

UNITED STATES PATENT OFFICE.

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SPINNING-FRAME.

SPECIFICATION forming part of Letters Patent No. 680,194, dated August 6, 1901.

Application filed June 3, 1901. Serial No. 62,820. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. CHAPMAN, a citizen of the United States, residing at Lowell, county of Middlesex, State of Massachusetts, have invented an Improvement in Spinning-Frames, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to spinning-frames, and more particularly to the builder-motion thereof or that part which effects the traverse of the yarn upon a yarn-receiver or bobbin mounted upon the rotating spindle.

In looms known as "feeler-looms" a change of filling is automatically effected when the filling in the shuttle has been exhausted to a predetermined extent, enough yarn being left on the bobbin or filling-carrier to extend at least once across the lay, and some filling-carriers are provided with a metal band which co-operates with the "feeler" when the yarn has been woven off sufficiently to expose the band. The filling-carriers for such looms must have a preliminary winding or bunch of yarn wound thereupon, so that the feeler will operate when the main or body winding has been woven off down to the bunch, leaving enough yarn to extend one or more times across the lay; and my present invention is applicable to the winding of such bobbins or filling-carriers as well as to winding other bobbins, the bunch being made in this invention by a short traverse rather than by an absolute stop in the traverse.

Figure 1 is a part cross-sectional view of a spinning-frame, the builder-arm and actuating devices therefor embodying my invention being shown in elevation. Fig. 2 is a detail, partly in section, on the line *x*, Fig. 1, looking to the right. Fig. 3 is a side view of a portion of the builder-controlling mechanism illustrated in Fig. 1, but differently positioned. Fig. 4 is a detail thereof, but viewed from the opposite side. Fig. 5 is a view of a portion of the winding mechanism, which is shown in Fig. 1 at the left-hand end of the builder-arm. Fig. 6 is a view in elevation of a yarn-receiver or bobbin with a bunch of yarn wound upon the head or base thereof, and Fig. 7 is a similar view showing the bunch

and also the main or body winding of yarn upon the yarn-receiver.

Referring to Fig. 1, the frame A supports the usual spindle-rail R^x , on which are mounted the rotatable sleeve-whirl spindles S, the vertically-reciprocating ring-rail R, provided with rings R' , one for each of the spindles, and the builder-motion, a part only of which is herein illustrated, may be and are all of usual and well-known construction, the builder-motion operating to effect the traverse of the ring-rail to wind the yarn upon the yarn-receiver or bobbin B.

I have herein shown the builder-arm B^x fulcrumed on the frame at B' and having mounted upon it the winding mechanism M, the latter of usual construction and actuated in usual manner by coöperation of the pawl m with the ratchet-wheel m' (see Fig. 5) to gradually elevate the ring-rail, as is common in winding yarn with "filling-winding," the pawl being intermittently engaged by an actuator m^x , (see Fig. 1,) during the laying of yarn upon the yarn-receiver or bobbin with the filling-winding.

In order to effect the winding of a bunch of yarn upon the receiver or bobbin, as well as to effect the filling-wind of the main portion or body of yarn, I have herein provided two separate actuating devices to coöperate with the builder-arm B^x , with means for automatically throwing one of said actuating devices out of operation and the other device into operation at the proper time.

The cam-shaft C^x , Figs. 1 and 2, has fast upon it two cams F and W, and in the present embodiment of my invention the cam W is of the shape substantially used in laying "warp-wind"—viz., a double-heart cam—while the cam F is of the shape usual for laying "filling-wind."

The builder-arm has mounted therein a short rock-shaft d , extended laterally from one side of the said arm and provided with two rigid followers wf , respectively, (see Figs. 1 and 2,) to coöperate one at a time with the cams W F, respectively, said followers being set at an angle to each other on the said rock-shaft, as shown best in Fig. 1. The rock-shaft at its outer end has fast thereupon a hook-like dog d' , secured in place on the rock-shaft by

a suitable set-screw 2, the dog being adapted to be engaged by a detent herein shown as an upturned resilient arm d^x , secured to the builder-arm and having on its outer face a lateral shelf or shoulder d^2 , on which the dog is adapted to rest. A second shelf or shoulder d^3 at the lower end of the detent is in the path of a lug d^4 on the inner face of the dog to be engaged thereby when the dog is turned into dotted-line position, Fig. 1, as will be hereinafter described. When the dog is in full-line position, Fig. 1, and also as shown in Fig. 2, the follower w will be in position to cooperate with the cam W , while the follower f will be in inoperative position, and the rocking movement of the builder-arm, and consequently the operation of the builder-motion as a whole, will be effected through the cam W . Referring to Fig. 1, it will be noted that at such time the pawl m will not be permitted to come into engagement with the actuator m^x , so that the winding mechanism will remain quiescent, and therefore the yarn which is laid upon the receiver or bobbin when the builder-motion is actuated through the cam W will be laid as warp-wind, as shown substantially in Fig. 6 and Figs. 6 and 7 at w^x , and I have herein shown this winding or bunch as laid upon the cylindrical base or butt b^x of the bobbin. When, however, the dog d' is released by the withdrawal of the detent-shoulder d^2 , as will be described, it will be immediately thrown down into dotted-line position, swinging the follower f up, and the builder-arm will rock in the direction of the arrow 3, Fig. 1, so that the rock-shaft d will assume the dotted-line position, Fig. 1, and the follower f will be turned up into position to engage the actuating-cam F . When this cam is cooperating with its follower to actuate the builder-motion, the elevation of the left-hand end of the builder-motion will permit the actuator m^x to intermittently engage and operate the pawl m , so that the winding mechanism will be operated in usual manner to gradually raise the ring-rail, and its traverse being effected by the rocking of the builder-arm the yarn will be laid with the filling-wind, as at f^x , Fig. 7, beginning at or near the base or butt of the bobbin or yarn-receiver and continuing upward toward the tip thereof to form the main or body winding of yarn.

Reference to Fig. 1 will show that when the follower f is first elevated into position to cooperate with its cam F it will be inclined to the left of a vertical line drawn through the fulcrum-shaft d ; but as soon as the cam F , rotating in the direction of the arrow 4, has caused the low point to engage the follower the latter will be swung over to the right of the vertical line through its fulcrum, so that thereafter the high part of the cam acting upon the follower tends to still further swing it over to the right. This further swinging movement of the follower is resisted, however, by the engagement of the lug d^4 with the

shelf d^3 at the lower end of the detent, as will be manifest by an inspection of the drawings, Figs. 1 and 2.

I have provided simple means for automatically effecting the change from one cam to the other, so that the bunch of yarn w^x will first be wound upon the yarn-receiver and thereafter at a predetermined time the bunch-winding cam W will be thrown out of operation and the body-winding cam F thrown into operation.

Referring to Fig. 2, a circular disk E is mounted loosely upon the shaft C^x , the periphery of the disk being provided with a series of pins or teeth e^x , the hub e' of the disk at one end bearing against a friction-washer e^2 , of leather or other suitable material, held in place by a collar C' , fast on the shaft. The collar is held in adjusted position on the shaft by means of a set-screw 5. A tripping device, shown as an arm t , is adjustably secured to the shaft C^x by means of a set-screw 6 (see Fig. 2) adjacent the outer face of the disk E , the outer end of the trip t being beveled or cam-shaped, as at t' , to pass beneath and elevate a spring-stop s^x , secured to a suitable bracket A^x , forming part of the framework of the machine and, as herein illustrated, having a bearing for the end of the shaft C^x . The stop s^x extends across the periphery of the disk E , which constitutes, as will be seen later, a releasing device to withdraw the detent d^x from the dog d' , and so long as the stop is in the path of one of the pins or teeth e^x the said disk will be restrained from rotation; but whenever the stop is lifted out of the path of a pin the disk E will be rotated with the shaft C^x , due to frictional engagement between the disk, the washer e^2 , and the hub of the trip t . The latter has its face on the shaft C^x , rotates therewith, and makes one complete revolution for every revolution of the shaft, and consequently will raise the stop s^x once for each revolution of the shaft to permit the disk E to be moved forward the distance between two adjacent pins on the periphery thereof. The inner face of the disk E has formed upon it a somewhat peculiarly shaped cam having an annular rising portion e^5 , with its low point at 7 and its high point at 8, the back of the cam sloping gradually from the part e^5 to the face of the disk, such sloping portion being shown at e^6 . The upper end of the detent d^x is bent over, as at d^5 , to normally approach very nearly the inner face of the disk E , and referring to Fig. 3 the position of the disk is shown at the time the winding of the bunch of yarn begins. As the winding progresses the disk will be rotated intermittently step by step by the intermittent release of the stop s^x , as has been described, until the low point 7 of the cam e^5 is in position to engage the bent-over end d^5 of the detent, and in Fig. 1 the parts are shown after the cam e^5 has moved the detent backward a little bit just before release of the detent. The space between the pin e^x ,

then in engagement with the stop s^x , and the next succeeding pin on the disk E is greater than the spaces between the other pins, so that as the trip elevates the stop and releases the disk it will move forward until the pin 30, Fig. 1, engages the stop, and this position is shown in Fig. 3, the end d^5 of the detent having slid along the cam e^5 up to its high point, and as the detent has been pushed backward the shoulder d^3 has been withdrawn from and releases the dog d' , as has been hereinbefore described, so as to throw the follower w out of operation and the follower f into the operation to start the laying of yarn with the filling-wind upon the bobbin. The inclined portion e^6 of the cam is provided, so that the builder-arm can be rocked and the detent moved up and down while the latter is under the control of the cam e^5 , the inclined portion e^6 permitting the detent to ride up into the cam e^5 as the builder-arm goes down. Of course after the complete revolution of the disk E step by step, as has been described, the subsequent rotative movement of the disk to bring the cam e^5 into engagement with the end of the detent will have no effect on the dog d' , as the latter, it will be remembered, moves into dotted-line position, Fig. 1, as soon as it has been released by the withdrawal of the detent by or through the action of the cam e^5 , and the laying of yarn upon the bobbin by filling-wind will continue as long as it is necessary to fill the bobbin to the desired extent.

I have deemed it unnecessary to illustrate in the accompanying drawings old and well-known parts of the builder-motion, as my invention does not alter or vary their operation except in so far as the movement of the builder-arm is concerned, the latter and the actuating devices coöperating therewith and the controlling means being fully shown and described herein.

The yarn-receiver or bobbin B herein shown, having its cylindrical butt or base b^x , is adapted to be used in a "Northrop" loom-shuttle, and it will be obvious that the bunch w^x can be readily removed from the bobbin by simply pushing it off the larger base onto the smaller barrel without necessitating scraping or cutting with a knife, which is now the general practice.

If the bobbin herein shown is to be applied to feeler-loom of the type wherein the filling-changing mechanism is operated when the yarn is woven off sufficiently to expose a metal band, such band might be located on the barrel of the bobbin—for instance, in dotted lines at 80, Figs. 6 and 7.

I have shown one practical embodiment of my invention, and various changes or modifications thereof may be made without departing from the spirit and scope of my invention.

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

1. In a spinning-frame, a builder-motion, primary and secondary actuators therefor, the former effecting the winding of a bunch, and the latter the winding of the main body of yarn, upon a yarn-receiver, and means to automatically render the primary actuator inoperative and the secondary actuator operative after the bunch has been wound.

2. In a spinning-frame, a builder-motion, and automatically-operating controlling means therefor to effect the winding of a bunch, and thereafter the main or service winding, of yarn upon a yarn-receiver.

3. In a spinning-frame, a builder-motion, warp and filling-wind actuating devices therefor, and means to automatically render the former of said devices inoperative after a bunch of yarn has been wound upon a receiver, and the latter of said devices operative, to complete the main winding of the yarn.

4. In a spinning-frame, a builder-motion, including a builder-arm, two different actuating-cams therefor, to effect respectively the winding of a bunch, and the main winding, of yarn upon a yarn-receiver, and means to automatically render one cam inoperative and effect the coöperation of the other cam with the builder-arm.

5. In a spinning-frame, a builder-motion, including a builder-arm, and a winding mechanism carried thereby, two traverse-cams to coöperate one at a time with the builder-arm, to effect different winding of yarn upon a yarn-receiver, and means to automatically render one cam inoperative and the other operative.

6. In a spinning-frame, a builder-motion, including a builder-arm, a winding mechanism mounted thereon, and an actuator for said mechanism, two traverse-cams to coöperate singly with and actuate the builder-arm, and means to automatically effect coöperation of first one and thereafter the other of the cams with the builder-arm, and to render the winding mechanism inoperative during the actuation of the builder-arm by one of the cams.

7. In a spinning-frame, a builder-motion, including a builder-arm, a bunch-winding cam, a body-winding cam, a follower for each cam, carried by the builder-arm, and means to automatically move one follower into inoperative, and the other into operative position, to thereby effect the actuation of the builder-arm by the bunch-winding and body-winding cams successively.

8. In a spinning-frame, a builder-motion, including a building-arm, two different actuating-cams, two connected followers pivotally mounted on the builder-arm, one for each cam, a detent to hold one of the followers in operative position, and means to automatically release the detent at a predetermined time to move the operating-follower into inoperative position and effect the coöperation of the other follower with its cam.

9. In a spinning-frame, a builder-motion, including a builder-arm, a rotatable shaft, bunch-winding and body-winding cams fast thereon, two connected followers pivotally mounted on the builder-arm and having an attached dog, a detent for the latter, a friction-actuated releasing device for the detent, mounted on the shaft and adapted to be intermittently rotated thereby, a stop for said device, and means to render said stop inoperative at each revolution of the shaft, the releasing device at each complete rotation thereof acting upon the detent to release the dog, and thereby acting upon the detent to release the dog and thereby change the followers, whereby the builder-arm is controlled first by the bunch-winding, and then by the body-winding, cam.

10. In a spinning-frame, a builder-motion, means to actuate it to wind a bunch of yarn upon a yarn-receiver, separate means to effect the body-winding of yarn upon the receiver, and a controlling device to automatically render the first means inoperative, and the second means operative, after the winding of the bunch of yarn has been completed.

11. In a spinning-frame, the reciprocating ring-rail, auxiliary traversing mechanism therefor to effect warp-wind of yarn upon the base of a yarn-receiver, to form a bunch thereon, main traversing mechanism to effect filling-wind of the yarn upon the body of the receiver, and means to automatically change

from warp-wind to filling-wind after a bunch of yarn has been wound upon the receiver. 35

12. In a spinning-frame, a builder-motion, actuating mechanism therefor to lay yarn on a yarn-receiver with warp-wind, and separate actuating mechanism to lay the yarn with filling-wind, and means to automatically change the action of the builder-motion from warp to filling wind. 40

13. In a spinning-frame, a builder-motion, two separate actuators therefor, to respectively wind a bunch of yarn on a yarn-receiver and thereafter to effect the service-winding of the yarn, and means to automatically render the former of said actuators inoperative and the latter operative at a predetermined time. 45

14. In a spinning-frame, a builder-motion, to effect the service-winding of the yarn upon a yarn-receiver, mechanism to vary the action of the builder-motion, to cause the latter to wind a bunch of yarn on the receiver, and means to automatically render said mechanism inoperative after the bunch of yarn has been wound, and permit the normal operation of the builder-motion to be effected. 50

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 55

ROBERT J. CHAPMAN.

Witnesses:

HORACE S. BACON,
LEOPOLD M. REINHARDT.

It is hereby certified that in Letters Patent No. 680,194, granted August 6, 1901, upon the application of Robert J. Chapman, of Lowell, Massachusetts, for an improvement in "Spinning-Frames," an error appears in the printed specification requiring correction, as follows: In line 126 page 3, the compound word "building-arm" should read *builder-arm*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 20th day of August, A. D., 1901.

[SEAL.]

THOS. RYAN,

First Assistant Secretary of the Interior.

Countersigned:

E. B. MOORE,

Acting Commissioner of Patents.