

May 2, 1967

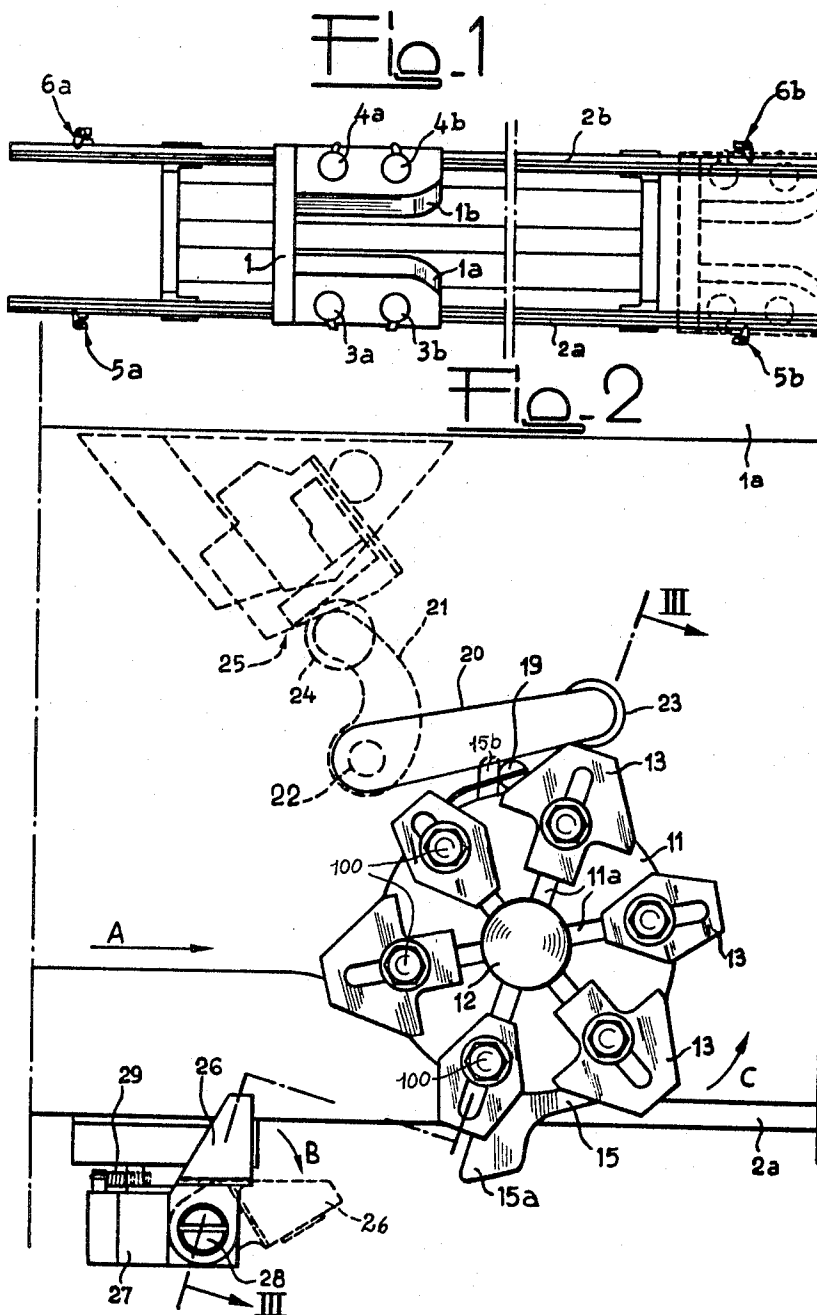
A. COPPO

3,316,739

STRAIGHT BAR KNITTING MACHINE

Filed April 13, 1964

2 Sheets-Sheet 1



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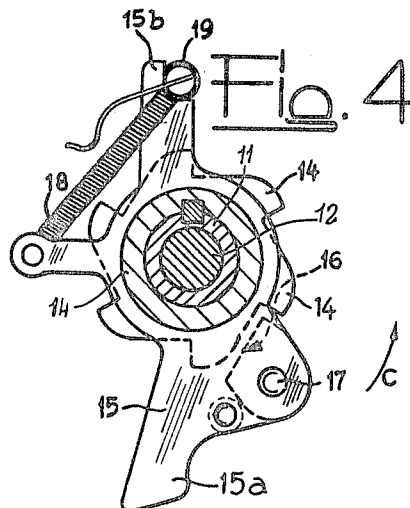
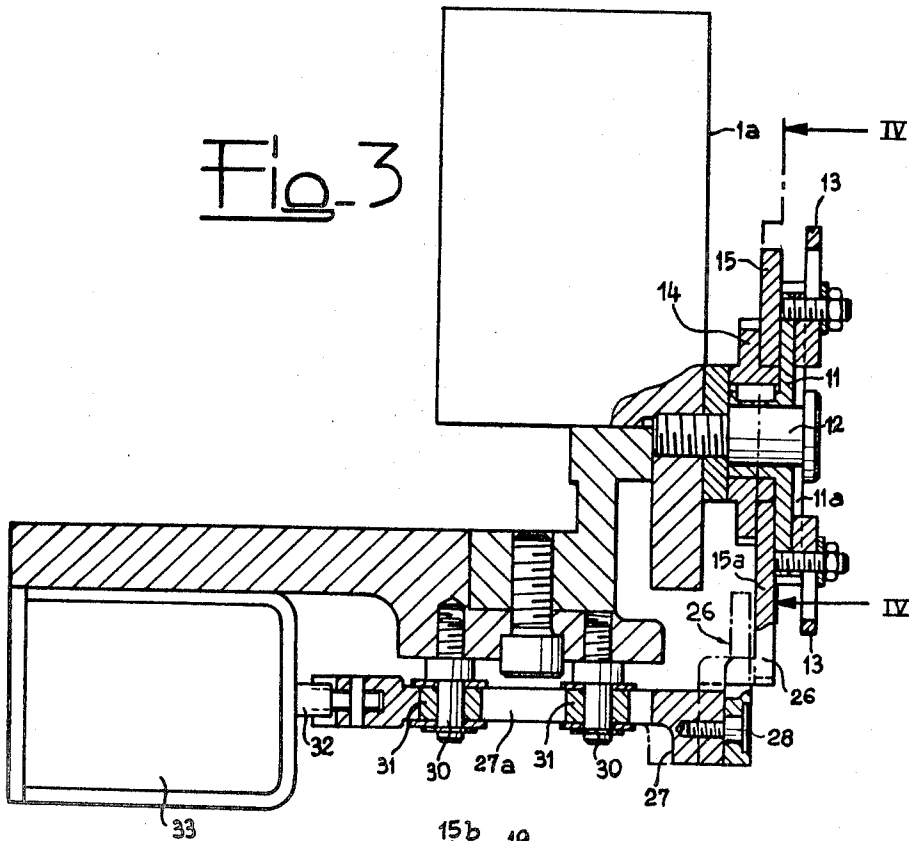
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STRAIGHT BAR KNITTING MACHINE

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1 Claim. (Cl. 66—71)

This invention relates to a device for use in automatic cycle straight bar knitting machines for varying the stitch density of the fabric by modifying the bottom stop position of the stitch cams accordingly.

The device according to this invention comprises in association with each stitch cam a spider or cam disc assembly carried by the yarn carrier capable of performing a step by step unidirectional rotary motion which is effected at the proper time by a cooperating abutment provided at one end of the guide bars for the carrier.

The invention shall be described in detail with reference to the accompanying drawings which show by way of example an embodiment thereof.

FIGURE 1 is a diagrammatical plan view of a straight bar knitting machine provided with the device according to this invention,

FIGURE 2 is a front view of the device,

FIGURE 3 is a sectional view on line III—III of FIG. 2 and

FIGURE 4 is a sectional view on line IV—IV of FIG. 3.

Reference numeral 1 denotes the yarn carrier of an automatic cycle straight bar Lamb type knitting machine. The forward and rear portions 1a, 1b, respectively, of the carrier move in a known manner along guide bars therefor 2a, 2b, respectively.

The forward portion 1a of the carrier carries two devices 3a, 3b adapted to cooperate with abutments 5a, 5b, respectively, situated at the ends of the forward guide bar 2a; similarly, the rear portion 1b of the carrier carries two devices 4a, 4b adapted to cooperate with abutments 6a, 6b situated at the ends of the rear guide bar 2b.

FIGURES 2 to 4 show in detail one of the devices carried by the carrier and abutment therefor.

Referring to the same figures, 11 denotes a disc rotatably mounted about a pivot 12 carried by the carrier. The disc 11 is formed with radial grooves 11a and corresponding tapped holes in which bolts 100 are screwed for attachment of lugs 13 acting as cams, which extend beyond the periphery of the disc and are radially adjustable in position.

A ratchet wheel 14 is securedly fixed beneath the disc 11 and has cooperating therewith a plate 15 mounted on a hub like portion of the wheel 14. The plate 15 carries a pawl 16 oscillating about a pivot 17, adapted to cooperate with the ratchet wheel 14, and is biased by a return spring 18 attached to a pin 19 secured to the carrier.

The plate 15 is provided with a lower extension 15a and a top extension 15b, the latter acting as a stop against the pin 19 under the action of the return spring 18.

The disc 11 with the lugs 13 and wheel 14 form a spider or cam disc assembly capable of being unidirectionally rotated about the pivot 12. This movement is effected by the ratchet gear comprising the plate 15 and pawl 16 thereon acting on the ratchet wheel 14.

The cams 13 on the spider or cam disc assembly cooperate with a bell crank lever comprising a top arm 20 and a bottom arm 21 mounted for oscillation about an axis 22. The arm 20 carries at its end a roller 23 adapted to bear on the cams 13, the arm 21 carrying a roller 24 constantly bearing on the stitch cam 25, thereby determining the lower stop position which governs the stitch density of the fabric made on the machine.

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The abutments secured to the guide bars each comprise a lug 26 mounted at the top of a rod 27 for rotation about a pivot 28 against the action of a return spring 29.

The rod 27 is formed with a central slot 27a, FIGURE 3, acting as a guide about pins 30 secured to the machine frame and their respective bushings 31. The rod 27 is connected at its lower end to a movable member 32 of an electromagnet 33.

Normally the electromagnet 33 is disenergized and holds the rod 27 and lug 26 in their lowered position, as shown in dash-and-dot lines the lug consequently being positioned lower than the extension 15a journaled on the spider carried by the carrier, so that the carrier is normally capable of performing longitudinal movements with respect to the guide bars 2a, 2b, without any interference between the spider and abutments. Under such conditions the stitch cams 25 keep in a constant bottom stop position without modifying the stitch density of the fabric made on the machine.

The electromagnets 33 on each device are connected in the electric circuit of the members for the automatic cycle of the machine so that they are energized at the proper time and lift their associated rods 27. The lugs 26 are then moved to their top position in the same plane as the extensions 15a journaled on the spiders. At the ends of the carriage motions the extension 15a therefore abuts its cooperating lug 26. At the end of the on stroke shown by arrow A the lug 26 moves in the direction of the arrow B in FIG. 2 against the action of the spring 29, to cause the extension 15a to reach beyond the lug and the spider to reach beyond the position of its respective stationary abutment. As the return stroke of the carriage starts in a direction contrary to arrow A, the extension 15a abuts the lug 26 which has in the meantime been restored to its normal position by the spring 29. The lug 26 is now rigid and affords a sufficient reaction to cause the plate 15 to perform an angular movement in the direction of the arrow C. This angular movement is transmitted through the pawl 17 of the ratchet gear to the wheel 14 and disc 11. The width of the said angular motion corresponds to the angular gap between the cams 13 so that on each angular movement of the spider the cams are switched over and cause the roller 23 on the bell crank lever to come opposite the next cam.

The extent by which the cam 13 extends beyond the disc 11 is previously adjusted in a proper manner to effect by the subsequent switching over of the spider predetermined variations in height of the stitch cams 25 to accordingly modify the stitch density of the fabric.

As will be obvious switching over of the cams, hence displacement of the bottom position of the stitch cams 25, occurs at the ends of the movement of the carrier to the left and to the right, independently of one another, which favourably affects knitting.

The number of cams 13 which can be provided on the disc 11 is preferably even and can be varied to afford a number of switch over possibilities for the stitch cams suiting the particular desired pattern of the fabric to be made.

What I claim is:

A straight bar knitting machine of the type comprising a yarn carrier having a forward and a rear portion, stitch cams carried by said portions, a guide bar for each of said stitch cams and means for varying the stitch density of the fabric, wherein the said means comprises, for each stitch cam carried by one of the said carrier portions, a cam disc assembly rotatably mounted on each of said yarn carrier portions, a plurality of peripheral cams adjustably secured to said cam assembly, said cams being equally spaced about the periphery of said cam assembly at varying radial distances, intermediate control means

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interposed between one of said peripheral cams and said stitch cam for determining the bottom position of said stitch cam, means for rotating said cam assembly step by step in one direction by the extent necessary to cause successive peripheral cams of said cam assembly to engage said intermediate control means and means for actuating the normally inoperative means for rotating said cam assembly when said yarn carrier moves to one end of a working stroke, said means for rotating said cam assembly comprising ratchet means associated with said cam assembly and a lug carried by said guide bar for the yarn carrier portion on which said cam assembly is mounted, said lug being positioned adjacent the end of said guide bar to act upon said ratchet means when said yarn carrier reaches the end of a working stroke, means for displaceably mounting said lug for movement between a normal inoperative position in which it is prevented from engaging said ratchet means and an operative position in which it is positioned to act upon said ratchet means at the end of a yarn carrier stroke, said lug being mounted at one end of a longitudinally reciprocable rod, electromagnetic means adapted to shift said rod and said lug

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between said inoperative position and said operative position, said lug being pivotably mounted on said rod for displacement by said ratchet means during movement toward the respective end of said guide bar, spring means adapted to return said lug to its original position to operate said ratchet means when said carrier moves in the opposite direction, said lug and said electromagnetic means being positioned on said guide bar in advance of the point where the stroke of said yarn carrier ends.

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