Aug. 22, 1933. G. NOBST 1,923,949

HIGH SPEED CIRCULAR KNITTING MACHINE

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Fig. 1.

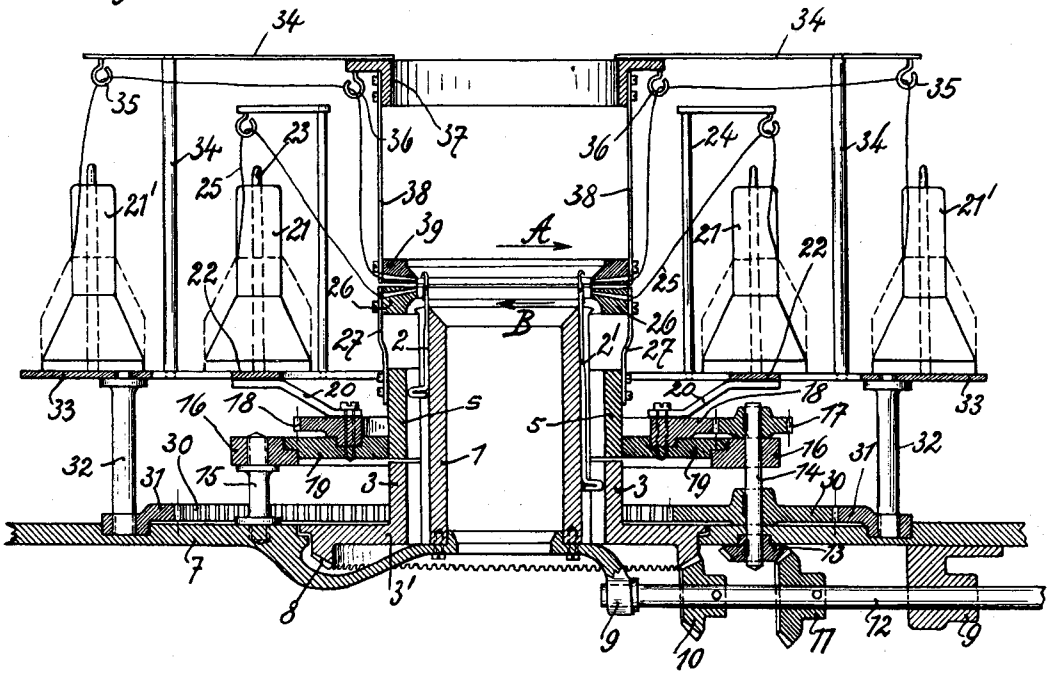


Fig. 4.

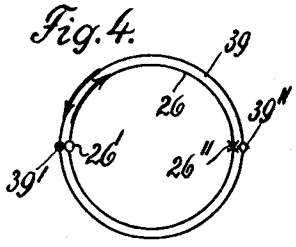


Fig. 5.

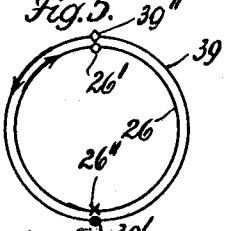


Fig. 6.

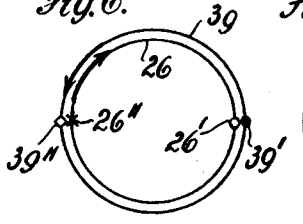


Fig. 7.

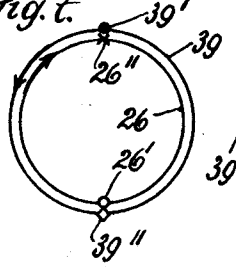
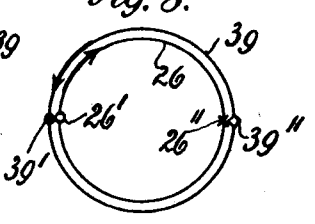


Fig. 8.



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Fig. 2.

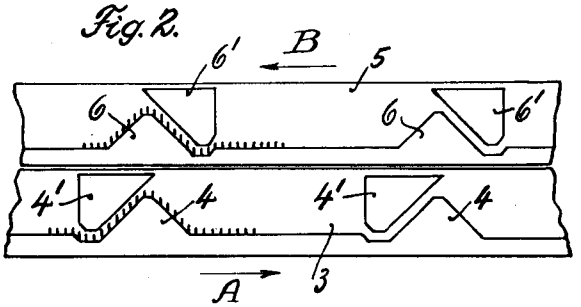


Fig. 3.

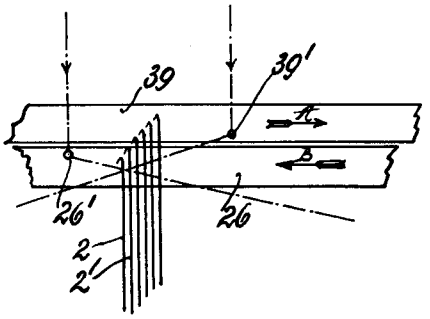
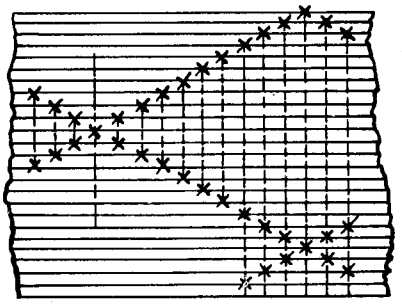


Fig. 9.



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Patented Aug. 22, 1933

1,923,949

UNITED STATES PATENT OFFICE

1,923,949

HIGH SPEED CIRCULAR KNITTING MACHINE

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Application September 19, 1931, Serial No. 563,771, and in Germany October 14, 1930

4 Claims. (Cl. 66—13)

The invention relates to a circular knitting machine and has for its object, compared with existing machines, to accelerate the formation of goods or to reduce the speed of the machine and thus insure better preservation of the working parts thereof while retaining the operating time now generally adopted. It employs a medium already known for other purposes which consists of two cam casings arranged one above the other moving, one to the other, in opposite direction and at the same time revolving round the stationary needle cylinder.

According to the invention the thread guides corresponding with the cam casings revolve permanently and in the direction of the cam casing belonging to them round the stationary needle cylinder. Therefore, either of the two threads supplied to the needles of the cylinder by the thread guides will have formed during half a rotation one half row of loops, so that two complete rows of loops will have been formed if both thread guides have made an entire rotation round the needle cylinder. In case several threads running each in the same direction are worked by different working parts or systems corresponding to same in numbers twice as many loop rows will be formed in one rotation as could be obtained before. At the places where the thread guides meet one another the threads are crossing and will be united to a loop. Such a loop prevents further running of a longitudinal loop row running in the finished fabric against this cross loop. If the thread guides revolving in opposite direction to the other were to revolve at uniform speed the cross loops would always appear in one and the same longitudinal loop row and it would not be possible to avoid the running of plain loops at those areas of the fabric where no cross loops are found.

According to the invention a rotational speed is given to one of the two threads of a unit which is different from that of the other thread of the same unit. Consequently the crossing spots of the threads can be arranged in such a manner that they form transverse lines in relation to the vertical wales. Owing to the number of thread guides and systems available it is possible to reduce considerably the plain areas.

The drawings show a circular knitting machine which is suitable for the execution of the invention. It shows:

Fig. 1 the circular knitting machine in front view, with two working systems, partly in section.

Fig. 2 the cam casings revolving in opposite direction to the other in working operation.

Fig. 3 a schematic sketch of the thread guide rings at thread crossing positions.

Figs. 4 to 8 different positions of the thread guide rings in schematic plan view.

Fig. 9 a piece of fabric in front view with the spots of thread crossing marked therein.

In the stationary cylinder 1 the latch needles are held in the usual manner but alternately there is a short latch needle 2 and a long latch needle 2'. Round this cylinder 1 revolves a lower cam casing 3 with two cams 4 and 4' respectively for pushing up and down the long needles 2' in the direction as per arrow A Figs. 1 and 2 and above it a cam casing 5 with two each cams 6 and 6' for pushing up and pushing down the short needles 2 which are moving in opposite direction as per arrow B, Fig. 1. The lower cam casing 3 has a foundation plate 3' which is guided in table plate 7 bearing the needle cylinder 1 and which has a bevel wheel at 8. Furthermore the stationary table plate 7 has, fixed to its right side, standards 9 which bear a shaft 12 equipped with two small bevel wheels 10 and 11 driven by a fast pulley or handle which is not shown in the drawings. While the small bevel wheel 10 in the rear is gearing into the bigger bevel wheel 8 of the lower cam casing thus giving the latter a turn in the direction as per arrow A, the small bevel wheel 11 in the front gears into another bevel wheel 13 which is fixed to a standing shaft 14. The latter is borne in the table plate 7 and in a ring 16 fixed upon pillars 15 is a small tooth wheel 17. By aid of this bored part 17 a rim gear wheel 18 will be compelled to rotate. This rim gear wheel 18 is fixed to a foundation plate 19 which is connected to the upper cam casing 5 and borne by the above-mentioned ring 16. Furthermore this rim gear wheel 18 bears feet 20 bent up to the ring 22 with bolts 23 serving for the bearing of the bobbins 21 for the upper cam casing 5. For this ring 22 gallows 24 are provided over which the threads 25 coming from off the so-called upper bobbins 21 will be led to a thread guide ring 26 which is placed directly above the stationary needle cylinder 1 and borne by supports 27 fixed to the upper cam casing 5.

With the driving shaft 12 furthermore a tooth wheel 30 is connected which lies directly above the table plate 7 and which is in mesh with a rim gear wheel 31 guided in the table plate 7. This rim gear wheel 31 bears by means of the pillars 32 a ring 33 lying on a level with the ring 22 bearing the already mentioned bobbins 21 but having a larger diameter. This second ring 33 also bears bobbins 21' and furthermore a gallows 34 which

serves not only as thread conductor at 35 and 36 but also holds fast rods 38 running down along a ring 37 above the needle cylinder 1 bearing a second thread guide ring 39 which is sitting directly above the already mentioned thread guide ring 26. The gear as shown and described works in such a manner that the upper cam casing 5, the lower thread guide ring 26 and the inner bobbins 21 are working together and will be turned in direction B while the lower cam casing 3, the upper thread guide ring 39 and the outer bobbins 21' form a unit and revolve in the direction of the arrow A round the needle cylinder 1.

In the example shown each of the thread guide rings 26 and 39 has two thread guiding channels 26' and 26'' respectively, or 39' and 39'' respectively. These four channels are working at the same speed of their rings 26 and 39 in one revolution as per Figs. 4–8 as follows:

First quarter: 39', 26' 26'', 39''
Second quarter: 39'', 26' 39', 26''
Third quarter: 39'', 26'' 26', 39'
Fourth quarter: 39', 26'' 39'', 26'

Fig. 8 shows again the first quarter.

It follows that, if each of these four thread channels has made a quarter circle movement, a thread crossing spot is formed which will be caught by an operating cylinder needle and formed to a loop. Besides this it follows according to these schemata that, if each of these thread channels has made a half circle movement, one upper channel and a lower channel have formed a loop row, that means that in the example shown four loop rows are formed in one entire loop rotation with two channel pairs. By intercalating more channel pairs in these thread guide rings, naturally, more loop rows can be formed in one rotation. It is, for instance, possible by arranging six systems each in each cam casing of a four inch machine to form twelve loop rows with twelve cross loops at one rotation of the cam casing. Thus a broad wale will be formed between two short cylinder needles following each other which, by means of the interposed long cylinder needle and thread thereof will be knitted to a form a cross loop. Besides, the threads meet at such different spots that already after the forming of a few transverse loop rows, a loop consisting of two thread crosses repeats itself in one and the same longitudinal loop row. Should contrary to all expectation a longitudinal loop row fail to contain a crossed loop at the manner of working heretofore described, this can be remedied by causing one cam casing with its thread guide to run quicker than the other.

While I have shown and described the principal embodiments of the invention, it should be understood that the specific arrangements, location and correlation of the parts is merely for illustrative purposes as I reserve the right to make all such changes and modifications not departing from the spirit of the invention or the scope of claims hereunto appended. Having thus described and shown the invention, I claim:

1. A circular knitting machine with cam casings one arranged above the other and revolving in opposite direction to each other, thus characterized, that the thread guides corresponding with the cam casings rotate continually and in the direction of the cam casing belonging to it round the stationary needle cylinder.

2. A circular knitting machine with cam casings arranged one above the other and revolving in opposite direction to each other, thus characterized that the thread guides corresponding fith the cam casings rotate continually and in the direction of the cam casing belonging to it round the stationary needle cylinder, that one casing with its thread guides moves more quickly than the other casing with its thread guides, and that the number of thread guides of one cam casing differs from that of the other.

3. A circular knitting machine according to claim 2, in which two sets of one-foot needles are arranged in the needle cylinder, one needle of one set being always disposed between two needles of the other set, and in which each cam casing has a ring serving as carrier for the bobbins, thread guides and thread guide units.

4. A circular knitting machine with cam casings arranged one above the other and revolving in opposite direction to each other, the thread guides of which corresponding with the cam casing rotate continually and in the direction of the cam casing belonging to it round the stationary needle cylinder, thus characterized that one casing with its thread guides moves more quickly than the other casing with its thread guides.

GEORG NOBST.