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H. J. RICKETSON & F. D. CHESBROUGH.

WARP STOP MOTION FOR LOOMS.

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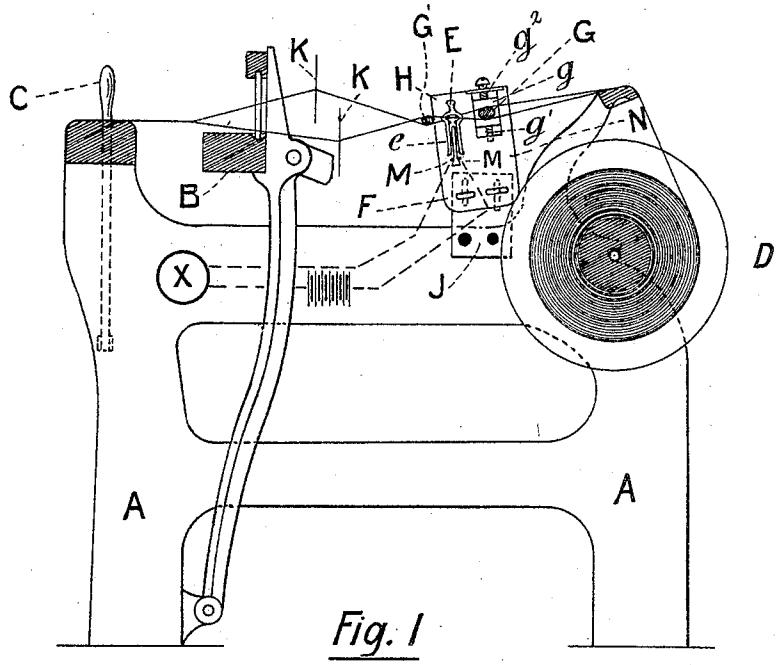


Fig. 1

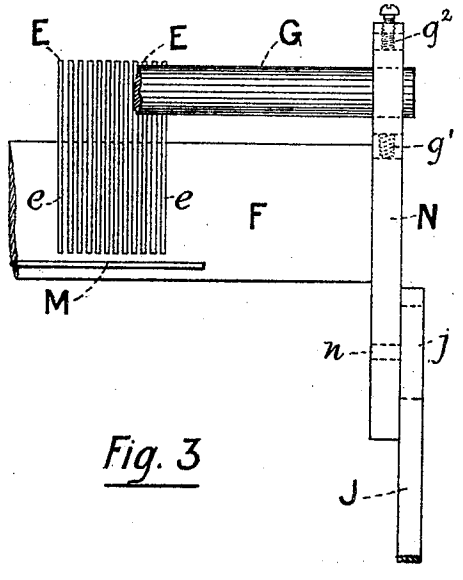


Fig. 3

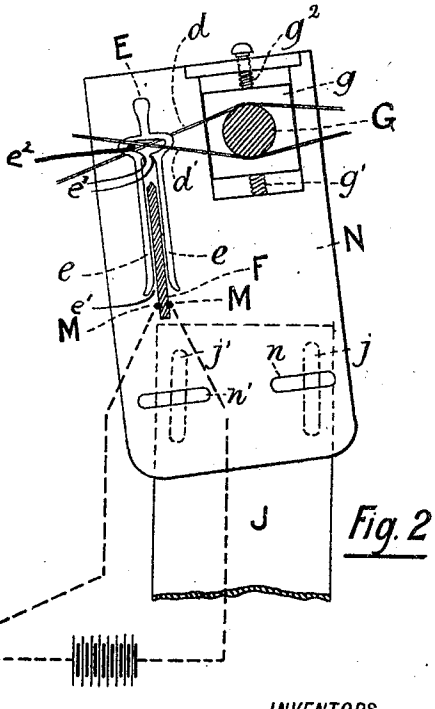


Fig. 2

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WARP STOP-MOTION FOR LOOMS.

No. 802,086. Specification of Letters Patent. Patented Oct. 17, 1905.

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To all whom it may concern:

Be it known that we, HARRY J. RICKETSON and FREDERICK D. CHESBROUGH, citizens of the United States of America, and residents of Fall River, in the county of Bristol 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 characters on the drawings representing like parts in the different figures and in the description.

This invention relates to warp stop mechanism adapted particularly for use in looms, although not restricted thereto.

It consists, essentially, of a series of drop devices or detectors, each of which is maintained normally inoperative while the warp is intact and when a warp-thread breaks drops, and thereby operates means for stopping the loom.

What we regard as the most important parts of our invention consists in the shape of the drop devices or detectors, in the novel manner in which they are severally suspended on the warp-threads, in the shape and construction of the insulating guide-bar, which carries both terminals of the electric circuit, and in the construction and arrangement of the lease-rods.

In our invention each detector is supported in an inoperative position by two of the warp-threads in such a manner that should either break the detector is no longer suspended in an inoperative position, but drops and closes an electric circuit or operates other mechanism by which the loom is stopped.

We have not described in this patent any specific means for stopping the loom. Many different kinds are known which are operated both mechanically and electrically by detectors suspended on the warp-threads. We have diagrammatically indicated an electrical appliance for stopping the loom when the detector falls owing to the breakage of a warp-thread; but we do not limit ourselves to electrical, but may use mechanically-operated devices as well.

Figure 1 is a sectional view of a loom from front to rear, showing our invention as applied thereto. Fig. 2 is an enlarged view of the detector, showing its shape and the manner in which it is supported on the two warp-threads and showing also the construction of the insulating guide-bar F, which carries the terminals M M. This figure also shows the rear lease-rod G and the manner in which it is supported in the bracket. Fig. 3 is a rear view of twelve of the detectors in position and also the general arrangement of the lease-rod G, the supporting-bracket N, the insulating guide-bar F, and the frame J.

The loom-frame A, the lay B, with its various attachments, the harness K, and the shipper C may be of any usual or well-known construction. The lease-rods G G′ divide the warp as it passes from the beam D into groups of alternate threads, one group of which (represented by *d*) crosses the other group, (represented by *d*′.) A series of detectors E are normally supported on the warp-threads in the manner shown in Fig. 2.

Our manner of supporting the detectors E on the warp-threads is, we believe, novel. By it we enable one detector to take care of two warp-threads, thus reducing by half the number of detectors required. It is not essential to our method of supporting the detectors on the warp-threads that the latter should be crossed by lease-rods. When lease-rods are not used, each detector is suspended on two adjacent warp-threads in the following manner: The threads for the sake of clearness may be termed the "left-hand" thread and the "right-hand" thread. The left hand thread is caught on the leg of the detector away from the operative, raised slightly, and carried over the right-hand thread. The detector is then slightly slipped down, both legs being on the right-hand side of the right-hand thread, the more distant leg of the detector holding the loop of the left-hand thread around it in place over the right-band thread. The part of the left-hand thread coming through between the legs of the detector is then looped down on the left-hand side of and under the right thread and caught around the near leg of the detector. The detector is then dropped into position and will be found to be suspended in such a way as to drop if either thread breaks. The essential characteristic of our method of supporting the detectors consists in keeping both ends of the warp-thread *d* on one side of the detector and both ends of the warp-thread *d*′ on the other side of the detector. In other words, the detector does not cross either warp-thread

or the intersection of them, but rests on the loops which they make around each other. If this precaution is observed, it makes no difference whether the warp-threads are crossed by lease-rods or not. The threads are shown as crossed for greater clearness and because we believe this to be practically the more advantageous way to apply our invention. It is evident that each detector will be suspended only so long as both of its supporting-threads shall remain intact. Should either thread break, the weight of the detector and the tension of the thread draws the broken end around the other thread and the detector drops until its legs *e e* come in contact with the electric terminals M M, which are attached to opposite sides of the insulating guide-bar F. The legs *e e* of the displaced detector form electric connections between terminals M and M and complete the circuit through the detector. The circuit so completed operates means for releasing the shipper-handle C, and thereby shifting the belt to the loose pulley and stopping the loom. The circle X is intended as a diagrammatical illustration of such a releasing device, of which many forms are well known and are in use.

Our detector E is preferably made of thin metal and is of novel shape. It has two comparatively long legs *e e*, flared slightly at the lower end. The inner edges of these legs form a parallel-sided slot, which terminates at its upper end in two inwardly-projecting shoulders e^3 e^3 and in which the insulating guide-bar F fits loosely. Above the parallel-sided slot formed by the legs of the detector is a wider but shallow eyelet e^2, where the detector engages the threads. The opening between the guide-slot e' and the eyelet e^2 is narrowed by shoulders e^3 e^3, projecting inwardly, as shown, the purpose being to prevent the detector from jumping up and down on the threads when the loom is in operation. Above the eyelet is a solid top shaped like an inverted pear.

The guide-bar F is composed of wood, hard rubber, or any suitable substance which is a non-conductor of electricity. Said guide-bar is comparatively thin and deep and fits loosely in the guide-slots of the detectors. It carries on its opposite sides, near its lower edge, parallel electric terminals which project from said insulating guide-bar and are below the reach of the several detectors until a detector becomes displaced by the failure of its supporting thread or threads. The guide-bar F is so mounted on the bracket N as to be capable of adjustment thereon, the means of adjustment being brackets adjustably mounted on N and supporting the ends of F.

The rear lease-rod G is mounted in a piece *g*, which is supported upon a spring *g'* and slides in its bearing in N. The spring *g'* allows the piece *g* and the lease-rod G to yield to the downward pull of the warp. The upward movement of *g* is limited by the screw g^2. The other lease-rod is not attached to the bracket N, but is supported by the warp in the usual way. In practice the warp moves up and down to a considerable extent under the influence of the alternating harnesses K K. Rigidly-held lease-rods check this movement, and thereby impose an additional strain upon the warp, causing more breakages. The construction herein described allows the warp considerable freedom of movement without interfering with the proper operation of the detectors. It is apparent that the detectors slide up and down on the guide-bar F as the warp moves up and down.

The bracket N is attached to part of the loom-frame J in such a way as to be adjustable thereon. In the form shown the adjustment is secured by the two slots *n* and *n'* on the bracket N and the slots *j* and *j'* on the loom-frame J.

Having thus described our invention, we claim—

1. As a new article of manufacture a detector made of metal having two comparatively long legs, flared slightly at the lower end, forming a parallel-sided slot, a shallow eyelet in the upper part of the detector where the detector engages the threads, and a narrow slit formed by inwardly-projecting shoulders between the eyelet and the slot.

2. A detector made of metal having two comparatively long legs flared slightly at the lower end, forming a parallel-sided slot, a shallow eyelet in the upper part of the detector where the detector engages the threads, a narrow slit formed by inwardly-projecting shoulders between the eyelet and the slot; and a pear-shaped top, substantially as described.

3. In a warp stop mechanism, movable detectors each of which is suspended on two warp-threads, with both ends of a single thread of each pair of threads on the same side of the detector for such pair, the two threads of each pair being upon opposite sides of such detector, combined with means actuated by a detector displaced by the breaking of one of its supporting-threads for stopping the loom.

4. In a warp-stop-motion mechanism, parallel lease-rods one of which is supported at or near each end in yielding bearings sliding in guides attached to the frame and is capable of movement to allow the lease-rod to move with the warp, a series of metallic detectors engaging warp-threads, and means for stopping the loom when any detector is displaced through the breaking of a warp-thread.

5. In a warp-stop-motion mechanism a series of metallic detectors supported on warp-threads each of said detectors having two legs which form a slot open at its lower

end, a guide-bar of non-conducting material comparatively thin and deep fitting loosely in the slots of said detectors and carrying on its opposite sides parallel electric terminals which project from the insulating guide-bar, combined with means for stopping the loom when the circuit is completed between said electric terminals by a displaced detector.

6. In a warp stop mechanism a series of movable detectors each supported in an inoperative position on a pair of warp-threads, both ends of a single thread of each pair of threads being upon the same side of the detector for such pair, said two threads of each pair being on opposite sides of said detector.

7. In a warp-stop-motion mechanism a bracket fastened to the loom-frame, parallel lease-rods, the rear one of which is supported upon yielding bearings carried by said bracket, a series of metallic detectors, each suspended and held inoperative on two warp-threads but so as to drop upon the breaking of either thread, an insulating guide-bar fitting loosely between the legs of said detectors serving as a guide for them and carrying near its lower edge projecting electric terminals adapted to make contact through the legs of a detector displaced by the failure of one or both of its supporting-threads, combined with means for stopping the loom, when a detector becomes so displaced.

8. In a warp-stop-motion mechanism a series of metallic detectors each suspended on and held inoperative by two warp-threads but so as to drop upon the breaking of either thread, an insulating guide-bar embraced by the legs of said detectors and serving as a guide for them, and which carries near its lower edge projecting electric terminals adapted to make contact through the legs of a detector displaced by the failure of one or both of its supporting-threads, combined with means for stopping the loom when a detector becomes so displaced.

9. In a warp stop mechanism a series of metallic detectors supported on warp-threads each of said detectors having two legs which form a slot open at the bottom, a flat guide-bar comparatively thin and deep fitting loosely in the slots of said detectors, and parallel electric terminals near the lower edge of said guide-bar combined with means for stopping the loom when the circuit is completed between said electric terminals by a displaced detector.

10. In a warp stop-motion brackets fastened to the loom-frame, parallel lease-rods the rear one of which is supported on two yielding bearings carried by said brackets, a series of metallic detectors each having two comparatively long legs forming a slot open at the bottom, a flat guide-bar comparatively thin and deep fitting loosely between the legs of said detectors, combined with means for stopping the loom when a detector is displaced by the failure of one of its supporting warp-threads.

11. In a warp stop-motion a bracket adjustably fastened to the loom-frame in combination with a flat guide-bar comparatively thin and deep adjustably mounted on said bracket.

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