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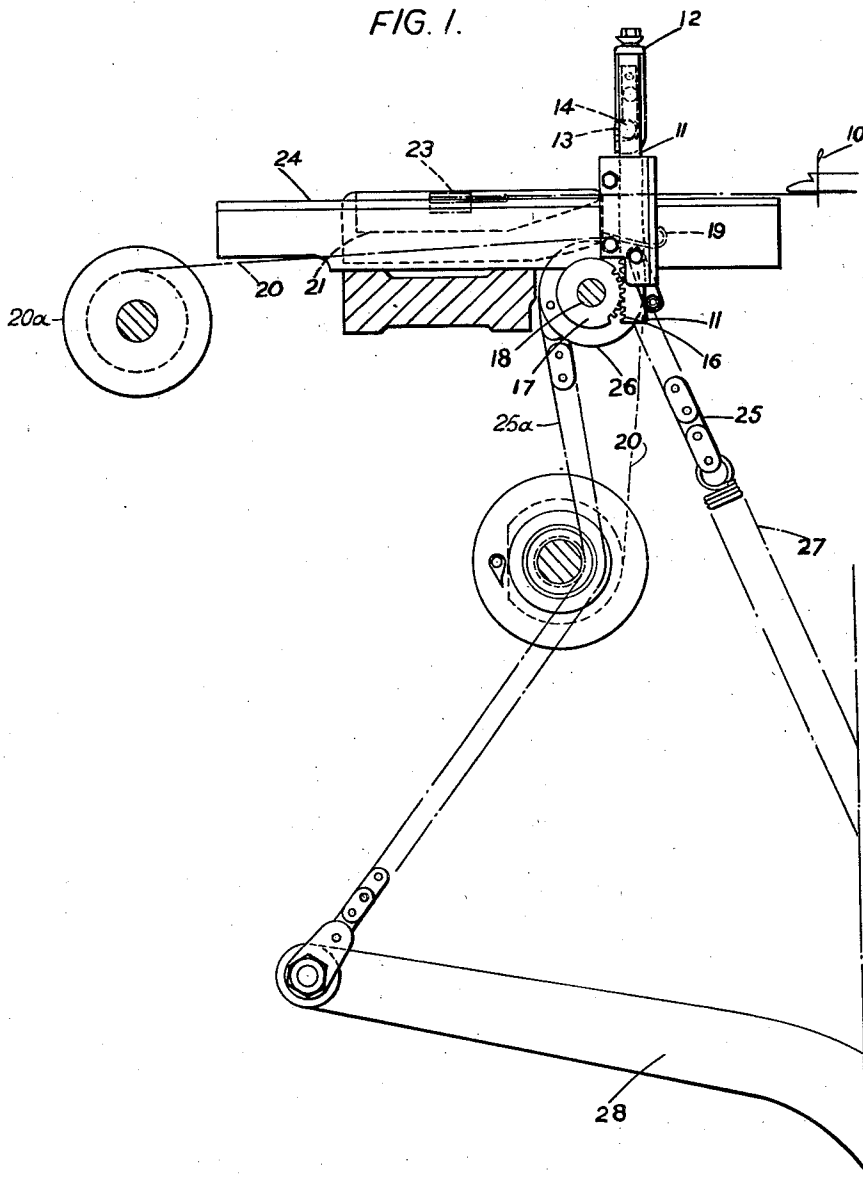
W. G. MACDONALD ET AL

2,381,072

COTTON'S PATENT AND OTHER STRAIGHT BAR KNITTING MACHINES

Filed Feb. 14, 1944

5 Sheets-Sheet 1



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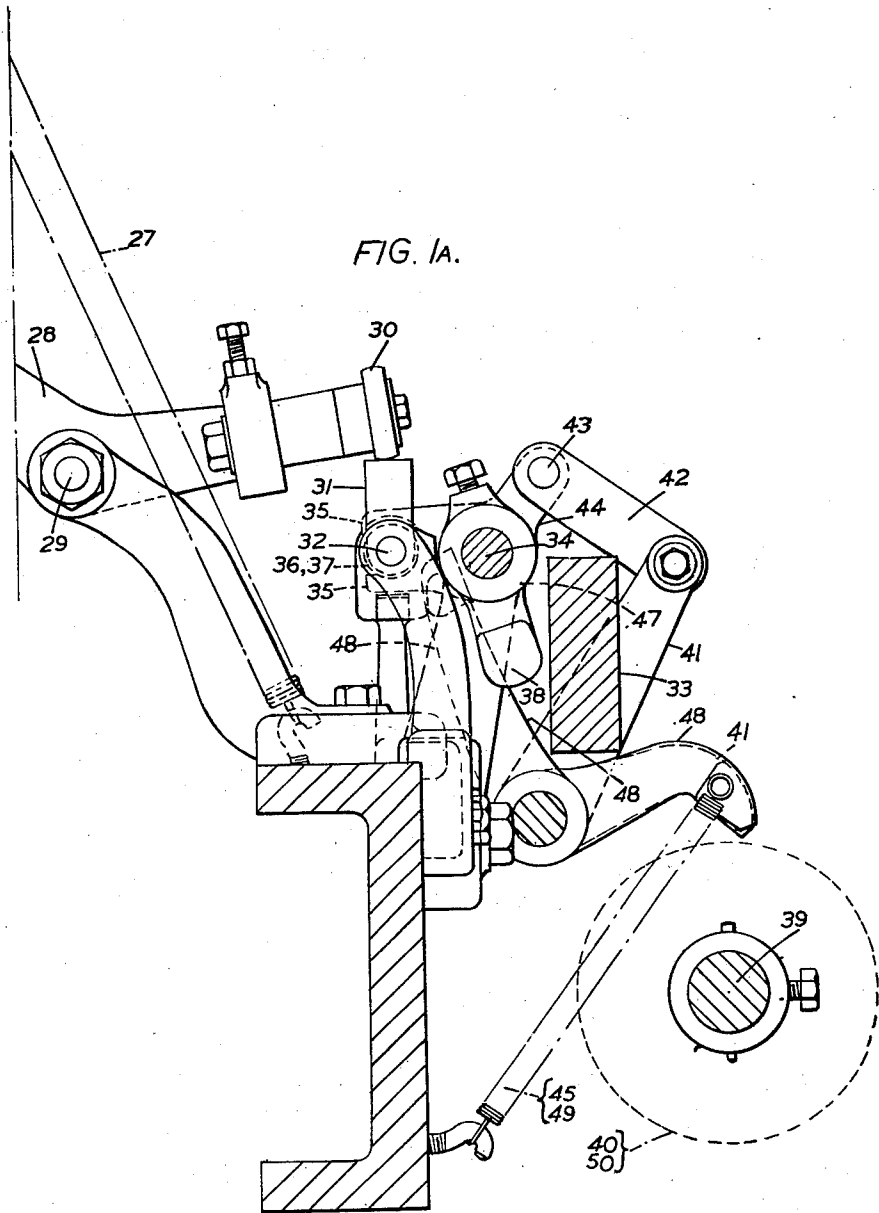
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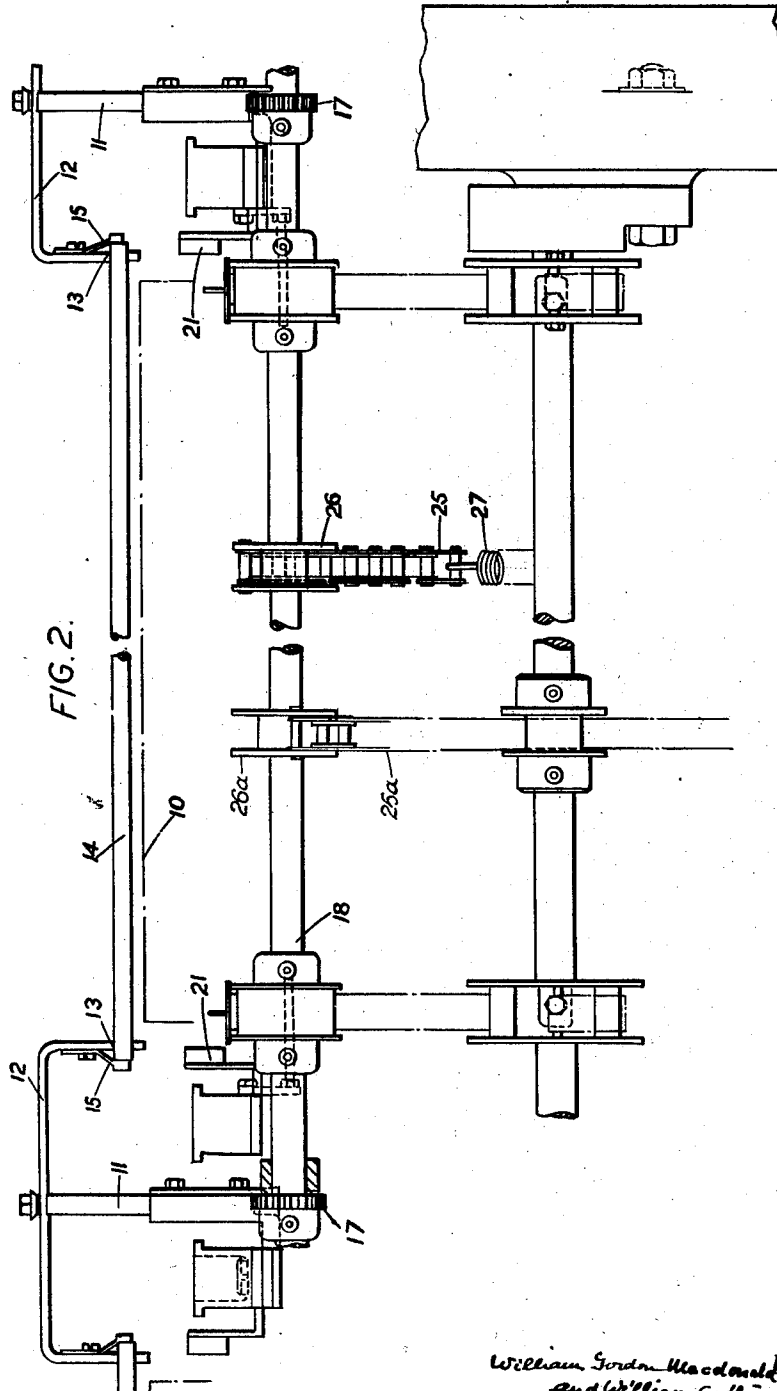


FIG. 2.

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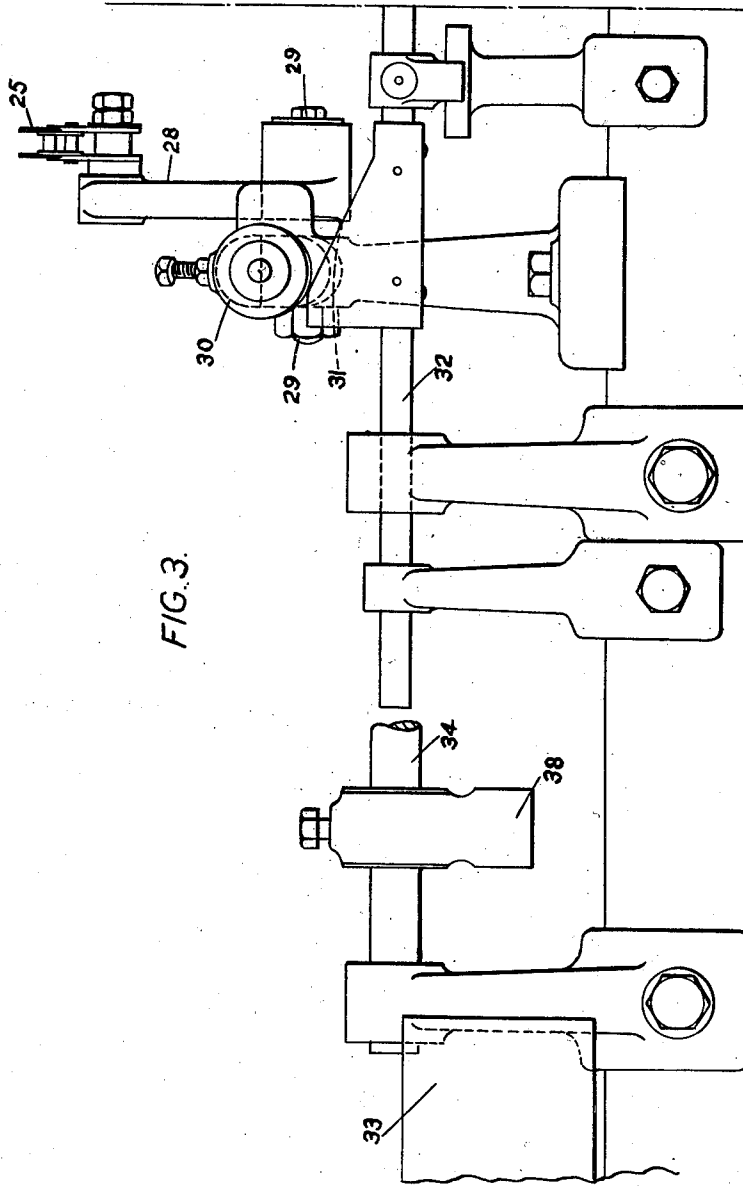


FIG. 3.

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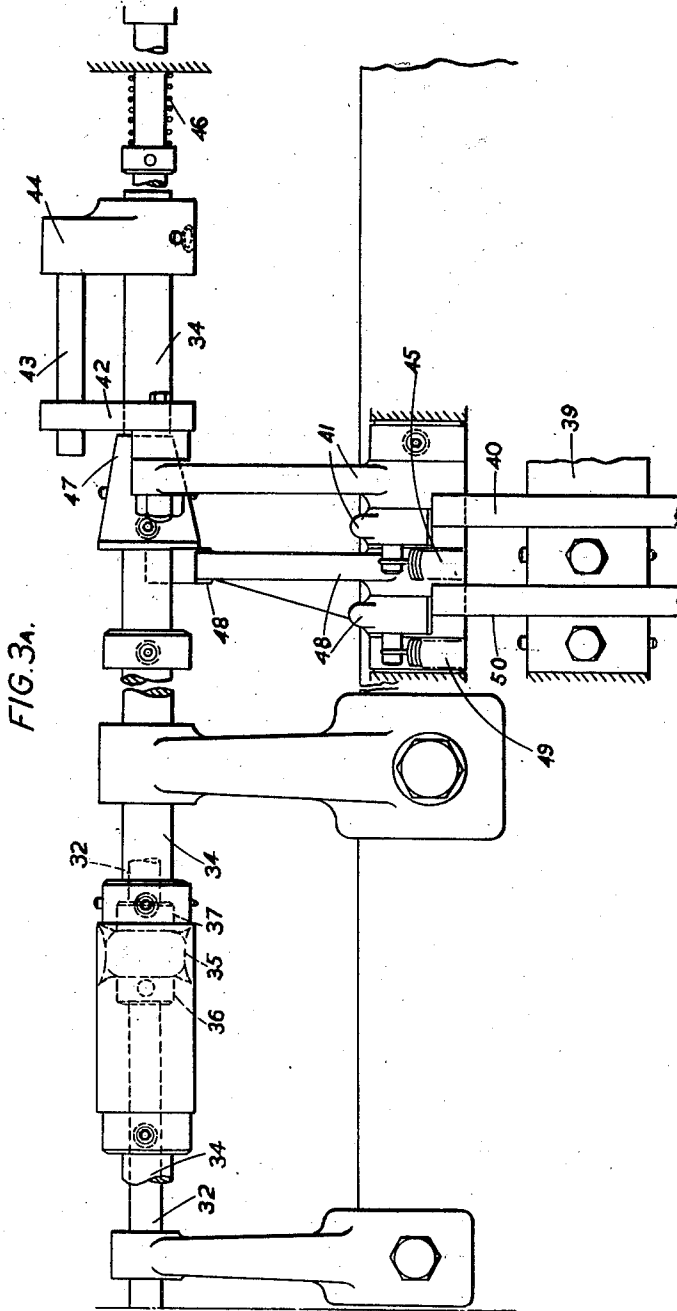


FIG. 3a.

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2,381,072

COTTON'S PATENT AND OTHER STRAIGHT BAR KNITTING MACHINE

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Application February 14, 1944, Serial No. 522,329
In Great Britain July 9, 1943

5 Claims. (Cl. 66-149)

This invention concerns Cotton's Patent and other straight bar knitting machines adapted for the production of welted fabric, and particularly those machines equipped with automatic welt turning apparatus. In the production of welted fabric the fabric is initially drawn away from the needles by a welt bar equipped with wetting instruments. A welt rod is then placed on the fabric, fabric take-up straps are connected to the ends of the welt rod, and the initial course of the welt fabric is returned to the needles over the top of the welt rod by suitable movement of the welt bar. The welt fabric therefore forms a loop in the bight of which the welt rod lies. The present invention provides mechanism for lowering the welt rod on to the fabric at the appropriate time.

According to this invention in a Cotton's Patent or other straight bar knitting machine for the production of welted fabric, there are provided spaced supports for a welt rod, and means for lowering said supports, from an upper position in which they are adapted to receive and support the welt rod above the fabric, thereby to lower the welt rod on to the fabric, and for raising said supports to the upper position. Specifically, there may be operating means for moving said supports, comprising a member movable into the path of the draw bar, draw lever or like part of the draw mechanism, that moves to and fro (e. g. reciprocates or oscillates), so as to be displaced thereby, and a connection between said member and the supports whereby displacement of said member results in movement of said supports, pattern-controlled means for moving said member into said path and out of it after said displacement, and for locking the said member in displaced position for a predetermined plurality of draws. By "pattern-controlled means" is meant means controlled by a patterning device such as a chain, pattern drum, cam disc, or the like.

These and other features of the invention are incorporated in the construction which will now be described as an example, as applied to a Cotton's Patent knitting machine adapted for the production of welted fabric, with reference to the accompanying drawings which show the relevant parts of the machine (omitting the automatic welt turning apparatus, which of itself forms no part of the invention) and in which

Figures 1 and 1A show a cross section through the machine and mechanism according to this invention;

Figure 2 is a front elevation of the upper part of the mechanism, and

Figure 3 is a rear elevation of the left hand portion and Figure 3A of the right hand portion, of the lower part of the mechanism.

In a Cotton's Patent knitting machine adapted for the production of full fashioned stocking blanks and provided with automatic welt turning mechanism, at each end of each division of needles (such as the division 10 in Fig. 2) there is a vertical plunger 11 carrying a cross bar 12. In the case of plungers 11 located between successive divisions each end of the cross bar is turned down as shown at the left hand side of Fig. 2, while in the case of plungers located beyond the end divisions only one end of the said cross bar is turned down as shown at the right hand side of Fig. 2. That face of the down-turned portion that is directed away from the needles is provided with a recess forming a hook 13 in which a welt rod 14 may be lodged, the said welt rod 14 extending horizontally and being supported at its ends by the two hooks 13 at either end of the division so as to be capable of being drawn out of said hooks horizontally away from the needles, the distance between the hooks being greater than the width of the division. A leaf spring 15 attached to each turned-down portion bears against the adjacent end of the rod 14 so that the rod is located endwise between said springs 15. Each plunger 11 is cut with a rack of teeth 16 and the racks are engaged by pinions 17 on a common horizontal shaft 18 that is rotatable to raise and lower the plungers 11 by mechanism hereinafter described.

When the plungers 11 are in the upper inoperative position the welt rods 14 may be inserted in the supports 13 and remain there until required. At the appropriate stage in the wetting operations the plungers 11 are lowered so that the welt rods 14 descend onto the fabric. A hook 19 on a take-up strap 20 is thereupon connected to each end of the welt rod 14, and the welt rod drawn forward out of its support by a pair of such straps 20. To effect this connection the welt rod may be lowered by the plungers 11 into a position whereat the hooks 19 automatically engage the rod when the take off roller 20a is partly rotated by hand. If desired the hooks 19 may be enlarged for this purpose. At each end of each division there is an upper guide 21 (extending horizontally forwards), beneath which the ends of the welt rods 14 are drawn by said hooks and by them

guided beneath the path of the welt bar 23 for which suitable horizontal guides 24 are provided. When the welt rods 14 have been drawn from their supports the plungers 11 are again raised to the inoperative position.

The descent of the plungers 11 needs to be so timed that the welt rods 14 are lowered to the fabric at the appropriate stage in the production of the welt. For this purpose one end of a chain 25 is anchored to a flanged wheel 26 on the aforesaid pinion shaft 18. One end of a further chain 25a is anchored to a second flanged wheel 26a. The other end of the chain 25 is connected to a tension spring 27 exerting a pull in a direction tending to lower the plungers 11. The other end of chain 25a is connected to one end of a lever 28 which is pivoted intermediate its ends at 29 and at the other end has a truck 30 so that when the truck is raised the lever 28 is rocked to cause the plungers 11 to rise. The rocking of the lever 28 is effected by an upwardly inclined ramp 31 on a rod 32 that extends horizontally at the back of the machine, said rod 32 being movable endwise to force the ramp 31 beneath the truck 30 or to remove it therefrom. This endwise movement is derived from the reciprocating draw bar 33. For this purpose there is a shaft 34 parallel with the rod 32, the said shaft 34 having a fork 35 rotatably mounted on but restrained against axial movement along it, the said fork 35 engaging between two abutments 36, 37 on the rod so that the shaft 34 may be rotated but when moved endwise moves the rod 32 with it. The said shaft 34 is further provided with a projection 38 which, when the shaft is rotated, is brought into and out of the path of the end of the draw bar 33. Thus when the projection 38 is rotated into the said path it is struck by the end of the draw bar 33, the rod 32 and the shaft 34 are moved sideways, and the lever 28 is rocked by ramp 31 to raise the plungers 11. Since it is not desired that the projection 38 shall be repeatedly struck by the end of the draw bar 33 immediately this displacement has been effected, the shaft 34 is then rotated to remove the projection 38 from the draw bar path. These movements of the projection into and out of said path are determined by pattern-controlled mechanism.

This mechanism comprises a horizontal cam shaft 39 at the rear of the machine carrying a plurality of cams which time the automatic movements involved in welt turning. There is one cam 40 provided on its periphery with a suitable rise (not shown) which is adapted to engage and rock a bell-crank-lever 41 that is connected to the shaft 34 by a link 42 slidably engaging a horizontal pivot pin 43 on an arm 44 projecting from said shaft 34. Thus when the rise is presented to the bell-crank-lever 41 the shaft 34 is rocked to move the projection 38 into the path of the draw bar 33 (so that the ascent of the plungers 11 is pattern-controlled) and immediately the rise is removed from the bell-crank lever 41 the latter is returned by a spring 45 and the shaft 34 is rocked to carry the projection 38 out of said path.

A suitable spring 46 is provided for returning the rod 32 and shaft 34 in the opposite direction to that in which they are displaced by the draw bar 33 and for thereby removing the rise 31 from beneath the truck 30 so as to permit the aforesaid tension spring 27 to lower the welt rods 14. It is necessary to lock the rod 32 in the displaced position (wherein the plungers 11 are held raised) for a predetermined period and to release

it for movement by the return spring 46 (so that the plungers are lowered) at a predetermined stage in the welt-forming operations of the machine. Therefore pattern-controlled locking mechanism is provided for locking the rod 32 in its displaced position. For this purpose there is a frusto-conical cam 47 on the shaft 34 and a co-operating bell-crank-lever 48 adapted to be rocked against the action of a spring 49 by a further cam 50 on the cam shaft 39. Before the displacement of the rod 32 and shaft 34 by the draw bar, the bell-crank-lever 48 co-operates with the plain part of the cam periphery. As the shaft 34 is displaced the cam 47 pushes past the end of the bell-crank-lever 48 and the latter springs in behind the big end of the frusto-conical cam and locks the shaft and rod against return. When a rise (not shown) on the second-mentioned cam 50 engages the bell-crank-lever 48 the latter is rocked to disengage from behind the big end of the cam 47 so that the shaft and rod may be returned by the aforesaid return spring 46 and the plungers 11 thereby lowered.

If desired there may be a finger grip or handle fixed to the shaft 18 in such manner that if the rod 14 is not lowered sufficiently by the spring 27 to be engaged by the hooks 19 the shaft may be partly rotated by the finger grip to lower the rod 14 finally into such position.

We claim:

1. In a straight bar knitting machine for the production of welted fabric and having draw mechanism including a part that moves to-and-fro, and a fabric take-up for connection to a welt rod; the combination of spaced supports for the ends of said welt rod which supports are movable between a raised position in which they support the rod above the fabric and a lower position in which the rod may be connected to the take-up and drawn thereby out of the supports, a member movable into the path of said part of the draw mechanism so as to be displaced thereby, pattern-controlled means for moving said member into and out of said path, means biasing said member against displacement by said part, a connection between said member and the welt rod supports for raising said supports when said member is displaced by said part and for lowering them under the influence of the bias, and pattern-controlled locking mechanism for locking said member in the displaced position and for releasing it at a predetermined stage in the operation of the machine.

2. In a straight bar knitting machine for the production of welted fabric and having draw mechanism including a part that moves to and fro, and spaced supports for the reception of a welt rod above the fabric, said supports being movable from an upper position in which they are adapted to receive and support the welt rod above the fabric, thereby to lower the rod into the fabric and subsequently back into the upper position; operating means, for moving said supports, comprising a member movable into the path of said part of the draw mechanism so as to be displaced thereby, a connection between said member and the supports whereby displacement of the member results in movement of said supports, and pattern-controlled means for moving said member into said path and out of it after said displacement.

3. Apparatus according to claim 2, having the member displaceable by said part in one direction, biasing means for moving it in the reverse direction, and pattern-controlled locking mech-

anism for holding said member in the displaced position against the action of the bias.

4. Apparatus according to claim 2, comprising a slidable shaft, a projection thereon for engagement by said part to displace the part, connections in the pattern-controlled means for swinging the projection into and out of the path of said part, and a connection between the shaft and the supports for moving the latter.

5. In a straight bar knitting machine for the production of welted fabric and having draw mechanism including a part that moves to and fro, and spaced supports for the reception of a welt rod above the fabric, said supports being movable from an upper position in which they are adapted to receive and support the welt rod

above the fabric, thereby to lower the rod into the fabric and subsequently back into the upper position; operating means, for moving said supports, comprising a member movable into the path of said part of the draw mechanism so as to be displaced thereby, a connection between said member and the supports whereby displacement of the member results in movement of said supports, and pattern-controlled means for moving said member into said path and out of it after said displacement, and for locking said member in the displaced position for a predetermined plurality of courses.

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