R. JAMIESON.

STOPPING MECHANISM FOR AUTOMATIC REPLENISHING LOOMS.

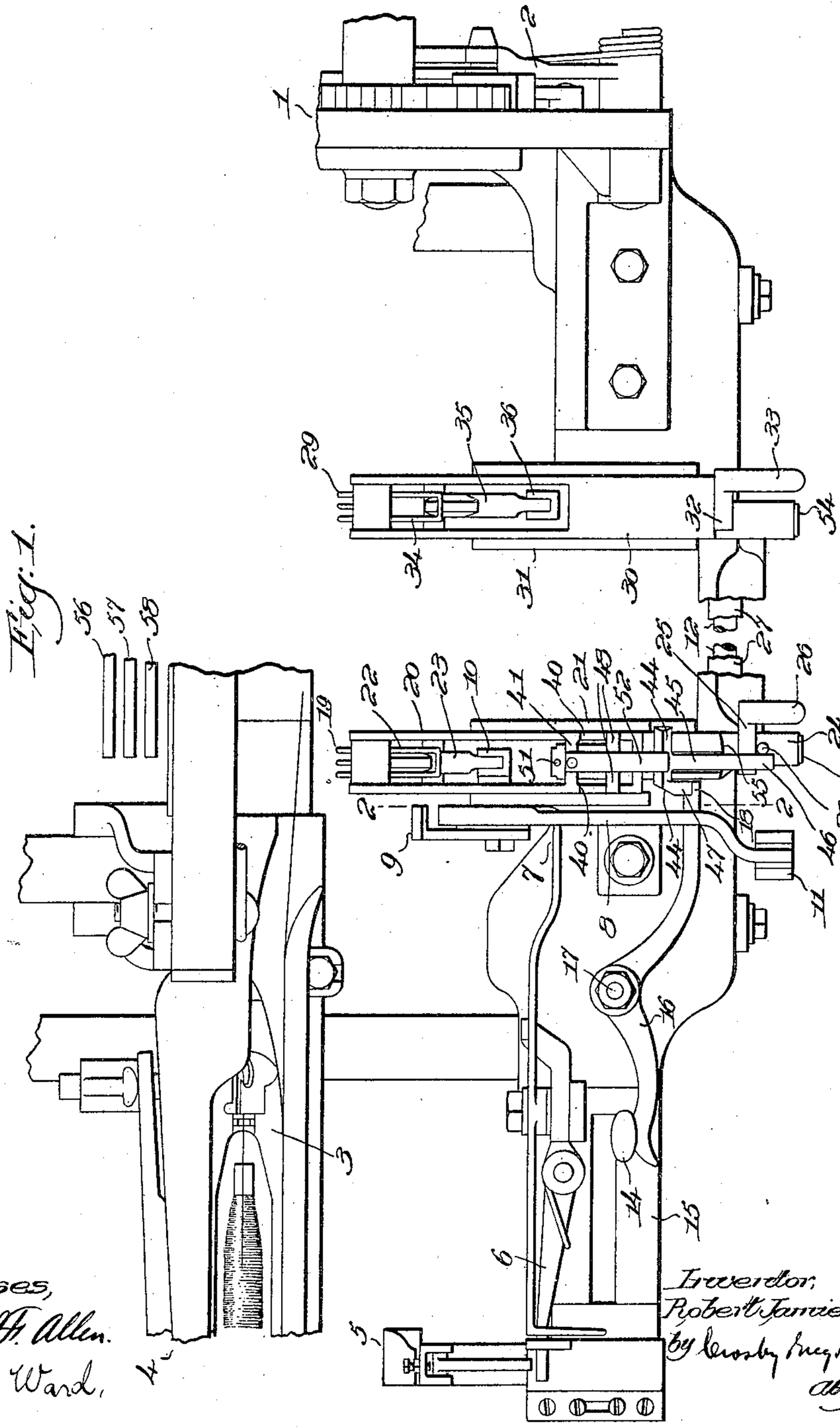
APPLICATION FILED APR. 23, 1908.

914,491.

Patented Mar. 9, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig: 2.

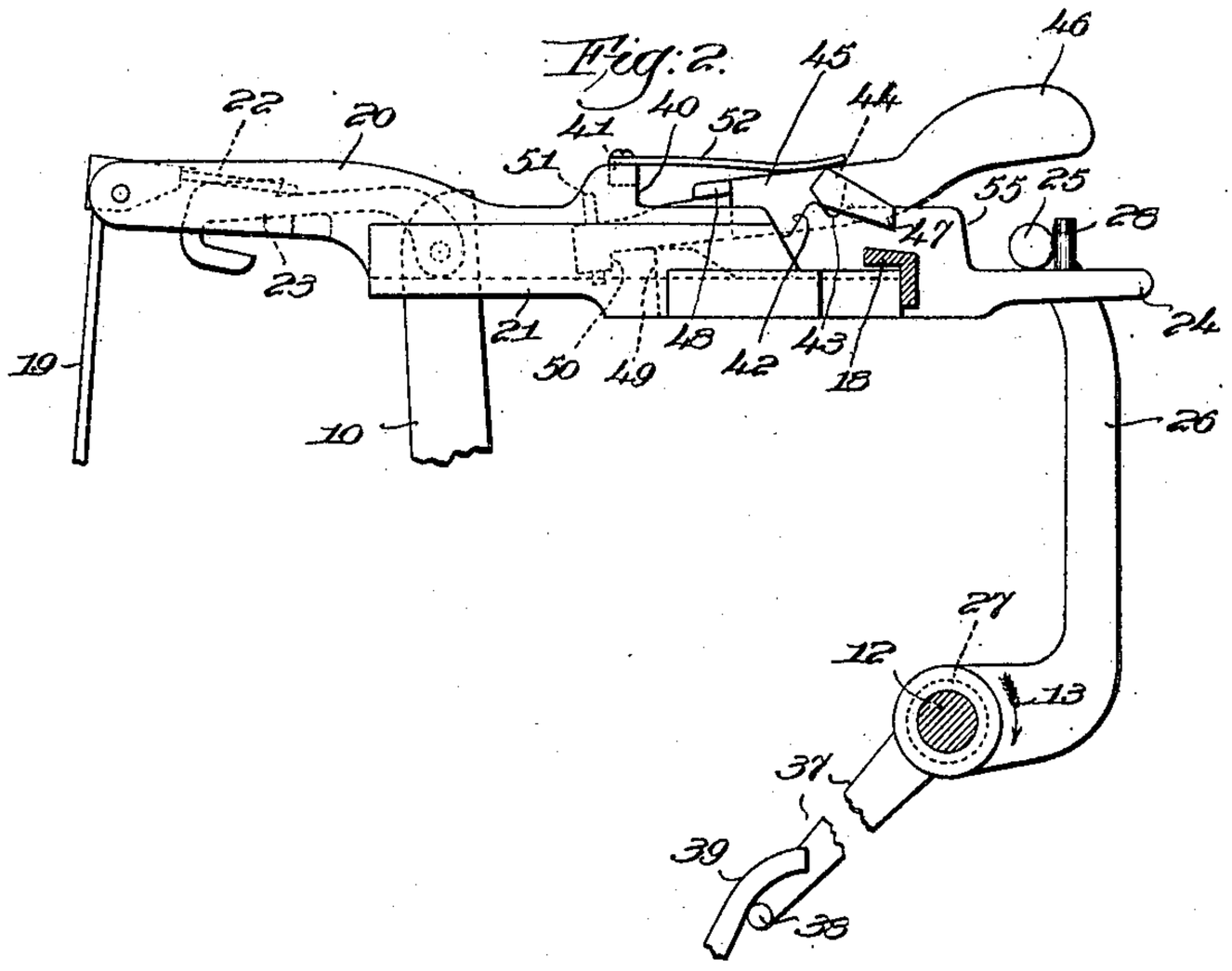


Fig: 3.

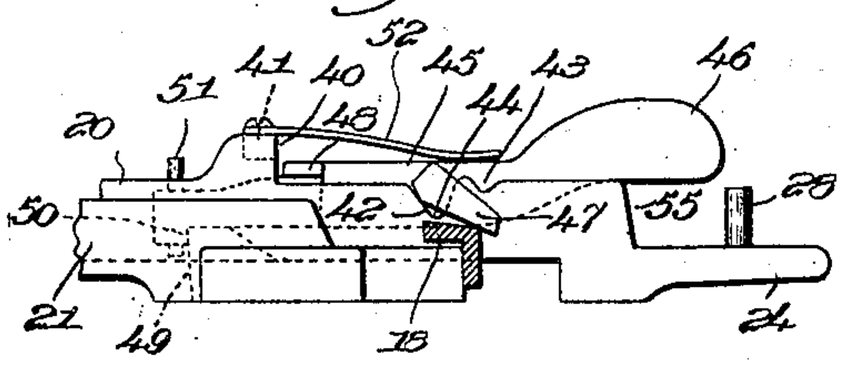


Fig: 4.

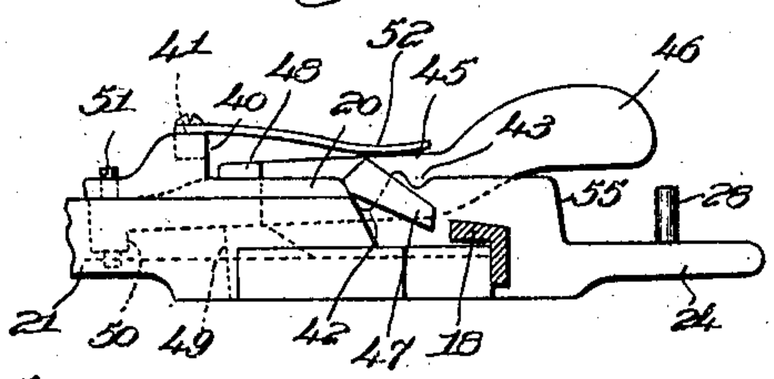


Fig: 5.

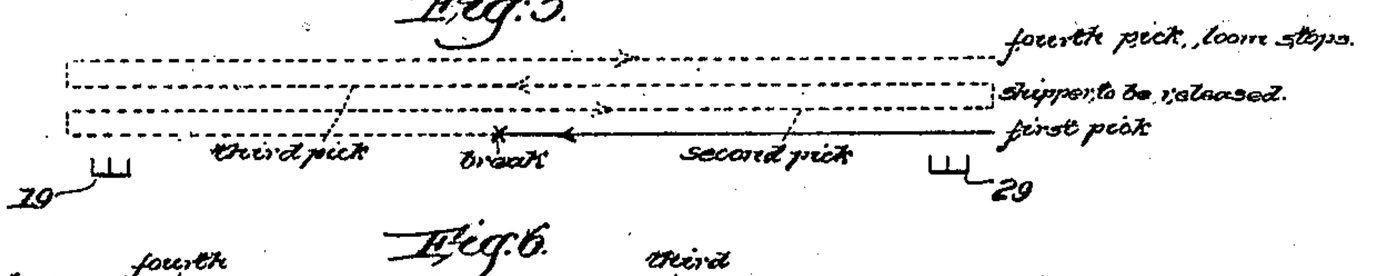
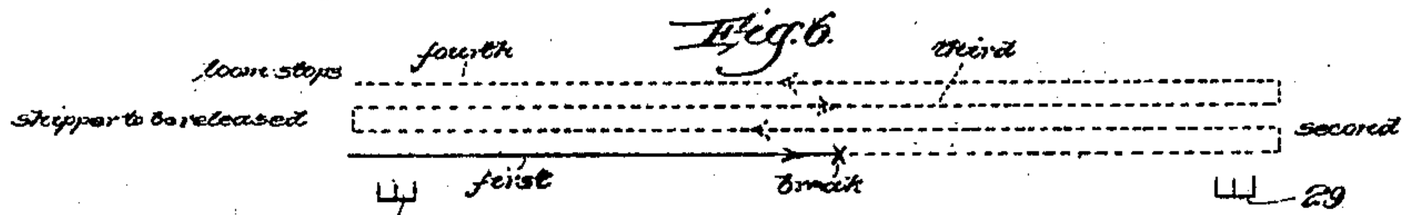


Fig: 6.



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UNITED STATES PATENT OFFICE.

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STOPPING MECHANISM FOR AUTOMATIC REPLENISHING-LOOMS.

No. 914,491. Specification of Letters Patent. Patented March 9, 1909.

Application filed April 23, 1908. Serial No. 428,717.

To all whom it may concern:

Be it known that I, ROBERT JAMIESON, a citizen of the United States, and resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Stopping Mechanism for Automatic Replenishing-Looms, of which the following description, in connection with the accompanying drawing, is a specification, like numerals on the drawing representing like parts.

When weaving certain kinds of cloth it is important that there shall be no faulty picks, that is, in which the filling is partly or wholly absent, and when the loom is of the type in which the filling is replenished automatically in the running shuttle means must be provided to so control the operation of the replenishing mechanism that after a break the filling will be laid in the same pick of the cycle as that in which failure of the filling occurs.

My present invention has for its object the production of means for so controlling the operation of the loom that when the filling breaks the loom will come to a stop with that shed of the cycle open corresponding to the shed in which the break occurred, such means being arranged in my present invention for three-harness work.

I have illustrated my invention in connection with a loom of the Northrop type, such as is shown in United States Patent No. 529940, granted to Northrop November 27, 1894, the loom being equipped with filling-exhaustion-indicating mechanism and with two filling-detectors or forks, one at each side of the loom.

I have so arranged the apparatus that when either detector detects filling absence the loom will be stopped, with the shed open in which the filling absence was detected, neither detector having any control over the replenishing mechanism but each detector arresting take-up. Filling-replenishment is effected by or through the feeler or filling-exhaustion-indicating mechanism, so that there is no discontinuance of filling from that source and there is no arrest of take-up when replenishment is effected.

Heretofore looms have been arranged with a feeler and double detectors or forks, each detector acting to stop the loom, but so far as I am aware the pick-finding feature is not present, it being necessary for the weaver to turn the loom over by hand to match the pick.

By my invention there is no necessity for matching the pick by hand as the loom stops with the proper shed open and all the weaver has to do is to see that the loose end of filling is suitably held when the shuttle is sent through the shed upon starting up the loom.

Figure 1 is a top plan view, centrally broken out, of a sufficient portion of an automatic filling-replenishing feeler loom with one embodiment of my present invention appled thereto; Fig. 2 is an enlarged side elevation of the filling detecting mechanism at the left-hand side of the loom, with the various parts in normal position, the view being taken on the line 2—2, Fig. 1, looking toward the right; Fig. 3 is a similar view, but showing the slide in its forward position, assumed after detection of filling absence by either detector; Fig. 4 shows the same parts, but with the slide back and the parts in readiness to effect shipper release upon the next forward movement of the slide; Fig. 5 is a diagrammatic view showing the sequence of operations when filling absence is initially detected by the main or left-hand detector; Fig. 6 is a similar view, but showing the operations when the auxiliary or right-hand detector intially detects filling absence.

The replenishing mechanism at the right-hand side of the loom, including a filling-feeder or hopper 1 and a transferrer 2, (partly shown in Fig. 1) are of well-known construction and operation, the automatically-self-threading shuttle 3 being shown in the shuttle-box 4 at the left-hand side of the loom, which box is in practice arranged for the entrance of the feeler 5 of the filling-exhaustion-indicating mechanism, which latter is substantially such as shown in United States Patent No. 789472 granted May 9, 1905 to Wood & Northrop.

Predetermined exhaustion of the filling in the running shuttle causes the feeler to operate in such manner that the transmitter 6 will be tilted, lifting its inner end 7 temporarily, and thereby bringing the rear end of a latch 8 into the path of a bunter 9 in practice mounted on the left-hand vibrating actuator or weft-hammer 10. This latch is pivotally connected at its forward end with an upturned arm 11 fast on a controlling rock-shaft 12 which when turned in the direction

of arrow 13, Fig. 2, effects the operation of the replenishing mechanism, as provided for in the Northrop type of loom referred to hereinbefore.

As shown in Fig. 1 the loom is provided with a suitable shipper 14 and is held in running position by the usual notched holding-plate 15, shipper release being effected by movement of the knock-off lever 16 fulcrumed at 17 and having its inner end provided with a shelf 18, Figs. 2, 3 and 4.

The replenishing mechanism is controlled as to its operation solely by angular movement of the rock-shaft 12, and herein this movement is effected only by or through the feeler mechanism, neither of the filling-detectors or forks having any operative connection with or control over said rock-shaft, as will appear presently.

At the left-hand or shipper side of the loom the filling detector or fork 19 is located, mounted on its slide 20 supported in the fixed guide or stand 21, the tail 22 of the fork cooperating in usual manner with the hook 23 of the weft-hammer 10 when filling absence is detected by such fork.

The front end of the slide is extended at 24 beneath the laterally turned head 25 of an upturned arm 26 fast on a sleeve 27 herein shown as concentric with the rock-shaft 12 but angularly movable independently thereof, a lug 28 on the extension 24 rising in front of the head 25.

At the right-hand or replenishing side of the loom a second filling-detector or fork 29 is located, mounted on a slide 30 movable in its stand 31 and coöperating at its front end with the head 32 of an arm 33 also fast on the sleeve 27, the fork-tail 34 coöperating with the hook 35 of the adjacent weft-hammer 36, Fig. 1, when said fork detects filling absence.

For convenience in reference the left-hand fork may be designated as the main fork or detector and the other one as the auxiliary detector or fork, the main fork detecting on the pick of the shuttle to the left, Fig. 1, and the auxiliary fork detecting on the pick of the shuttle to the right, as is usual in double-detector looms.

In the broad features of construction and operation so far described the apparatus is similar to that shown in United States Patent No. 763441 granted to Stimpson June 28, 1904 and herein the take-up is arrested whenever either detector detects filling absence and turns the tubular shaft or sleeve 27, substantially as in the Stimpson patent. This is accomplished by means of an arm 37, Fig. 2, fast on the sleeve and having a lateral lug 38 extended under the pawl-carrier 39 of the take-up mechanism, (not shown) so that when the arm 37 is elevated the pawl-carrier 39 will be lifted to disengage the take-up pawl from its ratchet in take-up mechanism such for instance as is shown in United States Patent No. 643284.

I will now describe the means whereby detection of filling absence by either detector will effect loom stoppage with the shed open in which filling absence is initially detected, so that matching the pick by hand is obviated.

The fork-slide 20 has its sides upturned to form vertical shoulders 40 connected by a bar 41, and near its forward end the two sides of the slide are provided with opposite notches 42, 43, the former being the deeper, arranged to coöperate with a laterally extended detent 44, Fig. 1, of a controller 45, made as an elongated casting inserted between the sides of the slide and provided at its forward end with a finger-piece 46. A dog 47 is formed on the end of the cross-bar constituting the detent 44, the latter resting in the notches 42 or 43 according to circumstances, and normally the detent is held in the shallower notches 43 so that the dog 47 is elevated above the shelf 18 on the knock-off lever, as in Fig. 2. The controller 45 has lateral ears 48 back of the detent, to rest upon the fork slide when the dog 47 is in position to engage the knock-off lever, as in Fig. 4, directly in front of the shoulders 40.

As shown in Figs. 2, 3 and 4 the rear end of the controller extends under the stop-bar 41 and between it and the top of an abutment 49 forming a part of the stand 21, a shoulder 50 on the controller at times coöperating with the abutment while a pin 51 on the controller limits forward movement of the controller by coöperating with the stop-bar 41. A light leaf-spring 52 is secured to the latter and is extended forward to bear at its free end upon the controller and prevent the same from jumping out of place accidentally, the spring serving to yieldingly retain the controller in one or the other of its positions.

Taking the normal position of the various parts of the detecting mechanisms, as in Fig. 1, and of the left-hand one of such mechanisms as in Fig. 2, if the slide 20 is moved forward or outward, it will carry with it the controller until its shoulder 50 engages the abutment 49, arresting the movement of said controller while the slide completes its forward movement, to the right viewing Fig. 2. As a result the detents 44 are moved out of the shallow notches 43 and drop into the deep notches 42, see Fig. 3, and the dog 47 will drop down into the position therein shown, but with its end forward of the shelf 18 on the knock-off lever. The slide now moves back, carrying the controller with it, to the position shown in Fig. 4, and it will be seen that the dog 47 is now back of the shelf 18 and in position to engage the same on the next outward movement of the slide 20. It will also appear that when

the controller is changed from inoperative position, Fig. 2, to that shown in Figs. 3 and 4, the lateral ears 48 are then just in front of the shoulders 40 on the slide so that as the latter moves forward the second time the shoulder will engage the ears 48 and will act through the controller 45 and dog 47 to swing the knock-off lever 16 and release the shipper. Thus it will appear that two successive forward movements of the main slide 20 are required to effect the operation of the shipper-releasing member 16, whether the initial forward movement of the slide be effected by or through detection of filling absence by the detector or fork 19, or otherwise, as will be explained. Supposing that filling absence is detected by the fork 19 on the flight of the shuttle to the left, Figs. 1 and 5, then on that pick the actuator 10 moves forward and through coöperation of its hook with the fork-tail 22 the slide 20 is moved forward effecting a change in the position of the controller 45 from that shown in Fig. 2 to that shown in Fig. 3, and the tubular shaft 27 is turned to arrest take-up. The shuttle is now picked to the right, on the second pick, the fork 29 detecting filling absence, and its slide 30 is moved forward by the adjacent actuator 36, Fig. 1, to swing forward the arm 33 and turn the shaft 27 a second time, again arresting take-up. It will be understood that as the slide 30 is moving forward the slide 20 will be moving back, but after the dog 47 has been moved back behind the shelf 18 the turning of the shaft 27 just referred to will swing forward the arm 26, and its head 25 engages the lug 28 and effects the second forward movement of the slide 20. This second movement of the slide 20 will not in practice operate the knock-off lever 16 to actually release the shipper until the shuttle is starting on the third pick, or to the left, Fig. 5, and the loom turns over far enough by its momentum, after shipper release, to throw the shuttle to the right on the fourth pick, the loom then coming to a stop with the shed open. A cycle of three picks is thus accomplished, and the loom comes to rest with the shed open on the fourth pick, which is the first pick of the succeeding cycle, and hence is the same pick as that in which filling absence was first detected, as will be seen from an inspection of Fig. 5. In other words the loom stops with the same shed open as the one in which filling absence was first detected, so that the weaver removes the partial pick of filling, properly positions the shuttle in the right-hand shuttle-box, if necessary, and starts the loom, usually resetting the controller 45 by grasping the finger-piece 46 and pulling the controller forward into the position shown in Fig. 2, with the detents 44 in the shallow notches 43.

The second case will now be considered, the break of filling being detected initially by fork 29, on the flight of the shuttle to the right. The slide 30 is moved forward, rocking shaft 27 and acting through arm 26 and lug 28 to simultaneously move forward the main slide 20, to change the relative position of the controller 45 from that shown in Fig. 2 to that shown in Fig. 3, and take-up is also arrested. The shuttle is now picked to the left, both slides moving back under the influence of usual retracting springs, indicated at 53 and 54, Fig. 1, and as the actuator 10 moves forward just before the third pick (with the shuttle moving to the right) the hook 23 will coöperate with the fork-tail 22 and will effect a second successive forward movement of the slide 20, but not till after the dog 47 is behind the shelf 18, so that shipper release is actually effected after the shuttle has started on the third pick. As before explained the momentum of the loom will then turn it over far enough for the shuttle to be picked to the left, on the fourth pick, before the loom comes to a stop, with the same shed open as the one in which the absence of filling was first detected. The second forward movement of the slide 20 brings its shouldered end 55 against the head 25 of the arm 26, and through the latter the shaft 27 is rocked to arrest take-up. The fourth or final pick of the series is the first pick of the cycle of three picks, hence the loom stops with the proper shed open and the shuttle at the left-hand side of the loom, so that when the faulty pick of filling is removed and the shuttle is properly boxed the loom is ready to be started.

Neither of the detectors has any control over the replenishing mechanism, as will be obvious, that mechanism being controlled solely by the feeler device.

Take-up will be arrested on the third and fourth pick in both of the cases illustrated diagrammatically in Figs. 5 and 6, for as there is no filling present in either of said picks one detecting mechanism will act on each pick to effect such arrest, preventing the formation of a thin place in the cloth.

Three harnesses are indicated at 56, 57, and 58, Fig. 1, to form the three-shed cycle for which the apparatus herein described is arranged, the shedding devices in themselves forming no part of my invention and being of any desired character to perform the work.

When the filling breaks the operation is such that two picks are allowed for detection of filling absence, one for the operation of the shipper releasing means, and one for the momentum of the loom to act, whether the break occurs on the flight of the shuttle to the right, or to the left.

The mechanism is simple and efficient, and a very complete control of the operation of the loom is attained, while the time of the

weaver is saved as the proper shed is open when the loom stops, requiring no turning over of the loom by hand to match the pick.

There are two changes in the operation of the loom, viz:—filling-replenishment and loom stoppage, both changes being effected automatically, but if the filling breaks the change will always be stoppage without replenishment, irrespective of which detector first detects filling absence.

While initial detecting action of either detector is always followed by loom stoppage there is a predetermined delay or retardation in the release of the shipper after the absence of filling has been detected initially, in order that the cycle may be completed and the loom finally stopped on the corresponding pick of the succeeding cycle.

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

1. In a loom provided with mechanism to effect automatically replenishment of the running filling only prior to complete exhaustion thereof, two filling-detectors located at opposite sides of the loom, a shipper, and means operated by initial detection of filling absence by either detector to effect shipper release a predetermined number of picks after such detection and stop the loom on the same pick of the cycle as that in which initial detection occurred.

2. In a loom provided with mechanism to effect automatically replenishment of the running filling only prior to complete exhaustion thereof, two filling-detectors located at opposite sides of the loom, a shipper, a releasing device therefor, and means operated by initial detection of filling absence by either detector to actuate said device and effect shipper release always at least two picks after such detection.

3. In a loom provided with mechanism to effect automatically replenishment of the running filling only prior to complete exhaustion thereof, two filling-detectors located at opposite sides of the loom, a shipper, and means operative to effect shipper release only after initial detection of filling absence by either of said detectors and detecting action of the other detector on the next pick.

4. In a loom provided with mechanism to effect automatically replenishment of the running filling only prior to complete exhaustion thereof, two filling-detectors located at opposite sides of the loom, a shipper, a device adapted to temporarily arrest take-up by detecting action of either detector, and means operative to effect shipper release only after initial detection of filling absence by either detector and detecting action of the other detector on the next pick.

5. In a loom, a shipper, a releasing device therefor, a filling-detecting instrumentality at each side of the loom, and means operated directly by one and indirectly by the other of said instrumentalities to actuate the releasing device only after initial detection of filling absence by either instrumentality and secondary detection of filling absence by the other instrumentality.

6. In a loom, a shipper, a releasing device therefor, a filling-fork and its slide at each side of the loom, a dog movable with and also relatively to one of said slides, to coöperate with and actuate the releasing device upon two successive outward movements of the adjacent slide, and means to effect outward movement of such slide by or through outward movement of the other slide when the corresponding fork detects filling absence.

7. In a loom, in combination, two filling-detectors, means controlled directly by one of them and indirectly by the other one to effect loom stoppage when either detector initially detects filling absence, and means to delay such stoppage until the same shed is open as that in which filling absence was detected.

8. In a loom, in combination, two filling-detectors, means controlled directly by one of them and indirectly by the other one to effect loom stoppage when either detector initially detects filling absence, means to delay such stoppage until the same shed is open as that in which filling absence was detected, and a device adapted to arrest take-up temporarily when detecting action occurs.

9. In a loom, main and auxiliary filling-forks, and their slides, at opposite sides of the loom, a shipper and a releasing device therefor, a normally inoperative member on the main slide to always operate the releasing device upon a secondary outward movement of the slide, means whereby said member is rendered operative by a primary outward movement of the said slide, and means actuated by initial detection of filling absence by the auxiliary fork to effect a primary outward movement of the main slide, the secondary movement thereof being effected by detection of filling absence by the main fork on the next pick.

10. In a loom, main and auxiliary filling-forks and their slides at opposite sides of the loom, means to effect outward movement of the main slide by outward movement of the auxiliary slide when its fork detects filling absence, a shipper, and a releasing device therefor, a controller on the main slide having a dog to at times engage and operate the releasing device, and means to operatively position said dog by a primary outward movement of the main slide and to bring said dog into actuating engagement with the shipper-releasing device by a secondary outward movement of said slide, such primary movement being effected by initial detection of filling absence by either fork and the secondary movement upon detecting action of

the other fork on the next pick, whereby shipper release is retarded for two picks in either case.

11. In a loom having automatic mechanism to replenish filling only prior to complete exhaustion of the running filling, means, including two filling-detectors and a retarding instrumentality, to effect stoppage of the loom with the same shed open as that in which filling absence was detected initially by one of the detectors.

12. In a loom having automatic filling-replenishing mechanism, means, including two filling-detectors and a retarding instrumentality, to effect stoppage of the loom with the shed open on the third pick after the pick on which filling absence was detected initially by either one of the detectors.

13. In a loom having mechanism to effect automatically replenishment of the running filling, only prior to complete exhaustion thereof, means to effect stoppage of the loom, a filling-detector to effect the operation of said means a predetermined number of picks after initial detection of filling absence by such detector, a second filling-detector to effect the operation of said means the same number of picks after said second detector initially detects filling absence, and a device to effect arrest of a take-up instrumentality upon detecting action of either detector.

14. In a loom, two filling-forks and their slides, at opposite sides of the loom, a controller carried by one of the slides and having a dog, a shipper and a releasing member therefor actuated by the dog only by the second of two successive outward movements of the slide on which the controller is carried, and means operating, after initial detection of filling absence by the fork upon whose slide the controller is carried, to give said slide a second outward movement when the filling absence is detected by the other fork.

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

ROBERT JAMIESON.

Witnesses:

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