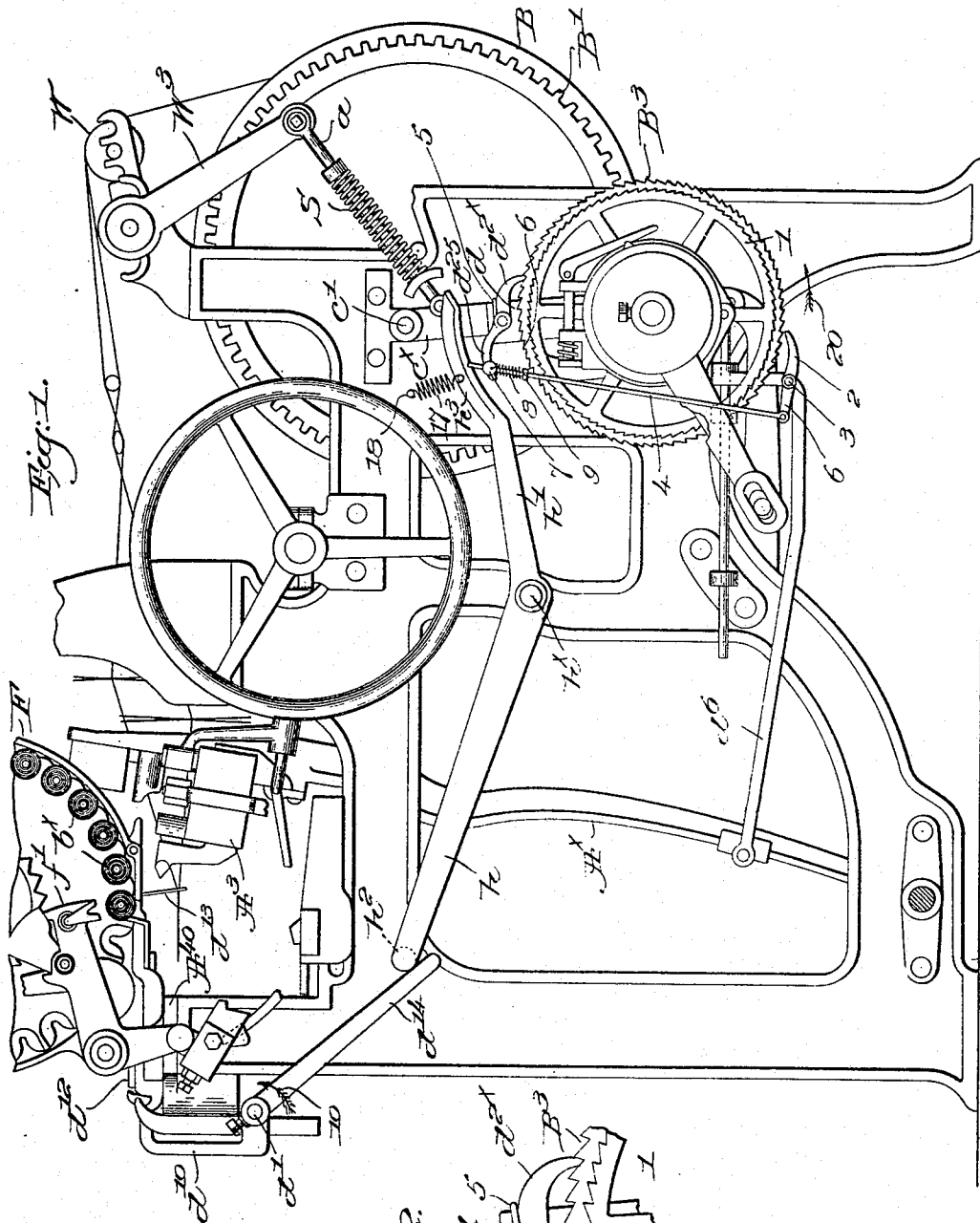


No. 829,689.

PATENTED AUG. 28, 1906.

A. E. BENSON.
LET-OFF MECHANISM FOR LOOMS.

APPLICATION FILED NOV. 15, 1905.



Witnesses,
Edward G. Allen,
Thomas J. Drummond,

Fig. 2.

Inwitness,
Arthur E. Benson,
By Messrs. Gregory,
Attys.

UNITED STATES PATENT OFFICE.

ARTHUR E. BENSON, OF AGRICULTURAL COLLEGE, MISSISSIPPI, ASSIGNOR
TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE:

LET-OFF MECHANISM FOR LOOMS.

No. 829,689.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed November 15, 1905. Serial No. 287,387.

To all whom it may concern:

Be it known that I, ARTHUR E. BENSON, a citizen of the United States, and a resident of Agricultural College, county of Oktibbeha, State of Mississippi, have invented an Improvement in Let-Off-Controlling Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates particularly to let-off mechanism for looms; and it has for its object the production of means for arresting the operation of such mechanism and turning back the same when the normal operation of the loom is temporarily interrupted—as, for instance, by an abnormal condition of the filling.

In a loom provided with automatic filling-replenishing mechanism the actuation of such mechanism to effect filling replenishment is a temporary interruption in the normal operation of the loom.

Means have been provided heretofore to arrest take-up and sometimes also to let back one or more picks when the filling breaks in order to prevent the formation of thin places in the cloth before the new filling has been laid in the shed, for even in automatic filling-replenishing looms one or more picks will be made without filling unless the loom is of the "feeler" type, so called. This is well so far as it goes, but the cloth is slackened by let-back even when the let-off mechanism is arrested, so that when the normal operation of the loom is resumed there is always a chance for a crack to be made because there is nothing to take care of or govern the slackened cloth and warp.

In my present invention I have provided means to turn back the let-off mechanism when its operation is arrested, the turning-back occurring while the loom is running without filling and the take-up is arrested. Such turning-back takes care of slack warp and tightens it so that when the lay beats up to the fell of the cloth after the fresh filling is laid the warp is under tension and the filling will be properly beaten in as though no change had occurred in the running of the loom, and the formation of a crack is prevented.

The arrest of the let-off mechanism is not new; but so far as I am aware it is broadly new to turn back the let-off when arrested upon the occurrence of a change in the normal operation of the loom.

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

Figure 1 is a right-hand side elevation of a portion of a loom with one embodiment of my invention applied thereto, automatic filling-replenishing mechanism being illustrated in connection with the loom; and Fig. 2 is an enlarged detail in side elevation of a portion of the mechanism embodying my invention, to be hereinafter referred to.

The filling-replenishing mechanism illustrated in Fig. 1 includes a filling-feeder F, mounted on the breast-beam A⁴⁰ and adapted to contain the filling-carriers b^x and the transferrer f' to transfer the filling-carriers singly to the running-shuttle upon the occurrence of an abnormal condition of the filling, such as failure thereof due to breakage or exhaustion, said mechanism operating in well-known manner.

Means to control the time of operation of such mechanism includes an operating rock-shaft d', having an upturned arm d¹⁰ to be engaged by slide d¹² of the weft-fork d¹³, said slide being moved outward upon failure of filling to rock-shaft d' in the direction of arrow 10, all substantially as in the United States patent to Northrop, No. 529,940.

The warp-beam B, from which the warp passes over the whip-roll W, the mechanism for effecting let-off and comprising the beam-gear B', ratchet B³, cooperating actuating-pawl d^{2x}, the compound pawl-carrier c^x d, fulcrumed at c', the link d⁶, connected with the lay-sword A^x, the arm W³, attached to the rocking whip-roll supports W', the link a, connecting said arm and the pawl-carrier, and the spring S may be and are all substantially as in United States patent to Draper & Roper, No. 647,815, dated April 17, 1900.

So far as my invention is concerned, however, any other suitable positively-actuated mechanism for effecting let-off may be employed.

The step-by-step advance of the ratchet B³

is effected through the actuating-pawl d^{2x} by the swinging movement of the lay acting through link d^6 in well-known manner.

In order to arrest the operation of the let-off mechanism, a pawl-controller h h' is fulcrumed at h^x on the loom side, the part h having a lateral lug h^2 (see dotted lines, Fig. 1) in the path of movement of a rocker-arm d^{14} , fast on and depending from the rock-shaft d' , the parts normally occupying the position shown. On the part h' an elongated flange h^3 is provided, extended above a tail d^{25} of the pawl d^{2x} , so that when the rock-shaft d' is turned in the direction of arrow 10 the arm d^{14} depresses the part h' of the pawl-controller, bringing the flange h^3 into engagement with the pawl-tail d^{25} to thereby lift the pawl d^{2x} and disengage it from the ratchet B^3 . This mechanism is, as described, similar to the pawl-controller shown in United States Patent No. 710,024, granted to Stimpson September 30, 1902, the operation just described taking place upon the occurrence of an abnormal condition of the filling.

In my present invention I provide for automatically reversing or turning back the let-off mechanism when the operation thereof is thus arrested in order that when new filling is laid the warp will be under tension as the lay A^3 beats up in order to prevent the formation of a crack in the cloth. To this end I have herein shown a second ratchet 1, having its teeth arranged reversely to the teeth of ratchet B^3 , the two ratchets being concentric and rigidly connected in any suitable manner.

A reversing or turning-back pawl 2 is fulcrumed at 3 on the link d^6 and so arranged as to at times coöperate with the ratchet 1, a rod 4, pivotally connected with the tail 6 of the pawl 2, having its upper end extended loosely through a rocking stud 7, extended outward from the tail d^{25} of the pawl d^{2x} . A spring 5 normally acts to throw said actuating-pawl into engagement with its ratchet B^3 , and a spring 8, coiled around the rod 4, is attached at its ends to the stud 7 and to a collar 9 on the rod 4, so that the spring can act by compression while normally serving to yieldingly connect the rod 4 and the tail of the pawl d^{2x} . The spring 5 normally acts to keep the spring 8 under slight tension, thereby holding pawl 2 inoperative.

When the pawl-controller h h' is operated as described, the pawl d^{2x} is rendered inoperative; but as the flange h^3 depresses the tail d^{25} the spring 8 is compressed sufficiently to push down the rod 4, and the turning-back pawl 2 is swung on its pivot 3 and brought into operative engagement with its ratchet 1, so that the latter is turned in the direction of arrow 20, and the let-off mechanism is positively turned back by the movement of the lay and the link d^6 as the lay swings back so long as the pawl-controller h h' is in its opera-

tive position. The spring 8 retains the pawl 2 operative, while permitting it to click over the teeth of the ratchet 1 when the lay swings forward, and when the pawl d^{2x} is allowed to reengage its ratchet the spring 8 expands to normal condition, and pawl 2 is rendered inoperative. Such turning back acts to tighten the warp, so that when the new filling is laid the lay as it beats up to the fell of the cloth will beat in such new filling properly without a crack, it being understood that the return of the rock-shaft d' to normal position permits reengagement of pawl d^{2x} and its ratchet B^3 , while the pawl 2 is disengaged simultaneously from the ratchet 1.

The loom is thus restored to its normal operation and runs as usual until an abnormal condition of the filling again calls into action the mechanism hereinbefore described.

A spring 17 may be used to restore the pawl-controller h h' to normal position, one end of the spring being secured to a fixed pin 18 on the loom side (see Fig. 1) and the other end to the part h' .

The length of flange h^3 permits the swinging movement of the pawl-carrier when the flange is in engagement with the pawl-tail d^{25} .

I have herein shown one practical embodiment of my invention; but the latter is not restricted to the construction herein shown and described, for the same may be varied or modified in details by those skilled in the art, for so far as I am aware it is broadly new to provide for turning back the let-off mechanism by or through a change in the operation of the loom—such, for instance, as the occurrence of an abnormal condition of the filling.

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

1. In a loom, in combination, filling-replenishing mechanism, let-off mechanism, and means to arrest the operation thereof and turn the same back by or through actuation of the replenishing mechanism.

2. In a loom, in combination, let-off mechanism, and means operative by or through an abnormal condition of the filling to arrest the operation of said mechanism and positively turn the same back, to thereby prevent the formation of a crack when the normal operation of the loom is resumed.

3. In a loom, let-off mechanism, a controlling rock-shaft, means to turn it by or through an abnormal condition of the filling, and means governed by such turning of the rock-shaft to arrest the operation of the let-off mechanism and positively turn the same back.

4. In a loom, in combination, filling-replenishing mechanism, let-off mechanism, means to arrest its operation when the replenishing mechanism is actuated, and a device to automatically turn back said let-off

mechanism when its operation is thus arrested.

5 In a loom, in combination, let-off mechanism, including an actuating-pawl and a carrier therefor, a normally inoperative turning-back pawl, and means operative by or through an abnormal condition of the filling to render the actuating-pawl inoperative and the turning-back pawl operative until
10 the normal action of the loom is resumed.

6. A loom having in combination a controlling rock-shaft, means to turn it by or through an abnormal condition of the filling, let-off mechanism, including an actuating-pawl and a ratchet with which it normally
15 coöperates, a turning-back ratchet and pawl, normally inoperative, and means governed by turning of said rock-shaft to render inoperative the actuating-pawl and effect co-
20 operation between the turning-back pawl and its ratchet.

7. A loom having a warp-beam, and positively-acting let-off mechanism therefor, including a pawl and ratchet, combined with
25 an oppositely-acting pawl and ratchet to reversely rotate said warp-beam, and means operative by or through an abnormal condition of the filling to release the warp-beam from control of the let-off pawl and ratchet
30 and cause the reversing-pawl and ratchet to assume control of the beam.

8. In a loom having a warp-beam, and positively-acting means to effect let-off of the warp on said beam, in combination, auto-
35 matic means to turn back the warp-beam, and an instrumentality acting automatically upon a change in the operation of the loom due to an abnormal condition of the filling to arrest the operation of said let-off means and
40 render operative the means to turn back the warp-beam.

9. In a loom provided with automatic filling-replenishing mechanism, means to govern the time of operation thereof, let-off
45 mechanism including an actuating pawl and ratchet, and a device actuated by the operation of said governing means to disengage said pawl and ratchet, and prevent reëngage-

ment until filling replenishment has been effected, combined with turning-back means
50 for the let-off mechanism rendered operative by said device when the actuating-pawl and ratchet are disengaged.

10. In a loom, in combination, a warp-beam, means to rotate it, including an actuating pawl and ratchet and a vibrating pawl-carrier, an oppositely-toothed ratchet rotatable with the actuating-ratchet, a turning-back pawl to coöperate with the second-named ratchet, a yielding connection be-
55 tween the pawls, to maintain one inoperative when the other coöperates with its ratchet, and vice versa, and means, acting by or through a change in the normal operation of the loom due to an abnormal condition of the
60 filling to throw out the actuating-pawl and render operative temporarily the turning-back pawl.

11. In a loom, in combination, filling-replenishing mechanism, let-off mechanism,
70 and means to turn the same back automatically upon actuation of the replenishing mechanism.

12. In a loom, in combination, a lay, a warp-beam, means to rotate it, including an
75 actuating pawl and ratchet operated by or through movement of the lay, an oppositely-toothed ratchet rotatable with the actuating-ratchet, a turning-back pawl to coöperate with the second-named ratchet, actuated by
80 the lay, a connection between said pawls to maintain one inoperative when the other co- operates with its ratchet, and vice versa, and means acting by or through a change in the normal operation of the loom due to an ab-
85 normal condition of the filling, to throw out the actuating-pawl and render operative temporarily the turning-back pawl.

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

ARTHUR E. BENSON.

Witnesses:

ROBERT COOKE,
JAMES S. COOKE.