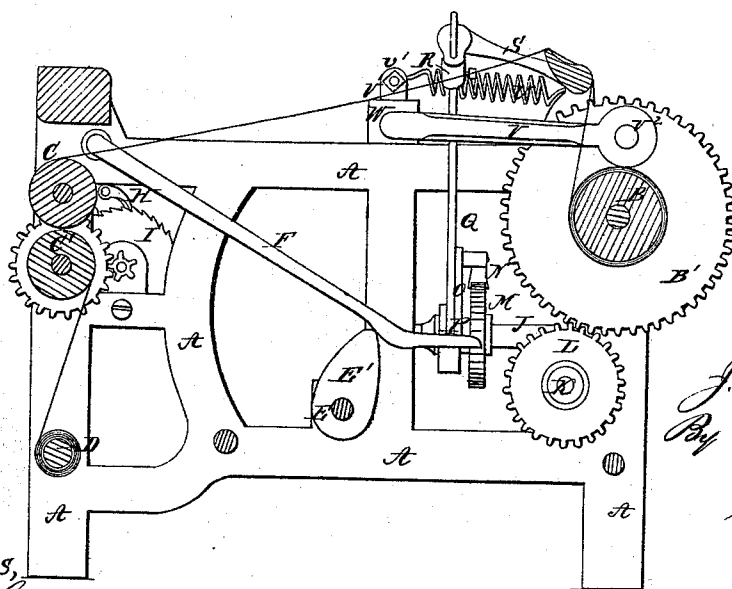
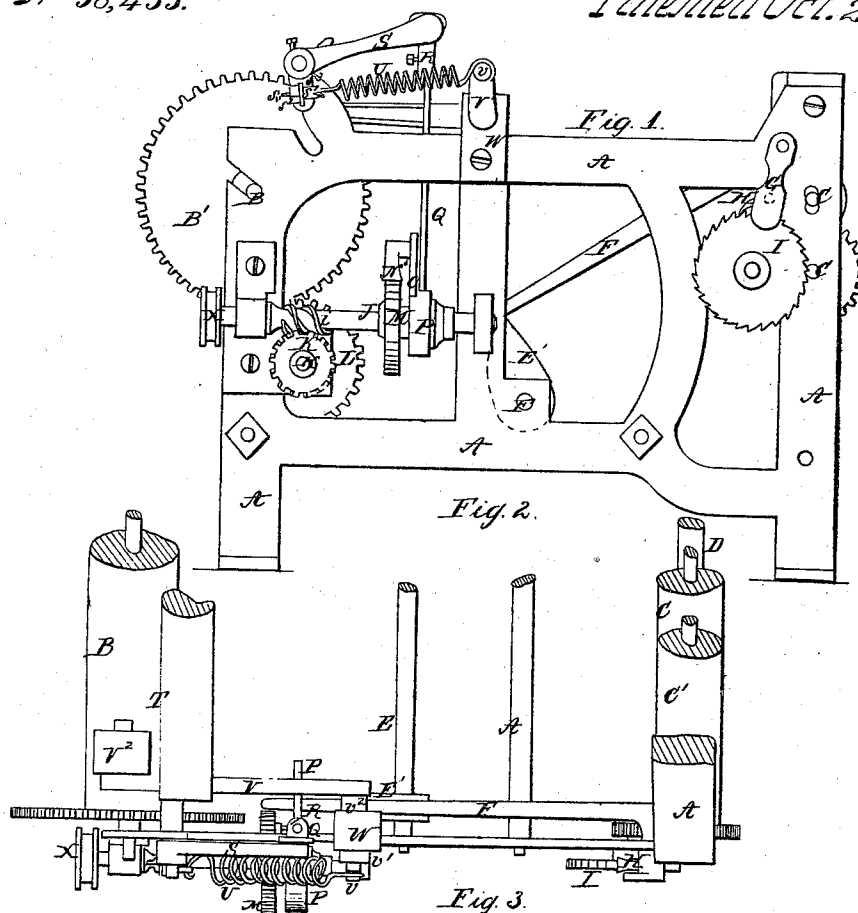


*J. F. Kirkwood.*  
*Let-Off and Take-Up.*

*N<sup>o</sup> 58,433.*

*Patented Oct. 2, 1866.*



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# UNITED STATES PATENT OFFICE.

JOHN F. KIRKWOOD, OF THISTLE, MARYLAND.

## IMPROVEMENT IN LET-OFFS AND TAKE-UPS FOR LOOMS.

Specification forming part of Letters Patent No. 58,433, dated October 2, 1866.

*To all whom it may concern:*

Be it known that I, JOHN F. KIRKWOOD, of Thistle, in the county of Baltimore and State of Maryland, have invented a new and useful Improvement in Looms; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, reference being had to the accompanying drawings, which are made a part of this specification, and in which—

Figure 1 is a side elevation of a loom illustrating my invention. Fig. 2 is a plan of a portion of the same. Fig. 3 is a vertical longitudinal section thereof.

Similar letters of reference denote corresponding parts in the several figures.

This invention relates to improvements in the construction and operation of the let-off and take-up mechanism.

In general terms, the chief object of the invention is to provide for the yarn-beam a self-adjusting tension device which shall, as the operation progresses, adjust the let-off mechanism in order to increase the speed of the yarn-beam, and thus maintain a uniform feed of the warp-threads.

The principal feature of the invention consists in the method of combining a self-adjusting tension-lever bearing upon the yarn-beam with a spiral spring, which is, by the constant movement of the lever due to its adjustment, made to offer less and less resistance to the motion of the oscillating whip-roll, and thus enable the latter, through the medium of a reciprocating rod connected therewith, to act with increasing effect upon the devices which impart motion to the yarn-beam.

This increased extent of motion is necessary in order to obtain a uniform feeding or letting-off of the warp-threads, as for a fixed or uniform extent of motion the feeding would decrease commensurately with the decrease of the diameter of the cylinder or yarn-beam from which the warp-threads are paid off.

The invention further consists in the arrangement whereby a single cam is made to operate both the let-off and take-up mechanism.

The following description will enable others skilled in the art to which my invention appertains to fully understand and use the same.

In the accompanying drawings, A A may represent various parts of the frame of the

loom; B, the yarn-beam; CC', the cloth-beams; D, the receiving-roll. E is a horizontal shaft, mounted within the lower part of the frame A, and rotated continuously by any suitable driving-power. E' is a cam fixed upon the shaft E, and having a form approximating to that of a heart. F is a lever, the loose extremity of which rests upon the cam E'. The pivoted end of the lever F is bent at a right angle to the lever proper, and passes through the frame A, the projecting extremity of the bent part having fixed upon it a vibrating arm, G, which carries a pivoted catch, H, which operates a ratchet-wheel, I, whereby motion is communicated through suitable gearing to the cloth-beam C'. The receiving-roll D is connected with the cloth-beam in customary manner, so as to rotate simultaneously therewith.

From the above it will be seen that the parts connected with and operated by the pivoted end of the lever F constitute the take-up mechanism.

The devices which produce the let-off motion of the yarn-beam B receive motion from the loose extremity of the lever F, and I shall now proceed to describe them.

J is a horizontal shaft, formed with a worm, j, gearing with a worm-wheel, K, which is fixed upon a short shaft, k, on the inner end of which is a pinion, L, engaging with the toothed beam-head B'.

M is a ratchet-wheel, keyed upon the horizontal shaft J, and receiving an intermittent rotary motion in one direction only from a catch, N, which is pivoted to a lug, O, projecting from an arm, P, which works freely upon the horizontal shaft J, and extends inward sufficiently to be struck upward by the loose extremity of the lever F, as the latter is thrown upward by the cam E'. The outer end of the arm P is weighted, in order to preserve its normal operating position, or, in other words, to balance it in such a way as to prevent it from assuming any position other than that which is due to the action of the devices whereby it is actuated. The elevation of the arm P (meaning the inner extremity thereof) causes the catch N to impart a partial rotary movement to the ratchet-wheel M. A reverse or downward movement of the arm P is effected by the vertically-reciprocating rod Q, which is held within a socket, R, attached to the end

of a vibrating arm, S, which is fixed upon the end of the oscillating whip-roll T. The whip-roll receives an oscillating or rocking motion from the warp-threads in consequence of the strain or jerk to which the latter are subjected when the lay is brought against the cloth. This jerking action of the warp-threads throws the whip-roll into an approximately horizontal position, from which it is immediately thrown into its inclined position by the action of a spiral spring, U.

These oscillations of the whip-roll T vibrate the arm S, and produce the vertical reciprocating movement of the rod Q, which serves in part to operate the let-off devices.

One extremity of the spiral spring U is fastened to a screw-bolt, *s*, which is adjusted and retained in a lug, *s'*, by means of a nut, *s*<sup>2</sup>, said lug *s'* being fixed to an extension, *s*<sup>3</sup>, of the arm S. The other end of the spring U is attached to a stud, *v*, which is retained by a nut, *v'*, in a slotted arm, V', attached to a stud-shaft, *v*<sup>2</sup>, which passes through the bracket W, and has attached to its opposite end the tension-regulating lever V. This lever carries at its loose extremity a friction-roller, V<sup>2</sup>, which bears constantly upon the periphery or circumference of the body of thread wound upon the yarn-beam B.

It will now be seen, as hereinafter explained, that the spring U, acting through the arm V', stud-shaft *v*<sup>2</sup>, and lever V, holds the roller V<sup>2</sup> against the yarn-beam with sufficient pressure to make the letting-off of the warp-threads conform to the positive and determinate action of the let-off devices.

When the yarn-beam is full at the commencement of the operation, the lever V, or rather its loose extremity, occupies an elevated position and the lever falls as the threads are unwound.

The effect of the falling of the lever is to contract and thus reduce the strength of the spring U, by bringing its point of attachment *v* nearer to its opposite point of attachment *s*, the arm V' having its upper extremity vibrated in the direction of the oscillating whip-roll T

as the lever V falls. Hence, as the diameter of mass of yarn on the yarn-beam is diminished, the let-off motion increases, for the contraction or weakening of the spring U, by the depression of the lever V, enables a given force applied to the oscillating whip-roll to act through the arm S with greater effect upon the vertically-reciprocating rod Q—that is to say, the motion of the whip-roll, being less retarded by the spiral spring U, is allowed to depress the rod Q to a greater extent, and this increase of movement being imparted to the arm P of the catch N, it follows that the movements due to the elevation and depression of the said arm P must cause each effective movement of the catch N to turn the ratchet M farther than previously—that is, when the tension of the spring U was greater.

The pressure of the roller V<sup>2</sup> of the lever V may be varied by setting the stud *v* in different positions on the arm V', so as to vary its leverage. This is effected by means of the slot therein and the nut *v'*.

The tension of the spring U can be varied, as occasion may require, by the screw-bolt *s* and nut *s*<sup>2</sup>.

A weighted cord or strap, depending from the pulley X, may be employed for the purpose of preventing the shaft S from undergoing any further rotary movement than that which is imparted by the actuating devices.

Having thus described my invention, the following is what I claim as new herein and desire to secure by Letters Patent:

1. The combination of the lever V and spring U with the whip-roll T, arm S, and rod Q, for the purpose of increasing the speed of the let-off devices conformably with the decrease of the thread upon the yarn-beam, substantially as described.

2. The arrangement of the lever V, cam E', and arm P, for imparting motion to both the let-off and take-up mechanism, as described.

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