Jan. 13, 1959 L. FERRAGUTI 2,868,002

CONTROL DEVICE FOR CIRCULAR KNITTING MACHINES

Filed June 19, 1956 2 Sheets-Sheet 1

Fig.1

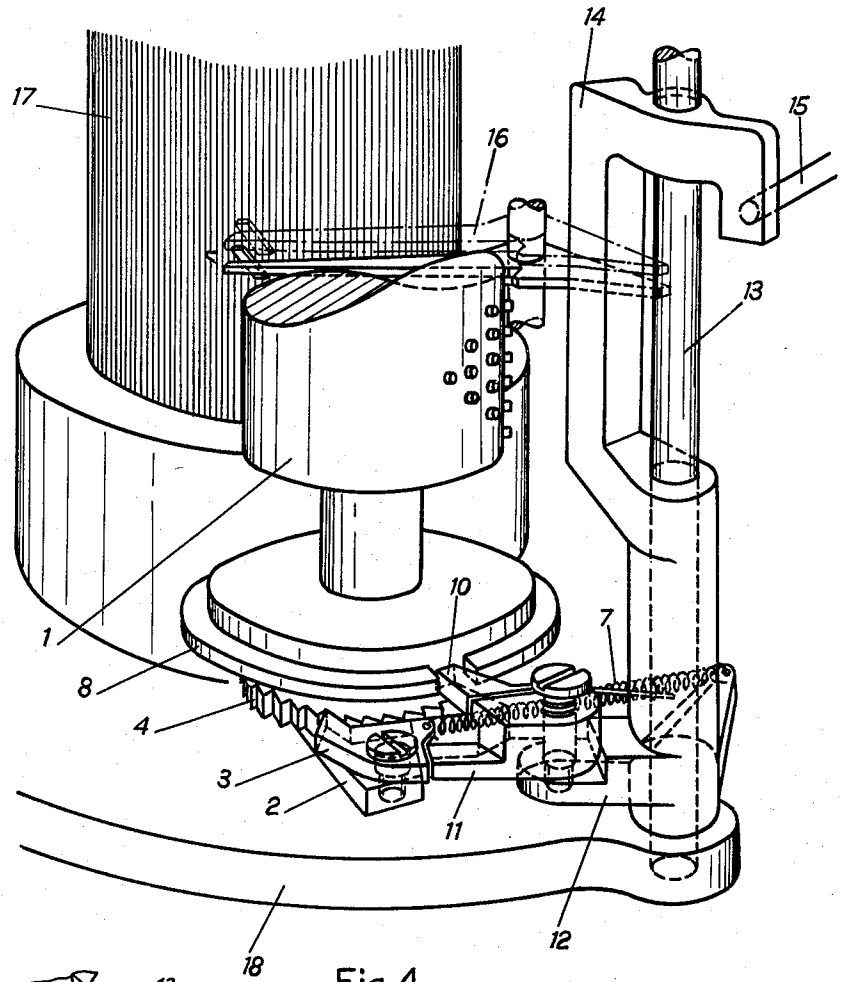
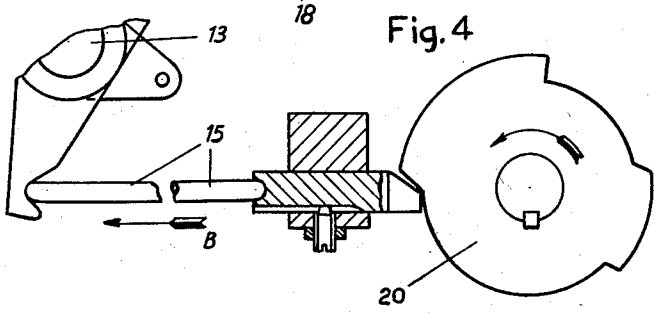



Fig.4

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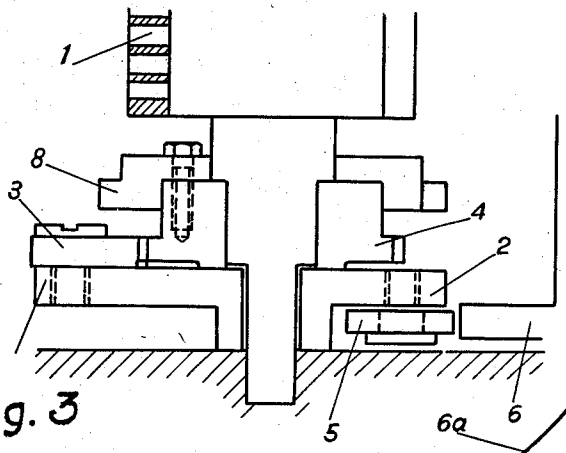
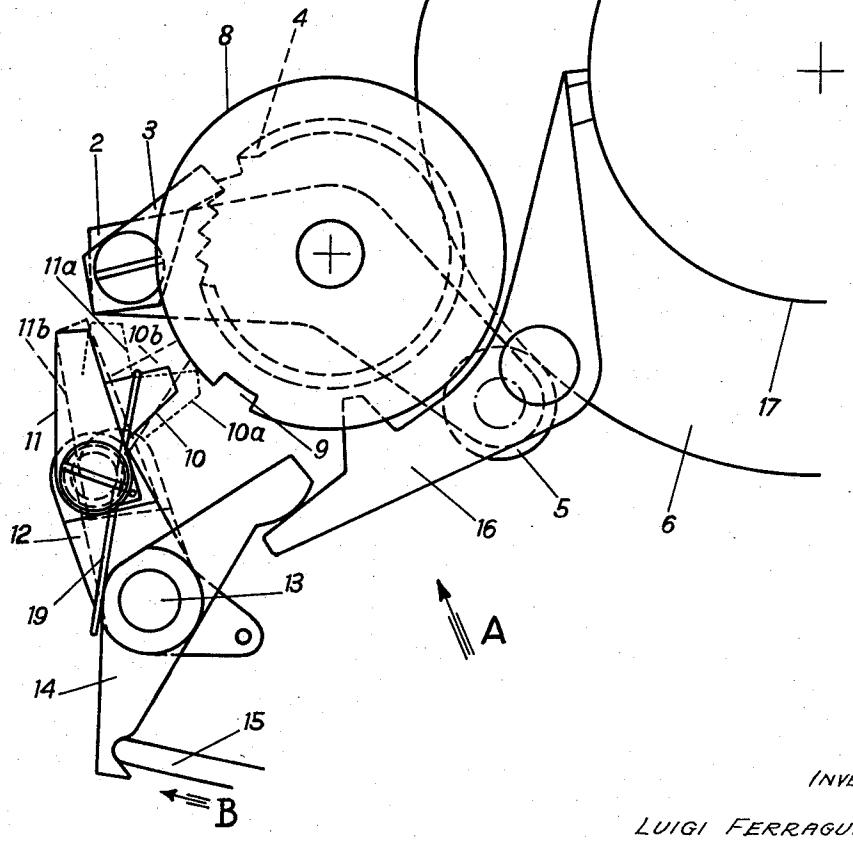



Fig. 3

Fig. 2

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# CONTROL DEVICE FOR CIRCULAR KNITTING MACHINES

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4 Claims. (Cl. 66—14)

In circular knitting machines, particularly in circular knitting machines for stockings with Jacquard patterns or of straight and reverse loops, the so-called "links," it is necessary to be able to stop and bring back to its initial position the patterning drum while at the same time lifting the patterning levers. In known machines there are provided to this end three control devices: one for lifting the levers, one for stopping the drum and one for returning the drum to its initial position.

The present invention has for its object a device which allows these three operations to be performed by a single control.

The device according to the invention is essentially characterized by a control member set in action by the main drive of the machine and capable of performing two active strokes of different length. By the shorter stroke the control member, through a lever system, causes the lifting of the patterning levers and the locking of the ratchet gear which operates the pattern drum, so that the drum stops. By the second and longer stroke the control member, through the same lever system, causes a further lifting of the levers and the temporary release of the ratchet gear, whereupon the drum will rotate idle, stopping at a predetermined point, that is when the drum returns to its initial position.

An embodiment of the control device according to the invention is shown by way of example on the accompanying drawing in which:

Figure 1 is a perspective view of the device;

Figure 2 is a plan view of the device;

Figure 3 is an elevation of the bottom portion of the device viewed in the direction of the arrow A of Figure 2; and

Figure 4 is a view of the operator for the control member.

The rotation of the patterning drum 1 is controlled by a lever 2, which carries at one end a pawl 3 adapted to engage with a ratchet wheel 4 coaxial to and rotatable with the drum 1. The other end of the lever 2 carries a roller 5, designed to roll on a cam 6 set in rotation by the main drive of the machine. When the depression 6*a* of the cam comes to face the roller 5 during the rotation of the cam 6, the roller, under the action of a return spring 7, which is attached at one end to the pawl 3, and at the other to an arm of the lever 12, follows the said depression, this resulting in the oscillation of the lever 2, which releases the pawl 3 from the tooth of the wheel 4 with which it was previously engaged, and causes it to fall behind the following tooth.

The cam 6, continuing its rotation, raises then the roller 5; the lever 2 oscillates in an opposite direction and the pawl 3 causes the ratchet wheel 4, and consequently the drum 1, to advance by a step.

A disc 8, coaxial and fixed to the ratchet wheel 4, has a notch 9 into which can engage a tooth 10 carried by an arm 11. The arm 11 is pivotably mounted on a lever



12 pivotable on a shaft 13 and secured to another lever 14 pivotable on the same shaft and acted upon by a control tappet 15. The lever 14 is adapted to act with one end on the usual patterning levers 16 cooperating with the drum 1.

In Figure 4 it may be seen that tappet 15 is actuated by the cam 20, which is a part of the main drum for controlling the pattern. This cam has two portions in relief. The first and lower portion determines the stopping of the patterning drum and happens to correspond to the portion at which the machine works the heel of the stocking.

Diagrammatically shown in the figures are also the needle cylinder at 17, and at 18, a part of the frame of the machine.

The control device operates as follows:

In its normal operation, the lever 2 with the pawl 3 causes, through the action of the cam 6, the stepwise rotation of the ratchet wheel 4 and hence of the drum 1. The oscillatory arm 11 mounted on the lever 12 is held thereon, by a spring 19, in such a position as to prevent it interfering with the movements of the pawl 3, and in which the tooth 10 of the said arm lies some millimeters apart from the disc 8.

When it is desired to stop the drum 1, the control tappet 15 is caused to advance a certain length in the direction of the arrow B in Figure 2, which results in an oscillation of the lever 14 and also of the lever 12 connected therewith. The lever 14 lifts the patterning levers 16 from the drum 1 while the lever 12 swings the arm 11, wihch latter takes thereupon place behind the pawl 3 so as to prevent an oscillation of the lever 2, and thereby stopping the drum. In this position of the arm 11, shown by a dash line at 11*a* in Figure 2, the tooth 10 of the arm 11 lies in the position 10*a*, in which the point of the tooth is in contact with the periphery of the disc 8.

To bring the drum 1 back to a predetermined initial position, the tappet 15 makes a longer control stroke. As a result, the levers 16 are further moved apart from the drum 1, while because of the further oscillation of the lever 12 (fixed to the lever 14), the tooth 10 travels to the position indicated at 10*b*, where it rests flatwise on the periphery of the disc 8, thus swinging the arm 11, against the tension of the spring 19, outwardly to the position 11*b*, in which this arm does not prevent the operation of the ratchet gear 3—4. Thus the lever 2 can oscillate by action of the cam 6 causing the drum 1 to rotate idly till the notch 9 arrives opposite to the tooth 10, which snaps into it taking the arm 11 behind the pawl 3 and thus stopping the rotation of the drum 1 in a position corresponding to its initial position.

On the return of the tappet 15 to the inactive position, the two levers 12 and 14, by action of the spring 7, return to the position of normal operation, thus permitting the beginning of a new working cycle.

As is known, as long as the machine works the heel, the pattern must stand still, again to set out when the machine takes to work the foot.

The second and higher portion determines the stopping of the patterning drum only when this has returned to zero, that is to say when it has returned to the initial position, for the patterning. This happens at the end portion of the foot, while the machine works the point of the stocking.

With the device of the invention it is thus possible, by the selective operation of a single member, i. e. the tappet 15, to perform the three desired operations, namely: the lifting of the patterning levers 16, the stopping of the patterning drum 1 and the returning of the drum to its initial position.

What I claim is:

1. In a circular knitting machine, a patterning drum, patterning levers operated by said drum, a ratchet gear driving said drum and operated by the main drive of the knitting machine, a control member operated by the main drive of the knitting machine and adapted to execute two active strokes of different lengths, a lever system operated by said control member and adapted, when operated by the shorter stroke of said control member, to lift said patterning levers and to stop said ratchet gear and, consequently, said drum, and adapted, when operated by the longer stroke of said control member, to further lift said patterning levers and to temporarily release said ratchet gear, causing said patterning drum to rotate idly to its initial position.

2. In a circular knitting machine, a patterning drum, patterning levers operated by said drum, a ratchet gear driving said drum and operated by the main drive of the knitting machine, a control tappet operated by the main drive of the knitting machine and adapted to execute two active strokes of different lengths, a lever system operated by said tappet and adapted, when operated by the shorter stroke of said tappet, to lift said patterning levers and to stop said ratchet gear and, consequently, said drum, and adapted, when operated by the longer stroke of said tappet, to further lift said patterning levers and to temporarily release said ratchet gear, causing said drum to rotate idly to its initial position, said lever system comprising a first lever acting on said patterning levers and a second lever secured to and pivotable with said first lever, said second lever carrying a stop member adapted, in consequence of the shorter stroke of said tappet, to enter the oscillation path of the pawl of said ratchet gear, thereby stopping said drum, and adapted, in consequence of the longer stroke of said tappet, to leave temporarily said path and to return to the stopping position upon arrival of said drum at the initial position.

3. In a circular knitting machine, a patterning drum, patterning levers operated by said drum, a ratchet gear driving said drum and operated by the main drive of the knitting machine, a disc coaxial to and integral in rotation with said drum, a notch formed in said disc, a control tappet operated by the main drive of the knitting machine and adapted to execute two active strokes of different lengths, a lever system operated by said tappet and adapted, when operated by the shorter stroke of said tappet, to lift said patterning levers and to stop said ratchet gear and, consequently, said drum, and adapted, when operated by the longer stroke of said tappet, to further lift said patterning levers and to temporarily release said ratchet gear, causing said drum to rotate idly to its initial position, said lever system comprising a first lever acting on said patterning levers and a second lever secured to and pivotable with said first lever, said second lever carrying a pivotable arm provided with a tooth, a spring acting on said pivotable arm, said arm being adapted, in consequence of the shorter stroke of said tappet, to enter the oscillation path of the pawl of said ratchet gear, thereby stopping said drum, and adapted, in consequence of the longer stroke of said tappet, to leave temporarily said path and to return to the stopping position upon arrival of said drum at the initial position, said tooth on said arm snapping in said notch of said disc, by action of said spring.



4. In a circular knitting machine, a patterning drum, patterning levers operated by said drum, a ratchet gear driving said drum and operated by the main drive of the knitting machine, a disc coaxial to and integral in rotation with said drum, a notch formed in said disc, a control tappet operated by the main drive of the knitting machine and adapted to execute two active strokes of different lengths, a lever system operated by said tappet and adapted, when operated by the shorter stroke of said tappet, to lift said patterning levers and to stop said ratchet gear and, consequently, said drum, and adapted, when operated by the longer stroke of said tappet, to further lift said patterning levers and to temporarily release said ratchet gear, causing said drum to rotate idly to its initial position, said lever system comprising a first lever acting on said patterning levers and a second lever secured to and pivotable with said first lever, said second lever carrying a stop member adapted, in consequence of the shorter stroke of said tappet, to enter the oscillation path of the pawl of said ratchet gear, thereby stopping said drum, and adapted, in consequence of the longer stroke of said tappet, to leave temporarily said path and to return to the stopping position upon arrival of said drum at the initial position, a spring fixed at one end to the pawl of said ratchet gear and, at the other end, to an arm of said second lever, said spring acting as a return spring for said pawl and said levers of said lever system on the return of said tappet to the inactive position.

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