2 Sheets, Sheet 1.

E. B. Bigelow,

Let Off for Looms.

No. 113,483. Patented Apr. 11. 1871.

Fig. 1.

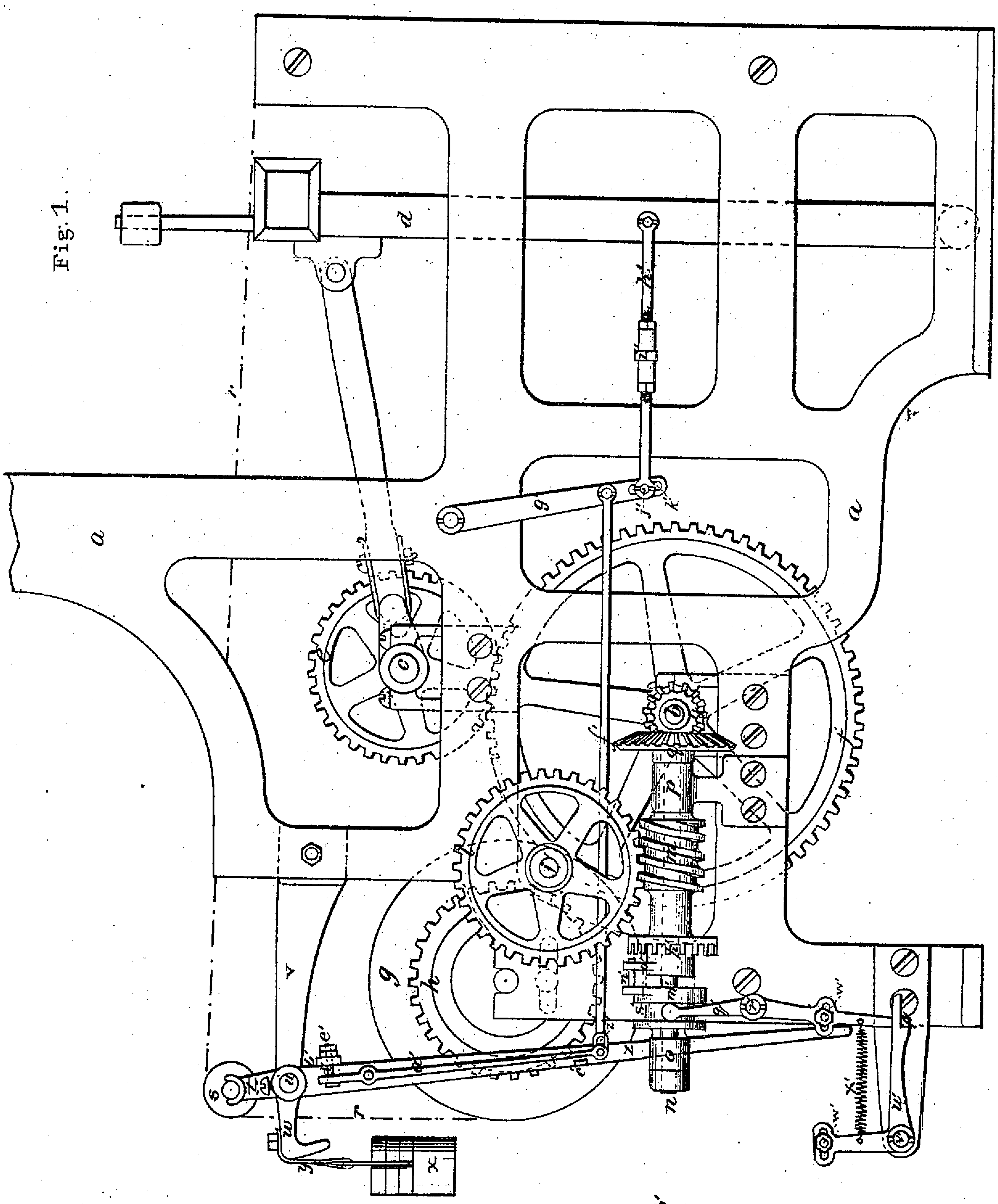
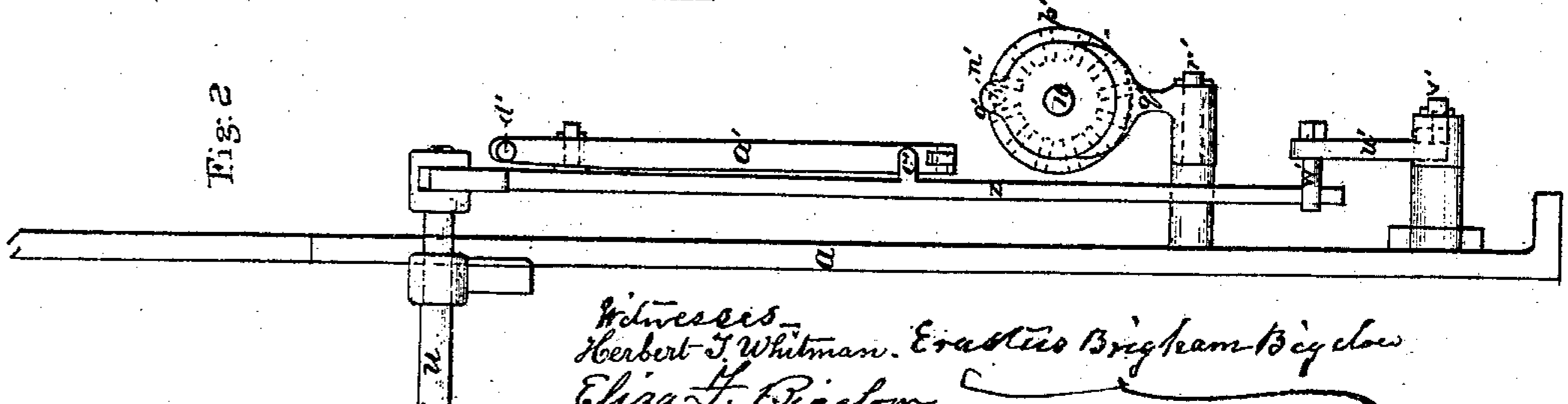


Fig. 2



Witnesses
Herbert T. Whitman.
Eliza F. Bigelow

Erastus Brigham Bigelow

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

E. B. Bigelow,

2 Sheets, Sheet 2.

Let Off for Loom.

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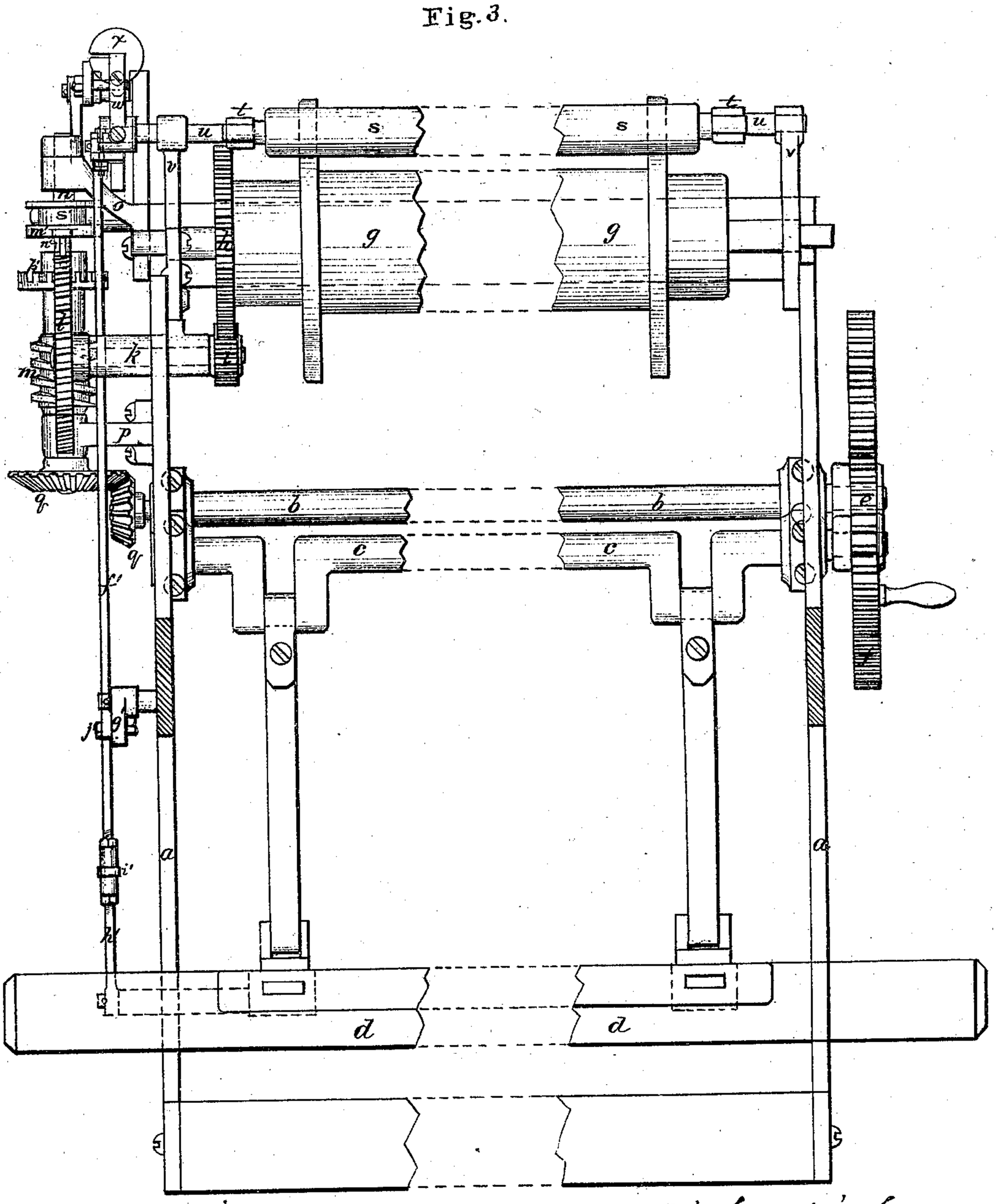
Fig. 3.



Witnesses.
Herbert T. Whitman.
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UNITED STATES PATENT OFFICE.

ERASTUS BRIGHAM BIGELOW, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN LET-OFF MECHANISMS FOR LOOMS.

Specification forming part of Letters Patent No. **113,483,** dated April 11, 1871.

I, ERASTUS BRIGHAM BIGELOW, of Boston, in the county of Suffolk and State of Massachusetts, have invented a Reversing Let-Off Mechanism for Power-Looms, of which the following is a specification:

The object of this mechanism is to turn the warp-beam forward and backward, according as the loom is turned, so that it will not only give out the warps during the operation of weaving, as heretofore done, but will also wind them up when the movement of the loom is reversed. It is intended to be used in connection with a "positive take-up motion" having a forward-and-backward movement in unison with the loom. The reversible movement of the mechanism gives great facilities for adjusting the warps when the weft is "picked out" or "mis-shot" is to be supplied.

The annexed drawing represents my improvements, with such parts of a loom as are necessary to illustrate their operation.

Figure 1 is a left-hand end elevation. Fig. 2 is a back elevation of the mechanism. Fig. 3 is a plan with the central part of the loom omitted.

The frame of the loom is marked *a;* the cam-shaft, *b;* the lay-shaft, *c*, and the lay *d*, the shafts *b* and *c* being connected by gears *e* and *f*, in the usual way.

The warp-beam *g* carries a spur-gear, *h*, which engages with a pinion, *i*, on the inner end of an axis, *j*. This axis is supported by a pipe-box, *k*, and has affixed to its outer end a worm-gear, *l*, which is actuated by a worm, *m*, on a horizontal shaft, *n*. The shaft *n* is supported by stands *o* and *p*, and is caused to move forward and backward in unison with the loom by the bevel-gears *q*.

The worm *m* is loosely fitted to the shaft *n*, and is of an unusual length, in order that the axis *j* may be moved toward and from the gear *h*, according as it may be desirable to increase or diminish the size of the pinion *i*.

From this description it will be seen that if the worm *m* is engaged with the shaft *n*, it will turn the warp-beam forward and backward, according as the loom is turned; and if it is disengaged it will remain at rest, and not turn the warp-beam either way, however the loom may be turned.

The mode in which this engagement and disengagement are effected to govern the giving out of the warp when the loom is in operation, and the winding it up when the movement of the loom is reversed, will now be described.

The warp, which is indicated by the dotted line *r*, passes from the warp-beam over a vibrator, *s*, (which acts as a slip-roll,) to a positive take-up mechanism, as is usual. The positive take-up mechanism being well known, it is deemed unnecessary to specify it.

The vibrator *s* is supported by arms *t*, extending upward from an axis, *u*, which oscillates in bearings *v*. To the axis *u* an arm, *w*, is affixed, from which a weight, *x*, is suspended by a strap, *y*, the weight being formed in sections for convenience in adjusting its force to the requirements of different kinds of cloth, which, in practice, should be graduated so as to give the required tension to the warp when the shed is formed.

A lever-arm, *z*, is affixed to the axis *u*, and has pivoted to its side a spring, *a′*, which is capable of vibrating between two stops, *b′* and *c′*, projecting from the lever-arm. An adjusting-bolt, *d′*, passes through the spring and the stop *b′*, and is provided with nuts *e′*, by which the force of the spring may be graduated, which, in practice, should be sufficient to counteract the blow of the lay in beating up the cloth. The spring is connected with the lay by a connecting-rod, *f′*, lever-arm *g′*, and adjustable rod *h′*, the object of interposing the two last-named parts being to furnish a ready means of varying the extent of the vibration imparted to the vibrator by the lay.

By the right and left handed nut *i′* the length of the rod *h′* may be lengthened or shortened, and the extent of the movement it imparts to the connecting-rod *f′* may be increased or diminished by elevating or depressing the stud *j′* in the slot *k′* in the lever *g′*.

When the lay advances to beat up the cloth it draws the spring *a′* and lever-arm *z* forward, thereby causing the vibrator *s* to move backward and tighten the warp to a degree to resist the beating in of the weft and prevent the yielding of the cloth before the reed; then, as the lay falls back, it relaxes its hold on the spring *a′* and lever-arm *z*, and allows the vibrator *s* to yield to the pull of the warps when the shed is forming; and when the lay

has nearly completed its backward movement a slot, z', allows the connecting-rod f' to free itself from the spring a' and leave only the weight x' acting on the warp.

By these devices co-operating as just explained the tension of the warp is diminished when the shed is formed and increased when the lay beats up the cloth, while the spring a' allows the vibrator s and lever-arm z to take positions varying at each beat-up of the lay, according to the varying lengths of the warps between the yarn-beam and take-up mechanism.

The varying positions of the lever-arm z are made the means of governing the action of the let-off mechanism.

A clutch, m', capable of sliding endwise on the shaft n, carries a clutch-pin, n', which passes through an arm, o', affixed to the shaft n, and engages with the teeth p' on a disk affixed to the worm m, before mentioned, the teeth being shaped so as to engage the pin and turn the worm in either direction.

When the clutch is thrown into gear the worm turns with the shaft, and when it is thrown out of gear the worm comes to rest, while the shaft continues in motion.

A lever, q', oscillates on a stud, r', with its upper end plying in a groove, s', of the clutch m', while its lower end has a projection, t', on which the horizontal arm of the lever u' latches. The lever u' oscillates on a stud, v', and carries an adjustable stud, w', at its upper end. The lever q' is also provided with a similar adjustable stud, w'. The two levers are connected together by a spiral spring, x', which throws the clutch m' into gear when the lever q' is set free from the lever u', and also causes the lever u' to latch onto the projection t' when the clutch is thrown out of gear and hold it in position.

In the drawing the loom is represented in that stage of its operation when the lay is beating up the cloth and the let-off clutch thrown out of gear.

Now suppose that as the weaving progresses more warp is required than has been given out—or, in other words, that the length of the warp between the warp-beam and the take-up mechanism has to a certain extent been diminished—the warp, when the shed is formed, will draw the vibrator s forward and cause the lever-arm z to strike against the stud w' on the lever u', and release the lever u' and allow the spring x' to throw the let-off clutch into gear and start the delivery movement. Then, when too much warp is being given out—that is, the length of the warp between the warp-beam and the take-up mechanism has to a certain extent been increased—the action of the lay on the spring a' at the time of the beat-up will cause the lever-arm z to strike against the stud w' on the lever q', and throw the let-off clutch out of gear and stop the delivery movement until put in action, as before.

When the movement of the loom is reversed the tension of the warp throws the clutch in gear the same as when the loom is running in the right direction. As the warp is wound back on the beam the tension is increased continually, and the clutch is kept in gear while the loom is being reversed.

It will be obvious to mechanicians that the form and arrangement of the various parts of the mechanism above described may be varied in many ways without departing from the distinguishing principles of my invention, and I do not intend to limit my claim to the form and arrangement of the parts as specified.

What I claim as new, and desire to secure by Letters Patent, is—

The combination, with a power-loom, of a let-off mechanism, such as is herein described, said let-off mechanism being capable of giving out the required warp when the loom is in operation and of winding it up when the movement of the loom is reversed, and being governed in its action by a vibrator, substantially as specified.

ERASTUS BRIGHAM BIGELOW.

Witnesses:

HERBERT T. WHITMAN,

ELIZA F. BIGELOW.