To all whom it may concern:

Be it known that I, FRANK WILCOX, a citizen of the United States, and resident of Norristown, Pennsylvania, have invented certain new and useful Improvements in Overtrow Guard-Cams for Knitting-Machines, of which the following is a specification.

One object of the invention is to provide a needle operating cam and a guard cam for preventing overthrow of the needles, with adjusting means accessible to the operator without removing the cams from between the cam ring and the cylinder, said adjusting means being adapted to adjust both cams in mesh to vary the loop lengths for tight and loose knitting, or to adjust the overthrow guard cam individually to take up lost motion between the stitch cam and the guard cam.

A further object, besides the adjustments just mentioned, is to provide for detaching the stitch cam from the machine without disturbing the overthrow guard cam. In this detaching action the stitch cam and its guide post are removed as one unit, leaving the guard cam with its post in place. A material advantage results from this independent removable action of the stitch cam and its independent replacement because the usual trouble is avoided of alining or positioning the butts of the needles in proper relation to receive the cam or cams when replaced. By leaving the overthrow guard cam in place and removing the stitch cam alone, the relative arrangement of the needle butts may be maintained because of the presence of the overthrow guard cam, and the stitch cam, therefore, can be replaced without interference by the needle butts and without hand adjustment thereof.

In arrangements where both cams are attached to one guide post and are removed and replaced as one unit, it is necessary to aline the needle butts to the contour of the cam path, or raceway, before the cam unit can be seated in place, requiring a templet to aline the butts, or a careful arrangement of the butts by hand. With the two separate cam units, one over the other and one removable independently of the other, replacement of the stitch cam can be effected without requiring any act of alinement on the part of the operator.

Another object of the invention is to provide adjusting means for the needle operating and overthrow guard cam including means whereby when the needle operating cam is adjusted the overthrow guard cam will also be adjusted in unison against the pressure of a spring, and whereby also the overthrow guard cam may be individually adjusted to take up lost motion, against the pressure of said spring, the said spring exerting pressure through the guard cam support upon the support of the needle operating cam. This spring arrangement lends itself to automatic adjustment, if desired, as in loose and tight knitting. Other objects of the invention will appear from the following description.

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

In the drawings:

Figure 1 represents the needle cams developed into flat form for convenience of illustration.

Fig. 2 is a sectional view.

The needles enter at the left of the camway, are elevated at 3, to take yarn, retracted to the level 4 for pressing and then they are retracted farther to pass under the stitch cam 5, all substantially as in ordinary practice.

Below the stitch cam 5 I provide an adjustable overthrow guard cam 6 and means to adjust it relative to the stitch cam, so that no excess space will exist between the two cams, thus preventing overthrow or excess downward movement of the needles in their rapid downward strokes.

The stitch cam is attached to a post or slideable cam guide 7 movable vertically in the cam box or ring and it is adjusted vertically by a screw 8, the head of which reaches over the slide or post, said screw being seated in the cam box. Below this cam slide or post 7 there is another slide or post 9 guided to move vertically in the cam ring or box and the overthrow cam 6 is attached, as shown to this slide. The slide is normally pressed upwardly by a spring 10 in the pocket of the slide and bearing upon the cam box or ring at its lower end. This spring tends constantly to press the overthrow guard cam upwardly. The upper slide or post carries a rod or wire 11 bearing on the lower slide or post, the upper end of the pin being
borne upon by a screw 12 at the top of the upper guide post or slide. From this construction, it will be seen that the position of the overthrow guard cam can be accurately determined in relation to the stitch cam by adjusting the screw 12 and forcing the cam slide 9 down against the pressure of the spring or by turning the screw back the spring will force the overthrow cam upwardly. This adjustment will set the overthrow cam in the desired position relative to the stitch cam, whereas the adjustment of the stitch cam for making longer or shorter stitches will be secured by adjusting the screw 8, but in this latter adjustment the position of the overthrow guard cam relative to the stitch cam will not be altered. In other words, I provide one means for adjusting the stitch and overthrow cams in unison for changing stitch length, namely, the screw 8 acting in conjunction with the spring and a second adjustment for setting the overthrow cam in the desired position relative to the stitch cam and without changing the position of the latter, said individual adjusting means for the overthrow guard cam consisting of the rod 11 and screw 12.

What I claim is:

1. In combination, a needle cam and an overthrow guard cam both operating upon the needle or jack butt and upon opposite sides thereof, said cams having independent guides, means for adjusting the overthrow guard cam guide with said cam individually in relation to the needle cam guide and means for adjusting both the needle cam guide and the guard cam guide with their cams in unison while maintaining the individual adjustment of said parts relative to each other, said adjustments being effected without detaching the guides with their cams from their working position, substantially as described.

2. In combination a needle cam unit and a separate overthrow guard cam unit both operating upon the needle or jack butt and upon opposite sides thereof, means for adjusting the overthrow guard cam individually in relation to the needle operating cam and means for adjusting both the needle operating cam and the guard cam as one unit while maintaining the individual adjustment of the guard cam relative to the needle operating cam, the individual adjusting means moving with the needle operating cam when the latter is adjusted, the said adjustments being made without detaching either of the cam units from their working positions.

3. In combination, a needle operating cam, a slide or post carrying said cam, an overthrow guard cam opposite the needle operating cam, a separate slide carrying the guard cam and in axial alinement with the post first mentioned, means for adjusting the slide of the needle operating cam for varying the stitches, said adjustment moving the slide of the overthrow cam in unison and means accessible without detaching the units, for adjusting the guard cam individually while in its working position, substantially as described.

4. In combination, a needle operating cam and guide, an overthrow guard cam, with an independent guide, a spring pressing the guard cam guide toward the needle operating cam guide, means movable with the needle operating cam guide for adjusting the guard cam guide against the spring pressure and in relation to said needle operating cam, and means for adjusting the needle operating cam and through the individual adjusting means simultaneously adjusting the guard cam against the spring pressure, said guides and cams being adjustable while in their working positions, substantially as described.

5. In combination a needle operating cam with its guide, an independent overthrow guard cam with its guide, a spring common to both guides for adjusting them in one direction, means common to both guides for adjusting them in unison against the spring pressure and means accessible while undetached from the machine for individually adjusting the guard cam guide against the pressure of the said spring and in relation to the needle operating cam guide, substantially as described.

6. In combination a needle operating cam, an overthrow guard cam, a post or slide for each cam, an adjusting rod carried by the post of the needle operating cam for adjusting the overthrow guard cam individually and in relation to the needle operating cam, a spring for pressing the guard cam in the opposite direction to the movement given by the rod, and means for adjusting the post of the needle operating cam and through the rod adjusting the overthrow guard cam in opposition to the spring, substantially as described.

7. In combination, a needle operating cam, an overthrow guard cam below the same, a post for each cam, a spring for forcing the post of the guard cam upwardly, adjusting means carried by the post of the needle operating cam for adjusting the post of the guard cam in opposition to the spring, and a screw for adjusting the post of the needle operating cam, and through the adjusting means on said post serving to adjust the overthrow guard cam, substantially as described.

8. In combination in a knitting machine, a cam supporting ring, a stitch cam and guide, and an overthrow guard cam on the inner side of said ring attached to an independent guide, the guard cam being arranged below the needle operating cam.
means accessibly mounted on the cam ring for adjusting the needle operating cam, which adjustment also adjusts the over throw guard cam, and individual adjusting means for the overthrow guard cam accessible without disconnecting the cam supports, substantially as described.

9. In combination a cam ring, a needle operating cam and guide, and an overthrow guard cam on a separate guide in said ring and between the same and the needle cylinder, means accessible at a point on the ring for adjusting the needle operating cam vertically, said means also adjusting the overthrow guard cam vertically, and means accessible without removing the overthrow guard cam for the adjustment of the said overthrow guard cam vertically and individually, substantially as described.

10. In combination a needle operating cam, a post therefor, an overthrow guard cam, a post for the guard cam axially in line with the needle operating cam, a spring for pressing the post of the guard cam, means for adjusting the post of the needle operating cam and thereby adjusting the post of the guard cam against the spring pressure, and means for adjusting the guard cam individually against the spring pressure, substantially as described.

11. In combination a needle operating cam, a post therefor, an overthrow guard cam, a post for the guard cam axially in line with the needle operating cam, a spring for pressing the post of the guard cam, means for adjusting the post of the needle operating cam and thereby adjusting the post of the guard cam against the spring pressure, and means for adjusting the guard cam individually against the spring pressure, substantially as described.

In testimony whereof, I affix my signature.

FRANK WILCOMB.