Dec. 18, 1934. R. HARGREAVES 1,984,641

BUILDER MECHANISM

Filed Nov. 13, 1933 2 Sheets-Sheet 1

Fig. 1.

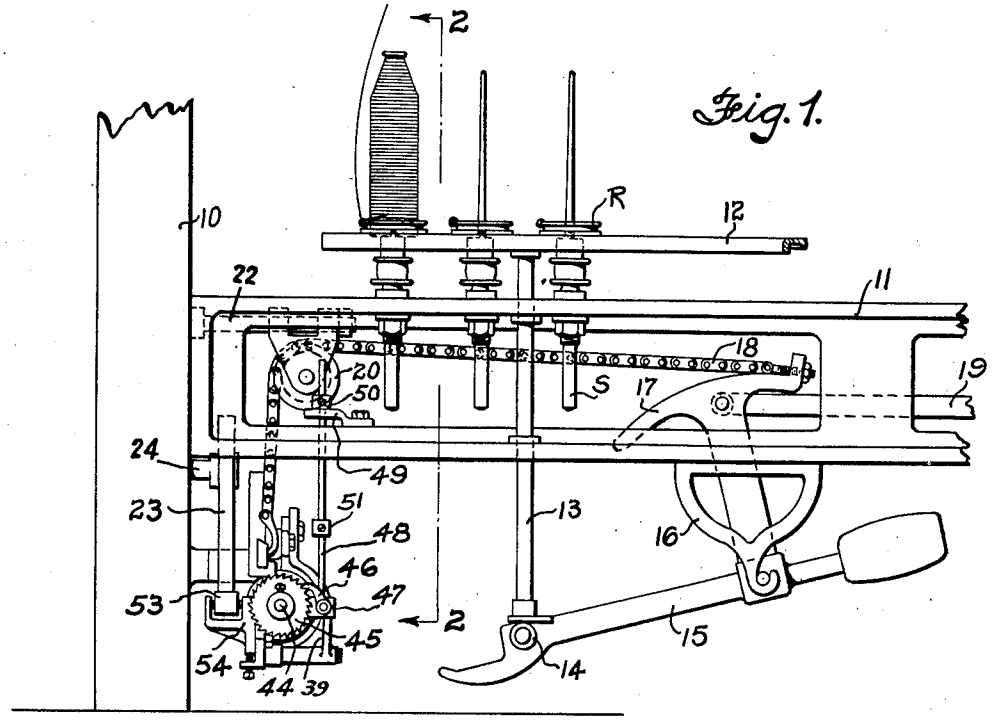

Fig. 2.

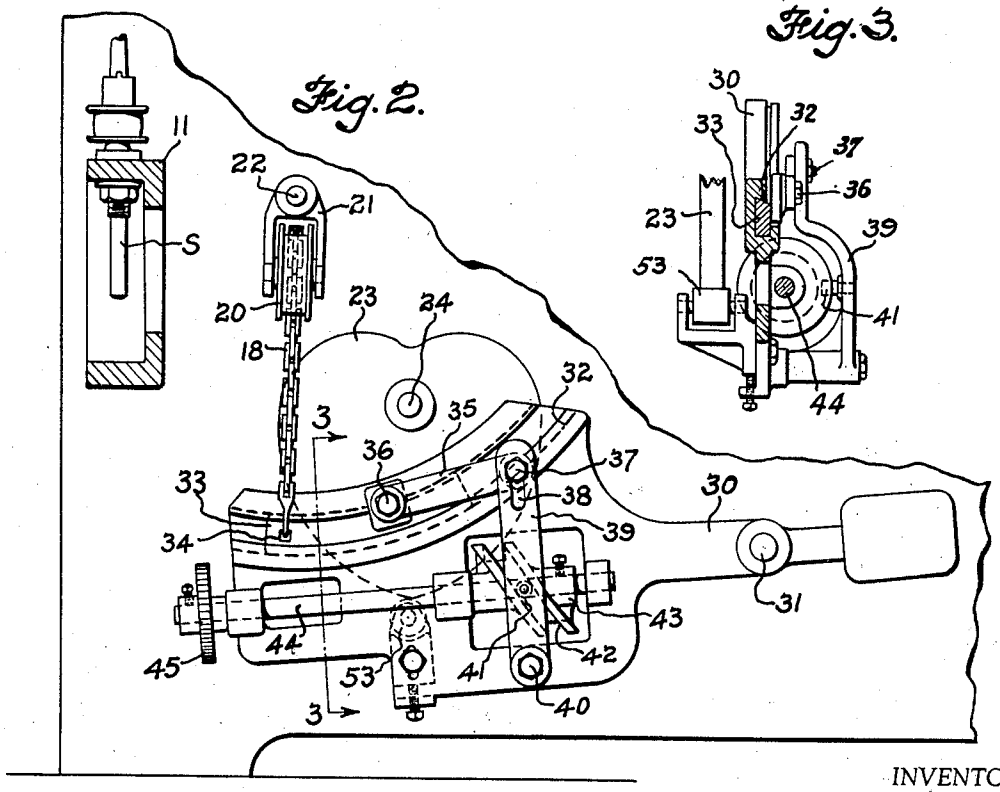

Fig. 3.

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Filed Nov. 13, 1933 2 Sheets-Sheet 2

Fig. 4.

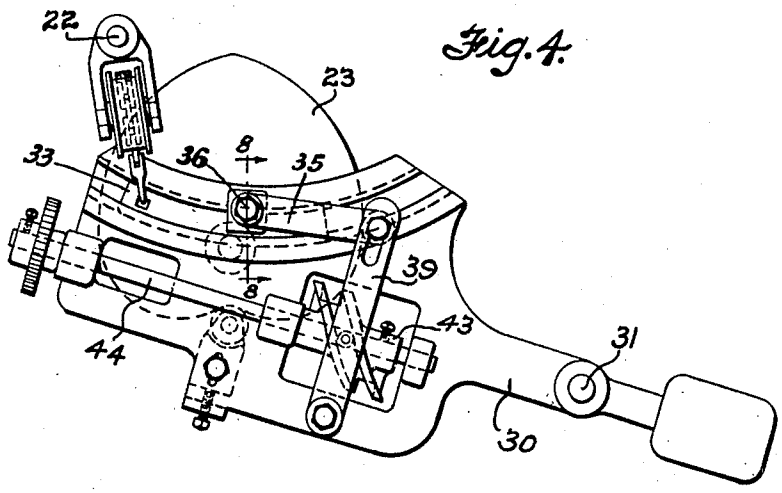


Fig. 5.

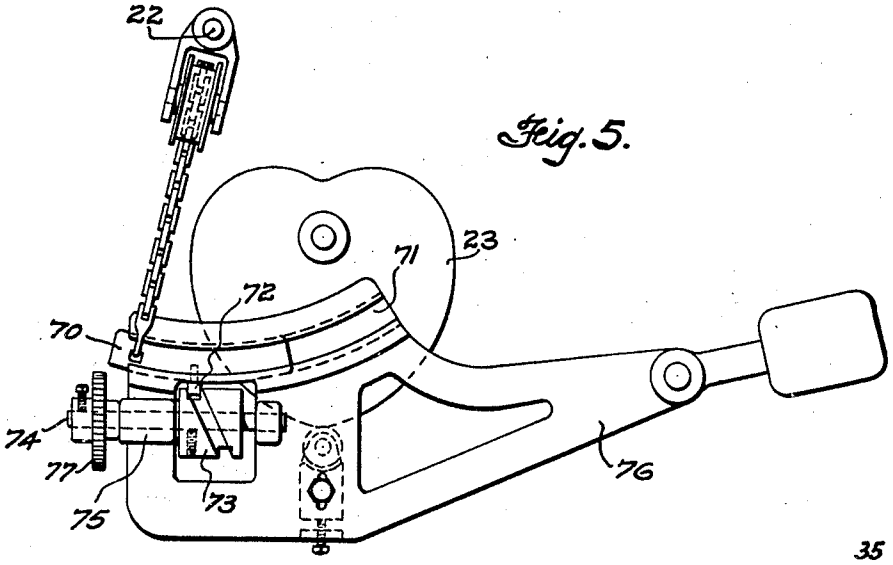


Fig. 6.

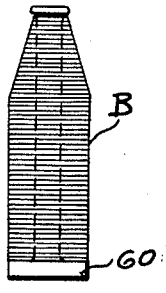


Fig. 7.

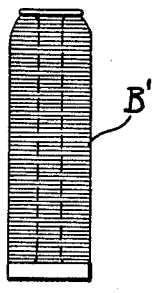
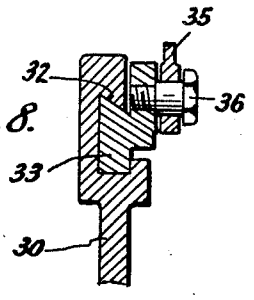


Fig. 8.



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1,984,641

UNITED STATES PATENT OFFICE

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BUILDER MECHANISM

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Application November 13, 1933, Serial No. 697,714

8 Claims. (Cl. 242—43.3)

This invention relates to a builder mechanism for regulating the traverse in winding yarn on bobbins in a spinning or twisting frame.

It is desirable that warp yarn bobbins contain the greatest possible length of yarn and accordingly it is desirable that the windings all extend to the extreme bottom or butt of the bobbins. The upper end or tip of the full bobbin is necessarily tapered, however, to prevent more than one layer of yarn being pulled off at a time, with consequent snarling of the yarn.

It is the object of my invention to provide an improved construction of builder mechanism by which these described results may be attained.

A more specific object is to provide a builder mechanism by which the length of the winding may be repeatedly increased and decreased, with the variation in length occurring at the tip end of the bobbin only.

My invention further relates to certain arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

Two forms of the invention are shown in the drawings, in which

Fig. 1 is a side elevation of parts of a spinning or twisting frame embodying my improvements;

Fig. 2 is a partial transverse sectional elevation, taken along the line 2—2 in Fig. 1;

Fig. 3 is a detail sectional view, taken along the line 3—3 in Fig. 2;

Fig. 4 is a view similar to Fig. 2 but showing the parts in a different position;

Fig. 5 is a side elevation of a modified form of builder mechanism;

Figs. 6 and 7 are views of bobbins satisfactorily produced by the builder mechanisms shown in Figs. 4 and 5 respectively, and

Fig. 8 is a detail sectional view, taken along the line 8—8 in Fig. 4.

Referring particularly to Figs. 1 to 3, I have shown parts of a spinning or twisting frame including an end frame 10, a spindle rail or longitudinal girt 11, a plurality of spindles S mounted on the spindle rail 11 and a plurality of spinning or twisting rings R mounted on a ring rail 12.

The ring rail 12 is supported on lifter rods 13 slidable vertically in bearings in the spindle rail 11 and engaged at their lower ends by rolls 14 on lifter levers 15. The levers 15 are pivotally supported in brackets 16 and are provided with upstanding arms 17, to one of which a lifter chain 18 is connected. Links 19 are provided to connect the arms 17 of successive pairs of lifter levers 15.

The chain 18 passes over a guide pulley 20 mounted in a bracket 21 pivoted on a fixed stud 22. The parts thus far described are of a usual commercial construction, as is also the heart cam 23 mounted on a slowly rotated cam shaft 24.

A builder lever 30 is mounted on a fixed pivot 31 and is provided with segmental guideways 32 in which a segment block 33 is slidable. The lower end of the chain 18 is connected at 34 to the segment block 33. A link 35 is pivoted at 36 (Fig. 8) to the segment block 33 and the opposite end of the link is pivoted on a stud 37 (Fig. 2) adjustable in a slot 38 in a lever 39 pivoted at 40 on the builder lever 30.

A cam roll 41 on the lever 39 is positioned in the cam groove 42 of a double helix cam 43, fixed on a cam shaft 44 rotatable in bearings on the builder lever 30. A ratchet wheel 45 is secured to one end of the cam shaft 44 and is actuated by a feed pawl 46 (Fig. 1) mounted on an arm 47 pivoted to swing about the axis of the cam shaft 44.

A rod 48 extends upward from the arm 47 through a fixed guide plate 49 and is provided with collars 50 and 51 above and below the plate 49. As the builder lever rises, the collar 51 will engage the plate 49, swinging the feed pawl downward, and as the builder lever moves downward, the upper collar 50 will engage the plate 49, whereupon continued downward movement of the builder lever will cause the pawl 46 to advance the ratchet wheel 45 in an anti-clockwise direction. The rate of feed is determined by the location of the collars on the rod 48. This feed mechanism also is old and well known.

A cam roll 53 (Fig. 1) is mounted in a bracket 54 adjustably secured to the builder lever 30 and positioned to engage the heart cam 23. The parts are so proportioned and the roll 53 is so positioned on the bulider lever 30 that when the builder lever is in its lowest position (as shown in Fig. 2 and corresponding to the lowest position of the ring rails), the axis of the segmental guideways 32 and segment block 33 substantially coincides with the axis of the stud 22 supporting the bracket 21 in which the guide-roll 20 is mounted.

Consequently the chain 18 will be pulled down to the same position by the cam 23 and builder lever 30, regardless of the position of the segment block 33 in its guideways 32. As a result of this, the bottom limit of travel of the yarn winding will remain unchanged for every position of the segment block.

The cam groove 42 (Fig. 2) is continuous and

is in the nature of a helix in one direction for 180°, continuing as a helix in the opposite direction for the succeeding 180° and being returned thereby to the starting point.

With this construction it will be evident that one complete revolution of the cam 43 will cause a complete oscillation of the cam lever 39 and segment block 33, moving the block alternately to the right and left along its guideways 32 as viewed in Fig. 2.

Such movement alternately shortens and lengthens the effective length of the builder lever 30 with respect to the chain 18. Maximum traverse is attained with the segment block in its extreme left-hand or outer position, and minimum traverse with the block in its extreme right-hand or inner position. In every position, however, as has been previously explained, the lowermost position of the ring rail remains unchanged, while the variation in traverse takes place at the upper end of the bobbins only.

These alternate increases and decreases in length of traverse follow at relatively short intervals, and the traverse is increased and decreased many times during the winding of a bobbin.

My improved builder mechanism, operating as above described, is well adapted to produce the bobbin indicated at B in Fig. 6, in which the upper end of the bobbin is provided with a relatively long taper while the bottom ends of all layers of the winding are snug against the base 60 of the bobbin.

The degree of taper at the tip of the bobbin may be varied by adjusting the stud 37 in the cam lever 38, and a greater variation may be obtained by changing the cam 43 and substituting a cam of either more or less pitch.

In certain cases, it is more satisfactory to produce a bobbin as indicated at B' in Fig. 7, in which only a very short taper or reduction in size at the tip end is formed. In such cases the somewhat simpler construction shown in Fig. 5 may be used.

In this construction the segment block 70 is mounted in segmental guideways 71 as previously described but is provided with a stud or roll 72 directly engaging a cam 73 on the cam shaft 74 rotatable in bearings 75 on the builder lever 76. The guideways 71 and segment blocks 70 are substantially concentric with the axis of the stud 22 when the builder lever is in its lowest position, all as previously described.

The cam shaft 74 is provided with a ratchet wheel 77 by which it is intermittently rotated by a feed mechanism such as is shown in Fig. 1 and previously described. Where a relatively short taper is satisfactory, the segment block 70 can be given sufficient oscillating motion direct from the cam 73 and without the multiplying action of the lever 39 shown in the construction previously described.

Although I have described my invention as applied on a frame having a stationary spindle rail with a reciprocating ring rail, it is obvious that my invention is applicable as well on a frame where the ring rail is stationary and the spindle rail is reciprocated.

One outstanding advantage of my invention lies in the fact that it is not necessary to wind back the builder mechanism on doffing. The new winding may begin with the segment block set for any length of traverse.

Having described two forms of my invention, it will be seen that I have provided very simple mechanism by which the windings on a bobbin may be repeatedly lengthened and shortened during the filling of the bobbin, and by which the lengthening or shortening of the windings will occur entirely at the tip end of the bobbin.

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

1. In a spinning or twisting frame having a vertically reciprocated rail, a builder mechanism comprising a builder lever, a connection from said builder lever to said rail, a guiding member for said connection mounted to swing on a pivotal axis, a segment block to which said connection is attached, segmental guideways on said lever for said segment block, a cam to oscillate said block in said guideways, and means to move said cam, movement of said cam in one direction effecting successive movements of said segment block in opposite directions.

2. The combination in a builder mechanism as set forth in claim 1, in which the cam is rotatable and has a continuous peripheral groove.

3. The combination in a builder mechanism as set forth in claim 1, in which the cam is rotatable and has a continuous peripheral groove comprising successive reverse helical portions.

4. The combination in a builder mechanism as set forth in claim 1, in which the axis of the segment block and its guideways substantially coincides with the pivotal axis on which the guiding member swings, when the builder lever is in its lowest position.

5. The combination in a builder mechanism as set forth in claim 1, in which a cam lever and link are provided for moving said segment block, said cam lever being swung in both directions by said cam and said link connecting the outer end of said cam lever to said segment block.

6. The combination in a builder mechanism as set forth in claim 1, in which multiplying connections are provided between said cam and said segment block.

7. The combination in a builder mechanism as set forth in claim 1, in which said segment block is provided with an element directly engaging said cam.

8. In a spinning or twisting frame having a movable rail, a builder mechanism for raising and lowering said rail, said builder mechanism comprising a builder lever, a connection from said builder lever to said rail, a segment block to which said connection is attached, segmental guideways on said builder lever for receiving said segment block, and means to move said block repeatedly in said guideways during the winding of a bobbin, first in one direction and then in the opposite direction, thereby effecting changes in the extent of the successive movements of said rail.

ROBERT HARGREAVES.