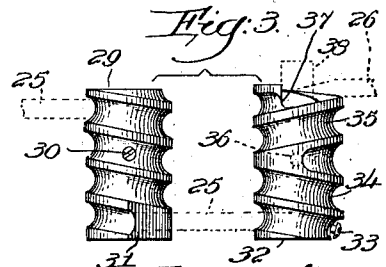
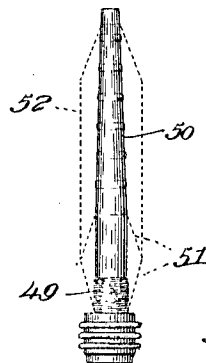
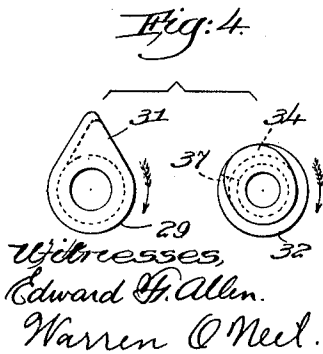
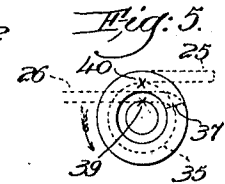
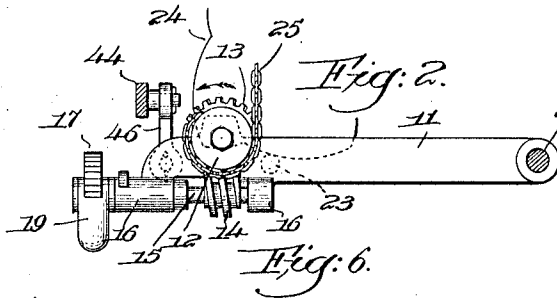
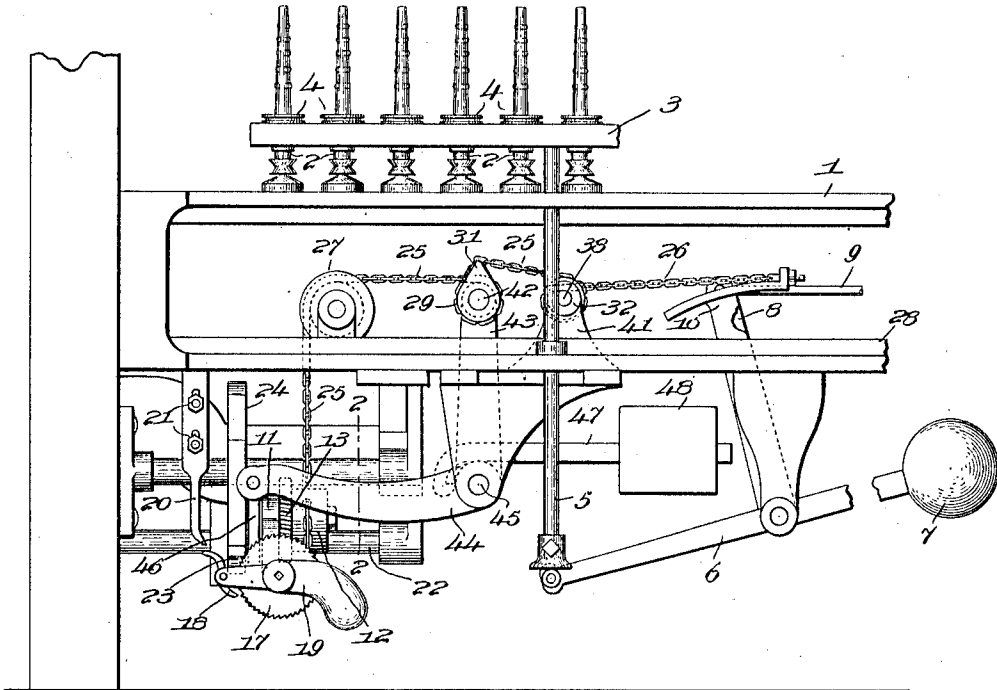


A. E. RHOADES.
TRAVERSE MOTION FOR YARN SPINNING APPARATUS.
APPLICATION FILED OCT. 26, 1911.

1,020,713.

Patented Mar. 19, 1912.

Fig. 1.



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UNITED STATES PATENT OFFICE.

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TRAVERSE-MOTION FOR YARN-SPINNING APPARATUS.

1,020,713.

Specification of Letters Patent.

Patented Mar. 19, 1912.

Application filed October 26, 1911. Serial No. 656,977.

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 Traverse-Motions for Yarn-Spinning Apparatus, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention has for its object the production of novel and simple mechanism for effecting and controlling the traverse of the ring-rail in yarn spinning apparatus where-
15 the yarn is laid in a predetermined manner upon a yarn-receiver or bobbin with a primary winding and thereafter with a main or service winding to complete the upbuilding of the yarn mass.

In United States Patent No. 941,648 granted to me November 30, 1909 I show a traverse motion so constructed and arranged that the winding is started with a short traverse, which is gradually increased up to
25 a predetermined point, after which the winding is completed with a traverse of uniform length, the speed of the traverse, during one reciprocation of the ring-rail, being uniform throughout the winding. So, too, the
30 "gain" in said patented structure varies inversely to the length of the traverse, the gain diminishing gradually from its maximum as the traverse increases from its minimum until uniform traverse is reached, at which
35 point the gain becomes uniform and so continues until the winding is completed. This relation of gain and traverse was adopted to prevent too much yarn being laid at the butt end of the yarn-receiver or bobbin, thus
40 obviating the building of a pear-shaped yarn-mass, as is fully set forth in the patent.

In my present invention the winding is started with the maximum gain and minimum traverse, the former diminishing gradually as the latter increases gradually to the point of uniform or constant traverse, after which both gain and traverse continue uniform to the end of the winding, as in my patent referred to, but the desired results
45 are attained by a different mechanism from that disclosed in my patent, and of a much simpler character.

The various novel features of the inven-

tion will be fully described in the subjoined specification and particularly pointed out 55 in the following claims.

Figure 1 is a front elevation of a portion of a spinning-frame having one embodiment of my invention applied thereto, the ring-rail being shown near lowest position and
60 with the apparatus in readiness to begin the winding of a set of bobbins; Fig. 2 is a transverse section detail on the line 2—2, Fig. 1, looking toward the left, showing in side elevation the builder-arm and parts immedi-
65 ately connected with or mounted upon it; Fig. 3 is a top plan view, enlarged, of the rotatable members or drums which govern the changes in the gain and traverse from the beginning of the winding up to a pre-
70 determined point; Fig. 4 is a front end view of said members; Fig. 5 is a rear end view of the member or drum which governs the gradual increase of the traverse; Fig. 6 is a side elevation of a bobbin with a small
75 portion of yarn wound thereupon, shortly after the beginning of the winding, the outline of the primary and main windings being indicated by dotted lines.

My invention is illustrated in connection 80 with a spinning apparatus wherein the ring-rail is raised by a lifting-weight and depressed by or through means actuated and controlled by the builder-motion, the winding mechanism thereof gradually letting off
85 the chain from the barrel to effect, in connection with means to be described, the desired "gain" of the traverse as the winding proceeds, and when maximum traverse is reached the winding mechanism operates
90 substantially in usual manner. Prior to such time, however, the operation of the drums shown in Figs. 1, 3 and 4 modifies the action of the winding mechanism to impart the maximum gain at the beginning of
95 the winding, with the minimum traverse, and to gradually decrease the gain to a constant amount during the time that the traverse is gradually increased to its maximum, as will appear hereinafter. 100

Referring to Fig. 1, the spindle-rail 1, spindles 2, vertically reciprocating ring-rail 3 having suitable rings 4, the lifter-rods, as 5, rocker 6 coöperating therewith and provided with a lifting-weight 7 to elevate 105 the ring-rail, the rocker-arm 8 and transmit-

ting link 9, and the branch 10 of the rocker, to which is attached the flexible connection between it and the builder-motion, may be and are all of well known construction.

Herein the builder-motion comprehends a builder-arm 11 having mounted upon it the winding barrel 12 with its attached gear 13, Figs. 1 and 2, in mesh with and driven intermittently by the worm 14 on shaft 15 mounted to rotate in suitable bearings 16, Fig. 2, on the arm. On its outer end said shaft has fixed upon it an actuating or pick-wheel 17, with which coöperates the pick-pawl 18 on the rocking and gravity-controlled pawl carrier 19 fulcrumed on the shaft 15. Upon each up-stroke of the builder-arm the tail of the pick-pawl engages the lower end of an operating member 20 adjustably held at 21, Fig. 1, on the main frame, and first the pawl is thrown into engagement with the ratchet 17; thereafter the pawl-carrier is rocked as the builder-arm continues to rise and thus the ratchet is partially rotated, to effect intermittent rotation of the barrel 12 and let off the connection between it and the branch 10 above referred to. The builder-arm is fulcrumed upon a rod 22 suitably suspended from the main frame, and said arm carries a follower-roll 23 which coöperates with the traverse cam 24, Fig. 1, and partly shown in Fig. 2, the builder-arm having a constant stroke, as will be apparent.

The flexible connection leading from the winding mechanism to the branch 10 is ordinarily a chain, herein made in two parts, 25 and 26, the part 25 being attached at one end to and wound around the barrel 12 and leading thence upward and over a guide sheave 27 carried by the longitudinal girth 28 of the main frame. Said chain part 25 passes from the sheave to and is wound around the continuously and spirally grooved member or drum 29, and is preferably attached to it, as by a screw or other fastening 30, Fig. 3, the spiral groove holding the chain in proper position on the drum as the latter is moved rotatively. At its front end, as herein shown, said drum has a radial enlargement or cam 31, along one face of which the spiral groove continues to the apex of the cam, the chain 25 passing over the apex, at the beginning of the winding operation, to the second member or drum 32, Figs. 1, 3 and 4, which is also spirally grooved. The end of the chain part 25 is attached to the drum 32 by a suitable screw 33, Fig. 3, and by reference to Fig. 4 it will be seen that when the two drums are rotated in the direction of the arrows said chain part 25 will be wound upon drum 32 as it is let off or unwound from drum 29.

As shown in Fig. 3 the drum 32 is oppositely grooved, the grooves 34 and 35 extending in opposite spirals from the center of the drum to its ends, the former guiding

the chain part 25 in winding on while the groove 35 guides the chain part 26 in winding off, one end of said part 26 being attached to the drum at 36; see dotted lines Fig. 3, while its other end is attached to the branch 10, thus completing the connection between said branch and the winding mechanism of the builder-motion. The rear end of the drum 32 is cut away at the outer end of the groove 35, so that the latter terminates at 37, Figs. 3, 4 and 5 whereby the chain part 26 at the beginning of the winding operation leads off from the drum 32 substantially tangent to its supporting stud 38, Figs. 1, 3 and 5, or from a point at the shortest distance radial from the axis of the drum. The difference between this radial distance and the greater radial distance of the bottom of the groove 35 from the axis of the drum is best shown in Fig. 5, such difference being the radial distance between the points 39 and 40. The fixed supporting stud 38 is carried by and extends horizontally from an ear 41 attached to the girth 28 and projecting above it, the drum 32, which I term the traverse-changing member or drum, being rotatable on the stud. Said drum is oscillated every time the builder-arm is oscillated, as will appear presently, and through the chain 26 and intervening parts the ring-rail is correspondingly reciprocated, the minimum traverse thereof being effected when chain 26 leads from the drum nearest its axis.

Inasmuch as the winding mechanism is letting off the chain 25 little by little the member 32 is not only oscillated as stated, but it is also advanced angularly or rotated step by step, in the direction of the arrow, Fig. 4, and thus the point at which the chain 26 leaves said member 32 is gradually moved outward, (from 39 to 40, Fig. 5) so that the throw of the rocker 6 is gradually increased, and the traverse of the ring-rail is thereby increased gradually from its minimum, at the starting of the winding, up to the time when chain 26 leaves the bottom of the groove 35, whereupon the subsequent traverse is uniform to the end of the winding. To prevent too much yarn being laid at the butt end of the bobbin, however, the gain starts at its maximum at the beginning of the winding, and is gradually diminished as the traverse increases, and this change in the gain is governed by the drum 29, which latter I term the gain-diminishing member or drum. Said drum is rotatably mounted on a stud 42 parallel to the fixed stud 38 but mounted on the upturned arm 43 of a bell-crank carrier 43, 44, Fig. 1, mounted to rock on a fixed fulcrum stud 45 carried by the main frame at right angles to the builder-arm fulcrum 22, the arm 44 being pivotally connected by a link 46 with the outer end of the builder-arm. An arm 47

connected to said rocking carrier to rock therewith has a weight 48 which in part counterbalances the weight of the builder-arm and parts thereon, and serves to maintain the roll 23 in engagement with the traverse cam 24, as will be apparent.

As the builder-arm 11 rises and falls the carrier will be rocked in unison, and the drum 29 will be moved bodily toward and from the drum 32, thus effecting the oscillatory movement of the latter on its stud 38, the weight 7 effecting rotation in one direction, but the letting off of the chain 25 by the winding barrel 12 permits the drum 29 to also advance angularly or rotate step by step on its stud 42, and consequently the drum 32 is advanced angularly to effect, as described, the gradual increase in the traverse by the cam portion at its inner end. Inasmuch, however, as the portion of the chain 25 between the drums at first leads off from the apex or tip of the cam 31 the increment of angular advance of the drum 32 will be greatest at the beginning of the winding operation, such increment causing the "gain" of the traverse, and as the drum 29 is turned on its stud 42 by the intermittent action of the winding barrel 12 the cam 31 will turn to the right and downward, Figs. 1 and 4. Thereby the portion of the chain 25 between the drums 29 and 32 will gradually move inward toward the axis of the drum 29, and as the radial distance between the leaving point of the chain and said drum axis gradually decreases the increment of angular advance of the traverse-changing member or drum 32 will decrease, gradually diminishing the gain of the traverse. When said chain 25 leaves the drum 29 at a point in the bottom of its spiral groove the leaving point will be at the same distance from the axis of the drum 29 as the distance of the leaving point of the chain 26 is from the axis of the traverse-changing drum 32. Hence the gain thereafter is uniform, and likewise the traverse, and the gain is then controlled altogether by let-off of the chain 25 from the winding barrel.

It will be understood that the amplitude of the bodily movement of the gain-diminishing member 29 toward and from the traverse-changing member 32 is constant from the beginning to the end of the winding, and also that each time the winding barrel 12 lets off the chain 25 the member 29 will be advanced angularly, such advances being uniform. So, too, there will be an angular advance of the member 32 each time the chain 25 is let off by the winding barrel, but owing to the cam 31 and its gradually changing position the angular advances of the member 32 will diminish from maximum to minimum during the period of increasing traverse. The bottoms of the

spiral grooves in both drums 29 and 31 are at the same radial distance from their axes, as will be manifest from Fig. 3.

Referring to Fig. 6, a portion of the primary winding of yarn is shown at 49 on the lower end or butt of the bobbin 50, the traverse starting at its minimum, with maximum gain, and as the winding proceeds the outline of the yarn-mass will gradually assume that indicated by dotted lines 51, at which time the traverse and the gain have become uniform or constant. Then the main or secondary winding is laid with constant traverse and gain, the completed yarn-mass having the outline substantially as indicated at 52, tapering at each end from a substantially cylindrical body, the gradual diminution of the gain from maximum to minimum while the traverse is increasing during the primary winding preventing improper building out of the yarn-mass at the bottom. In one sense the winding mechanism of the builder-motion controls the gain and the traverse throughout the winding, for by its intermittent action the angular advances of the traverse-changing and gain-diminishing members are effected, but these two members act to modify the operation of the winding mechanism and secure the desired changes in the traverse and gain during a predetermined period. Thereafter said members serve only as transmitters between the winding mechanism and ring-rail, and neither exert any influence upon nor alter the action of said mechanism. The traverse-motion as a whole is simple and consists of few parts, it is durable and cannot get out of order, and it can be readily applied to existing spinning frames at small expense.

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, an oscillating builder-arm having a constant stroke, a winding mechanism thereon, a reciprocating ring-rail, flexible connecting means between it and said winding mechanism, to effect reciprocation of the ring-rail, and modifying means acting upon said connecting means to vary the traverse and gain up to a predetermined point in the winding, said modifying means comprising a rotatable traverse-changing member having a traverse-increasing cam, a rotatable gain-diminishing member having a gain-decreasing cam, a fixed support for the former member, and a rocking support for the latter member, operatively connected with and rocked by the builder-arm, bodily movement of said gain-diminishing member toward and from the traverse-changing member oscillating the latter, the winding mechanism causing intermittent angular advances of the gain-changing member to effect, through

its cam, angular and gradually diminishing advances of the traverse-changing member, to decrease the gain, such advances of said traverse-changing member acting through its cam to gradually increase the traverse, until both cams cease to act, the angular advance of each of said members being thereafter equal and uniform and governed wholly by the winding mechanism, to impart uniform gain and traverse to the reciprocation of the ring-rail.

2. In apparatus of the class described, a builder-motion including an oscillating builder-arm having a constant stroke, and a winding barrel thereon to let off the chain intermittently, a reciprocating ring-rail, a two-part chain connection between it and the winding barrel, to effect reciprocation of the ring-rail, and modifying means connected with and acting through the chain to vary the traverse and gain up to a predetermined point in the winding, said means comprising a rotatable traverse-changing drum having a cam portion to act temporarily upon the chain and gradually increase the traverse, a second gain-diminishing drum rotatable and also movable bodily toward and from the first drum and having a cam portion to act temporarily upon the chain and gradually diminish the gain, a fixed support for the first drum, a rocking support for the second drum, and a positive connection between the builder-arm and said support to rock the latter, the part of the chain attached to the winding barrel being wound about the bodily movable drum and leading from its cam portion to the traverse-changing drum, to which it is attached, the other part of the chain being wound upon the latter drum and being at first acted upon by its cam portion, bodily movement of the gain-diminishing drum oscillating the traverse-changing drum upon its support, the winding barrel causing intermittent angular advances of the first-named drum to effect through its cam gradually diminishing angular advances, in the same direction, of the traverse-changing drum, to decrease the gain, such advances of the traverse-changing drum acting through its cam portion upon the second part of the chain to gradually increase the traverse, until the cam portions of both drums cease to act upon the chain, the parts of the latter thereafter leaving the two drums at equal distances from their axes, to impart uniform gain and traverse to the reciprocation of the ring-rail.

3. In apparatus of the class described, a reciprocating ring-rail, means, including a cylindrical drum having a traverse-increasing cam at one end, and a chain between the drum and ring-rail, to effect a gradually increasing traverse when said cam and chain are cooperating and thereafter to impart a uniform traverse when said chain and the

cylindrical drum cooperate, a second cylindrical drum having a cam to govern the gain, a chain connecting the second drum with the first drum and attached to the latter at one side of its cam, said chain when cooperating with the gain governing cam acting to gradually diminish the gain and thereafter imparting a uniform gain to the traverse when the chain cooperates with the cylindrical drum, means, including an oscillating builder-arm, to impart a bodily movement of the latter toward and from the first-named drum, to effect oscillation of the latter, and other means to effect intermittent angular advances of the gain-controlling drum, both of said drums being mounted independently of the builder-arm.

4. In apparatus of the class described, a reciprocating ring-rail, traverse-controlling means including a rotatable member having a traverse-increasing cam, a rotatable gain-controlling member having a gain-diminishing cam, an oscillating builder-arm having a constant stroke, an intermittently rotated winding barrel thereon, and a flexible connection between said barrel and the ring-rail, to effect reciprocation thereof, combined with means to move the gain-controlling member toward and from the traverse-controlling member, the cooperation of the cams with the flexible connection effecting a gradually increasing traverse and a gradually diminishing gain to the reciprocations of the ring-rail, the bodily movement of the gain-controlling member imparting oscillatory motion to the traverse-controlling member and angular advances of the latter being effected by angular advances of the gain-controlling member due to the operation of the winding barrel.

5. In apparatus of the class described, a reciprocating ring-rail, an oscillating builder-arm having a constant stroke, an intermittently rotated winding barrel thereon, and a flexible connection between said barrel and the ring-rail, combined with rotatable traverse-controlling and gain-controlling members, each having a cam portion and a cylindrical portion, to cooperate successively with the flexible connection, the cam portions acting therethrough to impart a gradually increasing traverse and gradually diminishing gain to the reciprocations of the ring-rail, the cylindrical portions of said members acting through said connection to impart uniform traverse and gain, and means to impart bodily movement of the gain-controlling member toward and from the traverse-controlling member, to oscillate the latter, the uniform angular advances of the gain-controlling member, governed by the winding barrel, acting through the cam portion of said member, to impart gradually diminishing angular advances to the traverse-controlling member.

6. In apparatus of the class described, a reciprocating ring-rail, an oscillating builder-arm having a constant stroke, an intermittingly rotated winding barrel there-
5 on, and a flexible connection between said barrel and the ring-rail, combined with two separate members mounted independently of the builder-arm and acting upon the flexible connection intermediate said arm and the
10 ring-rail, to govern the traverse and the gain during a predetermined portion of the winding, one of said members gradually increasing the traverse and the other member

gradually diminishing the gain during such 15
time, the latter member controlling the action of the former member, and means separate from the winding barrel to impart a bodily rocking movement to the member
20 which controls the gain.

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

ALONZO E. RHOADES.

Witnesses:

ROBERT JAMIESON,
EDWARD DANA OSGOOD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents.
Washington, D. C."
