

No. 649,242.

Patented May 8, 1900.

H. I. HARRIMAN.
WARP STOP MOTION FOR LOOMS.

(Application filed July 21, 1899.)

(No Model.)

2 Sheets—Sheet 1.

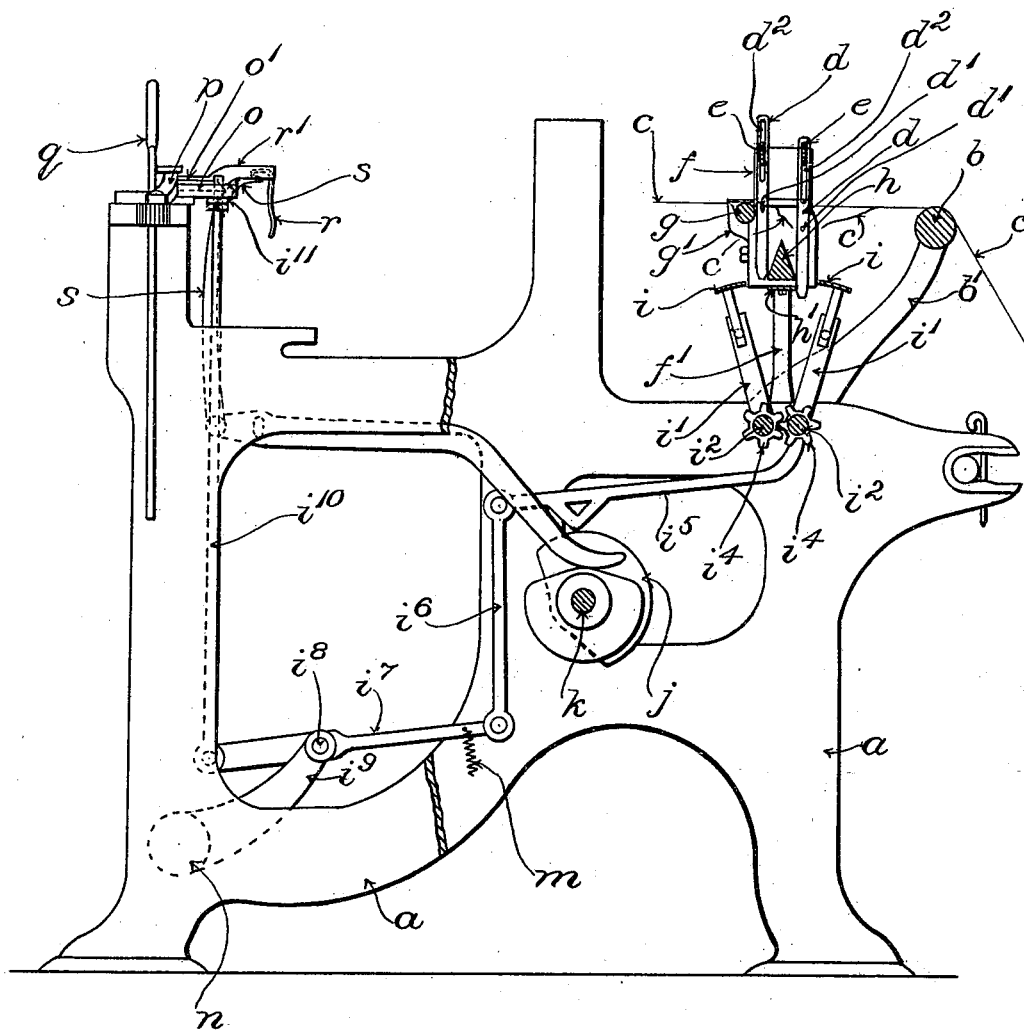


Fig. 1.

Witnesses:

Walter B. Russell

Oscar F. Hill

Inventor:

Henry I. Harriman

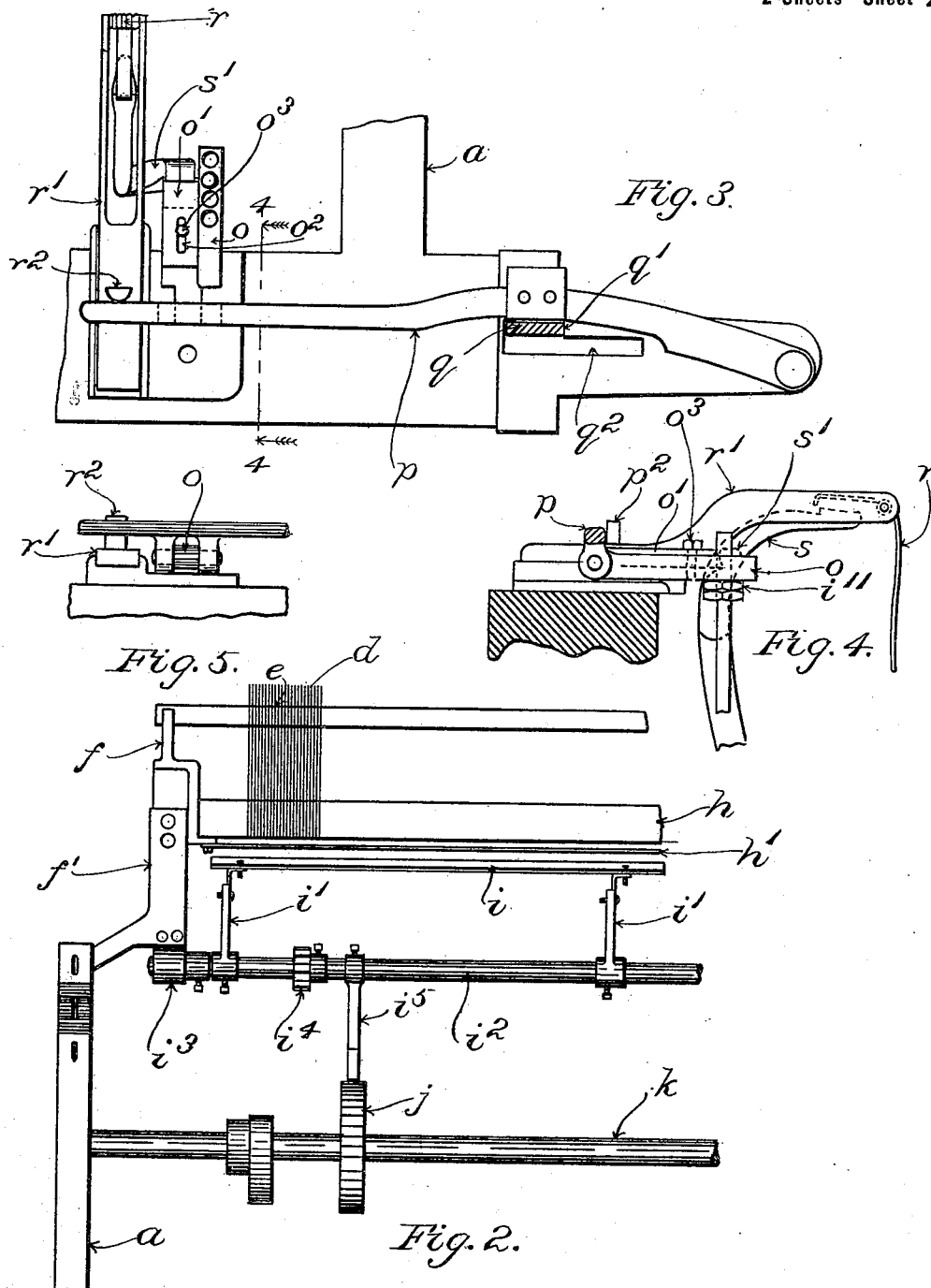
by Marcus Calver Randall
his Attorneys.

H. I. HARRIMAN.
WARP STOP MOTION FOR LOOMS.

(Application filed July 21, 1899.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:

Walter B. Russell.

Oscar F. Hill

Inventor:

Henry D. Harriman

by Marcus Balver & Randall
his Attorneys.

UNITED STATES PATENT OFFICE.

HENRY I. HARRIMAN, OF NEW YORK, N. Y.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 649,242, dated May 8, 1900.

Application filed July 21, 1899. Serial No. 724,595. (No model.)

To all whom it may concern:

Be it known that I, HENRY I. HARRIMAN, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented a certain new and useful Improvement in Warp Stop-Motions for Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention comprises improvements in the mechanisms which are employed in looms for the purpose of stopping the latter automatically in case one or more of the warp-threads should break or become excessively slack.

Various kinds of stop-motion mechanisms have been devised heretofore, some of them being entirely mechanical in construction and action, while others thereof have been electromechanical. In many of these stop-motion mechanisms a series of drops or detectors is applied to the series of warp-threads in a loom and a "vibrator" or "feeler" is arranged to move in a path immediately adjacent to the position in which the drops or detectors are held by the tension of the warp-threads. The drops or detectors are so arranged or contrived as that in case of breakage or excessive slackness of a warp-thread the corresponding drop or detector assumes a position extending across the path of the vibrator or feeler. In this new position the said drop or detector is encountered by the vibrator or feeler in its movement. As a result of this encounter the unshipping of the driving power and stopping of the loom are occasioned through the action of instrumentalities which thereupon are automatically brought into play. One form of drop or detector which has gone into general use in warp stop-motions consists of a strip of thin and light sheet metal several inches in length and formed with a slot or eye for the passage of the warp-thread upon which the said drop or detector is strung. The thinness of these drops or detectors is necessitated by the large number of the same that require to be employed side by side in one or more series extending crosswise of the loom in order that each warp-thread may be provided for. A series of these flat sheet-metal drops or detectors hangs in a loom from the warp-threads in a line par-

allel with a suitable backing-bar or guide, their lower ends being maintained by the warp-threads at a sufficient height to clear the path of movement of the vibrator or feeler. When one descends into the said path, it is struck by the vibrator or feeler and by the advancing movement of the latter is pressed toward the said backing-bar or guide. The drops or detectors should hang with their flat sides at right angles to the vibrator or feeler and backing-bar or guide, so that when in their lowered position they will be compressed edgewise between the latter two. However, they frequently occupy a more or less oblique position with respect to the backing-bar or guide and vibrator or feeler. Should one thereof occupy this oblique position when lowered into the path of the vibrator or feeler, it ordinarily will become completely turned around as a result of compression between the vibrator or feeler and backing-bar or guard until it stands flatwise with relation to the parts between which it is compressed, and then it will bend under pressure exerted by the vibrator or feeler upon the end thereof extending below the backing-bar or guide. For the purpose of obviating this and other disadvantages it has been deemed necessary heretofore to provide means for preventing the drops or detectors from assuming a flatwise position with relation to the vibrator or feeler when subjected to the pressure thereof.

One object of the present invention is to render unnecessary the use of special provisions for preventing the drops or detectors used in a warp stop-motion from turning around and to provide devices which will act equally well whether the drops or detectors stand edgewise or flatwise with relation to the vibrator or feeler, while also obviating any bending of the drops or detectors which stand flatwise or other injury thereto.

Another object of the mechanism is to provide an improved stop-motion mechanism of simple and efficient character.

The preferred embodiment of the invention is illustrated in the accompanying drawings.

In the said drawings, Figure 1 is a partly-sectional side elevation of a loom containing the said embodiment, only such parts of the loom being shown as are necessary to be referred to in explaining the nature and rela-

tions of the invention. Fig. 2 is a rear elevation of certain parts pertaining more particularly to the warp stop-motion. Fig. 3 is a plan of a portion of the breast-beam of the loom and certain parts which are applied thereto. Fig. 4 is a view in section on line 4 4 in Fig. 3 looking in the direction indicated by the arrows near the ends of such line. Fig. 5 is a detail view of certain of the parts in Figs. 3 and 4, showing them in front elevation.

Having reference to the drawings, *a a* designate the sides of the loom-frame.

b is the usual warp-supporting or guide roll, located at the rear of the loom and known as the "whip-roll," it being supported by stands *b'*, which are applied to the side frames *a a*.

The detector devices of my improved warp-stop-motion mechanism are shown located a short distance in front of the whip-roll *b*, although the position thereof may be varied in practice.

c, Fig. 1, designates warp-threads passing partly around the whip-roll *b* and extending forwardly therefrom in the loom.

d d are drops or detectors of sheet metal, such as have been referred to hereinbefore. Each of the said drops or detectors has a warp-eye *d'*, through which is passed one of the warp-threads *c*. Each is formed also with an elongated slot *d²* to provide for the application of the drop or detector to the supporting and guiding bar which is employed in the loom in connection with each series of drops or detectors. Two such series are shown in the drawings; but the precise number, it will be understood, is not material.

e e are two supporting and guiding bars upon which the two series of drops or detectors *d d* are strung, these bars passing through the slots *d² d²*.

f f are stands having notched seats which receive the bars *e e*, and *f' f'* designate brackets by means of which the said stands are supported from the side frames *a a*.

g is a warp-rest which may be employed, if desired, to serve as a support for the warp-threads on the side of the drops or detectors toward the usual position of the harness-frames. (Not shown.) The said warp-rest is in the form of a rod or roll having its ends received in seats or bearings provided at *g'* on the stands *f f*.

As thus far described the parts are or may be as heretofore.

Adjacent the lower ends of the drops or detectors and in an intermediate position with reference to the two series thereof are located the upper backing-bar *h* and the lower backing-bar *h'*. The ends of these two backing-bars are applied to the stands *f f*, as shown, the lower backing-bar being located immediately below the under side of the upper backing-bar, their proximate surfaces being separated by a very narrow space.

In connection with each series of drops or detectors I employ a vibrator or feeler *i*, the two vibrators or feelers which are employed

in the arrangement shown working at opposite sides of the pair of backing-bars *h h'*. The vibrators or feelers consist each of a comparatively-thin strip capable of passing edgewise into the narrow space between the said backing-bars *h h'*. For the actuation of the said vibrators or feelers they are mounted herein upon arms *i' i'*, which are made fast to parallel rock-shafts *i² i²*, the latter being supported by bearings *i³ i³*, provided on the brackets *f' f'*. The vibrators or feelers are coupled together to move simultaneously in opposite directions, as by means of inter-meshing gears *i⁴ i⁴*, that are made fast upon the rock-shafts *i²*.

For the transmission of motion to the vibrators or feelers an arm *i⁵* is made fast upon one of the rock-shafts *i²*, the said arm being arranged to bear against the periphery of a cam *j* on one of the rotating shafts of the loom, herein the cam-shaft *k*. The cam acts upon the arm *i⁵* to move the vibrators or feelers away from the backing-bars, while they are returned with a yielding force to feel for dropped warp-detectors through the action of a suitable spring, as *m*. Herein the arm *i⁵* is connected by a link *i⁶* with a lever *i⁷*, fulcrumed at *i⁸* upon a stand *i⁹*, projecting rearwardly from the front cross-girth *n*. The spring *m* is connected with the said lever *i⁷*, and its power is transmitted through the latter and the link *i⁶* to the arm *i⁵*.

The vibrators or feelers *i i* act in the usual manner in connection with lowered drops or detectors which occupy their normal position—namely, edgewise with respect to the backing-bars and vibrators or feelers—that is to say, they compress the said drops or detectors edgewise against the backing-bars until the yielding advancing movement of the vibrators or feelers is arrested by the presence of the lowered drops or detectors in front of the backing-bars. When the lowered drops or detectors occupy a more or less oblique position, the pressure of a vibrator or feeler thereagainst completes the turning of the same until it bears flatwise against the backing-bars. The upper and lower backing-bars *h h'* are separated from each other only by a space wide enough to just provide for the free working of the vibrators or feelers in and out of the same, and the vibrators or feelers themselves are made quite thin. Consequently the said backing-bars back up the dropped warp-detectors against the pressure of the advancing vibrators or feelers in immediate proximity to the latter on opposite sides of its path, thereby preventing the said warp-detectors from bending as a result of being pressed flatwise against the backing-bars by the vibrators or feelers.

For the purpose of causing the driving power of the loom to be unshipped when the vibrators or feelers are prevented from completing their full extent of movement under the action of the spring *m* mechanical devices are employed as follows:

i^{10} designates a rod which at its lower end is joined to the lever i^7 and at its upper end connects with a movable dog o . (See Figs. 1, 3, 4, and 5.) In the present instance the said upper end of rod i^{10} passes through a hole in the rear part of the dog o , the latter resting on a nut i^{11} or other shoulder on the said rod. The dog o is pivoted at its front end between lugs depending from the under side of the usual knocking-off lever p . The latter serves, as usual, to effect the disengagement of shipper-handle q from the retaining-notch q' of the slot q^2 , in which the upper portion of the shipper-handle works. The usual weft-fork is shown at r and its slide at r' , the latter having a projection at r^2 , which is arranged to press the knocking-off lever forward when the weft-fork slide r' is advanced and thereby to occasion the dislodging of the shipper-handle from the said retaining notch q' . As will be perceived, in the arrangement shown the knocking-off lever p is capable of being advanced independently of the weft-fork slide, although it is not essential that this movement should be independent, since the two parts may be connected in such manner as to cause them always to move in unison. The advance of the weft-fork slide to cause it to act to move the knocking-off lever and dislodge the shipper-handle is effected in usual manner through the engagement of the head of the gooseneck s with the tail of the weft-fork r when the weft is absent from in front of the tines of the said fork. In order to cause the knocking-off lever to be advanced also in the event of breakage or excessive slackness of a warp-thread, the gooseneck s is furnished with a second head or engaging portion s' for coaction with dog o . The said dog is provided with a piece o' , which is mounted thereon, and is slotted, as at o^2 , for the passage therethrough of the bolt o^3 , which secures the said piece to the dog o , the said slot permitting the piece o' to be adjusted into the required position to enable it to be engaged by the head or engaging portion s' at the required point in the advance of the gooseneck. Every time that the vibrators or feelers complete their full movement in feeling for the drops or detectors d the described connections operate to raise dog o out of the path of the head or engaging portion s' of the gooseneck. Whenever the vibrators or feelers are prevented by a fallen drop or detector from completing a stroke, the dog o remains down in the said path and is engaged by the said head or engaging portion s' , with the result that knocking-off lever p is operated to dislodge the shipper-handle q .

The periphery of the warp-rest g serves as a stop against which the warp-detectors of the front series are drawn by the advancing movement of the warp-threads, and it serves to limit the movement of the warp-detectors of the said series in a direction toward the harnesses. The bar h serves to limit the for-

ward movement of the warp-detectors of the rear series.

The position in which the warp-detectors and associated parts are represented in Fig. 1 of the drawings is convenient, inasmuch as such position permits the usual lease-rods (not necessary to be shown) to be located either on the side thereof next the whip-roll, which is desirable in connection with some kinds of warp-threads, or on the side thereof next the harnesses.

The location of the supporting-bars $e e$ above the warp-threads, as in the drawings, is preferable for several reasons. One of these is the fact that in such position there is less tendency for the slots $d^2 d^2$ of the warp-detectors to become filled with lint. Another is the fact that the increased length of the warp-detectors allows the latter to partially twist with greater facility, so as to lie flatwise at their lower ends against the backing-bars $h h'$. Hence when in the movement of the vibrators or feelers $i i$ toward the backing-bars they encounter one or more dropped warp-detectors occupying a more or less oblique position the twisting of the lower end or ends of such warp-detector or warp-detectors as the same is or are compressed against the backing-bars will be permitted to take place without liability of injury to the said warp-detector or warp-detectors. The fact that the slots $d^2 d^2$ in the warp-detectors are somewhat greater in width than the thickness of the supporting-bars $e e$ enables the warp-detectors to turn on the said bars to a considerable extent before being twisted by the pressure of the vibrators or feelers.

I claim as my invention—

1. In a warp stop-motion for looms, in combination, a series of thin sheet-metal warp-detectors, guiding means for the same, the vibrator or feeler, and the pair of fixed backing-bars separated by a narrow space and backing up a dropped warp-detector against the pressure of the advancing vibrator or feeler in immediate proximity to the latter at opposite sides of its path, thereby preventing the said warp-detector from bending when pressed flatwise between the vibrator or feeler and the backing-bars.

2. In a warp stop-motion for looms, in combination, a series of warp-detectors, a vibrator or feeler moved with a yielding force to feel for the warp-detectors means to occasion the movement of the vibrator or feeler, a knocking-off device, a movable dog in connection therewith, the gooseneck adapted for engagement with the said dog, and connections intermediate the dog and the vibrator or feeler whereby the dog is caused to move into and out of range with the gooseneck in unison with the working of the vibrator or feeler, and also whereby the engagement of the gooseneck with the dog is controlled.

3. In a loom, in combination, the weft-fork, its slide, the knock-off lever operated by the

advance of the said slide, the movable dog in connection with the said lever, the gooseneck coacting with both the weft-fork and the dog, a series of warp-detectors, a vibrator or feeler, 5 means to operate the vibrator or feeler, and connections intermediate the dog and the vibrator or feeler whereby the dog is moved into and out of range with the gooseneck in unison with the working of the vibrator or feeler and 10 the engagement of the same by the gooseneck is controlled.

4. In a loom, in combination, the weft-fork, its slide, the knock-off lever operated by the advance of the said slide, the movable dog in 15 connection with the said lever, the gooseneck coacting with both the weft-fork and the dog, a series of warp-detectors, a vibrator or feeler, an arm connected with the vibrator or feeler, a cam acting upon the said arm to move the 20 vibrator or feeler away from the warp-detectors, a spring acting to move the vibrator or

feeler toward the warp-detectors, and the lever connected with the said arm, and in operative connection with the said dog.

5. In a warp stop-motion for looms, in combination, a series of thin sheet-metal warp-detectors independent of the harness, guiding 25 means for the same, the vibrator or feeler, and the pair of fixed backing-bars separated by a narrow space and backing up a dropped 30 warp-detector against the pressure of the advancing vibrator or feeler in immediate proximity to the latter at opposite sides of its path, thereby preventing the said warp-detector 35 from bending when pressed flatwise between the vibrator or feeler and the backing-bars.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY I. HARRIMAN.

Witnesses:

CHAS. F. RANDALL,
LEPINE HALL RICE.