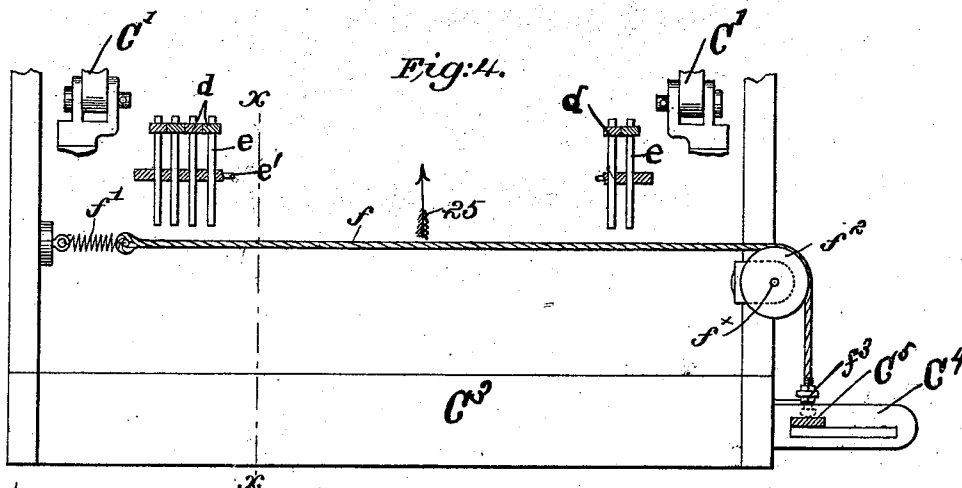
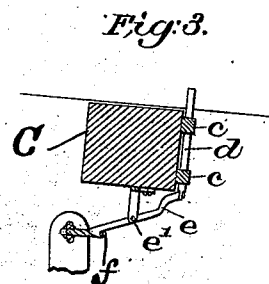
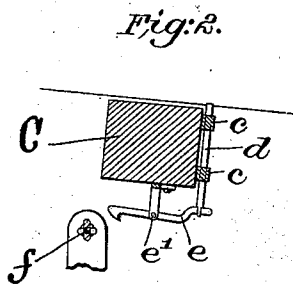
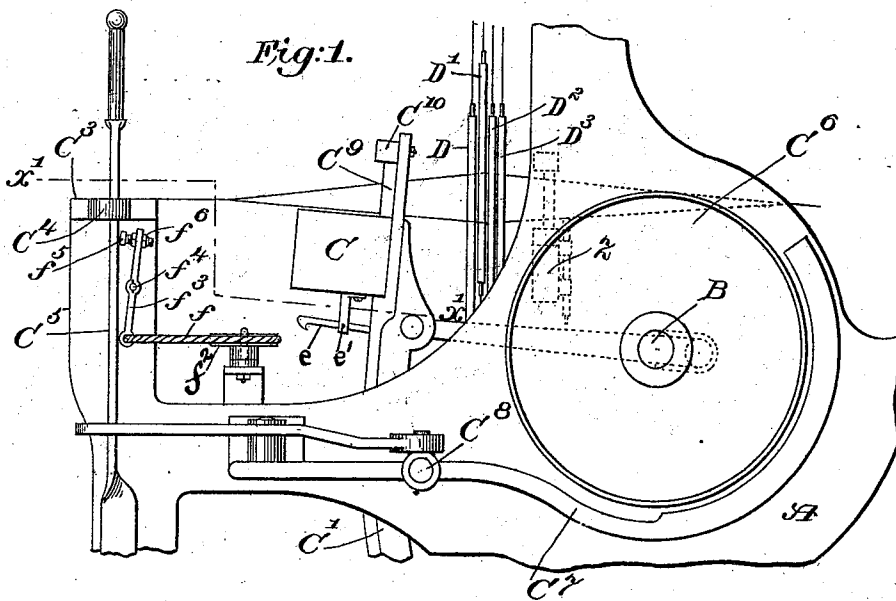


J. C. BROOKS.
WARP STOP MOTION FOR LOOMS.

No. 501,041.

Patented July 4, 1893.



Witnesses.
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Inventor.
John C. Brooks,
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Fig. 6.

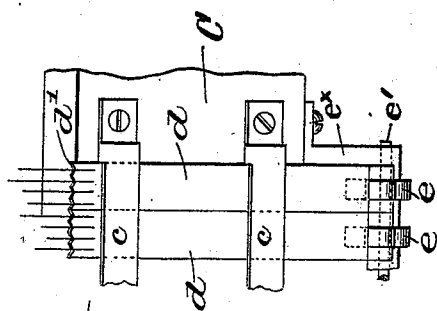


Fig. 5.

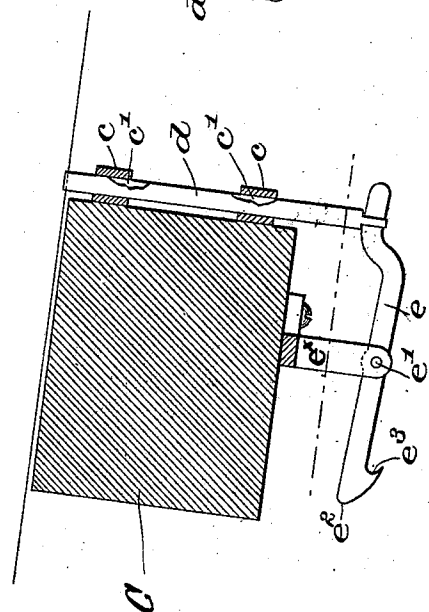


Fig. 8.

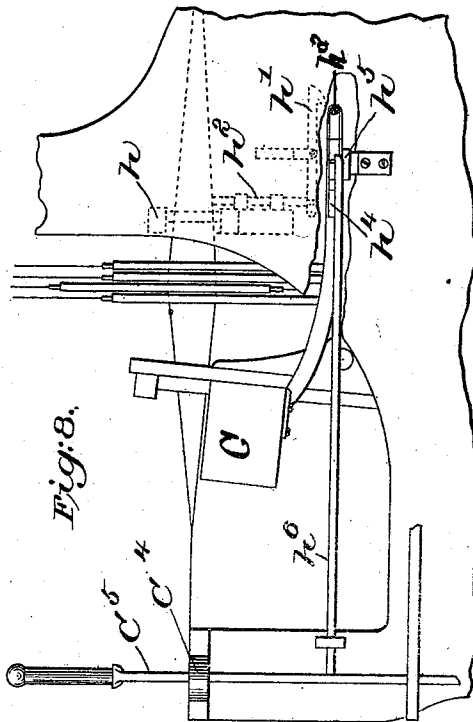


Fig. 7.

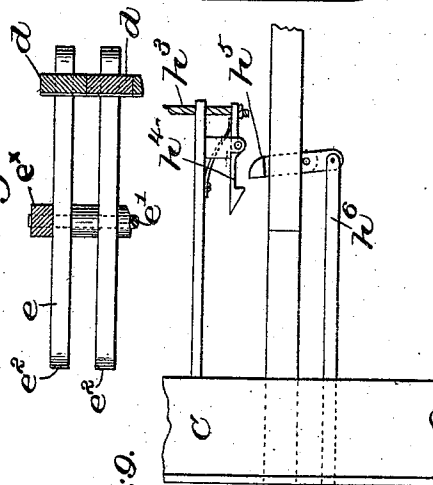
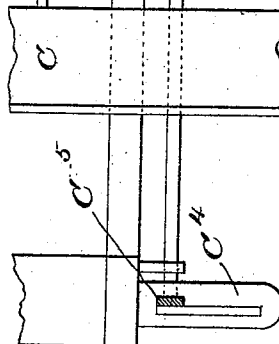


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN C. BROOKS, OF PATERSON, NEW JERSEY, ASSIGNOR TO GEORGE DRAPER & SONS, OF HOPEDALE, MASSACHUSETTS.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 501,041, dated July 4, 1893.

Application filed October 10, 1892. Serial No. 448,349. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. BROOKS, of Paterson, county of Passaic, State of New Jersey, 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 warp stop motions for looms, of the class wherein are employed a series of so-called warp detectors, said detectors being acted upon and moved from their normal into their abnormal positions by the warp threads as the latter are separated or opened to form a shed at each pick of the loom. In ordinary plain weaving the noticeable imperfections in the cloth are not caused so much by single broken threads as by the entangling of several or a large number of threads forming what is commonly known as a float or over-shot.

This invention has for its object to provide a warp stop motion of the class specified, which will automatically stop the loom whenever several threads become thus entangled, and while it may be so constructed as to stop the loom upon the breakage of a single thread, the stop motion will preferably be constructed to stop the loom only upon the breakage or entanglement of several threads.

One part of this invention, therefore, consists in the combination of the following instrumentalities, viz:—a series of warp detectors adapted to be acted upon and moved from their normal into their abnormal positions by the warp threads if the latter are perfect or unbroken, a stopping mechanism for the loom, an actuator therefor, and an independent connection between the said actuator and each detector, said connection being moved by said detector, to operate as will be described.

Another part of this invention consists in the combination of the following instrumentalities, viz:—a series of warp detectors, each of which is adapted to be acted upon and moved from its normal into its abnormal position by any or all of several warp threads, and a stopping mechanism for the loom actuated by a warp detector permitted to remain unmoved in its normal position, substantially as will be described.

Yet another part of this invention consists in the combination in a loom of the following instrumentalities, viz:—a lay, a series of warp detectors thereon adapted to be acted upon and moved from their normal into their abnormal positions by the warp threads if the latter are perfect or unbroken, a stopping mechanism for the loom, an actuator therefor, and devices on the lay moved by said detectors to engage the said actuator, and through the mechanism of the lay cause movement of the actuator to stop the loom, as will be described.

Other features of this invention will herein-after be described in the claims.

Figure 1, of the drawings represents in side elevation a sufficient portion of a loom to enable this invention to be understood; Fig. 2, a sectional detail taken at the dotted line $x-x$, Fig. 4, and showing the lay, detectors and connecting devices, carried thereby, and the actuator, the parts being in the positions they will occupy when the detectors are acted upon by unbroken warp threads; Fig. 3 a similar view showing the parts in a different position resulting from one or more broken warp threads; Fig. 4, a horizontal section on the irregular dotted line $x'-x'$, Fig. 1; Figs. 5, 6 and 7, details showing the detectors on an enlarged scale; and Figs. 8 and 9, partial end and plan views of a modification to be described.

Referring to the drawings, A represents a portion of the side frame of a loom; B the lay or crank shaft; C the lay; C' the lay sword operated from the said shaft; C³ the breast beam; C⁴ a holding-plate having a slot for the shipper C⁵ to move in and having a notch to hold said shipper in position; C⁶ a driving pulley on the shaft B; C⁷ a belt controller mounted to slide on the rod C⁸, and having its outer end engaged with the shipper C⁵; C⁹ the reed; C¹⁰ the lay cap; and D, D', D², D³ heddle frames, all of which are and may be of well known or desired construction and arrangement, and which may be actuated in the usual manner, so need not be herein further described.

Referring to the drawings, Figs. 2 to 6 inclusive, the lay C has secured to its rear side two longitudinal strips or guides c, c , slotted

longitudinally at c' , Fig. 5, to receive the vertical sliding warp detectors d , the detectors being so disposed along the lay as to provide one detector for a group of two or more spaces of the reed C^9 , each detector being of such width at its upper or acting face as to be acted upon, and depressed or moved into its abnormal position by any of the several warp threads which pass through the reed spaces composing the group in connection with which the said detector operates. The forked lower ends of the detectors d rest upon the inner ends of levers e pivoted upon the rod e' extending longitudinally of the lay and secured in brackets e^x upon the under side thereof. The warp threads moved to form the lower plane of the shed will act upon and depress the several warp detectors d arranged beneath them, the detectors so depressed or moved into their abnormal positions acting upon the levers e to raise their hooked ends e^2 as in Figs. 2 and 5. If, however, a detector fails to be depressed by any of these warp threads as it should be, this hooked end e^2 of the lever e , will drop into and remain in a position to engage the actuator, to be described, and will raise the detector as shown.

A cord or chain f , see Fig. 4, which constitutes the actuator, is connected by means of the spring f' to one of the end frames of the loom or to some other support, and is extended in front of and below the lay to the opposite end frame where it is passed about a pulley f^2 journaled on a stud f^x on the said end frame, the end of the said cord being attached to the lower end of a releasing lever f^3 , pivoted at f^4 on the frame and fitted at its upper end with an adjustable bolt f^5 which rests against the shipper C^5 . Suitable lock nuts f^6 are run upon the bolt f^5 , by means of which the said bolt may be held in adjusted position to properly regulate the contact of the lever f^3 with the shipper C^5 . Tension upon, or movement of the cord f in the direction of the arrow 25, Fig. 4, causes the free end of the cord to be drawn back over the pulley f^2 and thereby rock the lever f^3 on its pivot to cause the same to push the shipper C^5 from the notch in the holding-plate C^4 and permit the shipper to move to stop the loom in the usual manner.

The operation of the stop motion is as follows, viz:—Assuming the lay to have been moved forward for the purpose of beating in the weft thread previously left by the shuttle, the lay will begin its backward movement, during which movement, the warp threads will be opened to form a new shed for the passage of the shuttle, and the warp threads which are moved into the lower plane of the shed will act upon and depress the warp detectors d , said detectors turning their levers e on their pivots to raise their hooked ends into the positions Figs. 2 and 5, so that the said hooked ends in their backward movement will pass above the actuator f , stretched across in front of and beneath the lay, with-

out engaging the same, the loom continuing its operation in this manner so long as the warp threads remain unbroken or untangled. Frequently, however, the ends of the thread from the knots tied on the spoolers are of considerable length, and in the process of weaving, these hanging ends frequently catch and entangle several of the adjacent warp threads forming a so-called float or over-shot, which prevents the proper opening or separation of the warp threads in forming a shed. When the warp threads become entangled in this manner and fail to open properly, at least one of the warp detectors will fail to be moved from its normal position, the hooked end of the lever e pivoted to such detector remaining in its lowermost position, so that as the lay moves to its rearmost position after beating in the weft thread, the depressed hooked end of the lever e will catch the cord or actuator f and pull the same back with it in the direction of the arrow 25, Fig. 4, said cord when drawn back in this manner acting as described to move the lever f^3 to cause it to disengage the shipper C^5 and effect the stopping of the loom. Any one or more of the hooked levers e which are permitted to remain in their lowermost positions, Fig. 3, during the backward movement of the lay by reason of broken or entangled warp threads will catch the cord f and stop the loom as described. In case the backward movement of the lay, subsequent to the engaging of the cord f by one of the hooked levers e , be greater than the movement necessary to release the shipper, the spring f' through which the said cord is connected with the frame will yield sufficiently to prevent the breaking of the cord or other injury which might otherwise result.

In the construction chosen to illustrate this invention, the levers e constitute connections between their respective detectors and the actuators f , but the form or kind of connection may be varied to meet the varying constructions of looms.

In the construction shown, the detectors are mounted upon the moving lay, while the actuator is stationary, and in this respect also the invention is not limited to the particular construction shown, for as in Figs. 8 and 9, the detectors h^2 may be mounted on a fixed reed or support h , represented in dotted lines Fig. 8, the rearwardly extended levers or connections h' which are moved by the detectors h^2 co-operating with an actuator h^3 represented as a cord similar to the cord f except the cord h^3 is carried by the lay, the free end of the cord being attached to one end of a pivoted lever h^4 , the hooked end of which when thrown outwardly by the engagement of a connection h' with the actuator h^3 catches the end of a lever h^5 pivoted in the frame and which moves the rod h^6 to dislodge the shipper from its notch in the holding plate and stop the loom.

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

1. In a warp stop motion for looms, the combination of the following instrumentalities, viz;—a series of warp detectors adapted to be acted upon and moved from their normal into their abnormal positions by the warp threads while the latter are perfect or unbroken; a stopping mechanism for the loom, an actuator co-operating with the stopping mechanism and to connect the same with and to be operated by a moving part of the loom; and an independent connecting device for and engaged by each of the said warp detectors to move said actuator and thereby connect said stopping mechanism with said moving part of the loom to stop the latter, substantially as described.

2. In a warp stop motion for looms, the combination of the following instrumentalities, viz;—a lay, a series of warp detectors thereon adapted to be acted upon and moved from their normal into their abnormal positions by the warp threads while the latter are perfect or unbroken, a stopping mechanism for the loom, and an actuator therefor; and an independent device on the lay for and moved by each of the said detectors to engage the said actuator and through movement of the lay cause movement of the actuator to stop the loom, substantially as described.

3. In a warp stop motion for looms, the combination of the following instrumentalities, viz;—a lay, a series of warp detectors thereon adapted to be acted upon and moved from their normal into their abnormal positions by the warp threads while the latter are perfect or unbroken; a stopping mechanism for the loom, a single actuator therefor adapted to be moved by a moving part of the loom, and a separate engaging connection for and moved by each detector, to at times connect the said actuator with the said moving part of the loom, whereby the said detector when permitted to remain in its normal position will cause movement of said actuator and effect the stopping of the loom, substantially as described.

4. In a warp stop motion for looms, the combination of the following instrumentalities, viz;—a series of warp detectors adapted to be acted upon and moved from their normal into their abnormal positions by the warp threads while the latter are perfect or unbroken, a stopping mechanism for the loom, a shipper

therefor, an actuator adapted to be operated by a moving part of the loom to move said shipper, and a separate engaging connection moved by each of said warp detectors to at times connect said actuator with said moving part of the loom, whereby the detectors when permitted to remain in their normal positions will effect the stopping of the loom, substantially as described.

5. In a warp stop motion for looms, the combination of the following instrumentalities, viz;—a lay; a series of sliding warp detectors carried thereby and adapted to be acted upon and moved by the warp threads if unbroken; a series of hooked levers moved independently by said warp detectors; stopping mechanism for the loom and an actuator for the same consisting of a cord extending in line with and to be engaged by said hooked levers, to operate, substantially as described.

6. In a warp stop motion for looms, the combination of the following instrumentalities, viz;—a lay; a series of sliding warp detectors thereon adapted to be acted upon and moved by the warp threads if unbroken; a series of hooked levers acted upon and moved independently by said warp detectors, the cord *f* on the frame and adapted to be engaged by one or another of said hooked levers, the lever *f*³ moved by said cord and shipper *C*⁵, moved by said lever all to operate, substantially as described.

7. In a warp stop motion for looms, the combination of the following instrumentalities, viz;—a lay, a series of sliding warp detectors adapted to be acted upon and moved by the warp threads if unbroken, a series of hooked levers moved independently by said warp detectors, stopping mechanism for the loom and an actuator for the same consisting of a cord extending in line with and to be engaged by said hooked levers and fixedly attached to a rigid support by a spring, to operate, substantially as described.

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

JOHN C. BROOKS.

Witnesses:

F. R. ALLEN,
S. S. LAMBERT.