E. METCALF.

Let-Off and Take-Up Mechanisms for Looms.

No. 156,587. Patented Nov. 3, 1874.

FIG. 1.

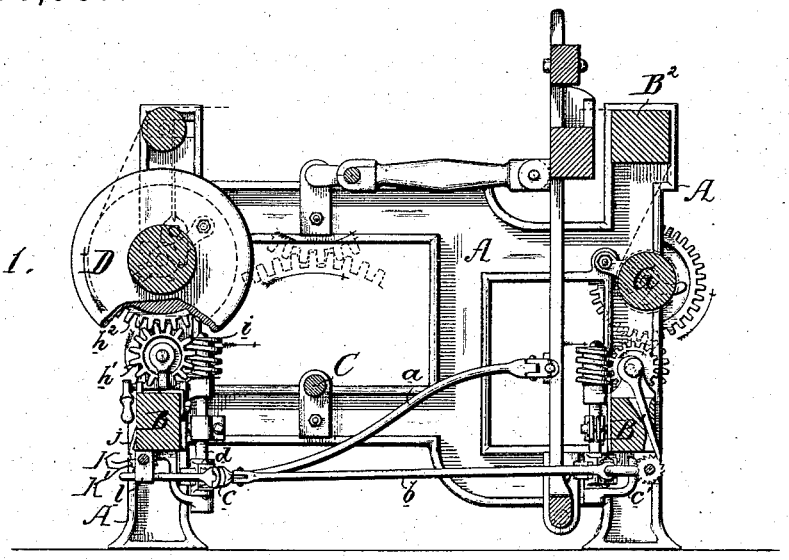


FIG. 4.

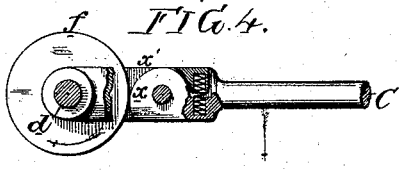


FIG. 3.

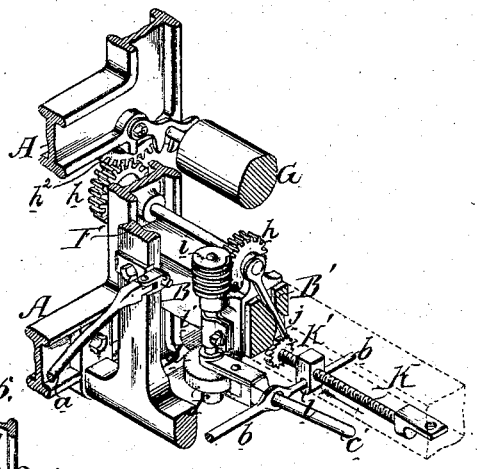


FIG. 2.

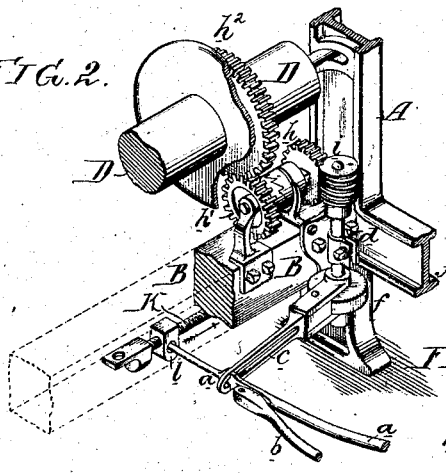
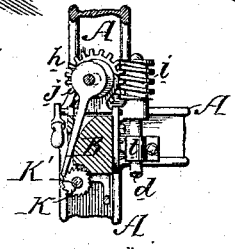


FIG. 5.



Witnesses,
Hubert Howson
John K. Rupertus.

Edward Metcalf
by his Attys
Howson and Sons

UNITED STATES PATENT OFFICE.

EDWARD METCALF, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF TWO-FIFTHS HIS RIGHT TO WILLIAM N. KENNEDY, OF SAME PLACE.

IMPROVEMENT IN LET-OFF AND TAKE-UP MECHANISMS FOR LOOMS.

Specification forming part of Letters Patent No. **156,587**, dated November 3, 1874; application filed October 3, 1874.

To all whom it may concern:

Be it known that I, EDWARD METCALF, of Philadelphia, Pennsylvania, have invented certain Improvements in Let-Off and Take-Up Mechanism for Looms, of which the following is a specification:

The objects of my invention are to obtain a positive differential take-up motion and a like let off motion, and to so connect the two that they will operate in unison, thus maintaining the warp tight during the operations of weaving; and these objects I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1 is a transverse vertical section of a loom with my improvements, Figs. 2 and 3 being detached views, showing the said improvements in perspective, and Figs. 4 and 5 detached sectional views of parts of my improvements.

The loom has the usual opposite-side frames A, connected together by the cross-bars B, B′, and B″. C is the driving-shaft, from which motion is communicated to the lathe and heddles in the ordinary manner. To a stud on one of the arms of the lathe is jointed one end of a rod, *a*, the opposite end of which is guided by a nut, *l*, on a threaded spindle, K, which has its bearings on the cross-bar B of the frame; and which has a ratchet-wheel, K′, and to the teeth of the latter is adapted an eccentric pawl, *j*, on a shaft, having a pinion, h^1, gearing into a wheel, h^2, on the warp-beam D. On the same shaft with the wheel h^1 is a worm-wheel, *h*, gearing into a worm, *i*, on a vertical shaft, *d*, which is turned intermittently by a slotted lever, *c*, the latter deriving its vibrating movement from the lathe through the medium of the reciprocating rod *a* above alluded to, this rod being so connected to the lever that it can be moved to and fro on the same. The letting off of the warp is effected by the lathe through the medium of the reciprocating rod *a*, vibrating lever *c*, worm *i*, and wheels *h*, h^1, and h^2; but the speed with which the warp-beam turns to let off the warp depends upon the position of the reciprocating rod *a* on the slotted lever *c*, or, in other words, on the length of the lever. The motion of the rod *a* being the same throughout, the farther this rod is from the shaft *d* on which the lever vibrates the less will be the intermittent rotating movement of the warp-beam, and the greater will be the movement of the beam the nearer the rod *a* approaches the shaft *d*. The position of the rod *a* on the lever *e* depends upon the screw-spindle *k*, the movement of which is also derived from the said rod through the medium of the devices above described.

When the warp-beam is full, a comparatively slow let-off motion is required, but this motion must be increased as the warp is drawn from the beam, in order to maintain a uniform tension of the said warp. As the warp is drawn off the beam, the nut *l* is slowly and intermittently traversed in the direction of the arrow, Fig. 2, and the consequence will be the gradual increase of the speed of the warp-beam. A corresponding positive differential motion is imparted to the cloth-roller G, Fig. 3, by devices substantially the same as those above mentioned, the speed of the cloth-roller decreasing as its diameter increases, owing to the fabric wound on it, and this decrease of the speed of the cloth-roller being at the same ratio as the increase of speed of the warp-beam as the warp is drawn from it.

The mechanism, through the medium of which the desired differential movement is imparted to the cloth-roller, may be briefly described as follows, reference being had to Fig. 3 of the drawing.

A rod, *b*, connected to and reciprocating with the above-mentioned rod *a*, has its outer end controlled by a screw-spindle and nut in precisely the same manner as the rod *a*, and a lever, *c′*, passes through an eye in this rod *b*, and this vibrating lever imparts an intermittent rotating motion to the cloth-roller through the medium of gearing similar to that described above, the differential character of the motion being determined by the screw-spindle, which is operated in the same manner as the spindle K.

I prefer to make each of the levers *c* and *c′* in the manner illustrated in Fig. 4, where it will be seen that the lever carries a cam or dog, *x*, which is pressed against the periphery of the disk *f* on the shaft *d*. On moving the

lever in the direction of the arrow, the cam or dog will bite the disk, the latter, consequently, moving with the lever; but, on moving the latter in a contrary direction, the dog will slide freely over the periphery of the disk.

I claim as my invention—

1. The within-described positive let-off or take-up motion for looms, consisting of the reciprocating rod *a*, and vibrating lever *c*, with mechanism, substantially as described, for imparting an intermittent rotating motion from the said lever to the warp-beam or cloth-roller, in combination with the screw-spindle *k*, deriving its motion from the said rod *a*, and with the nut *l*, for determining the position of the rod on the lever *c*.

2. The within-described positive differential let-off motion connected with the warp-beam, in combination with a like motion connected with the cloth-roller for taking up the fabric, the two motions operating in unison, as herein specified.

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

EDWARD METCALF.

Witnesses:

HUBERT HOWSON,
HARRY SMITH.