Aug. 23, 1938. L. ROBACZYNSKI 2,127,699

KNITTING MACHINE

Filed Jan. 22, 1937 2 Sheets-Sheet 1

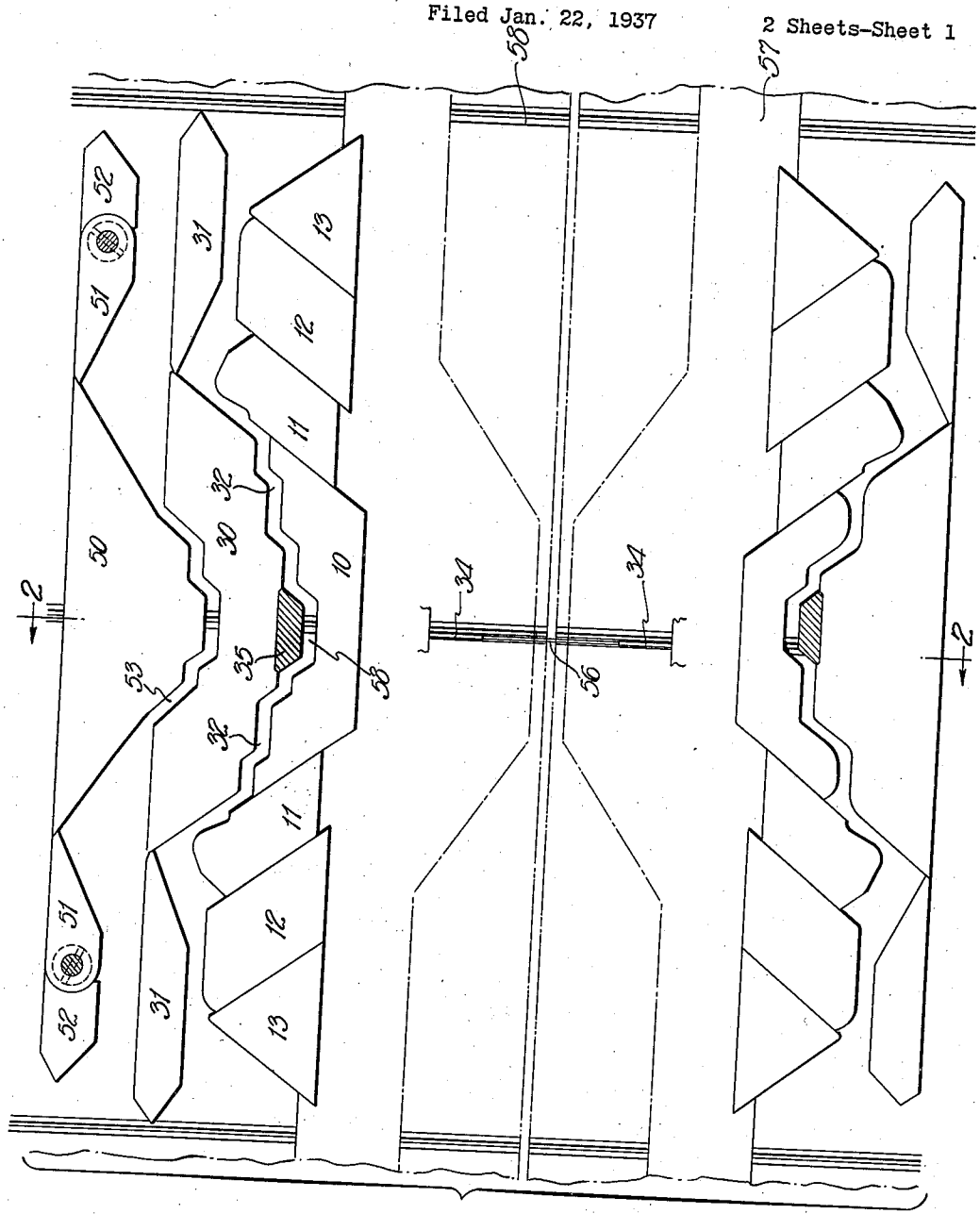


FIG. 1

WITNESS:

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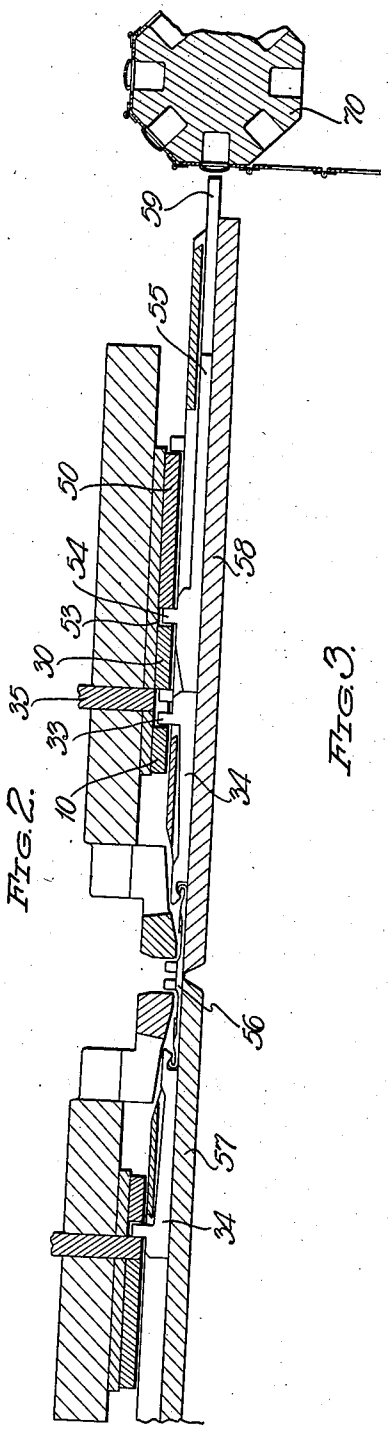


FIG. 2.

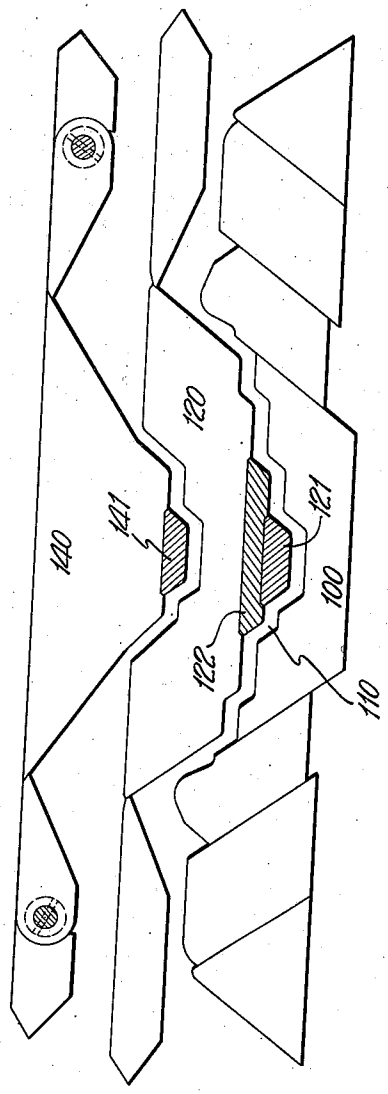


FIG. 3.

WITNESS

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2,127,699

KNITTING MACHINE

Ladislaus Robaczynski, Brooklyn, N. Y.

Application January 22, 1937, Serial No. 121,806

3 Claims. (Cl. 66—63)

This invention relates to improvements in knitting machines and more particularly it pertains to knitting machines of the so-called links and links type.

Machines of the above type include two co-operating needle beds arranged in the same horizontal plane. Needles and needle jacks are slidably mounted in the needle beds and movable over the needle beds in a longitudinal direction, there being a carriage provided with cam-ways for operation upon the needle jacks to in turn operate the needles and effect a knitting operation thereby.

In all such machines with which I am familiar with the exception of the machine illustrated in my co-pending application, Serial Number 68,948, filed March 14, 1936, the needles are moved to position to be transferred from one bed to the other by means of an extensible and retractable cam block which is introduced into that cam-way of the carriage through which the butts of the needle jacks pass in such a manner that when the cam block is retracted, the cam-way operates upon the jacks to effect a knitting operation by the needles and when the cam block is extended, the needle jacks will be moved to a point where they position the needles for transfer to the opposite bed or receive a needle from the opposite bed as the case may be.

Such an arrangement has its disadvantages, the most prominent of which is the fact that it will not produce simultaneous knitting and transfer of needles in a single traversing movement of the carriage. In other words, the needles which are not transferred from one bed to the other cannot be caused to perform a knitting operation simultaneously with the transferring of those needles which are to be transferred from one bed to the other.

In my prior application above mentioned, this disadvantage is eliminated by the provision of a stationary cam arranged forwardly of the knitting position and to the action of which the butts of the jacks of those needles which were to be transferred from one bed to the other were subjected, while the butts of the jacks of those needles which were not to be transferred were passed through the knitting cam-way or channel in the bed in which they were retained.

It is the object of the present invention to improve the construction and mode of operation of knitting machines of the aforementioned type and to provide such machines with a novel mechanism whereby certain needles in a needle bed may be transferred therefrom to the other bed while the needles remaining in the needle bed, or not transferred, may be caused to perform a knitting operation in the same traversing movement or course in which the transfer of certain needles takes place.

A feature of the present invention resides in a novel construction and arrangement of parts whereby such needles as are transferred from the rear bed to the front bed of a knitting machine are moved to their transfer position by a needle jack pusher operating directly upon the needle jacks of such needles as distinguished from those mechanisms heretofore employed in which the needle jacks of those needles to be transferred are operated upon by a cam block which is extensible with relation to the carriage to effect the transferring operation.

Other features of the invention relate to certain novel and improved constructions, arrangements and combinations of parts hereinafter described and particularly pointed out in the claims, the advantages of which will be readily understood and appreciated by those skilled in the art.

The invention will be clearly understood from the accompanying drawings illustrating the invention in its preferred form and the following detailed description of the constructions therein shown.

In the drawings,

Figure 1 is a horizontal sectional view of a knitting machine carriage, the section being taken in a plane directly above the cam blocks of the carriage.

Figure 2 is a transverse sectional view taken substantially on the line 2—2 of Figure 1, and;

Figure 3 is a fragmentary sectional view illustrating a slightly modified form of the invention.

Referring to Figure 1 which shows the cam block arrangement of the carriage, the rear half of the carriage is provided with a cam block system which includes a forward series of cams comprising a bridge cam 10, stitch cams 11, blind or plane cams 12 and guide or wing cams 13. These several cams are positioned at the front of the rear half of the carriage. Positioned to the rear of the aforementioned series of cams there is a second series of cams comprising a center cam 30 at each end of which there is a cam 31. This series of cams, together with the aforementioned series provides a cam-way or channel 32 through which the butts 33 of needle jacks 34, see Figure 2, are adapted to operate. Mounted in front of the center cam 30 there is an extensible and retractable cam 35 and move-

ments of this cam to either its extended or retracted position will alter the contour of the cam-way or channel 32 in a manner and for a purpose to be hereinafter described.

Immediately behind the second mentioned series of cams there is a third series of cams which comprises a rear center cam 50, the draw off cams 51 and the alinement cams 52. This third mentioned series of cams together with the second mentioned series provides a cam-way or channel 53, and it is through this cam-way or channel 53 that the butts 54 of jack pushers 55 are adapted to travel under certain operating conditions of the machine which will be hereinafter described.

The needles are designated 56 and, as heretofore stated, these needles are adapted to be transferred from one to the other of the needle beds, the front bed of which is designated 57 while the rear bed is designated 58 in Figure 2 of the drawings, and also as heretofore stated, this may be accomplished either by transferring all of the needles from one bed to the other in one course of the carriage, or to selectively transfer certain of the needles from one bed to the other and simultaneously knit with the needles not transferred during a single course of the machine, and these operations will now be described.

Assuming that all the needles are in the rear bed and it is desired to knit the straight so-called jersey stitch: Under such conditions the extensible and retractable cam 35 will be elevated, in which position the needle jack butts will follow along the rear wall of the cam-way or channel 32 in engagement with the front edge of the center cam 30, in which position the forward hook will be in position to receive a laid yarn in such a manner that as the needle jack butts pass around the rear end of the stitch cam 11 the needles will cast off and form a loop of the yarn laid therein.

When it is desired to transfer all of the needles from the rear bed to the front bed of the carriage, the extensible and retractable cam 35 will be lowered. Lowering of this cam forms a forward channel 58 through which the butts of the needle jacks will pass and all of the needles will be advanced to a point where they may be picked up by their respective needle jacks in the other or forward bed and be drawn thereinto in the usual manner.

Insofar as the invention has been described, the needles are positioned for transfer from the rear bed to the forward bed by the action of an extensible and retractable cam and it will be obvious that in such operation all of the butts of the needle jacks must pass through the forward channel 58 and will obviously effect a transfer of the needles without their performing any knitting operation, since they will be transferred to the forward bed, disconnect from their respective jacks in the rearward bed, and will therefore not be operated when the butts of the jacks in the rear bed pass around the stitch cam.

I will now describe the manner in which certain of the needles are moved to position for transfer from the rear bed to the forward bed while the needles remaining in the rear bed may perform a knitting operation.

The last aforementioned operation is accomplished by means of the jack pushers 55, heretofore mentioned, and a jacquard mechanism conventionally illustrated at 70 in Figure 2. This jacquard mechanism consists of a plurality of jacquard cards which are perforated in such a manner as to receive the rear ends 59 of certain of the jack pushers while other of the jack pushers will be moved forwardly. Those jack pushers which are moved forwardly will, through the medium of their respective jacks move their respective needles to the position where they may be engaged by their respective jacks in the front bed in order that the needles may be transferred. When operating in this last described manner the extensible and retractable cam will be retracted and such needle jack pushers as have not been advanced by the jacquard mechanism will not move their jacks forward with the consequence that the butts of these respective jacks will pass through the channel 32 in engagement with the forward edge of the center cam 30 and perform a knitting operation in the afore-described manner while those needles whose jacks have been moved forward by the jacquard mechanism and their respective jack pushers will be transferred to the front bed.

From the foregoing it will be apparent that under these last mentioned operating conditions the transfer of the needles from the rear bed to the front bed is accomplished entirely independently of any cams or cam blocks operating upon the butts of the needle jacks and that the selective needles are positioned for transfer directly from the jacquard mechanism through the jacks and their respective jack pushers. It is to be understood that those needles which are selected by the jacquard mechanism for transfer will, in the selective operation, have their jack pushers positioned by the jacquard mechanism for movement through the channel 53 between the second and third series of cams, and it will also be understood that the cam 35 being raised or retracted, the positioning of the needle jacks to in turn position the needles for transfer is accomplished solely by the needle jack pushers operating upon the pushers through their respective needle jacks.

In Figure 3 I have shown a slightly modified form of the invention and in this form the reference numeral 100 designates the bridge cam, 120 the center cam, and 140 the rear center cam. Mounted on the front of the bridge or the center cam 120 there are two extensible and retractable cams 121 and 122, while mounted in front of the rear center cam 140 there is an extensible and retractable cam 141. When both of the cams 121 and 122 are elevated certain or all of the needles will pass through the cam-way or channel 110 without performing either a knitting operation or a transferring operation. If, however, the cam 122 be extended while the cam 121 is retracted, all of the needles passing through the cam-way or channel 110 will perform the knitting operation and likewise if both of the cams 122 and 121 are extended, the butts of the needle jacks will pass around the forward edge of the cam 121 and will effect a transfer of all of the needles from the rear bed to the forward or front bed. The extensible and retractable cam 141 which operates upon the butts 54 of the needle jack pushers will operate to permit of certain of the selected needles passing through the machine in the rear bed to perform the knitting operation or to effect a transfer of the selected needles from the rear to the forward bed. Thus, when the extensible or retractable cam 141 is retracted, selected needles may be passed through cam-way 110 to perform a knitting operation and when this cam 141 is extended the selected needles will be transferred from the rear bed to the front bed, which action will take place entirely independently of any cams operating upon the needle jacks.

From the foregoing it will be apparent then that the present invention provides a new and improved mechanism for operating the needles of knitting machines and particularly for transferring selectively, needles from one to the other of the beds of a knitting machine entirely independent of any cams operating upon the needle jack butts. Furthermore, it will be obvious that the invention provides a mechanism wherein certain needles may be transferred while others may be retained in the rear bed to perform a knitting operation and that this may be accomplished simultaneously within one course of the machine.

While in the foregoing specification I have described the transfer of needles from the rear bed to the front bed, it is to be understood that the action is the same for transferring needles to the rear bed from the front bed, since in the conventional operation of the machine, all of the needles in the front bed are moved up to transfer position where they are grasped and transferred to the rear bed by their respective jacks in the rear bed when these latter are advanced to position to engage the needles to be transferred from the front bed to the rear bed.

Having thus described the invention, what is claimed as new, is:

1. In a knitting machine in combination, a pair of cooperating needle beds, needles slidable in said needle beds and transferable from one to the other of the needle beds, needle jacks for operating said needles, needle jack pushers for operating said needle jacks, a carriage, a plurality of stationary cam blocks carried by said carriage and arranged to define two cam passageways one of which is forward of the other, and movable cam blocks in each of said cam passages, said movable cam blocks being extensible and retractable to vary the contour of their respective cam passageways.

2. In a knitting machine in combination, a pair of cooperating needle beds, needles slidable in said needle beds and transferable from one to the other of the beds, needle jacks for operating said needles, needle jack pushers for operating said needle jacks, a carriage, a plurality of stationary cam blocks carried by said carriage and arranged to define two cam passageways one of which is forward of the other, an extensible and retractable cam block in each of said passageways adapted for movement to vary the contour of their respective passageways, and means for operating said cam blocks.

3. In a knitting machine in combination, a pair of cooperating needle beds, needles slidable in said needle beds and transferable from one to the other of said beds, needle jacks for operating said needles, needle jack pushers for operating said needle jacks, a carriage, a plurality of stationary cam blocks carried by said carriage and arranged to define two cam passageways, one of which is disposed forwardly of the other, a movable cam adapted to be extended into and retracted from the rear of said cam passageways to alter the contour thereof, and two movable cam blocks independently extensible into and retractable from the forward cam passageway to vary the contour thereof.

LADISLAUS ROBACZYNSKI.