

(No Model.)

2 Sheets—Sheet 1.

E. SMITH.

AUTOMATIC WARP STOP MOTION FOR LOOMS.

No. 491,139.

Patented Feb. 7, 1893.

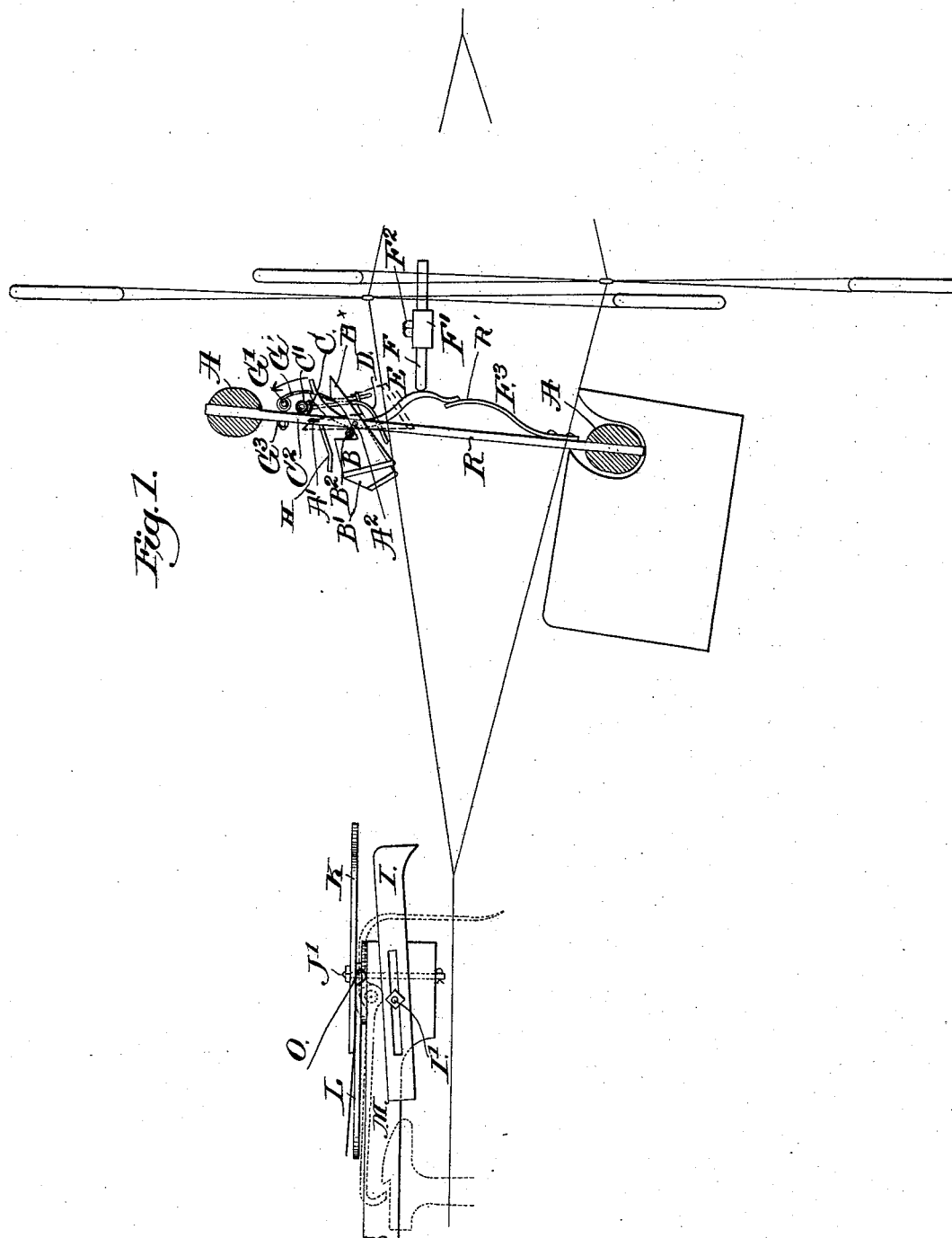


Fig. 1.

Witnesses:
Louis N. Lowell
Edward J. Allen.

Inventor:
Edward Smith
by Crosby & Morgan
attys

(No Model.)

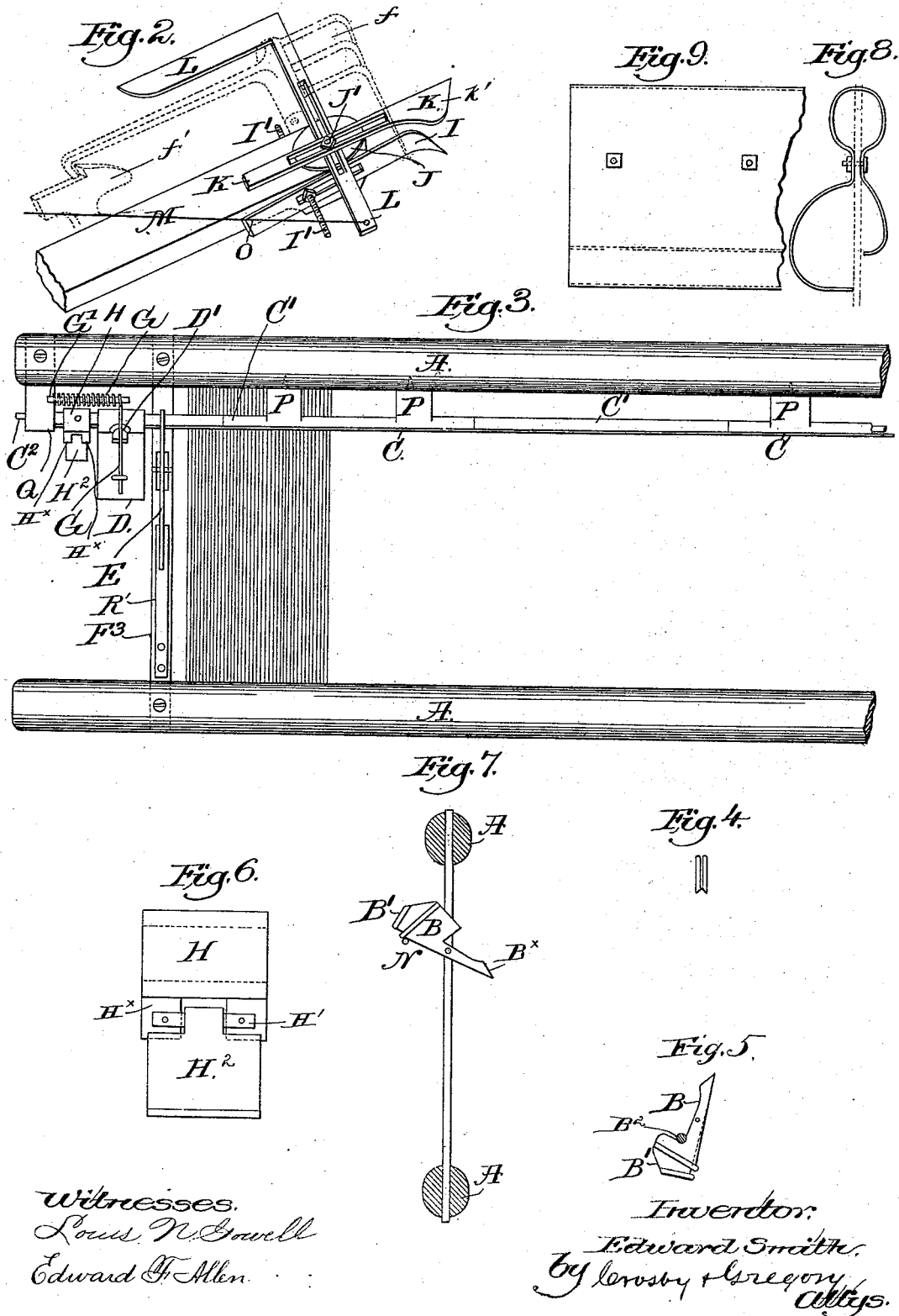
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UNITED STATES PATENT OFFICE.

EDWARD SMITH, OF BRADFORD, ENGLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GEORGE DRAPER & SONS, OF HOPEDALE, MASSACHUSETTS.

AUTOMATIC WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 491,139, dated February 7, 1893.

Application filed April 25, 1892. Serial No. 430,539. (No model.) Patented in England March 25, 1884, No. 5,398; in Germany January 11, 1885, No. 32,369; in France January 26, 1885, No. 166,657, and in Belgium June 23, 1885, No. 69,382.

To all whom it may concern:

Be it known that I, EDWARD SMITH, manufacturers' agent, a subject of the Queen of Great Britain, residing at 8 Brook Street, Bradford, in the county of York, England, formerly of 15 Booth Street, Bradford aforesaid, have invented a certain new and useful Automatic Warp Stop-Motion for Looms, (for which I have obtained Letters Patent in Great Britain, No. 5,398, bearing date March 25, 1884; in Germany, No. 32,369, bearing date January 11, 1885; in France, No. 166,657, bearing date January 26, 1885, and in Belgium, No. 69,382, bearing date June 23, 1885,) of which the following is a specification.

This invention relates to an automatic motion to effect the stopping of a loom upon the breakage of any of the warp threads.

In accordance with this invention, I provide the spaces of a reed with devices which I term catches, and which are acted upon and moved from their normal into their abnormal positions by the threads as the latter are opened to form a shed for the passage of the shuttle. These catches are connected in suitable manner with the stopping mechanism for the loom, so that if any catch fails during the formation of the shed to be properly moved by a warp thread, owing to the breaking of the latter, the said catch remaining in its normal position will operate to stop the loom.

In the particular construction of stop motion which I have selected for the purpose of illustrating my invention, the catches in the reed spaces are pivoted upon a wire which is passed through the several dents of the reed, the catches at one side of the reed being weighted to rest upon the warp threads which pass through the reed spaces beneath the catches. It will, therefore, be evident that in weaving goods for which one end or warp thread in each dent space is required to be raised at the opening of each shed, all the catches are regularly lifted, the operation of the loom continuing so long as all the catches are regularly lifted; but when a warp thread breaks, the particular catch suspended above it is not lifted, consequently the stopping

mechanism actuated by a catch in its normal position, is moved to stop the loom.

It will be understood that each dent space in the reed commonly receives several threads, and one catch in one dent space will care for the breakage of any thread in the dent space with which it co-operates.

Figure 1, shows in vertical section a sufficient portion of a loom to enable this invention to be understood. Fig. 2, a perspective detail of a portion of the connecting mechanism between the catches on the lay and the stopping mechanism of the loom. Fig. 3, a rear side elevation of the reed. Fig. 4, an end view of one of the catches showing the groove in the same. Fig. 5 a detail illustrating a modification to be described. Fig. 6, a detail of the attachment H to be described. Fig. 7, a detail of the reed and catches showing the latter as supported out of action by a wire; and Figs. 8 and 9, are respectively a partial end and face view of a guard to cover the catches as will be hereinafter described.

Referring to the drawings, A represents the reed of a loom, the same consisting of the usual reed dents R separated to leave dent spaces through which the warp threads are passed.

B and B' represent catches located in the dent spaces shown as pivoted upon a wire A² passed through the several dents of the reed as best exhibited in Fig. 1.

The catches B, B' are weighted, and flanged or thickened at one end, the catches B' being made longer than and arranged alternate with the catches B, such arrangement providing sufficient space for the thickened ends of the catches. The thickened ends of the catches may be made by blocking up the ends of the catches and afterward sawing or otherwise forming grooves therein to receive the warp threads as represented in Fig. 4, or the thickened ends of the catches may be formed by riveting narrow pieces of metal onto the catches, by soldering ends of the required shape upon the catches, or by cramping the ends of the catches themselves, the end of each catch in any case preferably having a

groove formed at its underside to receive the warp thread or threads. The ends B^x of the catches, or the ends opposite the thickened ends, are preferably made long and quite narrow as shown in Fig. 1.

The drawings illustrate suitable connections between the several catches on the reed and the stopping mechanism for the loom, whereby a catch left in its normal position will effect the stopping of the loom.

Referring to the drawings, C represents what I shall call a feeler, it being shown as a long segment of a hollow rod or tube arranged back of and just above the depressed ends B^x of the catches, the said segment being soldered or otherwise attached to the free parts of a long hinge C', the fixed or supporting parts P of the hinge being secured to the upper reed head, as shown, a wire C² passing through and connecting the two parts of the hinge. A projecting arm D fixed to one end of the feeler or to the free part of the hinge C' strikes an abutment I adjustably fixed by means of bolt I' to the part M of the frame, at each forward movement of the lay and reed toward the fell of the cloth and turns or rotates the feeler in the direction of the arrow Fig. 1, a latch E pivoted on a flat plate R' secured to the heads of the reed catching the feeler when it has been turned into its highest position and holding the same in such position during the backward movement of the lay. A spring F³ acts upon the lower end of the latch E and presses the same toward the feeler to catch and hold the latter as it is turned up by the abutment I. As the lay nears its rearmost position the free end of the latch E strikes an abutment F and is moved to release the feeler and permit the latter to be returned into its normal position by a spring G coiled about a rod G' secured to the support Q, said spring acting upon the arm D. The abutment F is made adjustable in its support F' and is held in adjusted position by a set screw F². The feeler thus turned up at the forward movement of the lay is caught and held in its elevated position during the backward movement of the lay, when it is tripped and permitted to return and remain in its normal position during the next succeeding forward movement, this operation being repeated at each pick of the loom.

H is a dagger standing out from one end of the feeler C, the end of the dagger being raised and lowered by the feeler as the latter is turned on its hinge.

Referring to Fig. 2, the usual weft fork *f* and weft hammer *f'* are shown in dotted lines, they being arranged on the loom frame and operated in the usual manner; the weft fork being pivoted to the usual weft slide bar, which, when moved by the engagement of the weft hammer with the hook on the weft fork operates to stop the loom. The weft fork *f* is, or should be, turned on its pivot by the

weft turned at each pick and its hooked end thereby raised out of the path of movement of the weft hammer, so that the loom will be stopped only when the weft fork fails of being turned on its pivot.

L is an angle lever secured to a rotatable disk or table J carried by the loom frame, the outer end of the lever when turned on its pivot with the table to the left Fig. 2, swinging over the hooked end of the weft fork to prevent the latter being raised. An arm K having a cam or inclined end face *k*, is also fixed to the movable table J, and as herein represented, the arm K and lever L are attached to the table J by a common bolt J' which constitutes the pivot on which the table is revolved, the arm and lever being each slotted to admit of adjustment. The inclined end *k* of the arm K faces the reed and stands in a position to be struck and moved to the left Fig. 2, by the dagger H as the reed moves forward to the fell provided its dagger is in its lowermost position, such movement of the arm K causing like movement of the lever L, the latter when moved, preventing the raising of the hooked end of the weft fork to thereby stop the loom. But the dagger H during the forward movement of the lay is in its normal elevated position, into which position it should be moved by the feeler as the latter is tripped and returned to its normal position, the dagger when in such normal elevated position, passing above the arm K without engaging the same. Therefore, in the regular operation of the loom, the tripping of the feeler at the end of the backward stroke by the abutment F causes the dagger to assume its elevated position and to pass above the arm K without moving it. But during the backward movement of the lay, as the shed is opened, should a warp thread break, its catch B or B' having nothing to sustain its weight, will drop into its dotted position until stopped by its end B^x striking the flat wire A' run lengthwise the reed through the dents thereof, the upper end of the catch then lying in such a position beneath the feeler that the said feeler when tripped by the abutment F striking the latch E, will be prevented from turning into its normal position to raise the dagger H and will be held by the depressed catch in its abnormal position with the dagger H in its lowermost position during the next succeeding forward or beating in movement of the lay, the said dagger in such position striking the inclined end *k* of the arm K, moving the same to the left Fig. 2, to swing the lever L over the hooked end of the weft fork to prevent the latter being raised, thus stopping the loom as described.

The end H² of the dagger H is hinged at H' to the dagger proper, and is free to turn upwardly, Fig. 1, but is prevented from turning in the opposite direction or downwardly by the ears H^x on the end of the dagger proper.

After the end of the dagger in its forward movement has passed above the arm K without engaging it, the abutment I acts upon the arm D to turn the feeler C back and to throw the dagger down into its lowermost position beyond the inclined end of the arm K, and upon the backward movement of the lay, the hinged end H² of the dagger permits the latter to pass freely over the arm K without moving the latter.

Fig. 5, shows a modified form of catch, the same being lighter than the form shown in Fig. 1.

Fig. 7, which is a vertical cross section of the reed, shows two catches held in their inoperative positions by a wire or supporting device N supported at its ends in suitable manner and passed under those catches which it is desired shall be withdrawn from action when the full number of catches is not required.

Fig. 8, is an end view, and Fig. 9, is a partial side elevation of a guard which is slipped over and secured or clamped to the upper head of the reed or to the lay cap, the said guard inclosing the catches and holding the same in their elevated positions out of action. This is convenient where the warp is woven out and another warp is being twisted in.

B² represents a wire or rod which rests upon the several catches of the series and steadies the same when working.

A cord or wire O is attached to one end of the lever L see Fig. 2, the cord or wire at its opposite end being attached to the usual rod or slide bar to which the weft fork is pivoted as shown in Fig. 2, this cord or wire being somewhat slack to permit the lever L to be turned on its pivot and prevent the lifting of the weft fork, as described. When, however, the lever is turned, the cord or wire is drawn taut, so that when the rod or slide bar is moved back by the weft hammer engaging the hooked end of the weft fork, the cord or wire O attached to the rod or slide bar and lever will also act to turn the latter back into its original position ready for the next starting of the loom.

The term "catch" as employed in the claims, covers any "catch" pivoted in or working into the dents of the working reed of the loom and arranged to be raised or operated upon by the warp threads at the opening of each shed.

This invention is not necessarily restricted to the particular mechanism by means of which a catch left unmoved in its normal position will act to stop the loom, for any suitable mechanism which will accomplish the stopping of the loom may be employed, and it will be understood that the shape or construction of the catches may be varied.

From the foregoing description it will be seen that any one of several threads with which a single catch co-operates, will when

raised, move the catch, but that should any thread which should be raised or moved be broken, its catch will not be lifted and the loom will be stopped.

In the foregoing description and in the claims, I have denominated the devices B, B', catches, the same acting to detect a broken warp thread and stop the loom. The invention is not, however, restricted to the particular form of catch herein shown for the purpose of illustrating this invention, as the same may be varied without departing from the scope of this invention.

I claim—

1. The combination in a loom of a series of reed dents, catches for the warp threads entering the spaces between the reed dents, each catch co-operating with two or more warp threads passing through its reed space to detect the breakage of either of the threads in said space without interfering with the shedding of the same, and a stopping mechanism for the loom controlled as to its operation by said catches whereby the loom may be stopped by the breakage of any one of two or more threads in a reed space, substantially as described.

2. In a loom, a lay having a reed and independently movable catches entering the spaces between the dents of the reed, each adapted to co-operate with two or more warp threads passing through its reed space to detect the breaking of either of said threads, but yet not interfere with the crossing movements of the warp threads in the formation of sheds, combined with a dagger, the position of which is controlled during the forward movement of the lay toward the breast beam, by the position of the said catches, whereby the loom may be stopped by the breakage of any one of two or more threads in a reed space, substantially as described.

3. A loom containing the following instrumentalities, viz;—a series of reed dents between which the warp threads are passed, a series of catches working in the spaces between the reed dents, each of which is adapted to be moved from its normal into its abnormal position by a warp thread provided such warp thread is unbroken; and a stopping mechanism adapted to be actuated by a catch when in its normal position, substantially as described.

4. A loom containing the following instrumentalities, viz;—a lay; a reed carried thereby to receive and guide the warp threads; a shed forming mechanism and a series of catches entering the spaces between the dents of the reed, one catch for each dent space and adapted to be moved by the unbroken warp threads of its dent space as the threads are moved by the shed forming mechanism, substantially as described.

5. In a warp stop motion for looms, a reed, a series of catches entering the spaces between

the dents thereof and resting upon and adapted to be moved from their normal into their abnormal positions by the warp threads, provided such threads be unbroken, combined
5 with a feeler automatically moved toward and from the said catches and adapted to contact with any catch remaining in its normal position by reason of the breakage of a warp thread, substantially as described.

10 6. A loom containing a lay, a series of reed dents, catches arranged between the said reed dents and resting upon and moved from their normal into their abnormal positions by said threads provided the latter are unbroken,
15 combined with a feeler automatically moved toward the said catches and limited in its movement by the position of said catches, and a dagger on the lay adapted to be moved with said feeler, and co-operating mechanism
20 to stop the loom, substantially as described.

7. A warp stop motion for looms containing the following instrumentalities, viz;—a shed forming mechanism, a series of catches adapted to be acted upon and moved from their
25 normal into their abnormal positions by the warp threads as the latter are moved to form a shed provided the threads are unbroken, a carrier for the said catches, a weft fork substantially as described, a stopping mechanism
30 for the loom controlled thereby, and mechanism actuated by a catch remaining unmoved in its normal position to prevent turning of the fork by the weft thread and thereby effect the stopping of the loom, substantially
35 as described.

8. In a warp stop motion for looms, a reed, and a series of catches arranged between the dents thereof and having thickened heads extended laterally at one side of the said reed,
40 substantially as described.

9. A loom containing the following instrumentalities, viz;—a reed, a series of pivoted catches each co-operating with a space therein and adapted to be moved from their normal
45 into their abnormal positions by the warp threads passed through the respective spaces as the threads are opened to form a shed provided said threads are unbroken, and a stopping mechanism for the loom actuated by a
50 catch when in its normal position, substantially as described.

10. A loom containing the following instrumentalities, viz;—a shed forming mechanism; a series of pivoted catches out of contact with
55 the warp threads when the shed is closed and adapted to have their free ends acted directly upon and be moved by the unbroken warp threads of an open shed, a feeler adapted to be moved toward said catches and be stopped
60 in its movement by a catch left in its normal position by reason of a broken warp thread, and a stopping mechanism controlled by said feeler, substantially as described.

11. A loom containing the following instrumentalities, viz;—a series of reed dents; a series of catches adapted to be acted upon

and moved from their normal into their abnormal positions by the warp threads if the latter are unbroken; a feeler, a spring to move
70 the same in one direction; an abutment to move the same in an opposite direction, a latch to catch the feeler when moved by the abutment and hold it in its new position, a second abutment to move the latch to release
75 said feeler, and a stopping mechanism for the loom controlled by said feeler, substantially as described.

12. In a warp stop motion for looms, a lay, a series of reed dents; and a series of pivoted catches entering the spaces between the said
80 reed dents, said catches contacting with only those warp threads lifted into the upper plane of the shed, and a stop for the catches to prevent their contact with the warp threads when the shed is closed, substantially as described.
85

13. In a warp stop motion for looms, the combination with a reed of a series of catches pivoted between the dents thereof and adapted to be acted upon and moved by the warp threads also passed between the said reed
90 dents, and a stopping mechanism for the loom actuated by a catch not properly moved by a warp thread, substantially as described.

14. In a warp stop motion for looms, the combination of the following instrumentalities, viz;—a lay, a series of catches thereon,
95 a segmental feeler C, abutments to cause automatic movement of the same toward and from the said catches, and a stopping mechanism for the loom controlled by the said
100 feeler, substantially as described.

15. In a warp stop motion for looms, the combination of the following instrumentalities, viz;—a series of reed dents, a series of catches, entering the spaces between the same
105 a weft fork, a lever adapted to be moved into position to prevent turning of the weft fork, and mechanism intermediate the catches and lever, to move the said lever, substantially as described.
110

16. A series of warp stop motion catches, combined with a guard to support all the catches, and a support for the guard, substantially as described.

17. In a warp stop motion for looms the
115 combination with a series of catches adapted to be acted upon and moved by the warp threads, of a supporting device to hold some of the catches in an inoperative position with the remaining catches free to operate, substantially as described.
120

18. In a warp stop motion for looms, the combination with a series of catches adapted to be acted upon and moved by the warp threads, of a rod resting upon all the detectors
125 to cause uniform movement of the same, substantially as described.

19. A loom containing the following instrumentalities, viz;—a shed forming mechanism; a reed; a series of catches working between
130 the dents of the reed, said catches being out of contact with the warp threads when the

shed is closed and adapted to be acted upon
and moved by the unbroken warp threads of
an open shed; a feeler adapted to be moved
toward said catches and be stopped in its
5 movement by a catch left in its normal posi-
tion by reason of a broken warp thread; and
a stopping mechanism controlled by said
feeler, substantially as described.

In testimony whereof I, the said EDWARD
SMITH, have hereunto set my hand this 29th 10
day of March, 1892.

EDWARD SMITH.

Witnesses:

CHARLES EDWARD SCOTT,
HENRY OSWALD WADE.