March 20, 1945. H. W. START ET AL 2,371,932

AUTOMATIC WELT TURNING MECHANISM OF STRAIGHT-BAR KNITTING MACHINES

Filed May 27, 1944 2 Sheets-Sheet 1

Fig. 1.

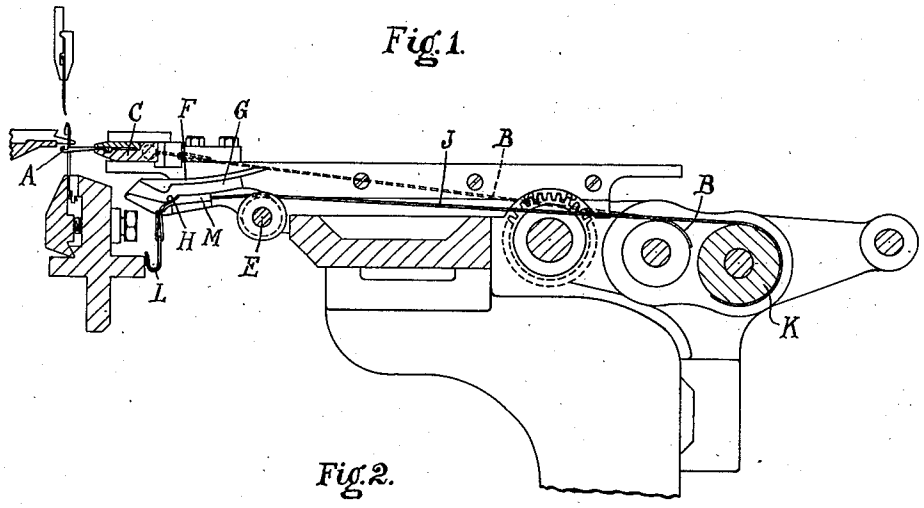


Fig. 2.

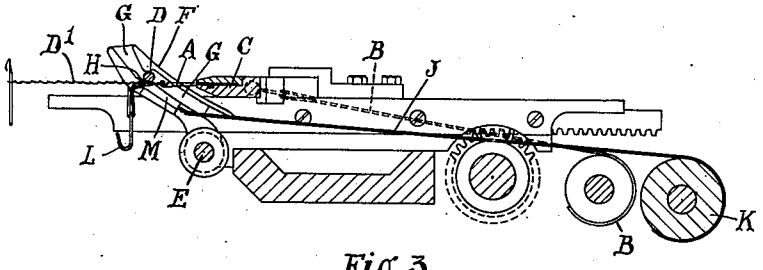
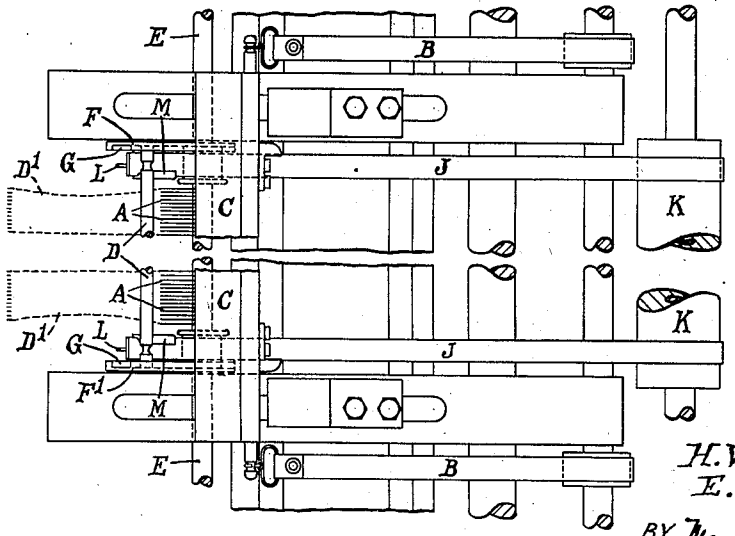


Fig. 3.



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Fig. 4.

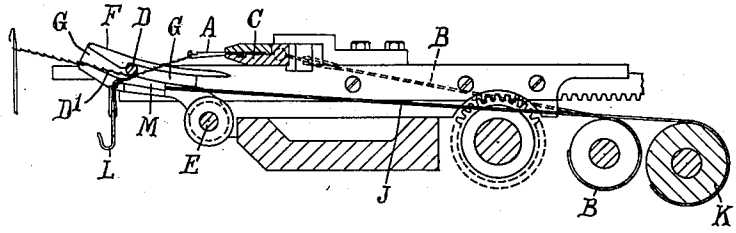


Fig. 5.

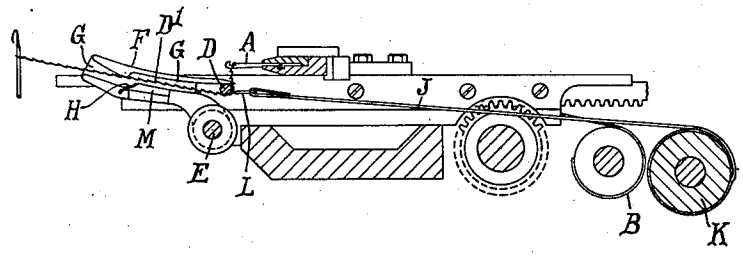


Fig. 6.

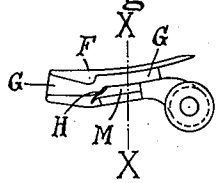


Fig. 8.

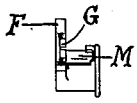


Fig. 9.

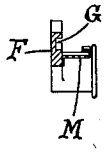
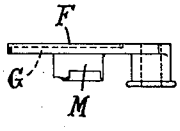


Fig. 7.



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UNITED STATES PATENT OFFICE

2,371,932

AUTOMATIC WELT TURNING MECHANISM OF STRAIGHT-BAR KNITTING MACHINES

Harry Wilfred Start, Carlton, and Ernest Start, Wilford, England

Application May 27, 1944, Serial No. 537,698
In Great Britain March 22, 1943

4 Claims. (Cl. 66—96)

This invention relates to improvements in the automatic welt turning mechanism of straight-bar knitting machines and is particularly applicable to machines of the kind in which a set of welt hooks are mounted in a bar carried by bearers disposed to the front of the needle-bar and are moved up to the needles to receive loops of the initial course, withdrawn therefrom during the knitting of at least a portion of the welt and moved up to the needles to restore thereto the loops of the initial course taken by welt hooks to complete the formation of the welt.

In welt turning mechanism of the kind described the necessary tension on the work during the production of a portion of the welt is applied by supplementary take up mechanism attached to the welt hook bar until such time as the main take-up mechanism can be brought into operation just prior to the welt hook bar reaching the limit of its travel away from the needles. The main take-up mechanism is connected by straps to the welt wire which is placed in position on the upper side of the work, when sufficient has been produced, and when the main take-up mechanism is brought into operation the welt wire is drawn back by the straps into a position below the welt hooks and then applies the necessary tension to the work after the welt hook bar has reached the limit of its movement away from the needles. The work extends from the needles substantially horizontally to the welt hooks and when sufficient work has been produced the welt wire is pressed down on the work and into engagement with catches to hold it in this position until the main take-up mechanism is brought into operation. It will be understood that a welt wire is placed in position in each division of the machine before the main take-up mechanism is brought into operation so that all the welt wires are drawn back together. With this arrangement the welt wires cannot be placed in position until sufficient work has been produced to permit of them being pressed down on the work and into engagement with their respective catches and consequently the welt hook bars may reach the limit of their travel before the welt wires can be placed in position in all the divisions, which would mean stopping the machine to complete this operation or else faulty work would be produced. Furthermore when the welt wires are drawn back by the main take-up mechanism there is a tendency for the welt wires to ride over the ends of the welt hooks onto the latter where they cannot perform their proper function.

The purpose of the present invention is to obviate the disadvantages of the prior arrangement.

The present invention provides, in welt turning mechanism of the kind described, angularly adjustable arms to engage with and hold the ends of the welt wires and adapted to be turned so that their ends project above the work to receive the ends of the welt wires. A further feature of the invention is the provision of guides on the arms which engage with the ends of the welt wires and direct the latter into a position beneath the welt hooks when the main take-up mechanism is brought into operation.

The invention will now be more particularly described with reference to the accompanying drawings in which:

Fig. 1 is a sectional elevation of part of a straight-bar knitting machine showing the welt hooks in position to receive loops of the initial course.

Fig. 2 is a sectional elevation and

Fig. 3 is a plan of part of a straight-bar knitting machine showing one of the welt wires placed in position when sufficient fabric has been knitted to permit of this operation being carried out.

Fig. 4 is a sectional elevation showing one of the welt wires depressed onto the fabric,

Fig. 5 is a sectional elevation showing one of the welt wires being drawn into its operative position when the main take-up mechanism is brought into operation,

Fig. 6 is a side elevation,

Fig. 7 a plan and

Fig. 8 a front elevation of one of the welt wire supporting arms shown detached,

Fig. 9 is a sectional elevation on the line X—X of Fig. 6.

Like letters indicate like parts throughout the drawings. Only sufficient of a straight-bar knitting machine to enable the invention to be understood is shown in the drawings.

At the commencement of a welt the welt hooks A are moved into the position shown in Fig. 1 so that they can receive loops of the initial course and the necessary tension on the work is applied by the auxiliary take-up mechanism which comprises straps B connected to the end of the welt hook bar C as shown in Figs. 2 and 3 and operated in well known manner. When the welt hooks A have been withdrawn a sufficient distance from the needles the welt wires D are placed in position on the fabric D^1. In order to hold the welt wires D arms are provided to engage with the ends thereof and retain them in posi-

tion. The arms are secured on an angularly adjustable shaft E carried in bearings attached to the fixed frame and disposed below the level of the welt hook bar C as shown in the drawings. Two arms are provided in connection with each welt hook bar in the machine, that is, one for each end of each welt wire. These two arms F, F^1, see Fig. 3, are turned up into the position shown in Fig. 2 when sufficient fabric has been knitted to permit of this by an angular adjustment of the shaft E. In order that the ends of the welt wires D may engage with their respective arms, the latter are preferably formed with grooves G in their inner side faces to receive the ends of the welt wires. These grooves G are preferably formed with a step H therein which is so disposed that it comes just above the level of the fabric when the arms F, F^1, are turned up into position shown in Figs. 2 and 3. It will therefore be seen that when the ends of the welt wires D are placed in the grooves G and released the ends will drop onto the steps H as shown in Fig. 2. The shaft E extends across all the divisions of the machine so that all the welt wire engaging arms will be turned up together by an angular adjustment of the shaft E about its axis. After the shaft E has been angularly adjusted to move the arms F, F^1 associated with each welt hook bar C into the position shown in Fig. 2 the welt wires D can be quickly placed in position for each welt hook bar and each welt wire D will drop onto the step H provided in the grooves G in its associated arms F, F^1, and be disposed in a similar position to the welt wire D shown in Fig. 2.

When the welt hook bar has nearly reached the limit of its motion away from the needles the shaft E is angularly adjusted to press the welt wires D onto the fabric D^1 as shown in Fig. 4. This operation moves the welt wires D into the mouth of that part of the groove G disposed behind the step H ready for the withdrawal of the welt wires D into their operative positions when the main take-up mechanism is brought into operation.

The main take-up mechanism comprises the usual straps J connected to the take-up roller K and provided with hooks L at their outer ends to engage with the welt wires D. The straps J are fully extended and placed in position ready for engaging with the welt wires when the main take-up mechanism is brought into operation, prior to the starting of the welt. To ensure that the hooks J engage with the welt wire supports M may be provided on the arms F, F^1 to hold the straps J in the position shown in Fig. 1 of the drawings.

The main take-up mechanism is brought into operation just prior to the welt hook bar C reaching the limit of its movement away from the needles and as the straps J are withdrawn by the take-up roller K the hooks L will engage with the welt wires D and draw them back along the grooves G as shown in Fig. 5.

In order to prevent the welt wires D riding over the ends of the welt hooks A when the take-up mechanism is brought into operation the groove G in the arms F, F^1, or the upper side thereof, is extended back to a point beyond the rearmost position of the ends of the welt hooks A as shown in Fig. 5 of the drawings. It will therefore be seen that when the main take-up mechanism is brought into operation the hooks L on the straps J will engage with the welt wires D and draw them back along the grooves G and that when they move out of engagement with the grooves G or the extension of the upper side thereof they will be in a position underneath the welt hooks so that they cannot ride over the latter.

When the welt wires D have been withdrawn from the grooves G the arms F, F^1 are returned to the position shown in Fig. 1 ready to receive the ends of the take-up straps J prior to the start of the next welt.

The arrangement described permits of the welt wires being placed in position in ample time before the welt hooks reach the limit of their movement away from the needles so that this operation can be effected without stopping the machine and effectively prevents the welt wires riding over the ends of the welt hooks.

What we claim as our invention is:

1. Welt turning mechanism for a straight-bar knitting machine having associated therewith pivoted welt wire holding arms adapted to be turned about their pivots to bring the ends of the arms above the work to receive the welt wires and supports on the arms to hold the ends of takeup straps so that the latter will engage with the welt wires when tension is applied thereto.

2. Welt turning mechanism for a straight-bar knitting machine having associated therewith pivoted welt wire holding arms angularly adjustable about their pivots to bring the ends of the arms above the work, a groove in the inner side faces of the arms to receive the ends of the welt wires and supports on the arms to hold the ends of take up straps in position to engage with the welt wires when tension is applied thereto.

3. Welt turning mechanism for a straight-bar knitting machine having associated therewith pivoted welt wire holding arms angularly adjustable about their pivots to bring the ends of the arms above the work, a groove in the inner side faces of the arms to receive the ends of the welt wires, a step in the groove to hold the welt wires over the work and supports on the arms to hold the ends of take up straps so that they will engage with the welt wires when tension is applied thereto.

4. Welt turning mechanism for a straight-bar knitting machine having associated therewith pivoted welt wire holding arms angularly adjustable about their pivots to bring the ends of the arms above the work, supports on the arms to hold the ends of take up straps in position to engage with the welt wires and a groove in the inner side faces of the arms to receive the ends of the welt wire and guide the latter into a position below the welt hooks when drawn back by tension applied to the take up straps.

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