

J. NORTHROP.
WARP STOP MOTION FOR LOOMS.
APPLICATION FILED AUG. 12, 1910.

1,045,169.

Patented Nov. 26, 1912.

3 SHEETS—SHEET 1.

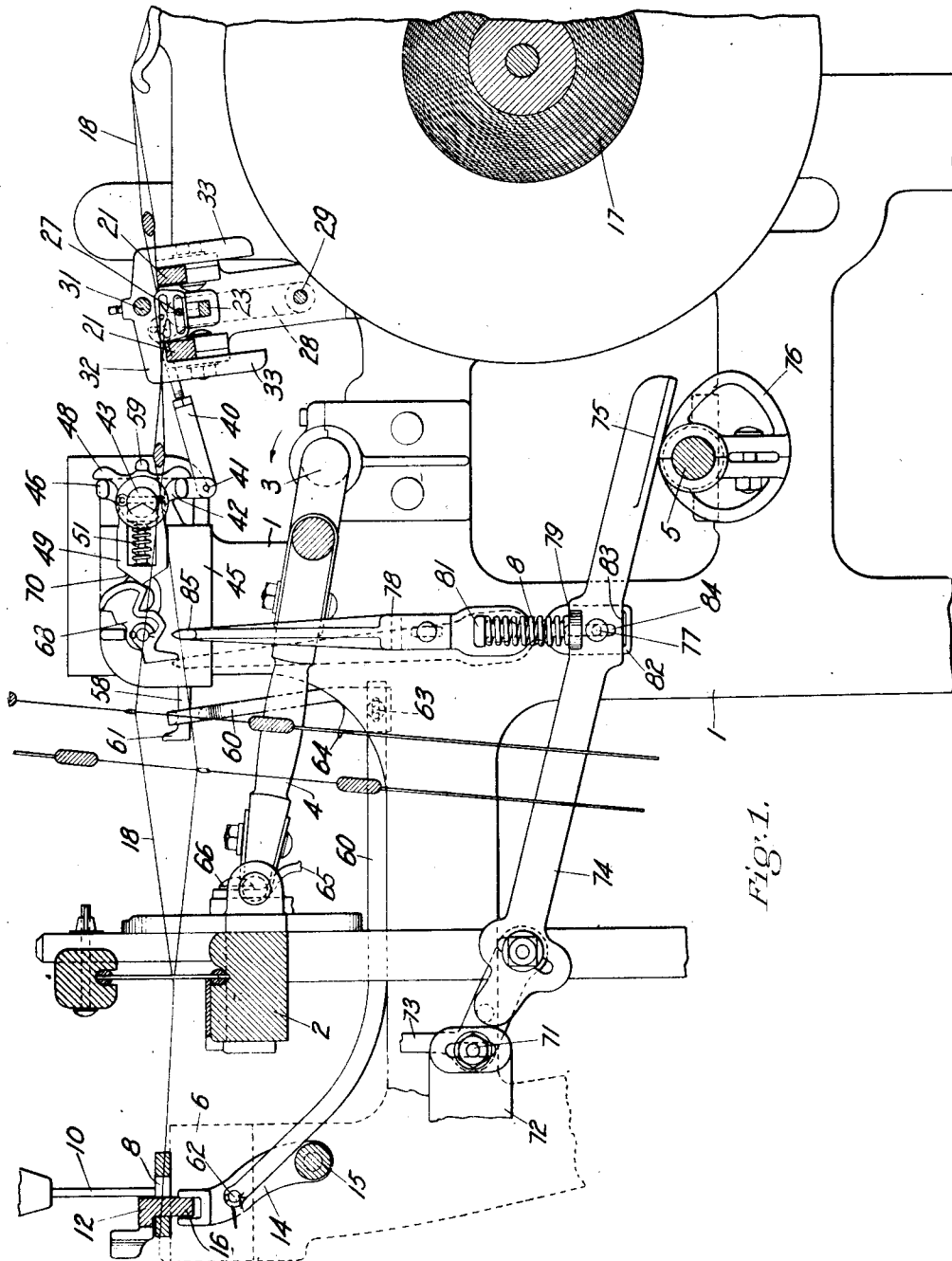


Fig. 1.

Witnesses:
Marion F. Semball
Anna M. Rose

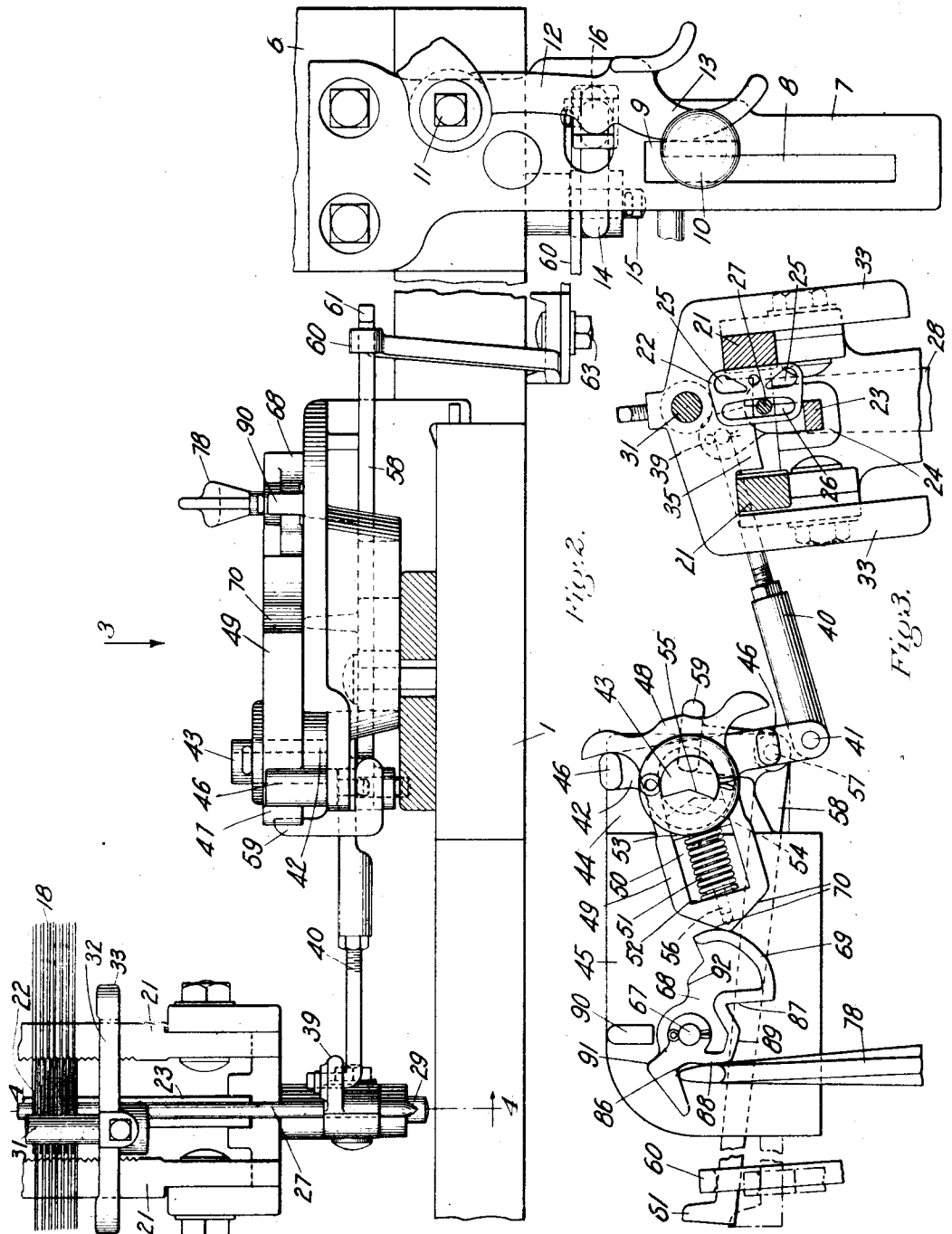
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3 SHEETS—SHEET 3.

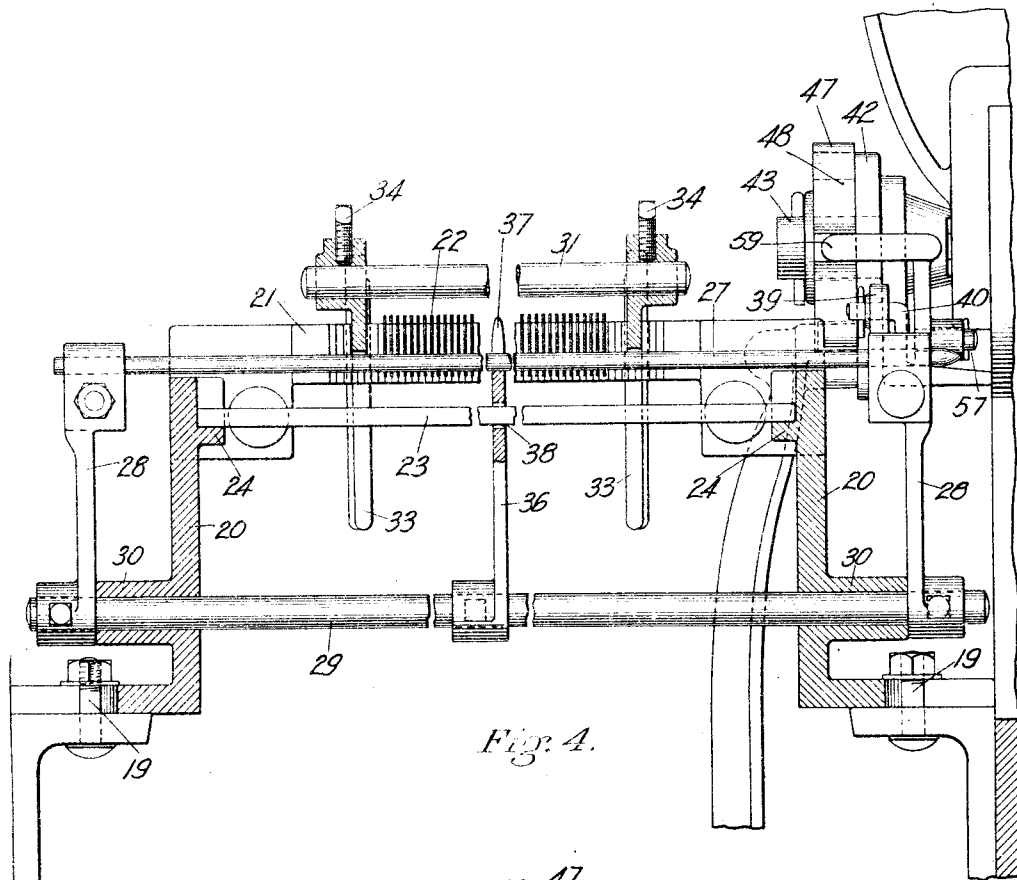


Fig. 4.

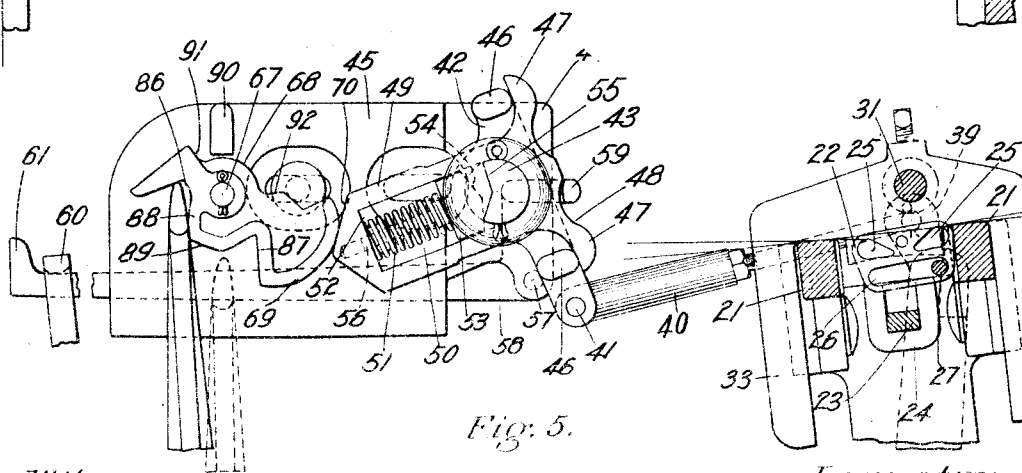


Fig. 5.

Witnesses:

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Att'y.

UNITED STATES PATENT OFFICE.

JONAS NORTHRUP, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO DRAPER COMPANY, A CORPORATION OF MAINE.

WARP STOP-MOTION FOR LOOMS.

1,045,169.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed August 12, 1910. Serial No. 576,796.

To all whom it may concern:

Be it known that I, JONAS NORTHRUP, a citizen of the United States, residing at Hopedale, in the county of Worcester and State of Massachusetts, have invented an Improvement in Warp Stop-Motions for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The invention to be hereinafter described relates to warp stop motions for looms which act, upon the occurrence of a warp fault, to bring the loom to rest.

As well understood by those skilled in the art, the suspension of metallic pieces, called drop wires, upon the warp threads as a means of indicating the breakage of any thread and stopping the loom if such breakage occurs, unfortunately causes a marked increase in the number of warp breaks. Moreover, the weight of the drop wires will often cause slackness in the threads, sufficient in some cases to cause loom stoppage, the same as if a warp thread were broken. Obviously it is desirable to minimize the number of warp breaks, or slack threads, or both, with the result of increased quantity and quality of cloth woven. It is likewise desirable that the shuttle shall always be in the same box at one side of the loom whenever the loom stops due to a warp fault, and that the parts constituting the device shall be simple and readily accessible.

With the above general features in view, the aims and purposes of the present invention will be best understood from the following description and accompanying drawings of one form of means for carrying the invention into practical effect, it being understood that the invention is not circumscribed and restricted to the details illustrated but is set forth in its true scope by the claims.

In the drawings:—Figure 1 is a central vertical section from front to rear of a loom provided with one form of the present invention looking in the direction of the arrow; Fig. 2, only so much of the loom structure being illustrated as is necessary to show the relation of the parts; Fig. 2 is an enlarged top or plan view of one side of the loom, showing more particularly the warp stop motion; Fig. 3 is an enlarged detail

view in side elevation of the warp stop motion, showing the parts in position for stopping the loom; Fig. 4 is a section on the line 4—4, Fig. 2; and Fig. 5 is an enlarged view in side elevation similar to that of Fig. 3 with the parts in position to permit the loom to run.

The loom frame 1, the lay 2, the crank shaft 3, the connection 4 between the crank shaft and lay, the bottom or cam shaft 5, the breast beam 6, and the bracket 7 having the slot 8 and holding notch 9 for a shipper handle 10, may all be of any usual or desired form and construction suitable to the purposes intended.

Pivotaly connected to the bracket 7 at 11 is a knock-off lever 12 having a part 13 to bear against the side of the shipper, the construction being such that movement of the knock-off lever clockwise, Fig. 2, will effect disengagement of the shipper from its holding notch and consequent stopping of the loom, as will be well understood by those skilled in the art.

Disposed adjacent the knock-off lever 12 is a knock-off actuator 14 which may be of any desired character to effect movement of the knock-off lever under conditions that will presently appear. In the present form of the invention the actuator 14 is conveniently made as an arm mounted on a support 15 to swing from said support as a center, said actuator 14 being connected to the knock-off lever by any suitable device, as for instance a notch in the end of the actuator and a lug 16 extending from the knock-off lever 12.

From the warp beam 17 the warp threads 18 pass over suitable guides or other desired devices, through a series of drop wires, and means are herein provided so that should a warp thread break or become objectionably slack, the knock-off actuator will be moved to disengage the shipper from its holding notch and cause loom stoppage.

Secured within the loom sides by suitable means, as for instance, the bolts 19, are the brackets 20, which afford a convenient device for sustaining the side bars 21 between which are disposed the drop wires 22. Below the drop wires 22 is the bottom bar 23 sustained by suitable ledges 24, 24, formed on the brackets 20, Fig. 4. Any suitable device may be employed within the true

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Figs. 1, 3 and 5, one arm of which is pivoted upward from said pivotal mounting and is provided with a finger 42 for normally resting against the sliding and rocking member 48, as clearly indicated in Figs. 2 and 5. The other arm of the lever 38 extends forward and projects through the upper slotted end portion of a stop arm 60, said horizontal arm of the lever 38 being preferably provided with an upwardly extending end portion 61 to prevent disengagement between said arm and the stop arm. The stop arm 60 is connected to the actuator 14 at 62, so that upon upward movement of the stop arm, said actuator 14 will move the knock-off lever 12 and cause disengagement of the shipper handle from its holding notch, as will be readily understood. The stop arm 60 preferably comprises two parts adjustably connected by a pin and slot connection at 63, Fig. 1, and is provided with a toe 64 which is normally below the path of movement of a bunter 65 secured to the rear portion of the lay, as at 25, Fig. 1, the construction being such that should the stop arm 60 be raised to place the toe 64 in the path of movement of the bunter 65, said stop arm will be moved rearwardly on the backward movement of the lay and cause disengagement of the shipper, as hereinbefore described.

Pivotal mounting on the bracket 16 at 67 is a wiper 68 having a rounded or cam portion 69 to act upon the inclined end of slider 70 of the slidable and rocking member 48, so that should said wiper be oscillated in a downward direction it will move the slidable and rocking member 48 in a downward direction, and conversely, should it be moved in an upward direction it will correspondingly move said slidable and rocking member. The wiper 68 may be oscillated by any means, one form of which is hereinbefore described by the present invention will now be described.

Pivotal mounting at 71, Fig. 1, on a bracket 72 secured to the machine frame, is the weft hammer 73, Fig. 1, one end of which is shown, said weft hammer 73 being suitably actuated by the arm 74, the other end of which 75, rides upon the cam 76 at 77 on the cam shaft 5. The wiper actuator 78, as a whole may be identified with Fig. 1. Projecting from the arm 74 is a rod 79, the lower end of a spring 80, the upper end of which rests against a seat 81 secured to the wiper actuator 78, suitably secured in place being projected from each of said arms 75 and 81, as indicated in Fig. 1, and serving to direct the action of the spring. As a further part the wiper actuator 78 has a finger 82 which under the stress of the spring 80 is normally held against the cam 76, and

in order that the wiper actuator 78 may have flexibility of lateral and pivotal connection with the arm 74, a pivot joint is formed by the pivot 77 passing through a slot 84 of said arm 74. The upper end portion 85 of the wiper actuator may be secured to the spring 80 in position directly beneath the pivot 67 of the wiper 68, but the flexibility of said wiper actuator 78 in the construction stated will enable said wiper actuator to move sidewise to a limited extent, as will be readily understood.

The outer portion of the wiper 68 is formed with the seats 86 and 87, between which are the cam directing portions 88 and 89, the construction being such that upon upward movement of the wiper actuator 78 the wiper will be moved or oscillated first in one and then in the other direction, the wiper actuator by its flexible connection with the arm 74 permitting sufficient movement of the wiper actuator to this end. In order to prevent undue oscillatory movement of the wiper 68 a stop 90 is secured to the bracket 45 to engage with corresponding stop portions 91, 92 of the wiper.

From the construction hereinbefore described, the details of which may be varied within the true scope of the present invention, it will be noted that upon reciprocating movement of the wiper actuator 78 due to the weft hammer actuating arm 74 and its cam, the wiper 68 will be oscillated first in one and then in the other direction under normal operative conditions of the loom, and with oscillatory movements of the wiper will thereby cause the mechanism of the parts hereinbefore described, cause the feeder bar 27 to move from its central position between the slide bar 21 first in one and then in the other direction, such movements of the feeder bar being within the straight slot 26 of the cam wheel. Or, however, a warp thread should break, the end of the drop wire previously supported thereby would fall and the feeder bar 27 in moving toward that end of the drop wire would be obstructed so that the rocking member 42 could no longer partake of the rocking movement of the slidable and rocking member 48, with the result that the slidable and rocking member 48 could fall down on one of the pins or projections 46 of the rocking member 42 and be moved rearwardly, or to the right, as indicated in Fig. 3. This movement of the slidable and rocking member 48 would be transmitted to the finger 50 of the two armed lever 38, thereby raising the stop arm 60 so that the toe 64 would, on the backward movement of the lay, be in the path of the bunter 65 and cause the wiper actuator 78 to knock off the shipper from its holding notch and cause loom stoppage.

As well understood by those skilled in the art of weaving, when a warp thread becomes broken and it is desired to draw the end through the harnesses or heddles of the shedding mechanism in piecing up, the weaver turns the loom crank, which operates the lay, to about the bottom center position in order to bring the harnesses level and even up the warp, the lay at such time being about half way back, a position that facilitates drawing in. Inasmuch as in the construction hereinbefore described the feeler bar does not operate until the crank reaches top center, it will be apparent that when the parts are positioned for drawing in a warp thread after loom stoppage due to abnormal warp condition, the feeler bar will be in central position and consequently not bind any of the drop devices or detectors.

It sometimes becomes desirable to operate the loom by hand or otherwise without actuation of the warp stop motion and to this end the flexible mounting of the wiper actuator 78 permits said wiper actuator to be removed from below the wiper 68 to one side thereof, as indicated by dotted lines in Fig. 1, whereupon the loom may be actuated as desired.

It will be noted that the wiper which actuates the feeler bar 27 from its central position toward one or the other of the side bars 21 is actuated from the same cam that actuates the weft hammer, that is, from the filling motion cam, or from a similar cam secured to the cam shaft 5, and that the knock-off action of the loom takes place on the backward movement of the lay following a forward or detecting movement of the weft hammer, the result being that should a warp thread be broken at any time, the loom will be stopped with the shuttle always on the same side of the loom, and if a filling replenishing loom be supplied with such warp stop motion and the weft hammer be disposed on the non-replenishing side, such stop action of the loom will occur when the shuttle is on the non-replenishing side.

It will appear from the construction described that the parts of the warp stop motion are simple in construction and disposed in a position to be readily accessible at the upper part of the loom and that while the details hereinbefore described constitute a convenient and practical embodiment of the invention, various modifications thereof may be made within the true scope of the present invention.

It is of importance to note that the series of drop wires, or warp detectors, are strung upon the feeder bar on which they may centrally rest when the feeler bar is in initial position, and that in such case the warp threads do not have to support the full weight of the drop wires or detectors but only pre-

vent tilting movement thereof about the feeler bar. Much strain and disturbing influence is thus removed from the warp threads with the result that breakage or slackness of warp threads is reduced to a minimum. Simplicity of mechanism also results by utilizing the filling motion cam, or the weft hammer operating arm, for actuating the rocking member of the stop motion, and by operating the parts in the manner substantially as described, the shuttle may always be found in the same box whenever the loom is stopped due to a warp fault.

What is claimed is:

1. In a loom, the combination of detectors for detecting the breakage or abnormal condition of a warp thread, a feeler co-acting with said detectors and adapted to be arrested by an abnormally positioned detector, means connected to the feeler for operating it, and an actuator for said means disconnected therefrom and actuated by the filling motion cam to periodically engage a part of said means to effect movement of the feeler.

2. In a loom, the combination of a series of detectors and a feeler detector for detecting breakage or an abnormal condition of a warp thread, a shipper, holding devices therefor, a rocking member connected to the feeler for operating the same, an actuator for said rocking member disconnected therefrom, a filling motion mechanism, connections between the filling motion mechanism and said actuator to cause said actuator to periodically engage said rocking member to move the same in one and then the opposite direction, and means to release the shipper when the movement of the feeler is obstructed.

3. In a loom, the combination of a series of warp detectors for detecting the breakage or abnormal condition of warp threads each provided with a slot, a feeler bar movable in said slots, means for moving the feeler bar in said slots longitudinally thereof from an initial position centrally of said detectors toward the ends thereof, and means to stop the loom when the movement of the feeler bar is obstructed.

4. In a loom, the combination of a series of warp detectors for detecting breakage or abnormal condition of warp threads, each detector engaging two warp threads, a feeler bar normally disposed centrally of said detectors and on which they may rest when in normal position, means for moving the feeler bar from said central position toward either end of the detectors, and means for stopping the loom with the shuttle always at one side thereof when movement of the feeler bar is obstructed.

5. In a loom, the combination of a series of warp detectors for detecting breakage or abnormal condition of warp threads, a fill-

ing motion cam, a feeler bar disposed centrally of the warp detectors, a rocking member for moving said feeler bar in either direction from said central position, an actuator and connections between the actuator and the filling motion cam to effect said movement of the feeler bar, and means to stop the loom when feeler movement is obstructed.

6. In a loom, the combination of deep wires adapted to be supported by the warp threads, a feeler bar, means for moving the feeler bar, said means including a rocking member, a flexible actuator for rocking said member, and the filling motion cam for operating the flexible actuator.

7. In a loom, the combination of deep wires adapted to be supported by the warp threads, a feeler bar, means for moving the feeler bar including a rocking member, a weft hammer, its operating arm, and flexible means actuated by said arm for engaging and rocking the rocking member.

8. In a warp stop motion for looms, the combination of a feeler bar, means including a rocking actuator for operating the same, and a series of warp detectors strong upon and normally resting on the feeler bar.

9. In a warp stop motion for looms, the combination of a series of detecting devices to detect the breakage or abnormal condition of warp threads, a feeler bar on which said detecting devices normally rest, means for moving the feeler bar, and means for stopping the loom when movement of the feeler bar is obstructed.

10. In a warp stop motion for looms, the combination of a series of detectors to detect breakage or abnormal condition of warp threads, a feeler bar on which said detectors normally rest, means for operating it, each of said detectors being provided with engaging portions at opposite ends to separately engage two warp threads, and means to stop the loom when a detector drops at either end and obstructs movement of the feeler bar.

11. In a warp stop motion for looms, the combination of a series of detectors for detecting the breakage or abnormal condition of warp threads, each of said detectors having a warp engaging portion at each end, a feeler bar initially disposed centrally of the detectors and on which they normally rest, side bars between which the detectors are disposed, means for moving the feeler bar toward either side bar, while the ends of the detectors are sustained by the warp threads, and means for stopping the loom when the feeler bar movement is obstructed.

12. In a warp stop motion for looms, the combination of a series of detectors for detecting the breakage or abnormal condition of warp threads, each of said detectors having a warp engaging portion at each end, a

feeler bar initially disposed centrally of the detectors and on which they may rest, side bars between which the detectors are disposed, a bottom bar, yielding means for moving the feeler bar toward either side bar while the ends of the detectors are sustained by the warp threads, and means for stopping the loom when the feeler bar movement is obstructed.

13. In a warp stop motion for looms, a series of warp detectors for detecting breakage or abnormal condition of warp threads, each having a warp thread engaging eye at each end, a feeler bar, each detector having a slot extending longitudinally thereof by which they are mounted on the feeler bar, means to move the feeler bar in said slots, and means for stopping the loom when movement of the feeler bar is obstructed.

14. In a warp stop motion for looms, a series of warp detectors for detecting breakage or abnormal condition of warp threads, each having a warp thread engaging eye at each end, a feeler bar, each detector having a slot extending longitudinally thereof by which they are mounted on the feeler bar, a bar disposed above the detectors to prevent undue rising movement, means to move the feeler bar in said slots, and means for stopping the loom when movement of the feeler bar is obstructed.

15. In a warp stop motion for looms, the combination of a wiper, a flexibly mounted actuator for oscillating said wiper, a feeler bar, means between the wiper and feeler bar for moving the latter, and a series of detectors operatively disposed with relation to the feeler bar.

16. In a warp stop motion for looms, the combination of a wiper, a wiper actuator, a feeler bar, means including the wiper for moving the feeler bar, a series of warp detectors, and means actuated from the filling motion cam for operating the wiper actuator.

17. In a warp stop motion for looms, the combination of a series of warp detectors, a feeler bar, means including a rocking member and wiper for actuating the feeler bar, filling motion devices, and operating means between the filling motion devices and the wiper for operating the latter from the former.

18. In a warp stop motion for looms, the combination of a series of warp detectors, a feeler bar, a rocking member for operating the feeler bar, a weft hammer, means for operating the weft hammer, and devices including a wiper actuated from said means for operating the feeler bar.

19. In a warp stop motion for looms, the combination of a series of warp detectors each having a warp thread engaging portion at each end, a feeler bar, filling motion devices, means for actuating the feeler bar from the filling motion devices, a stop rod,

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the lay having a bunter, and means for positioning the stop rod for operation by the bunter on the backward movement of the lay when movement of the feeler bar is obstructed.

20. In a warp stop motion for looms, a warp detector having a warp thread engaging eye at each end and a slot extending longitudinally of the detector at one side of both of said eyes.

21. In a loom, the combination of a series of warp detectors, a feeler bar, means including a rocking member and a wiping device for operating the feeler bar, and a flexibly mounted actuator for operating the wiping device.

22. In a loom, the combination of a series of warp detectors, a feeler bar, means including a rocking member and a wiper for actuating the feeler bar, a wiper actuator, means for operating the wiper actuator, and connections between said means and the wiper actuator permitting flexibility of the latter.

23. In a warp stop motion for looms, the combination of a series of warp detectors, a feeler bar, a wiper, means between the wiper and feeler bar for actuating the latter from the former, a wiper actuator, an arm to which the wiper actuator is flexibly connected, and means for operating the bar to cause the wiper actuator to engage the wiper successively at different points.

24. In a warp stop motion for looms, the combination of a series of warp detectors, a feeler bar, a rocking member for operating said feeler bar, a slidable and rocking member coacting with said first named member, a wiper for operating the slidable and rocking member, and a wiper actuator for operating the wiper.

25. In a loom, the combination of a series of warp detectors, a feeler, means for moving the feeler, and an actuator for said means, disconnected and adapted to be engaged and disengaged during the operation of the loom, and said actuator and means being movable relatively into inoperative relation that the loom may be run without causing loom stoppage when a detector indicates an abnormal condition of a warp thread.

26. In a loom, the combination of a series of warp detectors, a feeler, means for moving the feeler to cause it to feel for and be stopped by a warp detector when in abnormal position, and an actuator for said means, said means and actuator being disconnected and adapted for relative movement into inoperative relation, and means for maintaining them in such inoperative relation that the loom may be run at times without causing stoppage even though a detector may assume an abnormal position.

27. In a loom, the combination of a series

of warp detectors, a feeler, means for moving the feeler positively in both directions of its movement to cause it to feel for and be stopped by a warp detector in abnormal position, an actuator for said means, and devices permitting the actuator to be moved to and from operative relation with said means, that the loom may at times be run without causing stoppage when a detector indicates an abnormal condition of a warp thread.

28. In a loom, the combination of a series of warp detectors, a feeler, means connected to the feeler to cause it to feel for and be stopped by a warp detector in abnormal position, and an actuator for said means, said actuator and means being normally disconnected for relative independent movement that the feeler or actuator may be moved by hand, and the feeler may be caused to clamp and hold a drop detector and when the loom is at rest to enable the operative to readily pick out the abnormal warp thread.

29. In a loom, the combination of drop devices or detectors adapted to be supported by the warp threads, a feeler, mechanism including an actuator for positively moving the feeler in two directions, said actuator being normally disconnected from the train of mechanism between it and the feeler, and adapted to be moved into an inoperative position with respect to said mechanism.

30. In a loom, the combination of drop devices or detectors adapted to be sustained by warp threads, a feeler, weft stop motion devices, a rocking member for operating the feeler, an actuator for said rocking member, said actuator being disconnected from the rocking member and flexibly connected to the weft stop motion devices, and means actuated by backward movement of the lay upon arrest of the feeler by a drop device or detector to stop the loom with the shuttle always in the same box.

31. In a loom, the combination of drop devices or detectors adapted to be supported by warp threads, a feeler, means including a rocking member for actuating the feeler, an actuator for said rocking member normally disconnected therefrom, and means to move the actuator.

32. In a loom, the combination of drop devices or detectors adapted to be supported by warp threads, a feeler, means including a rocking member for actuating the feeler, an actuator, operating means therefor, and means for causing said actuator to engage the rocking member alternately on opposite sides of its rocking fulcrum.

33. In a loom, the combination of drop devices or detectors adapted to be supported by warp threads, a feeler, means including a rocking member for actuating the feeler, an actuator for said rocking member nor-

mally disconnected therefrom, means to move the actuator, and means permitting said actuator to be inoperatively positioned with respect to the rocking member.

5 34. In a loom, the combination of drop devices or detectors adapted to be supported by warp threads, a feeler, means including a rocking member for actuating the feeler, an actuator for said rocking member, means
10 for operating the actuator and causing it to engage and disengage the rocking member, and means permitting the actuator to be moved into inoperative position with respect to the rocking member.

15 35. In a loom, the combination of drop

devices or detectors adapted to be supported 20 by warp threads, a feeler, means including a rocking member for operating the feeler, said rocking member having actuator engaging portions at each side of its rocking point, and an actuator adapted to engage said por- 25 tions to rock the rocking member.

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

JONAS NORTHROP.

Witnesses:

WENDELL WILLIAMS,

BERTHA I. SNARE.