(No Model.)

C. F. CARR.

CIRCULAR KNITTING MACHINE.

No. 430,268. Patented June 17, 1890.

Fig: 1.

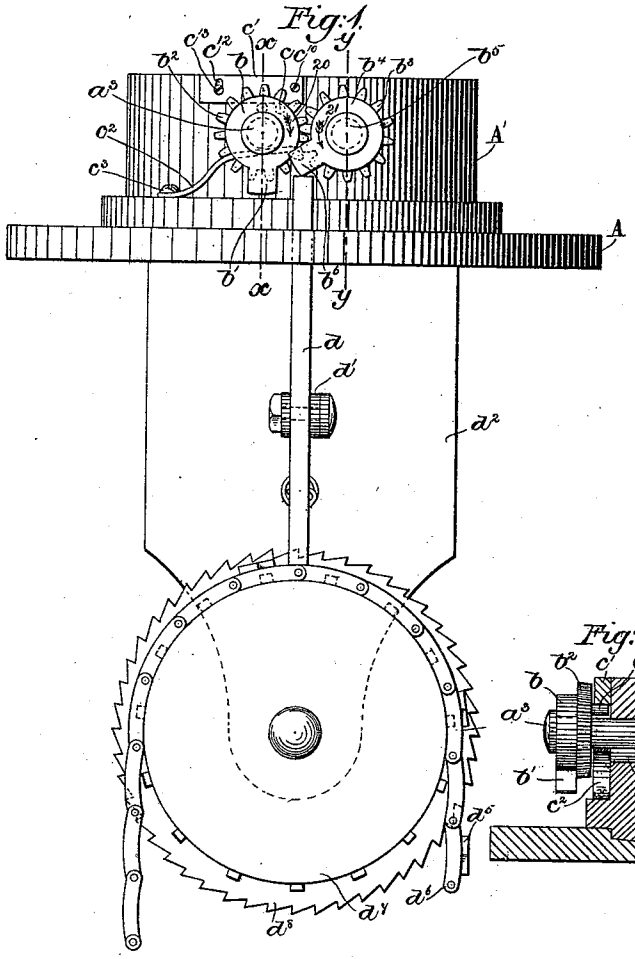


Fig: 2.

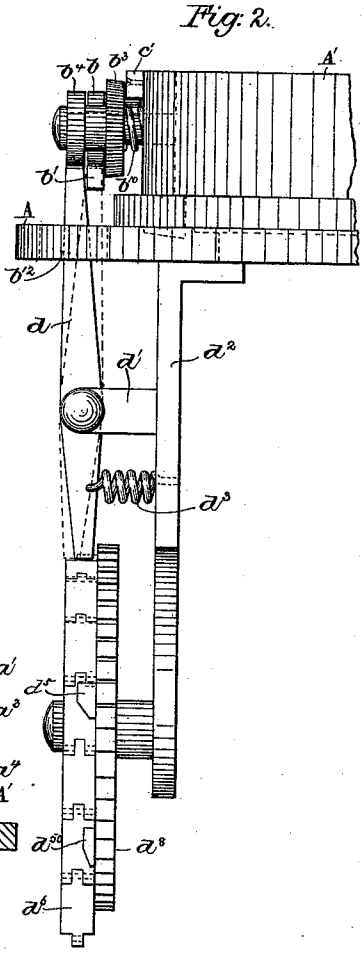


Fig: 3.

Fig: 4.

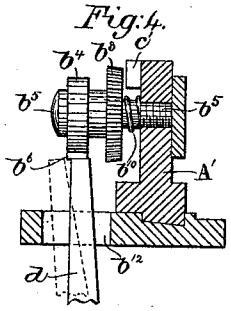


Fig: 5.

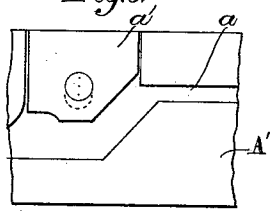
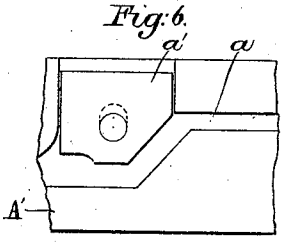


Fig: 6.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES F. CARR, OF LACONIA, NEW HAMPSHIRE, ASSIGNOR TO WARREN D. HUSE, OF SAME PLACE.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 430,268, dated June 17, 1890.

Application filed November 1, 1889. Serial No. 328,887. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. CARR, of Laconia, county of Belknap, State of New Hampshire, have invented an Improvement in Circular-Knitting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to knitting-machines of that class in which one or more sets of needles are employed in the production of circular work, and is an improvement upon the machine shown and described in United States Patent No. 381,963, dated May 1, 1888.

My present invention has for its object to provide mechanism, as will be described, whereby the vertical circular needles may be lowered to produce loose stitches and thereby obtain a slack course in the knitted garment.

My invention therefore consists, essentially, in the combination, with the cam-ring provided with a movable cam, of a hub connected to said cam and provided with a projection, a second hub having a projection, gears to rotate said hubs, a cam located on the outside of the cam-ring to move said hub downward, means to elevate said hub, a lever to engage said projections, and a pattern-surface to operate said lever, substantially as will be described.

Figure 1 is a side elevation of a sufficient portion of a knitting-machine embodying my invention to enable it to be understood; Fig. 2, an elevation of the same looking toward the left; Fig. 3, a sectional detail on the line x x, Fig. 1; Fig. 4, a sectional detail on line y y, Fig. 1; Fig. 5, an interior view of the cam-ring, showing the movable cam in the position occupied by it in the production of regular work; and Fig. 6 an interior view of a portion of the cam-ring, showing the movable cam in its lowest position for the production of slack work.

The bed-plate A and the cam-ring A′ are and may be of any usual or well-known construction. The cam-ring A′ is provided on its inner side with the usual grooves a, in which the butts of the cylinder-needles are extended in usual manner.

The cam-ring A′, in accordance with my invention, is provided with a vertically-movable cam a', having secured to it one end of a stud or screw a^3, (see Fig. 3,) which is extended through a vertical slot a^4 in the cam-ring A′. The stud a^3 on the outside of the cam-ring has loose upon it a hub b, provided with a projection b' on its periphery, the said hub having secured to or forming part of it a gear-wheel b^2, which, as herein shown, meshes with a similar gear-wheel b^3, secured to or forming part of a hub b^4, loose on a stud or pin b^5, the latter being herein shown as screwed into the cam-ring A′. (See Fig. 4.)

The stud b^5, as herein shown, is longer than the stud a^3, and the hub b^4 and its attached gear b^3 are pressed outward against the head of the stud b^5 by a spiral spring b^{10}, and the projection b^6 on the hub b^4 is thus placed out of line with the projection b' on the hub b.

The gear-wheel b^2 on its rear side is provided with a stud or pin c, adapted in the revolution of the said gear-wheel to be brought into engagement with a cam or block c', preferably, pivoted, as at c^{10}, to the cam-ring, and provided with a slot c^{12} through which a set-screw c^{13} is extended to secure said cam or block in its adjusted position to regulate the slack course.

The shaft a^3 is engaged on its under side, as herein shown, by a flat spring c^2, having one end secured, as by screw c^3, to the cam-ring, the said spring normally acting to raise the shaft a^3 and its attached cam a' into their uppermost position. (Shown in Figs. 3 and 5.)

The studs b' b^6 on the hubs b and b^4, respectively, are adapted to be engaged by the end of a pivoted rod or lever d, (herein shown as pivoted to an arm d', secured to or forming part of a bracket d^2, attached to the bed-plate,) the said lever having secured to its shorter arm a spring d^3, which normally acts to turn the lever d on its pivot and move its long arm outward out of the path of movement of the projections b' b^6, the upper end of the said lever being extended through a slot b^{12} in the bed-plate. (See dotted line, Fig. 2.)

The lower end of the lever d is adapted to be acted upon by cams d^5 on a pattern-chain d^6, mounted on a pattern-wheel d^7, having se-

cured to or forming part of it a ratchet-wheel d^8, which may be rotated in any usual or well known manner to produce travel of the pattern-chain.

In operation the machine is producing tight stitches or normal work when the cam a' is in its uppermost position, as shown in Fig. 5, and the said cam occupies the said position when the gear-wheel b^2 has been rotated in the direction of arrow 20, Fig. 1, to remove the pin c from engagement with the under side of the cam c' and allow the spring c^2 to raise upward the stud a^3 and its attached cam a'. As shown in Fig. 1, the pin c is in engagement with the cam c', and the cam a' is moved down into the position shown in Fig. 6, so that in the revolution of the cam-cylinder the vertical cylinder-needles are drawn down a longer distance to effect a longer stitch, and thereby obtain a slack course in the garment. The machine will continue to produce slack courses until in the travel of the pattern-chain a cam d^5 thereon strikes the lower end of the lever d and moves the upper end of the said lever into the path of movement of the projection b', so that on the next revolution of the cam-cylinder the said projection will strike the lever d and the hub b be turned on its stud a^3, rotating the gear b^2 in the direction of arrow 20 and removing the pin c from engagement with the cam c'. As the gear b^2 is thus moved in the direction of arrow 20, the gear b^3 is moved in the direction of arrow 21, to place the projection b^6 in position to be struck by the end of the lever d, when the latter is struck by a second cam d^{50} and moved into line with it, so as to act thereon, the cam d^{50} being narrower than the cam d^5. After the cam on the pattern-chain has acted upon the lower end of the lever d the lower end of the said lever is drawn in by the spring d^3, so as to throw the upper end of the said lever outside of or beyond the circular path of movement of the outside projection b^6, as shown by dotted lines, Fig. 4. After the cam a' has been restored to its normal position (shown in Fig. 5) the machine will continue to knit tight or regular work until in the further rotation or travel of the pattern-chain a second cam d^{50} acts upon the lever d and moves it into the path of movement of the projection b^6, so that on the next revolution of the cam-cylinder the projection b^6 is struck by the lever d, and the hub b^4 and its attached gear b^3 are moved in the direction opposite to that indicated by the arrow 21, and the gear b^2 and its attached hub b moved in the opposite direction to that indicated by arrow 20, thus bringing the pin c into engagement with the cam c' and depressing or lowering the cam a' into the position shown in Fig. 6 to produce a slack course.

I claim—

1. In a circular-knitting machine, the combination, with the cam-ring provided with a movable cam, of a hub connected to said cam and provided with a projection, a second hub having a projection, gears to rotate said hubs, a pin or stud on one of said gears, a cam located on the outside of the cam-ring to engage said pin and move its hub downward, means to elevate said hub, a lever to engage said projections, and a pattern-surface to operate said lever, substantially as described.

2. In a circular-knitting machine, the combination, with the cam-ring and a movable cam a', carried thereby, of a stud secured to said cam, a hub provided with a projection mounted on said stud, a gear on said hub, a cam c', and a pin c on said gear to engage said cam c', and a spring to lift said stud, a gear on a second stud secured to the cam-ring, a hub on said second gear provided with a projection, a lever, and a pattern-surface to act on said lever, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES F. CARR.

Witnesses:
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A. C. LEAVITT.