

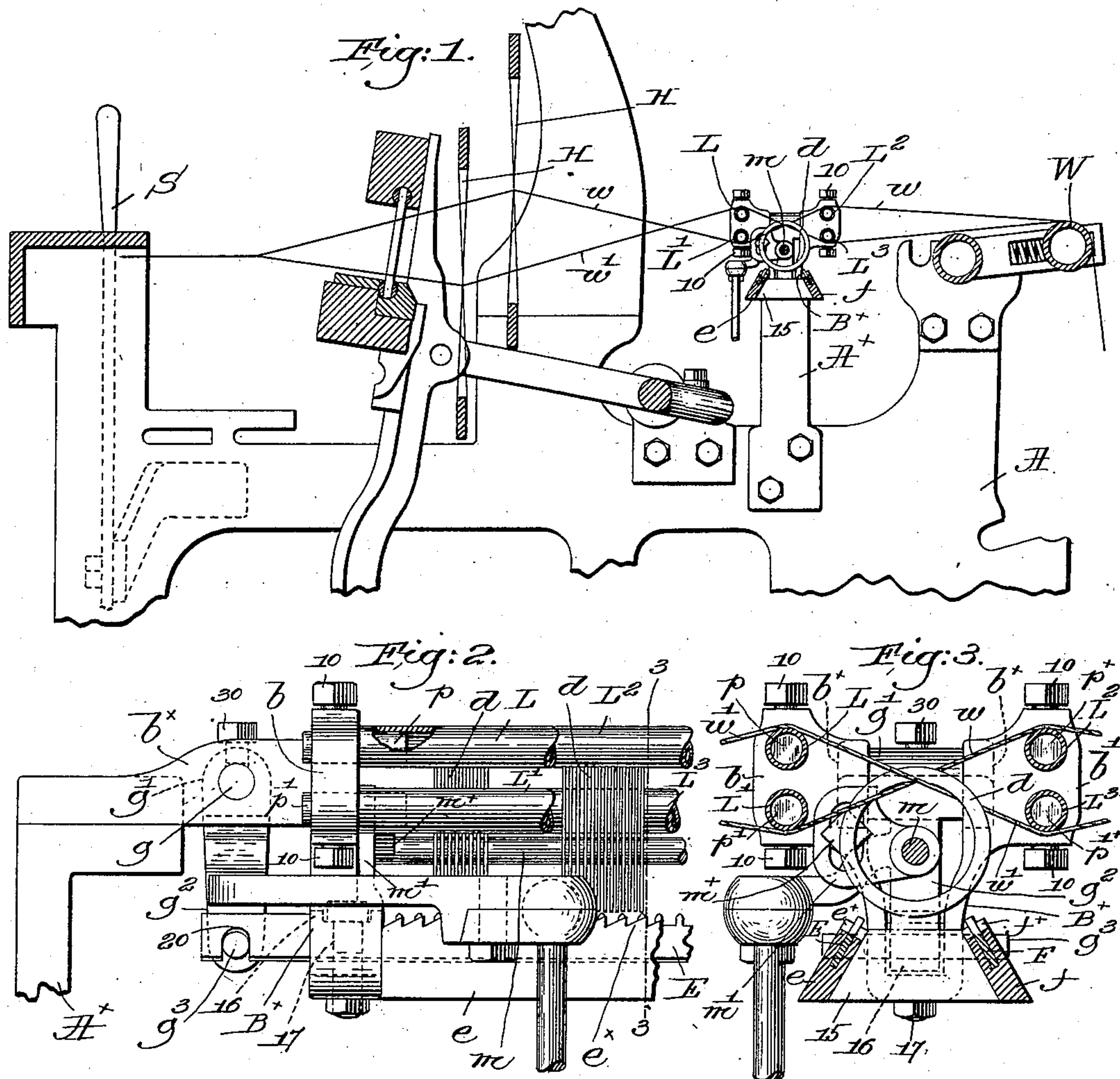
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C. H. DRAPER.
WARP STOP MOTION MECHANISM.

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NO MODEL.



Witnesses,
Edward H. Allen
Fried S. Grumbach

Inventor:
Clare H. Draper;
by Leroy Gregory,
attys.

UNITED STATES PATENT OFFICE.

CLARE H. DRAPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

WARP-STOP-MOTION MECHANISM.

SPECIFICATION forming part of Letters Patent No. 724,448, dated April 7, 1903.

Application filed September 17, 1902. Serial No. 123,712. (No model.)

To all whom it may concern:

Be it known that I, CLARE H. DRAPER, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Warp-Stop-Motion Mechanism, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

My present invention relates generically to warp-stop-motion mechanism wherein the movement of a controlling-detector into operative position by the failure of a warp-thread is made effective to cause the operation of stopping means for the apparatus as a whole.

As my invention is particularly adapted for use in connection with looms for weaving, I have illustrated it in operative connection with a loom.

In warp-stop-motion mechanisms of the type to which my present invention relates it is now usual to suspend the detectors more or less completely upon the intact warp-threads, the detectors being stationary relative to the longitudinal movement of the threads coöperating therewith, so that necessarily there is some rubbing or friction between the detectors and the threads, tending to wear the latter, particularly if they are light and soft.

My invention has for one of its objects the provision of means to materially lessen such wear, and this is effected by peculiar and novel detectors so hung upon the threads that a rotative motion is imparted to the detectors at a speed corresponding very closely to the speed at which the warp-threads travel. I have also made provision for employing one detector for every two threads, thus using a number of detectors equal to only one-half the total number of warp-threads, thereby saving the cost of the detectors, facilitating drawing in, and providing more room or space for the detectors themselves. By suspending each detector from a pair of threads the weight upon any one thread is reduced, with corresponding reduction of wear, and owing to the shape of the detectors they can be made very light individually, while preserving the requisite strength. By an ingenious

arrangement of the feeling device, which co-operates with a released detector, the failure of either thread of a pair releases the detector and permits it to move into operative position to act through the feeling device and effect the operation of the stopping means.

Another novel feature of my invention relates to the peculiar arrangement and construction of the leasing means, whereby the friction or drag upon the warps due to leasing is reduced to a minimum. Such leasing means also coöperate with the novel stop-motion detectors in providing ready facilities for suspending them upon pairs of warp-threads.

The various novel features of my invention will be clearly described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a transverse sectional view of a sufficient portion of a loom to be understood with one embodiment of my invention applied thereto. Fig. 2 is an enlarged front elevation of a portion of the stop-motion mechanism near the left-hand side of the loom, one of the lease-rods being broken out to show the manner of supporting it; and Fig. 3 is a vertical sectional detail on the line 3 3, Fig. 2, looking toward the left.

Referring to Fig. 1, the whip roll or bar W, the shed-forming devices, only the harnesses H being shown, and the loom sides A may be and are of usual or well-known construction, the novel features of my invention being located between the whip-roll and the shed-forming devices and supported on upright stands A^x, bolted to the loom sides.

A substantially U-shaped bracket B^x is secured to each stand A^x by means of a bifurcated lateral extension b^x, projecting from the outer faces of the enlarged heads b b' of the upright arms of each bracket. Each head is in my present invention bored to receive two removable plugs, one located above the other, the four plugs of each bracket being in parallelism and located at the corners of a rectangle, those in the head b being indicated at p and p' and in the head b' at p^x and p'^x, Fig. 3. The plugs are held in place by suitable set-screws 10, and their inner ends project beyond the inner faces of the heads, as in Fig. 2.

I have herein shown four lease-rods made as tubes, or they may be cylinders having tubular recesses at their ends to be entered by the plugs or gudgeons described and rotatably supported thereby. The front pair of lease-rods $L L'$ are mounted on the plugs p and p' of the two opposite brackets B^x , one at each side of the loom, while the back pair of rods $L^2 L^3$ are rotatably mounted on the plugs p^x and p'^x . The warp-threads are separated into two divisions w and w' , the threads of the former division passing over the rod L^2 and down beneath the rod L' , thence to the front harness, while the threads of the latter division pass under rod L^3 and up over rod L to the back harness, so that the threads of the two divisions cross between the two pairs of lease-rods. Each rod thus contacts with the threads of only one division and is free to rotate as the threads travel, so that the "drag" upon the threads is entirely eliminated, while a very perfect leasing or separation of the warp is effected. At the crossing-point of the threads I locate the controlling-detectors for the stop-motion, each crossed pair of threads coöperating with a detector, and herein the detectors are shown as ring-like or annular members d , preferably made of thin flat sheet metal of relatively large diameter, preferably stamped or cut out.

Referring to Fig. 3, the threads of the division w pass through its detectors from one side to the other in a forward and downward direction, the thread of the pair in division w' passing through from the same side of the detector, but in a forward and upward direction, so that the longitudinal movement of the threads acts to impart a rotative movement to the detector at substantially the same surface speed. The tendency of the detector to move forward bodily is restrained by the crossing of the threads, and the adjacent pairs of threads at opposite sides of each detector serve to maintain it in proper fore-and-aft position substantially in parallelism with the threads. Inasmuch as the detector rotates with its pair of warps, the rubbing friction is reduced to a minimum. Should either thread of a pair fail, the detector thereby released slides or moves bodily upon and in the direction of inclination of the other thread and engages a feeling device to effect the operation of the stopping means.

Two bars e and f are extended across the loom below the detectors and oppositely inclined, so that they are substantially radial to the center of rotation of the detectors, (see Fig. 3,) the bars being connected at each end by a cross-bar 15, having a tongue 16 to enter the lower part of the adjacent bracket B^x and secured rigidly thereto by a bolt 17. The bars e and f are toothed or notched along their upper edges, as at $e^x f^x$, respectively, and they are longitudinally slotted along such toothed edges to receive, respectively, toothed feeler members E and F , which are adapted

to reciprocate longitudinally. A short rock-shaft g is mounted in the bifurcated extension b^x of one of the brackets and passed through a sleeve-like hub g' , having a depending arm g^2 , carrying a transverse pin g^3 , adapted to enter notches 20 in the extended ends of the feeler members E and F . By swinging the arm g^2 the said members are reciprocated longitudinally in the bars e and f , the operation and general arrangement of the feeling device thus described being very similar to the mechanism shown and described in United States Patent No. 673,825, dated May 7, 1901, the teeth of the members E and F being straight-sided and beveled at their tips, while the teeth e^x and f^x are straight on one face and beveled on the other face, Fig. 2. As in said patent, one stroke of the feeler members is positive and the opposite stroke to the right, Fig. 2, is non-positive, and when on its positive stroke the parts are in the position shown in Fig. 2 a released detector will enter the space between two adjacent teeth of one or the other of the fixed bars e or f , and the straight face of the adjacent tooth of the feeler member will engage the detector and the non-positive stroke of such member will be arrested. The reciprocation of the feeler members may be effected in any suitable manner. (Not shown herein.) Thereby the operation of the stopping means will be effected in a manner well known to those skilled in the art, the shipper S , Fig. 1, being the only member of the stopping means shown herein.

If one of the threads w of a pair fails, the detector will slide bodily along the thread w' and coöperate with the teeth f^x and feeler member F , while if the thread w' fails the detector will slide along the thread w and coöperate with the teeth e^x and the feeler member E , in either case effecting the operation of the stopping means. To prevent displacement of a released detector, I have provided a guard-stop, shown as a rod m extended through the series of detectors, but not contacting therewith, and carried by plates m' , secured to the brackets B^x by bolts m^x . After the hub g' is inserted between the bifurcations of the extension b^x the rock-shaft g is inserted and held in place by a set-screw 30 in the hub. Should both threads of a pair fail, a somewhat unlikely contingency, the efficiency of the apparatus is in no way decreased, as the released detector will drop and coöperate with both feeler members and their corresponding fixed toothed bars, the stoppage of the apparatus being thereby effected.

It will be manifest that the particular arrangement and construction of lease-rods herein shown is not absolutely necessary to the proper operation of the detectors herein shown so long as the latter are in coöperative engagement each with a pair of crossed threads at their crossing-point; but the operation of the stop-motion mechanism is facili-

tated by the arrangement of lease-rods herein shown and described.

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

1. In a warp stop-motion, a series of annular controlling-detectors therefor, each maintained inoperative by the joint coöperation therewith of a pair of crossed warp-threads passing therethrough.

2. In a warp stop-motion a series of annular rotatable controlling-detectors therefor, each maintained inoperative and normally wholly supported by the joint coöperation therewith of a pair of crossed warp-threads passing therethrough.

3. In a warp stop-motion, a series of thin, flat annular controlling-detectors therefor, each freely suspended upon and maintained inoperative by a pair of crossed warp-threads passing therethrough.

4. In a warp stop-motion, a series of thin, flat, annular controlling-detectors therefor located side by side, and each freely suspended upon and maintained inoperative by a pair of crossed warp-threads passing therethrough from the same side, and means including a feeling device to coöperate with a detector released by either of its threads.

5. In a warp stop-motion, a series of annular controlling-detectors therefor, each maintained inoperative by the joint coöperation therewith of a pair of crossed warp-threads passing therethrough, a fixed guard-stop extended through the detectors to prevent undue movement of a released detector, and a feeling device to coöperate with a detector released by failure of either of its pair of warp-threads.

6. In a warp stop-motion, a series of annular rotatable controlling-detectors therefor, each maintained inoperative and normally wholly supported by the joint coöperation therewith of a pair of crossed warp-threads passing therethrough and oppositely inclined, the contact of said threads causing the detector to rotate and thereby effecting a traveling engagement between the detector and its threads.

7. In a loom, shed-forming means, a whip roll or bar, and two pairs of rotatable lease-

rods interposed between the latter and said means to divide the warps into two divisions, each lease-rod of a pair contacting with the threads of one division only, the threads of the two divisions crossing between the pairs of lease-rods, and stop-motion-controlling detectors, suspended from each pair of crossed threads, and maintained inoperative thereby, the release of a detector by failure of either thread of its pair rendering it operative.

8. In a loom, shed-forming means, a whip roll or bar, and two pairs of rotatable lease-rods interposed between the latter and said means, to divide the warps into two divisions, the threads of the two divisions crossing each other between the pairs of lease-rods, an annular stop-motion-controlling detector suspended from each pair of threads at their crossing-point, and means including two feeling members, to coöperate with a detector released by either thread of its pair.

9. In a loom, shed-forming means, a whip roll or bar, two pairs of rotatable lease-rods interposed between the latter and said means to divide the warps into two divisions, the threads of the two divisions crossing each other between the pairs of lease-rods, a series of thin, flat annular stop-motion-controlling detectors, located side by side and each freely suspended upon and maintained inoperative by a pair of threads passing therethrough at their crossing-point, and means to effect the operation of a stopping device for the loom, by or through the release of a detector of either thread of its pair.

10. In a warp stop-motion, a series of annular rotatable controlling-detectors therefor, each maintained inoperative and normally wholly supported by the joint coöperation therewith of a pair of crossed warp-threads passing therethrough, and a guard-stop extended through the series of detectors, to prevent undue movement or displacement of a released detector.

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

CLARE H. DRAPER.

Witnesses:

GEO. OTIS DRAPER,
ERNEST W. WOOD.