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E. S. STIMPSON.

LET-OFF ARRESTING MECHANISM FOR LOOMS.

(Application filed Apr. 28, 1902.)

(No Model.)

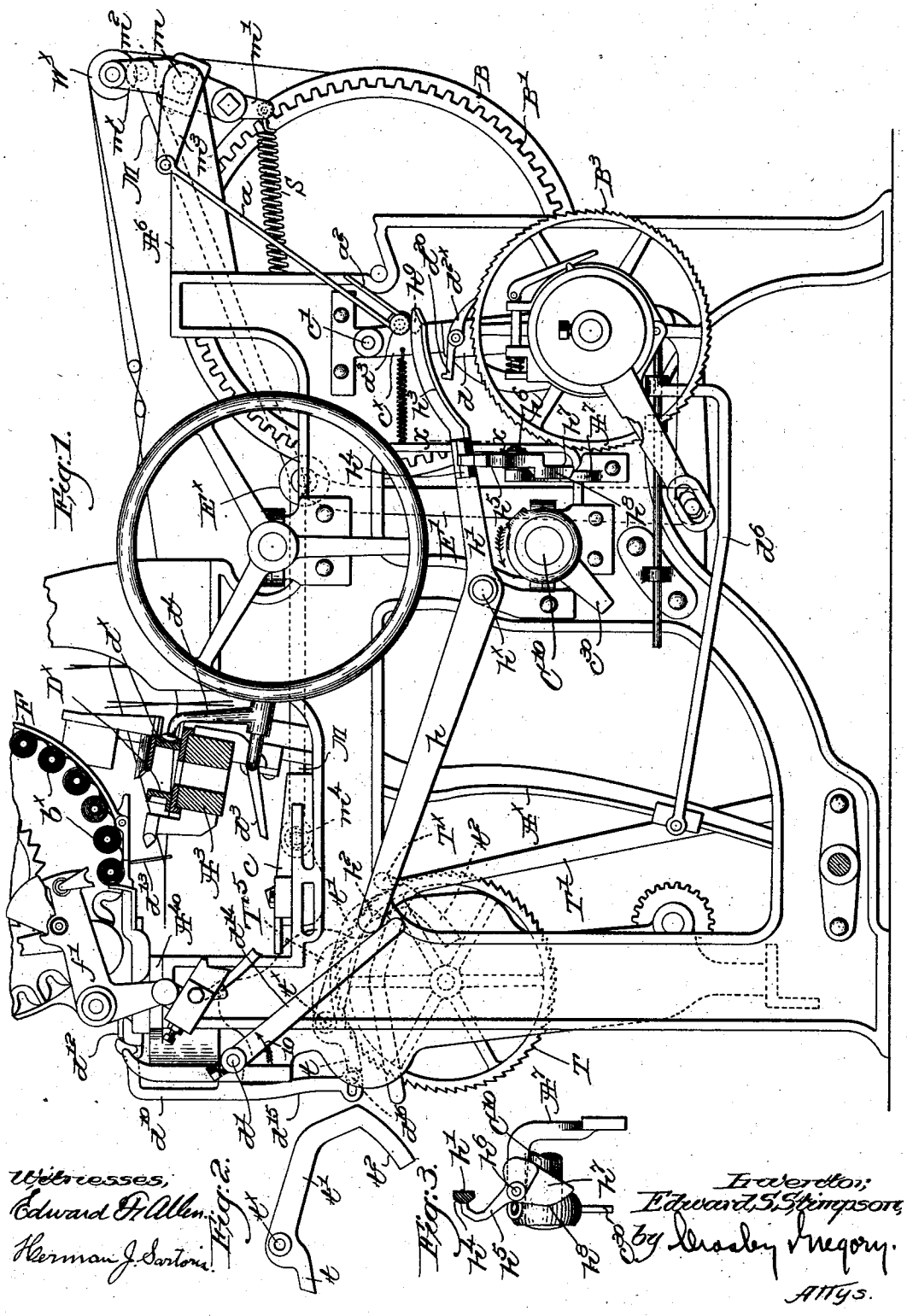


Fig. 1.

Witnesses,
Edward F. Allen.
Herman J. Santons.

Fig. 2.

Fig. 3.

Inventor:
Edward S. Stimpson,
by Dresden Gregory.
Attys.

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UNITED STATES PATENT OFFICE.

EDWARD S. STIMPSON, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

LET-OFF-ARRESTING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 710,024, dated September 30, 1902.

Application filed April 28, 1902. Serial No. 104,971. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. STIMPSON, a citizen of the United States, residing at Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Let-Off-Arresting Mechanism 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 looms for weaving; and it has for one of its objects the production of means for arresting the operation of the let-off mechanism when the normal running condition thereof is temporarily interrupted—such, for instance, as by replenishment of filling in a loom provided with automatic replenishing mechanism or when the shuttle is improperly boxed and the loom "bangs off."

Another object of the invention is to provide for arrest of the take-up mechanism when let-off is interrupted in order that the warps may not be subjected to any undue strain.

In automatic filling-replenishing looms the act of replenishment takes an appreciable, though very short, time, varying from one to three or four picks, according to the type of replenishing mechanism employed, and unless the let-off is arrested the warps will be improperly slackened, tending to make a thick place in the cloth. If the take-up continues in operation when the let-off is arrested, it will be manifest that the warps will be strained, so it is absolutely necessary in working with some kinds of yarn that both take-up and let-off be arrested, and provision is herein made for so doing.

Many looms are provided with warp stop-motions wherein upon breakage or undue slackness of a warp-thread a detector is moved into position to coöperate with a device which effects the stoppage of the loom, and in such a loom the continued operation of the let-off during a temporary interruption of the beat-up of the filling would tend to so slacken the warps as to cause a complete stoppage of the loom, which is objectionable because unnecessary. By arresting the let-off this slackness of the warps is prevented.

The various novel features of my invention will be hereinafter described, and particularly pointed out in the following claims.

Figure 1 is a right-hand side elevation of a portion a loom with one embodiment of my present invention applied thereto, an automatic filling-replenishing loom being illustrated. Fig. 2 is a detail, to be referred to, of a part of the means for arresting the take-up mechanism; and Fig. 3 is a rear elevation on the line x x, Fig. 1, looking toward the left, of a locking device for maintaining the let-off mechanism inoperative when its operation has been arrested.

The lay A^3, breast-beam A^{40}, and the protector mechanism, including a frog c, the dagger d^3 on the usual protector-shaft carried by the lay and having the arm or finger d^4, adapted to be moved by the binder $d^\times$ of the shuttle-box $D^\times$, when the shuttle is improperly boxed, may be and are all substantially as in United Stated Patent No. 692,911, dated February 11, 1902, wherein if the shuttle is improperly boxed the dagger d^3 will engage the frog c on the forward beat of the lay to release the shipping mechanism, (not shown,) of any usual or well-known construction.

The filling-replenishing mechanism includes a feeder or hopper F, mounted on the breast-beam and adapted to contain the filling-supplies $b^\times$, transferred singly to the shuttle by the transferrer f' upon the occurrence of an abnormal condition of the filling, such as its failure or exhaustion to a predetermined extent, in a manner well known to those skilled in the art.

The operation of the replenishing mechanism is controlled by means including an operating rock-shaft d', mounted on the loom-frame and having an upturned arm d^{10} to be engaged by the slide d^{12} of the weft-fork d^{13}, the slide being moved outward upon failure of the filling to rock the shaft d' in the direction of the arrow 10, substantially as in United States Patent No. 529,940.

Brackets A^6 on the loom-frame support a rock-shaft m, having upturned arms $m^\times$, in

which the whip-roll W× is rotatably mounted, a depending arm m', having attached to it one end of a spring S, the other end thereof being secured to the loom-frame, the spring acting upon the whip-roll in opposition to the pull of the warps, substantially as in Patent No. 692,911, referred to.

At the right-hand side of the loom the rock-shaft m has secured to it an upturned arm m^3, (see dotted lines, Fig. 1,) to which is pivotally connected a link M, the latter being jointed at its forward end with the frog c at m^4, Fig. 1, so that forward movement of the frog will swing the whip-roll toward the front of the loom to slacken or release the warps from normal tension, as in said patent.

Herein I have shown an arm m^3 secured to the rock-shaft m at the right-hand side of the loom, and said arm has pivoted to it a link a, which is hooked at a^2 to loosely embrace a headed stud a^3 on the member $c^\times$ of the pawl-carrier for the let-off mechanism fulcrumed at c' on the loom side.

The let-off mechanism herein illustrated comprises the warp-beam B, having an attached gear B', the ratchet-wheel B^3, coöperating actuating-pawl $d^{2\times}$, compound pawl-carrier $c^\times d$, link d^6, connected with the lay-sword $A^\times$, and the arm E', having a roll $E^\times$ to engage the periphery of the yarn mass on the beam, substantially as shown in United States Patent No. 647,815, dated April 17, 1900, though any other suitable positively-actuated let-off mechanism may be employed.

The variations in warp tension act through the link a in opposition to the spring S to move the pawl-carrier on its fulcrum, as in Patent No. 647,815, and when the whip-roll is positively moved to slacken the warps, as described, the hook a^2 permits the link a to slide on the stud a^3.

A pawl-controller, shown as a bent arm h h', is fulcrumed on the loom side at $h^\times$, the heavier part h of said arm being extended forward and having a lateral projection h^2 thereon (see dotted lines, Fig. 1) in the path of movement of a depending rocker-arm d^{14}, fast on the rock-shaft d', the said controller-arm normally occupying the position shown. The part h' thereof is rearwardly extended and is provided with an elongated curved flange h^3, projecting laterally therefrom and above a tail d^{25} on the pawl $d^{2\times}$, so that when the rocker-arm d^{14} lifts the end h of the controller-arm the flange will be depressed and engage the tail of the pawl $d^{2\times}$ and depress it, rendering said pawl inoperative. A cam-ledge h^4 is made on the side of the part h' of the controller-arm (see Figs. 1 and 3) to cooperate with the hook-like end of a locking-detent h^5, fulcrumed at h^6 on a bracket A^7, fast on the loom side, the lower end of the detent being weighted, as at h^7, and having a convex outer edge h^8. Normally the upper end of the detent rests against the outer face of the cam-ledge, as shown, and the convex face h^8 is held out of the path of a releasing device, shown as a tappet or wiper c^{30} on the cam-shaft C^{10} of the loom. When, however, the rock-shaft d' is turned in the direction of arrow 10, Fig. 1, as upon a change of filling, the rocker-arm d^{14} will tilt the controller-arm and the pawl $d^{2\times}$ of the let-off mechanism will be rendered inoperative, thereby arresting the let-off, and at the same time the hooked end of the detent h^5 will swing inward and hook over the top of the cam-ledge h^4, holding the controller-arm in abnormal position and maintaining pawl $d^{2\times}$ inoperative. The parts will be so held until the releasing device c^{30} comes into engagement with the curved edge h^8 of the detent, and thereupon the weighted end h^7 of the latter will be pressed inward, throwing the hooked end off the cam-ledge and releasing the controller-arm, which returns to normal position. Such locking of the controller-arm maintains the let-off inoperative for a predetermined number of picks while filling replenishing is effected.

When the shuttle is improperly boxed—as, for instance, when the loom bangs off—the forward movement of the whip-roll causes the arm m^3 to be depressed, moving the lower end of the link a against a lug h^9 (see dotted lines, Fig. 1) on the end h' of the controller-arm, depressing it so that, as before, the pawl $d^{2\times}$ will be rendered inoperative, the locking-detent h^5 at such time acting to maintain the let-off mechanism inoperative until the releasing device c^{30} disengages the detent and releases the controller-arm.

The take-up mechanism may be of any usual construction, and I have herein shown only the actuating-ratchet T thereof and its coöperating-pawl $T^\times$, the latter being mounted on the pawl-carrier T' and operated in well-known manner, the pawl being located on the side of the pawl-carrier and a detent-pawl T^5.

In Fig. 1 the arm d^{10}, fast on the operating or controlling rock-shaft d', is shown as provided with a long depending extension d^{15}, having a lateral stud d^{16} at its lower end, which bears against the short arm t of a bent lever $t\,t'$, fulcrumed at $t^\times$ on the loom side and shown separately in Fig. 2. The long arm t' normally extends beneath the take-up pawl $t^\times$, and it has a cam-like depending extension t^2.

When the rock-shaft d' is turned in the direction of arrow 10, Fig. 1, the extension d^{15} is swung inward, and the stud d^{16}, which is below the fulcrum $t^\times$, acts upon the lever-arm t to depress it, and thereby raise the arm t', the latter lifting the take-up pawl $T^\times$ and disengaging it from the ratchet T, so that take-up is arrested. The long extension d^{15} acting upon the short arm t of the lever $t\,t'$ acts with such increased leverage as to elevate the long arm t' so high that the pawl $T^\times$ is removed a considerable distance from the ratchet T, the cam-like extension t^2 being brought in front of the pawl and holding it

inoperative until return of the lever $t\,t'$ to normal position. (Shown in Fig. 1.)

I have simplified the take-up mechanism by omitting let-back pawls, or other devices which are usually provided, to prevent the formation of thin places in the cloth when the take-up is arrested, and I use herein a simple detent-pawl t^5, which is fulcrumed on the stud t^x.

To compensate for the omission of let-back pawls and prevent the take-up from being brought into operation too soon after its arrest, the increased movement of the take-up pawl away from the ratchet is provided, the time necessary for the pawl to return to engagement with the ratchet being sufficient to insure non-operation of the take-up during the picks required for a change or replenishment of filling. In this manner the formation of thin places in the cloth is prevented without employing any devices for letting back the take-up mechanism when it is arrested.

I have shown herein one practical embodiment of my invention, and various changes or modifications in details of construction or arrangement may be made by those skilled in the art without departing from the spirit and scope of the invention.

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

1. In a loom, filling-replenishing mechanism, let-off mechanism, and means to temporarily arrest the operation thereof upon actuation of the replenishing mechanism.

2. In a loom, let-off mechanism, means operative by or through an abnormal condition of the filling to arrest the operation of said mechanism, and a device to release the latter from the control of said means after a predetermined number of picks.

3. In a loom, a controlling rock-shaft, let-off mechanism, means to turn said rock-shaft by or through an abnormal condition of the filling, and connections between said rock-shaft and let-off mechanism, to temporarily arrest the latter when the former is turned.

4. In a loom, filling-replenishing mechanism, let-off mechanism, means to arrest its operation when the replenishing mechanism is actuated, and a device to automatically release the let-off mechanism from the control of said means.

5. In a loom provided with automatic filling-replenishing mechanism, let-off mechanism including an actuating-pawl, means operated by or through actuation of the replenishing mechanism to render the pawl inoperative, said means including a locking-detent, and a device to act upon the detent and automatically release the let-off mechanism from control of said means after a predetermined number of picks.

6. In a loom, filling-replenishing mechanism, let-off mechanism, a controller-arm operated upon filling replenishing to render the pawl inoperative, a detent to engage and lock said arm at such time, to maintain the let-off inoperative, and a device to act upon the detent after a predetermined number of picks and release the controller-arm, to thereby restore the let-off to operative condition.

7. In a loom, let-off mechanism, means to arrest the operation thereof by or through an abnormal condition of the filling, and separate means to arrest the operation of said mechanism when the loom bangs off.

8. In a loom, let-off mechanism, including an actuating-pawl, a device to act upon and render it inoperative, and two separate means to actuate said device, one of said means being operative by or through an abnormal condition of the filling, and the other being operative when the loom bangs off.

9. In an automatic filling-replenishing loom, let-off mechanism, means to arrest its operation upon filling replenishing, and separate means to arrest the operation of said mechanism when the shuttle is improperly boxed.

10. In a loom, a movable whip-roll, let-off mechanism, including an actuating-pawl, means operative upon improper boxing of the shuttle to positively move the whip-roll to slacken the warps, and a device operative by such movement of the whip-roll to render the actuating-pawl inoperative and thereby arrest the let-off mechanism.

11. In a loom, a movable whip-roll, let-off mechanism, including an actuating-pawl, means operative upon improper boxing of the shuttle to positively move the whip-roll to slacken the warps, a controller-arm for the pawl, actuated by such movement of the whip-roll to engage and render the pawl inoperative, a detent to engage the arm and maintain it in engagement with the pawl, and a device to automatically release the controller-arm from the detent after a predetermined number of picks.

12. In a loom provided with automatic filling-replenishing mechanism, means to govern the time of operation thereof, take-up and let-off mechanisms, and separate controlling connections between said mechanisms and the said governing means, to arrest the take-up and let-off upon actuation of the replenishing mechanism.

13. In a loom provided with filling-replenishing mechanism, means to govern the time of operation thereof, a movable whip-roll, means operative upon improper boxing of the shuttle to positively move the whip-roll and slacken the warps, let-off mechanism, including an actuating-pawl, a normally inoperative pivotally-mounted controller-arm for the pawl, having a cam-ledge, a locking-detent to coöperate with said cam-ledge when the controller-arm is moved to engage and render the pawl inoperative, separate connections between the said governing means and whip-roll and the controller-arm, to move the latter upon replenishment of filling or by movement of the whip-roll, to thereby render the let-off-actuating pawl inoperative, and a de-

vice to automatically act upon the detent and move it to release the controller-arm and permit it to return to inoperative position, the cam-ledge thereafter acting to hold the detent out of the path of movement of said device until the controller-arm is again moved and locked.

14. In a loom provided with automatic filling-replenishing mechanism, means to govern the time of operation thereof, take-up mechanism, including an actuating pawl and ratchet, and a device controlled by said governing means to disengage the pawl and ratchet upon operation of said governing means and maintain such disengagement during filling replenishing.

15. In a loom provided with automatic filling-replenishing mechanism, means to govern the time of operation thereof, take-up mechanism including an actuating pawl and ratchet, and a detent-pawl, and a device actuated by operation of said governing means to disengage the actuating pawl from the ratchet and prevent reëngagement therewith until filling replenishment has been effected.

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

EDWARD S. STIMPSON.

Witnesses:
CLARE H. DRAPER,
E. D. BANCROFT.