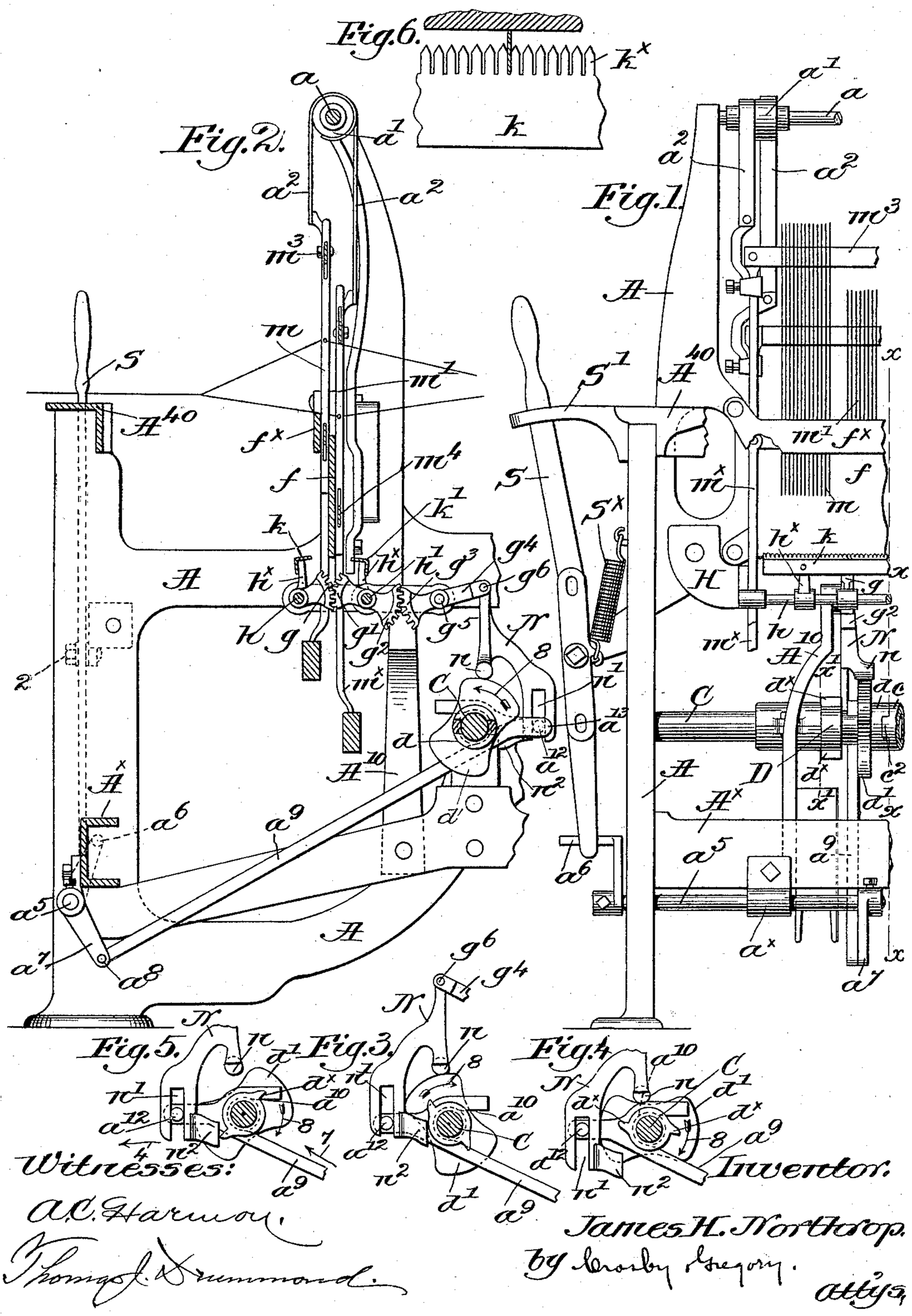
No. 607,947. Patented July 26, 1898.

J. H. NORTHROP.

WARP STOP MOTION MECHANISM FOR LOOMS.

(Application filed Oct. 8, 1897.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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WARP-STOP-MOTION MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 607,947, dated July 26, 1898.

Application filed October 8, 1897. Serial No. 654,514. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. NORTHROP, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Warp-Stop-Motion Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to that class of warp-stop-motion mechanism for looms wherein the breakage or undue slackening of the warp-threads operates through suitable actuating or controlling detectors to effect the stoppage of the loom. As is well known in such warp-stop mechanisms, a normally-vibrated feeler is held from its normal movement by a detector in abnormal position due to breakage or undue slackening of a warp-thread; and this present invention relates more particularly to the mechanism for normally vibrating the feeler and for effecting the stoppage of the loom, the movement of the feeler toward the detectors being effected by gravity.

Figure 1 is a front elevation of a sufficient portion of a loom to be understood with my present invention applied thereto. Fig. 2 is a vertical sectional view thereof on the line $x\ x$, Fig. 1, looking toward the left. Figs. 3, 4, and 5 are details on the line $x'\ x'$, Fig. 1, looking toward the right, of a portion of the mechanism for vibrating the feeler, the parts being shown in different positions; and Fig. 6 is an enlarged detail of a portion of the feeler in plan, a detector and its coöperating fixed abutment being shown in section.

The lay is omitted in the drawings for the sake of clearness, and the loom-frame A, the breast-beam A^{40}, the harness cam-shaft C, the overhead connection between the harness-frames and comprising the shaft a, sheaves a', and flexible straps a^2, and the shipper-lever S, pivoted at 2 and held in a notch in the usual holding-plate S′ against the stress of the actuating-spring $S^{\times}$, may be and are all of usual and well-known construction in looms, the shipper-lever operating a belt-shifter mechanism. (Not shown.)

A rock-shaft a^5 is supported in bearings in the loom side and in a bearing on a bracket $a^{\times}$, secured to the cross-girth $A^{\times}$, said shaft having fast thereon a knock-off arm a^6 to engage and release the shipper-lever from its holding-notch at the proper time, while the harness-cams (not shown) are mounted on a sleeve c, secured to the cam-shaft C, one end of the sleeve having lugs c^2, Fig. 1, to enter notches in a hub d, fixed in adjusted position on the cam-shaft, so that a locking connection is effected between the harness-cams and the hub d, so that any change in the set of the harness-cams on the shaft C will effect a corresponding change in the angular position of the hub d.

Such mechanism is not herein claimed, as it forms a portion of the subject-matter of United States Patent No. 594,355, dated November 23, 1897.

The rock-shaft a^5 has fast thereon an arm a^7, jointed at a^8 (see Fig. 2) to a link a^9, upwardly extended and bent or hooked at its free end, as at a^{10}, to partially embrace the cam-shaft C between the feeler-controlling cam d', shown as fast on the hub d, and a tappet-cam D, fast on the cam-shaft, said tappet-cam being provided with toes or tappets $d^{\times}$.

I have herein shown two series of warp-stop-motion-actuating detectors $m\ m'$, which in this instance also serve as heddles, slotted longitudinally to receive the supporting-bars $m^3\ m^4$ at the top and bottom of the harness-frame, said bars being connected to rigid side bars $m^{\times}$, the harness-frames being reciprocated by usual and well-known mechanism, omitted on the drawings to avoid confusion and forming no part of this invention.

Two rock-shafts $h\ h'$ are mounted in parallelism in suitable bearings on stands H, one being shown in Fig. 1 and provided with arms $h^{\times}$, to which are attached two oppositely-turned vibrators or feelers $k\ k'$ below the paths of and to coöperate with the detectors $m\ m'$, respectively.

I prefer to make the acting portions of the feelers as best shown in Fig. 6, wherein the feeler k is shown as slotted transversely to form a series of tines $k^{\times}$, having parallel sides and beveled points, the depth of the slots being preferably equal to substantially one-half the width of the detectors.

As clearly shown in Fig. 2, the shafts $h\ h'$ are connected by segmental gears $g\ g'$, to

thereby rock in unison in opposite directions to give the vibratory motion to the feelers in the direction of the length of the warps, the shaft h' having fast thereon a second segment-gear g^2 in mesh with a similar gear g^3, having a rearwardly-extended arm g^4 and fulcrumed at g^5 on a standard A^{10}, secured to the loom-frame. A depending leg N is pivotally connected at g^6 to the arm g^4 and is provided with a toe, or it may be a roll n, adapted to normally rest on the perimeter of the cam d', the weight of the leg tending to maintain such contact and through the intervening connections described to rock the feelers by gravity in their vibratory movement toward the paths of the detectors. A dropped detector will engage the coöperating feeler and stop its movement, and the leg N will be thereby held from descending to its full extent, as shown in Fig. 5. The lower end of the leg is forked or slotted at n' to receive a stud or roll a^{12}, extended laterally from a rearward extension a^{13} of the link a^9. The leg N has mounted thereon a bunter n^2 (see Figs. 3, 4, and 5) in the plane of movement of the tappets $d^\times$ on the cam D. Now when the parts are as shown in Figs. 1, 2, and 3, with the loom running properly, the feelers are at their extreme throw away from the paths of the detectors, such movement being effected by the engagement of the toe n with a high part of the controlling-cam d', and at such time the bunter n^2 will be in position to be engaged by the next advancing tappet $d^\times$, the direction of rotation of the camshaft C being shown by the arrows 8. Before the tappet can strike the bunter n^2, however, the toe n will under normal conditions leave the high part of cam d', and the descent of the leg N carries the bunter below and out of range of the tappet, as in Fig. 4, and the stroke of the feelers toward the detectors will be completed, gravity effecting such stroke. If, however, a warp-thread should break or unduly slacken, its coöperating detector will descend into the path of and stop the gravity-actuated stroke of the corresponding feeler, and the leg N will be held from descending to its normal extent when the low part of the controlling-cam d' passes beneath the toe n. Such position of parts is shown in Fig. 5, and it will be seen that the bunter n^2 will be in the path of and will be engaged by a tappet $d^\times$, so that the leg N will be swung on its fulcrum g^6 in the direction of the arrow 4. (See Fig. 5.) Such movement of the leg will move the link a^9 longitudinally in the direction of the arrow 7, Figs. 2 and 5, to thereby rock the knock-off arm a^6 and release the shipper-lever S to stop the loom.

A separator plate or bar f is interposed between the lower ends of the detectors and it serves as an abutment for a dropped detector when engaged by a feeler, while the front bar $f^\times$ forms a warp-rest.

The cam for controlling the movement of the feeler may be termed the "feeler-cam," and the tappet-cam may be designated as the "actuator" for the stopping means of the loom.

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

1. In a warp-stop-motion mechanism for looms, stop-motion-actuating detectors controlled as to their position by the warp-threads, a vibrating feeler moved by gravity toward and to be stopped by a dropped detector, stopping means for the loom, including a pivotally-supported bunter governed as to its position by the feeler, a rotatable shaft, and a bunter-actuating cam and feeler-controlling cam fast thereon, said controlling-cam effecting the movement of the feeler away from the detectors, substantially as described.

2. In a warp-stop-motion mechanism for looms, a plurality of series of stop-motion-actuating detectors controlled as to their position by the warp-threads, independently-mounted vibratable feelers one for each series, to be engaged and stopped by a dropped detector therein, connections between and to vibrate said feelers in unison, and means to positively rock the feelers away from the detectors, the opposite movement being effected by gravity, said means including a rocking arm, a leg depending therefrom, and a cam to normally engage said leg and rock said arm in one direction, substantially as described.

3. In a warp-stop-motion mechanism for looms, a plurality of series of stop-motion-actuating detectors controlled as to their position by the warp-threads, independently-mounted vibratable feelers one for each series, to be engaged and stopped by a dropped detector therein, connections between and to vibrate said feelers in unison, and means including a rocking arm, a leg depending therefrom, and a cam to normally move the leg to rock said arm in one direction, to positively rock the feelers away from the detectors, the opposite movement being effected by gravity, combined with stopping mechanism for the loom, including a bunter connected with said leg and governed as to its position by the feelers, and an actuator to engage the bunter and stop the loom upon engagement of a dropped detector by its feeler, substantially as described.

4. In a warp-stop-motion mechanism for looms, a plurality of series of stop-motion-actuating detectors controlled as to their position by the warp-threads, independently-mounted vibratable feelers one for each series, to be engaged and stopped by a dropped detector therein, gearing between said feelers, to effect their vibration in unison, a pivotally-mounted, depending leg connected with said feelers and having a bunter thereon, a cam to lift said leg and rock the feelers in one direction, and an actuator for the bunter, combined with a knock-off arm, and connections between it and the leg, movement of the

bunter by its actuator, due to stoppage of a feeler by a dropped detector, operating the knock-off arm to effect stoppage of the loom, substantially as described.

5. In a warp-stop-motion mechanism for looms, including stop-motion-actuating detectors and a coöperating vibratable feeler, a rocker-arm, a positive connection between the feeler and rocker-arm, to rock the latter, a bunter pivotally suspended from the rocker-arm, to rise and fall as the feeler vibrates, a tappet-cam adapted to engage and swing the bunter laterally upon stoppage of the feeler by a dropped detector, and stopping mechanism for the loom, connected with and operated by lateral movement of the bunter, substantially as described.

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

JAMES H. NORTHROP.

Witnesses:

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