

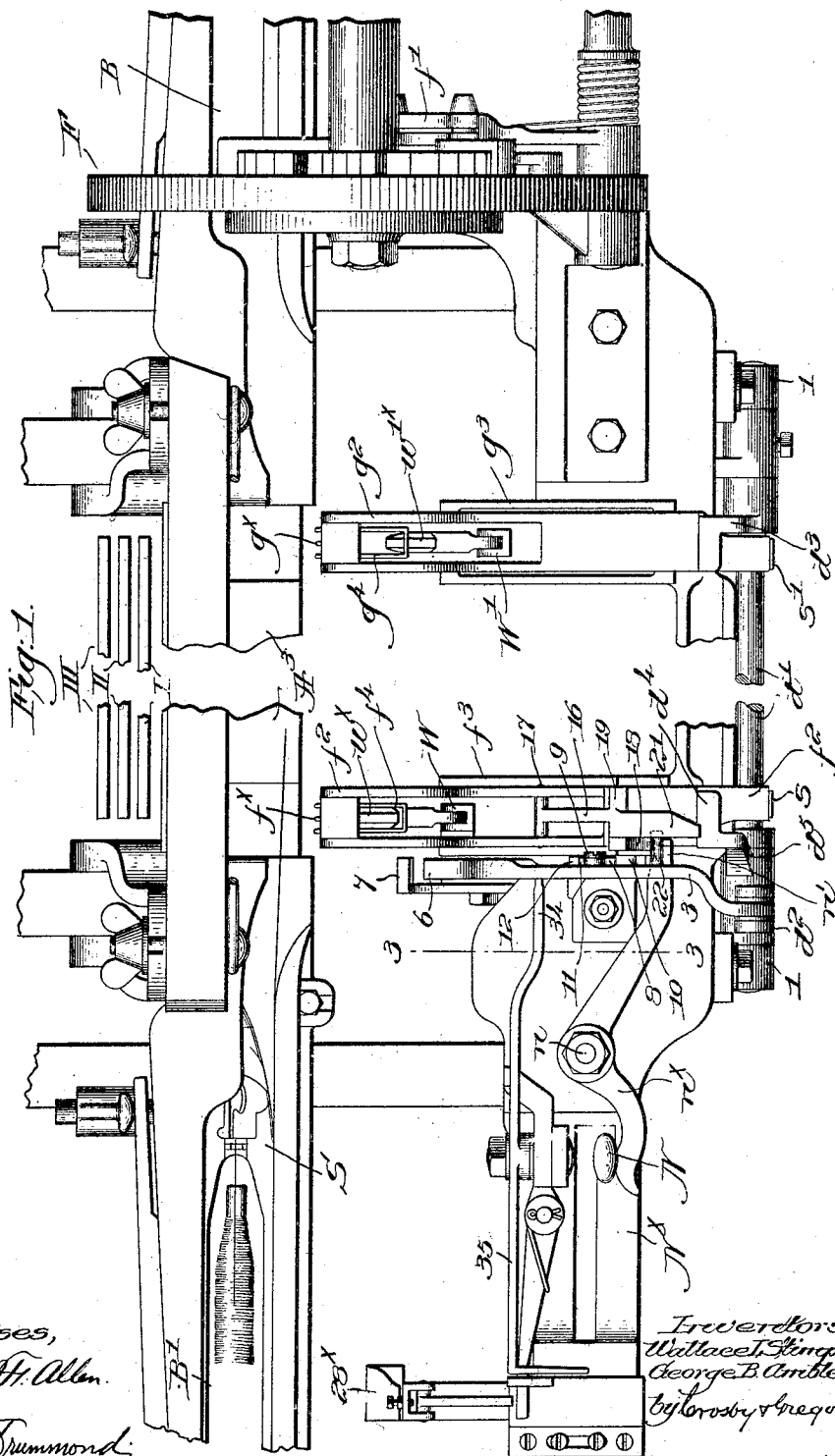
No. 887,977.

PATENTED MAY 19, 1908.

W. I. STIMPSON & G. B. AMBLER.
AUTOMATIC FILLING REPLENISHING LOOM.

APPLICATION FILED AUG. 13, 1907.

2 SHEETS—SHEET 1.



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Thomas J. Drummond.

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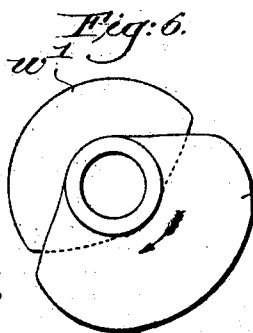
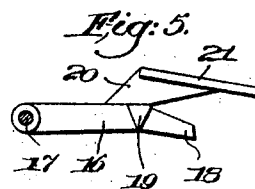
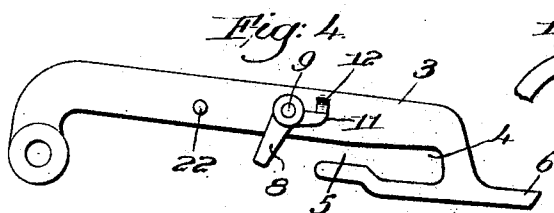
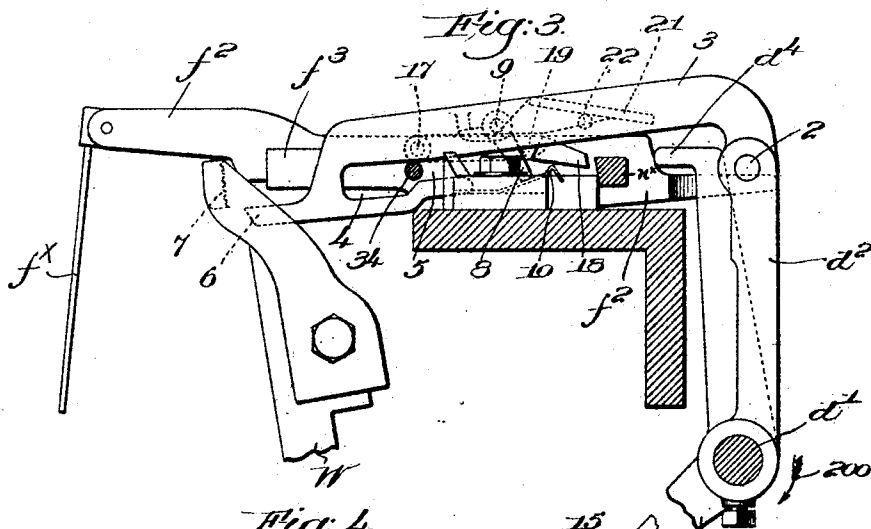
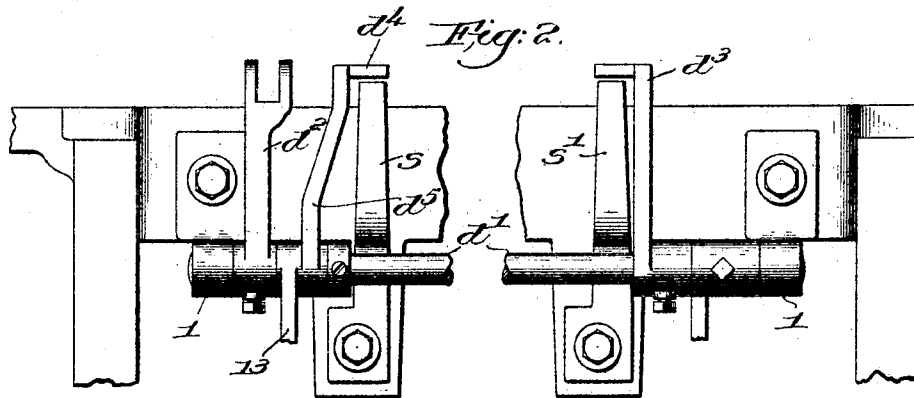
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2 SHEETS-SHEET 2.



Witnesses,
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UNITED STATES PATENT OFFICE.

WALLACE I. STIMPSON, OF MILFORD, AND GEORGE B. AMBLER, OF SOUTH FRAMINGHAM, MASSACHUSETTS, ASSIGNORS TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

AUTOMATIC FILLING-REPLENISHING LOOM.

No. 887,977.

Specification of Letters Patent.

Patented May 19, 1908.

Application filed August 13, 1907. Serial No. 388,322.

To all whom it may concern:

Be it known that we, WALLACE I. STIMPSON and GEORGE B. AMBLER, citizens of the United States, and residents of Milford, county of Worcester, and South Framingham, county of Middlesex, in the State of Massachusetts, have invented an Improvement in Automatic Filling-Replenishing 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 provided with mechanism to automatically replenish the running filling, and is illustrated in connection with a loom of the Northrop type, such for instance as forms the subject-matter of United States patent to Northrop No. 529940, dated November 27, 1894, one of the main objects of the invention herein being the production of simple and efficient pick-finding means, suitable for three-harness work.

In certain kinds of cloth, such as certain classes of so-called "drills", the presence of a pick wholly or partly bare of filling is very objectionable, making seconds of the cloth, while the occasional presence of double threads in the same pick is not considered objectionable. When weaving such cloth on an automatic filling-replenishing loom it is important that the pick in which new filling is first laid after replenishment following filling failure be the same one in which the failure of the old filling took place, so that there shall be no mis-pick, or empty pick, in the cloth.

The present invention is applied to a three-harness loom and is so arranged and constructed that when the filling breaks when traveling in one direction the filling will be automatically replenished and the new filling will be laid in the same shed of the cycle as that in which the break occurred. If the filling fails when the shuttle is going in the opposite direction the loom is stopped automatically, giving the weaver an opportunity to match the pick in usual manner.

The invention is herein shown as applied to a loom equipped with a filling feeler, so that when the running filling is exhausted to a predetermined extent the feeler will effect replenishment, making a perfect joining in the cloth.

In the present embodiment of the invention the loom is provided with two filling-detectors or forks, the detector at the shipper side of the loom being arranged to release the shipper and effect loom stoppage when filling absence is detected by such detector. The other detector, at the replenishing side of the loom, is arranged to cause filling replenishment on the second pick after such detector detects filling absence, so that the new filling is laid in the same shed of the 3-shed cycle as that in which the old filling failed, thereby matching the pick automatically. Such construction is advantageous over the ordinary feeler and double-detector style of loom in which both detectors act to stop the loom upon detection of filling absence, in that in the present case the loom continues to run when the filling breaks when laid in one direction and is stopped only when the break occurs when laid in the opposite direction. This permits a weaver to run a greater number of looms.

It is a curious fact that in the actual practice when the filling breaks the right-hand detector, or that one at the replenishing side of the loom, will on the average detect first considerably more than half the time. This is believed to be due to the fact that on the replenishing side the shuttle-eye is further from the edge of the cloth by almost the length of the shuttle than it is on the opposite or shipper side, and there are more chances for the broken filling to tilt the fork improperly at the shipper side than at the replenishing side. That is, if the broken filling end trails after the shuttle going to the shipper side there is a tendency to engage and tilt the fork at such side, but when the shuttle is going to the replenishing side the eye-end leads and the broken end extends such a short distance behind the shuttle that it practically never tilts the adjacent fork, and the latter thereupon detects filling absence.

The various novel features of the invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a top plan view, centrally broken out, of a sufficient portion of an automatic filling-replenishing feeler loom, with the present invention applied thereto; Fig. 2 is a front elevation, also centrally broken

out, of a portion of the apparatus shown in Fig. 1; Fig. 3 is an enlarged transverse sectional detail on the line 3—3, Fig. 1, looking toward the right; Fig. 4 is an inner side elevation of the latch forming a part of the feeler mechanism, to be described; Fig. 5 is a detail view in side elevation of a controlling member whereby loom stoppage is prevented when filling absence is detected by the detector at the replenishing side of the loom and such stoppage effected when the other detector detects; Fig. 6 is a side view of the two cams for operating the vibrating actuators, by or through which detecting action of the detectors is made effective.

Referring to Fig. 1 the loom is shown as provided at the right-hand side with an automatic filling-replenishing mechanism of the Northrop type, comprising a filling-feeder or hopper (partly shown at F) and a transferer f' to transfer the filling-carriers or bobbins from the feeder and insert them in the shuttle S when the latter is in the box B at the right-hand end of the lay A^3 . The left-hand box B' is in practice slotted in its front wall for the entrance of the feeler 28^x , the feeler mechanism being substantially such as shown in United States Patent No. 789472 granted May 9, 1905 to Wood & Northrop, the exhaustion to a predetermined extent of the filling in the shuttle S causing the transmitter 35 to be tilted, lifting its inner end 34, all as in said patent. Leaving the feeler mechanism temporarily, the actuation of the replenishing mechanism is effected when a controlling rock-shaft d' is turned the proper amount in the direction of arrow 200, Fig. 3, as provided for in Patent No. 529940 referred to. Said shaft is mounted in bearings 1 on the front of the loom frame, and has rigidly secured to it near its ends two upright arms d^2 , d^3 , the former having pivotally connected with it at 2 a rearwardly extended latch 3, clearly shown in Figs. 3 and 4. The rear end of the latch is increased in depth and provided with an opening 4 having a forwardly extended entrance slot 5, the extremity of the inner end 34 of the transmitter entering the opening and normally sustaining the latch with a bevel-ended tooth 6 below the path of movement of a preferably roughened head or bunter 7, Fig. 3, on the left-hand one of a pair W, W' of vibrating actuators, or weft-hammers. The actuators are vibrated in alternation in a manner common to such devices on double-detector looms, and herein the operating cams w and w' , Fig. 6, for the actuators W and W' respectively are shaped to give strokes of different amplitude, the cam w' imparting the lesser movement, for a purpose to be described.

Referring to Fig. 1 a filling detector or fork g^x at the replenishing side of the loom is tiltably mounted in a slide g^2 movable in a fixed guide g^3 , all of usual construction, the tail g^4

coöperating with the hook w^x of the actuator W when, upon absence of filling, the fork is not tilted. Thereupon the slide g^2 is moved forward against the upper end of the arm d^2 , rocking the shaft d' but not far enough to effect actuation of the replenishing mechanism, because of the throw of cam w' . As the shaft d' is turned the arm d^2 is swung forward, moving the latch 3 with it, and at such time a follower 8 pivoted at 9 on the latch, see Fig. 4, rides up on an inclined yielding or spring cam 10 fixedly attached at one end to the loom frame. This coöperation of the follower and cam elevates the latch 3, positioning its tooth 6 in the path of the bunter 7, so that when the actuator W swings forward the latch will be moved forward still further; due to the greater throw of its cam w , Fig. 6. Such movement of the latch continues the angular movement of the shaft d' in the direction of arrow 200 far enough to effect the actuation of the replenishing mechanism on the following pick, when the shuttle is in the box B. Suppose now that filling absence is detected by the detector g^x on the flight of the shuttle to the right, viewing Fig. 1, then on that pick the actuator W' moves forward, and by the slide g^2 and arm d^2 the shaft d' is turned far enough to effect the lifting of the latch 3 and the operative positioning of its tooth 6. The shuttle is now picked to the left, on the second pick, and the actuator W now acts as described, setting the shaft d' to effect filling replenishment, and on the following or third pick, to the right, the filling will be replenished when the shuttle is boxed at B. A cycle of three picks is thus provided, and the fresh filling will be laid on the fourth pick, to the left, which is the first pick of the succeeding cycle, whereby the new filling is laid in the same shed as that in which its absence was detected, so that there will be no empty or partly empty pick in the cloth. On the flight of the shuttle to the left after filling absence has been detected by fork g^x such absence will be detected by the left-hand detector or fork f^x , Fig. 1, and its tail f^4 will be engaged by the hook w^x of actuator W, to move forward the slide f^2 in the fixed guide f^3 . The front end of the slide engages the head d^4 of and swings outward an up-turned arm d^5 loosely mounted on the rock-shaft d' , the hub of the arm having a depending rearward extension 13 provided with a lateral lug 14, see Fig. 3, to coöperate with a pawl-carrier 15 of a take-up mechanism. Such take-up mechanism may be of suitable construction, for instance that shown in United States Patent No. 643284 granted February 13, 1900, to Clement.

When the arm d^5 is swung outward as described the extension 13 acts through the lug 14 to lift the pawl-carrier 15 into inoperative position, arresting take-up and permitting let-back for one or more picks, as in said

Clement patent. The control of the take-up mechanism thereby provided prevents the formation of a thin place in the cloth when the detector g^x first detects filling absence and through the mechanism previously explained causes filling replenishment at the proper time to match the pick with the new filling. Suitable springs s and s' effect the return movement of the fork-slides f^2 and g^2 respectively. The opening 4 in the latch 3 is made large enough to permit the lifting of the latch without restraint from the end 34 of the transmitter, and the cam 10 is made yielding so that as the bunter 7 moves the latch forward the slight depression of the rear end of the latch will not cause any strain or breakage, the cam giving to the downward push of the follower 8. Said follower is provided with a toe 11 which projects beneath a stop lug 12 on the latch, Fig. 4, preventing any turning of the follower on the forward movement of the latch, while permitting the follower to lift over the front end of the cam 10 as the latch returns to normal position.

So far as the operation by the feeler is concerned it is sufficient to state that when the predetermined filling exhaustion is reached the transmitter 35 is tilted, and the end 34 lifts the latch tooth 6 into the path of the bunter 7, so that the shaft d' will be turned and filling replenished when the shuttle is boxed at B, Fig. 1. No arrest of take-up is effected, as none is required, the fresh filling being laid before the old filling runs out.

It is necessary now to describe the manner in which loom stoppage is effected when filling absence is first detected by the detector f^x . The shipper N, Fig. 1, is released from its usual holding notch in the plate N^x by movement of the knock-off lever n^x , fulcrumed on the loom frame at n and having one arm extended at n' to a point near the slide f^2 . A controller 16, separately shown in Fig. 5, is pivotally mounted at 17 on the slide f^2 and has a forwardly extended toe 18 normally positioned back of the end n' of the arm of the knock-off lever, lateral lugs 19 on the controller resting on the top of the slide. Said controller is also provided with an upright web 20 supporting an elongated, lateral rib or shelf 21 which overhangs and rests upon a stud 22 projecting from the inner side of the latch 3, the shelf inclining downward and forward, as shown.

When filling absence is first detected by the fork f^x , the shuttle going to the left, the fork is not tilted and its slide f^x is moved forward by the actuator W, and the toe 18 of the controller 16 is brought against the extension n , turning the knock-off lever to release the shipper N and effect loom stoppage. At the same time the arm d^5 is swung forward by the slide, acting through the extension 13 to arrest the operation of the take-up mechanism, the weaver matching the pick in the

usual manner after the loom has stopped and the broken filling has been pieced up.

It will be remembered that the slide f^2 is moved forward on the shuttle flight to the left after filling absence has been detected by fork g^x , but at such time the latch 3 has been elevated and the stud 22 on said latch raises the shelf 21 so that the toe 18 of the controller is lifted and carried over the end n' of the knock-off lever, thereby preventing loom stoppage. When the parts return to normal position the stud 22 returns to the position shown in Fig. 3 and the toe 18 draws over and drops behind the end n' of the knock-off lever, in operative position should the detector f^x first detect filling absence. While the detector g^x detects filling absence a second time in the case where absence is first detected on the shuttle flight to the right the second detecting action will not cause a second and needless actuation of the replenishing mechanism, because the rock-shaft d' is then held in position by the actuator W and intervening devices to effect filling replenishment, and the short forward stroke of the slide g^2 will not be enough to cooperate with the arm d^3 . This will be manifest from the foregoing description and an inspection of the relative throw of the cams w and w' Fig. 4.

In Fig. 1 the three harnesses are indicated at I, II and III to form the three-shed cycle for which this mechanism herein described is particularly adapted, the shedding devices *per se* forming no part of this invention and being of any desired character to perform the requisite work. It will be seen that the function of one detector is to effect loom stoppage promptly when it detects filling absence on the shuttle flight toward the side of the loom at which said detector is located, while the other detector effects filling replenishment when filling absence is initially detected by it, but such replenishment is effected independently of the first named detector. Herein the stopping detector is located adjacent the shipper side of the loom and the replenishing detector adjacent the replenishing side of the loom, detecting action by such latter detector causing a delayed or retarded operation of the replenishing mechanism until the second boxing of the shuttle at the replenishing side after detection of filling absence. The position of the controller on the slide of the stopping detector determines whether outward movement of such slide will stop the loom or replenish filling, and the position of the controller is governed by the latch 3, as will be manifest. There are thus two changes in the operation of the loom provided for, to wit, filling replenishment or loom stoppage, and the particular change in operation depends upon which of the two detectors first detects filling absence.

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

1. In a loom provided with filling-replenishing mechanism, two filling-detectors located at opposite sides of the loom, a shipper, connections between it and the adjacent detector, to effect loom stoppage upon initial detection of filling absence by such detector, and means operated by initial detection of filling absence by the other detector to effect the actuation of the replenishing mechanism on the second pick after such detection.

2. In a loom, in combination, filling-replenishing mechanism, two filling-detectors, connections between one only of said detectors and the replenishing mechanism to effect the operation thereof on the second pick after detection of filling absence by such detector, and means operated only by the other detector to effect stoppage of the loom when said detector initially detects filling absence.

3. In a loom, in combination, filling-replenishing mechanism, two filling-detectors, connections between one only of said detectors and the replenishing mechanism to effect the operation thereof on the second pick after detection of filling absence by such detector, a device adapted to temporarily arrest take-up when filling replenishment is effected, and means operated only by the other detector to effect stoppage of the loom when said detector initially detects filling absence.

4. In a loom, filling-replenishing mechanism and a filling-fork having sole control of said mechanism and to effect the action thereof upon initial detection of filling absence by said fork, means to delay the replenishing action to the second pick after detection by the fork, a second filling-fork, means to effect loom stoppage upon the initial detection of filling absence by the second fork, and a device to prevent loom stoppage upon detecting action of the second fork following initial detection by the first fork.

5. In a loom, in combination, mechanism to replenish automatically the running filling, two filling-detectors, means controlled by one of them to effect loom stoppage when said detector initially detects filling absence, and means the actuation whereof is effected by initial detection of filling absence by the other detector to cause the operation of the replenishing mechanism and match with the fresh filling the pick in which the old filling failed.

6. The combination, in a loom, of filling-replenishing mechanism at one side thereof, a filling-fork at the same side, means, including a vibrating actuator at the opposite side of the loom, to effect the operation of said mechanism on the second pick after initial detection of filling absence by said fork, a shipper, a second filling-fork, and connections be-

tween it and the shipper to release the latter when the second fork initially detects filling absence, said connections at such time being operated by the vibrating actuator.

7. In a loom provided with filling-replenishing mechanism, two filling-forks and their slides, at opposite sides of the loom, a shipper and a releasing device therefor, a controller on the adjacent slide to operate the releasing device when the fork on said slide initially detects filling absence, connections between the other slide and the replenishing mechanism to cause operation of the latter by or through initial detection of filling absence by the fork on the last mentioned slide, and a device actuated by said connections to at such times render inoperative the controller, to thereby prevent loom stoppage.

8. In a loom, filling-replenishing mechanism, two filling-detectors, one only of them controlling the operation of the replenishing mechanism, means to effect such operation a predetermined number of picks after initial detection of filling absence by such detector, a shipper, means operated by detection of filling absence by the other detector to release it, and mechanism to prevent shipper release by said means when the second-named detector detects filling absence secondarily.

9. In a loom, filling-replenishing mechanism, a controlling rock-shaft therefor, a shipper, two filling-forks and their slides, a vibrating actuator for each slide, means operated by outward movement of one of the slides to turn the rock-shaft by or through the actuator of the other slide and effect the operation of the replenishing mechanism, and independent means to effect release of the shipper by coöperation of such actuator and its corresponding slide only when the fork on the latter initially detects filling absence.

10. In a loom having filling-replenishing mechanism, means, including a filling-detector, to effect the operation of said mechanism on the second pick after initial detection of filling absence by such detector, a feeler device to effect the actuation of said mechanism prior to complete exhaustion of the running filling, means adapted to effect stoppage of the loom, and a second filling-detector to actuate said means when filling absence is detected initially by the second detector.

11. In a loom having filling-replenishing mechanism, means, including a filling-detector, to effect the operation of said mechanism and cause the fresh filling to be laid in the same shed as that in which the old filling failed, when filling absence is detected initially by such detector, a device to throw the power off the loom, means, including a second filling-detector, to operate said device only when the said second detector initially de-

fects filling absence, and a feeler device to effect filling replenishment prior to complete exhaustion of the running filling.

12. In a loom having filling-replenishing mechanism, means, including a filling-detector, to effect the operation of said mechanism and cause the fresh filling to be laid in the same shed as that in which the old filling failed, when filling-absence is detected initially by such detector, a device to throw the power off the loom, means, including a second filling-detector and a controller, to operate said device when the detector initially detects filling absence, a feeler device to effect filling replenishment prior to complete exhaustion of the running filling, said feeler device including a member common to the means for effecting filling replenishment by the first-named detector, and a stud on said member to render inoperative the controller when said means operates.

13. In a loom having filling-replenishing mechanism, means, including a filling-detector, to effect the operation of said mechanism on the second pick after initial detection of filling absence by such detector, a feeler device to effect the actuation of said mechanism prior to complete exhaustion of the running filling, means adapted to effect stoppage of the loom, and a second filling-detector to actuate said means when filling absence is detected initially by the second detector, combined with a device adapted to effect arrest of a take-up instrumentality when the first-named detector effects filling replenishment.

14. In a loom, two filling-detectors located at opposite sides thereof, a normally-operative controller, means actuated by said controller to effect a change in the operation of the loom when filling absence is initially detected by one of said detectors, means to cause a different change in the operation of the loom when the other detector initially

detects filling absence, and a device actuated by the operation of the second-named means to render the controller inoperative at such time.

15. In a loom, two filling-forks and their slides, at opposite sides of the loom, a controller having a toe, carried by one of the slides, a shipper and a releasing member therefor actuated by the toe only when the corresponding fork initially detects filling absence, filling-replenishing mechanism, and means to effect a retarded operation thereof only by or through initial detection of filling absence by the other fork, said means including a member to lift the controller and render its toe inoperative when filling replenishment is to be effected.

16. In a loom, in combination, filling-replenishing mechanism, means to control its operation, including a rock-shaft, a connected latch, and a vibrating actuator, a feeler device to effect coöperation between the latch and actuator prior to complete exhaustion of the running filling, a filling-detector at the replenishing side of the loom, means operated upon detection of filling absence thereby to effect operative engagement of the latch and actuator, to thereby turn the rock-shaft and effect filling replenishment, a second filling-detector at the shipper side of the loom, a shipper, and means operated by said actuator to release the shipper and effect loom stoppage only when filling absence is initially detected by said second detector.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses.

WALLACE I. STIMPSON.
GEORGE B. AMBLER.

Witnesses:

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FRANK J. DUTCHER