

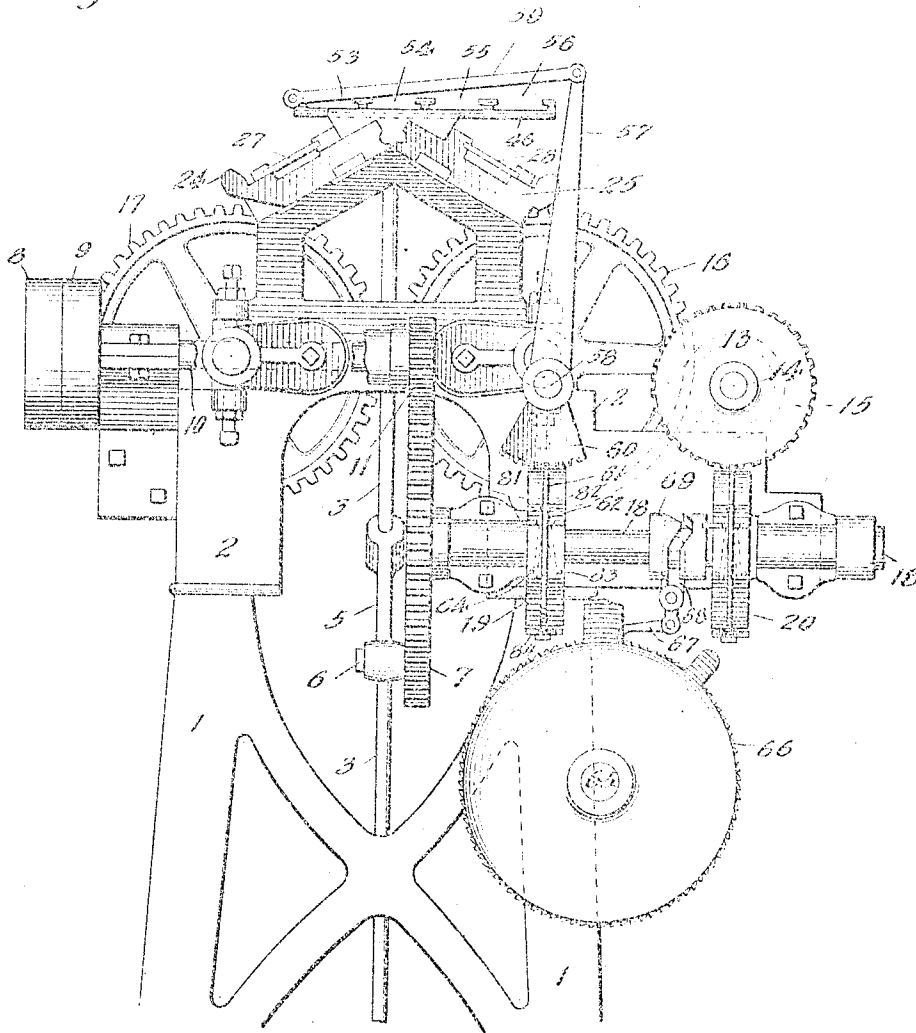
W. W. BURSON.
YARN CHANGING MECHANISM FOR KNITTING MACHINES.
APPLICATION FILED NOV. 5, 1902.

944,012.

Patented Dec. 21, 1909.

4 SHEETS—SHEET 1.

Fig. 1



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Inventor:
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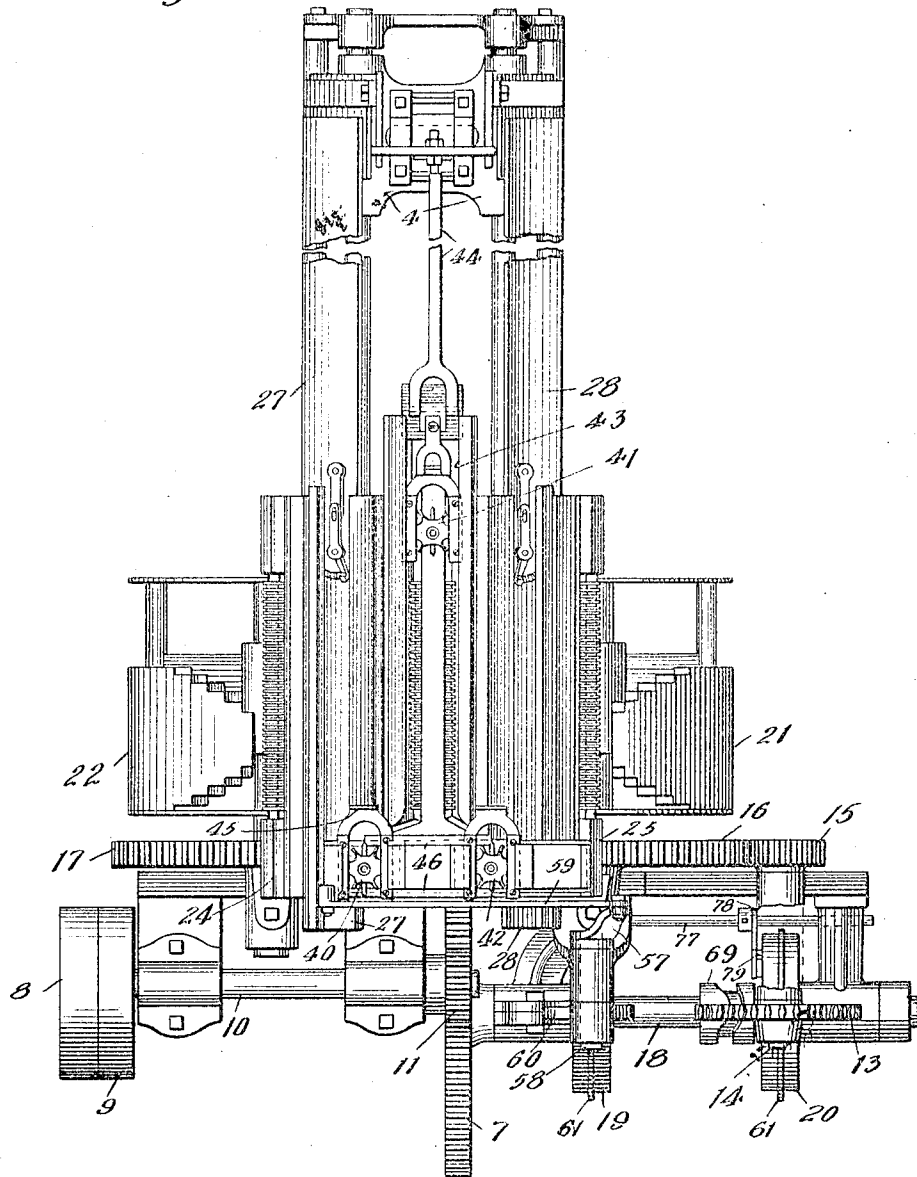
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4 SHEETS—SHEET 2.

Fig. 2



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4 SHEETS—SHEET 3.

Fig. 3

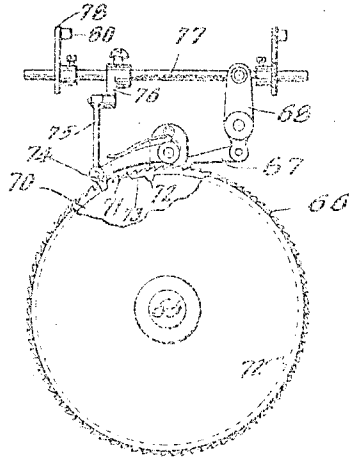


Fig. 4

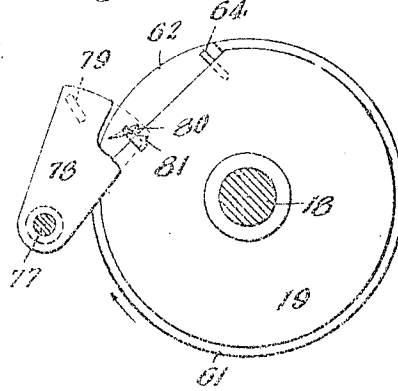


Fig. 6

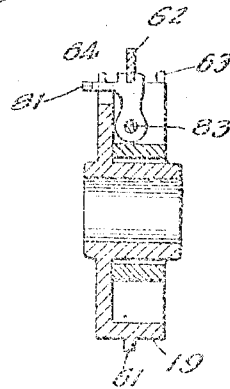


Fig. 5

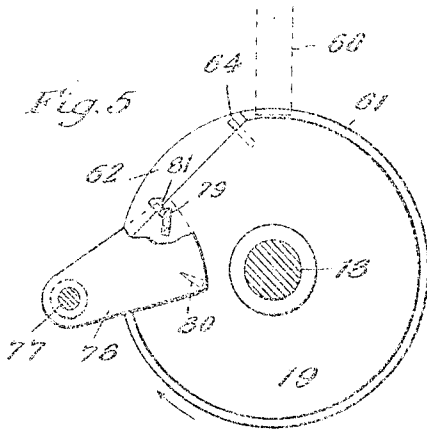
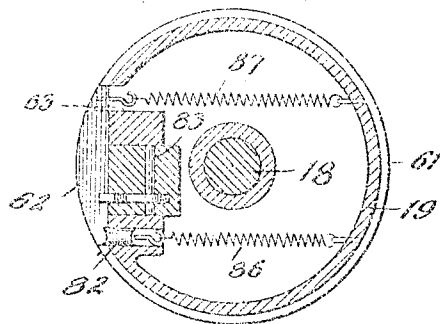


Fig. 7



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4 SHEETS—SHEET 4.

Fig. 8

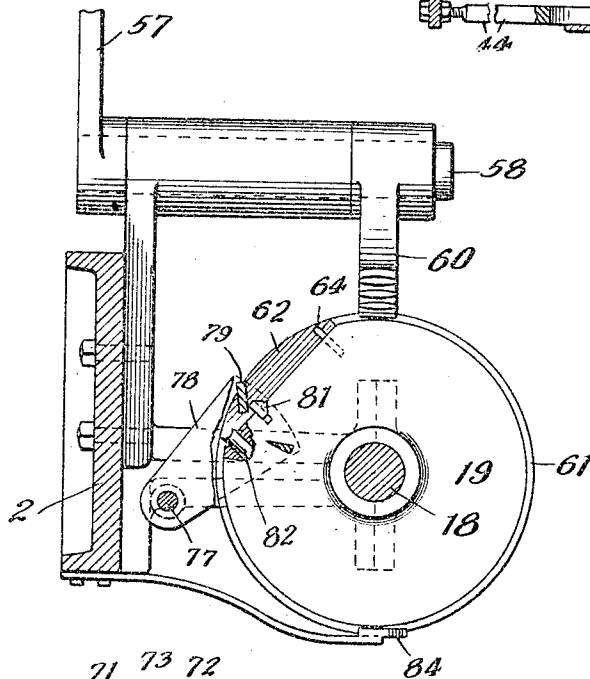


Fig. 10

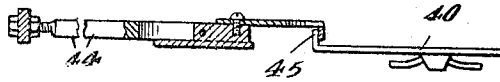
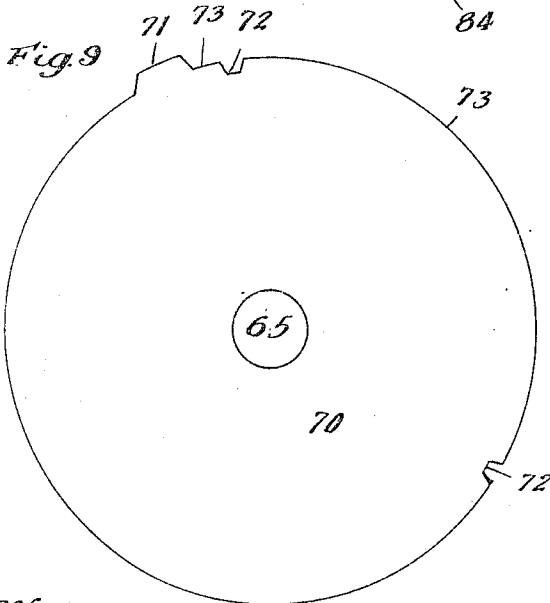


Fig. 11



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UNITED STATES PATENT OFFICE.

WILSON W. BURSON, OF ROCKFORD, ILLINOIS.

YARN-CHANGING MECHANISM FOR KNITTING-MACHINES.

944,012.

Specification of Letters Patent.

Patented Dec. 21, 1909.

Application filed November 6, 1908. Serial No. 461,274.

To all whom it may concern:

Be it known that I, WILSON W. BURSON, a citizen of the United States, residing in Rockford, in the county of Winnebago and State of Illinois, have invented a new and useful Improvement in Yarn-Changing Mechanism for Knitting-Machines, of which the following is a specification.

This invention relates to means for changing the yarn while the machine is in operation in that class of knitting machines known as straight knitting machines. It embraces a transversely movable transfer bar having a series of grooves or spaces adapted to admit the yarn carriers, and by which bar said grooves or spaces may be positioned in register with the ways in which the carriers travel past the needles, so that at the completion of each round of the carriers they will be entered in one of said grooves or spaces and be in readiness at such times to be transferred by the bar. The bar is actuated at proper times by suitable mechanism, so that it transfers any carrier which may have just entered it, out of register with the said ways, and presents another carrier in its stead, the latter being then automatically coupled to the actuating device and moved along to the needles and continuing the knitting.

The nature of the invention and the details of the mechanism by which it is controlled are fully set forth in the subjoined description, and are also illustrated in the accompanying drawings in which—

Figure 1 is an end elevation, certain parts being omitted. Fig. 2 is a plan view. Fig. 3 is an elevation of a portion of the mechanism controlling the transfer bar. Figs. 4 and 5 are detail views of the switch wheel showing different positions. Figs. 6 and 7 are sectional views of said wheel. Fig. 8 is another view of the switch wheel showing the cam carrying arm in a different position from Figs. 4 and 5. Fig. 9 shows the transfer control disk detached. Fig. 10 is a vertical section of the driving bar engaging the yarn carriers. Fig. 11 shows the guide for returning the movable switch section of the switch wheel to normal position.

In said drawing, 1 is the supporting base, and 2 the frame to which the operating parts are mainly attached. 3 is a rocking lever, the lower end of which is pivoted to the base by a link connection (not shown) and the upper end of which is pivoted to and oper-

ates a cross head 4. A pitman 5 is pivoted at one end to the rocking lever, and its other end engages the crank pin 6 of the crank wheel 7. The machine is driven by a belt running on the tight pulley 8, which, with its coacting loose pulley 9 is mounted on one end of the shaft 10, journaled on the frame 2. On the other end of shaft 10 is the driving pinion 11 which meshes into wheel 7, which is secured on shaft 18. A toothed wheel 13 on shaft 14 is actuated from shaft 18 by a switch wheel 20 on the latter, and the pattern cylinders 21 and 22 are driven from the wheel 13 by pinion wheel 15 on shaft 14, meshing with gear 16 on the shaft of pattern cylinder 21 and said gear 16 meshing with gear 17 on the shaft of cylinder 22. Shaft 18 carries a second switch wheel 19 which operates the yarn changing device forming the subject of this application, and which is described later. Spacing bars 24 and 25 are parts of the needle beds and in them are formed ways for the reciprocating cam bars 27 and 28 by which the needles are actuated.

I have shown three yarn carriers 40, 41 and 42. They travel back and forth along ways 43 formed between the needle beds, and receive power in so doing from the cross head 4, through the driving bar 44 which is adjustably fastened to the cross head and is adapted to detachably engage the upturned flange 45 upon the carriers. They are all of the kind known as latch opening carriers, that is to say they are armed with points adapted to open the latches of the needles. Their construction is well understood by users and manufacturers of straight knitting machines at the present time. One of said carriers is shown as moving along said ways 43, and the other two are shown in Fig. 2 as positioned in the carrier spaces of the transfer bar 46. This bar is movable back and forth in a straight line transversely of the machine and is supported on the block 47. It has any desired number of carrier spaces, such as 53, 54, 55 and 56, each adapted to admit a carrier, and the bar is also adapted to be moved so as to bring each of the spaces into register with the ways 43. The normal stroke of the head 4 is such that the carriers are entered in that one of the spaces 53 &c. which happens at the time to be in register with the ways 43, so that if the bar be moved when any acting carrier is in the bar, such carrier will be forced out of

action, and another carrier may in the same movement of the bar be positioned for action and take the place of the one which has just been forced out.

5 The transverse movements of the bar 46 are caused by a lever 57, pivoted at 58 and connected to the bar 46 by a rod 59, and the movements of lever 57 are received from and controlled as to the time of their occurrence
10 by the switch wheel 19 on shaft 18 through the downwardly extending toothed segment 60 which is rigid with the lever. Said switch wheel is provided with a centrally located peripheral rib 61, one section 62 of which is
15 hinged and movable from its central non-acting position shown in Fig. 1, to either of the lateral positions shown in dotted lines in the same figure, and in which the movable section will be stationed against the pin 63
20 or the pin 64. The rib 61 and its movable section engage the segment 60 and either hold it stationary or shift it according to the position which may have been given the movable section.

25 The mechanism for shifting the switch section is desirably constructed as follows: At 65 is a shaft on which is mounted a ratchet disk 66 having uniform teeth all around and engaged by the pawl 67. The
30 pawl 67 receives regular actuations through the lever 68, one end of which is engaged and vibrated by the cam 69 upon the shaft 18 and thereby is enabled to turn the disk and shaft 65. Attached to the ratchet disk
35 66 is another disk 70 which may appropriately be called the transfer control disk, and which is provided with one or more raised teeth 71 and one or more depressions
40 or notches 72, the intermediate portions 73 of the periphery of the disk between the teeth and the depressions being located in a plane midway between that of the top of
45 the teeth 71 and that of the bottom of the depressions 72. Riding upon the periphery of disk 70 is the foot 74 of an arm 75 which is joined to a crank 76 on a rock shaft 77,
50 carrying an arm 78. The shaft 77 is arranged parallel to shaft 18 and the arm 78 carries two cams 79 and 80 and is arranged in proximity to the switch wheel 19 so that
55 the cams engage the arm 81 attached to the movable switch section 62 and projecting laterally of the switch wheel as shown more particularly at Figs. 4, 5 and 6. The section
60 62 is pivoted upon a pivot 82, so that when the arm 81 which is also pivoted upon a pivot 83, is engaged by the cams, the section swings either toward pin 63 or toward
65 pin 64, depending upon which cam engages the arm, cam 79 being adapted to act upward on the arm and cause movement toward pin 63, and cam 80 being adapted to act downwardly on the arm and cause movement toward pin 64. The movable section
62 preserves an upright position upon the

wheel by virtue of the vertical pivot 82 upon which it swings and the swinging of it toward pin 63 causes movement of the transfer bar in one direction, and the swinging of the section toward pin 64 causes its move-
70 ment in the other direction.

With the construction described, the operation is substantially as follows: The transfer control disk is rotated regularly at intervals, and when the raised tooth 71 passes
75 the arm 75, it raises the latter so as to cause a rocking of shaft 71 and the arm 78 is thereby swung so as to carry its cam 79 against the arm 81 and operate the movable switch section and carry it against the post
80 or pin 63. This swings the segment 60 and in so doing shifts the transfer bar so as to carry the yarn guide then in active engagement with the driving bar 44 out of such engagement and at the same time by its lateral
85 movement bringing another guide into acting position with its flanges 45 engaging the driving bar. After the foot 75 has thus operated the switch it falls on to the intermediate track 73 of the control disk, and the
90 switch as soon as it has moved beyond the segment 60 is returned to its normal position by the guide 84 seen at Figs. 8 and 11 and located under the switch wheel. While upon
95 the track 73, the foot 75 is idle and the switch consequently remains in line with the rigid part of the rib 61, but it may be opened repeatedly as often as necessary by widening the teeth 71 or the notches 72. In Fig. 9 the
100 tooth 71 is adapted to cause three operations of the transfer bar in close succession, and the notches 72 shown each cause a single operation. The enlarged or widened teeth or notches act to retain the arm 75 in its raised
105 or depressed position for longer periods and consequently the arm 78 remains in acting position and trips the switch at each revolution of the latter, thereby causing the repeated transfer operations. When it is desired to drop the fabric from the needles, the
110 transfer bar is shifted so as to present an empty carrier space opposite the carrier drive device, so that at the next stroke of the latter no yarn will be delivered to the needles. At Fig. 7, I show two springs 86
115 and 87. One of these keeps the pivot 82 in position, and the other of which helps to maintain the switch in its upright position.

I claim:--

1. The straight knitting machine wherein
120 are combined a plurality of latch opening yarn carriers, a transfer bar having a series of spaces each adapted to admit one of the carriers, and each adapted to be stationed in register with the ways in which the carriers
125 travel, and means for moving said bar transversely in a straight line of said ways, so as to carry one carrier out of and another into action.

2. The straight knitting machine wherein
130

are combined a plurality of latch opening yarn carriers, a transfer bar having a series of spaces each adapted to admit one of the carriers, and each adapted to be stationed in register with the ways in which the carriers travel, and automatic means for moving said bar in a straight line transversely of said ways, so as to carry one carrier out of and another into action.

3. The straight knitting machine wherein are combined a plurality of latch opening yarn carriers, a transfer bar having a series of spaces each adapted to admit one of the carriers, and each adapted to be stationed in register with the ways in which the carriers travel, and also adapted to receive the carriers at the ends of their strokes, and means for moving said bar in a straight line transversely of said ways so as to carry one carrier out of and another into action.

4. The straight knitting machine wherein are combined a plurality of latch opening yarn carriers, the actuating devices of such carriers, a transfer bar having a series of spaces each adapted to admit one of the carriers, and each adapted to be stationed in register with the ways in which the carriers travel, and means for moving said bar in a straight line transversely of said ways, so as to carry one carrier out of and another into action.

5. The straight knitting machine wherein are combined a plurality of latch opening yarn carriers, the actuating devices of such carriers, a transfer bar having a series of spaces each adapted to admit one of the carriers, and each adapted to be stationed in register with the ways in which the carriers travel, and automatic means for moving said bar in a straight line transversely of said ways, so as to carry one carrier out of and another into action.

6. The straight knitting machine wherein are combined a plurality of latch opening yarn carriers, the actuating devices of such carriers, a transfer bar having a series of spaces each adapted to admit one of the carriers, and each adapted to be stationed in register with the ways in which the carriers travel, and also adapted to receive the carriers at the ends of their strokes, and means for moving said bar in a straight line transversely of said ways so as to carry one carrier out of and another into action.

7. The straight knitting machine wherein are combined a plurality of latch opening yarn carriers, a transfer bar having a series of spaces each adapted to admit one of the carriers, and each adapted to be stationed in

register with the ways in which the carriers travel, and means for moving said bar in a straight line transversely in either direction of said ways, so as to carry one carrier out of and another into action.

8. The straight knitting machine wherein are combined a plurality of latch opening yarn carriers, a transfer bar having a series of spaces each adapted to admit one of the carriers, and each adapted to be stationed in register with the ways in which the carriers travel, and automatic means for moving said bar in a straight line transversely in either direction of said ways, so as to carry one carrier out of and another into action.

9. The straight knitting machine wherein are combined a plurality of latch opening yarn carriers, a transfer bar having a series of spaces each adapted to admit one of the carriers, and each adapted to be stationed in register with the ways in which the carriers travel, and also adapted to receive the carriers at the ends of their strokes, and means for moving said bar in a straight line transversely in either direction of said ways so as to carry one carrier out of and another into action.

10. The straight knitting machine wherein are combined a plurality of latch opening yarn carriers, an actuating device for said carriers adapted to be engaged by and discharged therefrom by the sidewise movement of the carriers, a horizontally movable transfer bar having spaces for said carriers and into which they are moved by said actuating device, and means for moving said bar in a straight line transversely whereby it is adapted to carry one carrier out of such engagement and another into such engagement.

11. The straight knitting machine wherein are combined a plurality of latch opening yarn carriers, an actuating device for said carriers adapted to be engaged with the carriers when the latter are positioned for knitting, and to be disengaged therefrom when the carriers are withdrawn from such position, a horizontally movable bar having spaces for said carriers and into which they are moved by said actuating device, and means for moving said bar in a straight line transversely whereby it is adapted to carry one carrier out of such engagement and another into such engagement.

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