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KNITTING MACHINE.

APPLICATION FILED JAN. 29, 1915.

1,244,503.

Patented Oct. 30, 1917.

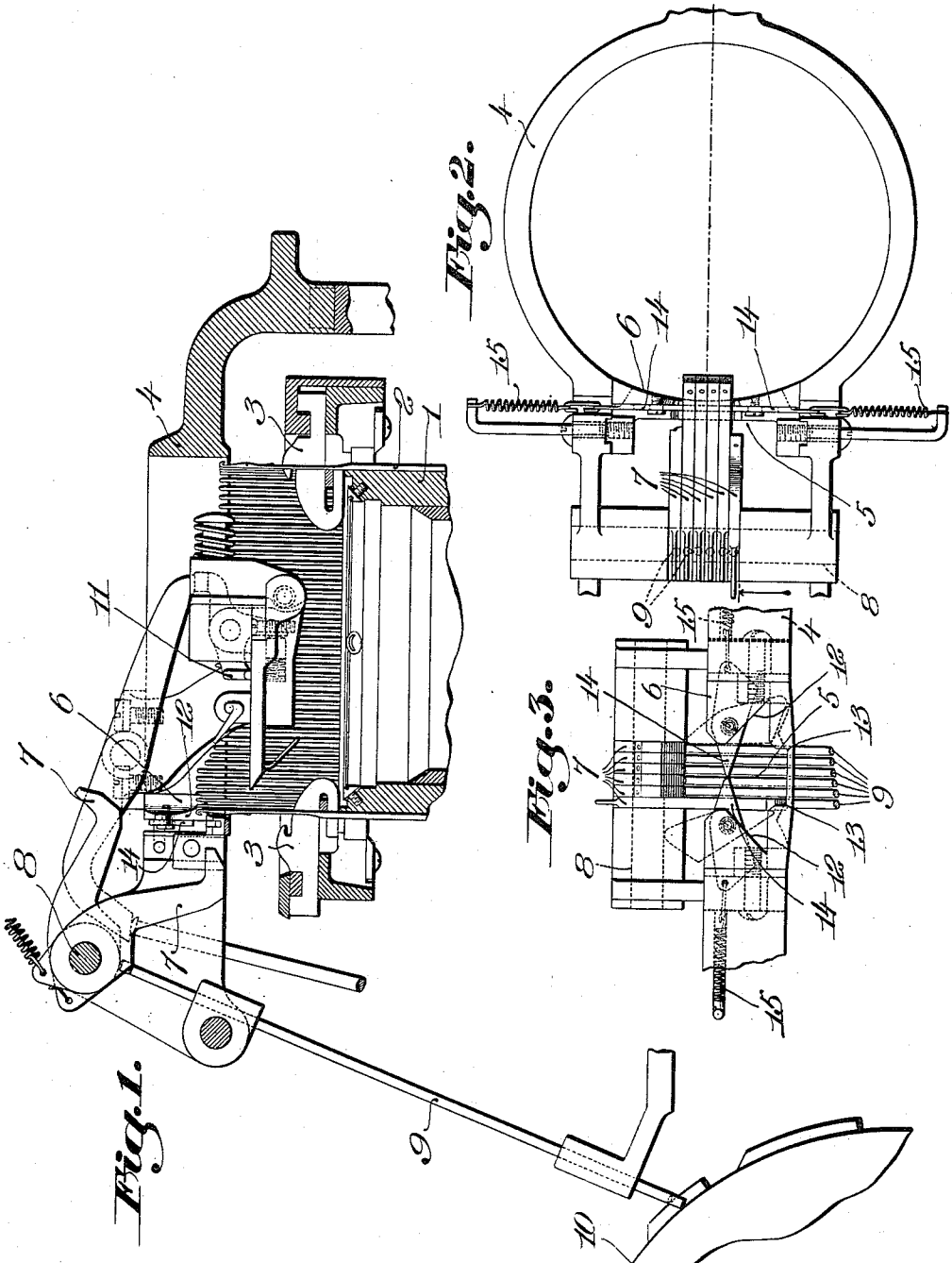


Fig. 1.

Fig. 2.

Fig. 3.

Witnesses

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KNITTING-MACHINE.

1,244,503. Specification of Letters Patent. Patented Oct. 30, 1917.

Application filed January 29, 1915. Serial No. 5,028.

To all whom it may concern:

Be it known that I, ROBERT J. JENCKES, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Knitting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to knitting machines, and more especially to devices for supplying yarn to the needles of circular independent needle machines.

In machines of this type it is customary to provide a series of yarn carriers which are operated to introduce and withdraw the various yarns used during the operation of the machine, and to provide the latch ring of the machine with an opening or throat through which the yarn carriers or yarns may pass vertically as they are presented to or withdrawn from the needles. This opening or throat thus formed in the latch ring presents a gap in the latch ring into which the latches of the needles which are in the upper or inactive series during reciprocatory knitting are liable to be thrown by centrifugal force in that type of machine in which the needle cylinder is rotated and reciprocated during the knitting. It is important, therefore, in this type of machine, that the throat be closed so that the latches of the inactive series of needles will be prevented from entering the throat to a sufficient extent to injure or break them. It is accordingly the object of the present invention to provide a novel and improved throat closing means which shall be simple in construction and uniformly reliable in operation, and which will effectively prevent the injury to the latches of the needles, while not interfering with the passage of the yarn guides or yarns in presenting the yarns to or withdrawing them from the needles. To that end the invention contemplates the provision in a machine provided with a series of yarn guides and a throat through which the yarns are presented to and withdrawn from the needles, of a yielding gate which normally closes the throat, and which is temporarily displaced during the passage of a yarn or yarn guide in either direction. The invention also includes certain further features of construction and combinations of parts which will be hereinafter described and referred to in the claims, the advantages of which will be apparent to those skilled in the art.

The invention will be readily understood from an inspection of the accompanying drawings and the following detailed description of the mechanism illustrated therein.

In the drawings, Figure 1 is a sectional elevation showing so much of a knitting machine as is necessary to illustrate the embodiment of the preferred form of the invention therein; Fig. 2 is a plan view of the latch ring and yarn guides; and Fig. 3 is an elevation looking from the interior of the latch ring.

The machine shown in the drawings is provided with a rotary needle cylinder 1 in which the needles 2 are mounted to reciprocate in the usual manner. The machine is provided with the web holding sinkers 3, and the needles and sinkers are operated in the usual manner by suitable cams, pickers and controlling devices, which may be of any suitable or well-known construction. The machine is provided with a latch ring 4, and the yarns used during the knitting are presented to and withdrawn from the needles through an opening or throat 5 formed in the latch ring or in a throat plate 6 secured in the latch ring. The various yarns are carried by a series of yarn carriers 7 which may be of any suitable construction, and which as shown are pivoted upon a stud 8 and are operated through rods 9, the upper ends of which engage the yarn carriers, and the lower ends of which ride on cams secured to a cam drum 10. The yarn withdrawn from the needles by the upward movement of one of the yarn guides is severed and held within the needles by suitable yarn severing and holding devices indicated at 11, the construction of which forms no part of the present invention, and which need not be described in detail.

The throat 5 is preferably provided with inclined sides 12 which will act to swing down any of the needle latches which may swing partially outward in traveling across the throat opening. The throat is also provided with yarn guiding notches 13 over which the active yarn or yarns lead to the

needles during the knitting. When a yarn carrier is in its lower or active position the yarn carried thereby leads from the guide in the end of the carrier over one or the other of the notches 13 to the needles. When the carrier is moved up into its upper or inactive position the yarn carried thereby is withdrawn from the needles, and as it is withdrawn it passes vertically up through the throat. When the yarn is again to be presented to the needles the yarn carrier is moved down into active position, and the yarn carried thereby which leads from the yarn guide in the end of the carrier to the holder within the needles passes down through the throat and into the yarn guide notch 13 of the throat. In the construction shown the ends of the yarn guides also swing vertically up and down through the upper part of the throat as their yarn guiding ends pass from the yarn feeding position outside of the needles to the inactive position above and inside the needles, or vice versa.

In accordance with the present invention the throat 5 is normally closed by a gate which is so mounted that it will not interfere with the vertical movements of the yarn guides or yarn, but will immediately return to normal throat closing position as soon as the yarn or yarn carrier has passed in either direction. In the construction shown, the throat closing gate comprises two fingers 14 pivoted on opposite sides of the throat, and having their free adjacent ends substantially in engagement or overlapping, so that they close the throat and form an effective guard for preventing the latches of the inactive needles from flying outward and striking violently against the edges or sides of the throat. The fingers 14 are yieldingly held in normal position by the springs 15, and are so mounted that they are free to move vertically in either direction against the tension of the springs, when engaged by the yarn carriers or yarns. If a yarn carrier is swung downward from active to inactive position it will strike on the upper side of one of the fingers 14, and will swing the finger into the position indicated in dotted lines at the left of Fig. 3. As soon as the yarn carrier and yarn have passed out of engagement with the inner end of the finger, the springs 15 will immediately return the finger to normal full line position. When a yarn carrier moves up to withdraw a yarn from the needles, it will strike the under side of one of the fingers 14, swinging the finger up into the position indicated in dotted lines at the right in Fig. 3. As soon as the yarn carrier and yarn have passed, the spring 15 will return the finger to normal position. Thus the fingers 14 form a yielding gate which normally closes the throat, and which is temporarily displaced in withdrawing or inserting a yarn to allow the passage of the yarn guide and yarn vertically in either direction. With this construction the throat is closed at all times except when a yarn is being inserted or withdrawn, and thus all danger of injury to the latches of the needles is avoided. The lower edges of the fingers 14 are preferably inclined to form cam surfaces for deflecting any latches that may swing outward in passing the throat.

While it is preferred to employ the specific construction and arrangement of throat closing devices shown and described, it is to be understood that this construction is not essential to the broader features of the invention, but may be varied and modified as found desirable or best suited to the cooperating devices of the machine in which the invention is to be embodied.

Having explained the nature and object of the invention, and specifically described one form of mechanism in which it may be embodied, what I claim is:—

1. A knitting machine, having, in combination, a series of yarn carriers, a throat through which the yarn is delivered to and withdrawn from the needles, and a yielding gate normally closing the throat.

2. A knitting machine, having, in combination, a series of yarn carriers, a throat through which yarn is delivered to and withdrawn from the needles, and a gate normally closing the throat and mounted to yield vertically in either direction.

3. A knitting machine, having, in combination, a series of yarn carriers, a throat through which yarn is delivered to and withdrawn from the needles, a gate normally closing the throat comprising two pivoted fingers projecting inward from opposite sides of the throat and mounted to swing vertically in either direction, and springs holding the fingers in normal position.

4. A knitting machine, having, in combination, a series of yarn carriers, a throat through which yarn is delivered to and withdrawn from the needles, a gate normally closing the throat which is displaced by the passage of a yarn carrier, and means for returning the gate to normal position when freed from the yarn carrier.

5. A knitting machine, having, in combination, a series of vertically movable yarn carriers, a throat through which yarn is delivered to and withdrawn from the needles, two fingers pivoted at opposite sides of the throat and extending inward across the throat, and springs for holding the fingers against displacement in either direction.

6. A knitting machine, having, in combination, a series of yarn carriers, a throat through which yarn is delivered to and withdrawn from the needles provided with inclined guides, fingers pivoted at opposite sides of the throat and extending across the throat, and springs for holding the fingers

yieldingly against displacement in either direction.

7. A knitting machine, having, in combination, a series of yarn carriers, a throat through which the yarn is delivered to and withdrawn from the needles, and means independent of the yarn carriers normally closing the throat and adapted to be displaced during the insertion or withdrawal of a yarn.

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