July 24, 1956 E. HAFNER 2,755,647

METHOD AND FLAT KNITTING MACHINE FOR THE MANUFACTURING OF REGULAR KNITTED FABRICS

Filed June 10, 1953

Fig. 1

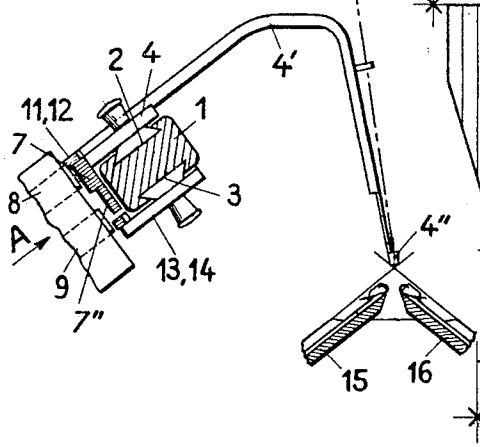


Fig. 2

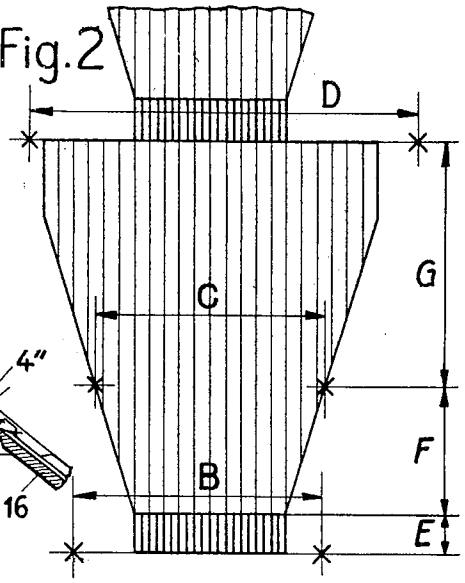


Fig. 3

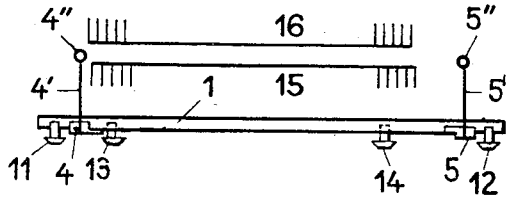


Fig. 4

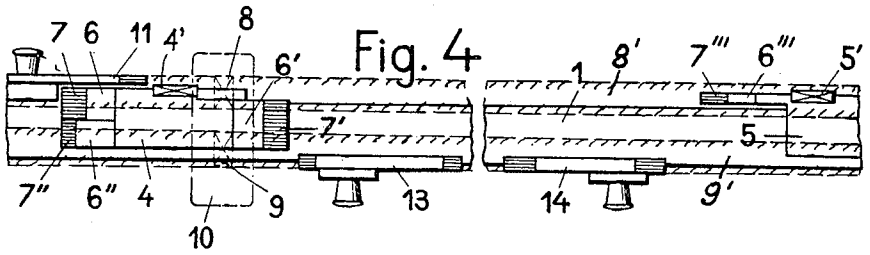
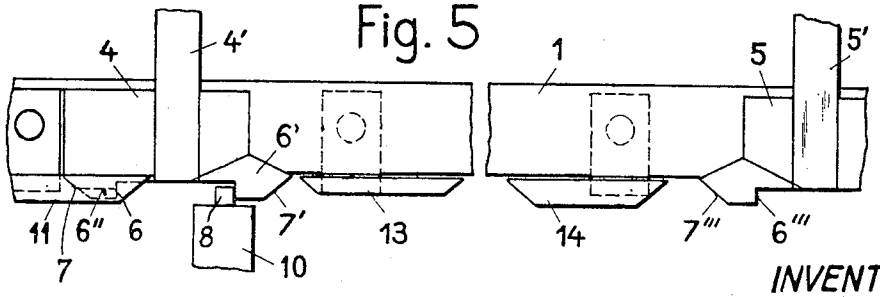


Fig. 5



INVENTOR:
ERNEST HAFNER
BY
Kenyon & Kenyon
ATTORNEYS

United States Patent Office

2,755,647

Patented July 24, 1956

2,755,647

METHOD AND FLAT KNITTING MACHINE FOR THE MANUFACTURING OF REGULAR KNITTED FABRICS

Ernest Hafner, St. Albans, N. Y., assignor to Dubied Machinery Company, Long Island City, N. Y.

Application June 10, 1953, Serial No. 360,671

Claims priority, application Switzerland June 17, 1952

6 Claims. (Cl. 66—127)

In the manufacture of fabrics with narrowing or widening of the stitches on flat knitting machines, it is well known to vary the path of the thread-carrier according to the changing width of the goods in order to obtain regular selvages on the goods. For this purpose stop devices are used, which are axially shifted either by hand or by mechanical devices in order to produce disengagement of the thread-carrier in such a way, that the latter is stopped on both sides of the needle rows immediately after the last knitting needles, while the driver, provided on a carriage and which heretofore had moved the thread carrier may continue its stroking engagement.

There are also devices known, in which the stroke of the thread-carrier is limited according to the changing width of the goods in that the driver of the thread-carrier is directly or indirectly uncoupled alternately in both directions of movement of its carriage by the respective last actually knitting needle of the row or by the spring, pusher or the like of the latter.

With the described method regular knitted fabrics may either not be produced automatically or expensive devices are necessary therefor, which in many cases in addition thereto necessitate a special construction of the flat knitting machine.

The prime object of the present invention is to overcome these disadvantages. For this purpose in the method of the invention for the manufacture of regular knitted fabrics on a usual flat knitting machine having a constant carriage stroke, for the production of regular selvages on the goods according to the changing width of the goods, the stroke of the thread-carrier block is changed gradually in proportion to the variable width of the fabric.

A further object of the present invention is to provide a flat knitting machine, for the working-out of this method, which is provided with inclined ramps and driving cams adapted to cooperate with adjustable drivers disposed in different movement courses.

The stroke limitation of the thread-carrier block is preferably obtained by release members provided on at least two slide surfaces of the guide rail.

Preferably at least two thread-carrier blocks are provided on a slide surface of the guide rail, the stroke limitation of which is obtained either by the one or the other of said thread-carrier blocks and the release members of the latter, or by release members, provided on at least two slide surfaces of the guide rail.

Preferably driving cams of the thread-carrier block are located above at least two movement courses of the drivers; these driving cams are stepped with respect to each other.

The method according to the present invention shall now be explained by way of example with the help of the drawing. The latter shows parts of an embodiment of the flat knitting machine forming also an object of the present invention.

In the drawings:

Fig. 1 shows a cross-section through a guiding rail having two slide surfaces,

Fig. 2 is a knitted portion with so-called patent selvage and ribbed knitting with stitch widenings,

Fig. 3 represents schematically the disposition of the thread-carriers in order to explain the manufacture of the knitted portion of Fig. 2,

Fig. 4 is a view in direction of the arrow A in Fig. 1, and

Fig. 5 is an upper view to Fig. 4.

In the represented embodiment the guiding rail 1 has a rectangular cross-section and comprises two opposed sliding surfaces 2 and 3; on the mentioned sliding surface 2 are provided the two thread-carrier blocks 4 and 5 (Figs. 3–5) with the associated supporting arm 4', 5', respectively, and the thread-carrier feeder 4'', 5'', respectively. Each of the two thread-carrier blocks 4 and 5 comprises on one and the same side two spaced driving cams 6 and 6' (Fig. 4) with associated inclined ramp 7, 7' respectively. Each thread-carrier block further comprises a driving cam 6'' and a ramp 7'', and according to Fig. 5 the cam 6'' is lower than the cam 6'. The reference numerals 8 and 9 designate two drivers which are provided separately slidable and adjustable in a known way against the action of springs in the driver box 10 fixed on the usual, not represented, carriage. The cam 6 is located in the movement course 8' of the driver 8, the cam 6'' in the movement course 9' of the driver 9 and the cam 6' in the movement courses 8' and 9' of both drivers 8 and 9. For limiting the stroke of the thread-carrier blocks 4 and 5 the guide rail 1 is provided on its upper slide surface 2 with two release members 11 and 12 and on its lower slide surface 3 with the two release members 13 and 14. These release members 11—14 are of a well-known type and serve to limit the thereby determined stroke of the thread-carrier blocks 4 and 5; the working surface of the two release members 14 and 13 are adapted to the height of the cams 6'', 6' respectively. The numerals 15 and 16 designate the two needle beds; at both sides of the latter at their end a thread-carrier block 4, 5 respectively is provided on the upper slide surface 2 of the guide rail 1 as shown in Fig. 3.

The operation of the described flat knitting machine is the following:

When the carriage is displaced the two drivers 8 and 9 adjustable on the driver box 10 are taken along and thereby also the thread-carrier block 4 or 5 in engagement with it over one of its cams 6, 6' 6'' or 6'''.

The knitting of the so-called patent selvage E shown in the knitting piece of Fig. 2, i. e. the determination of the working stroke B, respectively, is obtained as follows:

Previously to the stroke of the carriage, for example from the right to the left in Fig. 4, the driver 8 is set into working position in the usual way. Following this the thread-carrier block 5 located at the right hand side of the needle bed is taken along, i. e. displaced to the left, until the driver 8, due to its mounting onto the ramp 7' of the cam 6' of the thread-carrier block 4 disposed at the left of the needle bed, is uncoupled, i. e. comes out of engagement with the driving cam 6''' of the thread-carrier block 5. During the carriage stroke from the left to the right the driver 9 is in engagement with the (not represented) driving cam 6' provided on the thread-carrier block 5 until the driver 9, due to mounting onto the stop-device 14 is brought out of engagement with the said cam 6'. This operation is repeated until the patent selvage E has its desired size, whereupon at the last carriage stroke from left to right the thread-carrier block 5 is brought to its starting position on the right-hand side of the needle bed by the driver 8. Afterwards the carriage is shifted in idle running to the left-hand side of the needle bed.

Following this and according to Fig. 2 the portion F

of the ribbed goods with widenings is obtained with the stroke C of the thread-carrier block 4 as follows:

First the driver 9 is set into working position. It will afterwards be brought out of engagement with the driving cam 6', 6'' respectively of the thread-carrier block 4 at the carriage stroke from left to right (Fig. 3) by the release members 14 and at the return stroke of the carriage by the release member 13.

For the last stroke of the carriage from the right to the left in order to finish the portion F of the knitted goods the driver 9 is brought out of position and the driver 8 into working position, so that the thread-carrier block 4 is brought into its starting position on the left-hand side of the needle bed according to Fig. 3.

The manufacture of portion G of the knitted goods in Fig. 2 with the stroke D of the thread-carrier block 4 is obtained with the driver 8 in working position. The driver 8 is brought out of engagement with the driving cams 6', 6, respectively, of the thread-carrier block 4 at the carriage stroke, by the ramp 7 of the thread-carrier block 5 at the right-hand side of the needle bed (Fig. 3) and by the release member 11 on the left-hand side of the needle bed.

In the described manner the portion F—G of the knitted fabric with widening stitches according to Fig. 2 has been obtained, wherefor the thread-carrier block 4 has effected strokes adapted to the changing width of the goods, resulting in a regular structure of the stitches on both selvages of the goods. When two or more guide rails and a corresponding number of thread-carrier blocks and release members are used, it may be knitted in the described manner simultaneously with two or more locks.

I claim:

1. A method for automatically manufacturing fashioned knit goods on a flat knitting machine including a thread carrier block comprising varying in accord with the width of the knitted goods the traverse length of the thread carrier block abruptly over a plurality of machine gauges only after having widened or narrowed a large number of stitches.

2. A flat knitting machine of the character described having a constant carriage stroke comprising a guide rail having different slide surfaces, thread guide carrier blocks movable reciprocally on one of said surfaces in the longitudinal direction of said rail, controllable separate drivers movable in different spaced apart paths in the longitudinal direction of said rail for the full length of the carriage stroke, alternately acting pairs of cams for each thread guide carrier block secured to and movable with it, with one cam of each pair projecting into the movement paths of all drivers for engagement by any thereof and with the second cam of each pair projecting only into the movement path of respective different drivers, release members in pairs with one pair for each driver and adjustably positionable in predetermined spaced relationship along the movement paths of travel of the drivers and with respective release member pairs mounted on different slide surfaces of said rails whereby different strokes of the thread carrier blocks along the guide rail may

be effected by controlled selection of the operative driver engageable with cams of the thread guide carrier blocks and by determined adjustment of the spacing between that pair of the release members associated with the selected operative driver notwithstanding constant carriage stroke of the drivers.

3. The flat knitting machine of claim 2 wherein said one cam of each pair projects transversely of the guide rail into the movement paths of both drivers and is stepped transversely of the length of said guide rail for cooperation with one release member of each pair of release members and the selected operative drive member for providing selected limited thread guide carrier block movement notwithstanding constant carriage stroke of the drivers.

4. The flat knitting machine of claim 2 wherein two thread carrier blocks are utilized, both movable separately on one slide surface of said guide rail by a selected operative driver, said blocks having inclined ramps in the movement paths of different drivers, said ramps serving respectively to release the operative driver member from its driving connection with the carrier block it is driving at predetermined stroke positions of the drivers.

5. A flat knitting machine of the character described having a constant carriage stroke comprising a guide rail having different slide surfaces, thread guide carrier blocks movable reciprocally on said rail, controlled separate drivers movable in different paths in the longitudinal direction of said rail over the length of carriage stroke, alternately acting pairs of cams for each thread guide carrier block movable with it on said guide rail and with one cam of each pair projecting into the movement paths of all drivers for engagement by any thereof, release members adjustably secured in pairs in predetermined spaced relationship along the movement paths of travel of the drivers and with respective pairs of release members on different slide surfaces of said guide rail whereby different strokes of the thread carrier blocks may be effected by controlled selection of the operative driver and by determined adjustment of spacing between the pair of release members associated with the operative driver notwithstanding constant carriage stroke of the drivers.

6. A method of automatically producing regular knitted goods on a flat knitting machine having a constant carriage stroke and including a thread carrier block comprising varying in accord with the desired width of the goods, the traverse stroke of the thread carrier block abruptly over a plurality of machine gauges, i. e., subsequent to widening or narrowing of a substantial number of stitches.

References Cited in the file of this patent

UNITED STATES PATENTS

1,877,262	Werfelman	Sept. 13, 1932
1,990,440	Steinhart	Feb. 5, 1935
2,092,603	Friedman	Sept. 7, 1937
2,286,227	Ralston	June 16, 1942
2,610,493	Zimic	Sept. 16, 1952