Feb. 20, 1945. I. H. C. GREEN ET AL 2,369,781

ADJUSTABLE CAM MOUNT FOR KNITTING MACHINES

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FIG. 1.

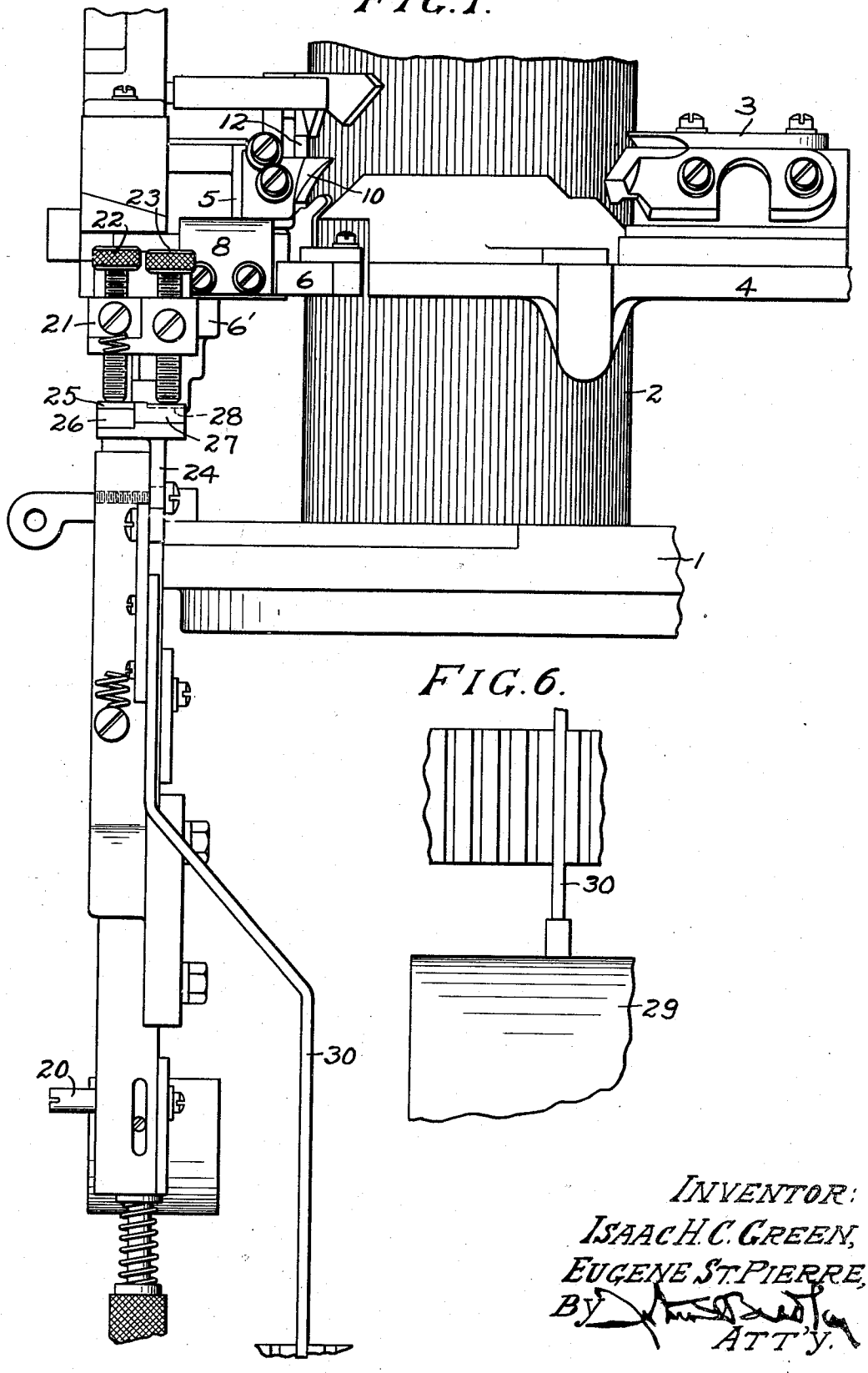


FIG. 6.

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FIG. 2.

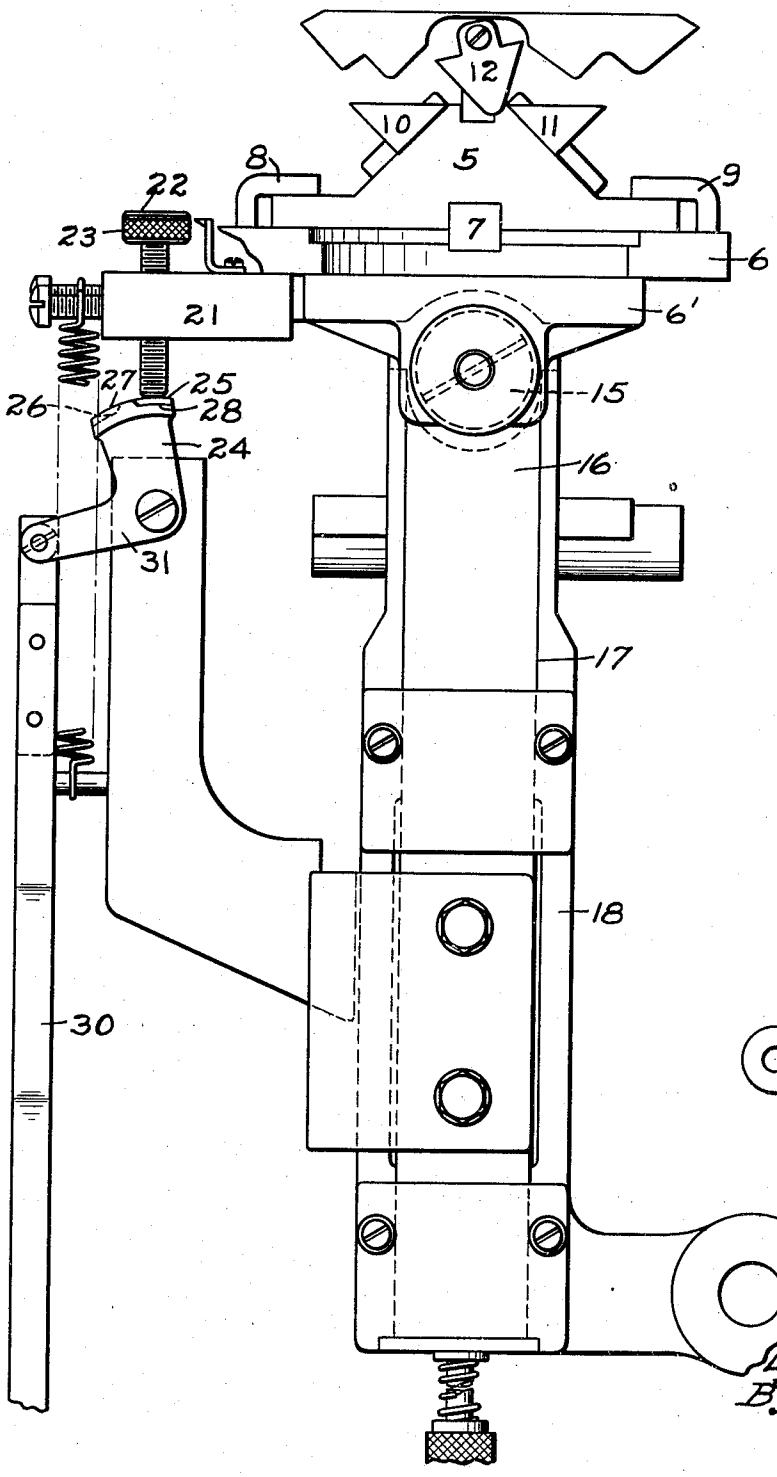
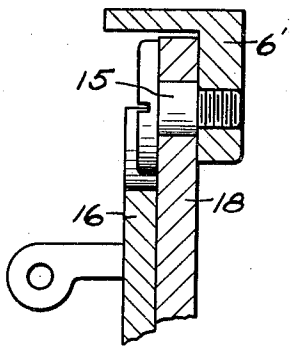


FIG. 5.



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FIG. 3.

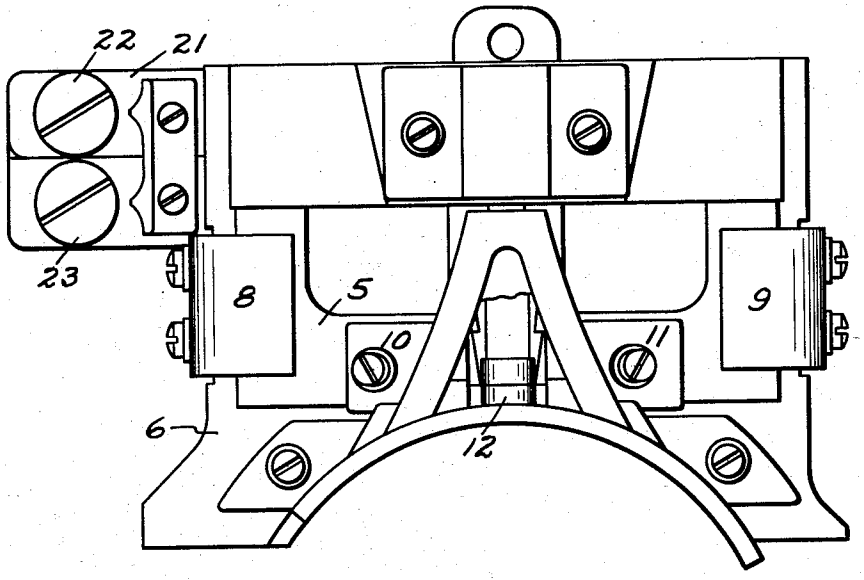
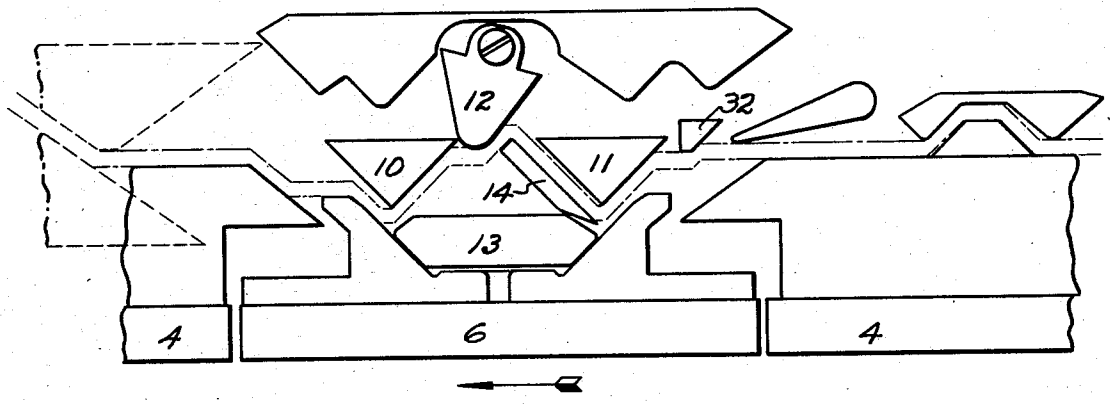


FIG. 4.



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ADJUSTABLE CAM MOUNT FOR KNITTING MACHINES

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Application March 11, 1944, Serial No. 526,028

9 Claims. (Cl. 66—43)

This invention is concerned with an adjustable support or mount for the cam block of a knitting machine and more particularly with such mounts for use on two feed, split foot type machines wherein portions of the fabric are knitted in a rotary manner of two yarns and other portions in a reciprocatory manner of a single yarn.

Such machines knit fabric by relative rotation of needles and cams at times and by reciprocating one or the other of these elements at other times. In either case, particularly when two yarns are separately fed and knitted in the parts of the fabric produced by rotary knitting, extremely accurate adjustment of the two stitch drawing cams is necessary so that the stitches drawn by one of the cams will be or appear to be of the same length as the stitches drawn by the other cam. This is also equally true when knitting a single yarn in a reciprocatory manner. There also two stitch cams are engaged and the stitches drawn at each must be of the same apparent length.

When a machine is assembled the cams may be adjusted at accurate distances above the cam carrying plate. Nevertheless the stitches drawn at these cams may be of unequal length because of other inaccuracies in the machine. Therefore, an accessible and simple means for adjusting the relative height of the two-stitch cams is a practical necessity and the adjusting element should have two separate adjustments, one for rotary knitting and the other for reciprocatory knitting because this change in the knitting motion of the machine involves factors which affect the stitches. Theoretically this is not so but practically it is invariably true, due as stated above, to unavoidable imperfections in one or more of the many parts or in their operation.

Since, in modern machines, the knitting operation from the beginning to the end is continuous, the necessary adjustments should and, practically, must be automatically made. This invention provides a simple effective and accessible means for automatically adjusting the stitches for both rotary and reciprocatory knitting not only when a single yarn is employed but also when two yarns are separately fed and knitted in the rotary manner.

The type of machine selected for illustration and description herein is exemplified by one of the Banner type, two feed, machines but it will be understood that the invention is not limited to this particular machine or to two feed knitting. Only the parts of the machine essential to an understanding of the invention are shown in the drawings of which:

Fig. 1 is an elevation showing the invention as applied to a two feed split foot knitting machine, enough of the machine being shown to properly associate the invention therewith;

Fig. 2 is an elevation of the invention as seen from the inside of the machine;

Fig. 3 is a plan view showing the auxiliary cam block and adjusting mechanism;

Fig. 4 is a diagrammatic view of the cams at the auxiliary side of the machine;

Fig. 5 is a sectional view showing in detail the connection between the auxiliary cam block assembly and the fashioning bar; and

Fig. 6 is a fragmentary view illustrating the control drum and connection by means of which the knitting cam adjustments are automatically operated.

In Figs. 1 and 2 the invention is shown applied to the auxiliary cam assembly of a two feed, split foot, Banner type machine wherein the leg and instep are knitted at the auxiliary side, the leg being knitted of two independently fed and knitted yarns, usually identical, and the instep of one of these yarns. In these figures a circular base is shown at 1 and the needle cylinder at 2. The main cam block is generally indicated by 3 and is mounted on plate 4 so that it can be moved vertically for purposes of fashioning and also withdrawn from active position all in a manner similar to that shown in Patent #2,083,027.

The auxiliary cam block 5 is shown at the opposite side of Fig. 1 and also in Fig. 2. This block is supported upon cam plate 6 by means of key 7 and guides 8 and 9 so that it can slide radially of the needle cylinder 2. The mechanism for moving this cam block towards and away from the cylinder is not shown. It is illustrated in the patent mentioned above.

On cam block 5 are mounted stitch cams 10 and 11, a swingable center cam 12, guard cam 13 and raise cam 14. Stitch cams 10 and 11 are so mounted that their vertical heights may be adjusted. When setting up the machine the cam block is placed upon a flat surface and a gauge of the proper height is used to set these cams at equal distances from the surfaces. As already stated, theoretically this will insure that stitches of the same length will be produced at stitch cams 10 and 11 both when independently knitting two yarns in a rotary manner and also during reciprocatory knitting but in actual practice this is not the fact. To obtain equality of stitch length at these two cams it is necessary to adjust

the cams by trial and error until the desired result is obtained and this must be done separately for rotary and reciprocatory knitting.

In addition, a further adjustment of the cam block is required to provide for the necessary variations of loop length in different parts of the stocking. This involves moving the entire cam block vertically up or down as the case may be.

To provide these adjustments cam plate 6 is mounted upon a base 6' pivotally supported as shown at 15 at the upper end of a bar 16 vertically slideable in a guideway 17 in a bracket 18 rigidly attached to the frame or any other stationary part of the machine. This construction is shown in Patent #2,208,307 and is for moving the cam assembly up or down to secure the variations in loop length required for the different parts of a stocking. This adjustment may be made automatically from a suitable fashioning cam through suitable connections indicated herein by the pin 20 in Fig. 1. No further description of this means of adjustment is required since it is fully described in the patent just referred to.

Adjustment of the relative heights of stitch cams 10 and 11 which is the principal subject of this invention is obtained by the following mechanism. As already stated, cam plate 6 upon which cam block 5 is supported is pivotally mounted as at 15. An extension 21 integral with cam plate support 6' is tapped and adjusting screws 22 and 23 threaded therethrough. Beneath the lower ends of adjusting screws 22 and 23 is a bell crank 24 the upper end of which is provided with two camming surfaces, one for each of screws 22 and 23. Each of these surfaces has a high and low part and they are so arranged that the high part of one surface is positioned beside the low part of the other surface so that when one adjusting screw is engaged by the high part of its cam the low part of the other cam will be beneath the other adjusting screw so that this screw will not make contact with it. Specifically, the high part of the camming surface for adjusting screw 22 is shown at 25 in Figs. 1 and 2 and its low part at 26 in Fig. 2. The high part of the cam for adjusting screw 23 is shown at 27 in Figs. 1 and 2 and the low part at 28. The high and low part of each of these cams are of the same heights but positioned at opposite ends so that when one of the adjusting screws 22, for example, is riding upon the high part 25 of its cam the low part 28 of the other cam is beneath the end of the other adjusting screw 23 so that it is not in contact with it. Consequently, by suitable movement of bell crank 24 either adjusting screw 22 or 23 can be brought into action.

Bell crank 24 may be swung to bring the camming surfaces described above into the proper positions to operate adjusting screws 22 and 23 at the proper times by any suitable means such, for example, as a drum or cam wheel 29 rotated at suitable speed with which engages a suitably guided rod 30 pivotally attached to the end 31 of bell crank 24 opposite to that upon which the camming surfaces 25—28 are carried.

Obviously, the camming mechanism just described serves only to bring adjusting screw 22 or 23 as the case may be into operation. The actual adjustment of the relative heights of stitch cams 10 and 11 is made manually by turning these screws one way or the other and thus determining the position of cam plate support 6' and, consequently, of cam block 5 with respect to its pivot 15 when either adjusting screw 22 or 23 is engaged by the high part of its cam. Since the low part of one cam is beneath its screw when the other screw is riding upon the high part of its cam each of these adjusting screws provides an adjustment which is wholly independent of the other.

For example, adjusting screw 22 may be used for adjusting the relative heights of stitch cams 10 and 11 during reciprocatory knitting so that the desired loop length is obtained in both directions of knitting. Adjusting screw 23 may be used for making a similar, but probably different, adjustment of the relative heights of stitch cams 10 and 11 for rotary knitting where two yarns are independently fed and independently knit at the auxiliary side of the machine, that is to say, where rotary knitting is performed at both stitch cams. In this way, the stitches knit at both cams can be equalized or varied as desired.

The same adjusting screw 23 may also be employed in the same way for altering the length of the stitch made at front stitch cam 10 only when a single yarn only is being knit in a rotary manner.

It will be evident that the relative adjustment of stitch cams 10 and 11 by swinging the cam block upon pivot 15 as above described supplements the vertical or fashioning adjustment of the cam block thus insuring that the stitches will not only be of the actual length desired in various parts of the stocking but that the stitches of the different yarns used will in all parts be of the same or the desired relative lengths.

Since the cam adjustments described above are effected through the initial adjustment of cam plate support 6' they do not interfere with the radial withdrawal of the cam block or of any cams designed for individual withdrawal such, for example, as cams 12, 14 and 32 in Fig. 4. Also since all of the cams concerned with the guidance of the needles in relation to the knitting cams 10 and 11 are supported by cam plate support 6', the adjustments above described do not affect their relation. The entire group of cams involved moves vertically or swings about pivot 15 as a unit.

The particular arrangement of cams shown in Fig. 4 is that employed at the auxiliary side of a two feed, split foot Banner machine in which the leg is knit of two separately fed and knitted yarns and the instep of one of those yarns, the sole presumably being knit of a third yarn of different character.

This cam assembly requires no detail description beyond that already given except to say that, as shown, it is arranged for two feed rotary knitting. For reciprocatory knitting, cams 14 and 32 would be withdrawn and, when knitting the heel and toe, swing cam 12 would also be withdrawn. With this explanation one skilled in the art will be able to follow the paths taken by the needles.

The invention is not limited to the cam assembly shown or to two feed rotary knitting or to the structural details of the adjustments disclosed. Obviously, many modifications could be made without departing from the invention.

We claim:

1. In a circular knitting machine a cam block, cams on said cam block adapted to draw stitches during rotary and reciprocatory knitting, a pivoted support for said cam block, an abutment, a plurality of adjusting means on said support engageable with said abutment and means for mov-

ing said abutment so as to engage each of said adjusting means in alternation.

2. In a circular knitting machine a cam block, cams on said cam block adapted to draw stitches during rotary and reciprocatory knitting, a pivoted support for said cam block, an abutment, a plurality of manually operable adjusting means on said support engageable with said abutment and means for moving said abutment so as to engage each of said adjusting means in alternation.

3. In a circular knitting machine a cam block, cams on said cam block adapted to draw stitches during rotary and reciprocatory knitting, a pivoted support for said cam block, an abutment, a plurality of adjusting means on said support engageable with said abutment, means for moving said abutment so as to engage each of said adjusting means in alternation and resilient means for urging said adjusting means towards said abutment.

4. In a circular knitting machine a cam block, cams on said cam block adapted to draw stitches during rotary and reciprocatory knitting, a pivoted support for said cam block, an abutment, a plurality of manually operable adjusting means on said support engageable with said abutment, means for moving said abutment so as to engage each of said adjusting means in alternation and resilient means for urging said adjusting means towards said abutment.

5. In a circular knitting machine a cam block, cams on said cam block adapted to draw stitches during rotary and reciprocatory knitting, a pivoted support for said cam block, an abutment, a plurality of adjusting means on said support engageable with said abutment and means for moving said abutment so as to engage one of said adjusting means during rotary knitting and so as to engage another of said adjusting means during reciprocatory knitting to establish independently the relative heights of the stitch cams for each type of knitting.

6. In a circular knitting machine a cam block, cams on said cam block adapted to draw stitches during rotary and reciprocatory knitting, a pivoted support for said cam block, an abutment, a plurality of adjusting means on said support engageable with said abutment and means for automatically moving said abutment so as to engage each of said adjusting means in alternation at any desired times during knitting.

7. In a circular knitting machine a cam block, cams on said cam block adapted to draw stitches during rotary and reciprocatory knitting, a pivoted support for said cam block, means for raising and lowering said support and said cam block without altering the relative heights of said stitch cams, an abutment, a plurality of adjusting means on said pivoted support engageable with said abutment and means for moving said abutment so as to engage each of said adjusting means in alternation to alter the relative heights of said stitch cams.

8. In a circular knitting machine a cam block, cams on said cam block adapted to draw stitches during rotary and reciprocatory knitting, a pivoted support for said cam block, means for raising and lowering said support and said cam block without altering the relative heights of said stitch cams, an abutment, a plurality of adjusting means on said pivoted support engageable with said abutment and means for moving said abutment so as to engage each of said adjusting means in alternation to alter the relative heights of said stitch cams independently of said means for raising and lowering said cam block.

9. In a circular knitting machine a cam block, cams on said cam block adapted to draw stitches during rotary and reciprocatory knitting, a pivoted support for said cam block, an abutment, a plurality of adjusting means on said support engageable with said abutment and means for moving said abutment so as to engage one of said adjusting means but not the other.

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