

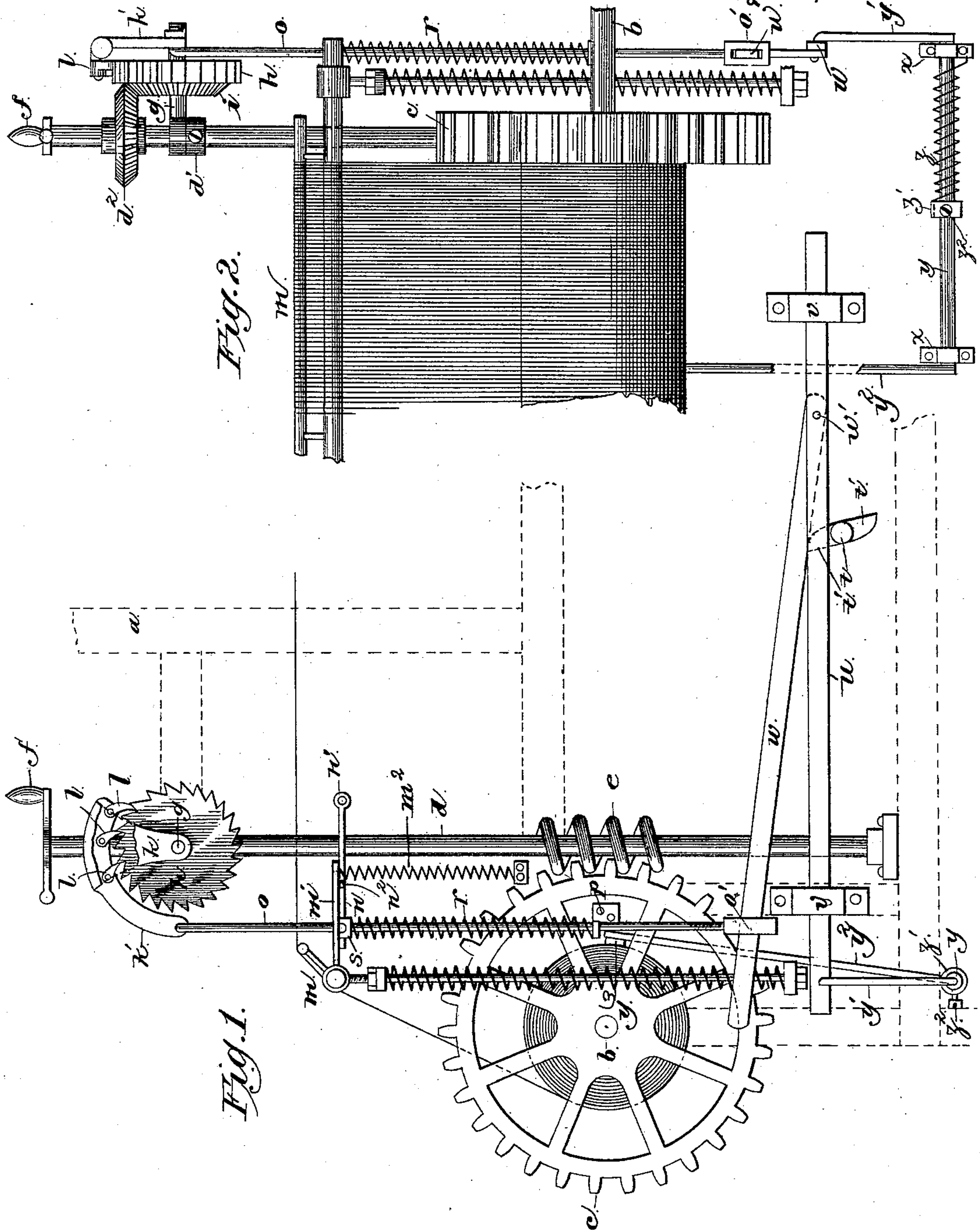
(No Model.)

H. L. ESTEN & A. GREAVES.

LET-OFF MOTION FOR LOOMS.

No. 345,627.

Patented July 13, 1886.



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# UNITED STATES PATENT OFFICE.

HENRY LEMERTINE ESTEN AND ABRAHAM GREAVES, OF PASCOAG, R. I.

## LET-OFF MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 345,627, dated July 13, 1886.

Application filed December 7, 1885. Serial No. 184,936. (No model.)

*To all whom it may concern:*

Be it known that we, HENRY LEMERTINE ESTEN and ABRAHAM GREAVES, citizens of the United States, residing at Pascoag, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Let-Off Motions for Looms, of which the following is a specification, reference being had to the accompanying drawings.

Our invention relates to the mechanism used in looms to gradually let off the warp from the warp-beam; and it consists in the peculiar construction and combination of devices that will be set forth more fully hereinafter, and particularly pointed out in the claims.

The object of our invention is to provide an apparatus to automatically let off the warp from a full to an empty beam without alteration.

Our object is to further provide a mechanism that is durable, compact, and easily adjusted, and that can be applied to any kind of loom weaving woolen, worsted, or cotton cloth.

In the drawings, Figure 1 is a side elevation of our invention, with parts of a loom-frame shown in dotted lines. Fig. 2 is a rear elevation of our improved apparatus.

*a* represents the loom-frame.

*b* represents the warp-beam, to each end of which is secured a worm gear-wheel, *c*.

*d* represents a vertical shaft, which is journaled in suitable bearings with which the loom-frame is provided, and keyed to this shaft is a worm, *e*, that meshes with one of the gear-wheels *c*. To the upper end of the shaft *d* is attached a crank-handle, *f*, by means of which the warp-beam may be reversed when necessary. A miter gear-pinion, *d*<sup>2</sup>, is keyed near the upper end of shaft *d*. Extending at right angles from the shaft *d*, near the upper end thereof, is a horizontal spindle, *g*, on which is journaled a ratchet-wheel, *h*, and a miter gear-pinion, *i*. The ratchet-wheel and pinion may be either formed integrally or made separately and secured together. The shaft *d* is loose in an eye formed at the inner end of the spindle, and has a collar, *d*<sup>1</sup>, that is clamped to the shaft and supports the eye of the spindle.

*k* represents an oscillating block or casting, which is journaled on the spindle *g* and has a rearwardly-extending downwardly-curved

arm, *k*<sup>1</sup>. A series of gravity-pawls, *l*, are pivoted to this block and engage with the ratchet-wheel *h*. The wave *m*, over which the yarn from the warp-beam passes, is supported in rear of the shaft *d* and above the warp-beam in the usual manner. This wave has a forwardly-extending lever-arm, *m*<sup>1</sup>. A coiled retractile spring, *m*<sup>2</sup>, is attached to the free end of the lever-arm *m*<sup>1</sup>, and the function of the said spring is to normally lower the wave to the position shown in Fig. 1. A lever, *n*, is fulcrumed at its front end to the loom-frame, as at *n*<sup>1</sup>, and has a laterally-extending stud or arm, *n*<sup>2</sup>, on which the lever-arm *m*<sup>1</sup> bears. A vertical rod, *o*, has its upper end attached to the curved arm of the block *k*, and is guided in a bearing, *p*, attached to the loom-frame. A coiled extensile spring, *r*, is placed on the rod *o* and bears on the bearing *p*. The rear end of the lever *n* is connected by a collar, *s*, to the rod *o*, the said collar being supported by the spring *r*.

The usual picker-shaft, *t*, is journaled in the loom-frame, and is provided with a double cam, *t*<sup>1</sup>. A horizontal bar, *u*, is supported in guideways *v*, and adapted to move back and forth therein. A lever, *w*, is fulcrumed at its front end to the bar *u*, as at *w*<sup>1</sup>, and the rear end of said lever passes through a link, *o*<sup>1</sup>, that is attached to the lower end of the rod *o*.

Near the rear side of the loom-frame are bearings *x*, in which is journaled a rock-shaft, *y*, which is parallel with the warp-beam, and has arms *y*<sup>1</sup> and *y*<sup>2</sup>, bent at right angles from its ends. The arm *y*<sup>1</sup> is connected to the rear end of the bar *u*, and to the upper end of the arm *y*<sup>2</sup> is secured a pad, *y*<sup>3</sup>, that bears against the yarn on the warp-beam. On the rock-shaft *y* is placed a coiled spring, *z*, one end of which is secured to one of the bearings *x*, and the other is secured to a collar, *z*<sup>1</sup>, on the rock-shaft, which collar has a set-screw, *z*<sup>2</sup>, by means of which it may be secured to the rock-shaft. The spring is wound on the rock-shaft to produce sufficient tension to cause the pad to bear against the yarn on the warp-beam.

The operation of our invention is as follows: The rotation of the picker-shaft, when the loom is in motion, causes the cam-arms *t*<sup>1</sup> to raise the outer end of lever *w*. This movement of the lever is communicated through the rod *o*



to the block *k*, imparting an oscillating motion to the latter, and thereby causing the pawls *l* to rotate the ratchet-wheel *h* and gear-wheel *i*. This latter, through its companion gear *d*<sup>2</sup>, rotates the vertical shaft *d* and causes the worm thereon to slowly rotate the gear-wheel *c* and the warp-beam, thus letting off the yarn proportionately to the speed of the loom. The pad *y*<sup>3</sup>, as before stated, bears against the yarn on the warp-beam, and as the yarn is let off the pad moves rearwardly toward the warp-beam, the rock-shaft moving the bar *u* correspondingly. This causes the fulcrum *w*' of the lever *w* to approach the cam, and consequently gives increased movement to the rear end of the lever *w* and the oscillating block *k*, causing the pawls pivoted to the latter to move the ratchet-wheel farther at each upstroke of the lever *w*, thus accelerating the rotation of the warp-beam constantly until all the warp-threads or yarn have been let off. When the wave is lowered by the strain on the yarn, due to the blow of the lay in driving home the weft, or due to the action of the heddles in shedding, the arm *m*', by bearing downwardly on the pin *n*<sup>2</sup>, lowers the free end of the lever *n*', overcomes the tension of the spring *r*, and depresses the rod *o*. This lowers the lever *w* and moves the block *k* rearwardly, so as to cause the pawls *l* to slip idly over the teeth of wheel *h* and take a new hold thereon.

An apparatus thus constructed is adapted to let off the warp from a full to an empty beam automatically.

35 Having thus described our invention, we claim—

1. The combination of the warp-beam, the shaft *d*, geared thereto, the ratchet-wheel

geared to the said shaft, the oscillating block having the pawls engaging the ratchet-wheel, 40 the sliding bar *u*, the lever *w*, pivoted thereto, the actuating-cam, the rod connecting the oscillating block and the lever *w*, and the spring-actuated rock-shaft having the arm connected to the sliding bar, and the pad bearing on the warp on the beam, substantially as described. 45

2. The combination of the warp-beam, the shaft *d*, geared thereto, the ratchet-wheel geared to the said shaft, the oscillating block having the pawls engaging the ratchet-wheel, 50 the actuating-lever *w*, the cam, the rod *o*, connecting the lever *w* with the oscillating block and having the spring *r*, the lever *n*, connected to rod *o*, and the wave having an arm engaging with the lever *n*, substantially as described. 55

3. The combination of the warp-beam having the gear-wheel *c*, the shaft *d*, having the worm meshing with wheel *c* and the gear-pinion *d*<sup>2</sup>, the gear-pinion *i*, engaging with pinion *d*<sup>2</sup>, the ratchet-wheel *h*, fast with pinion *i*, the 60 oscillating block *k*, having the pawls engaging with the ratchet-wheel, the rod *o*, attached to the block *k*, the lever *n*, spring *r*, bearing under said lever, the wave having the arm engaging with lever *n*, and the actuating-lever 65 *w*, attached to the rod *o* and the cam *t* to raise the lever, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

HENRY LEMERTINE ESTEN.  
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Witnesses:

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