

Dec. 20, 1960

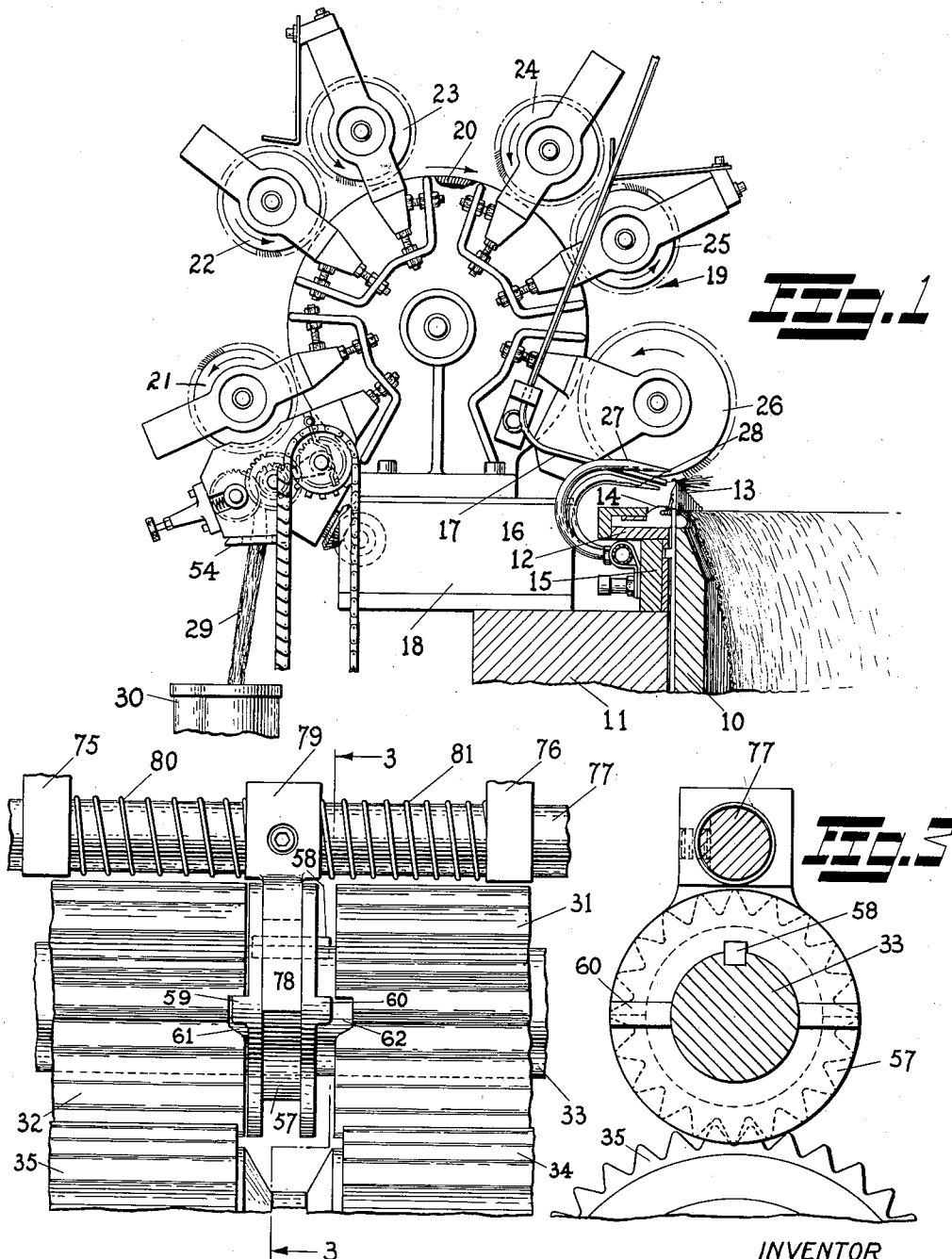
W. C. ROSE

2,964,932

KNITTING MACHINE AND METHOD

Filed Feb. 13, 1958

2 Sheets-Sheet 1



INVENTOR
WARREN C. ROSE

BY

Robert C. Southworth

ATTORNEY

Dec. 20, 1960

W. C. ROSE

2,964,932

KNITTING MACHINE AND METHOD

Filed Feb. 13, 1958

2 Sheets-Sheet 2

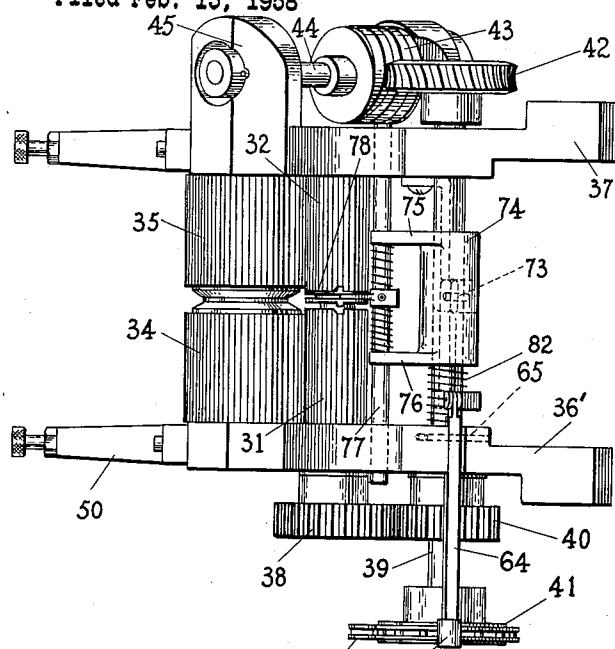


FIG. 4

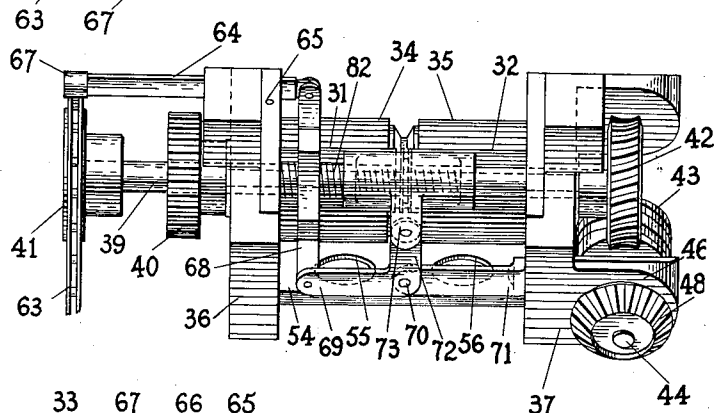


FIG. 5

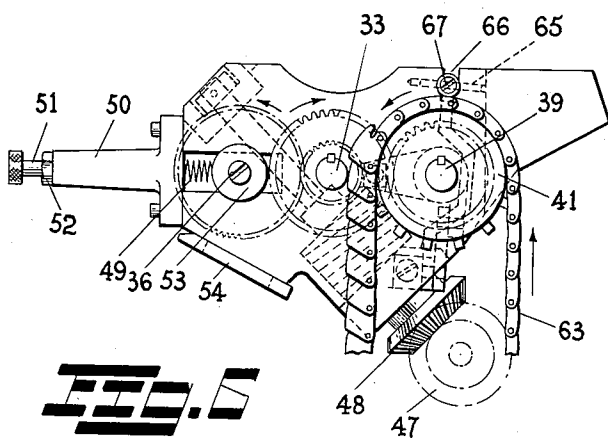


FIG. 6

INVENTOR
WARREN C. ROSE

BY

Robert C. Southworth
ATTORNEY

1

2,964,932

KNITTING MACHINE AND METHOD

Warren C. Rose, Norristown, Pa., assignor to Wildman Jacquard Co., Norristown, Pa., a corporation of Pennsylvania

Filed Feb. 13, 1958, Ser. No. 714,993

5 Claims. (Cl. 66—9)

This invention pertains to knitting machines and more particularly, to mechanism by which certain improvements are realized in the production of so-called "high pile" fabrics.

It is a general object of the invention to improve knitting machines of the type described so that they may be used to knit high pile fabrics and effect changes from one type of pile forming fibers to another and vice versa, according to pattern requirements.

It is a further object to accomplish the result above mentioned in multifeed machines and while employing fiber stock in roving or similar form not unlike that now used for high pile knitting where no pattern or variegated effects are sought.

A further object is that of accomplishing the desired result with simple means which shall be inexpensive, add a minimum of complication mechanically and which shall be comparatively free from trouble during operation of the devices.

Other objects will become apparent from the following disclosure.

High pile fabrics are those in which a base fabric is supplemented by fibers incorporated in such manner that the fibers are drawn into tufts at each stitch to project to at least one side of the fabric. The pile thus formed is much longer than anything accomplished by way of combining, knapping or by forming terry loops which may or may be cut. Of course, the pile is usually sheared and treated by processes which enhance its appearance and by which it may be made to resemble very closely several natural materials.

One limitation thus far imposed upon results of this knitting is that the raw stock employed, in roving form or otherwise, has been continuously fed and unless one were to resort to the highly impractical possibility of feeding a variegated roving, the effect is one in which no variation can be realized except in the treatment of the fabric after it has been taken from the knitting machine.

According to the invention of the instant case, fiber stock in the form of roving is fed to the instrumentalities of a knitting machine, preferably via card means and at a plurality of feeds, by a mechanism effective for advancing one or another roving at a feed according to pattern means, that is, selectively. These rovings may differ in material, texture, color or in any other desired manner.

One preferred form the invention may take involves modifying the feed rollers by which a roving is fed to a card as in French Patent No. 527,671 so that a plurality of rovings may be independently fed to the card, one at a time, and the drive so controlled that one or another roving may be advanced at will while the other or remainder remain stationary. Such means is preferably pattern controlled so that the effect in the fabric itself shall follow a prearranged pattern scheme or plan.

The invention will be described in detail by reference to a specific embodiment thereof illustrated in the accompanying figures of drawing, wherein:

2

Fig. 1 is a sectional view showing part of a knitting machine to which the invention has been applied.

Fig. 2 is a detail view showing certain feed rolls and clutching means.

5 Fig. 3 is a section taken at 3—3, Fig. 2.

Fig. 4 is a plan view of one multiple roving feeding means with pattern control.

Fig. 5 is an elevation of the mechanism of Fig. 4.

10 Fig. 6 is an end view of the mechanism of Figs. 4 and 5.

Now referring to Fig. 1, the invention is applied to a knitting machine having a needle cylinder 10, circular base 11, sinker head 12, needles 13 and sinkers 14. Cams in cam sections 15 and in sinker cap 16 cause the needles and sinkers respectively to function in known manner. A yarn is fed to the needles through a tubular or other guide 17 and that yarn is knitted to form a base fabric, as herein described, a jersey fabric.

On a base 18, attached to circular base 11 or to any fixed part or parts of the machine, is mounted a card mechanism generally denoted by numeral 19 and having among other parts, a card cylinder 20 rotatable as shown, a licker-in cylinder 21, worker rollers 22, 23 and 24, 25, which constitute two groups of such worker means. Any suitable number of the same may be used. Finally, a single feeding means or doffer cylinder 26 in a relatively fixed position with respect to said machine removes the fibers from the card and as the hooks of needles 13 enter the card clothing they take a tuft of fibers in addition to the base yarn and then knit, the fibers being cast off as pile at the back of the fabric in simple, single faced pile knitting. A number of air nozzles 27, 28 assist by projecting air streams to cause the fibers to appear cleanly at a single face of the fabric.

35 A supply of fibers of staple lengths or in any other suitable form are furnished as very loosely twisted rovings 29 and may be coiled in cans 30 to be drawn therefrom and advanced or fed to the licker-in by a system of selectively controlled feed rolls as will presently be explained.

40 That mechanism described to this point is largely old and well known, however, according to the practice followed up to now, a roving of definite physical characteristics only has been fed, and, in fact, the same stock must have been fed at each of the several feeds so that the texture, color and the general appearance of the resulting fabric have been invariable once a particular class and color of stock has been selected.

According to the invention, two or more rovings are 50 always available for feeding at each feed and any one of these may be fed at a feed for any desired period of time or extent of knitting in the fabric. Then when desired, a change may be automatically effected by which each feed will receive stock embodying a different characteristic or characteristics from that just fed or advanced to the cards and thence to the needles. As shown in Figs. 1, 4, 5 and 6, a preferred form which the invention may take comprises feed rolls 31 and 32 which may be selectively locked to a driven shaft 33 for rotation therewith. Rolls 31 and 32 function with presser rolls 34 and 35 freely rotatable on a shaft 36. These rolls are preferably fluted.

60 Shaft 33 is rotatable in bearings in end plates 36' and 37 and has a gear 38 keyed or otherwise fast to its projecting end. These end plates bolt to the end of the base 18, Fig. 1.

65 A second shaft 39 is likewise rotatable in bearings in these end plates and has a gear 40 fast to it with a sprocket 41 similarly fixed to the shaft end beyond this gear. At the opposite end a worm gear 42 is fast to that shaft end and receives driving torque from a worm 70

3

43 rotated with shaft 44 carried in bearings 45 and 46 which are, as herein shown, contained in projections from the end plate 37. Shaft 44 is in turn driven from a part of the card mechanism through gearing or the like which includes bevel gears 47 and 48, the former fixed to a driven shaft projecting from the base 13 and the latter keyed to the end of shaft 44.

The pressure rolls 34 and 35 are maintained in nip relationship with the driven rolls 31 and 32 by means of springs 49, Fig. 6, carried in caps 50 screwed to their respective end plates. Each spring is adjustable by a screw 51 locked by a nut 52, all this being a common way of obtaining pressure and thus not to be further described here. Shaft 36 is held at each end in a collar 53 slidable along a slot in the end plate and against which the spring bears.

End plates 36' and 37 are spaced by a strut 54 and this strut also serves as a guide for each of two rovings to be fed since these rovings are threaded through apertures 55 and 56. Thus each roving is guided centrally of that pair of rolls 31-34 or 32-35 as the case may be, and cannot become displaced to feed in an offset position to foul the opposite rolls or roving.

Means for selectively coupling either set of rolls to render it effective will now be described. A grooved collar 57 slidable along the shaft 33 is positioned between rolls 31 and 32. It is prevented from turning relatively to the shaft by key 58 fixed in the latter. This collar has dogs 59 and 60 projecting at its end faces which engage in cooperating slots 61 and 62 in the adjacent roll ends. Shifting of the collar makes it possible to engage either dog selectively to cause the roll thus affected to turn with the shaft and to advance the roving affected by that particular roll and the cooperating pressure roll 34 or 35 as the case may be. Of course, as one dog becomes active the other is disconnected to stop that side of the unit from driving.

To change the position of collar 57 a pattern control means is provided. This includes by way of example, a pattern chain continuously or otherwise advanced and linkage by which the pattern dictates are conveyed through to the collar. At the end of drive shaft 39 the sprocket 41, before mentioned, carries a chain 63 which is comprised of what are referred to as high and low links.

A lever 64 is pivoted at 65 and confined within a slot 66 in the end plate 36. This lever is provided with a follower 67 at its outer end aligned to ride upon the chain while at its inner end, it has connected to it a link 68 attached at its opposite end to one arm 69 of a bell crank pivoted at 70 on a bracket 71 in turn fixed to end plate 37. The other arm 72 of the bell crank is slotted and engages a pin or other connecting means extending from a lug 73 integral with a hub 74 of a slider having arms 75 and 76 and being axially movably along shaft 39. Arms 75 and 76 are slotted at their end to straddle a rod 77. A fork 78 engages within the groove in collar 57 and its hub portion 79 is set-screwed to rod 77 as shown in Figs. 2 and 3. Springs 80 and 81 are under compression between the said arms 75 and 76 and this last mentioned hub so that under endwise motion of the slider, the fork 78 can move collar 57 from one roller to another. The change does not actually occur until the entering dog aligns with the roll slot it is to enter since, until that occurs, the spring will merely be compressed to greater extent. A spring 82 tends to shift these parts to the right, Fig. 5.

In operation the machine may be assumed to be running with the cards in operation and being fed with a roving 29 being passed between rolls 31 and 34, for example. These are driven by the gear train above described. At that time the collar 57 would be in position at the right, Fig. 2. The opposite side of the unit would be inactive with a roving nipped between the rolls, but

4

not feeding. At that time follower 67 would be riding upon one of the high links of chain 63.

As that follower drops from a high link, the shifter means under the influence of spring 82, moves the parts to the right, Fig. 5 (left, Fig. 2), whereupon spring 81 is loaded to greater extent moving the collar to the left, Fig. 2, until at the time dog 59 aligns with slot 61 the parts enter starting the drive for the opposite roving and discontinuing that for the companion roving.

The advancing roving enters the licker-in and that which has been arrested merely breaks off at the licker-in.

While the operation of a single card only has been given by way of example, it is to be understood that all cards are in operation, that all feeding units are likewise feeding and preferably, all are so timed that the patterns are synchronized and all changes are effected coincidentally. Normally all rovings fed at one time would be of similar characteristics and then a change might be effected by which other rovings come into active play. The changes thus made produce horizontally disposed variations in the character of the fabric.

While a chain pattern control has been described by way of example, it is to be understood drums or other devices may be employed. Their extent and the nature of the pattern itself govern the space between repeats.

While the present disclosure relates specifically to a selectivity between two rovings at each feed, it is to be understood that the invention may be extended to control a greater number at each or at some of the feeds. Again some only of the feeds may be provided with roving change means.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This invention is, therefore, not to be limited to the precise details described, but is intended to embrace all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

I claim:

1. In a knitting machine of the type described, the combination of instrumentalities for drawing yarn into loops to form a fabric and means to present to said instrumentalities fibers to be drawn with said yarn to appear as pile extending from a face of the fabric, said means for presenting fibers to the instrumentalities comprising pairs of feeding rolls and drive means therefor, and means operable for selectively engaging a predetermined one of said pairs of rolls with said drive means and disengaging another pair thereof from said drive means thereby to feed fibers of desired characteristics at will.

2. Mechanism as defined in claim 1 wherein said means for selectively engaging said feed rolls with the drive means comprises a shiftable clutch and a pattern means for governing the position of said clutch.

3. Mechanism as defined in claim 1 wherein said means for presenting fibers comprises pairs of fluted rolls in side-by-side relationship, one roll at least of each pair being driven and the other roll of each pair being pressed into a nip relationship to the first, a shaft, said first mentioned rolls being freely mounted on said shaft, means by which said shaft is driven and clutch means by which one or the other of said rolls on said shaft may be clutched to rotate with it, and a pattern means by which the said clutching of said rolls to the shaft is selectively governed.

4. In a knitting machine of the type described, the combination of instrumentalities for drawing yarn into loops to form a fabric and means to present to said instrumentalities fibers to be drawn with said yarn to appear as pile extending from a face of the fabric, said means for presenting fibers to the instrumentalities comprising at the location of at least one feeding station a single feeding means for presenting fibers to said instrumentalities, fiber advancing means independently operable for feeding fibers from two separate sources of fibers to said single feeding means and means operable selec-

5

tively to drive said advancing means to cause fibers from one of said advancing means to be fed to said feeding means.

5. In a knitting machine of the type described, the combination of instrumentalities for drawing yarn into loops to form a fabric and means to present to said instrumentalities fibers to be drawn with said yarn to appear as pile extending from a face of the fabric, said means for presenting fibers to the instrumentalities comprising at the location of at least one feeding station a single feeding means in a relatively fixed position with respect to said machine for presenting fibers to said instrumentalities, pairs of feeding rolls independently operable for feeding fibers from two separate sources of fibers to said

6

single feeding means, and means operable selectively to drive said pairs of rolls to cause fibers from one of said pairs of rolls to be fed to said feeding means.

References Cited in the file of this patent

UNITED STATES PATENTS

1,114,414	Tauber	Oct. 20, 1914
1,848,370	Moore	Mar. 8, 1932
1,894,596	Moore	Jan. 17, 1933
2,098,303	Moses	Nov. 9, 1937
2,171,236	Getaz	Aug. 29, 1939
2,694,907	Moore	Nov. 23, 1954