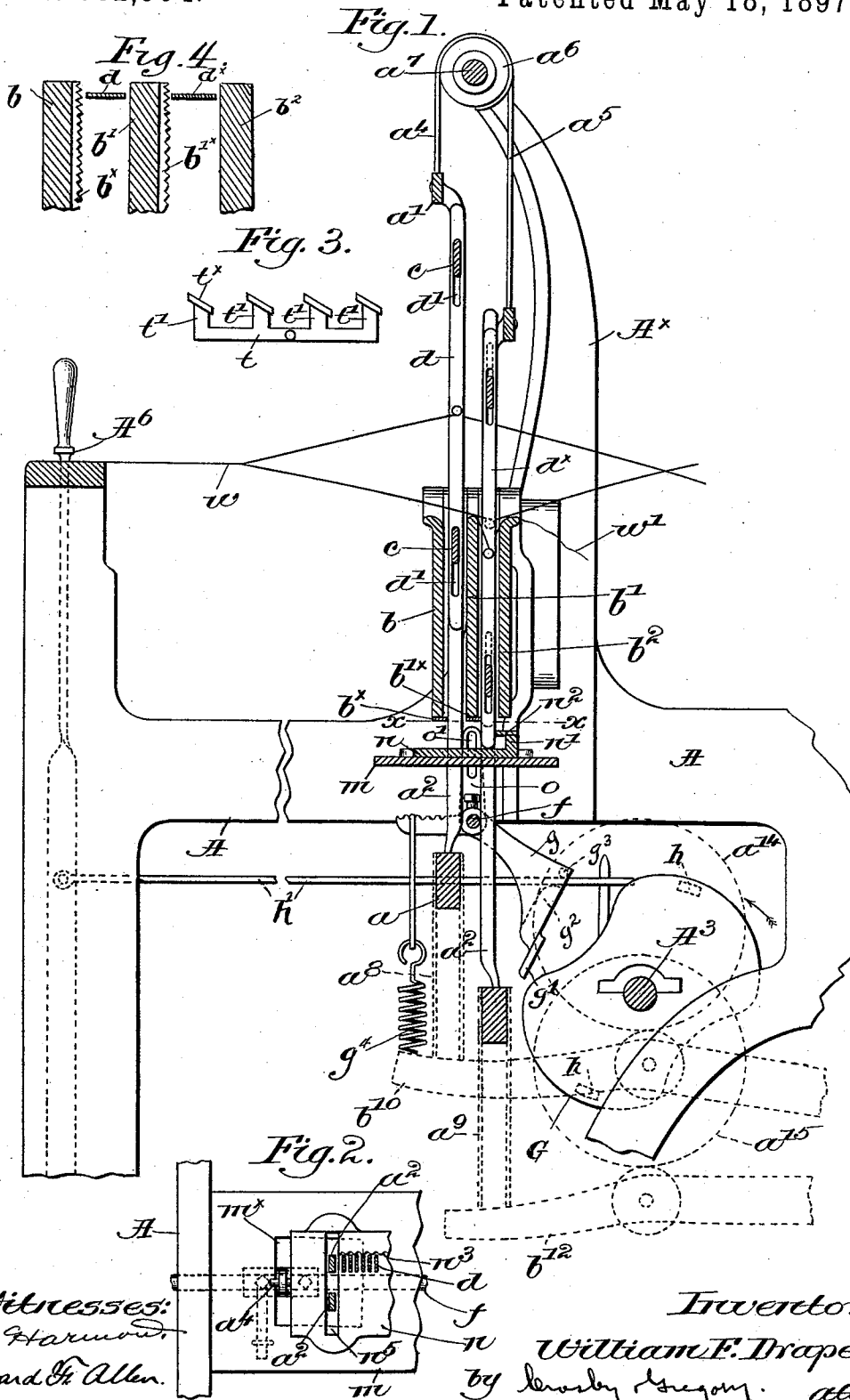


(No Model)

W. F. DRAPER.
WARP STOP MOTION FOR LOOMS.

No. 582,904.

Patented May 18, 1897.



Witnesses:
A. L. Hammond,
Edward H. Allen.

Inventor:
William F. Draper.
by Bradley Gregory, attys.

UNITED STATES PATENT OFFICE.

WILLIAM F. DRAPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE
DRAPER COMPANY, OF SAME PLACE AND PORTLAND, MAINE.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 582,904, dated May 18, 1897.

Application filed January 30, 1897. Serial No. 621,272. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. DRAPER, of Hopedale, county of Worcester, 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.

This invention relates to that class of warp stop-motion mechanism for looms wherein a series of stop-motion-actuating detectors acting merely as such or also serving as heddles are utilized to effect the stoppage of the loom upon breakage or undue slackness of a warp-thread.

A number of patents have been granted for warp stop-motions of this general character, in the majority of which a detector in abnormal position due to failure of its warp-thread is engaged by a vibrator, so actuated that it will not operate properly should the harness mechanism of the loom be improperly set.

In this invention I have provided for some variation in the set of the harness mechanism as regards the action of the vibrator, which practically insures the proper engagement of the latter with a detector in abnormal operative position.

Figure 1 is a longitudinal section of a sufficient portion of a loom to be understood with one form of my present invention embodied therein, the lay and other mechanism having no direct connection with this invention being omitted. Fig. 2 is a partial horizontal sectional view taken on the line xx , Fig. 1, looking down. Fig. 3 is a detail in side elevation of a modified form of vibrator; and Fig. 4 is a horizontal sectional view through the guide and separator bars, looking down.

The loom-frame A , cross or cam shaft A^3 , the shipper-lever A^6 , and the usual notched plate to hold it in place while the loom is running properly are and may be all as common in looms, the shipper-lever operating a belt-shipper (not shown) to control the usual driving-belt.

The uprights A^x , one at each side of the loom-frame, support, as herein shown, plates or bars b b' b^2 , arranged in parallelism transversely to and below the warp-threads w , the bars being sufficiently separated to permit the

harness or heddle frames to move between them, the center bar b' acting as a separator for the lower ends of the two series of warp stop-motion-actuating detectors d . (Herein shown as heddles.) The bars b b^2 also serve as supports for the warp-threads when in the lower plane of the shed.

The heddle or detector frames (herein shown as two in number) are each composed, essentially, of a bottom bar a , top bar a' , rigidly connected by side bars a^2 , each frame being provided with upper and lower cross-bars c , extended through slots d' at or near the upper and lower ends of the detector-heddles, substantially as shown in United States Patent No. 536,969, dated April 2, 1895, to which reference may be had, the heddles having a movement vertically independent of the vertical movement of the frame by reason of the fact that the slots d' are longer than the width of the cross-bars c .

Suitable straps a^4 a^5 connect the upper bars a' of the frames with pulleys a^6 on a rotatable shaft a^7 , mounted in the uprights A^x , while the lower bars a of the heddle-frames are connected by suitable straps a^8 a^9 with the levers b^{10} b^{12} , (partly shown in Fig. 1 in dotted lines,) and actuated in usual manner by cams a^{14} a^{15} on the cam-shaft A^3 , all as in said patent referred to.

A horizontal plate m is extended across the loom-frame below the paths of movement of the heddles and cut out at m^x , Fig. 2, to permit the passage of the side bars a^2 of the heddle-frames, said plate forming a support for a vibrator, (shown as a flat base n , upturned at its rear side at n' and having secured to the upturned portion a cap n^2 , preferably notched or corrugated on its front edge, as at n^3 , Fig. 2.)

The base n of the vibrator rests and slides upon the support m , being normally reciprocated backward and forward beneath the paths of the detector-heddles d , the cap n^2 being adapted to engage a detector in abnormal position due to breakage or failure of its warp-thread, a detector-heddle d^x , Fig. 1, being shown in abnormal position due to breakage of its warp-thread w' .

Referring to Fig. 1 it will be seen that the dropped detector rests on the base n of the vibrator, and accordingly the detector has

not dropped as far as the cross-bars *c* would have permitted under ordinary conditions.

The distance the detector drops upon failure of its warp-thread is not, therefore, now governed by the position of the detector-frame so much as by the vibrator, and therefore some variation in the set of the mechanism for reciprocating the harness or heddle frames is permissible without throwing out of proper operation the vibrator.

The lower ends of the guide and separator bars *b* and *b'* are provided with plates *b^x* *b'^x*, preferably serrated or notched at their edges adjacent the heddles (see Fig. 4) to prevent twisting of the latter when engaged by the cap of the vibrator.

The vibrator is provided at each end with a stud *a'*, only one of such studs being shown in Fig. 2, to enter a longitudinal slot *o'* in a rocker-arm *o*, fast on a rock-shaft *f*, so that when the latter is rocked the vibrator will be moved first in one and then in the other direction.

Referring to Fig. 2 it will be seen that the base *n* of the vibrator is transversely slotted at *n^s* to receive the side bars *a²* of the reciprocating frames.

Any suitable mechanism may be employed to rock the shaft *f*, and I have herein shown mechanism substantially the same as that shown in Patent No. 536,969, referred to.

The rock-shaft has fast upon it a controller-lever *g*, having a toe *g'*, a heel *g²*, extended inwardly from one side thereof, and a pin or projection *g³*, while a spring *g⁴*, operably connected to one arm of the controller-lever, acts normally to keep the toe *g'* of the latter in contact with the cam *G*, fast on the shaft *A³*. This cam is provided at one side with pins or projections *h*, which, in the rotation of the cam, are adapted, when the loom is working properly, to pass under the elevated end of the connecting-rod *h'*, attached to the shipper-lever *A⁶*, said rod at such time resting upon the heel *g²* and between it and the pin *g³*. When, however, a detector, as *d^x*, moves into the position shown in Fig. 1, it will be engaged by the cap *n²* of the vibrator, stopping the movement of the latter and of the controller-lever, retaining the latter in the position shown in Fig. 1. In such position of the controller-lever the end of the rod *h'* will be in the path of movement of one of the projections *h*, so that in the further movement of the cam said projection will act on the rod to disengage the shipper-lever from the notch in the usual holding-plate to operate in usual manner the belt-shipper or other equivalent device to move the belt from the fast onto the loose pulley, thus stopping the loom.

Obviously any other mechanism can be employed for moving the vibrator which will normally reciprocate the latter back and forth in the direction of the length of the warp and which will permit stoppage of the vibrator by engagement with a dropped detector.

The vibrator shown in Figs. 1 and 2 has

such amplitude of movement that a single cap or disengaging portion *n²* will coöperate with a dropped detector of either series.

In Fig. 3 I have shown a vibrator adapted for use with more than two harnesses or detector-frames, the base *t* having a series of longitudinally-upturned flanges *t'*, preferably beveled at their upper ends and having mounted thereon cap or detector engaging bars *t^x*. These latter are inclined relatively to the base of the vibrator to assist a detector in dropping into place should it fall upon one of the caps. In either case the throw of the vibrator is independent of the set of the harness-actuating cams, and owing to the peculiar construction of the vibrator said harness-actuating cams may be varied as to their set within reasonable limits without causing improper operation of the vibrator.

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

1. In a loom, a series of warp-stop-motion-actuating detectors, a vibrator movable back and forth below said detectors in the direction of the length of the warp-threads, to engage and be stopped by a detector in abnormal position, the vibrator having a projecting portion to support and restrict the full downward movement of such detector, and means to normally move the vibrator, substantially as described.

2. In a loom, a series of warp-stop-motion-actuating detectors, a vibrator movable back and forth in a substantially horizontal plane below said detectors and having an extended, flat base, a longitudinal cap on the vibrator to engage a dropped detector resting on the base, and means to normally move the vibrator, substantially as described.

3. In a loom, a series of warp-stop-motion-actuating detectors acting as heddles, means to reciprocate them vertically, a fixed guide for the lower ends of said detectors, a vibrator having a cap to engage the edge of and be stopped by a dropped detector, the base of the vibrator being extended in front of said cap below the guide, to support a detector when engaged by the cap, and means to normally move the vibrator back and forth in the direction of the length of the warp, substantially as described.

4. In a loom, a series of warp-stop-motion-actuating detectors, means, including a cam, to reciprocate them vertically, a vibrator having a shelf-like base to support, and a cap to engage the edge of a dropped detector, the base restricting the downward movement thereof, means, including a cam, to normally move the vibrator back and forth below the detectors, and a shaft upon which the cams are secured, substantially as described.

5. In a loom, a frame having a cross-bar and a series of warp-stop-motion-actuating detectors supported thereby, and having a vertical movement independent of the frame, means to vertically reciprocate said frame, a

vibrator independent of the frame and adapted to be reciprocated in the direction of the length of the warp-threads, to engage and be stopped by the edge of a detector in abnormal position, the base of the vibrator preventing the full downward movement thereof, whereby the reciprocating means may be varied as to its movement, and means to normally move the vibrator back and forth below the detectors, substantially as described.

6. In a loom, a plurality of series of warp-stop-motion-actuating detectors, means to move them vertically, a vibrator having an extended base below said detectors and to support a dropped detector, a plurality of caps on said base, each coöperating with the detectors of one series, and means to normally move the vibrator back and forth below the detectors, substantially as described.

7. In a loom, a plurality of series of warp-stop-motion-actuating detectors, means to move them vertically, a vibrator having an extended base below said detectors and to support a dropped detector, a plurality of caps on said base, each coöperating with the detectors of one series, said caps having their tops inclined to direct a dropped detector to the base of the vibrator, and means to normally move the latter back and forth below the detectors, substantially as described.

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

WILLIAM F. DRAPER.

Witnesses:

GEO. OTIS DRAPER,
WM. W. KNIGHT.