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SPINNING OR TWISTING APPARATUS.

APPLICATION FILED MAR. 9, 1908.

**900,592.** Patented Oct. 6, 1908.

2 SHEETS—SHEET 1.

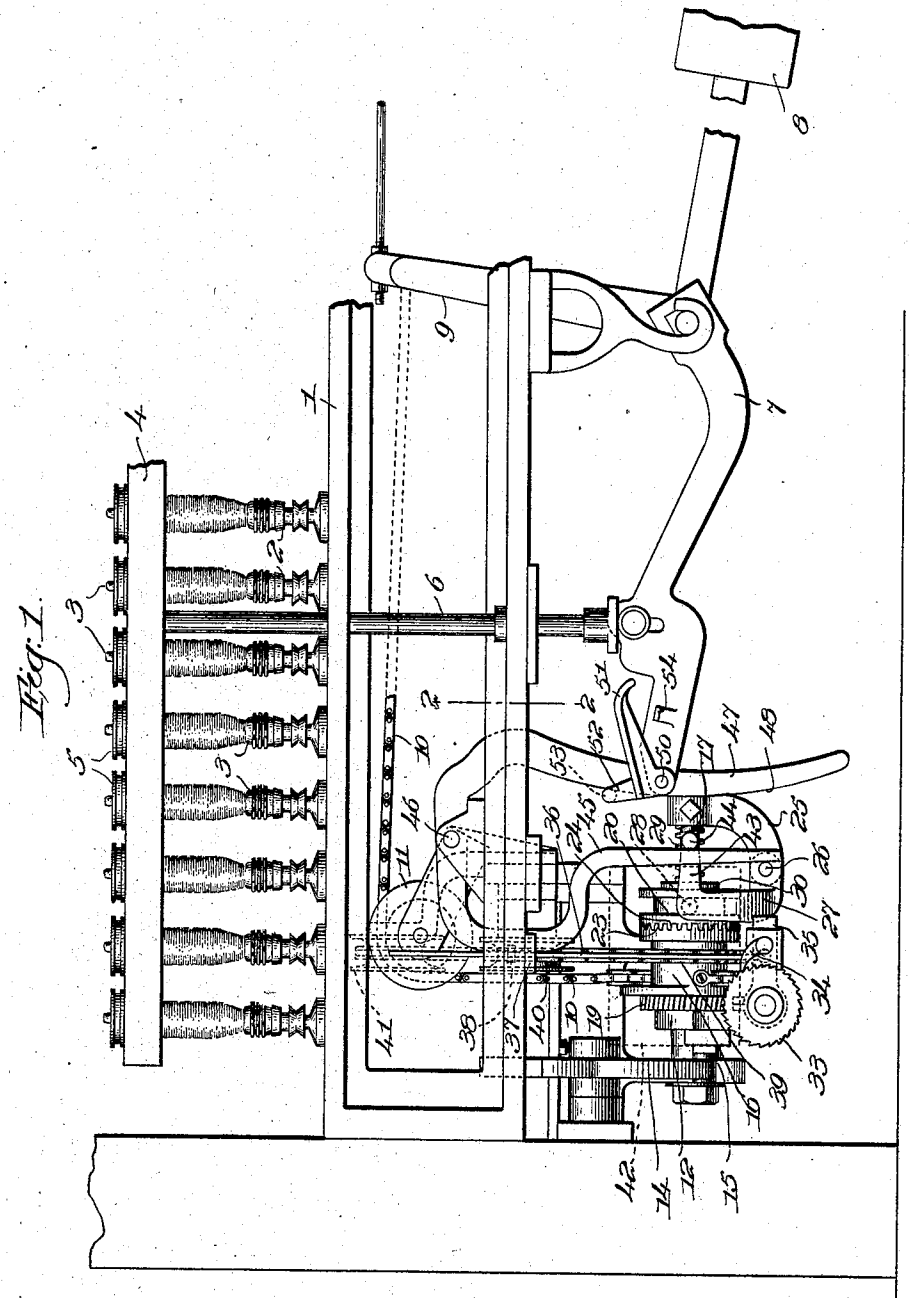


Fig. 1.

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2 SHEETS—SHEET 2.

Fig: 2.

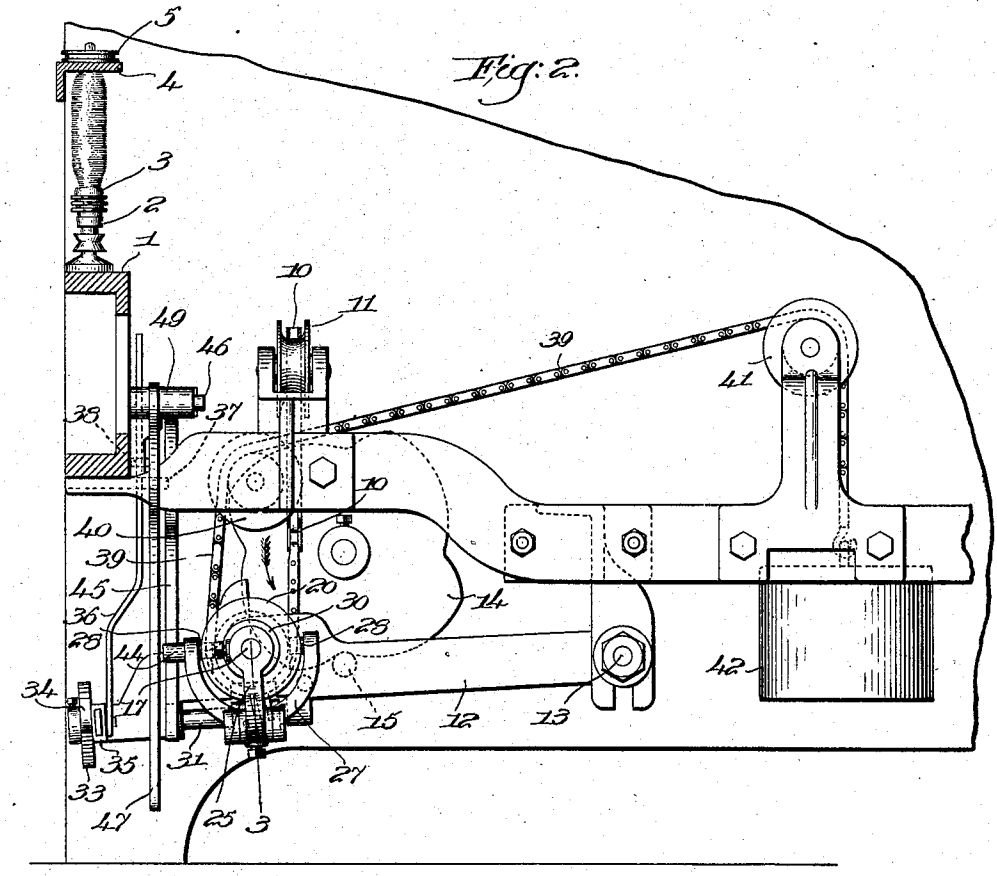
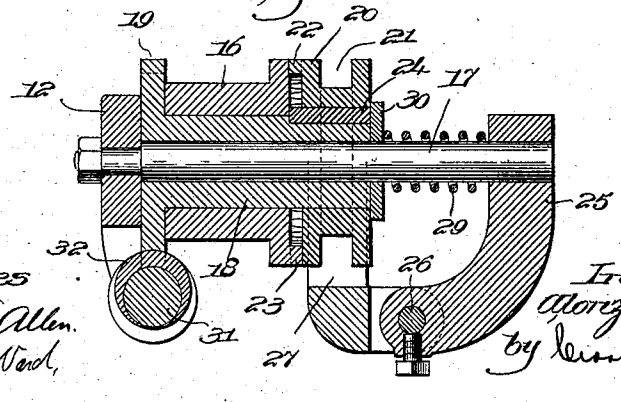



Fig: 3.




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# UNITED STATES PATENT OFFICE.

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## SPINNING OR TWISTING APPARATUS.

No. 900,592. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed March 9, 1908. Serial No. 419,870.

*To all whom it may concern:*

Be it known that I, ALONZO E. RHOADES, a citizen of the United States, and resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Spinning or Twisting Apparatus, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to apparatus for spinning or twisting yarn wherein the yarn is traversed upon the bobbins by the vertical reciprocations of a ring-rail, governed by what is technically termed the builder-motion.

The builder-motion comprises a rocking arm actuated by a traverse-cam, and a winding mechanism mounted on the arm and connected with the ring-rail by means including a flexible member or chain, which is gradually and automatically let-off by the winding mechanism to effect the "gain" of the traverse, whereby at each up-stroke the ring-rail rises a little higher and at each down-stroke descends not quite so low as on the previous down-stroke, laying the yarn in successive layers upon the bobbin from the lower end or butt to the upper end or tip.

As the chain is gradually unwound or let off from the drum of the winding mechanism during the operation of the apparatus it is necessary, after doffing a set of bobbins, to wind-back before starting the winding of a fresh set, such winding-back consisting in manually rotating the drum in order to wind up the chain thereon to the starting position. The winding-back is usually performed by the attendant who applies a crank-like key or similar device to the winding mechanism, and the operation involves the expenditure of time and strength.

My present invention has for its object the production of means for effecting winding-back automatically, and herein I have shown such a construction and arrangement that the automatic winding-back is initiated by or through manual depression of the ring-rail preparatory to doffing.

As will appear hereinafter the normal operation of the spinning or twisting apparatus acts to set or place in condition for subsequent action the instrumentality whereby the winding-back is effected.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a front elevation of a portion of a spinning or twisting frame, showing the builder-motion and adjacent parts, and with one embodiment of my invention applied thereto, the ring-rail being shown in readiness to be depressed for doffing; Fig. 2 is a view in inner side elevation of the parts at the left of the line 2—2, Fig. 1, the adjacent rocker being omitted for the sake of clearness of illustration; Fig. 3 is an enlarged sectional detail of a portion of the winding mechanism of the builder-motion, to illustrate the construction whereby the winding-back instrumentality is thrown into and out of control of the winding mechanism, the section being taken on the line 3—3, Fig. 2.

The spindle-rail 1 on which are mounted the spindles 2 shown in Figs. 1 and 2 as provided with filled bobbins 3; the vertically reciprocating ring-rail 4 provided with rings 5, one for each spindle, the lifter-rods, as 6, attached to the ring-rails; the rocker 7 cooperating with the foot of the lifter-rod, Fig. 1, and having a weight 8 to lift the ring-rail, and the rocker-arm 9 rigidly connected with the rocker and transmitting reciprocating movement to the other lifter - rods (not shown) may be and are all of well-known or usual construction in spinning or twisting apparatus.

A chain or other flexible connection 10 is operatively connected at one end with the rocker, Fig. 1, and passes over a fixed guide-sheave 11 down to the winding mechanism of the builder-motion, the latter acting through the chain 10 to positively lower the ring-rail and permitting its ascent by the weight 8.

The builder-motion as herein shown comprises a builder-arm 12 having a fixed fulcrum 13, Fig. 2, and oscillated by the coöperation of a traverse-cam 14 with a roller or other stud 15 on the builder-arm, the weight 8 acting through the intervening connections to maintain the follower 15 in engagement with the actuating cam 14, (shown herein as a four-point cam) the builder-arm having mounted

upon it the winding mechanism, consisting essentially of a rotatable drum 16 around which the chain 10 is wound and to which its adjacent end is attached. The drum is acted upon by letting-off means during the winding of the yarn upon a set of bobbins, to gradually and positively rotate said drum and thereby let off the chain 10 little by little to effect the "gain" of the traverse.

Herein there are certain novel features of construction and arrangement in the letting-off means which I will describe in detail.

Referring now to Fig. 3 an elongated stud 17 is rigidly connected with the builder-arm 12 and extends laterally therefrom, and upon said stud is rotatably mounted the elongated hub 18 of the worm-gear 19 forming a member of the letting-off means, the drum 16 being rotatably mounted on said hub adjacent the gear. Beyond the drum the hub has splined thereon a clutch disk 20, having an annular groove 21, the teeth 22 of the clutch member being adapted to coöperate with opposed teeth 23 on the adjacent end of the drum, to connect the latter and the worm-gear when the clutch, *i. e.*, the two sets of teeth 22 and 23, are in engagement so that the drum and worm-gear will then rotate in unison.

The spline 24 is shown in Fig. 3, and it will be understood that the disk 20 can be moved longitudinally on the hub 18 but is always rotatable therewith.

A depending bracket 25 fixed on the outer end of the stud 17 has fulcrumed upon it at 26 a yoke 27 provided with roller or other studs 28 entering the groove 21, a spring 29 being coiled around the stud 17 between the bracket 25 and a washer-like disk 30 resting against the outer face of the grooved clutch disk 20, the spring acting to throw the clutch into operation.

The builder-arm 12 carries a worm-shaft 31 having a worm 32 in constant mesh with the worm-gear 19, and a pick-wheel 33 is fast on said shaft, a pawl 34 on a pawl-carrier 35 rocking on the shaft coöperating with the pick-wheel to rotate the shaft intermittingly, the pawl-carrier having a connected upturned link 36 slidable in a fixed guide 37 and provided with a stop-collar 38, so that on each down stroke of the builder-arm the collar will engage the guide 37 and rock the pawl-carrier, to advance the pawl, and the worm. The worm, pick-wheel, coöperating pawl, and the device for causing rotation of the pick-wheel constitute parts of the letting-off means, and operate in well known manner.

The drum 16 is made somewhat longer than usual, in accordance with my present invention, to accommodate a chain or other suitable flexible member 39, attached at one end to the drum and wound around it reversely to the winding of the chain 10, the chain 39 being led upward from the drum over a fixed guide-sheave 40 and thence rearwardly to and around a second guide-sheave 41, Fig. 2, and down to an operating weight 42, as herein shown.

The weight and connected chain herein constitutes a winding-back instrumentality, to rotate the drum 16 in such a direction that the chain 10 will be wound up thereon when it is desired to wind back the winding mechanism of the builder-motion, as will be explained.

I have provided the yoke 27 with an arm 43 having a lateral lug 44 in the path of movement of the depending leg 45 of a peculiarly shaped clutch-releaser, shown best in Fig. 1, and fulcrumed at 46 on a part of the main frame of the apparatus, said clutch releaser having a second depending leg 47 which has an edge 48 on an arc struck from the fulcrum of the rocker 7.

Viewing Fig. 2 it will be seen that the legs 45, 47 are laterally offset and connected by a hub 49, the peculiar shape of the clutch-releaser being made necessary in order that it shall clear various parts of the apparatus and the framing. The free end of the rocker 7 moves up and down close to the leg 47 and upon said rocker I fulcrum at 50, Fig. 1, a manually operated depressing member shaped to present a foot-piece or treadle 51 and an arm 52 having a rearwardly extended lug 53 crossing the curved edge 48 of the leg 47, a stop 54 on the rocker limiting downward relative movement of the treadle 51.

The normal vibration of the rocker 7 will cause the lug 53 to slide up and down along the curved edge of the leg 47 without causing any change in the clutch-releaser, while the winding mechanism is controlled by the letting-off means, and as the drum 16 is rotated to let off the ring-rail controlling chain 10 the chain 39 of the winding-back instrumentality will be wound up automatically, lifting the actuating weight 42.

In Figs. 1 and 2 it is supposed that the winding of a set of bobbins has been completed, the ring-rail being shown in its highest position, and in Fig. 2 the winding-back actuator 42 is set, or in condition to operate.

Before doffing the operator depresses the ring-rail, and herein this is effected by placing the foot upon the treadle 51 and pushing it down onto the stop 54 and thereafter continuing the downward pressure, to thereby depress the free end of the rocker 7 and lower the ring-rail to doffing position.

When the initial swing of the depressing member is effected the lug 53 coöperates with the leg 47 and swings the clutch-releaser 45, 47 to the right, Fig. 1, to thereby swing the yoke 27 and disengage or render

inoperative the clutch connection (the teeth 22, 23) between the winding drum and the letting-off means.

Obviously the drum is thereby released from the control of the said letting-off means and immediately the winding-back instrumentality assumes control of and operates to rotate the drum 16 and wind up the chain 10 as the descent of the weight 42 causes the chain 39 to unwind from the drum, it being remembered that the depression of the ring-rail has slackened the connections between the winding mechanism and the ring-rail. The weight 42 is heavy enough to overcome friction and inertia of the parts, and the winding-back is quickly and effectively performed automatically. After the winding-back is completed the release of the depressing member 51, 52 permits the clutch-releaser to return to normal position as the spring 29 expands and throws the clutch into operative condition. The winding mechanism is thereby released from control by the winding-back instrumentality and restored to the control of the letting-off means, the winding mechanism thereafter so controlling the winding-back instrumentality that the latter is set or placed in operative condition by the operation of the letting-off means acting through the winding mechanism.

My invention is not restricted to the precise construction and arrangement herein shown and described, as various changes or modifications may be made by those skilled in the art without departing from the spirit and scope of my invention as set forth in the appended claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In apparatus of the class described, in combination, a vertically-reciprocating ring-rail, a builder-motion, including a winding mechanism, controlling connections between it and the ring-rail, including a flexible member gradually let off by the winding mechanism, and means to effect automatically winding-back of the winding mechanism when the ring-rail is manually depressed for doffing, said means being under the control of the winding mechanism during its operation, and until manual depression of the ring-rail.

2. In apparatus of the class described, in combination, a vertically-reciprocating ring-rail, a builder-motion, controlling connections, including a flexible member, between said builder-motion and ring-rail, the builder-motion including a winding drum to which the flexible member is attached, an instrumentality to effect winding-back automatically, said instrumentality being controlled and set in operative condition by the drum during the normal rotation thereof, and a manually operated device to cause said instrumentality to assume operative control of the winding drum.

3. In apparatus of the class described, a reciprocating ring-rail, a builder-motion including a winding mechanism, operatively connected with and to control the reciprocations of the ring-rail, means to effect automatically winding-back of said mechanism, and a manually actuated device to depress the ring-rail for doffing, and by such depression, cause said means to assume operative control of the winding mechanism.

4. In apparatus of the class described, a reciprocating ring-rail, a builder-motion, including a winding mechanism, controlling connections between it and the ring-rail, means to cause said mechanism to gradually let off the controlling connections and thereby effect the gain of the traverse, an automatic winding-back instrumentality for the winding mechanism, placed in operative condition by the operation of the letting-off means acting through the winding mechanism, and a manually actuated device to release the winding mechanism from the control of the letting-off means and permit the winding-back instrumentality to assume operative control of the winding mechanism.

5. In apparatus of the class described, a reciprocating ring-rail, a builder-motion, including a winding drum, letting-off means normally coöperating with the drum, controlling connections between the ring-rail and builder-motion, including a chain attached to the drum, a winding-back instrumentality connected with said drum, to reversely rotate it automatically to wind up the chain, and a manually controlled clutch between the drum and the letting-off means, release of the clutch freeing the drum from cooperation with the letting-off means and permitting the winding-back instrumentality to operate.

6. In apparatus of the class described, a reciprocating ring-rail, a builder-motion, including a winding drum, a controlling chain attached thereto and operatively connected with the ring-rail, means to intermittingly rotate the drum and let off the chain, a winding-back instrumentality, including a chain oppositely wound upon and attached to the drum, normal rotation of the drum acting to set the winding-back instrumentality, a manually operated depressing member for the ring-rail, and means rendered operative by actuation of said member to effect depression of the ring-rail to disconnect the winding drum and the means to intermittingly rotate it, to thereby permit automatic reverse rotation of the drum by the winding-back instrumentality.

7. In apparatus of the class described, in

combination, a reciprocating ring-rail, controlling means therefor including a builder-motion having a winding drum, means to intermittingly rotate the drum, a winding-back instrumentality operatively connected with and to effect automatically reverse rotation of said drum, a normally operative clutch connecting the drum and the means to rotate it intermittingly, and means to render the clutch inoperative by or through manual depression of the ring-rail, to thereby permit the winding-back instrumentality to assume control of and effect reverse rotation of the drum.

8. In apparatus of the class described, in combination, a reciprocating ring-rail, a builder-motion, including a winding drum, controlling connections between the drum and the ring-rail, means to act upon the drum and let off said connections, a winding-back instrumentality controlled by the drum during the letting-off operation and by the drum placed in condition to operate, and manually operated means to free the drum from the control of the letting-off means and thereby cause the winding-back instrumentality to assume control of and actuate the drum to take up the controlling connections between it and the ring-rail.

9. In apparatus of the class described, in combination, a reciprocating ring-rail, a builder-motion, including a winding drum, controlling connections between the drum and the ring-rail, means to act upon the drum and let off said connections, a winding-back instrumentality controlled by the drum during the letting-off operation and by the drum placed in condition to operate, a manually operated depressing member for the ring-rail, and means actuated by operation of said member to release the drum from the control of the letting-off means and cause the winding-back instrumentality to assume control of and actuate the drum to take up the controlling connections between it and the ring-rail.

10. In apparatus of the class described, a builder-arm having a fixed stud extended therefrom, a winding drum rotatable on the stud, letting-off means, including a worm-gear rotatable on the stud, and an actuating worm, a normally-operative clutch connecting the gear and drum, to effect rotation of the latter by the former, a winding-back instrumentality connected with and to effect reverse rotation of the drum, normal rotation of the drum setting said instrumentality, and a manually actuated device to release the clutch and thereby disconnect the drum and the letting-off means, to permit the winding-back instrumentality to effect reverse rotation of the drum.

11. In apparatus of the class described, a reciprocating ring rail, a builder-motion operatively connected therewith and including a winding mechanism, a winding-back instrumentality connected with said mechanism and set in operative condition by the same when controlled by the letting-off means, letting-off means normally connected with the winding mechanism to control the operation thereof, and a manually operated device to disconnect the letting-off means and the winding mechanism, to permit actuation of the latter by the winding-back instrumentality.

12. In apparatus of the class described, a reciprocating ring-rail, a builder-motion operatively connected therewith and including a winding mechanism, a winding-back weight connected with said mechanism and operatively positioned by the same when controlled by the letting-off means, said letting-off means to normally operate the winding mechanism, and a manually operated device to render the letting-off mechanism inoperative and permit the winding-back weight to actuate the winding mechanism.

13. In apparatus of the class described, a reciprocating ring-rail, a builder-arm, and its actuating cam, a drum rotatably mounted on the arm and having one member of a clutch, letting-off means including a worm-gear rotatable adjacent the drum, a clutch member rotatable with said gear and adapted to coöperate with the member on the drum, to effect rotation thereof by the gear, a spring to effect coöperation of the clutch members, a manually actuated clutch-releaser, a winding-back instrumentality connected with the drum, and controlling connections for the ring-rail, also connected with said drum, the intermittent rotation of the latter by the letting-off means effecting the gain of the traverse and also acting to set the winding-back instrumentality, manually effected disengagement of the clutch members releasing the drum from the letting-off means and permitting the winding-back instrumentality to operate.

14. In apparatus of the class described, a vertically reciprocating ring-rail, a builder-motion, including a rotatable drum, a chain attached thereto and operatively connected with the ring-rail, a second chain reversely wound around the drum and having an attached weight, letting-off means normally connected with and to rotate the drum to gradually let off the chain connected with the ring-rail and to simultaneously wind up the weighted chain, and means to manually release the drum and letting-off means, to thereby permit the weight to act and effect through its chain winding-back of the drum.

15. In apparatus of the class described, a vertically reciprocating ring-rail, a builder-

motion, including a winding mechanism, a controlling connection between it and the ring-rail, a winding-back instrumentality also connected with the winding mechanism, letting-off means normally connected with and to govern the winding mechanism, and means actuated by manual depression of the ring-rail to disconnect the winding mechanism and the letting-off means, to permit the winding-back instrumentality to assume control of and wind back the winding mechanism.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ALONZO E. RHOADES.

Witnesses:
ALEXANDER P. DAVIS,
EDWARD DANA OSGOOD.