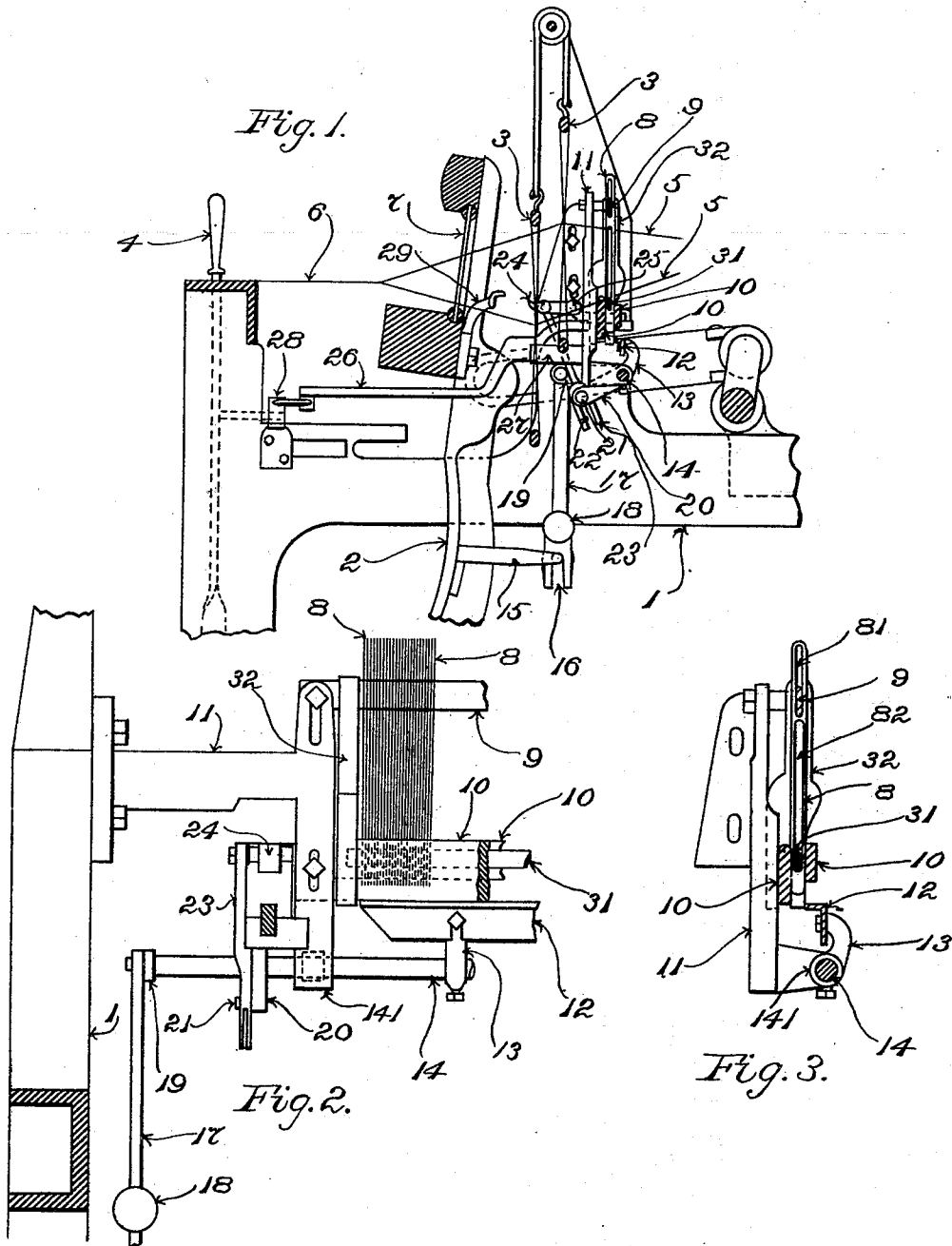


E. A. ROBINSON & V. PIRON.  
WARP STOP MOTION FOR LOOMS.

(Application filed Dec. 22, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:  
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Inventors:  
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No. 624,252.

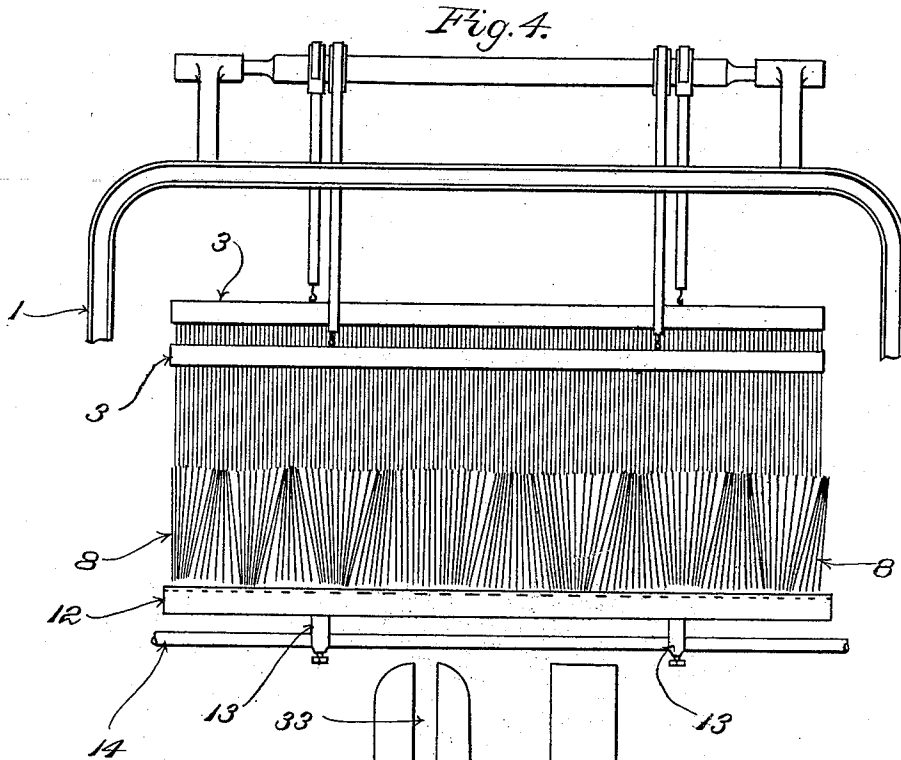
Patented May 2, 1899.

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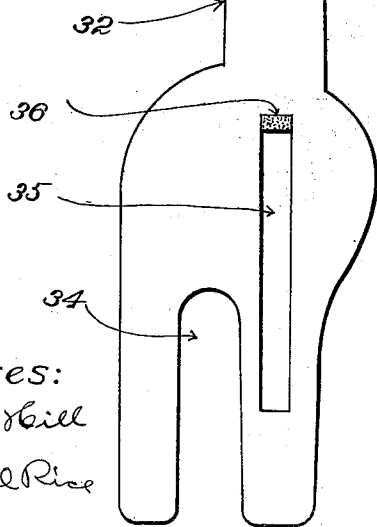
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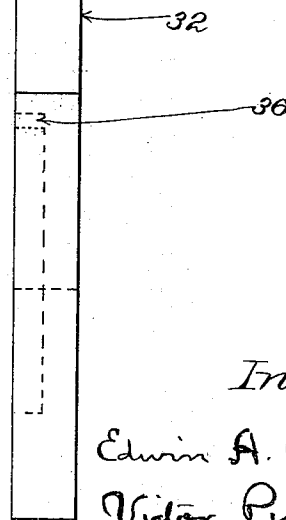
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*Fig. 5.*



*Fig. 6.*



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3 Sheets—Sheet 3.

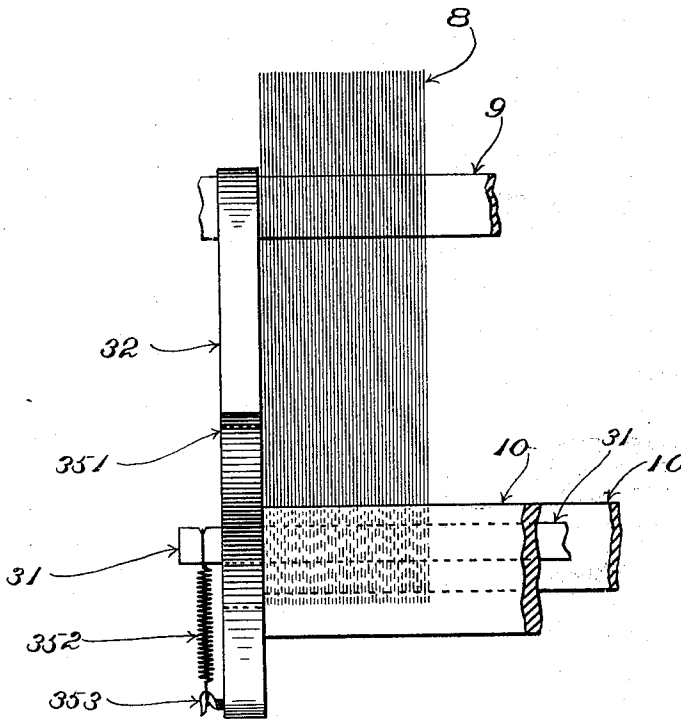


Fig. 7.

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# UNITED STATES PATENT OFFICE.

EDWIN A. ROBINSON AND VICTOR PIRON, OF LOWELL, MASSACHUSETTS;  
SAID PIRON ASSIGNOR TO SAID ROBINSON.

## WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 624,252, dated May 2, 1899.

Application filed December 22, 1898. Serial No. 699,982. (No model.)

*To all whom it may concern:*

Be it known that we, EDWIN A. ROBINSON and VICTOR PIRON, citizens of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Warp Stop-Motions for Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to warp stop-motions for looms, and more especially to that class of warp stop-motions in which the detectors or drop-wires are arranged to cooperate with those portions of the warp-threads which are moved or spread apart by the harness-frames in the operation of forming the shed for the reception of the weft-thread. In warp stop-motions of this class the rise of the warp-threads which are lifted for a given shed formation moves the said detectors or drop-wires out of the path of the vibrator or feeler. In practice in a loom which is in operation at the customary high rate of speed the rapid upward and downward movements of the warp-threads set up a continuous and excessive lateral swaying or swinging in the detectors or drop-wires, this swaying or swinging being in a direction at right angles to the length of the warp-threads. The upper ends of the detectors or drop-wires fall or sway over first toward one side of the loom and then over toward the other side thereof as the sheds successively are formed in the warp-threads. All of the detectors or drop-wires do not sway or swing in the same direction, for at each shed formation some thereof sway or swing toward the right, while others sway or swing toward the left. This lateral swing or vibration of the detectors or drop-wires is undesirable and objectionable. It tends to occasion unnecessary wear of the warp-threads. It interferes with the sensitiveness and proper working of the detectors or drop-wires. It operates sometimes to prevent prompt engagement of the vibrator or feeler with the detector or drop-wire that corresponds with a broken or slack thread in consequence of swinging the lower end of such detector or drop-wire above the reach of the vibrator or feeler.

The aim of our invention is to suppress and prevent tendency to lateral swing or vibration of the detectors or drop-wires which has been referred to above.

The invention consists in a simple means of attaining this result, as now will be described with reference to the accompanying drawings, in which latter we have represented one embodiment of the invention and the application of the same to one well-known form of warp stop-motion for looms.

In the drawings, Figure 1 shows in vertical section on a plane extending from front to rear in the loom certain portions of an ordinary plain loom with the said embodiment of our invention applied thereto. Fig. 2 is a view showing some of the parts of Fig. 1 in rear elevation on an enlarged scale. Fig. 3 is a detail view, in side elevation, on the same enlarged scale as Fig. 2. Fig. 4 shows in rear elevation the harnesses, part of the frame of a loom, and a series of detectors or drop-wires, this figure being intended to illustrate the lateral swaying or swinging of the detectors or drop-wires to which reference has been made. Fig. 5 shows in side elevation one of the guide-blocks to which reference is made hereinafter. Fig. 6 shows an edge view of the said guide-block. Fig. 7 is a view of a modification employing springs.

In the drawings, 1 designates the loom-frame.

2 is the lay.

3 3 are the harnesses. In practice the lay and harnesses are arranged, mounted, and operated in customary manner, not necessary to be described herein.

4 is the usual shipper-handle.

5 5 designate the warp-threads, and 6 the woven cloth.

7 is the reed.

8 8 designate the detectors or drop-wires, the same being represented herein as of customary form—namely, composed of flat strips of sheet metal—each detector or drop-wire having an upper slot 81 and a lower slot 82.

9 and 10 10 are rods which are employed in connection with the detectors or drop-wires 8 8 for the purpose of holding the latter in proper position. The opposite ends of these rods 9 and 10 10 are connected with brackets

11, that are attached to the side frames of the loom. (See Figs. 1 and 2.) The detectors or drop-wires 8 8 are strung on the rod 9, the latter passing through the upper slot 81 of each detector or drop-wire. The said rod limits the extent of the vertical movement of the detectors or drop-wires and prevents the latter from falling entirely out of place in case of breakage or absence of the warp-threads. The rods 10 10 are located on opposite sides of the lower ends of the detectors or drop-wires and serve to guide the said ends between them. The arrangement of parts just described is well known and at present in use.

12 designates the vibrator or feeler, it being carried by arms 13, which are fast on the shaft 14. The said shaft is supported in bearings 141, which are provided on the bracket 11, the engaging portion or blade of the vibrator or feeler being arranged to move in a path immediately below the guide-rods 10 10 for the lower ends of the detectors or drop-wires. The vibrator is shown herein as operated by means of an arm 15, projecting from one of the lay-swords and having a laterally-projecting portion or pin which enters the slot 16, that is formed in the lower end of the rod 17, the latter being weighted, as at 18, and the upper end thereof being pivoted to the arm 19, which is made fast upon the shaft 14 of the vibrator or feeler 12, all being substantially as in United States Patent to O. Piper, No. 594,213, granted November 23, 1897, to which reference may be had. Thus the vibrator or feeler is retracted in a positive manner at each forward movement of the lay through the action of the devices which have just been described, while as the lay swings backward the vibrator or feeler is advanced to feel for a dropped detector or drop-wire through the action of the weight 18, as will be obvious. As will be understood, should the vibrator or feeler 12 in its advance encounter a dropped detector or drop-wire (see Fig. 1) it will be arrested thereby and prevented from completing its advance. This arrest of the advancing movement of the vibrator or feeler is made operative to occasion the stoppage of the loom in suitable manner. We have shown herein devices by means of which in the case of the arrest of the advancing movement of the vibrator or feeler the shipper-handle 4 is dislodged from its usual holding-notch. Thus an arm 20 is fastened on the shaft 14 of the vibrator or feeler 12. A pin 21, that is carried by the said arm 20, plays in a slot 22 of a bar 23. The bar 23 is pivotally connected with a dog 24, which latter is pivoted at 25 to an ear on a slide-rod 26, the latter resting at its rear end on a bearing 27, along which it is fitted to slide from front to rear in the loom. The front end of the said slide-rod 26 is connected to one arm of a bell-crank 28, the other arm of which makes contact with the shipper-handle 4. A bunter 29 is mounted on the lay. As will be obvious, the

dog 24 is operated from the shaft 14 of the vibrator or feeler 12, so as to rise and fall in unison with the movements of the vibrator or feeler. In case the vibrator or feeler should be arrested in its advancing movement in consequence of encountering a detector or drop-wire which has been permitted to descend into its path through the breaking or slackening of a warp-thread that is passed through the slot 82 of such detector or drop-wire then the dog 24 will remain upheld in the path of movement of the bunter 29. In the next backward movement of the lay the said bunter will encounter the said dog and force the slide-rod 26 rearwardly, thereby turning the bell-crank 28 and dislodging the shipper-handle 4. The devices thus far described are of old and known character.

We have referred hereinbefore to the lateral swaying or swinging of the detectors or drop-wires that is occasioned by the rise and fall of the warp-threads as they are shed. An attempt to illustrate approximately the positions of the detectors or drop-wires that is assumed by them at a particular instant in the working of the loom is made in Fig. 4 of the drawings. The detectors or drop-wires on the formation of each shed are caused to assume a variety of angular positions, some inclining in one direction and some in the other, while the angle of inclination varies, as will be perceived on reference to Fig. 4. The positions of the detectors or drop-wires alter at each successive shed formation. In order to restrain the detectors or drop-wires and prevent the swaying or vibration in question, we combine therewith means of placing them under a slight degree of tension as they are being lifted. Thus in the present embodiment of the invention we thread through the lower slots 82 of the detectors or drop-wires a rod 31, this rod passing entirely beneath the warp-threads 5 5. As each shed is formed the detectors or drop-wires which are being raised by the ascending warp-threads take bearing by the lower ends of their loops 82 against the under side of the rod 31 and carry the latter with them a short distance. The use of this rod 31 has in practice yielded excellent results. It holds the detectors or drop-wires perfectly steady in their proper vertical position, and it does not in the least interfere with the working of the detectors or drop-wires and of the devices cooperating therewith. In practice we usually rely upon simple gravity for the purpose of causing the rod 31 to seek to remain in its lowest position, although, as will be obvious, springs may be utilized, if desired. Fig. 7 shows one arrangement employing springs. In this figure the groove 35 of Fig. 5 is replaced by a slot 351, passing through block 32, and the rod 31 is long enough to pass through this slot and have connected with its outer projecting end one end of the tension-spring 352, the other end of which is connected with the fixed screw-hook 353,

standing out from the block. We find it convenient to employ blocks, as 32, at the opposite ends of the series of detectors or drop-wires. One of these blocks is shown separately in Figs. 5 and 6. Herein the blocks are shown supported by fitting them to the rods 9 and 10 10, the upper extremity of each block being slotted vertically, as at 33, to receive the upper rod 9, while the lower extremity thereof is slotted, as at 34, to fit upon one of the rods 10. These blocks 32 32 prevent end-wise movement of the rod 31, and they also operate to steady and hold in position the detectors or drop-wires at the ends of the series of the latter. Each block 32 is grooved vertically, as at 35, on its inner face to receive the corresponding end of the rod 31. The lower end of this groove operates to limit the descent of the rod 31. A bit of soft packing 36 may be placed in the upper end of the groove 35 in order to cushion the blow of the rod 31 against the upper end of the groove 35.

The hereinabove-described lateral swaying of the detectors or drop-wires acts to throw the lower ends of the latter upward more or less relatively to the path of movement of the vibrator 12, as will be apparent from Fig. 4. In this figure the lower ends of the series of detectors or drop-wires will be seen disposed in a more or less sinuous or wavy line. Hence it will be apparent that under some conditions the lower end of a detector or drop-wire corresponding with a broken or slackened warp-thread may be turned or swung upward sufficiently with relation to the path of movement of the vibrator to prevent the said vibrator from engaging with such detector or drop-wire. This will interfere with the prompt stopping of the loom. Our invention prevents this from happening.

We claim as our invention—

1. In a warp stop-motion for looms, the combination with the harnesses, and the series of detectors or drop-wires provided with slots strung upon the warp-threads and moved by the latter as they are shed, of the independently-movable rod 31 passing through said slots in the said detectors or drop-wires, raised by the latter, and operating to steady the said detectors or drop-wires through engagement with the lower ends of the said slots, substantially as described.

2. In a warp stop-motion for looms, the combination with the harnesses, and the series of detectors or drop-wires provided with slots strung upon the warp-threads and moved by the latter as they are shed, of the independently-movable rod 31 passing through said slots in the said detectors or drop-wires, raised by the latter and operating to steady the said detectors or drop-wires through engagement with the lower ends of the said slots, and the blocks 32 at the ends of the series of detectors or drop-wires, substantially as described.

3. The combination with a series of detectors coacting with the warp-threads in a loom and provided with slots, of the independently-movable gravitating rod 31 passing through said slots, supported by the lower ends thereof, and raised by the detectors as they ascend, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

EDWIN A. ROBINSON.  
VICTOR PIRON.

Witnesses:

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JOHN F. HASKELL.