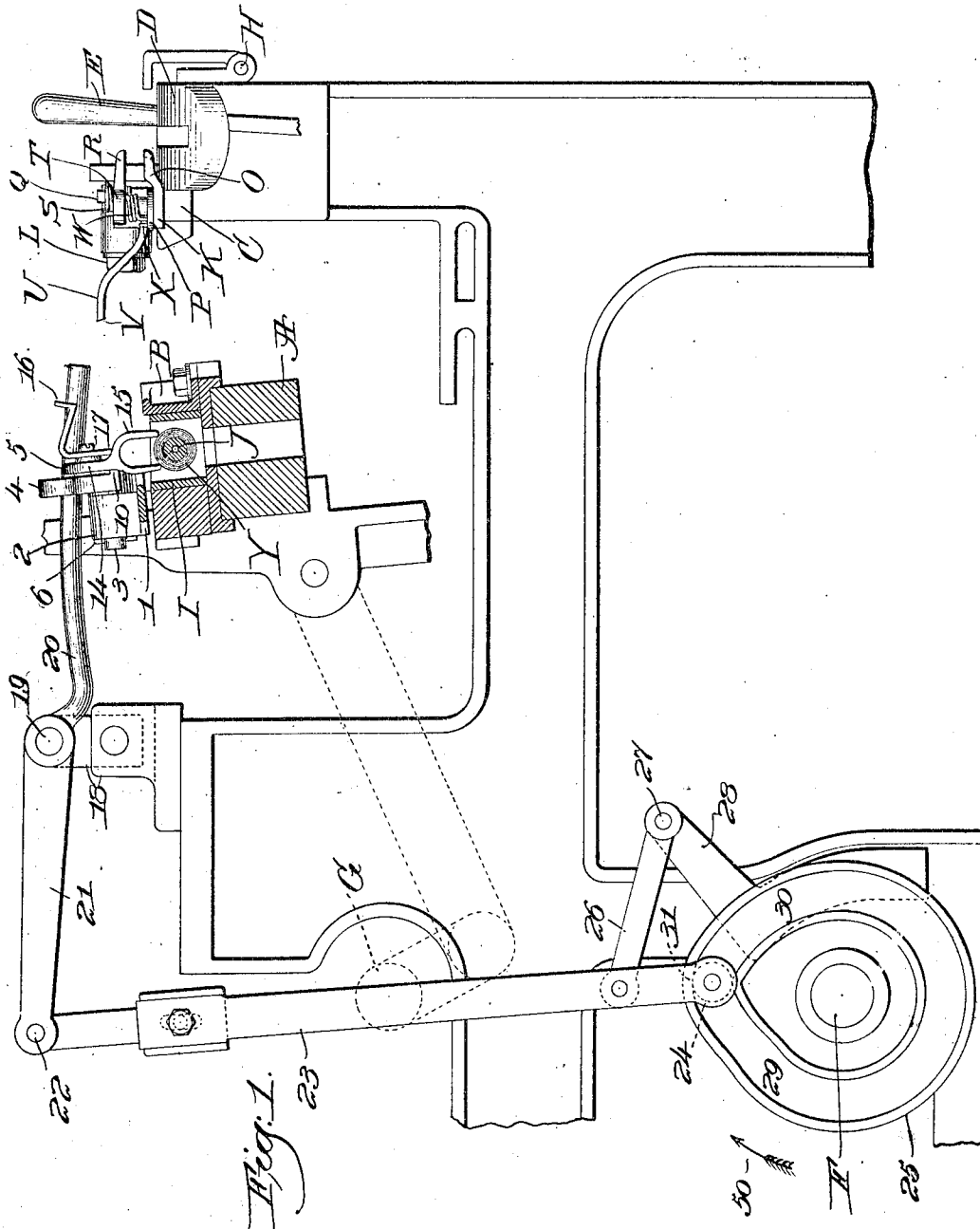


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FILLING REPLENISHING FEELER LOOM.  
APPLICATION FILED JAN. 9, 1911.

1,019,279.

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2 SHEETS—SHEET 1.



Witnesses,  
Edward G. Allen  
Joseph M. Ward.

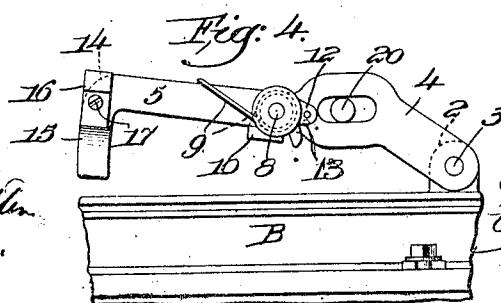
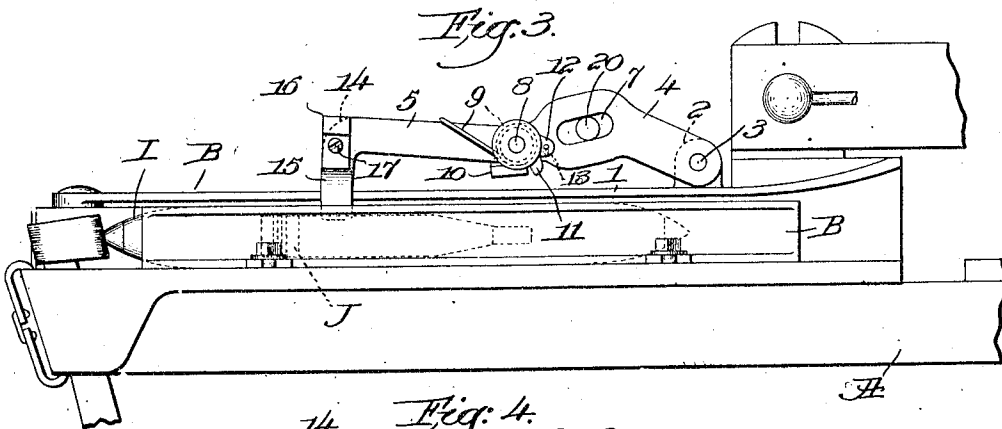
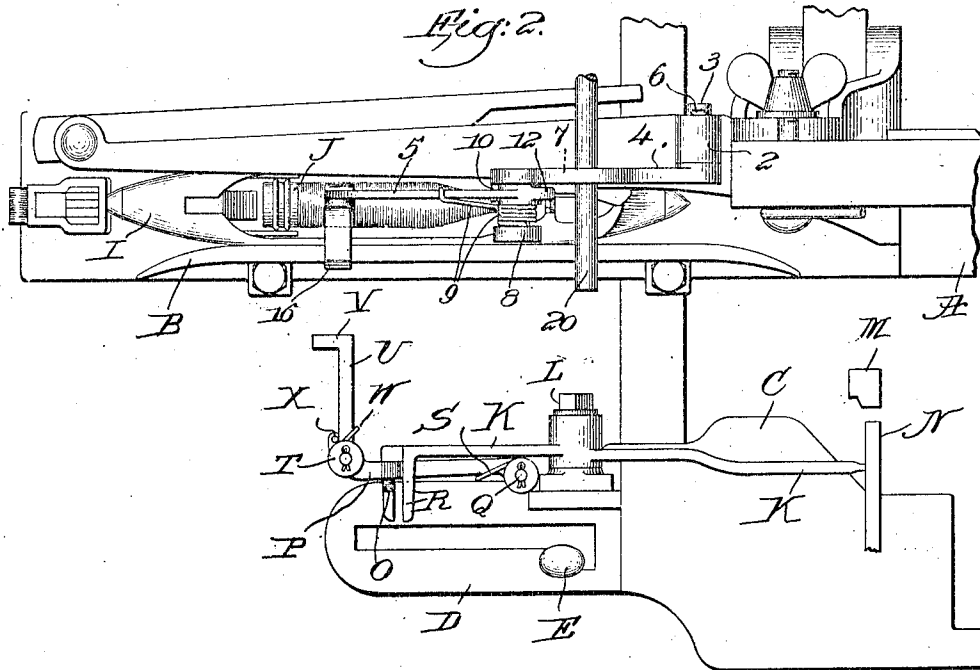
Inventor,  
A. E. Rhoades,  
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*Edwards*

# UNITED STATES PATENT OFFICE.

ALONZO E. RHOADES, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

## FILLING-REPLENISHING FEELER-LOOM.

1,019,279.

Specification of Letters Patent.

Patented Mar. 5, 1912.

Application filed January 9, 1911. Serial No. 601,680.

*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-Replenishing Feeler-Looms, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to looms of the type wherein the filling in the working shuttle is replenished automatically from time to time by or through the instrumentality of feeler mechanism which intermittently cooperates with and determines the volume of filling in the shuttle and causes the replenishment of filling when the supply in the working shuttle is substantially exhausted.

In United States Patent No. 646,866 granted April 3, 1900 to Northrop a loom of this type is shown, the feeler mechanism being constructed and arranged to detect a predetermined degree of exhaustion or diminution of the volume of filling in the shuttle by or through the diameter of the filling mass, the operative movement of the feeler proper being effected by or through the shuttle as it enters the shuttle-box.

My present invention has provision for detecting a predetermined degree of exhaustion or diminution of the volume of the filling in the shuttle by or through the diameter of the yarn mass in the shuttle, but the operation of the feeler proper, and the feeler mechanism as a whole, is governed or controlled by means wholly independent of the shuttle, and the various novel features of my present invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a left hand side elevation of a portion of an automatic filling replenishing loom of the Northrop type with one form of my present invention embodied therein, the nearer end of the lay, its shuttle-box, and shuttle therein being shown in section; Fig. 2 is a top plan view of the mechanism at the left hand side of the loom shown in Fig. 1 and in the same relative positions as therein illustrated; Fig. 3 is a front elevation of the left hand end of the lay with the feeling shuttle-box and a portion of the feeler mechanism; Fig. 4 is a similar view of some of the parts shown in

Fig. 3, but with the feeler and its carrier in fully retracted position.

As will appear by detailed description hereinafter the feeler is mounted upon a support or carrier pivotally connected with the lay, and the movement of the feeler toward and away from the filling in the shuttle is governed by an actuator in sliding cooperation with the carrier, said actuator being moved positively and intermittently by suitable means having a properly timed operation relative to other working parts of the loom, more particularly the shuttle and the lay.

The lay A, the shuttle-box B at the left hand end thereof, the breast-beam C having the notched holding-plate D for the shipper E, the main or cam shaft F, Fig. 1, and crank-shaft G, and the rock-shaft H by or through which the actuation of the filling replenishing mechanism is effected, may be and are all of well known construction and substantially as in the Northrop patent referred to, the controlling rock-shaft H being the only feature of the replenishing mechanism necessary to illustrate herein.

The automatically self-threading shuttle I adapted to receive and hold a filling-carrier or bobbin J may be of any suitable character commonly used in automatic replenishing looms of the Northrop type, except that, unlike the shuttles used in ordinary "feeler" looms, no slot or opening in the side wall of the shuttle is necessary in my present invention.

In Fig. 2 is shown a rocking transmitter K fulcrumed at L and adapted to effect the cooperation of a vibrator, such as the weft-hammer M, with a latch N when the rock-shaft H is to be turned, substantially as in Patent No. 789,471 granted May 9, 1905 to Wood and Northrop, the outer end of the transmitter having a cam extension O with which cooperates a horizontally-swinging controller P fulcrumed on the plate D at Q. The controller has a guard R which overhangs the cam extension P and the controller moves between the extension and the guard, the frontward swing of said controller, against its retracting spring S, acting upon the transmitter K to elevate its inner end and place the latch N in position to cooperate with the weft-hammer M. At its outer end the controller carries an upright, headed stud T on which is pivoted a

rearwardly extended and upwardly bent dog U having its rear end laterally widened at V, a spring W normally acting to hold the dog in the position shown in Figs. 1 and 2 against the stop-pin X on the controller, the articulation of the dog and controller providing for ease of movement when by means to be described the dog is engaged and moved frontward to effect the operative movement of the controller and the transmitter K.

Referring now to Figs. 1 and 2 the cover-plate 1 of the shuttle-box B is provided near its inner end with an upright ear having a transverse bearing 2 for a fulcrum stud 3 fixedly attached to an arm 4 forming one member of a two-part feeler carrier, a second arm 5 constituting the other member, the stud rocking in the bearing and being held therein by a cotter-pin 6 or other suitable device. The member 4 is slightly V-shaped longitudinally, see Fig. 3, and its outer end is provided with a cam-slot 7, a frontwardly extended, headed stud 8 being fixedly mounted on the outer end of the said member beyond the cam-slot, and upon said stud is fulcrumed the second member 5 of the carrier.

As shown in Fig. 2 the members 4, 5 are parallel to each other and to the path of the shuttle across the lay, the studs 3 and 8 being at right angles thereto and both above the shuttle-box, the parts being so disposed that the carrier member 5 is always positioned over the open top of the shuttle-box B about midway between its ends.

A spring 9 is attached at one end to the member 5 and at its other end the spring is fixed to the head of stud 8, the spring being coiled around the stud between its head and the front face of the member 5, see Fig. 2, the winding of the spring being such that when free to act it depresses the member 5 upon a lateral shelf or stop 10 projecting from the outer end of the inner member 4, as shown in Fig. 4. The inner end of member 5 has a lug 11 depending therefrom to engage the inner end of the stop 10 and limit the upward swing of said member on the fulcrum stud 8 when the feeler contacts with a full or nearly full bobbin in the shuttle. The member 5 is also provided with an inwardly extended perforated ear 12, and the member 4 adjacent said ear has a hole 13, Fig. 4, the purpose of which will be referred to.

Herein I have shown the feeler proper as integral with the member 5, and to this end the outer end of said member is downturned at 14, Figs. 1, 3 and 4 and is shaped to present a yoke-like feeler 15 shaped like an inverted U, the depending legs thereof being adapted to engage the filling Y on the bobbin at points equidistant from the longitudinal axis of the latter, see Fig. 1, when the

feeling stroke or movement is imparted to the feeler. In other words the feeler 15 detects a predetermined degree of exhaustion or diminution of the volume of filling in the shuttle by or through the diameter of the yarn mass, the effective distance between the legs of the feeler being determined beforehand so that the downward or feeling stroke of said feeler is never completed until the diameter of the yarn-mass on the bobbin is less than the distance between the feeler legs, and when this condition of affairs is present the full downward stroke of the feeler is accomplished.

It may be stated here that the carrier member 4 has a constant stroke, but by reason of the gradual diminution of the filling in the shuttle the downward stroke of the member 5 gradually increases up to the full stroke, the member 5 swinging on its fulcrum 8 relative to member 4 while also having a bodily movement with said member 4 about the fulcrum 3. The spring 9, which is a light one, resists the relative movement of the two members and acts to place them in the relative position shown in Fig. 4 on every upward or retracting stroke of the carrier about its fulcrum 3.

As shown in Figs. 2, 3 and 4 the depending legs of the feeler are quite broad, so that the filling-contacting edges thereof are long enough to engage a considerable portion of the filling each time the feeler is caused to contact therewith, thus distributing the strain of impact upon the yarn and preventing injury thereto.

A frontwardly extended bunter 16 is fixedly attached at 17 to the member 5 of the carrier, at a point opposite the widened end V of the dog U, but the bunter is not permitted to engage said dog until the predetermined exhaustion of the filling permits a sufficient downward movement of the feeler 15 to position the bunter substantially on a level with the dog.

Referring now to Fig. 1 the loom side has mounted upon it back of the lay a bracket 18 having a horizontal stud 19 on which is fulcrumed the actuator 20 for the feeler-carrier, said actuator being shown as a preferably round and rigid bar longitudinally curved and extended over the lay transversely thereto, and passing through the cam-slot 7 of the carrier member 4. Said actuator is of such length that it extends through said slot in all positions of the lay, so that there is a sliding engagement between the actuator and the feeler-carrier and the latter is thereby continuously controlled or governed by said actuator.

A rearward extension 21 of the actuator is pivotally connected at 22 with a depending link 23 provided with a roller or other suitable stud 24 which coöperates with the groove in a cam 25 fast on the shaft F, a

short radius arm 26 being pivotally connected at one end with the link and at its other end being fulcrumed at 27 on a stand 28 mounted on the loom side.

5 The radius bar prevents improper swinging movement of the link 23 while permitting it to rise and fall as the cam 25 revolves, to effect the positive and intermittent oscillation of the actuator 20, and preferably the link is made in two parts, as  
10 shown, for longitudinal adjustment, a common form of construction.

As the shaft F makes one revolution for every two revolutions of the crank-shaft G  
15 the groove of the cam 25 is laid out to present a long circular or dwell portion from 29 to 30, (reading opposite to the direction of rotation indicated by arrow 50) equal to about three-fourths of a revolution of the  
20 cam, and with a gradual but rather rapid rise from 30 to the high point 31, and a somewhat more rapid drop from such high point to the beginning of the dwell at 29.

When the follower 24 is traversing the  
25 dwell portion of the cam the lay swings back, forward, and back while the actuator 20 is quiescent at its highest position, and preferably the curve of the actuator is at this time an arc whose center is coincident  
30 with the lay rocker-shaft, and during such time the shuttle has been picked to the right, the filling has been beaten in, and the shuttle has been picked to the left, to box B, on the second backward swing of the lay  
35 in readiness for the feeler to act. Now, as the lay is moving forward, Fig. 1, with the shuttle in the left-hand box B the part 30 to 31 of the cam operates through the follower and the link 23 to quickly depress the  
40 actuator 20, and consequently the two-part feeler carrier is swung downward on its fulcrum 3 as the lay moves toward front center. If there is sufficient filling present  
45 to stop the feeler 15 in its downward movement the jointed carrier is "broken" at the pivot stud 8, while the member 4 completes its full down stroke, such a condition being shown in Fig. 3, and as the feeler is arrested  
50 by the filling the bunter 16 will be moved forward with the lay in a path above the dog U. The follower roll 24, after passing the high point 31 of the cam, is quickly depressed by the cam portion between 31 and  
55 29, Fig. 1, the "dipping" movement of the actuator and the feeler carrier being completed before the shuttle is picked from the box B after the beat-up is completed, but the rise of the feeler carrier does not occur  
60 until the bunter 16 has had an opportunity to engage and push the dog U frontward as the lay moves toward front center. Now let it be supposed that the filling has been diminished to such an extent that the diameter thereof is just small enough to permit  
65 the feeler 15 to pass downward at opposite

sides of the bobbin. When the previously described depression of the actuator is effected the feeler carrier will swing downward and as the filling offers no obstacle to the feeler 15 the latter will descend its  
70 full distance, the two members 4 and 5 of the carrier moving down together without any relative movement, and the bunter 16 will be moved down therewith so that as the lay beats up the dog U will be engaged  
75 by the bunter and pushed forward before the part 31, 29 of the cam comes into action. Such forward movement of the dog is communicated to the controller P and the latter in turn acts upon the cam-extension O and  
80 rocks the transmitter K, positioning the latch N for engagement by the weft-hammer M, which at this time is moving forward. Thereupon the rock-shaft H will be turned and the operation of the replenishing  
85 mechanism will be effected when the shuttle I is in the right hand shuttle-box, in a manner familiar to those skilled in the art. When the described coöperation of the bunter and the dog is effected the parts remain  
90 in engagement only long enough to provide for the proper movement of the controller P, and the part 31, 29 of cam 25 acts to elevate the feeler carrier and its adjuncts before the shuttle is picked from the  
95 box B.

It is sometimes desirable to throw the feeler mechanism out of operation without disturbing the other parts of the loom, and to do this all that is necessary is to swing  
100 up the carrier member 5 until the perforation in its ear 12 registers with the hole 13 in member 4, and a pin is pushed into the registering apertures, holding the member 5 up far enough to prevent any operative  
105 engagement of the feeler 15 with the filling.

From the foregoing description it will be apparent that the operation of the feeler mechanism is effected wholly independent of the shuttle, the intermittent movement of  
110 the feeler into and out of the shuttle being effected positively on every alternate pick, and as the spring controlling the jointed feeler carrier is of low power the feeling action is delicate and has no tendency to  
115 damage the filling.

Various changes or modifications of different features of construction and arrangement may be made by those skilled in the art without departing from the spirit and  
120 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:

125 1. In a loom, a lay, a rocking carrier mounted thereon, a feeler connected with said carrier, to detect, by or through its diameter, a predetermined diminution of the volume of filling in the shuttle, an actuator  
130

mounted independently of the lay and in sliding engagement with the carrier, a cam to move said actuator intermittently and thereby rock the carrier to effect the feeling operation of said feeler, and yielding means to permit stoppage of the feeler on its active stroke prior to substantial exhaustion of the filling.

2. In a loom, in combination, a lay, a feeler carrier pivotally mounted thereon transversely to the shuttle path, a depending feeler mounted on said carrier and adapted to engage intermittently the filling in the shuttle to detect a predetermined diminution of the volume thereof, a rocking actuator having a stationary fulcrum and extended across the lay, said actuator in sliding engagement with the carrier, means to oscillate said actuator on alternate picks, to thereby move the feeler into and out of feeling position, and means, governed by said feeler when the filling is exhausted to a predetermined extent, to effect a change in the operation of the loom.

3. In a loom, in combination, a lay having a shuttle-box, a two-part feeler carrier comprising a member fulcrumed on the lay adjacent the shuttle-box, and a second member pivotally connected with the first-named member, a spring normally acting to prevent relative movement of said members, a feeler mounted on the second member, an actuator fulcrumed independently of the lay and in sliding engagement with the first member of the feeler carrier, to impart a uniform oscillation thereto, and means to oscillate said actuator intermittently and positively, the controlling spring of the carrier permitting relative movement of the two members thereof on every active stroke until predetermined filling exhaustion permits the feeler to accomplish its maximum stroke.

4. In a loom, in combination, a lay having a shuttle-box, a feeler carrier comprising an inner arm fulcrumed on the lay adjacent the

shuttle-box and an outer arm pivoted on said first arm and having at its outer end a depending feeler, means to rock the inner arm positively and intermittently with a constant stroke, a yielding connection between said arms, whereby the outer arm will move relatively to the inner arm when the feeler contacts with the filling prior to predetermined exhaustion thereof, and means actuated by or through the feeler on the forward beat of the lay when predetermined filling exhaustion is reached, to effect a change in the operation of the loom.

5. In a loom, a lay, a feeler, a rocking, two-part jointed carrier therefor fulcrumed on the lay, an actuator slidably connected with said carrier to impart a constant, positive oscillation to one part thereof at every alternate pick, a spring to prevent relative movement of the carrier parts when substantial filling exhaustion is reached, and means to oscillate said actuator and move the feeler into and out of contact with the filling in the shuttle on alternate picks.

6. In a loom, a lay having a shuttle-box, a jointed feeler carrier fulcrumed at its inner end on the lay adjacent the shuttle-box, a calipering feeler mounted on the outer end of the carrier, to intermittently engage the filling in the shuttle, an actuator fulcrumed behind the lay and in continuous sliding engagement with the carrier, means to oscillate said actuator positively and at regular intervals, to impart an intermittent rocking movement to the feeler and its carrier, and a spring controlling relative movement of the parts of said jointed carrier according to the volume of filling in the shuttle.

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

ALONZO E. RHOADES.

Witnesses:

ROBERT JAMIESON,  
E. D. OSGOOD.