May 7, 1940. R. H. LAWSON 2,199,637

CAM FOR KNITTING MACHINES

Original Filed Dec. 31, 1935 2 Sheets-Sheet 1

FIG. 3.

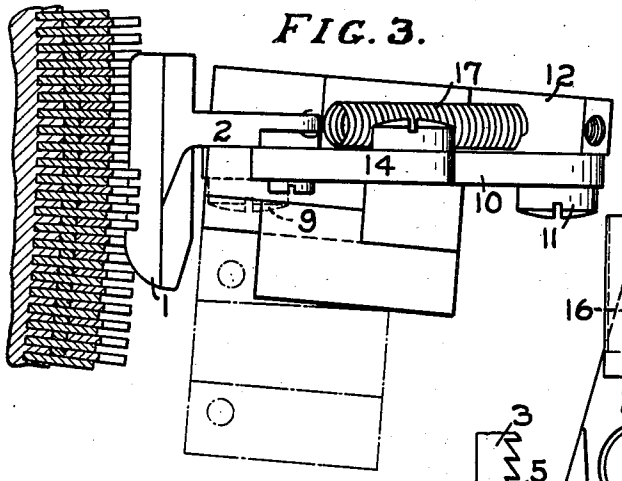


FIG. 2.

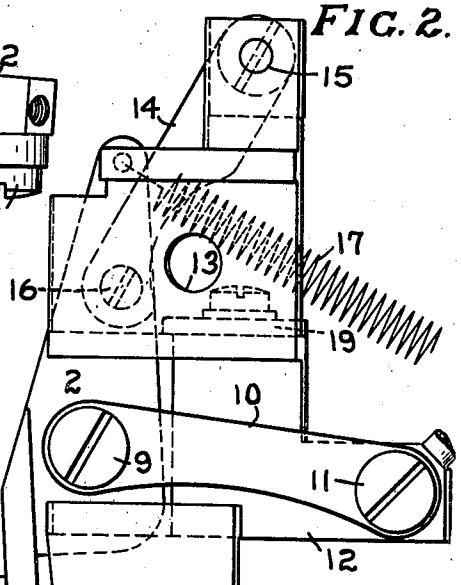
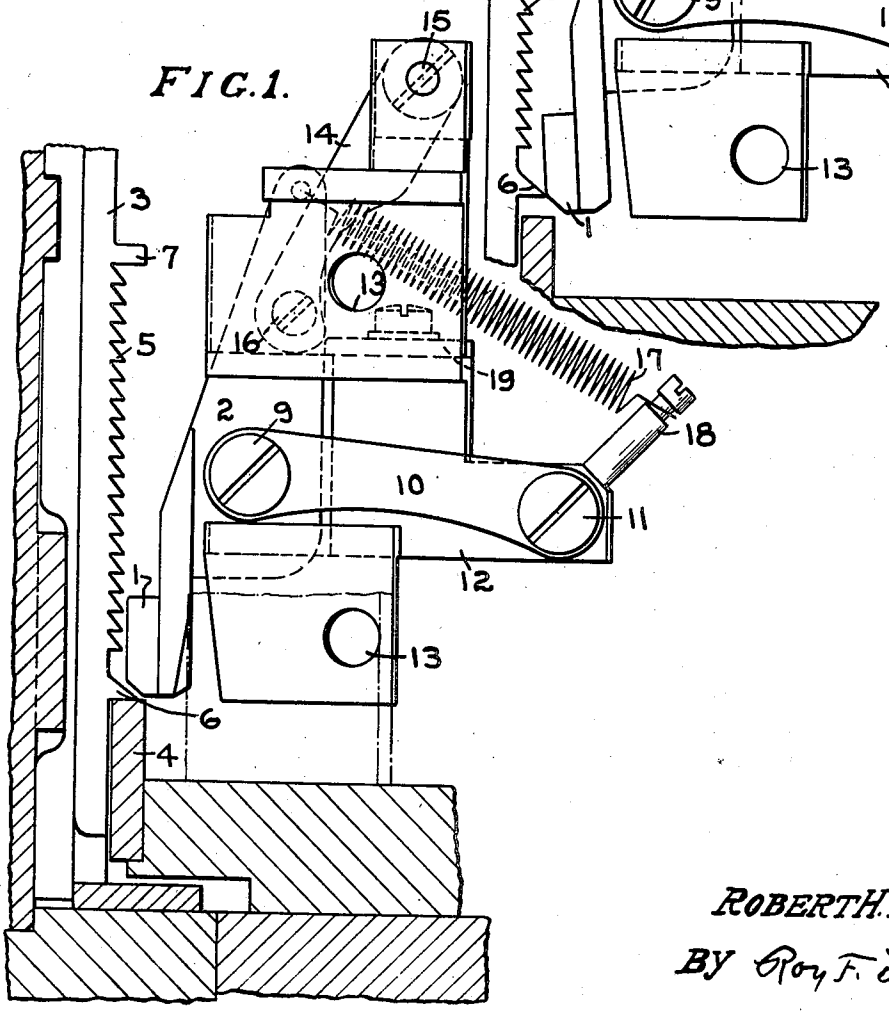


FIG. 1.



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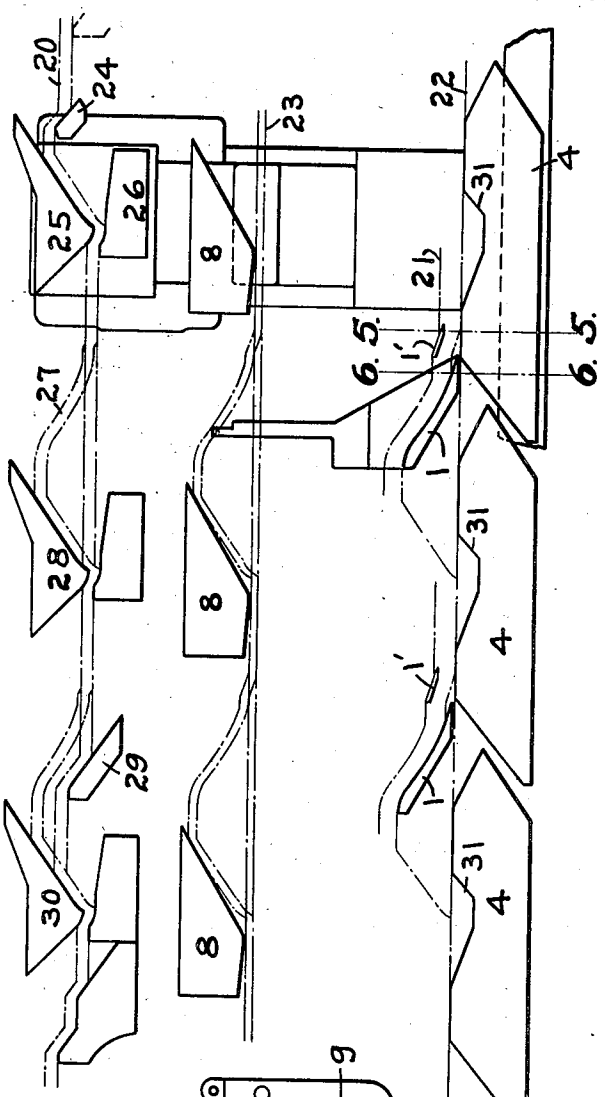


FIG. 4.

FIG. 5. FIG. 6.

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CAM FOR KNITTING MACHINES

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Original application December 31, 1935, Serial No. 56,991. Divided and this application March 4, 1937, Serial No. 129,018. In Canada January 4, 1935

6 Claims. (Cl. 66—57)

This case concerns improvements in cams for employment on knitting machines, more specifically, cams used for raising needles or jacks, or other instrumentalities by engagement of butts thereon. The case is a division of applicant's copending application Serial No. 56,991, filed December 31, 1935.

In the drawings:

Fig. 1 is a sectional view greatly enlarged, showing the manner in which jacks pass by the jack raising cam, also how that cam is attached to the selector block;

Fig. 2 is a view corresponding to Fig. 1 but showing how the raising cam may be swung out of the way when improperly engaged by a jack butt;

Fig. 3 shows the mechanism of Fig. 1 as seen from above;

Fig. 4 is a diagrammatic view showing the manner in which the selector device functions to cause needles to knit, to float or to tuck;

Fig. 5 is a section taken on line 5—5 of Fig. 4 showing a small portion of the needle cylinder, a jack and part of the cooperating needle, and the manner in which a plunger engages the selector butts on the jack; and

Fig. 6 is a section taken on line 6—6 of Fig. 4 showing the same instrumentalities illustrated in Fig. 5 after the jack has been selected for operation by the raising cam.

There has been disclosed in the application of Lawson & Smith, Serial No. 706,082, now Patent No. 2,067,877, certain selecting mechanism involving manually operated plungers and a cam for raising jacks or other instrumentalities which have been preliminarily selected by the plungers or the like. In the application Serial No. 56,991 certain improvements on this selecting mechanism and the cam for raising the jacks or other instrumentalities after they have been selected have been described. The movable cam which is the subject matter of this divisional case has certain advantages over that of the patent in that it may be moved out of position upon contact of a butt which is in a position to strike squarely against the point of the cam, and at the same time will not change its elevation throughout any appreciable extent. This mechanism comprises the advantages attendant upon a swinging type of cam which will not tend to bind but will work freely, and wherein no difficulties will be experienced as are likely to be experienced if the cam changes its elevation as it would in the prior construction.

Referring to Figs. 1, 2 and 3, the jack raising cam and its attached parts have been shown in the position which they occupy relative to the needle cylinder, jacks, etc. The cam 1 projects from the lower end of an arm designated at 2 and is normally maintained in an active position as shown in Figs. 1 and 3. A jack 3 has been indicated in Fig. 1 as passing along a cam 4, a series of which extend about the base of the knitting machine as shown in Fig. 4, and at this height would not be engaged by the said cam and thus would not affect the needles in any way. The jack has a series of saw-toothed butts 5 and below these butts which are used for selection purposes, one larger butt 6. Each of the jacks always has the butt 6 in the position shown but may have one or more of the butts 5 broken away. Above the saw-tooth selector butts there is one rectangular shaped butt 7 which is for the purpose of engaging a cam 8, one of which is included at each separate feeding station, and whereby the jack will be controlled to return to its lowermost position even if the cooperating needle should fail to do so.

In case there should be some misalignment between parts or for any reason one of the jack butts 6 should pass through at such a level that it ran into the point of cam 1, that cam has been provided with means to allow it to swing outwardly so that no damage may result. In the case previously referred to this cam 1 swung about a single pivot point which forced the cam to change its relative elevation in reference to the jack butts passing by it. To overcome the evils which resulted from a tendency of the cam to change its proper height and to allow it to move more nearly in a straight line, a compound system of pivoting levers is employed wherein it has been pivoted at point 9 to an arm 10 which is also pivoted at 11 to a fixed portion of a bracket 12. This bracket has been attached to an upright (not shown) at the forward end of the assembly by means of two screws which pass through enlarged holes 13, Fig. 1, in the bracket to provide for a slight adjustment. The adjustment is brought about by means of a pair of adjusting screws (not shown) which abut against the upper end of the upright. This adjustment takes care of positioning the cam at the proper height and it may be moved into the proper radial position by means described in application Serial No. 56,991. A second arm 14 is also pivoted at a fixed point 15 on an upwardly extending portion of said bracket 12 and is connected to the arm 2 by means of a shouldered screw 16. A spring 17 has been attached at the upper end of

said arm and also to a pin 18 which is fixed to some suitable part of the assembly.

When in the position shown in Fig. 1, the arm 10 bears upon a horizontal portion of said bracket 12 and for all intents and purposes the cam is stationary. However, when contacted by a butt which is not passing at the proper height as in Fig. 2, the tension in spring 17 is easily overcome so that said cam will swing upon the levers or arms 10 and 14 into a position approximately that shown in said figure. The cam itself will remain at about the same elevation so that it will not swing into the path of any other jack butt as might have been possible in the previous construction. A plate 19 has been attached to the bracket 12 just behind a slot in which the arm 2 moves so that the swing of the arm will be limited to about the position shown in Fig. 1 where it will remain vertical when in active position. This plate is provided with a slot for adjustment.

The operation of the device is shown in Figs. 4, 5 and 6 wherein three different possibilities are shown. In Fig. 4 the pathway of needle butts is shown at 20 and the path of selector butts at 21. The lowermost path 22 indicates that which is traveled by the jack butts 6, while the butts 7 would travel in the path indicated at 23. At the first knitting point shown at the right-hand side of the figure, the jacks have not been acted upon to effect the action of needles in any way. Said jacks have merely passed along over the cam 4 which maintains them at an elevation such as shown in Fig. 1 where they will not be engaged by the following raise cam unless they are selected by one of the plungers. The needles pass through this knitting station to knit and it is not possible with the set-up shown to form any kind of ornamental stitch. A cam 24 raised the needles to the position in which the latches are cleared whereupon they take yarn and knit as they pass down under cam 25. A cam 26 acts to relieve the stitch and to return all the needle butts to a common level.

A selector device such as has been indicated in the application Serial No. 56,991 would be interposed between this knitting station and the one next following in which case it is likely that some needles would knit while others might merely be caused to miss the yarn in which case floats would appear in the fabric. All of the needles which are to knit must have at least one selector butt engaged by a plunger 1' so that the butt 6 will ride up cam 1 whereupon the jacks will elevate their corresponding needles to a latch clearing position which is shown by the upper pathway 27. These needles will draw stitches as they pass under a stitch cam 28, while the remaining needles will merely pass along at the lower level not drawing any yarn at this feed.

In the next stage the needle butts which are not selected will be engaged by a cam 29 which will not raise said needles to a latch clearing height, however, it will raise them high enough to take the yarn in their hooks so that tuck stitches will be formed at the next casting off point. The remaining needles which were selected would take yarn and knit under cam 30 precisely in the same manner in which they did in the previous stage. Each of cams 4 is provided with a recessed portion 31 which will allow the butts 6 on the jacks to descend below the upper edge of said cams in case there is any misalignment, or stitch length is adjusted to such an extent that there would be a lack of clearance.

The cams 1 are movable during this operation of the machine as shown in Fig. 2 in the event any one of the butts 6 strikes directly against the point of the cam in which case a smash would result except for the resilient movement of the cam. One particular instance where these cams may move as described is evident in the changing of patterns by pulling out certain of the plungers 1' wherein several of the jacks being engaged by that plunger might be in intermediate positions, some one of them at least being likely to strike the cams as indicated.

Since the cam moves in a horizontal plane and does not swing downwardly, there is no tendency for the cam to be pushed down or away from the cylinder by the resistance of the butts of instrumentalities passing up said cam. Thus it follows that the only movement of the cam will be one which had resulted from improper contact of a butt or butts, and once the improperly positioned butts have passed, the cam will be free to return to its normal operating position and will not be held outwardly by butts passing as might frequently occur with the mechanism as originally constructed. These advantages are obtained without using an exceedingly strong spring to hold the cam inwardly against the cylinder and thus the swinging movement, when necessary, will be an exceedingly easy one.

The device has been described with respect to a particular embodiment of the same, but certain modifications will be evident to those skilled in the art, these falling within the scope of the invention wherein a swinging cam is provided which does not change its elevation to any appreciable extent during its movement away from butts as described. The invention is defined in the appended claims.

I claim:

1. A cam for engaging and acting upon butts of knitting instrumentalities including in combination a butt engaging portion, an arm, pivots about which said arm and cam may swing in a vertical plane, said pivots being provided by a system of levers so constructed and arranged that swinging movements of the arm result in substantially horizontal movements of the cam.

2. A cam for engaging butts on knitting instrumentalities including in combination a butt engaging portion, an arm from which said butt engaging portion projects, said arm being mounted for movement in a substantially vertical plane, a system of levers upon which the arm is pivoted and resilient means to maintain the said arm and cam in one position.

3. A cam for engagement with butts of movable knitting instrumentalities including in combination a butt engaging portion, an arm from which said butt engaging portion projects, a pair of levers on which the arm is pivoted and a support to which said levers are pivoted, the construction being such that movements of the cam as the arm pivots on said levers will be held substantially at right angles to the movement of said instrumentalities.

4. A cam for engaging butts on knitting instrumentalities including a support, a butt engaging portion and an extending arm to which said butt engaging portion is connected, a compound pivoting means between said arm and said support and resilient means to urge the arm in one direction, the construction being such that swinging of the cam about its pivot will not substan-

tially change the elevation of the cam, said change in elevation being less than would be possible if the cam swung about a single pivot anywhere within the supporting arm.

5. A cam for engagement with butts of knitting instrumentalities including in combination a butt engaging portion, an arm from which said butt engaging portion projects, a support, a pair of levers pivoted at one end to the support and at their other ends to the arm, the construction being such that movements of the cam throughout a limited extent will swing the arm about said levers so that the cam will move in a substantially horizontal pathway, resilient means for urging the cam to one position and a stop for preventing excess movement in that direction.

6. A cam for engagement with butts of knitting instrumentalities including in combination a butt engaging portion, an arm from which said butt engaging portion projects and means on which said arm and butt engaging portion may be swung in a substantially vertical plane, and resilient means for urging the cam in one direction so that it may be displaced against the said resilient means upon improper contact of said butts with the cam, said means on which the arm and butt engaging portion swing being so constructed that the effective point about which swinging movement takes place is outside the arm itself and allows the cam to move in a substantially horizontal direction whereby when moved outwardly by improper contact with passing butts the cam may immediately return to active position.

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