

(No Model.)

2 Sheets—Sheet 1.

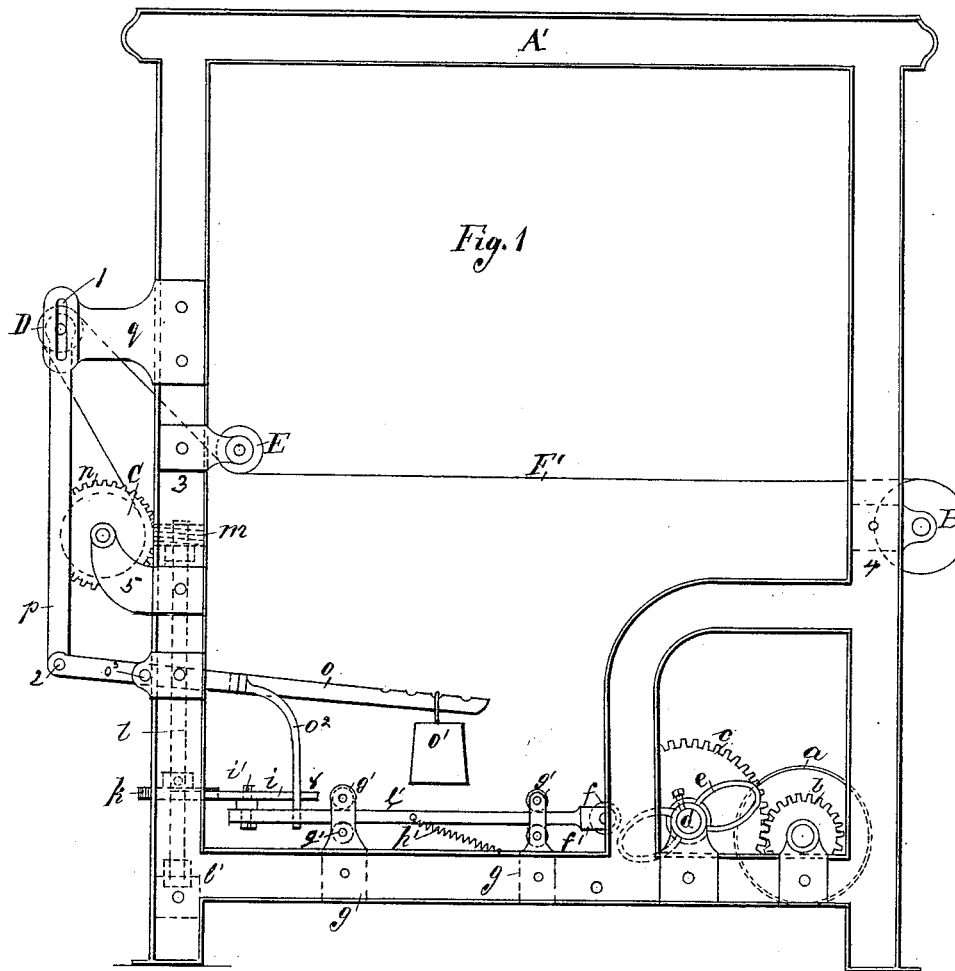
JOSEPH NIGHTINGALE & JOHN NIGHTINGALE.

LET-OFF MECHANISM FOR LOOMS.

No. 348,335.

Patented Aug. 31, 1886.

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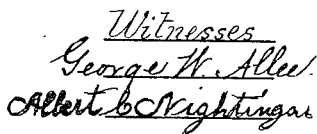
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2 Sheets—Sheet 2.

LET-OFF MECHANISM FOR LOOMS.

A Patented Aug. 31, 1886.



Inventor
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UNITED STATES PATENT OFFICE.

JOSEPH NIGHTINGALE AND JOHN NIGHTINGALE, OF PATERSON, N. J.

LET-OFF MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 348,335, dated August 31, 1886.

Application filed December 30, 1885. Serial No. 187,118. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH NIGHTINGALE and JOHN NIGHTINGALE, citizens of the United States, residing at Paterson, Passaic county, State of New Jersey, have invented a new and useful Improvement in Let-Off Mechanism for Looms, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

Heretofore a drag composed of a rope secured at one end and having a weight attached to the other end, with one or more turns of the rope around the warp-beam, has been employed to control the warp-beam to cause the same to deliver the warp-threads in the loom in accordance with the tension placed on the same, determined by the number of turns of the drag-rope around the warp-beam. This means for maintaining the desired tension on the warp-threads is found to be unreliable, for the reason that changes of temperature, acting on the drag-rope, produce changes in the tension of the warp-threads. If the temperature be low and moist, the moisture is absorbed by the drag-rope, which contracts the rope and increases the tension on the warp-threads by cramping the warp-beam's action, causing the same to deliver the warp-threads in the loom by jerks, producing thereby a ribby and uneven fabric, which reduces its market value and causes a loss to the manufacturer, besides which it causes unusual strain and excessive wear on the harness from the warp-threads in formation of the shed, making frequent renewals of the harness necessary.

The object of our invention is to provide a reliable and automatic means for controlling the warp-beam in looms, wherein the beam will deliver the warp-threads in the loom automatically and at a uniform tension at each formation of the shed.

The invention consists in a let-off mechanism for looms, composed of devices which will be fully explained and claimed.

Figure 1 of the drawings shows a portion of one side of an ordinary loom in elevation, having our invention attached thereto. Fig. 2 is a front elevation of the same with our invention attached, in which figure the top of the loom is removed; and Fig. 3 is a plan of the same having our invention attached, in

which figure a portion of the loom-frame, cam-shaft, rock-lever, warp-beam, and tension-roller is removed.

A represents a portion of an ordinary loom, having the usual frame, A', cam-shaft *d*, pulleys *a*, gear-wheels *b c*, and cloth-beam B. The loom A, which is constructed the same as is usual, does not need to be further described herein. To the sides of the loom-frame and to the rear standards thereof we arrange and secure by bolts slotted brackets *q*, having slots 1. In the slots 1, that are vertically arranged, we arrange a tension-roller, D. The roller D is movable in the slots 1, and is journaled in the upper ends of bars *p*. The lower ends of bars *p* are pivoted to projections formed on a rock-frame, *o*³, by pivot-bolts 2. The rock-frame *o*³, which we arrange transversely in the loom and journal in the sides of the loom-frame, is provided centrally with a weight-arm, *o*, on which arm is arranged a weight, *o*¹, as shown.

On the rock-frame *o*³ we arrange suitably and secure by a bolt, 6, a guard, *o*². The guard *o*² is provided with a tapering lower end, *o*⁴, to act forcibly on the inner end of a pawl, *i*, that we pivot to a pawl-bar, *e*¹, by a pivot-bolt, *i*¹. The pawl-bar *e*¹, which we arrange between rollers *g*¹, has a bifurcated end, *f*¹, in which we journal a roller, *f*, to be engaged by a cam, *e*, placed on the shaft *d*. The rollers *g*¹ we journal in open brackets *g*, that are bolted to the frame A'. To the pawl-bar *e*¹ we arrange and secure one end of a spring, *p*¹, to draw forward the pawl-bar after the same has been forced rearward by the cam *e*, and the opposite end of the spring we secure to the loom-frame. The warp-beam C is journaled in brackets 5, bolted to the frame of the loom.

On the warp-beam C we arrange and secure a worm-wheel, *n*, to accommodate a worm, *m*, which we arrange on a shaft, *l*. The shaft *l* we also provide with a ratchet-wheel, *k*, to be engaged by the pawl *i*, by which means the shaft *l* is actuated. The pawl *i* is provided with a spring, *i*², while the shaft *l* is journaled in and supported by a step, *l*¹, that is secured to the frame A', as shown.

To the sides of the loom-frame we arrange and secure by bolts brackets 3, in which brackets we journal a guide-roller, E, while the

cloth-beam B is journaled in brackets 4, that are bolted to the loom-frame. The warp-threads E' are taken from the warp-beam C over the roller D, under the roller E, through the loom to the cloth-beam, as shown.

The loom is supposed to be in motion, and the operation is as follows: The cam *e* engages the roller *f*, and forces rearward the pawl-bar, which is drawn forward again by the spring *p'*, put in tension by the rearward movement of the bar *e'*, under the influence of the cam's action thereon, which actions of the cam and spring impart an intermittent movement to the pawl-bar *e'*, and by means of said bar a like movement to the pawl *i*, which causes the pawl to take up a certain number of teeth on the ratchet-wheel *k* at each rearward movement of the pawl-arm *e'*, which turns the shaft *l* and worm *m*, and by means of the worm *m* turns the warp-beam C, causing the warp-beam to unwind the warp-threads E' from off the same, to be taken through the loom and woven into fabric and wound on the cloth-frame B in the usual way. As the weaving is continued, the warp-beam C delivers the warp-threads in the loom under a uniform degree of tension, regulated by means of the weight *o'*, which is adjustable on the arm *o*. As the weight is moved out toward the end of the arm, the tension on the warp-threads will be increased, and the opposite will be the case when the weight is moved inward on the lever. Should the tension be decreased on the warp-threads by a derangement of the devices in the front of the loom, the weight *o'* will carry the arm *o* downward, and cause the guard *o''* to engage the pawl *i*, and taper *o'*, as the guard is carried down by the weight, will force inward the end 8 of the pawl until the ratchet-wheel *k* escapes the pawl's action thereon, which stops the delivery of the warp-threads in the loom by the warp-beam, while in the same action the outer end of the frame *o''* will be elevated, and by means of bars *p* will raise the tension-roller D in the slots 1, to take up the slack on the warp-threads, thus automatically stopping the delivery of the warp-threads in the loom when the take-up thereof is deranged. When the normal ten-

sion on the warp-threads is restored, the weight *o'* is raised to its elevated position by the tension placed on the warp-threads, which action raises the guard *o''*, when the spring *i''* causes the pawl *i* to re-engage the ratchet-wheel *k* and take up thereon its usual number of teeth at each rearward movement of the pawl-bar *e'*, and causes the warp-beam to deliver the warp-threads E' in the loom at their normal tension, while the tension-roller D is lowered in the slots 1 to its former position.

By our invention a uniform tension is automatically maintained on the warp-threads E' at each formation of the shed, which prevents unequal strain on the harness with excessive wear and early fracture from the chafing of the warp-threads thereon, which makes renewals of the harness less frequent.

Another great advantage derived from the use of our invention is, that by the uniformity of the tension which it maintains on the warp-threads the weft-threads are thrown in evenly throughout the fabric by the shuttle, which gives a smooth, even face to the cloth.

Having described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination, with the pawl-bar *e'*, rollers *g'*, and pawl *i*, carried by said bar and reciprocated therewith, of the ratchet-wheel *k*, spring *i''*, shaft *l*, the worm *m*, worm-wheel *n*, spring *h'*, warp-beam C, cam *e*, brackets *g*, step *l'*, and loom-frame, as described and shown.

2. The combination, with pawl-bar *e'*, cam *e*, and pawl *i*, carried by said bar *e'*, of the ratchet-wheel *k*, spring *i''*, spring *h'*, rollers *g'*, brackets *g*, the shaft *l*, step *l'*, worm *m*, the wheel *n*, the warp-beam C, the guard *o''*, rocking frame *o''*, lever *o*, weight *o'*, the roller D, bars *p*, for carrying roller D, the brackets *g*, having slots 1, roller E, roller B, brackets 3, brackets 4, brackets 5, and loom-frame, substantially as described.

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Witnesses:

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