No. 891,809. PATENTED JUNE 30, 1908.

G. L. BALLARD.

CAM ADJUSTING MECHANISM FOR KNITTING MACHINES.

APPLICATION FILED JUNE 4, 1907.

2 SHEETS—SHEET 1.

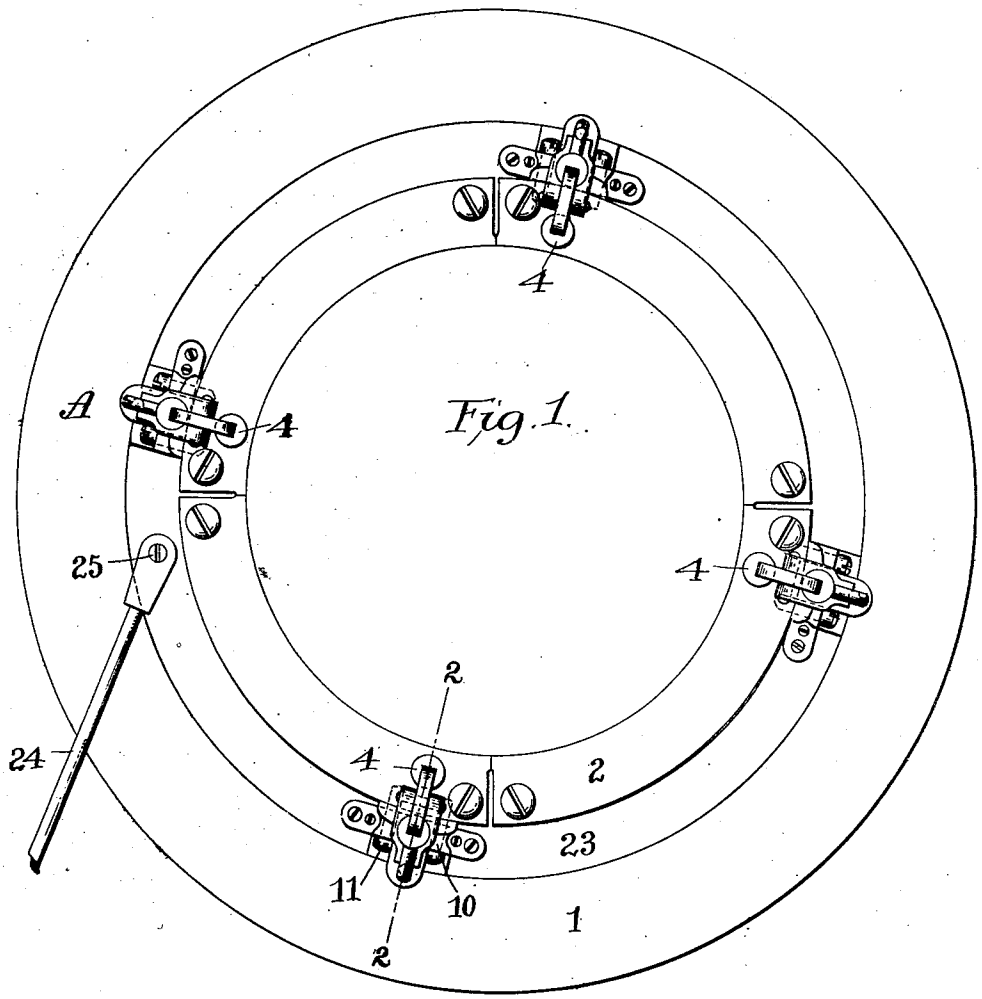


Fig. 1.

Fig. 4.

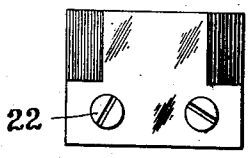
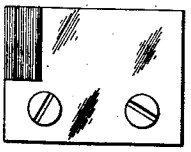


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 2.

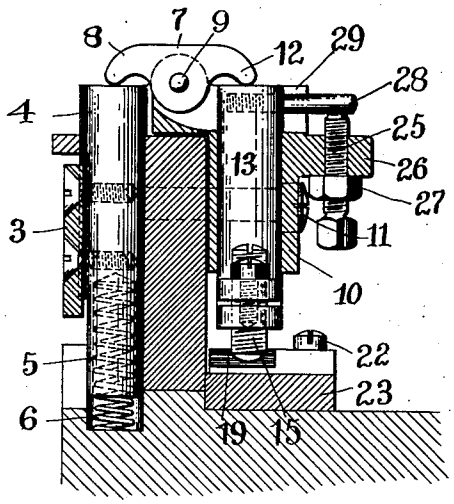
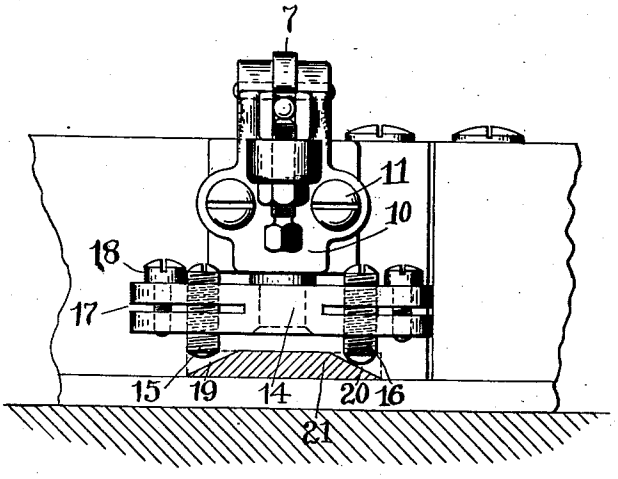


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CAM-ADJUSTING MECHANISM FOR KNITTING-MACHINES.

No. 891,809. Specification of Letters Patent. Patented June 30, 1908.

Application filed June 4, 1907. Serial No. 377,221.

To all whom it may concern:

Be it known that I, GEORGE L. BALLARD, a citizen of the United States, residing at Norristown, Pennsylvania, have invented certain new and useful Improvements in Cam-Adjusting Mechanism for Knitting-Machines, of which the following is a specification.

My invention relates to knitting machines and my object is to provide an attachment which may be applied to existing machines for operating the needle or stitch cams thereof and to produce different effects in the fabric.

By the use of my invention the manufacturer can build one line of machines which may be sent out to meet the requirements of one class of trade, and for supplying the demands of another class of trade, it will be simply necessary for him to apply my attachment to what may be termed this standard line of machines.

I have shown my invention applied to a knitting machine of the circular type and also as applied to the cam ring or cylinder of such machine, though it will be understood that I do not limit myself in this respect as the fundamental principle of my invention may be embodied in other ways and with other forms of machines than the one illustrated.

The invention consists in the features, combination and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the accompanying drawings,—Figure 1 is a plan view of the cam ring which as ordinarily carries the cams for the cylinder needles, my attachment being shown in place in connection with the said cam ring. Fig. 2 is a sectional view on the line 2—2 of Fig. 1. Fig. 3 is a front view of the attachment in place upon the cam ring. Fig. 4 represents in detail one of the cams as shown in Fig. 3. Fig. 5 is a plan view of one of the interchangeable cams adapted for use in connection with the attachment as shown at A Fig. 1.

In these drawings, 1, indicates the ring of a knitting head and 2 the cam ring supported thereon. This cam ring carries the cams for the cylinder needles, one of which is indicated at 3 in Fig. 2. This cam is carried by a post 4 which is normally pressed upwardly by a spring 5 arranged in a socket or recess in the lower end of the post and bearing at its lower end in a socket 6 in the main ring 1. The upper end of the post projects above the upper face of the cam ring and by means of this post the position of the cam vertically may be determined. In ordinary practice, a screw is employed having its screw threaded stem threaded into the upper face of the cam ring and having its head overlying the upper end of the post so that by turning the screw the post may be adjusted vertically. This form of machine is well known and needs no further description.

In carrying out my invention I apply an attachment whereby the post 4 may be adjusted automatically for different knitting effects.

My attachment comprises a lever or rocker piece 7 having its inner arm 8 rounded and bearing upon the upper end of the post 4, the said rocker piece being pivoted at 9 to the bracket 10 of my attachment, which bracket is secured by screws 11 to the side face of the cam ring. The outer arm 12 of the lever or rocker piece is also rounded and is borne upon by the upper end of a movable post 13 which is guided in an opening in the bracket 10 outside of the cam ring.

The bracket, it will be noticed, partly overlies the upper face of the cam ring to furnish a support for the rocker or lever 7, but its main portion depends along the outer face of the cam ring.

The lower end of the post 13 is provided with an arm 14 firmly secured thereto and extending laterally therefrom. This arm extends laterally in both directions, as shown in Fig. 3, and it is provided with contact points or pins consisting in the present instance of the screws 15—16, threaded through the said lateral extensions of the arm 14 and projecting below the same. These screws may be adjusted vertically through the arms and for holding them in adjusted position the said arms are split at 17, the said split portions being drawn together by screws 18 so that the adjustable pins or contact points 15—16 will be securely clamped in the positions to which they are adjusted.

The contact points 15—16 extend down into the path of inclines 19—20 formed on the cam blocks or plates 21, which blocks or plates are secured by screws 22 to the ring 23

encircling the cam cylinder and resting upon the ring 1 of the knitting head. This ring is adapted to be adjusted circumferentially through any suitable connections leading to the pattern mechanism, and I have indicated at 24 a representative form of such connection, this consisting of a link pivoted at 25 to the ring.

When now the ring 23 is moved in one direction it will cause the incline 19—20, as the case may be, of the cam 21 to engage the contact point or pin respectively 15 or 16 with which said incline is adapted to coöperate and this will raise the post 13 vertically through the bracket 10, thus causing the tilting of the rocker or lever 7 on its pivot and forcing downwardly the post 4 with the stitch cam 3 thereon to the predetermined position for securing the desired knitting effect in the fabric.

When the ring 23 is moved circumferentially in the opposite direction to its first position the spring 5 will exert its force, elevate the post 4 and raise the stitch cam to its former position for at this time the cam 21 will have been moved to the point to withdraw its incline from contact with the pin or screw 15 or 16 as the case may be.

The upward movement or the upper position of the post 4 and the stitch cam 3 is determined by an adjustable stop screw 25 passing through a lug 26 on the bracket of the attachment and being set in any position to which it is adjusted by a set nut 27. This stop screw is engaged by a pin 28 extending laterally from the post 13 into which it is screwed, the said pin passing through a notch or slot 29 in the bracket by the walls of which it is guided and by which construction the cylindrical post 13 is held against circumferential movement so that the relation of the horizontal arm 14 and the contact points or screws 15—16 will be maintained in relation to the operating cam 21.

It will be observed from Fig. 3 that the contact screws 15—16 may be adjusted to different elevations in relation to their coöperating inclines on the cam and thus a different adjustment of the needle cam will be secured when the cam carrying ring 23 is moved in one direction from that when the said ring is moved in the opposite direction, and furthermore, it will be understood that the cam inclines may be of different form and that the cam plates or blocks themselves may be removed and interchanged with blocks or cams of different form, so that a variety of different knitting effects may be secured by proper adjustment of the parts and by the use of proper cams. For instance, a slack welt may be produced by an adjustment derived through the operation of the incline 19 against the contact screw 15, while a loose course will be produced by the operation of the incline 20 of the cam against the contact screw 16. I therefore do not limit myself to the form of the cam or to the use of two contact screws at each attachment. For instance, a form of cam such as shown in Fig. 5 may be used in connection with an attachment having the arm 14 extending in one direction only from the post 13, such for instance as indicated at A in Fig. 1. This last mentioned cam and the attachment shown at A would effect adjustment of the needle or stitch cam when the ring 23 is moved only in the one direction.

As shown in Fig. 1, a plurality of attachments may be disposed at different points around the cam ring in machines employing a plurality of feeds and the attachment at one point may effect a different adjustment of its cam from the attachments at the other points or feeds.

From the above it will be seen that I provide an attachment for a knitting machine which may be applied to machines as now constructed and that by the use of my invention the manufacturer will not have to build a special line of machines for the trade requiring the adjustments of the stitch cams which my attachment is capable of producing, but on the contrary, the machines may be sent out without my attachment for one class of trade, and my attachment may be supplied or fixed to this standard line of machines in order to meet the requirements of another class of trade.

What I claim is:—

1. In combination with the cam ring of a knitting head and its cam, an attachment consisting of a bracket removably secured exteriorly of said ring and operating means carried thereby for adjusting the cam and the circumferentially movable ring with means thereon for actuating said operating means, substantially as described.

2. In combination with the cam carrier or support of a knitting machine, a post connected to the cam and mounted to move vertically therein and extending above the same, and an adjusting means located wholly exteriorly of said cam support or carrier and acting on the upper end of the said post for communicating adjusting movement to the said post, and means for operating automatically said adjusting means, substantially as described.

3. In combination in a knitting machine, a cam carrier or support, a cam carried thereby, a circumferentially movable ring, a post carrying the cam and movable vertically of the cam ring, and operating connections between said circumferentially movable member and said post said operating connections being arranged exteriorly of the said cam carrier or support and acting on the upper part of the post, substantially as described.

4. In combination in a knitting machine, a cam carrier or support, a cam, and means for

adjusting the cam comprising a member on the outer side of said cam carrier, and connections extending therefrom upwardly outside the carrier, inwardly, and thence downwardly to the said cam, and a bracket removably secured to the cam carrier for holding said member, substantially as described.

5 In combination in a knitting machine, a cam carrier or support, a cam, and means for adjusting the cam comprising a post movable vertically on the outer side of said support, and connecting means between the same and the said cam extending over the top of the cam ring, substantially as described.

6. In combination in a knitting machine, a cam carrier or support, a cam, a vertically movable member with means for operating the same automatically and means for transmitting a reverse movement from said vertically movable member to the cam, substantially as described.

7. In combination in a knitting machine, a cam carrier or support, a cam, a vertically movable post carrying the same, a vertically movable post on the outer side of the cam carrier or support, means for operating the last mentioned post, and means for transmitting the movement of the outer post to the inner post, substantially as described.

8. In combination in a knitting machine, a cam carrier or support, a cam, a vertically movable post carrying the same, a vertically movable post on the outer side of the cam carrier or support, means for operating the last mentioned post, and means for transmitting the movement of the outer post to the inner post, said means comprising a rocker, or lever, intermediately pivoted and having its arms engaging respectively the inner and outer posts, substantially as described.

9. In combination in a knitting machine, a cam carrier or support, a cam, a rocking lever intermediately pivoted to move in a vertical plane and extending over the cam ring to press the cam down, the inner end of said lever being in connection with the cam, means for raising the cam and means engaging the outer end of said lever for operating the same, substantially as described.

10. In combination with a cam carrier or support, a needle cam, a vertically movable post, a bracket removably secured to the cam carrier and in which the post moves, a circumferentially movable cam for operating said vertically movable post and a connection from said vertically movable post to the cam, substantially as described.

11. In combination with the cam and its carrier or support, a post connected to the cam, a vertically movable member, a rocker between the same and the post and a cam for operating the vertically movable member, substantially as described.

12. In combination with the cam and its carrier or support, a bracket attached to said support, a post vertically movable in said bracket, a rocker pivoted to the bracket and in connection with the needle cam, and a circumferentially movable cam, on the outer side of said carrier or support for operating the vertically movable member, substantially as described.

13. In combination, a cam carrier or support, a cam, a post to which the cam is connected, a second vertically movable post, means for adjusting the said post vertically and automatically, an operated connection between the posts, a bracket carrying said operating connection and the vertically movable post, a spring for pressing the cam upwardly and a stop screw for limiting the downward movement of the vertically movable post, substantially as described.

14. In combination, a cam ring, a bracket attached thereto, a vertically movable post in said bracket, said bracket having a guide way or notch 29, a pin on the post extending therethrough, an adjustable stop for limiting the movement of the said post by engaging the pin, means for adjusting the post, and a connection from the said post to the needle cam, substantially as described.

15. In combination, a cam carrier or support, a cam thereon, means for adjusting the cam comprising a vertically movable post having at its lower end a laterally extending portion, an adjustable pin or screw extending vertically through said laterally extending portion, and a cam having sliding movement and engaging the said adjustable pin or screw, substantially as described.

16. In combination, a cam carrier or support, a cam adjustably mounted thereon, a vertically movable post having at its lower end a pair of adjustable pins or screws, a connection between the post and the cam, and a cam having double inclines for engaging one or the other of said adjustable pins according to the direction of movement of the cam, substantially as described.

17. In combination, a cam carrier or support, a vertically adjustable cam, a vertically movable post with a connection from its upper end to said cam, said post being arranged on the outside of the cam carrier, a circumferentially movable ring, and an interchangeable cam carried by the said ring for operating the post vertically, substantially as described.

18. In combination in a knitting machine, a cam carrier or support, a cam having a portion attached thereto extending to the top of the cam carrier or support, a vertically movable member on the outer side of the cam carrier, a bracket carrying said vertically moving member and removably attached to the cam carrier, a connection

between the upper end of the said vertically movable member and the top of the cam portion, said connection extending over the top of the cam carrier, and a circumferentially movable cam arranged below the bracket and operating the vertically movable member, substantially as described.

In testimony whereof, I affix my signature in presence of two witnesses.

GEORGE LAWSON BALLARD.

Witnesses:
CARRIE LANDIS,
GEO. R. RALSTON.