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TIP BUNCH APPLYING MEANS FOR SPINNING FRAMES

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FIG. 1.

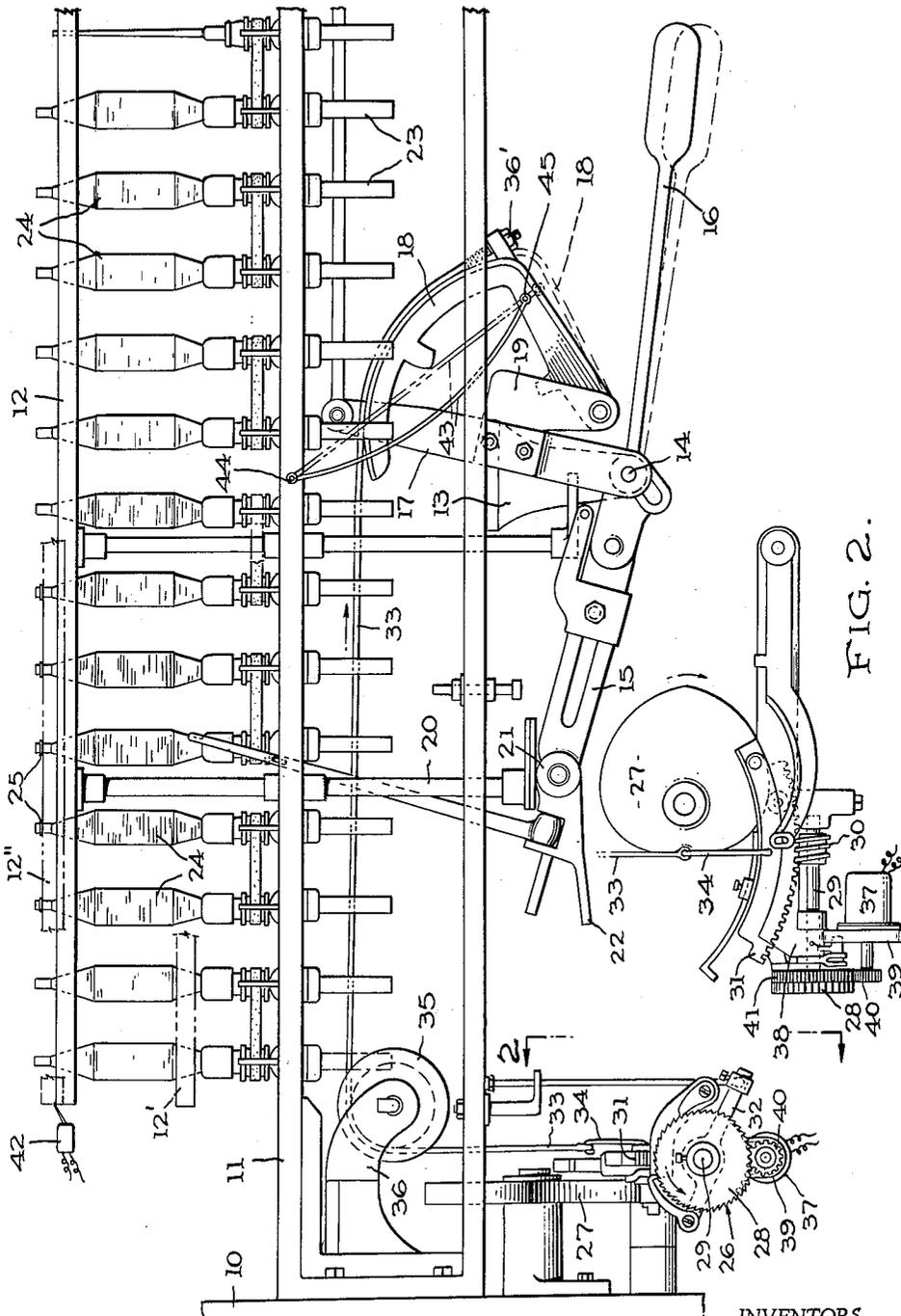


FIG. 2.

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TIP BUNCH APPLYING MEANS FOR
SPINNING FRAMES

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This invention relates to spinning frames of the movable ring rail type, and more particularly to means for applying the tip bunch to the ends of bobbins having filling wound thereon.

The object of the invention is to provide a highly simplified and direct means for applying the tip bunch to bobbins by utilizing the builder motion in a direct and simplified manner after completion of the normal bobbin building operation.

More particularly, the invention comprises a small separate drive motor mounted directly upon the builder arm and operating gearing directly connected with the pick gear shaft to revolve the same a sufficient amount after completion of the normal bobbin building to raise the ring rail the required additional amount for the application of the tip bunch to the top ends of the bobbins. The invention eliminates the necessity for more complicated and indirect means to effect the building of the tip bunch as, for example, the means shown for this purpose in United States Patent 2,979,881 to Thibault et al.

Further and general objects of the invention are to provide tip bunch applying mechanism characterized by simplicity of design and construction, efficiency of operation and economy of manufacture.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

FIGURE 1 is a fragmentary side elevation of a spinning frame having the invention applied thereto, parts omitted, and

FIGURE 2 is a fragmentary elevational view taken substantially on line 2-2 of FIGURE 1, with parts omitted.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention, FIGURE 1 illustrates the left hand side of a conventional spinning frame including an upright frame end 10, the usual fixed horizontal spindle rail 11, rigidly secured to the frame end 10 and the movable horizontal ring rail 12 adapted to be raised and lowered relative to the fixed spindle rail.

The ring rail 12 is movably supported in the following manner. A depending bracket 13 is rigidly mounted upon the bottom of spindle rail 11 and has a stud 14 rotatably mounted upon its lower end. This stud has fixed thereon a rockable lifting arm 15 extending beyond one side of the stud and the bracket 13 and including a counterbalancing weight 16 extending beyond the opposite side of the rockable stud. A generally upstanding arm 17 rigid with the lifting arm 15 and counterweight projects above the stud 14 and is also rigid with the stud to rock therewith upon the bracket 13. The usual arcuate quadrant 18 is rigidly secured to the arm 17 through a bracket 19 to rock with the arm 17 and lifting arm 15 on the axis of the stud 14. A vertical support rod 20 is secured at its upper end to the ring rail 12 and bodily carries the ring rail and has its lower end resting upon a roller 21 carried by the lifting arm 15. A portion of the lifting arm 15 extends beyond the support rod 20 to form

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the usual foot pedal 22 which may be employed at the proper time to lower the ring rail, as where no automatic ring rail lowering means is provided.

In connection with FIGURE 1, it will be understood by those skilled in the art that the ring rail 12 is supported along its length by several of the support rods 20 and a corresponding number of rockable lifting arms 15 and associated elements. Several of the brackets 15 are mounted upon spindle rail 11 in longitudinally spaced relation for carrying a corresponding number of rockable studs 14 and associated elements including quadrants 18. These mechanisms for elevating and lowering the support rods 20 are linked together in a well-known manner to operate in unison for carrying and raising and lowering the ring rail.

In FIGURE 1, the ring rail 12 is shown in full lines at the normal upper limit of its movement as where the bobbins are completely built with the yarn. In broken lines at 12', the ring rail is shown in the fully lowered position as when the filled bobbins are ready for doffing. At 12'' in FIGURE 1, the ring rail is shown in the extreme upper position where it is disposed for applying the tip bunch to the bobbins.

Spindles 23 are journaled for rotation upon the spindle rail 11 in the usual manner to be driven in unison. Bobbins 24 are removably mounted upon the spindles, and the tip bunch 25 is shown applied to the upper tips of the bobbins by the mechanism of this invention to be described in detail.

A conventional and well-known builder motion 26 is supported by the frame end 10 in the usual manner. This builder motion includes a filling or warp cam 27, the usual pick gear 28 and pick gear shaft 29 having a worm pinion 30 thereon, meshing with and operating a rack 31.

A picking mechanism 32 turns the pick gear 28 a few teeth at a time to effect the gradual elevation of the ring rail 12 during the normal building of the bobbins. A flexible chain or cable 33 is connected with the rack 31 by a hook link 34, and the cable 33 extends upwardly and is trained over a guide pulley 35 journaled upon a fixed bracket 36, rigidly secured to the spindle rail 11. The cable 33 extends longitudinally of the spindle rail and engages over quadrant 18 and has its end adjustably anchored thereto at 36'. The construction and operation of the builder motion 26 is conventional and well-known and need not be described herein in greater detail. During the building of the bobbins 24, the pick gear 28 turns gradually clockwise, FIGURE 1, to pay out the cable 33 in the direction of the arrow and allow the quadrant 18 to turn clockwise with the arm 17 upon the axis of the stud 14 and under influence of the counterbalancing weight 16. This gradually shifts the ring rail from the lowermost position 12' to the elevated position 12, where the bobbins are built with yarn to the full extent.

To effect the application of the tip bunch 25 to the upper tips of the bobbins, a small electric motor 37 is mounted directly to the builder motion arm 38 by a bracket 39 rigid with such arm and depending therefrom. A small gear or pinion 40 is secured to the armature shaft of motor 37 to mesh with a larger spur gear 41, rigidly mounted upon the pick gear shaft 29 to drive the latter.

When the ring rail reaches the normal upper limit of its travel shown at 12 in FIGURE 1, one end of the same closes a time delay switch 42 suitably supported upon the spinning frame and connected electrically in the circuit of the motor 37. When the switch 42 is thus closed, the motor 37 is started for driving the gears 40 and 41 and the pick gear shaft 29 for a sufficient length of time to elevate the ring rail to the tip bunch applying position 12'', wherein the tip bunch 25 is applied to the tops of the several bobbins. The motor 37 will stop automatically under influence of the time delay switch 42 when the ring

rail has reached the proper elevation for applying the tip bunch.

When the motor 37 thus operates, the pick gear shaft 29 and pick gear 28 are turned continuously counter-clockwise, FIGURE 1, and the pawls which normally operate the pick gear a few teeth at a time under influence of the picking mechanism merely skid over the inclined teeth of the pick gear. The cable 33 is payed out a further amount in the direction of the arrow to allow an increased movement of the quadrant 18 under influence of the counterbalancing weight 16, and the support rods 20 are thus elevated a corresponding increased amount to raise the ring rail to the tip bunch applying position 12'.

After the motor 37 is again de-energized by the time delay switch 42 and after full application of the tip bunch 25 to the bobbins, the ring rail may be lowered with the foot pedal 22, or by automatic means, when such are employed, to the bobbin doffing position shown at 12'. When new bobbins are then placed upon the spindles 23, the spinning frame repeats its normal cycle of operation and the conventional builder motion 26 operates in the normal manner to gradually elevate the ring rail to the normal full bobbin position shown at 12 and during this normal operation, the motor 37 is inactive and the two gears 40 and 41 merely idle and do not interfere in any manner with the operation of the spinning frame. When the ring rail again closes the switch 42, the motor 37 is again energized for driving the shaft 29 and causing the increased elevation of the ring rail to the tip bunch applying position as described.

In order to positively limit movement of the quadrant 18 in a clockwise direction under influence of counterbalancing weight 16, thereby preventing the ring rail from rising above the tip bunch applying position 12', a section of cable 43 has one end connected at 44 to the spindle rail 11 and its other end connected at 45 to the quadrant 18. This cable 43 is slack in all positions of the quadrant prior to the movement of the ring rail to the tip bunch applying position. In such position and when the quadrant 18 is in the position shown in broken lines, the cable 43 becomes taut and the quadrant is restrained from any further movement in the clockwise direction. Thus the cable 43 forms a positive stop for movement of the quadrant in one direction. Other types of positive stops may be employed, if preferred.

According to the invention, the only modification of the conventional structure resides in the provision of the small motor 37 on the builder motion arm and the two gears 40 and 41 to be intermittently operated by the motor to effect the extended elevation of the ring rail in the manner and for the purpose described. The invention does not interfere with the normal construction or operation of the spinning frame and may be applied thereto very economically and without the necessity for any substantial increased maintenance.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

What is claimed is:

1. In a spinning machine, a fixed spindle rail, spindles mounted upon the spindle rail for rotation, bobbins carried by the spindles, a vertically shiftable ring rail to be raised and lowered relative to the spindle rail, a support rod carrying the ring rail, a lifting arm including a counterbalancing weight and a quadrant rockably mounted upon the spindle rail and engaging and supporting said support rod, a flexible element engaging and secured to the quadrant, guide pulley means on the spinning frame for the flexible element, a builder motion including a rack connected with the flexible element, a pick gear shaft, a

worm pinion on the pick gear shaft meshing with said rack to operate the same, a pick gear on the pick gear shaft, a picking mechanism to operate the pick gear in a step-by-step manner to gradually pay out the flexible element and cause gradual elevation of the ring rail to a full bobbin position, a gear on the pick gear shaft, an electric motor mounted upon the builder motion, a gear driven by the motor and meshing with the last-mentioned gear to drive the same, and an electrical time delay switch in the path of travel of the ring rail to be closed by the ring rail when the latter is in the full bobbin position and then energizing the motor to turn the pick gear shaft independently of said picking mechanism and pay out the flexible element an additional amount to allow elevation of the ring rail to a tip bunch applying position.

2. Tip bunch applying mechanism for spinning frames comprising in combination, a builder motion including a pick gear and a picking mechanism to operate the pick gear, a pick gear shaft carrying the pick gear, a worm gear secured to the pick gear shaft, a rack meshing with and operated by the worm gear, a flexible element connected with said rack, a quadrant connected with the flexible element and having its motion controlled thereby and rockably supported upon the spinning frame, gravity operated means connected with the quadrant and urging the same in one direction, an elevatable ring rail, lift mechanism interconnecting the ring rail and quadrant, separate electrical power operated means connected with the pick gear shaft to turn the same independently of the picking mechanism when the ring rail reaches the full bobbin position and thereby causing elevation of the ring rail to the tip bunch applying position, and electrical limit switch means in the path of travel of the ring rail and operated by the ring rail when the latter reaches said full bobbin position to energize said electrical power-operated means.

3. In a spinning machine, an elevatable ring rail, gravity operated means carrying the ring rail and tending to raise the same, a flexible element secured to the gravity operated means and resisting movement thereof in one direction under the influence of gravity, a builder motion connected with the flexible element and normally controlling the letting out of the same for gradually elevating the ring rail toward the full bobbin position, electrical power means coupled with the builder motion to drive the same continuously after the ring rail reaches the full bobbin position to further elevate the ring rail suddenly to a tip bunch applying position, and electrical time delay switch means in the path of travel of the ring rail and connected with said electrical power means and operated by the ring rail to energize the power means during a predetermined time interval when the ring rail reaches the full bobbin position.

4. In a spinning frame of the movable ring rail type, a builder motion including escapement mechanism operable to allow gradual elevation of the ring rail to a full bobbin position during the normal oscillation of the ring rail for building the bobbins, a time delay limit switch on the spinning frame engaged by the ring rail when the latter reaches said full bobbin position and then actuated by the ring rail and electrical motor means geared directly to the builder motion and driving the same directly for a predetermined time to effect additional elevation of the ring rail to a tip bunch applying position when said motor means is energized by the actuation of said time delay switch by said ring rail.

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