June 17, 1924. 1,497,698

A. RIEFFEL

CAM FOR KNITTING MACHINES

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Fig. 1.

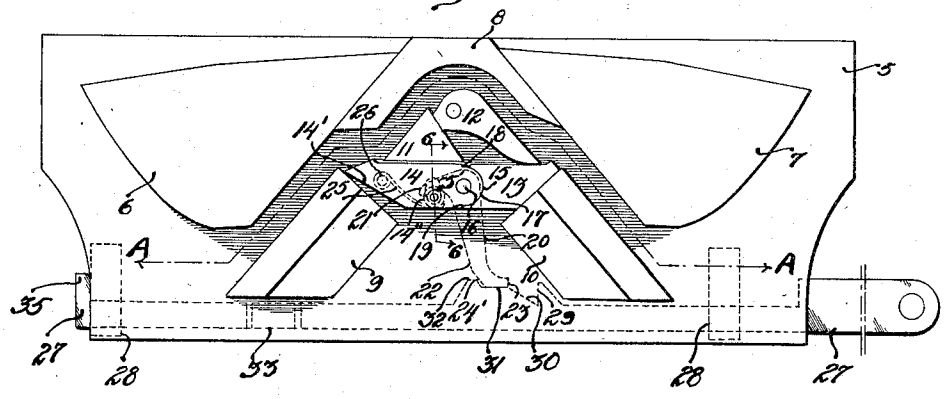
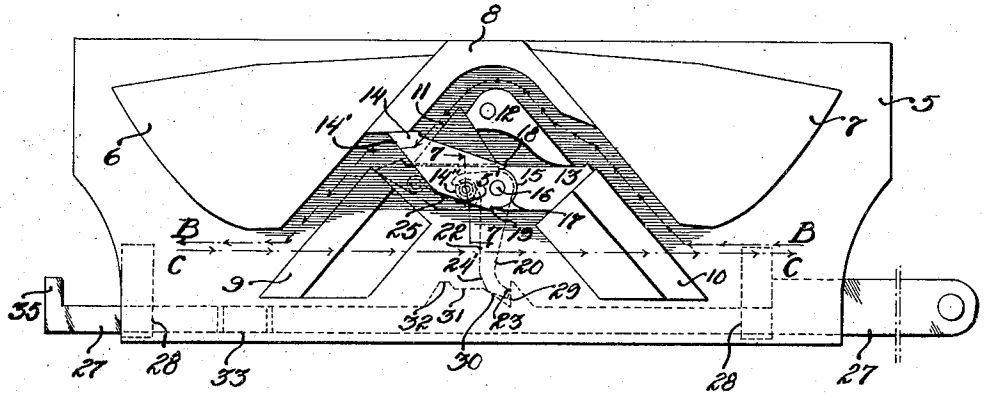


Fig. 2.



Witnesses

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Fig. 3.

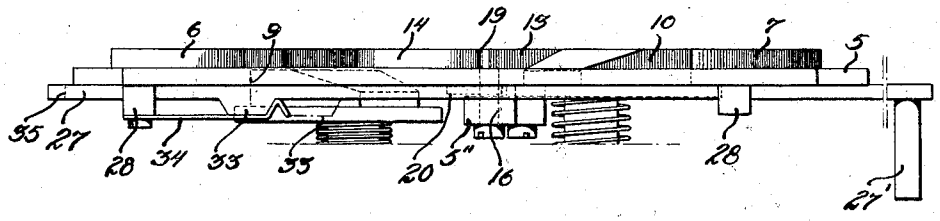
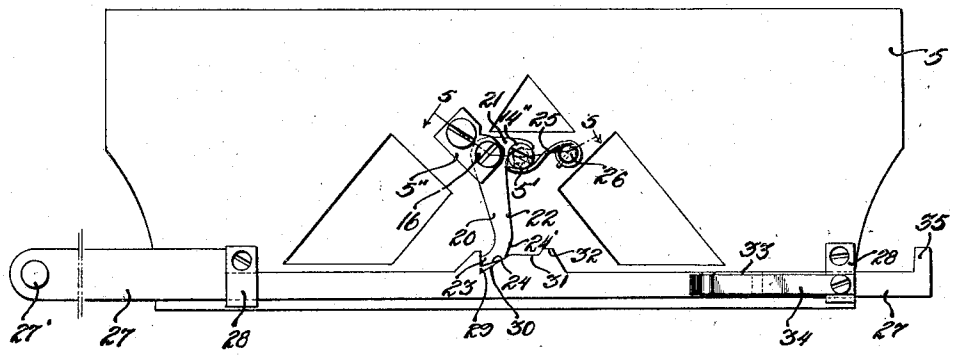


Fig. 4.



Witnesses

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Filed Sept. 14, 1922 3 Sheets-Sheet 3

Fig. 5.

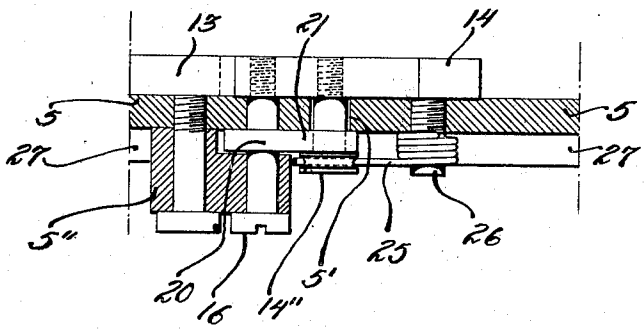


Fig. 6.

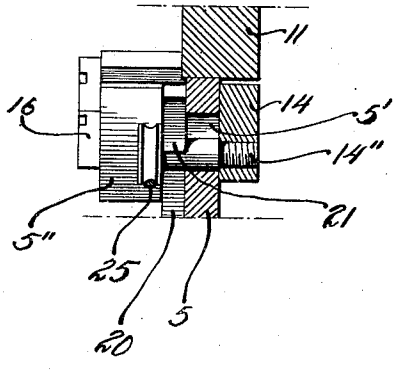
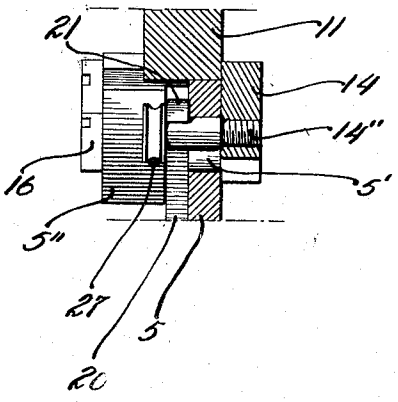


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

AUGUST RIEFFEL, OF PHILADELPHIA, PENNSYLVANIA.

CAM FOR KNITTING MACHINES.

Application filed September 14, 1922. Serial No. 588,123.

To all whom it may concern:

Be it known that I, AUGUST RIEFFEL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Cams for Knitting Machines, of which the following is a specification.

This invention relates to knitting machines and more especially to those of the straight reciprocating or independent needle type, and has particular reference to cams and stops or locks for controlling the movements of the needles during the knitting operation.

Heretofore, during the knitting of certain classes of work on knitting machines of the above character, such as used in knitting flat goods, as arms of sweaters, the needle butts instead of following a predetermined path below the guard cam, would jump up due to the tension on the yarn or other reasons, and pass between portions of the cams which were not arranged to receive them in an operative manner during the reciprocation of the carriage which supports the cams, and as a consequence, injury to the goods and also a general breaking up of the needles would occur.

The object of my invention is to provide an improved guard cam which will permit the operation of the machine in the usual way and prevent the butts of the needles jumping upward and passing or attempting to pass in a different path, thus avoiding ruin of the goods and breaking of the needles or other damage.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is a face elevation of my improved lock and guard cam with the parts adjusted and secured in position to elevate and depress the needles to their full limit,

Figure 2 is a similar view showing certain of the parts and cams in position to cause the needles to take another path.

Figure 3 is a bottom view of the device shown in Figure 2,

Figure 4 is a rear elevation with the parts in the position shown in Figures 2 and 3,

Figure 5 is an enlarged fragmentary horizontal sectional view taken on the line 5—5 of Figure 4,

Figure 6 is an enlarged fragmentary vertical sectional view taken on the line 6—6 of Figure 1, and

Figure 7 is an enlarged fragmentary sectional view taken on the line 7—7 of Figure 2.

The latch needles are slidable by means of their butts, upon the needle beds, in the usual manner. These butts are actuated to move the needles of opposite banks toward and away from each other by means of cams mounted upon cam plates which are moved transversely across the banks of needles. In the drawings, 5 is one of a pair of stationary lock plates which are adapted to be secured to the under surfaces of the carriage of a reciprocating type of knitting machine, such as used in knitting flat goods. Plate 5 carries movable side cams 6 and 7, a top cam 8, needle lifters 9 and 10 adapted to move in and out beneath side cams 6 and 7, a triangular block 11 and a pivoted finger 12, cams 11 and 12 constituting the center elevating cams.

Beneath cams 11 and 12 and over lifters or elevating cams 9 and 10, is a guard cam consisting of two parts including a stationary part 13 over lifter 10 and a pivoted part 14 over lifter 9. Part 13 is fixed to plate 5 in a horizontal position with its outer end between the upper end of lifter 10 and the lower end of tongue 12 and its inner end is preferably provided with a semi-circular concavity 15. Part 14 is fixed to a center pivot pin 16, about midway between lifters 9 and 10, and preferably, has a convex inner end 17 fitting concavity 15, and a beveled free end 14′. Parts 13 and 14 may have end shoulders 18 and 19 to limit the swing of pivoted part 14. Bell crank 20 is mounted on pin 16 at the back of plate 5 beneath a block 5″, secured to the back of plate 5, and has a curved short arm 21, which is adapted to engage a stop pin 14″ projecting from the back of part 14, and movable in a slot 5′ in plate 5. The long arm 22 of the bell crank has an oppositely curved toe 23 at its free end, with beveled faces 24 and 24′. A spring 25 is mounted on a pin 26 at the back of the plate and presses upwardly at its free end on pin 14″ to hold pivoted part 14 in its upward position shown in Figure 2.

A slide 27, mounted in guides 28 on plate 5, is provided on its upper edge with shoulders 29 and 32, an inclined wall 30

leading upward from the heel of shoulder 29 and a horizontal face 31 leading from the inclined wall to the heel of shoulder 32. The toe of bell crank lever 20 is positioned to ride the upper edge of the slide between shoulders 29 and 32. When the slide is in its outer position, toe 23 rests on the horizontal face 31 as shown in Figure 1 of the drawing. The short arm 21 of the bell crank will then press downwardly on pin 14'' and hold the pivoted part 14 in alignment with part 13 and in engagement with lifter 9. When slide 27 is moved in, the long arm of the bell crank will ride downwardly on inclined face 30, engage with shoulder 29 and be moved inwardly thereby swinging short arm 21 out of engagement with pin 14''. Spring 25 will then press pin 14'' upwardly and swing part 14 upwardly into contact with safety guard 8 as shown in Figures 2 and 4 of the drawings. Slide 27 is provided with a projection 33 beveled on each side and a spring 34, secured to one of the guides 28, has its free end adapted to engage a beveled face of the projection and hold the slide in "in" or "out" position. The slide may also be provided with a shoulder 35 adapted to engage the end of a guide 28 and limit the outward movement of the slide.

The ends of slot 5' limit the opposite movements of pin 14'' under pressure of arm 21 and spring 25, but part 14 may move independently of bell crank 20, to permit it to swing down under pressure of the needle butts.

Parts 6, 7 and 8 are spaced from the other parts described at the front of plate 5 and form paths through which the needle butts are guided as the carriage is reciprocated. When slide 27 is in, part 14 is raised and spring 34 is engaging inner beveled end of projection 33. When slide 27 is pulled out as shown in Figure 1 of the drawings, faces 24 and 24' will ride on inclined wall 30 and face 31 until face 24' engages shoulder 32 and face 24 engages face 31, bell crank 20 will be moved on its pivot to swing, bent end 35 will engage guide 28 and spring 34 will ride over inner end and face of projection 33 and engage the outer beveled end thereof to hold slide 27 in this position and pivoted end 14 down whereby parts 13 and 14 will take the position of a full length guard cam, as if it were a fixed or one-piece cam.

When parts 9, 10 and 11 are "in," as shown in Figure 1, a path A—A is formed through which the needle butts pass in both directions in producing a rib stitch. When block 11 is "out" and parts 9 and 10 are "in," the needle butts pass in the path A—A toward the left and will pass under and across block 11 and beneath finger 12 which rises on its pivot, in moving to the right. This is for producing a Cardigan or tuck stitch. When the parts are in the position shown in Figure 2 with lifter 9 and block 11 "out," and pivoted part 14 elevated, the needle butts will pass to the left in the path or direction indicated by arrow line B—B, but in passing to the right will cross over lifter 9 as indicated by the path C—C, forcing lifter 10 in as it passes this part. This is for producing a flat rib stitch or tubular work. When part 14 is lowered or down as shown in Figure 1, path A—A is opened but when part 14 is up or elevated as shown in Figure 2, path A—A is closed and the needles cannot pass to the right but can only pass in the direction of the arrow line and path B—B.

In the old construction with the single piece construction of guard cam, the needle butts instead of following the path C—C, accidentally jump up due to the tension of the yarn or for other reasons and pass in between the upper portions of the cams through path A—A while the upper portions of the cams are not arranged to receive them in an operative manner, such as when block 11 is "in," and a general breaking up of the needles would occur during the reciprocation of the carriage in the knitting operation.

By forming the guard cam in two sections and swinging part 14 to the position shown in Figure 2, entrance to path A—A is closed except in the direction of path B—B when spring 25 will give and part 14 move down from the full line to the dot-and-dash line position shown in Figure 2 and permit the needles to pass. When part 14 is up and needles are taking path C—C, should the needles jump up for any reason, they will engage the beveled end 14', of part 14, which is spaced from and substantially parallel to the upper end of lifter 9, and will be guided downwardly to continue in a horizontal path in the direction of arrow line C—C, thus obviating the objections referred to. When cam 11 is in its "out" position, part 14 prevents the needle butts from passing into the space occupied by cam 11 when in its "in" position. On the other hand, when it is desired to operate on other classes of work which require the full length of guard cam, part 14 can be set as shown in Figure 1 and will form a substantially rigid cam without in any way detracting from the efficiency of the device.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

Having thus described my invention,

what I claim as new and desire to secure by Letters Patent is:—

1. In combination with a lock plate in a knitting machine having a top cam and needle lifters, of a fixed cam between the lifters; a movable cam pivoted thereto and adapted to swing into engagement with the top cam; a spring for keeping the movable cam in its raised position; a bell crank lever for keeping the movable cam in its lowered position, and means for moving the lever.

2. In combination with a lock plate in a knitting machine having a top cam and needle lifters, of a fixed cam between the lifters; a movable cam pivoted thereto and adapted to swing into engagement with the top cam; a pin on the movable cam extending through a slot in the plate; a spring on the plate and engaging the pin for keeping the movable cam in its raised position; a bell crank lever on the plate and engaging the pin for keeping the movable cam in its lowered position, and means for moving the lever.

3. In combination with a lock plate in a knitting machine having a top cam and needle lifters, of a fixed cam between the lifters; a movable cam pivoted thereto and adapted to swing into engagement with the top cam; a spring mounted on the plate for keeping the movable cam in its raised position; a bell crank lever mounted on the plate for keeping the movable cam in its lowered position, and a slide mounted on the plate and operatively connected with the lever.

4. In combination with a lock plate in a knitting machine having a top cam and needle lifters, of a fixed cam between the lifters; a movable cam pivoted thereto and adapted to swing into engagement with the top cam; a spring mounted on the plate for keeping the movable cam in its raised position; a bell crank lever mounted on the plate for keeping the movable cam in its lowered position; a slide for moving the lever, and angular surfaces on the slide adapted to engage the end of the lever for moving and holding it in position.

5. In combination with a lock plate in a knitting machine having a top cam and needle lifters, of a fixed cam between the lifters; a movable cam pivoted thereto and adapted to swing into engagement with the top cam; a spring mounted on the plate for keeping the movable cam in its raised position; a bell crank lever mounted on the plate for keeping the movable cam in its lowered position; a slide for moving the lever; a shoulder on the slide adapted to engage the end of the lever; an inclined wall leading upward from the shoulder, and a horizontal face leading from the inclined wall.

6. In combination with a lock plate in a knitting machine having a top cam and needle lifters, of a fixed cam between the lifters; a movable cam pivoted thereto and adapted to swing into engagement with the top cam; a spring mounted on the plate for keeping the movable can in its raised position; a bell crank lever mounted on the plate for keeping the movable cam in its lowered position; a slide mounted on the plate and operatively connected with the lever; means for limiting the movement of the slide in either direction, and means for holding the slide in its limited position.

7. In combination with a lock plate in a knitting machine having a top cam and needle lifters, of a fixed cam between the lifters; a movable cam pivoted thereto and adapted to swing into engagement with the top cam; a spring mounted on the plate for keeping the movable cam in its raised position; a bell crank lever mounted on the plate for keeping the movable cam in its lowered position; guides on the plates; a slide mounted in the guides and operatively connected with the lever; shoulders on the slide adapted to engage the guides for limiting the movement of the slide in either direction, and means for holding the slide in its limited position.

8. In combination with a lock plate in a knitting machine having a top cam and needle lifters, of a fixed cam between the lifters; a movable cam pivoted thereto and adapted to swing into engagement with the top cam; a spring mounted on the plate for keeping the movable cam in its raised position; a bell crank lever mounted on the plate for keeping the movable cam in its lowered position; a slide mounted on the plate and operatively connected with the lever; a projection on the slide, and resilient means on the plate adapted to engage either side of the projection for holding the slide in its limited position.

9. In combination with a lock plate in a knitting machine having a top cam and needle lifters, of a fixed cam between the lifters; a movable cam pivoted thereto and adapted to swing into engagement with the top cam; a spring mounted on the plate for keeping the movable cam in its raised position; a bell crank lever mounted on the plate for keeping the movable cam in its lowered position; a slide mounted on the plate and operatively connected with the lever; a projection on the slide, and a strip spring on the plate adapted to engage either side of the projection for holding the slide in its limited position.

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

AUGUST RIEFFEL.

Witnesses:

ELIZABETH GARBE,

CHARLES E. POTTS.