Aug. 7, 1923. 1,464,052

T. WIDDOWSON

CIRCULAR KNITTING MACHINE

Filed July 3, 1922

Fig. 1.

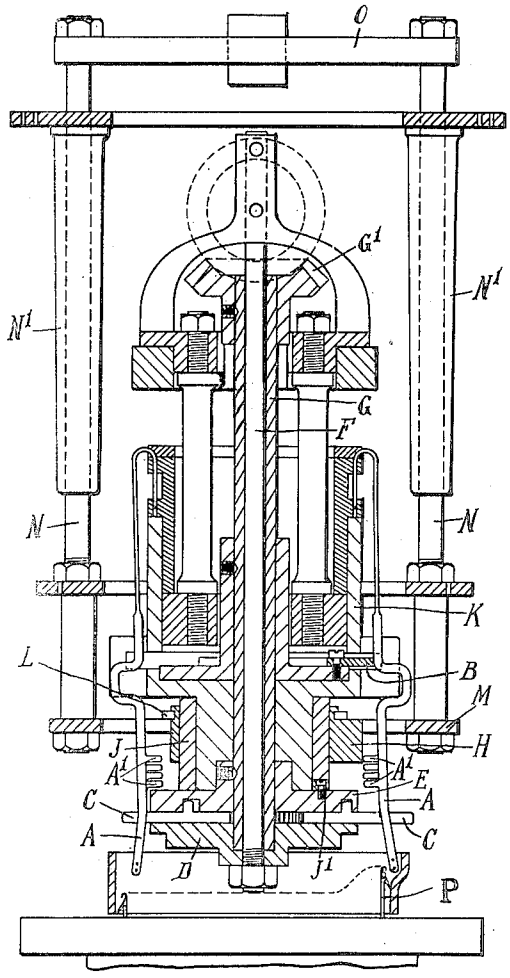


Fig. 3.

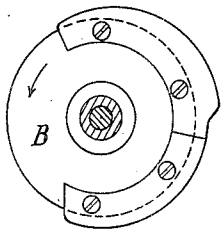


Fig. 4.

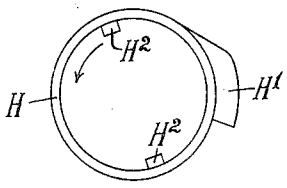


Fig. 5.

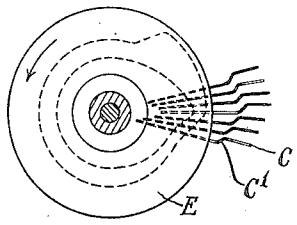
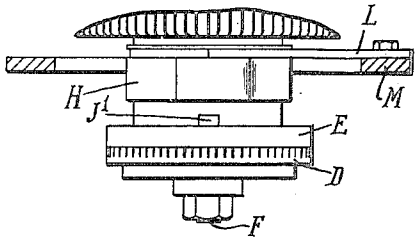


Fig. 6



Fig. 2.



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UNITED STATES PATENT OFFICE.

TOM WIDDOWSON, OF NOTTINGHAM, ENGLAND.

CIRCULAR-KNITTING MACHINE.

Application filed July 3, 1922. Serial No. 572,629.

To all whom it may concern:

Be it known that I, TOM WIDDOWSON, a subject of the King of Great Britain, and a resident of the city and county of the city of Nottingham, in England, have invented certain new and useful Improvements in or Relating to Circular-Knitting Machines, of which the following is a specification.

This invention relates to improvements in circular knitting machines which are fitted with vertical striping or patterning attachments consisting of a series of dependent thread controlling guides adapted to supply extra threads to certain of the needles, and in which provision is made for putting certain of the striping or ornamenting thread-guides out of action periodically in order to increase the range of effects which can be produced, said provision consisting in existing machines of exterior projections on the lower ends of the said thread guides, and a rising and falling ring or plate which is moved into the path of said projections in order to hold the corresponding guides in their inner positions. Its object is to obviate the stress which is put upon the guides and the consequent damage thereto, which this system of working entails.

According to this invention, provision is made for delaying the return movement of different series of the guides until it is too late for the mechanism which moves them angularly to act. As a result of this action the said guides return on the same side of their needles as they were projected, and their threads are consequently not carried round and delivered to the needles.

Referring to the accompanying drawings:

Fig. 1. is a vertical section showing a striping or patterning attachment of the type described, to which my improvements are applied.

Fig. 2. is an elevation showing the pattern cam operating mechanism.

Figs. 3 to 5 inclusive are plans of the respective operating cams.

Fig. 6. is an example of the class of ornamental designs which can be produced.

Like letters indicate like parts throughout the drawings.

The dependent thread-guides A are carried and operated in the usual manner, that is, they are disposed on a head K occupying the same position as a ribbing attachment, their lower ends are moved radially outwards by means of a main central cam B, and are further moved angularly by means of inclines C′ (see Fig. 5) on radially projected instruments C, so as to carry their threads round their respective needles, and are returned to their normal positions again within the line of the needles, by their own elasticity.

In the present arrangement, the dial D which carries the radially projected instruments C is situated at the bottom of the head K, and the cam E for operating said instruments is disposed above it.

In order to operate this cam E under these circumstances, the dial D is secured to the lower end of a fixed vertical shaft F which is carried from above, whilst the cam E is disposed on the lower end of a sleeve G which is mounted on said shaft F.

The upper end of this sleeve G carries a wheel G′ which is geared to the driving mechanism, so that it is rotated at the same speed as the knitting-cam ring. The main central cam B which moves the lower ends of the thread-guides A radially outward, is also mounted on this sleeve G.

The whole of the thread-guides A are successively operated by the arrangement described, every revolution of the machine in the usual manner, and in order to control them as previously described, the following additional arrangement is provided.

Each of the dependent thread-guides A is provided near its lower end with an inner projection A′, these projections are disposed at different levels on the different guides comprising each group of the latter, and a cam H which is hereinafter referred to as the pattern cam, is disposed just above cam E which operates the radial instruments.

This pattern cam H is provided with a rise

H′ (see Fig. 4.) which moves round with the knitting-cam, it is rotatably connected to the radial instrument cam E, and in addition it has a rising and falling movement which is obtained from say pattern chain or cam mechanism of well known construction and arrangement.

As shown in the drawings, the pattern cam H is mounted on a sleeve J which is mounted loosely on the fixed head K, and this sleeve J is connected to the cam E by a key J′ (see Fig. 1.).

The cam H can slide on this sleeve J, but is rotatably connected thereto by means of splines or studs H^2 in the interior of the cam H (see Fig. 4.) engaging in keyways cut in the exterior of the sleeve J.

The pattern cam H is raised and lowered by means of a fork L, which engages in an annular groove or recess in the cam boss, and this fork L is connected to a rising and falling annular framing M which surrounds the attachment. The framing M is carried by two vertical plungers N (see Fig. 1.) working in fixed guides N′, and the upper ends of these plungers are attached to a cross-head O, which is connected to the pattern chain mechanism for controlling the cam H.

The action of the pattern cam H is as follows: When in its upper position, it is above the level of the inner projections A′ on the thread-guides A, and is out of action. When lowered to a certain extent, its lower portion is disposed on the same level as the inner projections A′ on certain of the thread-guides A, and the rise H′ on the cam then engages the said projections. The corresponding thread-guides A are then held by the said cam H in their outer positions to which they have been moved by the main cam B, for a longer period, and their return movement is thus delayed until such time as the instruments C have returned to their initial or inner position again. As a result of this action, the lower ends of the delayed guides A instead of being deflected round their respective needles P by the inclines C′ on the said instruments C as is normally the case, return on the same side again as that on which they were projected, their threads are not in this case carried round and delivered to the needles, and the particular thread guides are therefore for the time being inoperative.

The pattern cam H may be of such a width that by lowering it step by step, the whole or the greater part of the thread-guides are put out of action in succession, and by raising it in the same manner, the thread-guides are gradually brought into action again.

In some cases however the pattern cam rise H′ may be narrow, and certain thread-guides A or groups are then put out of action in succession by lowering the cam step by step and the reverse effect is obtained by raising it again.

It is obvious that by arranging the inner projections A′ on the thread-guides A of different needles in say a group, on different levels, that a considerable variety of ornamental figures may be produced by the threads controlled thereby, and that as the thread controlled by each guide may be of a different colour, numerous variations in the colour effects of such figures may be made.

As an example of the class of work which may be produced, a group of the thread-guides may be employed at any point in the circumference of the machine, and would in ordinary circumstances, produce a parallel stripe either continuous or intermittent. With the arrangement described, the width of the stripe can be increased and diminished as required by putting into and out of action certain of the thread-guides A, as well as if desired the whole of them out of action at intervals, and fancy outlined figures (such for example as that shown in Fig. 6) either separated entirely from each other, or connected by narrow vertical stripes extending over one or more wales can be produced. Alternatively parallel stripes can be produced with fancy outlined figures therein, of the same colour as the body of the fabric.

It is therefore particularly applicable for producing fancy outlined chevrons on the ankle of hose and half-hose, a result which has hitherto only been attained by subsequently embroidering the hose.

The usual provision may be made for putting the thread-guides A, or a certain proportion of them permanently out of action, that is, means may be provided for raising them so that the main cam B cannot act upon them as in the existing arrangement.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a striping or patterning attachment for circular knitting machines, the combination of a series of thread guides with inner projections, a main operating cam for moving them outwards, radially projected instruments for moving the guides angularly, and a centrally disposed supplementary or pattern cam which can be brought into action and is adapted to act on the inner projections on and delay the return movement of the guides until it is too late for the radial instruments to move them angularly, substantially as described.

2. In a striping or patterning attachment for circular knitting machines, the combination of a series of thread guides provided with inner projections disposed at different levels, a main operating cam for

moving the guides radially outwards, radially projected instruments for moving the guides angularly, a centrally disposed supplementary or pattern cam which is adapted to act on the inner projections on and delay the return movement of the guides, said cam being adapted to be raised and lowered and act upon the projections on different series of guides in each of its respective positions, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

TOM WIDDOWSON.

Witnesses:
F. C. SHELDON,
L. A. SHELDON.