June 25, 1929. S. BOYD 1,718,629

YARN SPINNING OR WINDING MACHINE

Filed Aug. 11, 1927 2 Sheets-Sheet 1

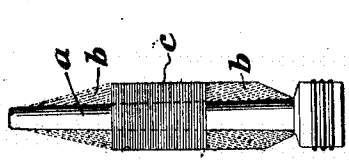


Fig. 2

Fig. 1

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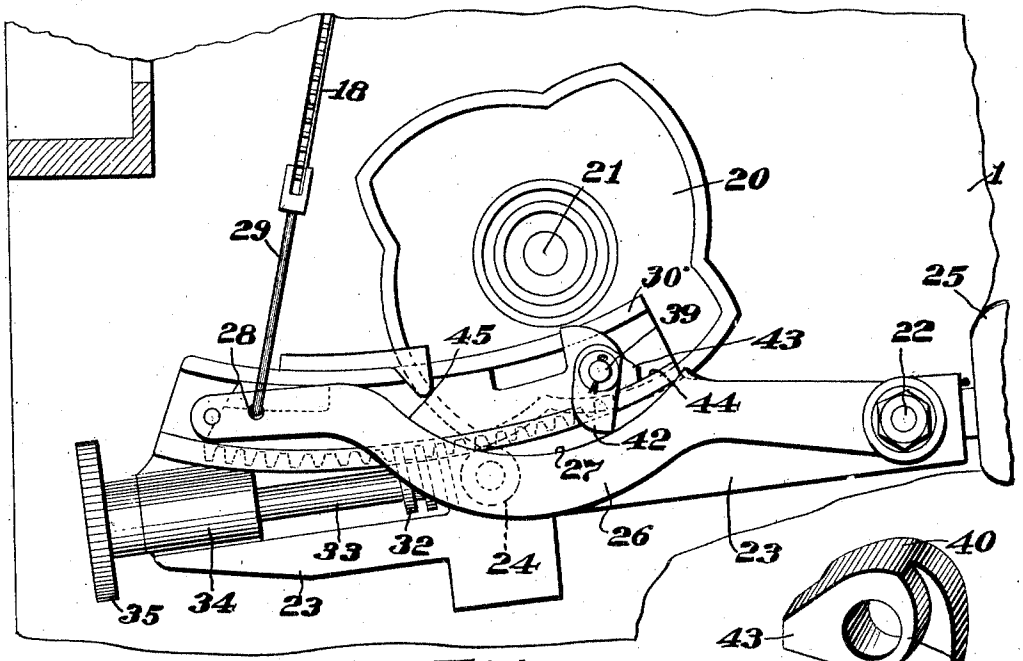


Fig. 3

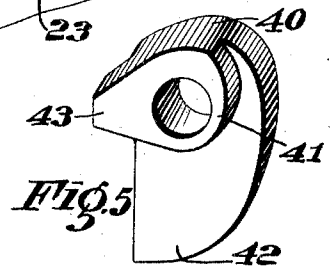


Fig. 5

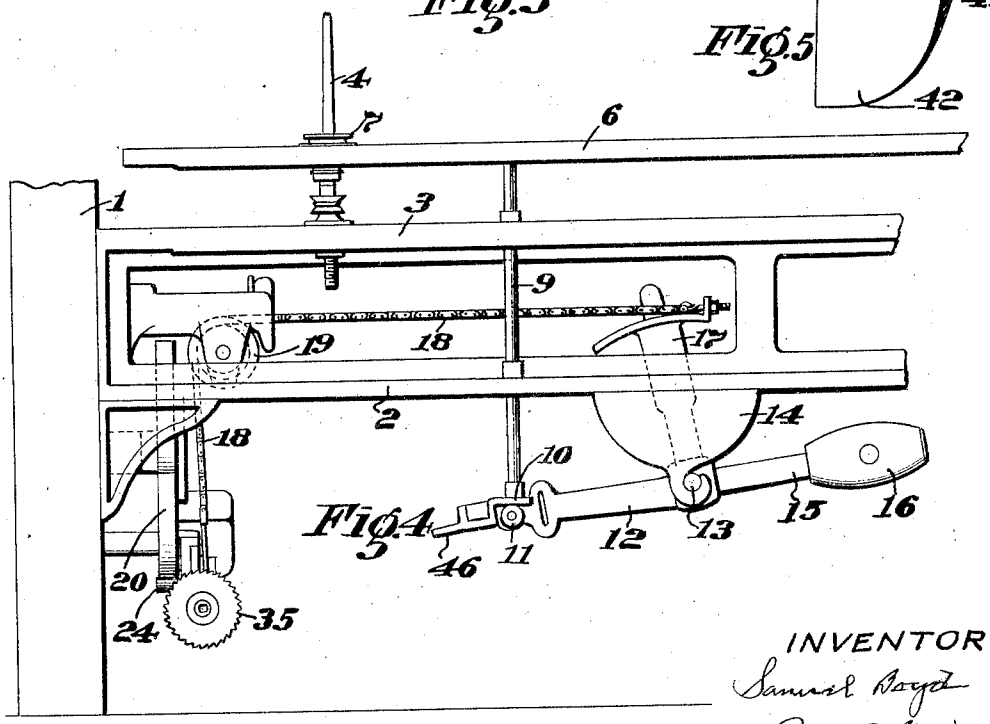


Fig. 4

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UNITED STATES PATENT OFFICE.

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YARN SPINNING OR WINDING MACHINE.

Application filed August 11, 1927. Serial No. 212,180.

This invention relates to spinning or winding machines and is more particularly directed to the builder mechanism of such machines, whereby yarn carriers are supplied or filled with yarn.

It is now the ordinary practice to wind yarn upon yarn carriers for subsequent use. In warp wound yarn carriers, the yarn is laid upon the carriers in generally cylindrical formation, wherein each traverse of the yarn usually extends the full length of the yarn carrier. In filling wound carriers the yarn is laid upon the carrier in conical formation, each conical layer extending a little further towards the tip of the carrier than the preceding layer, so that the yarn may be withdrawn from the carrier by pulling it endwise therefrom. These two general types of yarn windings are now well understood in the art.

Filling wound carriers are now frequently employed for holding yarn that is subsequently to be withdrawn endwise therefrom in the spooler, whereby the yarn previously wound by filling winds is laid upon the spooler bobbins by warp wind. Such warp wound bobbins are then mounted in the usual creel for the warping operation. Filling wound carriers are now ordinarily employed also in shuttles during the weaving operation. Whether such filling wound carriers be employed in connection with a spooler or be used in the loom as weft or filling, it is necessary to withdraw the end of the yarn either to tie it to the yarn in the spooler or connect it to a fixed point in the loom, with the result that the yarn is liable to kink or snarl, a condition which is particularly observable in tightly twisted or spun yarn.

Should the yarn snarl or kink back of the knot in the spooler or between the filling carrier and the point of attachment in the loom, such snarls and kinks may be carried into the fabric, either by the warp or filling, thereby producing imperfect cloth.

One of the objects of the present invention is to provide a builder mechanism for spinning or winding machines whereby the yarn may be wound upon carriers by filling wind and on completion of the filling wound carriers, a portion of the filling wound carrier may be overlaid by yarn windings, to provide at the exterior of the filling wound carrier an end portion which may be connected to the preceding yarn in the spooler or to a fixed point adjacent the hopper in the loom, without undue slackness of the yarn between the carrier and end of the yarn, thereby avoiding snarls and kinks due to slackness which may be present in yarn when withdrawn directly from the filling wound portion of the filling carrier.

The invention and new combination of parts will best be made clear from the following description and the accompanying drawings of one good form thereof.

In the drawings:

Fig. 1 is a general view of a spinning or winding machine, with parts broken away, containing the present invention;

Fig. 2 is partial sectional and elevational view of a filling wound carrier having overlying yarn wound on its exterior, as contemplated by the present invention;

Fig. 3 is an enlarged side elevation of a builder mechanism containing the present invention;

Fig. 4 is a general front elevation of a spinning or winding machine containing the present invention; and

Fig. 5 is a detached detail showing the traverse controlling member or tumbler.

The spinning or winding machine may be of usual construction and, as shown, comprises the end frames 1, only one of which is shown in Fig. 1, connected by the girths 2, above which is the spindle rail 3 on which is mounted a series of spindles 4 for receiving yarn carriers. The spindles 4 are rotated as usual by any suitable means, such, for instance, as the spindle band 5 driven from a suitable tin roller or other source of power.

Above the spindle rail 3 is the ring rail 6 having a series of rings 7 through each of which passes one of the spindles 4, and associated with each of the rings 7 is a traveler 8 which acts in conjunction with its associated ring to direct the yarn to the yarn carriers mounted upon the spindles, all as usual in ring spinning frames.

The ring rail 6 has extending downwardly therefrom the lifters 9, the lower end portions of which have shoes which rest upon the bearing or roller 11 mounted on an arm 12 pivotally connected at 13 to a bracket 14 extending from the girth 2. The laterally extending arm 15 of the lever 12 has a weight 16, which normally tends to lift the ring rail 6, as usual, and extending upwardly from the lever 12 is the segment arm 17 to which is connected the flexible member 18 which may

be a chain or other suitable flexible connector. The flexible connector 18 passes over a guide pulley 19 and its end extending downwardly therefrom is associated with the builder mechanism, as will presently be explained.

The builder mechanism, in the present instance of the invention, is connected to the ring rail to impart thereto a traverse movement to lay the yarn upon the yarn receivers by filling wind, and associated with the builder mechanism is means for changing the path of travel or traverse of the ring rail to lay windings upon the yarn receivers after filling wind has been completed, and prior to doffing.

The builder mechanism comprises the builder cam 20 which may be mounted upon the cam shaft 21 and be rotated from any suitable source of power now well understood in the art and therefore not illustrated. Pivotally mounted on a stud 22 extending from the frame of the machine is the builder arm 23 having a cam follower 24 which is normally pressed into engagement with the builder cam by a weight 25, the construction being such that as the builder cam is rotated the builder arm will be raised and lowered, as usual.

The builder arm has associated therewith a traverse control arm 26, which, as shown in the present instance of the invention, is pivotally mounted on the same stud 22 as is the builder arm. The traverse control arm has a rounded or concave portion 27 and its free end is connected at 28 with the end 29 of the flexible connector 18. Between the builder arm and the traverse control arm means are provided for regulating or controlling the traverse or movement of the ring rail during winding, as will now be explained.

Mounted upon the builder arm is the segment guide 30 in which is mounted the toothed segment 31 for endwise movement, which is imparted to the segment rack by means of pick mechanism. The pick mechanism in the present instance comprises a worm 32 mounted on a worm shaft 33 carried by suitable bearings 34 on the builder arm, and having at its outer end a pick wheel 35 which is given a step-by-step rotative movement by a pawl 36 mounted on an arm 37 and actuated by the pick rod 38, substantially as usual in builder mechanisms, the effect being that as the worm shaft 33 is rotated step-by-step, the segment rack will be moved endwise—backward in the present instance.

Extending from the segment rack is a pin 39 on which is mounted the traverse controlling member 40 which is of novel construction and functional operation.

The traverse controlling member 40 has a bearing portion 41 which, as indicated in Fig. 1, normally rests upon or in engagement with the top surface of the traverse control arm 26 during filling wind. Extending alongside of the bearing portion 41 of the traverse control member 40 is the projection 42 which may be formed integral with or secured to the bearing portion 41 of the traverse control member. It will thus be noted that the traverse controlling member is formed in the nature of a tumbler which normally occupies the position indicated in Fig. 1 during filling wind, but assumes the position automatically as indicated in Fig. 3 owing to the weight of the tumbler should the ring rail be manually lowered on completion of the filling wind, and since the portion 42 of the traverse controlling member extends further from the pivotal support 39 than does the bearing portion 41, it follows that the ring rail will be positioned by the projection 42 of the tumbler to cause the yarn to be laid upon the filling wind in cylindrical spirals due to the action of the builder arm and builder cam.

Extending from the traverse controlling member 40 is a stop 43 which engages a trackway 44 on the segment guide 30 when the tumbler has been moved to its operative position, as indicated in Fig. 3.

In winding back, which is done by manual rotation of the worm shaft 33 prior to commencing filling wind on a fresh set of carriers, the curved edge surface of the projection 42 of the tumbler will engage the upwardly inclined portion 45 of the traverse control arm and be tripped or rotated from its operative position of Fig. 3 into its position as indicated in Fig. 1, thereby bringing the bearing portion 41 of the traverse controlling member into position for commencing filling wind.

With the parts in the position as indicated in Fig. 1, with a fresh set of yarn receivers mounted upon the spindles 4, the machine is ready to be started to lay filling winds upon the yarn receivers. As the segment rack is moved lengthwise or backwardly by the pick mechanism, the bearing portion 41 of the traverse controlling member will permit the traverse control arm 26 to gradually lift under the weight of the ring rail and thereby cause the ring rail to move gradually to its upper position to complete filling wind, which is accomplished when the traverse controlling member is at or near its rearward position relative to the traverse controlling arm. The yarn receivers now being supplied with filling wind yarn, the machine attendant manually depresses the ring rail, thereby permitting the traverse control arm 26 to drop of its own weight, with the result that the traverse controlling member or tumbler 40 will automatically turn upon its pivotal support to carry the projection 42 into contact with the curved portion of the traverse control arm, as indicated in Fig. 3. Thus the ring rail is lowered to an intermediate position between the head and tip of the yarn receivers and maintained in such position by the traverse controlling member or tumbler while the builder arm and builder cam act

through the traverse controlling member to traverse the yarn in one or more layers upon the body of the filling wind. When sufficient yarn has been wound upon the filling wind to satisfy the conditions of subsequent use of the yarn carriers, the machine is stopped, the ring rail further lowered for doffing and the filled carriers with filling and overlying windings are removed. The resulting condition of the yarn carrier is shown by Fig. 2 wherein the yarn carrier or receiver *a* is supplied with filling wind *b* in conical layers, as usual, and about the cylindrical portion of the filling wind is laid the yarn *c* of sufficient extent, either one or more layers, to provide the necessary yarn for tying up in the spooler or securing the yarn to a fixed part in a filling replenishing loom, without, at such time, producing the slack in the yarn which would be liable to kink or snarl.

Manual depression of the ring rail for the accomplishment of the above-described purposes may be conveniently effected by a foot-piece 46 extending from the lever 12, it being understood that such manual depression of the ring rail will be to an intermediate position between the upper and lower limits of the cylindrical portion of the filling wound carriers or receivers.

What is claimed is:

1. In a yarn spinning or winding machine, the combination of yarn guides, a builder arm, connections between the yarn guides and builder arm, and a builder cam acting upon the builder arm to lay filling wind upon yarn receivers, and means for changing the path of traverse movement of the yarn guides by the builder arm and builder cam on completion of the filling wind to cause them to traverse and lay an additional length of yarn upon a part of the cylindrical portion of the filling wind prior to doffing.

2. In a yarn spinning or winding machine, the combination of a builder mechanism for laying yarn on yarn receivers by filling wind, including yarn guides, a builder arm, a builder cam, and connections between the builder arm and yarn guides, and means for changing the path of movement of the yarn guides by the builder mechanism on completion of the filling wind to cause the builder arm and builder cam to lay an additional length of yarn overlying a part of the cylindrical portion of the filling wind.

3. In a yarn spinning and winding machine, the combination of yarn guides for directing yarn to yarn receivers, a builder arm, connections between the builder arm and yarn guides, a builder cam acting upon the builder arm to lay yarn upon receivers in conical layers of predetermined traverse, and means for changing the path of traverse of the yarn guides by the builder arm and builder cam during the continued operation of the machine to lay additional winds upon the cylindrical body of the filling wind prior to doffing.

4. In a yarn spinning or winding machine, the combination of yarn guides for directing yarn to yarn receivers, a builder arm, connections between the yarn guides and builder arm, a builder cam acting upon the builder arm for traversing the yarn guides, and means rendered effective upon lowering the yarn guides upon completion of the filling wind to automatically change the path of movement of the yarn guides by the builder cam and builder arm to lay yarn in cylindrical coils upon the cylindrical portion of the filling wound carriers.

5. In a yarn spinning and winding machine, the combination of yarn guides for directing yarn to yarn carriers, a builder arm, connections between the builder arm and yarn guides, a builder cam acting through the builder arm for traversing the yarn guides to lay yarn upon yarn receivers in conical layers of filling wind, means for lowering the yarn guides at will during the machine operation, and a traverse change controller rendered effective by lowering the yarn guides to cause the builder arm and builder cam to lay the yarn upon the cylindrical portion of the filling wound receivers.

6. In a yarn spinning or winding machine, the combination of a ring rail having yarn guides, a builder arm connected to the ring rail, a builder cam acting through the builder arm for traversing the ring rail to lay yarn upon yarn receivers in conical layers of filling wind, and means rendered operative upon lowering the ring rail to an intermediate position to cause the traverse of the ring rail by the builder arm and builder cam to traverse and lay a series of cylindrical spirals upon the body of the filling wound carriers prior to doffing.

7. In a spinning or winding machine, the combination of yarn guides for directing yarn to yarn receivers, a builder arm, a builder cam acting upon the builder arm, a traverse control arm connected to the yarn guides for transmitting movements of the builder arm by the builder cam to the yarn guides, and means between the builder arm and traverse control arm for changing the position of the traverse of the yarn guides by the builder arm and builder cam when the yarn guides are lowered that one or more layers of yarn may be wound upon the filling wound carriers prior to doffing.

8. In a spinning or winding machine, the combination of yarn guides, a builder arm and builder cam, a traverse control arm connected to the yarn guides, a traverse controlling member connected to the builder arm and acting upon the traverse control arm to lay yarn by filling wind upon yarn receivers, and a projection on the traverse controlling member for changing the path of traverse of the

yarn guides by the builder arm and builder cam when the yarn guides are lowered to thereby lay yarn upon the cylindrical portion of the filling wound carriers.

9. In a spinning or winding machine, the combination of yarn guides, a builder arm, a builder cam, a traverse control arm connected to the yarn guides, means between the builder arm and traverse control arm for laying yarn upon receivers by filling wind during regular traverse, and additional means between the builder arm and traverse control arm rendered operative to change the path of traverse caused by the builder arm and builder cam when the yarn guides are lowered to an intermediate position to lay yarn upon the cylindrical portion of the filling wound carriers.

10. In a spinning or winding machine, the combination of yarn guides, a builder arm and builder cam, a traverse control arm connected to the yarn guides, a segment rack on the builder arm, a traverse controlling member mounted on the segment rack and comprising a bearing portion which acts upon the traverse control arm until the filling carriers are completely supplied with filling wound yarn and a projecting portion extending beyond the bearing portion which is positioned to engage the traverse control arm when the yarn guides are lowered to thereby change the position of the path of traverse of the yarn guides by the builder arm and builder cam.

11. In a spinning or winding machine, the combination of yarn guides, a builder cam, a builder arm having a cam follower bearing upon the builder cam, a traverse arm connected to the yarn guides, a rack on the builder arm, a traverse controlling member mounted on the rack and constituted as a pivoted tumbler having a bearing portion to act upon the traverse arm during filling wind until the completion of the filling wound carriers and a portion extending further from the pivotal mounting than the bearing portion and which is positioned to engage the traverse arm by turning movement of the tumbler when the yarn guides are manually depressed to thereby change the position of the path of traverse of the yarn guides by the builder arm and builder cam.

12. In a spinning or winding machine, the combination of yarn guides, a builder cam, a builder arm having a cam follower bearing upon the builder cam, a traverse arm connected to the yarn guides, a rack on the builder arm, a traverse controlling member mounted on the rack and constituted as a pivoted tumbler having a bearing portion to act upon the traverse arm during filling wind until the completion of the filling wound carriers and a portion extending further from the pivotal mounting than the bearing portion and which is positioned to engage the traverse arm by turning movement of the tumbler when the yarn guides are manually depressed to thereby change the position of the path of traverse of the yarn guides by the builder arm and builder cam, and a stop for limiting the turning movement of the tumbler.

13. A builder mechanism for spinning or winding machines, comprising a builder cam, a builder arm actuated by the cam, a traverse arm, a rack on the builder arm and pick mechanism for moving the rack, a traverse controlling member having a bearing portion to engage the traverse arm during filling wind and a projecting portion automatically engaged with the traverse arm when the ring rail is manually depressed that the traverse effected by the builder arm and builder cam may thereafter lay yarn upon the body of the filling wind, and means for tripping the traverse controlling member to its filling wind position on winding back.

In testimony whereof, I have signed my name to this specification.

SAMUEL BOYD.