

Let-off Mechanisms for Looms.

Patented July 28, 1874.



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IMPROVEMENT IN LET-OFF MECHANISMS FOR LOOMS.

Specification forming part of Letters Patent No. **153,516**, dated July 28, 1874; application filed June 17, 1874.

To all whom it may concern:

Be it known that I, DAVID ARTHUR, of Lawrence, Essex county, Massachusetts, have invented certain Improvements in Looms, of which the following is a specification:

These improvements relate to means whereby by a positive and unvarying mechanical motion the reduction in bulk of the warp-yarn shall increase the extent of "let-off" movements of the yarn-beam; and these improvements will be found to consist in certain novel devices hereinafter explained.

In the drawings accompanying this specification, Figure 1 is an end elevation, Fig. 2 a front elevation, and Fig. 3 a plan, of a loom containing my improvements.

In these drawings, A represents the frame of a loom for weaving fabrics of cotton or other material, the end standards of such frame being shown at B B, the cam or driving shaft at C, the crank-shaft at D, the yarn or warp beam at E, and the cloth-beam at F, such component elements being arranged in the ordinary manner of looms of the class to which my improvements relate.

In carrying my invention into practice I proceed as follows: The front edge of the outer standard B I mount in a suitable bearing, *a a*, horizontal shaft G, whose extreme inner end carries a pinion, H, that engages a spur-gear, I, fixed to the adjacent end of the yarn-beam, while midway upon the shaft G I mount a spur-gear, J, which engages a second spur-gear, K, making part of or attached to a ratchet-wheel, L, mounted upon a horizontal stud, M, projecting inwardly from the upper part of an upright oscillating bar, N, which is supported loosely and rocks upon the outer end of the shaft G, a pawl, O, being pivoted to the extreme upper end of the bar N, and engaging the ratchet-wheel L, the whole being so arranged that each vibration or oscillation of the bar N effects an advance movement of the ratchet-wheel and pinion K, and through them of the gear I and yarn-beam, to the extent of one or more teeth of the ratchet, a friction-wheel, P, and band Q being combined with the gear J to prevent backlash and slip of the latter.

R in the drawings represents a slotted plate or slider, which is disposed alongside of and slides upon the bar N, and straddles the shaft G, such slider being confined to the bar by clasps *b b*, or their equivalents, which will permit it to slide freely up and down upon the latter, the said slider being suspended in position from the end of a chain or cord, S, the opposite end of which cord is secured to one end of a long horizontal rod, T, to be hereinafter explained, the cord or chain S in its passage from the said rod to the slider being partially about several rollers, *c d e f*, the two former being pivoted to the end standard B, and the two latter to an upright post, *g*, created upon the front corner of said standard. To the lower extremity of the oscillating plate or slider R I pivot one end of a pitman, U, the opposite end of which is in turn pivoted to an adjustable block or crank-pin, V, applied to a wheel or hub, W, affixed to the outer or front end of the cam-shaft C, the pitman being the agent whereby the rotations of the hub effect oscillating movements of the slider upon the shaft G as a fulcrum, and the slider in turn effects oscillating movements of the bar N. The rod T, before referred to, extends across the entire loom-frame, in rear of the yarn-beam, and lying closely up to and against the outer surface of the body of yarn wound upon the beam, and maintained in contact therewith by springs *h*, applied as shown in the drawings, each extremity of the rod T sliding in horizontal guides *i i* on the end standards of the loom-frame. The slider R is so adjusted or suspended that when the yarn-beam is full such slide is at or about at its lowest position and farthest from its point of oscillation, which is the shaft G; consequently the slider, under such conditions, effects comparatively short movements or advances of the ratchet-wheel and yarn-beam, in order to compensate for the large diameter of the body of yarn.

As the body of yarn, in the act of weaving, diminishes, the follower-rod T advances in consonance therewith, and, through the instrumentality of the chain S, allows the slider R to rise to a corresponding degree, and by this

means lessens the distance between the pivot of the pitman U and the shaft or fulcrum G, and compels the slider to impart a longer throw to the pawl O, and a greater length of movement of the ratchet-wheel and yarn-beam, or such an one as shall compensate for the reduction in the bulk of yarn.

As it is not advisable to depend upon the gravity of the slider R to effect its own descent, I attach to its lower end one extremity of a spring, whose other end is attached to the floor of the apartment; or, in lieu of this spring, the lower end of the slide may be connected by a chain or cord with the follower T in such manner as to effect the same result.

In order that the "take-up" movements of the cloth-beam F may follow the let-off movements of the yarn-beam, I apply to the outer or front end or journal of the cloth "feed-roll," shown at k in the drawings, and to the adjacent part of the standard B, a duplication of the mechanism heretofore explained as combined with the yarn-beam, with the exception of the compensating slider R, the second pitman U' being attached at one end to the crank-pin V, and at the other end to the second oscillating bar N', &c. The wrist or crank pin V is, in the present instance, a block sliding within a transverse channel cut in the outer end of the hub W, and confined in position, when set, by a screw, or its equivalent. By means of this adjustable crank-pin the extent of throw or oscillation of the bars N N' are varied, should it be found at any time desirable so to do.

In let-off mechanisms which depend upon a frictional adhesion of surfaces, a greater or less degree of slip and of uncertainty in action is observable, and the number of "picks" to an inch of cloth woven varies greatly with variations in the size of the woof or filling, with consequent variations in the degree of beating up of the fabric, and in its body and texture.

One important advantage resulting from my improvements will be seen to consist in the fact that, as the mechanism is positive, and therefore unvarying in its character, it insures as the weaving proceeds a uniform rate of speed of the cloth, with respect to the number of picks per inch of cloth woven, regardless of any variations that may exist in the size or uniformity of the shoot or filling. Another advantage of my improvements consists in the fact that they may be applied with ease and small cost to any form of loom in use to which they relate.

I claim—

The oscillating and slotted slider R and bar N, so arranged upon the shaft G and so operating together that the latter imparts, through its pawl, intermittent advances or let-off movements of the yarn-beam, and the former determines the extent of such advances, substantially as and for purposes stated.

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Witnesses:

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