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CIRCULAR KNITTING MACHINE

Filed Jan. 19, 1928

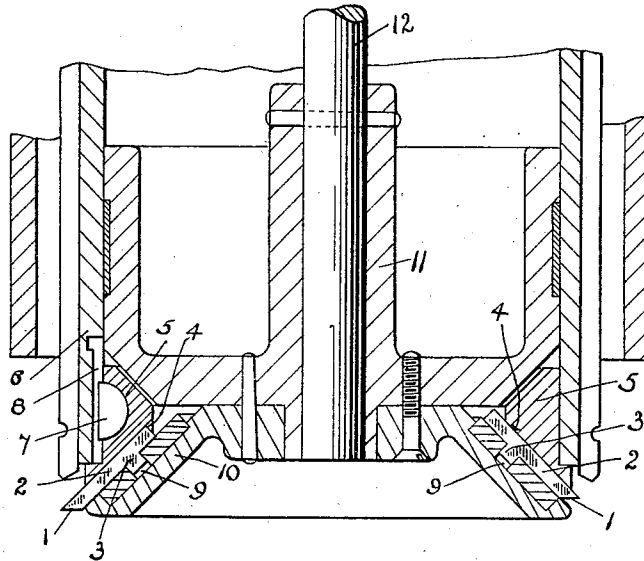


FIG. 1.

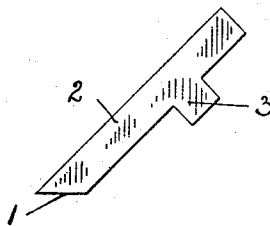


FIG. 2.

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UNITED STATES PATENT OFFICE

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CIRCULAR-KNITTING MACHINE

Application filed January 19, 1928, Serial No. 247,826, and in Great Britain February 19, 1927.

This invention relates to circular knitting machines and concerns those of the type having co-axial opposed needle cylinders and is applicable to both stationary and revolving cylinder machines of this type and which operate also with an oscillating motion such for example, as for the purpose of making heels and toes in the production of seamless hosiery. The invention is an improvement in or a modification of the invention described and claimed in the specification of my co-pending United States application, Serial No. 149,393, filed November 19, 1926.

As is well known, in machines of the type aforesaid, the needle cylinders are usually superposed the top one acting as the rib cylinder and the bottom one as the plain cylinder.

The object of the invention is to provide for such machines improved means to facilitate levelling up and knocking over of the rib loops as will be hereinafter described.

A specific example of the improvement is illustrated in the accompanying drawing in which,

Figure 1 is a sectional elevation of such example and

Figure 2 shows an improved holding down bit.

To enable knitting to take place upon two or more adjacent rib needles without the cooperation of the opposing plain or frame needles, means have been provided to facilitate the action of the rib needles in drawing their loops and prevent the knitted web from being drawn upwards. For instance, a ring, the periphery of which has been formed with vertical and radial tricks has been used in the top cylinder, or again the top cylinder has been provided with sinkers or knocking-over bits which were vertically movable, i. e. movable in the same direction as the rib needles.

Now to be effective for the intended purpose the means adopted should project outwards between the rib needles to an extent sufficient to prevent the yarn or web from slipping up over the outer end of such means. For example, if the rib needles are working in vertical tricks in the peripheral edge of a ring or disc then the walls of such tricks

should, if possible, project outwards between the needles to such an extent as to constitute ledges which will hold the yarn or web down when the rib needles rise. A limitation upon the extent of such projection is however, imposed firstly by the necessity to provide clearance for the feeder and secondly and mainly by the necessity to provide clearance for the slack thread during reciprocating knitting as for instance when knitting the heel and toe of a stocking.

Where the rib needles have operated in conjunction with a trick ring or some similar device in the top needle cylinder it has generally been found necessary to limit the projection of the intervening walls or to round or bevel off the lower corner of such walls for the purpose of preventing the slack thread from catching therein during reciprocating knitting, with the result that owing to the insufficient projection there has been a tendency for the yarn or web to slip upwards over the outer edge during the up-draw motion of the rib needles.

The invention forming the subject of the specification before referred to was designed to overcome this difficulty and accordingly provided in the top or rib needle cylinder of machines of the kind referred to what is termed a collapsible trick ring or similar part, the essential feature of which is that its periphery while being formed to provide between the rib needles radial projections which are of adequate extent to hold down the yarn or web, is collapsible or contractile in order to provide clearance when necessary and clear the slack thread during reciprocating knitting. The operative portion of the periphery is constituted by holding down blades, bits or like elements disposed radially between the rib needles and capable of radial movement. The important feature is that the bits or the like are radially movable (in contradistinction to the vertically movable sinkers or knocking-over bits previously mentioned) whereby they may occupy either a projected or extended position for use or a withdrawn or contracted position. According to one arrangement the circular series of bits or like elements is contracted and ex-

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panded in part, i. e. in the region of the rib stitch cam only. That is to say those bits located near the rib stitch cam may be moved out to the projected position while the others remain in the contracted position.

5 According to the present improvement or modification I employ a series of holding down bits which have their outer ends bevelled, inclined or similarly formed to provide
10 holding down edges for the yarn or web, and are positioned so that said edges are disposed horizontally. Conveniently said bits are straight and are carried slidably in a conical
15 tricked bed or ring. The bits therefore operate on the angle and when withdrawn or retracted the horizontal holding down edges are correspondingly raised, thereby providing greater clearance for the thread.

20 According to a convenient example the bits work in a ring one side or face of which is made conical, i. e. inwardly bevelled, and tricked to constitute an interiorly conical bed for the reception of the bits, and the latter
25 have butts for engagement with a cam or equivalent on or in an opposing conical carrier or bed, said cam being suitably arranged and designed to impart the required movement to the bits. Conveniently the tricked
30 face or side of the ring is disposed downwards with the cam carrier or bed underneath.

According to the illustrative example the end 1 of each bit 2 is bevelled and constitutes the holding down edge when the bit is in use. The bits are provided with butts 3 and work
35 in tricks 4 in the lower conical or bevelled face of a ring 5 located in the lower end of the top needle cylinder 6 and keyed to the latter by means of a key 7 and keyway 8.

The butts 3 project from the ring 5 into
40 a cam track 9 provided on or formed in a conical bed 10 displaced below the ring 5. The said cam track is formed to retain the majority of the bits in the withdrawn position and represented at the right hand side
45 of Figure 1 to project those which are located in the vicinity of the rib stitch cam (not shown) as represented at the left hand side of the figure. The cam bed is attached to a
50 central sleeve 11 in the needle cylinder which is fixed on a shaft 12 and is turned, when required, either frictionally by the cylinder or positively in the manner fully set forth in the prior specification, to change the position
55 of the cam 9 whereby bits in that portion of the needle circle where the slack thread is located during reciprocating knitting are withdrawn and thus clear the thread.

What I claim then is:—

1. In a circular knitting machine of the
60 type having co-axial opposed cylinders in which needles operate to produce rib fabric, a circular series of straight holding down bits having inclined outer ends, and a conical
65 tricked bed which is mounted in the rib needle cylinder and whereby the said bits are car-

ried slidably so that their outer ends constitute horizontal holding down edges, said bits being slidable radially between the rib needles for respectively holding down the yarn or web and providing clearance for the feeder, when necessary, and the slack yarn during
70 reciprocating knitting, and means for effecting the movement of the bits, for the purpose described.

2. In a circular knitting machine of the
75 type having co-axial opposed cylinders in which needles operate to produce rib fabric, a circular series of straight holding down bits having butts and bevelled outer ends, a conical
80 tricked bed which is mounted in the rib needle cylinder and whereby the said bits are carried slidably so that their outer ends constitute horizontal holding down edges, said bits being slidable in and out between the rib needles, and a cam track for acting on the butts whereby during circular knitting
85 some of the bits are projected in the vicinity of the rib stitch cam for holding down the yarn or web while the remainder are kept withdrawn, said cam track being movably arranged so that its position and the point at which the bits are projected can be changed for reciprocating knitting to provide clearance for the feeder, when necessary, and the
90 slack yarn, for the purpose described.

3. In a circular knitting machine of the type having co-axial opposed cylinders in which needles operate to produce rib fabric, a circular series of straight holding down bits having butts and bevelled ends, a conical
100 ring tricked on the under side for the reception of the bits and mounted in the rib needle cylinder so that the bits can slide radially in and out between the rib needles, a conical bed disposed below said ring, a cam track on said bed for engagement by the butts whereby bits are projected in the vicinity of the
105 rib stitch cam only, during circular knitting, for holding down the yarn or web, and a rotatable sleeve to which the conical cam bed is attached and which is operable to change the position of the cam for reciprocating knitting, and thereby change the point of projection of the bits to provide clearance for the feeder, when necessary, and the slack yarn,
110 for the purpose described.

4. In a circular knitting machine of the type having co-axial opposed cylinders in which needles operate to produce rib fabric, a radially tricked conical bed in the rib needle
115 cylinder, yarn or web holding elements formed with inclined ends and slidable in the tricks whereby horizontal holding down edges are provided, and means for effecting projection and withdrawal of said elements between the rib needles, for the purpose specified.

In testimony whereof I affix my signature.

THOMAS SCOTT GRIEVE. 120