This invention relates to mechanism for controlling the winding of the yarn on bobbins in a ring spinning or twisting frame. Worsted manufacturers in particular are demanding larger and longer bobbins, in order to increase production by reducing the frequency of doffing and the number of knots in the yarn. The preferred yarn package is now a warp-wound bobbin tapered at the top of the bobbin and filled in full against the butt or flange at the bottom of the bobbin.

It is the general object of our invention to provide a builder mechanism for a ring spinning or twisting frame by which this preferred winding may be conveniently produced.

A further object is to provide a builder mechanism by which the yarn turns in successive layers so overlap that mohair or similar yarn may be wound without developing loose ends to engage the traveler and thereby limit the diameter of the full bobbin.

Our invention further relates to arrangements and combinations of parts which will be herein-after described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a side elevation of parts of a worsted ring spinning frame embodying our improvements;

Fig. 2 is an end elevation thereof, partly in section;

Fig. 3 is a side elevation of certain of the parts shown in Fig. 1 but in a different position and on a reduced scale.

Fig. 4 is a view of the winding produced by our improved builder mechanism, and

Fig. 5 is a rear view of a rack bar to be described.

Referring to the drawings, we have shown portions of a spinning or twisting frame having an end frame member 10 supporting a fixed ring rail 11 on which a plurality of spinning or twisting rings 12 are secured in the usual manner.

Spindles S are mounted on a spindle rail 15 and support a plurality of bobbins B, preferably of the general type shown in Fig. 4. The yarn Y is guided to the bobbins B through travelers T on the rings 12 in the usual manner. The spindles S are provided with whirls 16 and are continuously rotated by driving bands not shown.

Each spindle rail 15 is mounted on a plurality of chains 21 connected by chains 21 to a traverse rod 22 extending longitudinally of the spinning or twisting frame. Fixed guide pulleys 23 are provided for each chain 21. The end of the traverse bar 22 is secured to a block 25 slidable lengthwise on a slotted supporting frame member 26.

Our improved builder mechanism comprises a heart cam 30 mounted on a cam shaft 31 and continuously rotated at slow speed by driving mechanism comprising a pulley 32 on a main drive shaft 33, a pulley 34 on an intermediate shaft 35, a belt 36 connecting the pulleys 32 and 34, a gear 37 rotatable with the pulley 34 and engaging a larger gear 38 on a short shaft 39, and a worm 40 rotatable with the gear 38 and engaging a worm wheel 41 on the cam shaft 31. The heart cam 30 is thus positively driven at greatly reduced speed from the main driving shaft 33.

The cam 30 engages a cam roller 44 on a short lever 45 pivoted on a stud 46 mounted on a slotted bracket 47 for adjustment lengthwise of the spinning frame.

The lever 45 has a side face 48 engaged by a roll 50 mounted on a slide 51 movable along a guideway 52 formed on a long lever 53 pivoted at 54 to a slotted supporting bracket 55. A rack bar 56 extends upward from the slide 51 and is provided with pin teeth 58 engaging a pinion 57 mounted on a longitudinally extending shaft 58. The shaft 59 is provided with a key 62 and is slidable in a sleeve 63 mounted in the frame 10 and secured thereon by a collar 64. A portion 65 of the shaft 59 is screw-threaded in a nut 60 having a swivel mounting in a bracket or support 61 slidably mounted on the long lever 53.

The sliding block 25 previously described has an upward projection providing a bearing for the screw-threaded end of the shaft 59 and abutting the end of the shaft. The weight of the spindle rails 15 and associated parts causes the block 25 to constantly engage firmly against the end of the shaft 59 and to assume a position as far to the left (as viewed in Fig. 1) as is permitted by the position of the shaft 59.

The parts thus far described are substantially of a usual commercial construction except for certain changes in the outline and throw of the heart cam 30 and for certain changes in the shape of the short lever 45. The end teeth 58 on the slide bar 56 are conventional in this type of builder mechanism as is also the slide bar 59. (See Hartley Patent No. 1,357,363.)

Our present invention relates particularly to the provision of improved and novel means for actuating the shaft 59 on which the pinion 57 is mounted.

2,013,876

BUILDER MECHANISM FOR RING SPINNING AND TWISTING FRAMES

Application January 4, 1933, Serial No. 650,128

6 Claims. (CL 242—45.7)
The novel provision for actuating the shaft 58 comprises a slotted arm 70 (Fig. 2) secured to the sleeve 63 and having a pin 71 secured by a link 12 to a crankpin 73 secured in a radial slot in a disc 74 mounted on a fixed stud 75 and provided with a gear 76 engaged by a larger gear 77 rotatable on a second fixed stud 78. The gear 77 is driven from the cam shaft 31 through a worm 79 and worm gear 80, said worm gear 80 being secured to and rotatable with the gear 77.

A slow continuous rotation is thus given to the disc 74 and crank-pin 73 through the gear chain described, which rotation causes the arm 70 to oscillate back and forth through a substantial angle, thereby causing similar oscillation of the shaft 58 on which the pinion 51 is mounted. The extent of oscillation of the arm 70 and shaft 58 may be varied by adjusting the crank-pin 73 in the disc 74 or by adjusting the studs 71 in the arm 70. The usual angle of oscillation is between forty and sixty degrees.

Having described the details of construction of our improved builder mechanism, the method of operation will be readily understood. The connections are such that when the roll 44 is at the point of the cam 50 (Fig. 1), the shaft 58 and lever 59 are in their extreme right-hand positions and the spindle rail 15 is in its highest position, thus causing the yarns Y to be wound at the butts of the bobbins B.

When the parts are in this position, as shown in Fig. 1, it will be noted that the side face 43 of the short lever 45 is vertical and parallel to the guideway 52 on the long lever 53. Consequently the spindle rail 15 will be raised to the same point regardless of the position of the slide 51 on the guideway 52 of the long lever 53.

As a result of this straight line construction, each layer on the bobbin B extends to the bottom flange or butt of the bobbin, so that the bobbin is not tapered at the lower end but fills in the full space against the butt or flange, thus correspondingly increasing the amount of yarn on a full bobbin.

As the roll 50 is moved upward on the long lever 53, the effective radius of the short lever 45 will be reduced, while the corresponding effective radius of the long lever 53 will be increased, thus substantially reducing the swinging movement of the lever 59 and correspondingly reducing the travel of the spindle rail 15.

This reduction in traverse, however, does not shorten the winding at the butt of the bobbin, due to the fact that the straight face 43 brings the parts back to their original vertical position each time the yarn is wound down to the butt. Consequently the traverse of the yarn varies gradually in successive layers from the distance a in Fig. 4 to the distance b in Fig. 4, the latter distance corresponding to the full length of the bobbin.

The oscillating movement of the arm 70 and shaft 58 causes the traverse to periodically and alternately increase and decrease during the winding of the bobbin. The period of increase and decrease may be varied but ordinarily the traverse increases from the distance a to the distance b while winding ten or twelve layers of yarn on the bobbin B and the traverse correspondingly decreases during the winding of the next ten or twelve layers.

The locus of the winding may be conveniently adjusted vertically for different bobbins by disconnecting the link 72 and giving the shaft 58 one or more turns in a desired direction, thus varying the position of the nut 68 with respect to the boss 67, thereby correspondingly varying the vertical position of the spindle rail 15. Consequently the nut 60 remains substantially unchanged in axial position on the shaft 58 during the ordinary operation of the builder mechanism.

As each layer of yarn on the bobbin B comprises exactly the same number of turns, it is obvious that the spacing between adjacent turns of yarn must increase as the traverse increases and decrease as the traverse decreases. Consequently the turns in successive layers overlap to some extent and this overlapping of the yarn has been found to substantially prevent 15 fraying of the yarn or production of loose ends on bobbins when spinning Mohair or other similar loose fibre yarns. As no loose ends interfere with the operation of the travelers on the rings 12, the winding may be continued to produce much larger bobbins than could previously be wound with a given size ring when spinning or twisting this type of yarn.

By varying the outline of the cam 30, the distribution of the yarn turns lengthwise of the bobbin B can be varied and the taper at the top of the bobbins may be increased or decreased as desired. Also by increasing the height of the cam 30, bobbins of any desired length within the capacity of the frame may be wound.

Having thus described our invention and the advantages thereof, we do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what we claim is:

1. In a ring spinning or twisting machine having a fixed ring rail and a movable spindle rail, in combination, a builder mechanism comprising associated levers mounted on spaced pivots and extending from their pivots in opposite directions and alongside each other, a transmitting member between said levers and engaging both levers, and means to repeatedly reciprocate said transmitting member lengthwise of one of said levers during the winding of a bobbin by said machine.

2. In a ring spinning or twisting machine having a fixed ring rail and a movable spindle rail, in combination, a builder mechanism comprising associated levers mounted on spaced pivots and extending from their pivots in opposite directions and alongside each other, a transmitting member between said levers and engaging both levers, and means to repeatedly reciprocate said transmitting member lengthwise of one of said levers during the winding of a bobbin by said machine, said latter means including a rack connected to said transmitting member, a gear engaging said rack, and means to periodically oscillate said gear.

3. In a ring spinning or twisting machine having a fixed ring rail and a movable spindle rail, in combination, a builder mechanism comprising associated levers mounted on spaced pivots and extending from their pivots in opposite directions and alongside each other, a transmitting member between said levers and engaging both levers, and means to repeatedly reciprocate said transmitting member lengthwise of one of said levers during the winding of a bobbin by said machine, said latter means including a rack connected to said transmitting member, a gear engaging said rack, a shaft on which said gear is mounted, and means to periodically oscillate said shaft and gear.

4. In a ring spinning or twisting machine having a fixed ring rail and a movable spindle rail, in combination, a builder mechanism comprising associated levers mounted on spaced pivots and
extending from their pivots in opposite directions and alongside each other, a transmitting member between said levers and engaging both levers, and means to repeatedly reciprocate said transmitting member lengthwise of one of said levers during the winding of a bobbin by said machine, said latter means including a rack connected to said transmitting member, a gear engaging said rack, a shaft on which said gear is mounted, an arm on said shaft, a continuously rotated crank-pin, and a link connecting said crank-pin to said arm, whereby said shaft and gear are periodically oscillated.

5. In a ring spinning or twisting machine having a fixed ring rail and a movable spindle rail, in combination, a builder mechanism comprising associated levers mounted on spaced pivots and extending from their pivots in opposite directions and alongside each other, a transmitting member between said levers and engaging both levers, and means to repeatedly reciprocate said transmitting member lengthwise of one of said levers during the winding of a bobbin by said machine, said latter means including a shaft movable axially with one of said levers, a rack and gear connection between said shaft and said transmitting member, and means to periodically oscillate said shaft during its axial movement with said lever.

6. In a ring spinning or twisting machine having a fixed ring rail and a movable spindle rail, in combination, a builder mechanism comprising associated levers mounted on spaced pivots and extending from their pivots in opposite directions and alongside each other, a transmitting member between said levers and engaging both levers, and means to repeatedly reciprocate said transmitting member lengthwise of one of said levers during the winding of a bobbin by said machine, said latter means including a shaft movable axially with one of said levers, a rack and gear connection between said shaft and said transmitting member, and means to move said arm back and forth over a relatively short arc during the continued winding of a bobbin.

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