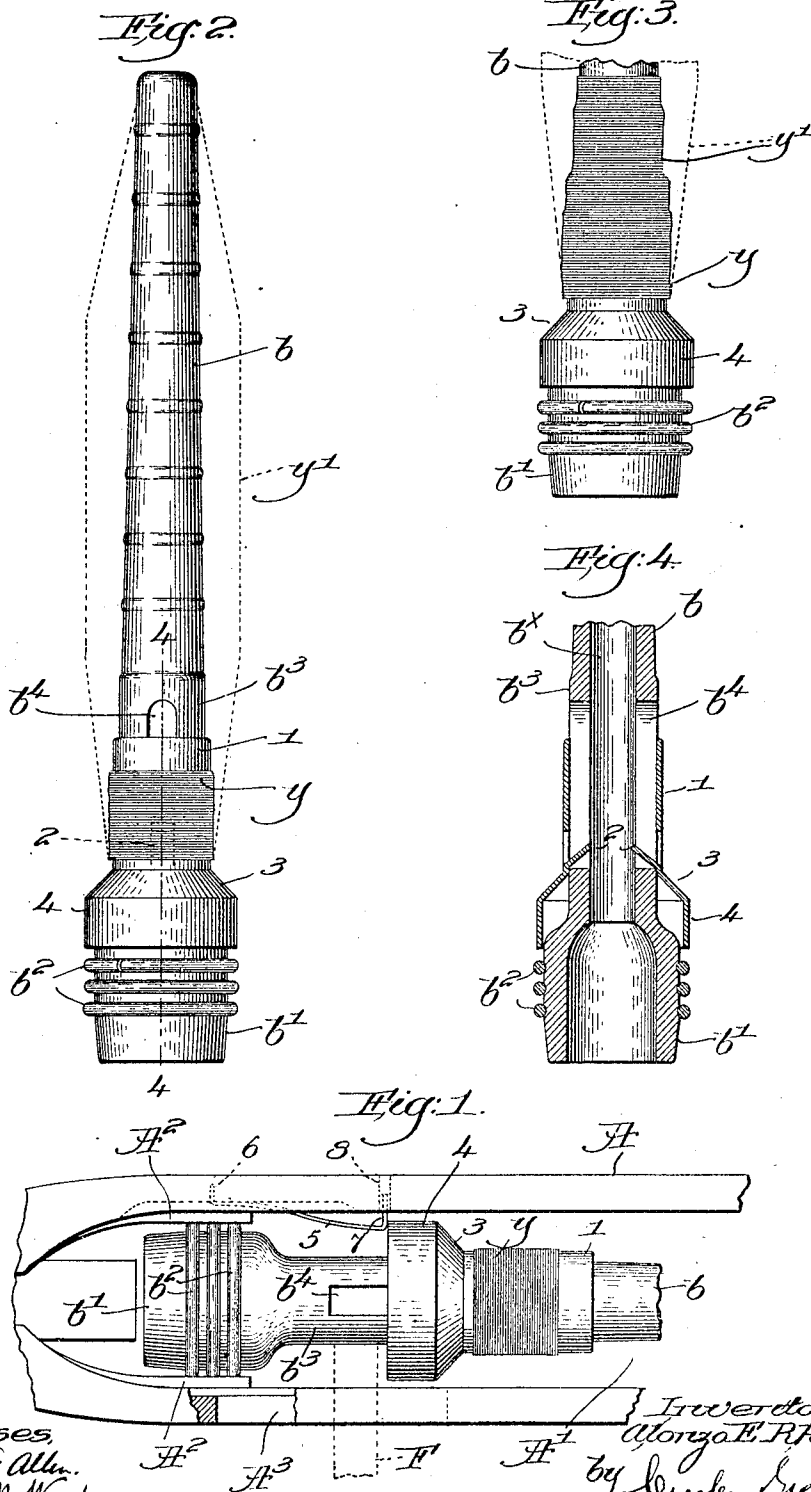


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 FILLING EXHAUSTION INDICATING MEANS FOR LOOMS.
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UNITED STATES PATENT OFFICE.

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FILLING-EXHAUSTION-INDICATING MEANS FOR LOOMS.

943,846.

Specification of Letters Patent.

Patented Dec. 21, 1909.

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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 Filling-Exhaustion-Indicating Means for Looms, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to that class of looms wherein the supply of filling in the working shuttle is replenished automatically prior to complete exhaustion of the old supply, or stoppage of the loom is effected, in order to avoid defects in the cloth being woven. Such looms are technically termed "feeler looms" because a member of the exhaustion-indicating means is arranged to cooperate intermittently with the filling in the working shuttle to "feel" the same and at the time of predetermined exhaustion or depletion of the filling effect the desired change in the operation of the loom, such member being termed a "feeler".

Various devices have been used for indicating the predetermined exhaustion or depletion of the filling in the shuttle, some being so arranged that the filling-induced movement of the feeler gradually decreases in amplitude to the point of predetermined exhaustion of the filling, while in other devices the effective movement of the feeler is prevented until the filling is exhausted to a predetermined extent. A device of the latter character is shown in United States Patent No. 638,200 granted to J. H. Northrop November 28, 1899, the filling-carrier being provided with a longitudinally-movable controller or feeler-stop, which is held in the path of the feeler until released by depletion of the filling, the released controller being moved by its momentum out of the feeler path when the shuttle is boxed. In that patent the controller is shown as an annulus or ring longitudinally mounted on the filling-carrier and held in its highest position, or farthest from the head of the carrier, when the latter is on the spindle during the spinning operation.

My present invention has for its object the production of improved filling-exhaustion-indicating means having in some respects a general resemblance to the patented

structure above referred to, but differing essentially therefrom in various features of construction, arrangement and operation, as will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a top plan view of a portion of a loom-shuttle and filling carrier therein, with one embodiment of my present invention applied thereto, the controller being shown in its abnormal position, out of the feeler path; Fig. 2 is an elevation of the filling-carrier and controller in the position assumed when on the spindle of a spinning frame, showing the preliminary winding of yarn or filling in full lines and the main winding thereof in dotted lines; Fig. 3 is a detail in elevation of the head end of the filling-carrier and the controller, with a portion of the yarn wound thereon; Fig. 4 is a vertical sectional detail of the carrier and the controller, on the line 4-4, Fig. 2.

The shuttle A partly shown in Fig. 1 is of a well known form employed in looms of the type wherein the filling-supply is changed automatically, such shuttle having an opening A' for the reception of the filling-carrier and being provided with spring holding-jaws A² to grasp the head of the carrier, the front wall of the shuttle having a slot or aperture A³ for the reception of the feeler, indicated by dotted lines at F.

As herein shown the filling-carrier or bobbin comprises an elongated and somewhat tapered barrel b, and an enlarged head b' provided with rings b² to be engaged by the holding-jaws A² of the shuttle, the filling-carrier having the usual longitudinal bore b* for the reception of the spindle during the operation of spinning or laying the winding of yarn upon the carrier.

The barrel near the head is made cylindrical for a part of its length, as at b³, and is provided with a longitudinal slot or recess b⁴ extending diametrically through the cylindrical portion from one to the other side thereof, substantially as in the patent before referred to.

The controller is slidably mounted on the slotted part b³ and I have herein shown said controller as comprising a cylindrical body 1 embracing the part b³ to slide freely thereon and held from rotation by lugs 2 turned inward into the slot b⁴, see Fig. 4, such lugs also limiting longitudinal movement of the

controller, the inner end of the body thereof having a conical extension 3 provided at its base with a relatively deep annular flange 4. This flange is considerably larger in diameter than the body 1 and is concentric therewith, and with the extension 3 forms a species of hood or shield for the part of the head b' of the filling-carrier during the spinning operation, as will be referred to hereinafter. The controller is preferably made of light, stiff metal, spun or otherwise formed to the desired shape, and it will be seen that the body 1 thereof is quite long.

Within the opening A' of the shuttle at the jaw end thereof I have provided a yielding or spring detent 5, Fig. 1, fixed at one end as at 6 by being embedded in the shuttle-wood, or fastened otherwise in any suitable manner, the detent extending longitudinally toward the opposite end of the shuttle and at its free end it is bent outward at 7 and extended into a socket 8 provided therefor in the rear wall of the shuttle. The function of the detent will be explained after reference has been made to the spinning operation whereby the proper yarn mass or load is laid upon the filling-carrier.

Referring to Figs. 2, 3 and 4, when the filling-carrier is placed on the spinning-spindle (not shown) the controller is positioned as shown, with the hood 3, 4 thereof inclosing the upper portion of the head b' , the body 1 being then properly positioned with relation to the ring-rail of the spinning frame to receive upon it a preliminary winding y of the yarn, Figs. 2 and 3. This preliminary winding is of sufficient length to extend, say, a couple of times or more through the shed, in order that the filling-replenishing mechanism may have time to operate when predetermined filling-exhaustion is indicated, and after such preliminary winding is laid the laying on of the main winding y' is effected in usual manner. The hood 3, 4 protects the head of the filling-carrier and prevents any of the yarn from being laid thereupon, particularly when the ring-rail is positioned to deliver the yarn at or adjacent the lower end of the body of the controller, the extension 3 serving as a definite point of support for the main body of yarn at its base. It will be seen that while the preliminary winding is only laid upon the body of the controller the main winding y' is laid upon both the controller and the filling-carrier, so that thereby said controller is firmly held in the position shown in Fig. 2 so long as any part of the yarn is laid upon the filling-carrier. The filling-supply thus constituted is ready for use in the shuttle, and when inserted therein by the transferring mechanism employed in automatic filling-replenishing looms the extension 3 and flange 4 will be out of range of both the feeler F and the detent 5, though

the latter may and probably will in general be pressed outward by the adjacent yarn mass. Such detent, however, will not in such case interfere with the proper delivery of the yarn from the shuttle as it will press very lightly thereupon. The parts remain in such relative position during the unwinding of the main body y' of the yarn, the controller being held from longitudinal movement upon the filling-carrier until all of the yarn has been drawn off from the carrier itself. When that is accomplished the controller is released but it will be remembered that there still remains the preliminary winding y upon the controller.

On the boxing of the shuttle at the right-hand side of the loom, viewing Fig. 1, the controller, no longer held from longitudinal movement by the main winding, will by its momentum slide upon the part b^3 toward the tip of the filling-carrier, and such movement will carry the edge of the flange 4 past the shouldered part or bend 7 of the detent, see Fig. 1. The latter, by its resiliency, positions itself in operative position just as soon as the flange 4 has slid past the free end of such detent, so that the controller is at once brought under the control of the detent and cannot by its momentum slide toward the head of the filling-carrier when the shuttle is boxed at the left-hand side of the loom.

While the controller remains under the control of the main winding of filling the feeler F , Fig. 1, will intermittently engage the filling and will thereby be held from operative movement, but when the controller is released by the filling and moves into the control of the detent the controller is altogether out of the feeler-path, as shown in Fig. 1. The feeler is now permitted to perform its proper functional movement, and the change in the operation of the loom is effected by mechanism provided for the purpose and forming no part of my invention.

It will be seen that by the construction herein shown and described a very close and accurate operation is made possible, with a minimum of filling waste, for the difference between the inaction and action of the feeler is substantially the thickness of the body 1 of the controller. This obviates any cooperation of the filling-exhaustion-indicating mechanism with the shuttle and the filling-carrier or the filling, conjointly, and provides for a prompt and efficient functional action of the feeler whenever the filling in the working shuttle is depleted or exhausted to a predetermined extent.

From the structure illustrated, it will be seen that by slightly changing the position of the feeler to the left from that indicated in Fig. 1 such feeler could be made to engage intermittently the part 4 of the hood of the controller while the latter is controlled by the filling, the functional operation of such

feeler occurring when the controller is freed from control of the filling and engaged by the detent. The hood prevents any winding of the yarn upon the head of the filling-carrier, as has been stated, and enables the spinning operation to be effected without any special effort on the part of the spinner when the preliminary winding is being laid.

Various changes or modifications in details of construction may be made by those skilled in the art without departing from the spirit and scope of my invention as set forth in the annexed claims.

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

1. In combination, a loom-shuttle having a feeler-opening in one wall and provided with a normally inoperative detent at its opposite wall, and a filling-carrier provided with a longitudinally-movable feeler-controller, itself controlled by the wound filling, said detent coöperating with the controller to maintain it in abnormal position when the filling has been exhausted to a predetermined extent, said controller having a cylindrical, continuous yarn-carrying portion.

2. In combination, a loom-shuttle having a feeler-opening in one wall and provided at its opposite wall with a detent, and a filling-carrier provided with a longitudinally-movable feeler-controller having a yarn-carrying portion and a hood, said controller itself held by the main mass of filling in the feeler-path, the detent coöperating automatically with the hood to maintain the controller out of the feeler-path when the filling has been exhausted to a predetermined extent.

3. In combination, a loom-shuttle slotted to receive a feeler and provided with a normally inoperative detent at a distance from such slotted portion, and a filling-carrier provided with a controller movable longitudinally thereon and having a cylindrical body, a conical extension at the inner end thereof, and an annular flange on the base of the extension, projecting therefrom in a direction opposite to the body, the main winding of yarn preventing movement of the controller until predetermined exhaustion of the yarn, said detent coöperating with the flange when the controller is freed and maintaining it out of the feeler-path.

4. In combination, a loom-shuttle slotted for the free entrance of a feeler and provided with a normally inoperative detent, at a distance from the slotted portion, and a filling-carrier provided with a longitudinally-movable controller having at its inner end an annular hollow enlargement held around the enlarged head of the filling-carrier by the wound filling, exhaustion of the latter to a predetermined extent releas-

ing the controller and permitting longitudinal movement thereof out of the feeler-path, the detent coöperating with the controller when freed by the unwinding of the filling permitting the functional movement of the feeler.

5. In combination, a loom-shuttle having a feeler-opening and provided with a detent at a distance from such opening, a filling-carrier in the shuttle provided with a longitudinally-movable controller having at its inner end an annular flange normally embracing the head of the filling-carrier, a preliminary winding of filling on the controller, and a main winding of filling on said controller and the filling-carrier, holding said controller from longitudinal movement and with the flange surrounding and protecting the head of the filling-carrier, the detent coöperating with the controller when the latter is freed by exhaustion of the main winding and changes its position, to retain said controller in such changed position and wholly out of the feeler-path.

6. A filling-carrier for loom-shuttles, provided with a longitudinally movable controller having a cylindrical portion to receive a preliminary winding of filling, and an enlarged annular hood on the inner end of said cylindrical portion, to fit over and cover the upper part of the head of the filling-carrier during the spinning operation.

7. A filling-carrier for loom-shuttles, provided with a controller capable of longitudinal movement only thereupon and having a continuous, cylindrical body portion to receive a preliminary winding of filling, and an enlarged annular hood on the inner end of the body to fit over the head of the filling-carrier during the spinning operation and prevent the filling from being laid upon the head.

8. A filling-carrier for loom-shuttles, provided with a longitudinally-movable controller having a body portion to receive a preliminary winding of filling, a conical extension on the inner end of the body, and a deep annular flange on the base of said conical extension, and adapted to extend over the head of the filling-carrier.

9. A filling-carrier for loom-shuttles, provided with a controller capable of longitudinal movement only thereupon and having a cylindrical body adapted to receive a preliminary winding of filling, means to limit longitudinal movement and prevent rotation of said controller relatively to the filling-carrier, a conical extension on the inner end of the body, and an annular flange on the base of said extension concentric with the body, and adapted to extend over the head of the filling-carrier.

10. A filling-supply for loom-shuttles, comprising a filling-carrier having a longitudinally-movable controller thereon, pro-

vided at its inner end with a conical extension terminating at its base in a deep annular flange adapted to extend over the head of the filling-carrier, means to maintain the controller always coaxial with the filling-carrier, a preliminary winding of yarn on said controller, and held thereby from contact with the filling-carrier, and a main winding of yarn laid on said controller and on the filling-carrier, to hold the controller from movement until the main winding of yarn has been drawn off.

11. A filling-supply for loom-shuttles, comprising a filling-carrier having a head and provided with a longitudinally-movable controller having a continuous, cylindrical body, a hood on the inner end of the body to project over and shield the adjacent part of the head, a preliminary winding of yarn on the cylindrical body, and a main winding of yarn laid on the body and on the filling-carrier, to restrain the controller from longitudinal movement until the main winding has been drawn off.

12. A filling-supply for loom-shuttles, comprising a filling-carrier having a head and provided with a longitudinally-movable controller having a cylindrical body, a conical extension on the inner end of the body, an annular flange on the base of said extension projecting in the opposite direction from and concentric with the body, to shield the head during the spinning operation, a preliminary winding of yarn on the body of the controller and held thereby from contact with the filling-carrier, and a main winding of yarn laid on the body and on the filling-carrier, to prevent movement of said controller until such main winding has been drawn off.

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

ALONZO E. RHOADES.

Witnesses:

JESSE D. BROMLEY,
E. D. OSGOOD.