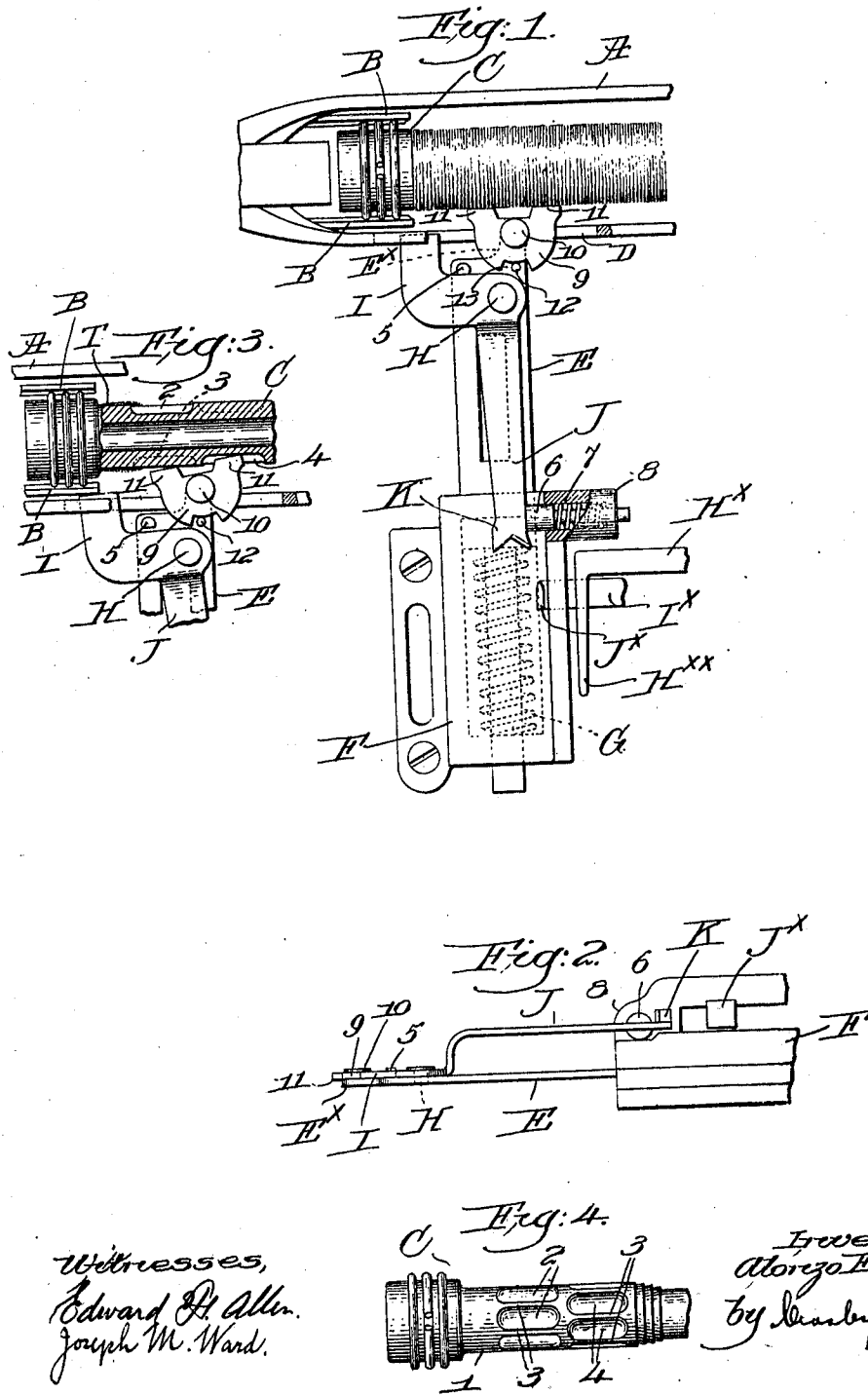


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FILLING EXHAUSTION INDICATING MECHANISM FOR LOOMS.
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Patented May 23, 1911.



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UNITED STATES PATENT OFFICE.

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FILLING-EXHAUSTION-INDICATING MECHANISM FOR LOOMS.

992,988.

Specification of Letters Patent.

Patented May 23, 1911.

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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 Mechanism 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 looms provided with automatic mechanism to replenish the filling in the working shuttle prior to complete exhaustion of the running filling, the replenishing mechanism being controlled as to its operation by filling-exhaustion-indicating mechanism, and my invention has for its object the production of novel and simple mechanism for indicating the substantial or predetermined exhaustion of the filling in the shuttle. In connection with such exhaustion-indicating mechanism I prefer to use a novel form of filling-carrier or bobbin, so constructed that a very efficient and prompt operation of the indicating mechanism results when filling replenishment is called for.

The indicating mechanism comprehends a yieldingly sustained and reciprocating member or carrier, a feeler, and an actuator both of which are mounted upon the carrier. The feeler is pivoted thereon to swing laterally and it is provided with laterally separated impinging portions which enter the shuttle intermittently and impinge upon the filling therein until substantial exhaustion thereof. While there is ample filling both portions of the feeler impinge simultaneously upon the filling and there is no swinging movement of the feeler relatively to the carrier, the latter being at once moved forward in unison with the feeler as the lay beats up. During this time the actuator, which is normally in inoperative position, has no functional movement, but as soon as the filling opposite either impinging portion of the feeler becomes exhausted the feeler will be swung upon its pivot into abnormal position before the forward movement thereof with the carrier begins, and thereupon the functional movement of the actuator is effected by means on the shuttle separate from the filling. Such functional movement of the actuator is made effective to bring about the

operation of the replenishing mechanism. In order to make absolutely sure the swinging movement of the feeler at the proper time I have devised a novel filling-carrier, the barrel thereof having two series of axially-arranged depressions therein, the depressions of one series being arranged opposite the spaces between the depressions of the other series. The feeler is so positioned that one series of such depressions will be opposite each impinging portion of said feeler, and when the filling is woven off to expose the depressions it will be obvious that one or the other impinging portion of the feeler will enter a depression and cause the feeler to swing laterally into abnormal position. That is to say, it is impossible for both impinging portions of the feeler simultaneously to enter depressions or to impinge upon the intervening ribs, owing to the staggered arrangement of the depressions of the two series, and if one impinging portion of the feeler enters a depression of one series then the other impinging portion must engage a rib between the other series of depressions, and swinging of the feeler on its pivot is inevitable. Thus I insure prompt operation of the exhaustion-indicating mechanism at the proper time.

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 top plan view, partly broken out, of filling-exhaustion indicating mechanism embodying one form of my invention, the adjacent end of a shuttle with a filling-carrier or bobbin being shown in connection therewith, the filling being present in sufficient amount to prevent any abnormal positioning of the feeler; Fig. 2 is a left hand side elevation of a portion of the indicating mechanism shown in Fig. 1; Fig. 3 is a detail in plan view of the feeler, and the adjacent ends of the carrier and actuator, with the filling-carrier partly in section, to illustrate the manner in which functional movement of the actuator is effected when the feeler is abnormally positioned; Fig. 4 is a side elevation of the head and barrel of the filling-carrier or bobbin to show more clearly the two series of axially-arranged depressions therein.

The shuttle A of suitable character, supposed to be boxed at the feeling side of the

loom, Figs. 1 and 3, has usual spring-jaws B to grasp the head of the removable filling-carrier or bobbin C, the side wall of the shuttle toward the front of the loom having an elongated slot D through which the feeler can enter the shuttle.

Referring more particularly to Fig. 4 the elongated and cylindrical barrel 1 of the filling-carrier is provided with two series of axially-arranged depressions 2, 4, the depressions being longitudinally extended and as shown entering quite deeply into the wood of the barrel, the depressions 2 being separated by ribs 3, while similar ribs 3 alternate with the depressions 4, and I preferably make the depressions considerably wider than the thickness of the intervening ribs at the surface of the barrel. It will be seen that the depressions of one series are staggered with relation to the depressions of the other series. That is, a depression 2 is arranged with its longitudinal center opposite to the rib 3 between two of the depressions 4, and vice versa, so that no positioning of the filling-carrier in the shuttle can bring a rib of one series in alinement with a rib of the other series, nor can depressions of the two series be alined. This is important in connection with the feeler, as will appear hereinafter.

Herein the feeler-support or carrier is shown as a flat bar E mounted to slide back and forth in a suitable stand F which in practice is mounted on a fixed part of the loom, a spring G, see dotted lines Fig. 1, serving to project the carrier rearward, the opposite or forward stroke being effected by or through the lay on alternate forward beats thereof, in a well known manner. The carrier E has pivoted upon it at H an actuator I, J, the arm I thereof being substantially L-shaped and having its free end turned rearwardly to enter the slot D of the shuttle opposite the adjacent spring-jaw B, while the long arm J of the actuator is extended forwardly, and notched at its free end, as at K, Fig. 1. As clearly shown in Fig. 2 the long arm J is bent up near its pivot stud H, and then again bent substantially parallel to the carrier, so that the notched end K will move back and forth above the stand F as the carrier reciprocates. The beveled notch K is arranged to cooperate at times with the upturned finger J* on the controller I*, said finger and controller, and the transmitter H* having a cam-slotted part H** through which the controller is extended, being substantially as in United States Patent No. 911,672 granted February 9, 1909, to Northrop, and operating substantially as therein set forth. Under normal conditions the actuator arm I is held against a stop lug 5 on the carrier, Fig. 1, by means of a plunger 6 controlled by a spring 7 in a housing 8 on the stand F, the plunger bearing against the

inner edge of the actuator arm J and holding its notched end out of range of the finger J* when the carrier E is moved forward on the feeling pick. When functional movement of the actuator is effected it is swung on its pivot H, compressing spring 7 and causing its notch K to engage and effect the operation of the controller I* and transmitter H*, substantially as in the Northrop patent, to bring about the operation of the filling replenishing mechanism. Functional movement of the actuator is effected by engagement of the free end of the arm I with the spring-jaw B, and such engagement is controlled as to the time of its occurrence by the feeler, which latter is a flat metal plate 9 pivoted by an upright stud 10 on a prolongation E* of the carrier to swing in a lateral plane at one side of the actuator arm I. The rear portion of the feeler projects beyond the carrier extension and is notched or bifurcated to present two alined and laterally separated impinging portions 11, 11, equi-distant from the fulcrum pivot 10. A limiting pin 12 on the carrier enters a segmental notch 13 in the front edge of the feeler, to prevent undue swinging movement thereof in either direction. Manifestly no swinging of the feeler upon the carrier will occur when both portions 11 impinge upon the filling in the shuttle as the lay beats up on the feeling stroke, for as shown in Fig. 1 each impinging portion will be equally engaged by the filling and the feeler and carrier will be moved forward as a unit on the beat-up. While sufficient filling remains to maintain this unity of movement of feeler and carrier, without any abnormal positioning of the feeler relative to the carrier, the free end of the actuator arm I will be held from impinging upon the spring-jaw B of the shuttle, and hence there will be no functional movement of the actuator. When, however, the filling weaves off so that the impinging portions are not pressed upon equally and simultaneously on the feeling stroke the feeler will swing on its pivot 10 in one or the other direction, and will then permit the arm I to impinge upon and be moved by the jaw B before the forward stroke of the carrier begins.

The normal action of the mechanism is illustrated in Fig. 1, and it will be seen that while the feeler is in engagement with the filling simultaneously at both sides of its fulcrum 10 the forward movement of the feeler and carrier as a unit will be effected before there is any impingement of the actuator arm I upon the jaw B. By reference now to Fig. 3 the abnormal action of the parts is disclosed, and it is supposed that the filling has been exhausted to the small portion T, both series of depressions 2 and 4 in the barrel of the carrier being exposed. As the lay advances on the feeling pick the

left hand impinging portion 11 of the feeler engages one of the ribs 3 between two of the depressions 2 while the right hand portion is opposite a depression 4, and manifestly, the feeler will be swung on its pivot 10, as shown in Fig. 3, and thereby permitting the free end of the actuator arm I to impinge upon the jaw B, so that the actuator is swung into operative position. That is, its functional movement is effected, so that on the forward stroke of the carrier E as the lay beats up the notch K of the actuator arm J will engage the finger J* of the controller I*, and the resulting movement of the controller will operate through the transmitter H*, Fig. 1, to effect the actuation of the replenishing mechanism, as provided for in the Northrop and other patents relating to looms of this general type. The depressions in the filling-carrier permit a very considerable swinging movement of the feeler into its abnormal position, as will be obvious, and the advantage of providing two series of depressions, staggered or offset with relation to each other, will be apparent, for no possible position of the filling-carrier in the shuttle can fail to locate a depression of one or the other series opposite one of the impinging portions 11 of the feeler. Hence when the filling weaves off to expose the depressions the feeler will be swung on its pivot in one or the other direction to bring about the functional movement of the actuator, as described. Under normal conditions the actuator will be held from any movement relative to the carrier E by the simultaneous coöperation of the stop 5 and plunger 6 with the actuator. After a fresh filling-carrier has been inserted in the shuttle the coöperation of the filling with the two impinging portions 11 of the feeler will center the latter on the carrier on the first feeling pick, as will be clearly apparent, and the spring plunger 6 will restore the actuator to its normal, inoperative position when the lay swings back after functional movement of said actuator has been effected.

The novel form of filling-carrier herein shown and described is not claimed in this application, as the same forms the subject-matter of claims in a divisional application Serial No. 614,757, filed by me the 16th day of March, 1911.

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

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

1. In a loom, in combination, a shuttle containing a supply of filling-exhaustion-

indicating mechanism including a reciprocating carrier, a normally inoperative actuator movably mounted thereon, and a feeler pivoted to swing laterally on the carrier and having separated impinging portions, the feeler entering the shuttle intermittingly to impinge upon the filling therein, and means on the shuttle separate from the filling to effect the functional movement of said actuator to cause a change in the operation of the loom when the feeler is abnormally positioned on the carrier, absence of the filling opposite either impinging portion of the feeler causing the latter to swing on its pivot into abnormal position.

2. In a loom, in combination, a shuttle containing a supply of filling, filling-exhaustion-indicating mechanism including a reciprocating carrier, a normally inoperative actuator movably mounted thereon, and a feeler pivoted to swing laterally on the carrier and adapted to enter the shuttle intermittingly and engage the filling therein, impact of the filling upon the feeler simultaneously at opposite sides of its pivot preventing swinging movement of the feeler into abnormal position, and means on the shuttle separate from the filling to effect the functional movement of the actuator to cause a change in the operation of the loom when the feeler is abnormally positioned by impact thereupon at one side of its pivot.

3. In a loom, in combination, a shuttle containing a supply of filling, filling-exhaustion-indicating mechanism including a reciprocating carrier, a normally inoperative actuator pivoted thereon to swing laterally, and a feeler also pivoted on the carrier to swing laterally thereon and having separated impinging portions to enter the shuttle intermittingly, simultaneous impingement of such portions of the feeler upon the filling maintaining the feeler centered on the carrier in normal position, and a device on the shuttle separate from the filling to engage and effect functional movement of the actuator to cause a change in the operation of the loom when the feeler is swung into abnormal position upon substantial exhaustion of the filling.

4. In a loom, in combination, a shuttle containing a filling-carrier having its barrel provided with two series of axially-arranged depressions covered by the filling until substantial exhaustion thereof, the depressions of one series being located opposite the spaces between the depressions of the other series, a reciprocating carrier, a normally inoperative actuator movably mounted thereon, and a feeler pivoted to swing laterally on the carrier and having separated impinging portions opposite the two series of depressions in the filling-carrier, the feeler entering the shuttle intermittingly and both impinging portions engaging the

filling simultaneously to maintain the feeler centered on the carrier until the filling is substantially exhausted, exposure of the depressions in the barrel at such time causing one of the impinging portions of the feeler to enter a depression and permit swinging movement of the feeler into abnormal position, and means on the shuttle separate from the filling to effect the functional movement of the actuator to cause a change in the operation of the loom when the feeler is positioned abnormally.

5. In a loom, in combination, a shuttle containing a filling-carrier having its barrel provided with two series of axially-arranged depressions covered by the filling until substantial exhaustion thereof, the depressions of one series being located opposite the spaces between the depressions of the other series, a reciprocating carrier, a normally inoperative actuator movably mounted thereon, and a feeler pivoted to swing laterally on the carrier and having separated impinging portions opposite the two series of depressions in the filling-carrier, whereby one or the other impinging portion of the feeler will enter a depression of one series when the filling is substantially exhausted while the other impinging portion engages the barrel between two depressions of the other series, to swing the feeler into abnormal position, and means on the shuttle separate from the filling to engage and effect functional movement of the actuator to cause a change in the operation of the loom when the feeler is abnormally positioned.

6. In filling-exhaustion-indicating mechanism for looms, a reciprocating carrier, a feeler pivoted thereon to swing laterally and having separated impinging portions extended beyond the end of the carrier and adapted to enter the shuttle intermittingly, said impinging portions simultaneously engaging the filling at such time to prevent swinging movement of said feeler on the carrier, means to limit swinging movement of the feeler, an actuator pivoted on the carrier to swing laterally thereon, and means to maintain the actuator inoperatively positioned on the carrier during the normal operation of the loom and until substantial exhaustion of the filling permits the feeler to be swung laterally on its pivot.

7. In filling-exhaustion-indicating mechanism for looms, a reciprocating carrier, a feeler pivoted thereon to swing laterally and having separated impinging portions extended beyond the end of the carrier and adapted to enter the shuttle intermittingly, and be centered on the carrier by engagement

with the filling until predetermined exhaustion thereof, means to limit swinging movement of the feeler, an actuator pivoted on the carrier to swing laterally thereon, a stop on the carrier, and yielding means cooperating with the actuator to maintain it normally in engagement with said stop and in inoperative position until the feeler is swung laterally upon predetermined exhaustion of the filling.

8. In a loom, in combination, a shuttle containing a supply of filling, a reciprocating carrier, a feeler pivoted thereon to swing laterally and adapted to enter the shuttle intermittingly and be centered on the carrier by engagement with the filling until predetermined exhaustion of the filling, a normally inoperative actuator movably mounted on the carrier, means in the shuttle to swing the feeler into abnormal position when such exhaustion of the filling is reached, and different means carried by the shuttle to engage and effect functional movement of the actuator to cause a change in the operation of the loom when the feeler is swung on the carrier into abnormal position.

9. In a loom, in combination, a shuttle, a filling-carrier therein having two series of axially-arranged depressions covered by the filling until substantial exhaustion thereof, the depressions of one series being arranged opposite the spaces between the depressions of the other series, a reciprocating carrier, a feeler pivoted thereon to swing in a lateral plane and having impinging portions at opposite sides of its pivot, an actuator mounted on the carrier to move with it and also relatively thereto, means normally maintaining the actuator inoperative, engagement of both impinging portions of the feeler with the filling causing unitary movement of the feeler and carrier, to prevent functional movement of the actuator, exposure of the depressions in the filling-carrier causing the feeler to swing into abnormal position as an impinging portion thereof enters a depression of one or the other series, and means on the shuttle separate from the filling to engage and effect functional movement of the actuator to cause a change in the operation of the loom when the feeler is abnormally positioned.

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

ALONZO E. RHOADES.

Witnesses:

G. W. OSGOOD,
ROBERT JAMIESON.