

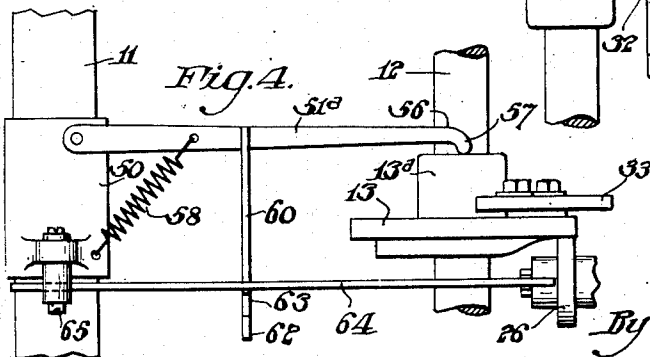
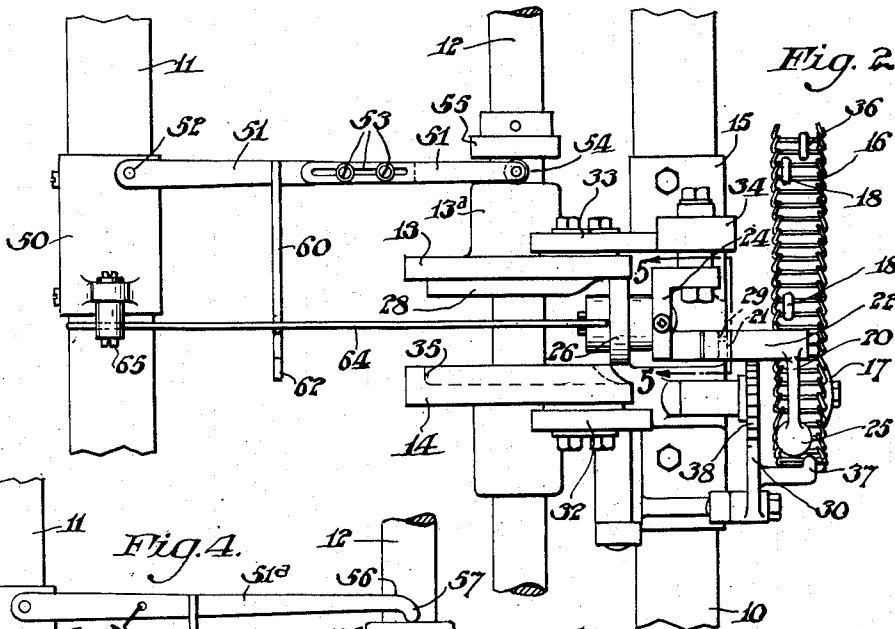
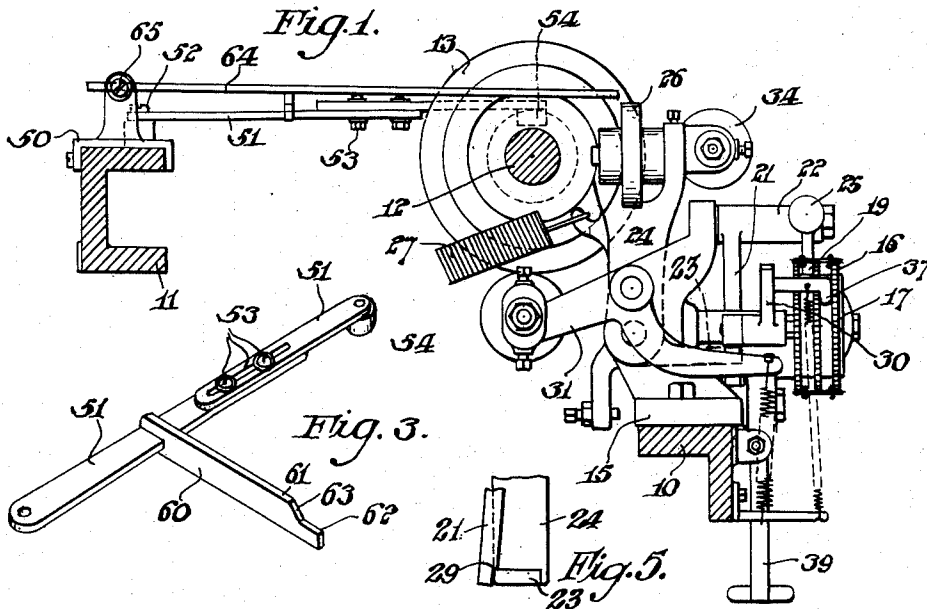
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ATTACHMENT FOR KNITTING MACHINES

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ATTACHMENT FOR KNITTING MACHINES

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9 Claims. (Cl. 66—89)

This invention relates to attachments for full fashioned knitting machines and more particularly to a safety attachment which may be applied to flat knitting machines now in use or hereafter constructed for increasing the effectiveness of the machines by reducing breakdowns.

In practically all the flat knitting machines now in use, difficulties are encountered with the chain motion which controls the narrowing operation on the knitting machine. When the long part of a stocking is finished to the place where it must be decreased in width so as to correspond with the narrowing of the leg toward the ankle, the narrowing mechanism of the knitting machine must be brought into action and narrowing and knitting must set in alternately and at proper intervals to give the leg the desired shape. A chain motion is employed for accomplishing this automatically but if, for any reason, the narrowing mechanism is operated twice in succession, and so that there is no knitting operation interposed between the narrowing operations, injury to the needles or to the narrowing points or both will occur and the fabric which is being knitted is either damaged or spoiled.

It is an object therefore of the present invention to provide an attachment for knitting machines which will prevent successive narrowing or picoting operations unless and until a course of knitting has been interposed therebetween.

It is a further object of the present invention to provide an attachment for knitting machines which will effectively reduce the likelihood of injury to the needles of the knitting machine.

It is a further object of the present invention to provide an attachment for knitting machines which will reduce the likelihood of damage or injury to the fabric being knitted and thus increase the yield of fabric free from spoils or seconds.

Other objects of the invention will appear from the annexed specification and claims.

The nature and characteristic features of the invention will be more readily understood from the following description, taken in connection with the accompanying drawing forming part hereof, in which:

Figure 1 is a fragmentary vertical sectional view of a portion of a knitting machine with the attachment of the present invention applied thereto;

Fig. 2 is a fragmentary plan view of the apparatus shown in Fig. 1;

Fig. 3 is an elevational view of a control arm forming part of the attachment illustrated in Figs. 1 and 2; and

Fig. 4 is a fragmentary plan view of a knitting machine showing a modified form of the attachment; and

Fig. 5 is a fragmentary sectional view on the line 5—5 of Fig. 2.

It will, of course, be understood that the description and drawing herein contained are illustrative merely, and that various modifications and changes may be made in the structure disclosed without departing from the spirit of the invention.

Referring more particularly to the drawing, the safety attachment of the present invention is there illustrated in connection with a machine of the Reading type, although, it will, of course, be evident that the attachment of the present invention may be used on other types of flat knitting machines where the same or a similar character of control of the loop transfer operations such as narrowing or picoting is employed, and changes may be made for this purpose.

The front beam of the knitting machine is shown at 10 and the back beam at 11. The cam shaft of the machine at 12 has mounted thereon cams 13 and 14 for effecting a lateral or longitudinal shifting of the cam shaft 12 in the customary manner, in one direction and to the right as illustrated in knitting cams (not shown) are moved out of action and the narrowing or picoting cams (not shown) are moved into action, and upon lateral or longitudinal shifting of the cam shaft 12 to its initial position, the narrowing or picoting cams are moved out of action and the knitting cams moved into action. This movement of the cam shaft 12 is effected by the chain motion 15 which may be of any well known type. The chain motion 15 is preferably carried by the front rail 10.

The chain motion 15 as illustrated preferably includes a pattern chain 16 for determining the particular and separated courses in which a narrowing or picoting operation is to take place as heretofore indicated by laterally shifting the position of the cam shaft 12. The pattern chain 16 is mounted on a chain sprocket 17.

A pin or button 18 is provided on the pattern chain 16 where a narrowing operation is desired and in the form of chain motion mechanism illustrated this button 18 contacts a projection 19 on a lever 20 to lift the lever 20 and thereby swing an arm 21 of a bell crank 22. The pins or buttons 18 are removable for shifting to the desired position on the chain 16. The bell crank 22 has its arm 21 which is constantly pressed against a lateral projection 23 of a lever 24 by its arm 20

which is weighted as at 25, and a locking device is provided which is intended to prevent the lever 24 from being shifted to move the cam shaft 12 except as desired.

Upon movement of the lever 24, a stud shaft roller or shogging truck 26 carried thereon is permitted to move and is moved by a spring 27 connected thereto to a position such that it contacts the lateral projection 28 of the cam 13. The contact of the roller 26 with the projection 28 of the cam 13 forces the cam 13 and the cam shaft 12 to the right for bringing the narrowing or picoting mechanism into action.

The locking device includes a small shoulder at 29 on the arm 21 which engages the lateral projection 23 on the lever 24 and is intended to prevent the lever 24 from being shifted to move the cam shaft 12 until the lever 24 is released by the chain motion. The release is effected through a ratchet pawl 30 which is operated through a lever 31 and a supplementary cam 32 on the cam 14 and works in the ratchet of the chain sprocket 17 so as to cause the chain sprocket to rotate the space of one tooth for each revolution of the cam shaft 12.

When one of the buttons 18 comes under the projection 19 of the lever 20, it will lift this lever 20 thereby swinging the lever and releasing the projection 29 and the lever 24.

During the revolution where the locking device is in action the pawl 30 has moved the sprocket 17 the space of one tooth thus moving the button 18 from its position beneath the projection 19.

After the narrowing operation has taken place, the supplementary cam 33 which is secured to the cam 13 moves against the stud shaft roller 34, pushes the roller 34 back and moves the arm 24 and the roller 26 so that the roller 26 is brought to a position so that it may engage with the lateral projection 35 of the cam 14 and operate to shift the cam shaft 12 back to its original position.

Upon the engagement of the lever 21 with the lateral projection 29 and if the engagement is effective the lever 24 is held in position until released by the next button 18 brought under the projection 19. The chain 16 may also be provided with a number of high buttons 36 which contact with a projection 37 of the ratchet pawl 30 to disengage the ratchet 38 of the sprocket wheel 17 and consequently stop the travel of the chain 16. The narrowing is thus intended to be stopped automatically without requiring the attention of the knitter. When it becomes necessary to start it again, the operator may, by actuation of a manually operable lever 39, cause a ratchet pawl (not shown) to engage the teeth of the ratchet wheel 38 of the chain sprocket 17 to rotate the latter for the space of one tooth and remove the high button 36 from beneath the projection 37 and bring the pawl 30 into operation again.

The foregoing structure represents and is typical of the chain motions with which difficulty has been encountered and which is overcome by the attachment hereinafter described.

The safety attachment of the present invention preferably includes a base or frame member 50 which is adapted to be secured, in any desired manner, to the back beam 11 of the knitting machine. The frame member 50 permits the installation of the attachment on knitting machines which are now in use.

The frame member 50 has a lever arm 51, 75

thereon, pivotally mounted as at 52, and the length of the lever arm 51 is preferably made adjustable, such as by a suitable bolt and slot connection 53 between the constituent portions of the lever arm 51. The end portion of the lever arm 51 is preferably provided with a roller 54 on the end thereof for engagement with the end face of the boss 13^a of the cam 13. A collar 55 is preferably mounted on the shaft 12 to insure a positive actuation of the lever arm 51 in accordance with the positioning of the cam shaft 12.

In the modified form of lever arm 51^a shown in Fig. 4 the end portion 56 of the arm 51^a is shaped as at 57 for contact with the end face of the boss 13^a, and a spring 58 connected to the lever arm 51^a and to the frame member 50 is provided for holding the end portion 57 of the lever 51^a in contact with the end face of the boss 13^a.

The lever arm 51 has secured thereto for movement therewith a control arm 60 which has a high portion 61, a low portion 62 and an inclined connecting portion 63 therebetween for purposes hereinafter referred to.

The frame member 50 also has pivotally mounted thereon for vertical movement a control rod 64, the mounting preferably including a bolt 65 so that the rod 64 may be adjusted with the forward end thereof at the desired position with respect to the roller 26.

The control rod 64 extends forwardly between the cams 13 and 14 for engagement as hereinafter more fully referred to with the rear face of the stud shaft roller 26. The control rod 64 rests on and is in engagement with the control arm 60 and is raised or lowered by the control arm 60 in accordance with the positioning of the lever 51.

When the stud shaft roller 26 has been brought into contact with the cam 13 by one of the buttons 18 on the chain 16, the cam shaft 12 is moved to the right and in so doing, the hub 13^a of the cam 13 is likewise moved to the right and carries with it the lever 51 and the control arm 60 mounted thereon provides a controlled support for the control rod 64. As the control arm 60 moves to the right the high portion 61 moves to a position so that it does not support the control rod 64 but the control rod 64 may rest upon the stud shaft roller 26. As the cam shaft 12 revolves, the cam member 33 is brought to a position so that it engages the roller 34 to move the lever 24 and the roller 26 thereon outwardly. As the roller 26 moves outwardly the control rod 64 will no longer be supported upon the roller 26 and will drop behind the roller 26. The control rod 64 upon dropping will be supported by the low portion 62 of the control arm 60. This occurs in the interval before the roller 26 has engaged the projection 35 on the left hand cam 14 and before the roller 26 by such engagement has returned the cam shaft 12 to its initial position. The control rod 64 is then effective to hold the roller 26 in its forward position, in spite of any failure of the latching mechanism to hold the lever 24 in its forward position. The roller 26 is thus positively held in a position to contact the projection 35 on the cam 14 and return the shaft 12 to its initial position. Upon the return of the shaft 12 to its initial position another knitting operation will take place before the roller 26 can again move inwardly to bring about another narrowing operation.

Upon the return of the cam shaft 12 the lever

arm 60 under the control of the movement of the cam shaft 12 returns to its initial position so that the rod 64 is raised out of contact with the stud shaft roller 26 by the inclined portion 63 of the control arm 60 and held out of position by the high portion 61 of the control arm 60 until another narrowing operation is brought about. The projection 28 will cover a portion of its travel after the return of the shaft 12 to its initial position support the roller 26.

It will be seen that even if, for some reason, there is a tendency for a narrowing or picoting operation to follow immediately after another narrowing or picoting operation this will be prevented by the attachment herein described.

I claim:

1. In a knitting machine having mechanism for controlling the loop transfer operations, said mechanism including a rotatable and longitudinally shiftable shaft having a cam mounted thereon and a member adapted to engage said cam to shift said cam shaft longitudinally, the combination therewith of auxiliary means actuated by the longitudinal movement of said shaft for preventing the longitudinal actuation of said shaft in the next succeeding revolution thereof.

2. In a knitting machine having mechanism for controlling the loop transfer operations, said mechanism including a rotatable and longitudinally shiftable shaft having a cam mounted thereon and a member adapted to engage said cam to shift said cam shaft longitudinally, the combination therewith of means for preventing the longitudinal actuation of said shaft in the next succeeding revolution thereof, said means including a holding member for holding said engaging member out of contact with said cam, and a control device for said holding member directly actuated by the longitudinal movement of said shaft.

3. In a knitting machine having mechanism for controlling the loop transfer operations, said mechanism including a rotatable and longitudinally shiftable shaft having a cam mounted thereon and a member adapted to engage said cam to shift said cam shaft longitudinally, the combination therewith of means for preventing the longitudinal actuation of said shaft in the next succeeding revolution thereof, said means including a movable member for alternatively holding said engaging member out of contact with said cam and permitting engagement of said engaging member with said cam, and a control device for controlling the movement of said movable member, said control device being directly actuated by the longitudinal movement of the shaft.

4. In a knitting machine having mechanism for controlling the loop transfer operations, said mechanism including a rotatable and longitudinally shiftable shaft having a cam mounted thereon and a member adapted to engage said cam to shift said cam shaft longitudinally, the combination therewith of means for preventing the longitudinal actuation of said shaft in the next succeeding revolution thereof, said means including a member movable into and out of engagement with said engaging member for holding said engaging member out of contact with said cam, and a control device for controlling the movement of said movable member, said control device including a portion movable with said cam shaft in its longitudinal movement.

5. In a knitting machine having mechanism

for controlling the loop transfer operations, said mechanism including a rotatable and longitudinally shiftable shaft having a cam mounted thereon and a member adapted to engage said cam to shift said cam shaft longitudinally, the combination therewith of means for preventing the longitudinal actuation of said shaft in the next succeeding revolution thereof, said means including a member movable for engagement with said engaging member for holding said cam engaging member out of contact with said cam, and a device for controlling the movement of said movable member including a positioning device operated by the longitudinal axial movement of said cam shaft.

6. In a knitting machine having mechanism for controlling the loop transfer operations, said mechanism including a rotatable and longitudinally shiftable shaft having a cam mounted thereon and a member adapted to engage said cam to shift said cam shaft longitudinally, the combination therewith of means for preventing the longitudinal actuation of said shaft in the next succeeding revolution thereof, said means including a member movable into and out of engagement with said cam engaging member for holding said cam engaging member out of contact with said cam, and a device for controlling the movement of said movable member, said control device having a portion movable with said cam shaft in its longitudinal movement, and a positioning device for said movable member actuated by the movement of said movable portion.

7. In a knitting machine having mechanism for controlling the loop transfer operations, said mechanism including a rotatable and longitudinally shiftable shaft having a cam mounted thereon and a member adapted to engage said cam to shift said cam shaft longitudinally, the combination therewith of means for preventing the longitudinal actuation of said shaft in the next succeeding revolution thereof, said means including a control lever operable by said shaft upon longitudinal movement of said shaft, a control arm connected to said lever, and a control rod, said control arm having portions for supporting said control rod at predetermined positions with respect to said engaging member in accordance with the positioning of said control arm.

8. In a knitting machine having mechanism for controlling the loop transfer operations, said mechanism including a rotatable and longitudinally shiftable shaft having a cam mounted thereon and a member adapted to engage said cam to shift said cam shaft longitudinally, the combination therewith of means for preventing the longitudinal actuation of said shaft in the next succeeding revolution thereof, said means including a control lever operable by longitudinal movement of said shaft, a control arm connected to said lever, and a control rod movable by said control arm to a plurality of positions, said rod in one of said positions being in engagement with said cam engaging member for preventing the engagement of said member with said cam and in another of said positions being held out of engagement with said cam engaging member.

9. In a knitting machine having mechanism for controlling the loop transfer operations, said mechanism including a rotatable and longitudinally shiftable shaft having a cam mounted thereon and a member adapted to engage said cam to shift said cam shaft longitudinally, the combina-

tion therewith of means for preventing the longitudinal actuation of said shaft in the next succeeding revolution thereof, said means including a control lever operable by longitudinal movement of said shaft, a control arm connected to said lever, and a control rod, said control arm having portions for supporting said control rod at predetermined positions with respect to said cam

engaging member in accordance with the position of said control arm, said rod in one position being in engagement with said cam engaging member for preventing the engagement of said member with said cam and in another position being held out of engagement with said cam engaging member.

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