UNITED STATES PATENT OFFICE.

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RELEASE AND LET-BACK MOTION.


To all whom it may concern:

Be it known that I, FREDRICK HOWARD, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Release and Let-Back Motions, of which the following is a specification.

This invention relates to looms, and more particularly to automatic filling replenishing looms wherein the filling in the working shuttle is replenished or changed automatically when required, my invention having for its object the production of novel means for releasing and letting back the cloth take-up roll or other mechanism by which the cloth is taken up as it is woven.

In the type of loom referred to when the filling fails, or when the bobbin is changed in the working shuttle, a thin place will be made in the cloth if the latter is taken up without interruption, because one or more picks contain no filling or only a partial length of filling. To avoid the formation of such thin places in automatic filling replenishing looms means is provided to prevent, whenever the running filling breaks or runs out, and disengage the take-up pawl from the ratchet which operates the take-up mechanism, thereby arresting temporarily take-up of the cloth and also permitting retrograde rotation of the ratchet a predetermined amount, usually two teeth. The tension of the warp causes the let-back of the take-up mechanism, so that the two or more imperfect or empty picks in the cloth which otherwise would accompany change of filling are compensated for and obviated. Should the change of filling be improperly effected after a predetermined number of picks the filling stop-motion operates to effect stoppage of the loom automatically. Provision is not always made, however, for cases in which the loom is stopped by the breaking of a warp thread or otherwise. In such cases the weaver, either to repair the break or through clumsiness or ignorance, frequently moves the lay back and forth several times, thereby causing the take-up mechanism to operate and resulting in the formation of thin places in the cloth.

My present invention provides means whereby, upon an automatic change of filling, take-up is arrested temporarily and the take-up ratchet is let back two or more teeth, automatically, and I have also provided means whereby, if the filling stop-motion stops the loom the take-up pawl is rendered inoperative until the break is repaired. When the loom is stopped by the filling stop-motion, or by hand, the apparatus is so constructed and arranged that the resulting movement of the shipper to stopping position will operate through the medium of the warp stop-motion rock-shaft to abnormally position the take-up pawl-carrier and throw the pawl thrown out of engagement with the ratchet and such disengagement is maintained until the shipper is again thrown on or moved to running position. If the loom is stopped by the warp stop-motion the turning of the rock-shaft on which the shipper knock-off arm is mounted will effect disengagement of the take-up pawl and the ratchet, and it follows that in all three cases the rock-shaft of the warp stop-motion will be turned to effect abnormal positioning of the take-up pawl-carrier.

When a loom equipped with my invention is stopped it follows that the weaver can move the lay back and forth as much as desired without taking up any cloth or leaving any thin places therein.

The 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 side elevation of the parts of a loom directly connected with or adjacent the mechanism embodying my present invention, the warp stop-motion rock-shaft and the lay rocker-shaft being shown in section; Fig. 2 is an enlarged perspective view of the lifting finger, to be referred to; Fig. 3 is a top plan view, enlarged, of the disengaging member or arm for the take-up pawl-carrier; Fig. 4 is a detail in side elevation and part section, enlarged, showing the adjustable connection between the disengaging member and the rock-shaft of the warp stop-motion; Fig. 5 is a detail view of a portion of the loom-side, the knock-off arm for the shipper, and the warp stop-motion rock-shaft on which said arm is mounted, the link which operates said rock-shaft being partly shown.

In Fig. 1 A is a part of the usual frame for the cloth-roll slide of the loom, and B is
the depending lever arm operated by or through the filling or weft-fork upon failure of the filling. Said arm B is pivoted to the frame A at 10 and is so actuated by the filling-fork mechanism when a change of filling is called for, due to breakage or running out of the filling in the working shuttle, that it is moved into dotted line position, Fig. 1.

C is the take-up ratchet which, through the usual train of gears, not shown, operates the sand or take-up roll, and D is the take-up pawl-carrier, having fixedly mounted thereon the take-up pawl 20 which engages the teeth of and intermittently actuates the ratchet C. The pawl-carrier D is pivotally connected with and longitudinally reciprocated by an arm 30 carried by the lay-sword N, fulcrumed on the usual lay rocker-shaft E, and as will be apparent the intermittent action of the pawl 20 will rotate the ratchet C in the direction of the arrow in Fig. 1.

F is the usual detent pawl, held by gravity in normal engagement with the ratchet C to prevent retrograde rotation thereof, said detent pawl being pivotally mounted at 41.

G is the let-back pawl, loosely mounted on the pivot 41 to cooperate with the ratchet, said pivot 41 passing through a slot 40 in the pawl G, the latter having at times a sliding movement with relation to the pivot, in practice adjusted as to its length by pins, not shown, to determine the number of teeth the ratchet C can turn back when released from the control of the take-up and detent pawls, in a manner familiar to those skilled in the art. When the pawls 20 and F are disengaged from the ratchet the latter lets back the cloth a distance determined by the effective length of the slot 40.

At the lower end of the lever arm B I preferably provide a slot 11, and by a suitable bolt and nut 12 I secure to said arm the lifting finger H, shown separately in Fig. 2. The finger H is also slotted at 13, so that by such slot and the slot 11 the finger may be adjusted longitudinally and vertically. At its rear end the finger has a lateral projection or nose 14 which extends under the detent pawl F, whereby, upon filling failure and the movement of lever arm B to dotted line position, Fig. 1, the change in the position of the lifting finger will lift the pawl F from engagement with the teeth of the ratchet C. This finger H is so shaped and adjusted that under normal conditions it is in contact with or very close to and under the upper end 21 of the take-up pawl-carrier D, so that when the finger H disengages the detent pawl F from the ratchet it will swing back said pawl-carrier D and disengage the take-up pawl 20 from the ratchet, transferring control of the latter to the let-back pawl G. Should the part 21 of the pawl-carrier D be too far away from the lifting finger H to be moved thereby as described the detent pawl F when raised will strike the under part of the pawl-carrier D and throw the pawl 20 out of action.

In the present embodiment of my invention I have provided the warp stop-motion rock-shaft K with a collar 50 having at the top a slot or groove 53, see Fig. 4, adapted to form a seat for a disengaging member or arm L provided with a slot 54 for the reception of a set-screw 51, by means of which arrangement the member L is attached adjustably to the collar 50. The shaft K corresponds in practice to the shaft 92 in United States Patent No. 729,641 granted June 2, 1905, to Northrop. As shown in Fig. 4, the set-screw 51 is tapped into the collar and bears against the shaft K, thereby adjustably attaching the collar 50 to said shaft. A check nut 52 on the screw 51 bears upon the member L and holds it in adjusted position on the collar within the limits of the slot 54.

The rock-shaft K is mounted on the lower part of the loom frame, Fig. 5, and the turned knock-off arm M which releases the shiver upon the occurrence of a warp fault is fixedly attached to the rock-shaft, a depending arm 92 fast on the latter being pivotally connected with a link 95 forming a part of the warp stop-motion, as in the Northrop patent, or as in Patent No. 673,825 dated May 17, 1901. When a warp fault occurs the link 92 pulls on the arm 95 and turns the rock-shaft K to swing the knock-off arm M forward and effect release of the shiver S. Conversely, shiver release by hand or by the filling stop-motion acts through the knock-off arm M to turn the rock-shaft K in the same direction, just as if the warp stop-motion had operated. Consequently, whenever the loom is stopped, by manual movement of the shiver S, or automatically by either the filling or the warp stop-motion, the movement of the shiver to stopping position is accompanied by turning of the rock-shaft K and thereby the disengaging member L is raised to dotted line position, Fig. 1.

Inasmuch as the free end of the member L is adjusted to be almost in contact with the take-up pawl-carrier D under normal conditions the upward swing of said member L pushes back the pawl-carrier into dotted line position, Fig. 1, and disengages the pawl 20 from the ratchet C, arresting take-up.

Preferably the take-up pawl-carrier D is bent or concave at 22 to be more readily acted upon by the disengaging member L, and while I prefer to connect the latter with the warp stop-motion shaft K it can in practice be connected with any other convenient shaft which has a definite rotative move.
ment accompanying movement of the ship- 
per to stopping position.

In some prior structures the detent pawl 
has been disengaged from the ratchet by the 
movement of the take-up pawl-carrier to render 
the take-up pawl-carrier inoperative, such 
movement of the take-up pawl-carrier being 
effected by engagement with an arm oper- 
ated similarly to the lever arm B herein,
upon breakage of filling or change of filling, 
thus permitting the ratchet to let back a dis- 
tance governed by the let-back pawl. 
Should the disengaging member L of my in- 
vention be applied to such a construction it 
will be apparent that whenever the loom 
was stopped by hand or by the warp stop- 
motion the inoperative positioning of the 
take-up pawl-carrier would also release the 
ratchet from the control of the detent pawl, 
permitting let back of the cloth. This is not 
desirable, for in such a case no picks have 
been lost. By my invention, however, picks 
whenever lost are compensated for by the let- 
back motion, but when no picks are lost such 
let back device does not operate. So, too, 
when the loom is stopped by either the filling 
or the warp stop-motions, or by hand 
through the medium of the shipper, the take- 
up mechanism is thrown out of action and 

hence the lay can be moved back and forth 
freely without injuring the evenness of the 
cloth.

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

1. In a loom, a take-up ratchet, detent and 
let-back pawls cooperating therewith, and a 
take-up pawl-carrier having an actuating 
pawl fixedly mounted thereon and in engage- 
ment with the ratchet, combined with an 
arm adapted to be operated by or through a 
change in the running filling, a lifting finger 
fixedly attached to said arm and passing un- 
der the take-up pawl-carrier and the detent 
pawl, to throw them out of action, a warp 
stop-motion shaft, and a disengaging mem- 
ber attached to the warp stop-motion shaft 
adapted to temporarily engage and bodily 
move the take-up pawl-carrier away from 
the ratchet to thereby disengage the actuat- 
ing pawl from the ratchet when the loom is 

stopped.

3. In a loom, a take-up ratchet, an actu- 
ating pawl and detent and let-back pawls nor- 
mally in engagement with the ratchet, and a 
take-up pawl-carrier on which said actuating 
pawl is fixedly mounted, combined with 
means operative upon a change in the con- 
dition of the running filling to cooperate di- 
rectly with said detent pawl and also with 
the take-up pawl-carrier and release the 
ratchet from control thereby, whereby take 
up of the cloth is arrested and the let-back 
pawl cooperates with the ratchet to permit 
let back, and separate means operated by or 
through stoppage of the loom to act directly 
and temporarily upon and move the take-up 
pawl-carrier and disengage its pawl from 
the ratchet while the latter remains under 
the control of the detent pawl, said separate 
means including a shaft rocked whenever the 
loom is stopped, and an arm fast on said 

shaft and moved by turning thereof into di- 
rect engagement with and to move the pawl- 
carrier away from the ratchet.

In testimony whereof I affix my signature 
in presence of two witnesses.

FREDRICK HOWARD.

Witnesses:
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JOHN J. DEVINE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, 
Washington, D.C."