely plated threads is fully shown and described in the patent to Lawson et al, No. 1,702,608, issued February 19, 1929, and my present improvements are described in connection with this type of machine.

As reference to the aforesaid patent will disclose, the automatic control of the sinkers by the special pattern drum, will produce designs in all parts of the leg and foot with no provision for omitting the designs except by shift of the drum to inoperative position.

As previously set forth my present improvements are adapted to omit the design, when desired, in any longitudinal sectional portion as determined, without omission in the remainder of the tubular fabric, nor in the unbroken continuation of the design in such remaining portion, and to effect this sectional omission of design I provide added control means which will now be fully described.

Referring to the drawing, 5 indicates the needle cylinder, 6, the sinker ring, 7 the knitting needles, and 8 the cooperating reverse-plating sinkers, which are radially moved by determined ones of a plurality of sinker-actuating connections shown in the form of push rods 9, selectively operated by suitable lugs 10 on pattern drum 11. This pattern drum has ratchet gears 12 and 13 by which it is rotated step by step on its axial pivot connection 14 to a platform 15, which platform is pivoted at 16 to a fixed frame support 17, and is provided with an extension 18 by means of which it may be turned on its pivot 16 to move drum 11 into and out of position for its lugs 10 to operate push rods 9. Such turning movement of platform 15 is indicated as controlled by the knitting machine pattern drum 19 provided with suitable cams 20 acting on a lever 21 intermediately pivoted at 22 and its opposite end connected by a link rod 23 to one end of a bell-crank 24, having a pivotal axle support 25 and its opposite end connected by a link rod 26 to said platform extension 18. Reverse turning of platforms 15 to normal position is provided for by spring 18a connected to extension 18.

The aforesaid mechanism, diagrammatically indicated in the drawing and above briefly referred to, operates in the well known manner more fully set forth and described in the said Lawson Patent 1,702,608, as reference thereto will disclose, to selectively actuate the sinkers 8 so as to reversely plate two main threads in accordance with the pattern determined by lugs 10 on drum 11, the later being suitably rotated step by step as in said patent through its gears 12 and 13. As set forth in said patent and com-

monly employed, the rotative means for drum 11 is active when said drum is in position for its lugs to operate rods 9, and is held in abeyance when the drum is turned away from said rods, which is necessary during reciprocative knitting of heel and toe pockets in a stocking fabric.

My present improvements relate to mechanism adapted to produce pattern designs controlled by said drum in certain parts of the tubular fabric with omission in other parts in the same courses, as in the high splice heel and sole portion of a stocking fabric, and at the same time continue said drum in operation to produce the continuous pattern design in the remaining portions of said tube, as the entire circular portion of the leg outside the high splice heel area, and the instep and top of the foot portion.

To this end, the preferred mechanism, indicated in the drawing in Figs. 1, 2, and 3, consists of a segmental cam 30 secured to the needle cylinder 5 and operative on the end of a crank arm 31 fixed to pivotal axle 25 to additionally operate bell crank 24 and, through link bar connection 26 of the latter to extension 18 of platform 15, turn said platform on its pivot 16 during a portion of each cylinder rotation. Segmental cam 30 is so adjusted as to act on the drum 11 during that portion of the cylinder rotation producing the desired pattern-omitted area, as the aforesaid high splice heel and reenforced sole portion of the foot; and its turning movement of platform 15 is sufficient only to move the drum lugs 10 out of position to operate on push bars 9 during such portion of the cylinder rotation, but not as far as effected by pattern drum cam 20, so that continued step-by-step rotation of drum 11 will maintain a continuous pattern control in the remaining portion of such cylinder rotation. As the sinkers 8 rotate with the needle cylinder 5, it will be seen that such movement of drum 11 acts to prevent reverse plating in the areas controlled by cam 30.

In order that cam 30 may act automatically at the proper time, I have indicated a second cam 32 on pattern drum 19, acting on one end of a lever 33 pivoted coaxially at 22 with lever 21, and connect the opposite end of said lever 33 by a link rod 34 to one end of a bell crank 35 pivotally supported at 36. Secured to the opposite end of bell crank 35 is a rod 37 carrying a forked arm 38 engaging a roller 39, movable lengthwise on a pin extension 40 of crank arm 31 into and out of the circular path of cam 30. At the proper time cam 32 acts to move roller 39 into the path of said cam 30 for its part circle action on bell crank 23 effecting oscillation of drum 11 as above described.

The mechanism thus set forth, it will be readily seen, controls the movement of such sinkers 8 so that their reverse plating action on the main threads is omitted during parts of determined rotations of the cylinder, thus omitting the pattern design from such parts.

Such omission of the pattern design in certain areas of the tubular fabric is very desirable and the mechanism above set forth for accomplishing this may be radically modified within the spirit of my invention. For instance in Figs. 4 and 5 I have indicated another means for effecting such pattern omission. Cam 45 shown in Fig. 4 is adapted to be mounted on pattern drum 19, and has three cam levels 46, 47, and 48 all acting directly on lever 21 aforesaid, level 46 forming a rest for said lever when drum 11 is in position for its lugs 10 to act on push rods 9; level 47, an intermediate position, turning said drum away from said push rods for a determined distance but not sufficient to disengage the drum racking mechanism; and level 48 further turning said drum to idle position where its racking mechanism is in abeyance. And in connection with such cam 45 I employ special sinkers 8a, of slightly less length than the sinkers 8, and dispose such special sinkers within the areas in which no reversing of the threads is at times desired. In such modified form lever 21 alone controls under the action of cam 45, and it will be readily seen that when intermediate level 47 has partly turned drum 11, the lugs 10 of the latter will act on the rods 9 sufficiently to actuate long sinkers 8, but not the shorter sinkers 8a which consequently will not reverse plate the threads so long as drum 11 remains in this intermediate position.

From the foregoing description it is believed the nature of my invention and the improved machine operation effected thereby will be readily understood, and it will be further understood that other modification than that described may be devised and I do not desire to limit myself to the specific mechanisms set forth in detail above, but,—

What I claim is:

1. In a circular knitting machine having guide fingers for two main knitting threads, a needle cylinder, a sinker ring, sinkers of varying length mounted for radial movement in said ring and adapted to reversely plate said main threads, a plurality of selectively operated sinker-actuating connections, a rotated drum carrying connection-actuating lugs and mounted to move into and out of operative position relative to said sinker-actuating connections, and means to move said drum comprising a cam having an intermediate step to position said drum during determined needle cylinder rotations so as to actuate only certain length ones of said sinkers.

2. In a circular knitting machine having guide fingers for two main knitting threads, a needle cylinder, a sinker ring, sinkers having varying extensions and mounted for radial movement in said ring so as to reversely plate said main threads, a drum having pattern lugs operative to radially move said sinkers, means to move said drum into and out of operative relation to said sinkers, means to rotate said drum when in operative position, and means to move said rotating drum to an intermediate position during determined needle cylinder rotations so as to position said drum lugs for operation on sinkers of a determined extension.

3. In a knitting machine having guide fingers for two main knitting threads; a circle of knitting needles to receive said thread; a circle of radially movable sinkers surrounding said needles, of varying length, and adapted to reversely plate said main threads; a plurality of push rods operative on selected sinkers; a rotatable pattern drum for selectively operating said push rods; means to position said drum relative to said push rods for operative action on the full circle of sinkers, a partly withdrawn position for operative action on certain sinkers only of a determined length, and in fully withdrawn position free from operation on all the sinkers; and means to rotate said drum constantly when in operative and partly withdrawn position, and to stop said drum rotation when in fully withdrawn position.

HARRY McADAMS.