

No. 677,838.

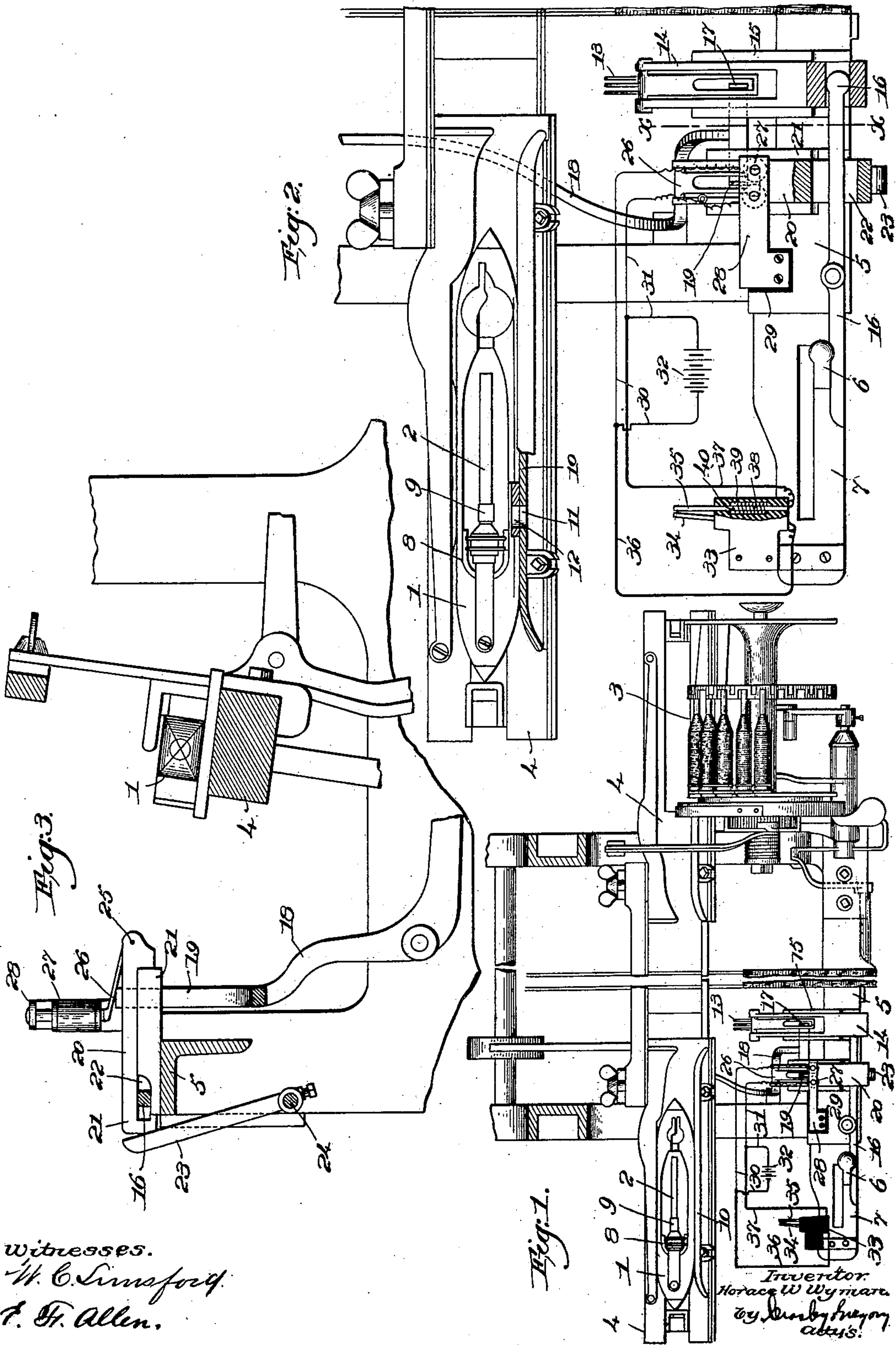
Patented July 2, 1901.

H. W. WYMAN.

FILLING REPLENISHING MECHANISM FOR LOOMS.

(Application filed Mar. 5, 1901.)

(No Model.)



Witnesses.
W. C. Simpford.
F. H. Allen.

Inventor.
Horace W. Wyman.
by Kirby & Frey
attys.

UNITED STATES PATENT OFFICE.

HORACE W. WYMAN, OF WORCESTER, MASSACHUSETTS.

FILLING-REPLENISHING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 677,838, dated July 2, 1901.

Application filed March 5, 1901. Serial No. 49,955. (No model.)

To all whom it may concern:

Be it known that I, HORACE W. WYMAN, a citizen of the United States, and a resident of Worcester; in the county of Worcester and State of Massachusetts, have invented an Improvement in Filling-Replenishing Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

This invention relates to looms provided with mechanism for automatically replenishing the filling when the filling in the shuttle has been exhausted to a predetermined extent. In looms of such type, wherein the means for controlling the operation of the filling-replenishing mechanism includes a normally open electric circuit containing an electromagnet, the circuit is closed by contact of its terminals with an electrical conducting-surface on the filling-carrier exposed by the withdrawal of the yarn or filling therefrom. It has been found that the resistance of the electromagnet to the passage of the current when the circuit is closed is sufficient to so weaken the current at the contacting portions of the terminals with the conducting-surface on the filling-carrier that the armature of the magnet does not act with certainty in all cases. As a consequence the change of filling is not always made upon the first contact of the terminals with the conducting-surface referred to, so that the filling may be exhausted beyond the desired point before it is replenished, producing an imperfection in the cloth.

My present invention has for its object the production of means for overcoming such objections, and, as will more fully appear hereinafter, I have radically departed from prior apparatus wherein the time of operation of the filling-replenishing mechanism is determined by or through the action of an electric circuit. To such end I have provided an electrically-governed controlling device which is rendered active at the proper time by diminishing the action of the electric current thereupon.

The various novel features of my invention will be hereinafter fully described, and particularly pointed out in the following claims.

Figure 1 is a top or plan view, centrally broken out, of a portion of a loom provided

with automatic filling-replenishing mechanism, with one practical embodiment of my invention applied thereto. Fig. 2 is a similar view, enlarged and partly in section, of the mechanism at the left-hand side of the loom illustrated in Fig. 1; and Fig. 3 is a transverse sectional view on the line *xx*, Fig. 2, looking toward the left.

The self-threading shuttle 1, of any desired type, adapted to contain a filling-carrier 2, the battery 3, or means for automatically replenishing the shuttle with filling and removing the spent filling-carrier therefrom, the lay 4, operated in usual manner, the breast-beam 5, and the shipper 6, normally held in the notched plate 7, may be and are all of usual or well-known construction.

The filling-carrier 2, having a head to be engaged by a holding device 8, mounted in the shuttle, is provided with an electrical conducting-surface, such as a metallic ring 9, located near the head and normally covered by the filling until the latter has been exhausted to a predetermined extent.

Referring to Fig. 2, the front wall 10 of the shuttle-box at the side of the loom opposite the battery has an aperture 11, and the side wall of the shuttle is also provided with an aperture 12, opposite the conducting-surface 9, the apertures 11 and 12 registering with each other when the shuttle is boxed, as shown in said Fig. 2.

I have shown a weft-fork 13, of usual construction, mounted on a slide 14, supported in a suitable guide 15 on the breast-beam and operatively connected with a knock-off lever 16 for the shipper 6 to release the latter when the slide 14 is moved outward upon breakage of the filling, such outward movement being effected by engagement of the tail of the weft-fork with a branch 17 of the weft-hammer 18 in well-known manner.

The weft-hammer is provided with a second branch 19 in my present invention to at times move outwardly a slide 20, mounted in a guide 21 on the breast-beam and recessed or slotted at 22 to avoid interference with the knock-off lever, and at its outer end the slide coöperates with an upturned arm 23, fast on the usual controlling or rock shaft 24, rocking of the latter effecting the operation of the filling-replenishing mechanism in a manner well

known in looms of this type. The bifurcated inner end of the slide 20 has pivotally mounted therein at 25 a loop-like member 26, which in the present embodiment of my invention constitutes the armature of an electromagnet 27, supported above said armature on a bracket 28, which is preferably insulated, as at 29. The electromagnet is contained in a closed electric circuit 30 31, which includes a battery 32 or other source of electric energy, the latter supplying current of sufficient strength to normally energize the magnet, and thereby attract the armature 26, as shown in Fig. 3, so that the free end thereof is held out of the path of movement of the branch 19, and so long as such condition of the respective parts continues there will be no coöperation of the weft-hammer and the slide 20, and the electromagnet is quiescent in so far as concerns actuation of the filling-replenishing mechanism. If, however, the current is diminished below the point requisite to overcome the resistance of the magnet-coils the magnet will be deenergized and the armature 27 will move into the path of the branch 19, and on the next outward stroke of the latter the slide 20 will be moved out, acting through arm 23 to rock the shaft 24, and thereby effect the actuation of the filling-replenishing mechanism. In other words, the controller—i. e., the magnet—will be rendered active as relates to said replenishing mechanism upon a diminution of the current by which it is governed. The means for effecting such activity of the controller will now be described, and, referring more particularly to Fig. 2, a block 33 of insulating material, secured to a fixed part of the loom at the side opposite the battery, has mounted therein a bipart feeler consisting of two metallic conducting pins or terminals 34 35, insulated from each other, longitudinally and independently movable in the block and so located that at alternate picks their inner ends pass through the apertures in the shuttle-box wall and the shuttle-box and feel the filling in the latter. The said feeler members are connected in shunt with the closed circuit by the wires 36 37, respectively, as clearly indicated by the diagrammatic illustration of the circuits, and this shunt is constructed to have a lower resistance than the resistance of the closed circuit and the contained electromagnet. Such difference in resistance may be conveniently effected by using larger wire in the shunt than in the closed circuit, so that when the shunt is closed its total resistance will be safely below that of the main or closed circuit.

In the operation of the loom the feeler members 34 35 will intermittently engage the filling in the shuttle as the lay beats up and no change in the condition of the closed circuit will be effected while sufficient filling remains on the filling-carrier to cover the conducting-surface 9; but when the latter is exposed sufficiently to permit contact therewith by the members 34 35 the shunt will be instantly

closed, presenting a new path of relatively low resistance for the current, and more or less of the current will traverse such path, being diverted from the closed circuit, and such diminution or diversion of the current short-circuits the electromagnet, deenergizing the same, and thereby permitting the armature 26 to be engaged by the weft-hammer. It is to be observed that by such arrangement of the bipart feeler in shunt I am enabled to establish a direct circuit with the source of electrical energy outside of the circuit containing the electromagnet, so that when the gap between the terminals is closed the current in the shunt will act with great certainty and instantly to produce the desired result. The coöperation of the conducting-surface 9 with the terminals of the shunt thus establishes the current in the latter, and simultaneously the electromagnet is released from the control of the closed circuit by which it is normally governed. After such release of the electromagnet the shunt is opened by the retreat of the lay; but before it is opened the outward movement of the slide 20 will take the armature 26 forward out of the magnetic field and the change of filling is effected. With the fresh supply of filling in the shuttle the shunt will remain open, and the magnet having become energized will attract the armature as soon as the slide 20 moves inward to normal position, and the various parts will then be in the normal condition herein illustrated, ready to again operate at the proper time.

Any suitable means may be provided for normally maintaining the feeler members or terminals 34 35 yieldingly extended toward the lay—as, for instance, by a spring 38, Fig. 2—in a recess 39 of the block 33, coiled about the terminal and secured thereto at 40, each terminal having such a spring. The terminals can thus be moved outward when they engage the filling as the lay beats up, the springs moving them back to normal position as the lay retreats.

I have herein shown one practical embodiment of my invention, and the latter is not restricted to the construction and arrangement herein shown, either as to detailed or general features, as various changes or modifications, such as would occur to those skilled in the art, may be made without departing from the spirit and scope of my invention.

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

1. In a loom, filling-replenishing mechanism, means to determine the time of its operation, including a normally-energized electromagnet, a shuttle adapted to contain a supply of filling, and means operative upon exhaustion of the filling in the shuttle to a predetermined extent to deenergize the electromagnet and thereby effect the actuation of the filling-replenishing mechanism.

2. In a loom, filling-replenishing mechanism,

ism, means to determine the time of its operation, including a closed electric circuit containing a normally-energized electromagnet, a shuttle adapted to contain a supply of filling, and means operative upon exhaustion of the filling in the shuttle to a predetermined extent to weaken the current in said circuit sufficiently to deenergize the electromagnet and thereby effect the actuation of the filling-replenishing mechanism.

3. In a loom, filling-replenishing mechanism, means to determine the time of its operation, including an electric circuit and a controller governed thereby, a shuttle adapted to contain a supply of filling, and means operative upon exhaustion of the filling in the shuttle to a predetermined extent to decrease the current in the circuit and thereby render the controller operative to effect the actuation of the filling-replenishing mechanism.

4. In a loom, filling-replenishing mechanism, means to determine the time of its operation, including a closed electric circuit, a shuttle adapted to contain a supply of filling, and means operative upon exhaustion of the filling in the shuttle to a predetermined extent to vary the current in said closed circuit and thereby effect the actuation of the filling-replenishing mechanism.

5. In a loom, filling-replenishing mechanism, means to determine the time of its operation, including a closed electric circuit, a shuttle adapted to contain a supply of filling, and means operative upon exhaustion of the filling in the shuttle to a predetermined extent to decrease the current in said closed circuit and thereby effect the actuation of the filling-replenishing mechanism.

6. In a loom, filling-replenishing mechanism, means to determine the time of its operation, including a closed electric circuit, and a normally open shunt of less resistance in electrical connection therewith, a shuttle adapted to contain a supply of filling, and means operative upon exhaustion of the filling in the shuttle to a predetermined extent to close the shunt and deflect current from the closed circuit, to thereby render the latter operative to effect the actuation of the filling-supplying mechanism.

7. In a loom, a closed electric circuit containing a normally-energized electromagnet, a shunt in electrical connection with said circuit and of less resistance, and a filling-carrier having a circuit-closer adapted to engage the shunt-terminals when said closer is exposed to contact therewith, to reduce the current in the closed circuit and deenergize the electromagnet.

8. In a loom, a closed electric circuit containing an electromagnet, a shuttle adapted to contain a supply of filling, and means to short-circuit the said electromagnet upon exhaustion of the filling in the shuttle to a predetermined extent.

9. In a loom, a closed electric circuit containing a normally active electromagnetic con-

troller, a shuttle adapted to contain a supply of filling, and means, operative upon exhaustion of the filling in the shuttle to a predetermined extent, to short-circuit said controller and thereby render the same inactive.

10. In a loom, filling-replenishing mechanism, a shuttle having a filling-carrier provided with a shunt-closer, a closed electric circuit, and an electrically-connected shunt of less resistance, the terminals of the shunt being independent of the shuttle, contact of the shunt-closer with said terminals upon exhaustion of the filling in the shuttle to a predetermined extent shunting a portion of the current from the closed circuit to effect the actuation of the filling-replenishing mechanism.

11. In a loom, filling-replenishing mechanism, a shuttle having a filling-carrier provided with a shunt-closer, a closed electric circuit, a normally-energized electromagnet included therein, a shunt of less resistance than, and in electrical connection with, said circuit, and having its terminals adapted to contact with the shunt-closer upon predetermined exhaustion of the filling in the shuttle, to short-circuit and deenergize the electromagnet, and means operative upon such deenergizing of the latter to effect the actuation of the filling-replenishing mechanism.

12. In a loom, provided with filling-replenishing mechanism, means to determine the time of operation of said mechanism, including a closed electric circuit containing an energized electromagnet, a lay and means to move it, a shuttle provided with a filling-carrier having a contact member, two terminals located side by side and longitudinally movable, in shunt connection with said closed circuit, and means to maintain the terminals in position to engage the filling on the filling-carrier as the lay advances, exposure of the contact by exhaustion of the filling, to engage the terminals, short-circuiting the electromagnet and therethrough effecting the actuation of the filling-replenishing mechanism.

13. In a loom, filling-replenishing mechanism, means to determine the time of operation thereof, including a closed electric circuit containing a normally quiescent controller, a shuttle adapted to contain a supply of filling, and means, operative upon predetermined exhaustion of the filling in the shuttle, to short-circuit said controller and thereby render it active, to effect the actuation of the filling-replenishing mechanism.

14. In a loom, a shuttle having a filling-carrier provided with a contact member normally covered by filling, a bipart feeler to intermittently engage the filling in the shuttle, a closed electric circuit, and means to electrically connect the parts of the feeler in shunt with the said circuit, exposure of the contact member to engage the bipart feeler, by exhaustion of the filling in the shuttle, diverting a portion of the current through the shunt, and mechanism operated by or through

such diversion of the current to effect a change of filling.

15. In a loom, mechanism to effect a change of filling, means to determine the time of operation thereof, including an electrically-governed controller, a shuttle adapted to contain a supply of filling, and means, operative upon predetermined exhaustion of the filling in the shuttle, to short-circuit said controller

and thereby effect the actuation of said filling-changing mechanism.

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

HORACE W. WYMAN.

Witnesses:

JOHN C. EDWARDS,
EDWARD F. ALLEN.