R. W. SCOTT.

KNITTING MACHINE.

APPLICATION FILED MAR. 26, 1912.

1,191,740.

Patented July 18, 1916.

2 SHEETS—SHEET 1.

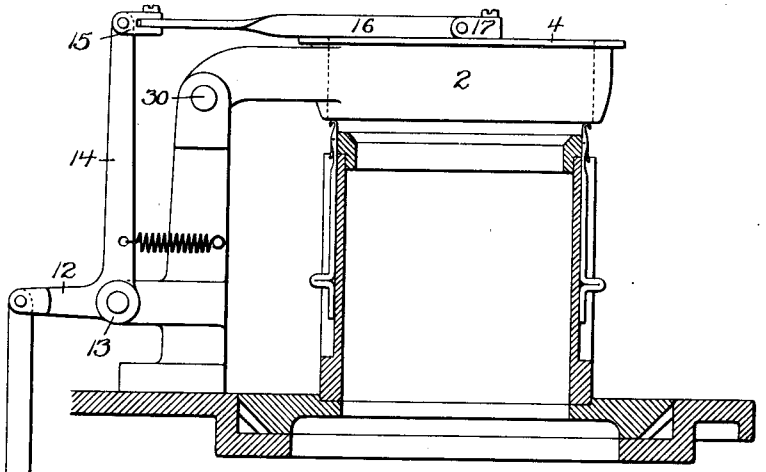


Fig. 1.

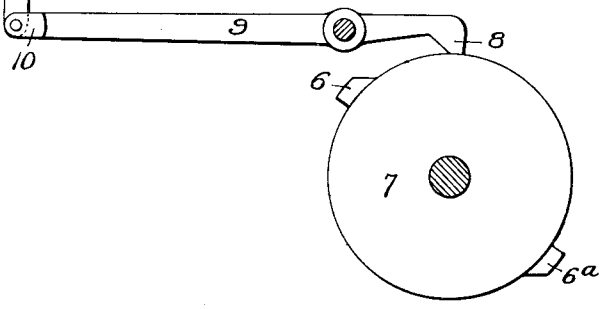
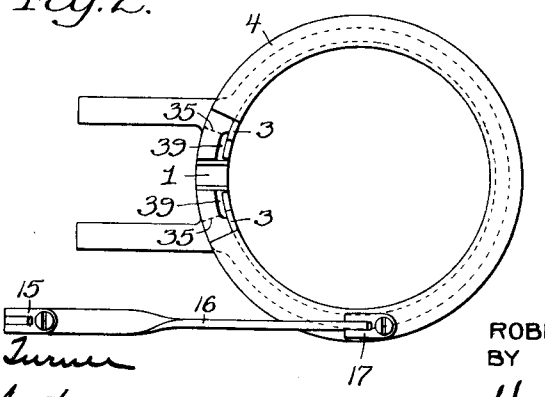


Fig. 2.



WITNESSES

Hamilton D. Turner

Elsie Fullerton

INVENTOR

ROBERT W. SCOTT

BY HIS ATTORNEY

Harry Smith

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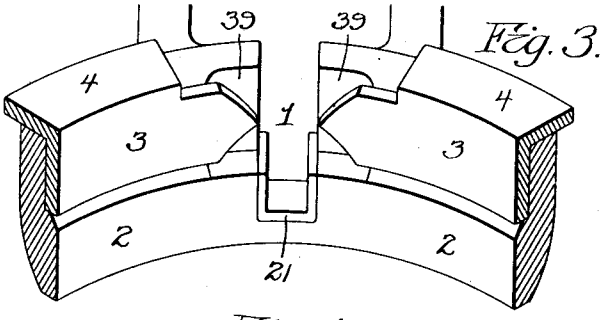


Fig. 3.

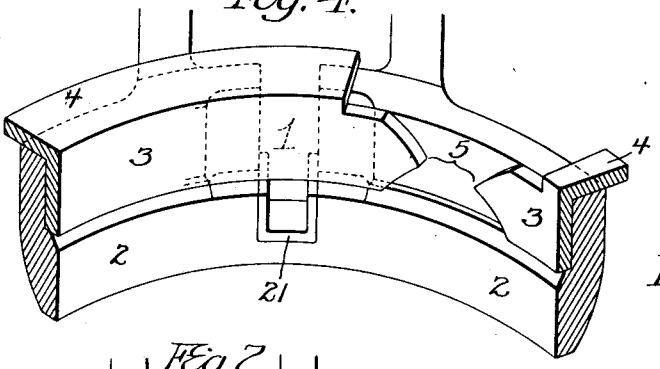


Fig. 4.

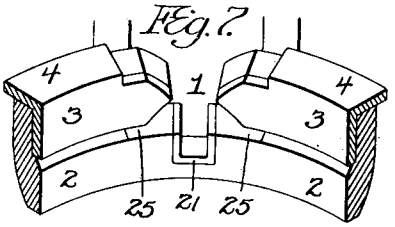


Fig. 7.

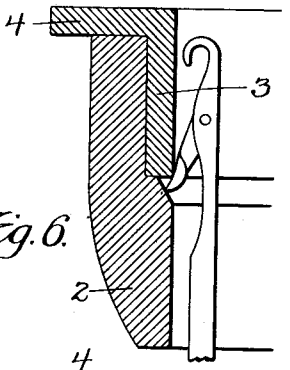


Fig. 6.

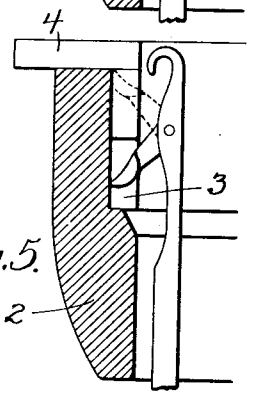


Fig. 5.

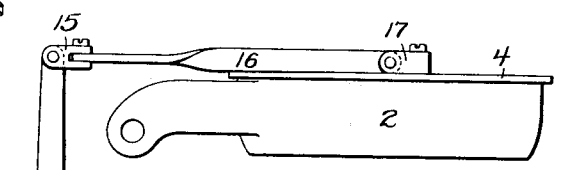


Fig. 8.

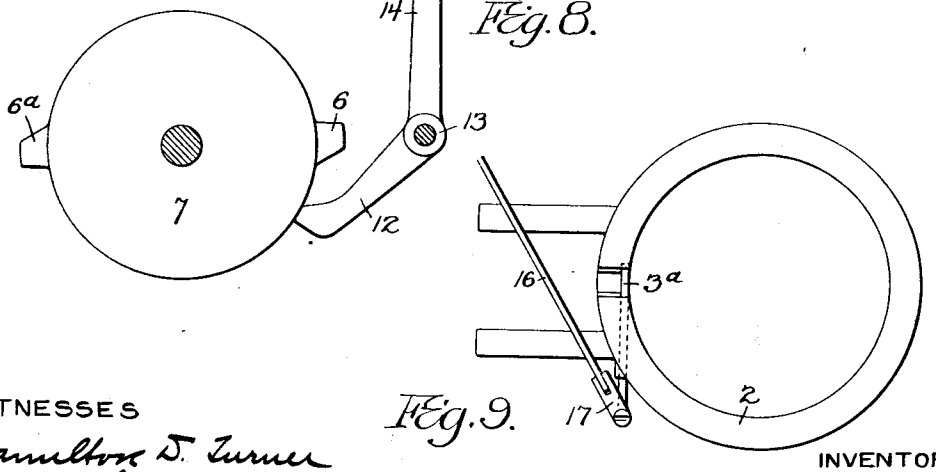


Fig. 9.

WITNESSES

Hamilton D. Turner

Elsie Fullerton

INVENTOR

ROBERT W. SCOTT

BY HIS ATTORNEY

Harry Smith

UNITED STATES PATENT OFFICE.

ROBERT W. SCOTT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO SCOTT & WILLIAMS, INCORPORATED, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

KNITTING-MACHINE.

1,191,740. Specification of Letters Patent. Patented July 18, 1916.

Application filed March 26, 1912. Serial No. 686,384.

To all whom it may concern:

Be it known that I, ROBERT W. SCOTT, a citizen of the United States, residing in Boston, Massachusetts, have invented certain Improvements in Knitting-Machines, of which the following is a specification.

My invention relates to that class of knitting machines in which a multiplicity of yarn changing levers or other guides are mounted on a convenient part of the machine, usually a latch guard ring, with their yarn delivery ends free to play in a gap in said ring, the width of which gap depends upon the number of such yarn changing guides employed. This gap, if left with vertical side walls, would, when the needles were in a certain position in respect thereto, permit the latches of the needles, as for instance, from centrifugal force, to swing out into the gap and assume such a position therein that said latches would contact with the walls of the gap and would be broken or injured thereby. In order to obviate this defect it has heretofore been suggested to make each individual yarn guide or lever with a gap closing portion, the intent being that, at all times when the yarn guides were moved to a non-feeding position, each individual yarn guide would close as much of the gap as might be represented by its own width, but this method is objectionable because it involves very exact fitting of the yarn guides so that no crevices may exist between them, and so that the surface of one will not protrude beyond the surface of its neighbor and thus present a shoulder upon which the extended latch might be caught and thus be injured or broken.

Another plan heretofore suggested has been to so angle the side walls of the gap that the walls themselves would exert a cam like influence on the projecting latches of the needles so as to properly position said latches and prevent injury thereto or faults in the knitted fabric, which might otherwise occur. Practice has, however, demonstrated that this latter method cannot be relied upon to position the latches where the gap is of any material width, due to the use of a multiplicity of yarn guides, and it has been determined that the danger of latch displacement and injury increases in the ratio that this gap is increased in width.

In order to overcome the objections to the methods above referred to, I have provided positive means whereby the gap may be closed and the latches of the needles prevented from entering the same when the needles are in such a position that entrance of the latches into the gap would otherwise take place.

In the accompanying drawings Figure 1 is a side elevation of sufficient of a common form of knitting machine to illustrate the application of my invention thereto; Fig. 2 is a plan view of that portion of the machine to which my invention particularly relates; Fig. 3 is a sectional perspective view of part of the same showing the open gap for the operation of the yarn guides; Fig. 4 is a similar view illustrating the gap closer in position to close the gap; Figs. 5 and 6 are enlarged sectional views of parts of the device, and Figs. 7, 8 and 9 are views illustrating certain modifications of my invention.

In the present instance I have illustrated my invention as applied to that type of machine in which the gap 1 for the reception of the yarn guides is formed in a latch guard ring 2, located above the top of the needle cylinder, but it should be understood that my invention is not limited to this particular type of machine, but is applicable to any construction of machine which is subject to the objections before noted.

In the construction shown in the drawing the latch guard ring 2 is recessed on its inner side at the top, to receive a secondary ring 3, which, by preference, has a flange 4 turned or otherwise formed on its upper end. This secondary ring likewise has a gap 5 formed therein, which, in one position of the ring, is in substantial register with the gap 1 on the latch guard ring, but when said secondary ring is in its other position it will close the gap 1 and prevent the needle latches from entering the same.

The side walls of the gap in the secondary ring are appropriately beveled as shown in Figs. 3 and 4, the purpose of which will be later described.

In machines organized for the knitting of a so-called seamless stocking, the machine is capable of rotation while knitting the tubular portions, and of reciprocation when knitting the heel and toe portions, as is well known to those skilled in the art. During the rotating knitting the secondary ring may be so positioned that its gap will be in regis-

ter with the gap in the guard ring 1 as shown in Fig. 3, so that the latter gap is open and the yarn guides can function therein to effect any desired change in the yarn fed to the needles. Ordinarily, during such rotating knitting, none of the needles are raised to such a position that their latches will be free to enter the gap, but when the needles are so raised, as occurs during the formation of the heel and toe, advantage is taken of action by any appropriate moving member of the machine to close the gap in the latch guard ring 1 by a proper fractional reciprocation of the secondary ring 3.

In the construction shown in Fig. 1 such reciprocation of said ring 3 is brought about by a cam lug 6 on a drum 7, which is mounted and racked step by step in any ordinary way. This cam lug, when it is brought under the foot 8 of a lever 9, imparts a downward movement to the end 10 of said lever, which is transmitted through the agency of a connecting rod 11 to one arm 12 of a bell crank lever 13, suitably pivoted in respect to the latch guard ring 2, the other arm 14 of said lever being connected by a universal joint 15 to one end of a link 16, whose other end is connected at an appropriate point by another universal joint 17 to the flange of the secondary ring 3. When the end 8 of the lever 9 rests upon the drum 7, the secondary ring may occupy the position shown in Fig. 3, which position may be that assumed by it during round and round knitting. On beginning the formation of the heel or toe, however, the drum 7 is moved so that the lug 6 passes under the foot 8 of the lever 9 and through the medium of the mechanism described imparts a fractional reciprocation to the secondary ring 3, and moves its gap to the position shown in Fig. 4.

When in this position the gap 1 is effectually closed by that portion of the secondary ring which is adjacent to the gap 5 therein, and it is impossible for the latch of the needle to enter the gap in the main ring 2. Ordinarily, when the needles are at the clearing point, that is to say, the highest point to which they are projected during the round and round knitting, the ends of the latches will be protected by that part of the latch guard ring 2 below the throat plate 21. If the needles, when at the clearing point, are lifted to such a height that the ends of their latches are not so protected, the secondary guard ring 3 may be actuated so as to close the gap 1 at all times except when a change of yarn guides is being effected. At times it is necessary to remove the needle cylinder, and in order to do so the common practice is to raise one-half of the needles so that their butts, upon which act the cams for effecting the reciprocation of the needles in knitting, will be above said cams, and if a rib top is to be transferred to the needles from a transfer ring it is also customary to likewise throw the needles to an abnormally elevated position, and if, at such times, the gaps in the main and secondary guard rings are in register and the gap is consequently opened, there may be a remote possibility of some of the latches of these abnormally elevated needles standing in position so close to a right angle with the stem of the needle, that they might come in contact with the walls of the main gap. In order to overcome even this remote possibility of danger to the latches, I may recess the faces of said main latch guard ring on opposite sides of the gap as shown for instance at 39 in Fig. 2, in order to permit the latch to clear this portion of said main latch guard ring even if said latch is at right angles to the stem of the needle, so that when the machine is being turned by hand with the gap open as above described, the latch cannot be injured by contact with said main latch guard ring, but will be turned out of danger by the beveled surface of the side of the gap in the secondary ring 3, or, in the absence of this provision, the side walls of the gap in the main ring may be beveled, as shown for instance in Fig. 7, the ring 2 in this case being recessed as shown for instance at 25 in Fig. 7, to such an extent as to permit the free downward swing of the latch. By using a mutilated ring for closing the gap in the main latch guard ring I am enabled to provide opposed edges, preferably beveled, and the ring is a convenient form of closure because it lends itself admirably to a fractional reciprocatory movement from a pattern drum upon the machine. Ordinarily the pattern drum 7 will make one complete revolution during the formation of the stocking, and consequently the lug 6 upon the pattern drum will be duplicated as for instance at 6^a, in order to provide for the closure of the gap during the formation of the toe of the stocking, the lug 6 providing for such closure during the formation of the heel of the stocking.

When the gap 1 is closed by the secondary ring 3, the latches of the elevated needles will still be free to swing into the gap in said secondary ring when the needles are passing the same as shown for instance by either full or dotted lines in Fig. 5, but the latches will, in such case, contact with the inner wall of the main ring 2, and will thus be held in such a position that the beveled side walls of the gap in the secondary ring will turn the latches either up or down without injury thereto.

In order to prevent injury to the latch when a needle is being restored to operative position by the "down-pick", I bevel the inner corner of the ledge of the main guard

ring upon which the secondary guard ring rests, as shown for instance in Fig. 6, so that it will serve to turn inwardly or toward the stem of the needle, any latch whose lower end may contact therewith, thereby preventing the bending or breaking of the latch which might occur if an abrupt shoulder was presented at this point.

When the latch guard ring 2 is swung upward on its pivot 30, as is customary in transferring a web to the needles from a transfer point ring, the end 8 of the lever 9 will be lifted out of contact with the drum 7 and the free raising of the guard ring will therefore not to be interfered with. In some cases the pattern drum 7 may be located in position shown in Fig. 8, so that its lugs may act directly upon the arm 12 of the bell crank lever 13. The lever 9 and connecting rod 11 being dispensed with.

It will be understood that motion may be imparted to the gap closer or secondary guard ring in any suitable manner, and while I have shown this member as being actuated from the pattern drum 7 at relatively infrequent intervals, determined by the formation of the heel and toe upon the stocking, this operation may be modified, for instance if the yarn change was so timed that it occurred while the ever active sixth of the needles were passing the gap 1, that is to say, those needles which constitute the middle third of the heel and toe fashioning set, or, in the case of a rotary cam ring machine, while the gap was passing this group of needles, then the gap closing secondary ring might be actuated at each reciprocation of the machine, so that the gap in the main latch guard ring would be open when registering with the group of needles referred to, and closed at other times.

Instead of beveling the edge or edges of the gap 1 in the main latch guard ring, I may rely upon the beveled edges of the gap in the secondary ring, and cut away the edge of the gap in the main latch guard ring as indicated by dotted lines at 35 in Fig. 2, and the bevel of the edge of the secondary ring may exist on one side only of the gap therein, and I wish it to be understood that various modifications in the construction and operation of the gap closing means may be adopted without departing from the spirit of my invention.

It will be noted that in the construction shown and described it is only that portion of the ring 3 to the left of the gap in said ring which serves to close the gap 1 in the main latch guard ring, and I may therefore, instead of employing a secondary ring with a gap therein, elect to employ but a short segment, for instance, as much as is shown at the left in Fig. 3, and thereby gain substantially all of the advantages of using the ring with the gap in it, and it will also be apparent that the use of the segmental closure is not necessary, as a closure in the form of a bolt sliding in a straight line might be employed as shown for instance at 3^a in Fig. 9.

I claim:—

1. The combination, in a knitting machine, of a member having a gap therein for the operation of a plurality of yarn guides with a member operating independently of the yarn guides to close or open said gap.

2. The combination, in a knitting machine, of a member having a gap therein for the operation of a plurality of yarn guides, a member independent of said yarn guides, and automatic means for moving said latter member to close or open the gap.

3. The combination, in a knitting machine, of a member having a gap therein for the operation of a plurality of yarn guides, and a member sliding back and forth across said gap and serving when in one position to open the same and when in the other position to close it.

4. The combination, in a knitting machine, of a latch guard having a gap therein for the operation of a plurality of yarn guides, and a gap closer independent of the yarn guides and mounted upon said latch guard but movable in respect thereto so as to open and close the gap therein.

5. The combination, in a knitting machine, of a swinging member having therein a gap for the operation of a plurality of yarn guides, a gap closer swinging with said member, a fixed cam for operating said gap closer, and connections between the gap closer and the cam, said connections being so disposed that the cam does not interfere with the swinging movement of the gap closer with its carrier.

6. The combination, in a circular knitting machine, of the circle of needles, a member having a gap therein for the operation of a plurality of yarn guides, a gap closer, and means for moving said gap closer in a path concentric with the circle of needles to open or close the gap.

7. The combination, in a knitting machine, of a member having a gap therein for the operation of a plurality of yarn guides, said member being recessed adjacent to the gap to permit free movement of the needle latches, and means for opening and closing said gap.

8. The combination in a knitting machine, of a latch guard ring having therein a gap for the operation of a plurality of yarn guides, and a movable gap closer, said ring having also a shoulder for the support of said movable gap closer, said shoulder being beveled to prevent interference with the latches of the downwardly moving needles.

9. The combination, in a knitting ma-

chine, of a member having a gap therein for the operation of a plurality of yarn guides, and a member movable to open or close said gap, said member having a beveled end to cause upward or downward movement of needle latches contacting with the same.

10. The combination, in a knitting machine, of a member having a gap therein for the operation of a plurality of yarn guides, one of the walls of said gap being beveled to act as a latch turner, and a member movable to open and close said gap, said member also having a beveled portion to act as a latch turner.

11. The combination, in a knitting machine, of a latch guard ring having a gap therein for the operation of a plurality of yarn guides with a secondary ring mounted on said main ring and also having a gap therein for the operation of said yarn guides, said secondary ring being movable so as to open or close the gap in the main latch guard ring.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ROBERT W. SCOTT.

Witnesses:

WALTER L. TOY,

ARTHUR M. BLADES.