T. King.

Narrow Ware Loom.

No. 1,064.
32,068.

Patented Apr. 16, 1861.

Fig. 1

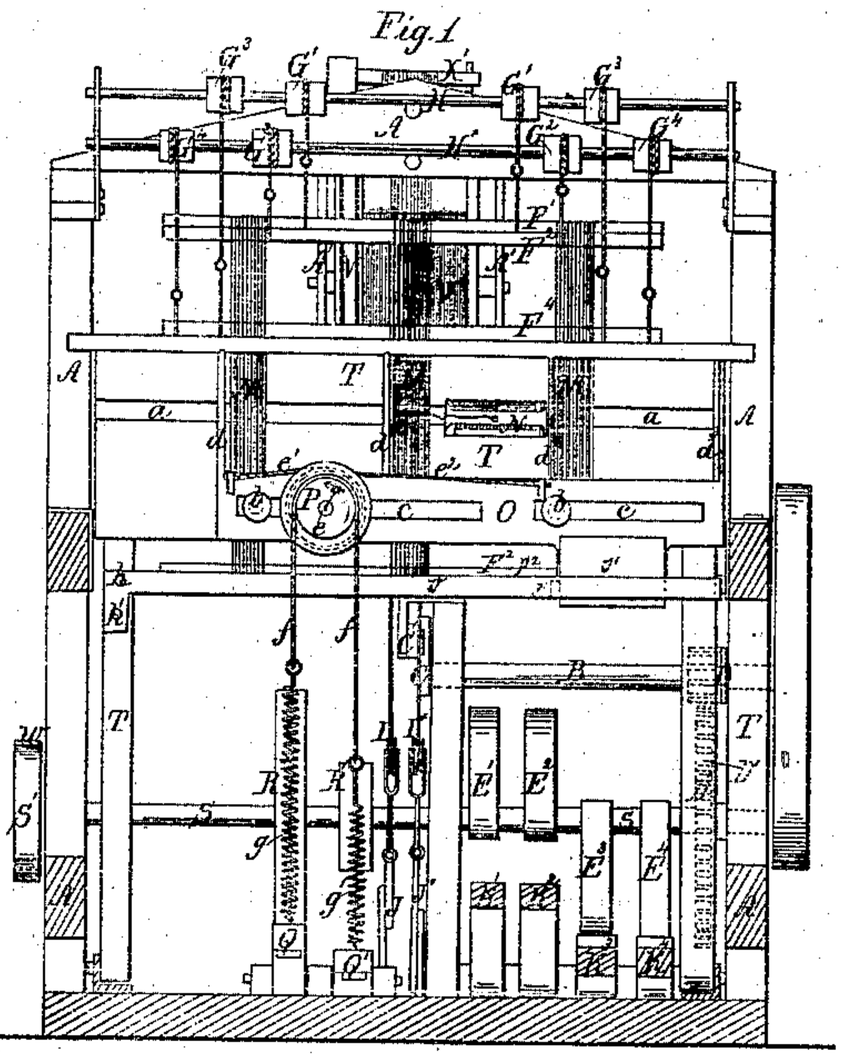


Fig. 2

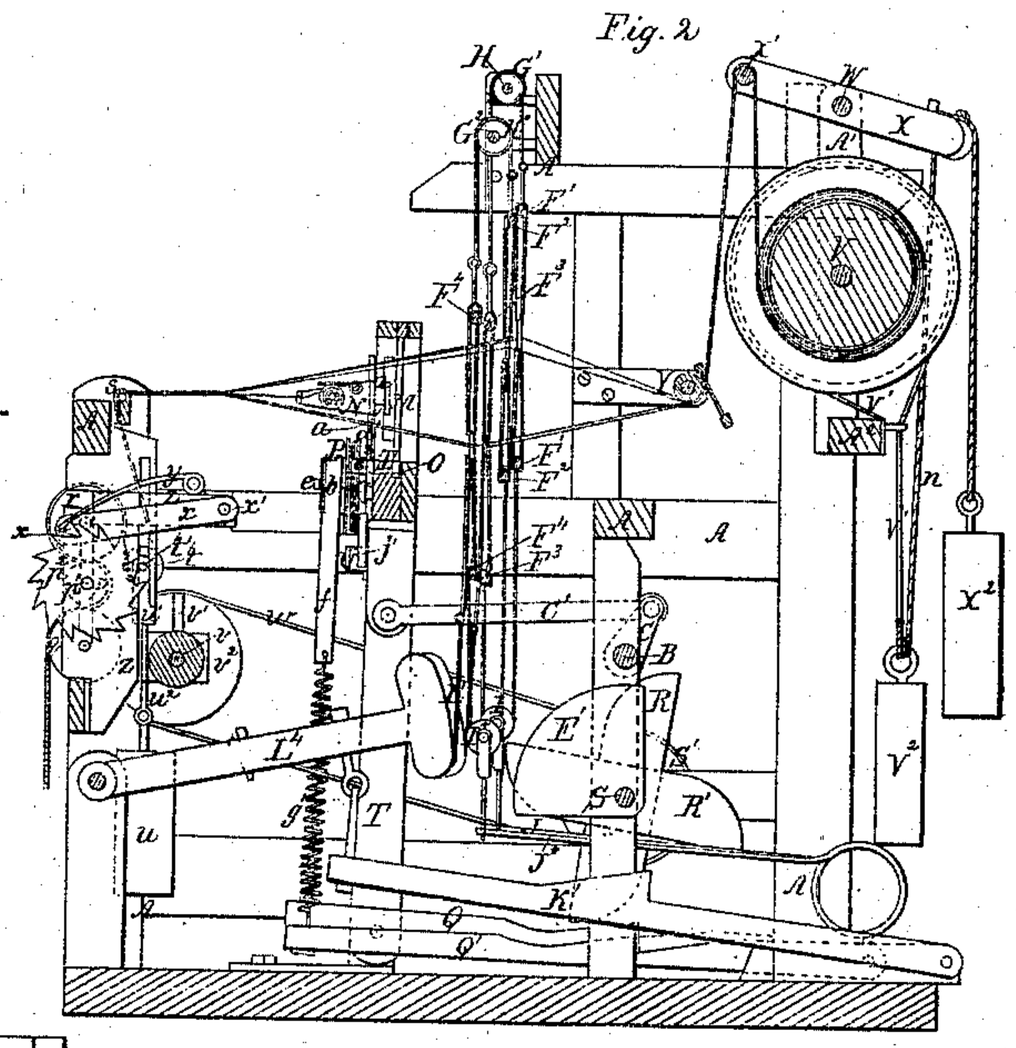


Fig. 3

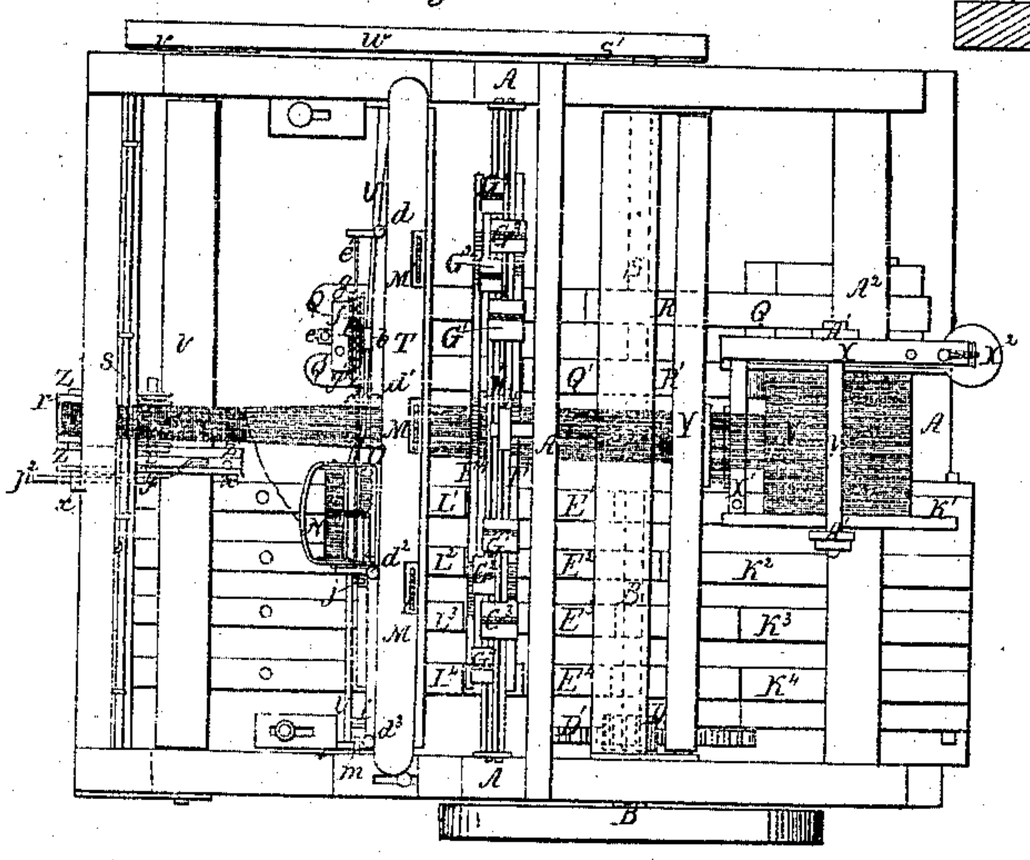
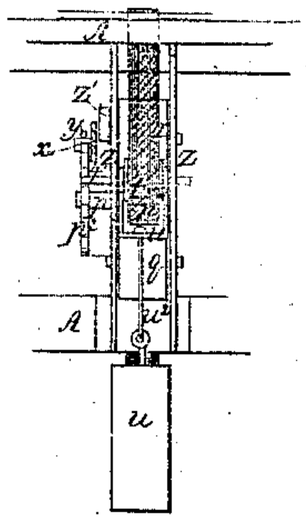


Fig. 4



Witnesses
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THOMAS KING, OF WEST FARMS, NEW YORK.

POWER-LOOM.

Specification of Letters Patent No. 32,068, dated April 16, 1861.

To all whom it may concern:

Be it known that I, THOMAS KING, of West Farms, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Power-Looms; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a transverse vertical section of a "narrow-ware" loom taken in rear of the breast beam and take-up mechanism. Fig. 2, is a vertical section of the same parallel with the warp. Fig. 3, is a plan of the same. Fig. 4, is a back view of the take-up mechanism.

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

The first part of my invention consists in an improved shuttle-motion which is applicable with especial advantage to looms for weaving tape and other narrow fabrics known as narrow-ware looms. The shuttle driver in that class of looms is commonly operated by tappets, and the shuttles are consequently thrown with greater or less force according to the speed of the loom so that when the loom is working very slowly the shuttles have not always force enough imparted to them to carry them through the warp; and the object of this part of my invention is to obviate this difficulty and to drive the shuttles with the same force whether the loom is working at a high or low speed.

The second part of my invention consists in an improved self regulating let-off. This feature like the first is applicable with especial advantage to narrow-ware looms; but both features are applicable to looms for weaving wide goods.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, is the framing of the loom.

B, is the main shaft carrying the crank C, for driving the lay T, and the gear D, for driving the cam-shaft S, the said crank being connected with the lay by a rod C′, and the said gear gearing with a gear D′, on the cam-shaft. This loom is for weaving a four leaf tweel, and hence the cam-shaft gear D′, is so proportioned to D, as to give the cam-shaft but one revolution for every four revolutions of the main shaft.

E′, E², E³, E⁴, are the four harness cams.

F′, F², F³, F⁴, are the four leaves of headles suspended from rollers G′, G′, G², G², G³, G³, G⁴, G⁴, on two rock shafts H, H*, which work in bearings in the upper part of the framing, and kept strained by pulleys I, I*, and springs J, J*, at the bottom.

K′, K², K³, K⁴, are the treadles on which the cams act, and L′, L², L³, L⁴, are a second series of treadles connected with the treadles K′, K², K³, K⁴, and with the harness.

The above described parts do not differ essentially from the corresponding parts of other power looms for weaving narrow-ware with four leaves of harness.

a, is the race way.

M, M, M, are the reeds, three in number, the loom being for weaving three webs.

N, is one of the shuttles fitted to the race way in the usual manner. The other two are omitted to avoid confusion of parts.

O, is the shuttle driver consisting of a slotted bar or plate attached to the lower race-board of the lay by bolts *b*, *b*, passing through its slots *c*, *c*, or by any other means which permit it to move longitudinally.

d′, *d′* *d²* *d²*, are the usual pins carried by the driver to drive the shuttles. The shuttle N, is driven by the pins *d′*, *d²*.

P, is a rocker fitted to rock on a fixed pin *e*, which is secured to and stands out in a forward direction from the lower race-board of the lay. This rocker is connected with the driver O, by two cords *e′*, *e²*, which are wound upon the former in opposite directions. The said rocker has also passing over and secured to it a strap *f*, the ends of which are connected by strong and long spiral springs *g*, *g′*, with the two treadles Q, Q′, which are depressed alternately by means of two cams R, R′, on the cam shaft S.

U, is a locking bar for locking the shuttle driver at the termination of its stroke in either direction till it is required to drive the shuttles in the opposite direction. This bar extends all across the lay near one side of which one of its ends is secured by bolts *h*, *h*; and it is made elastic in such a manner that its opposite end tends to rest against a stop *i*, near the opposite side of the lay. The said

bar has a projection j, on its rear side for the purpose of acting alternately against opposite sides of a downward projection j', on the driver for the purpose of locking the driver till the proper time for the flight of the shuttles, and then permitting the shuttles to be driven by the force of the springs g, g', acting upon the rocker P, and not by the direct agency of the cams and treadles which are only used to strain the springs while the driver is locked.

m, is a fixed unlocking piece attached to the side of the loom next the free end of the locking bar for the purpose of causing that bar to unlock the driver at the proper time to throw the shuttles in either direction.

The operation of the shuttle-motion is as follows: The spring g, acts upon the strap f, to turn the rocker P, in the direction of the arrow 7 shown upon it in Fig. 1, and so cause the said rocker by winding up the cord e^2, to move the shuttle driver O, to the left. The spring g', acts upon the strap to turn the rocker in the opposite direction to make it wind up the cord e', and so move the shuttle driver to the right.

Figs. 1, and 3, represent the driver as having been last moved to the right, and as being locked by the projection j, of the locking bar U, acting against the left side of the projection j', of the shuttle-driver. It remains locked in this position from near the commencement of the forward stroke of the lay and till near the termination of its back stroke, when the shuttle has to be thrown; and while it remains so locked the cam R′, is leaving the treadle Q′, and letting slack the spring g', and the cam R, is depressing the treadle Q, and straining the spring g, but just as the lay is completing its backward stroke the locking bar U, comes in contact with the stationary unlocking piece m, at the right side of the loom and as the backward movement is completed the locking bar is arrested and the projection j', on the driver carried back clear of the projection j, on the locking bar leaving the driver under the influence of the strained spring g, which instantly acts upon the rocker to move it in the direction of the arrow 7, and carry the shuttle-driver rapidly to the left.

The drawing represents the lay as moving back and about to bring the locking-bar into contact with the unlocking piece m, as is best shown in Fig. 3. As the lay commences to move forward again, it soon carries the locking bar U, clear of the unlocking piece m, and allows it to drop back with its projection j, on the left side of the projection j', of the driver and so to lock the driver while the lay again moves forward and back, and while the spring g', is strained by the action of the cam R′, on the treadle Q′, for the purpose of giving motion to the rocker P, in the opposite direction to the arrow 7, to move the shuttle-driver O, to the right, as soon as the latter is liberated by the arrest of the locking bar U, by the unlocking piece m, as before described. In this operation it will be understood that as the shuttle driver is operated upon by the springs g, g', and not by the cams and treadles (which only strain the said springs) the force with which the shuttle is thrown is the same whether the loom be working at a high or low speed.

V, is the yarn beam having its shaft fitted to fixed bearings in two standards A′, A′, at the upper part of the rear of the loom. V′ is a friction band applied to one of the heads of the said beam. One end of this band is secured to the fixed rail A^2, and the other end has suspended from it a weight V^2 by which the friction is produced.

W is a rock-shaft arranged parallel with and above the yarn beam in bearings in the upper parts of the standards A′, A′. This rock-shaft has rigidly secured to it a lever X, to the front arm of which is secured a roller or shaft X′, arranged parallel with the yarn beam, and from whose rear arm is suspended a weight X^2. The warp yarn passes from the beam V, over the roll or shaft X′, and under the whip roll Y, which is arranged in stationary bearings. The weight V^2, is sufficient to make the band V′, produce a degree of friction that will hold the beam when full of yarn, against the greatest amount of tension to which the warp is desired to be subjected in the weaving process so that the friction band V′, may be considered in a measure as a positive stop to the yarn beam. The weight X^2, acting through the lever X, upon the roll or shaft X′, produces a tension on the yarn between the yarn beam and the take-up, and the weight is made just sufficient to produce the tension desired in weaving. The rear arm of the lever X, besides having the weight X^2, suspended from it is connected by a cord or chain n, with the weight V^2, for the purpose, when the tension on the yarn increases beyond the degree desired, of making such increased tension, by its action on the roll or shaft X′, exert a tendency to lift a portion of the weight V^2, and so to reduce the friction of the band V′, and allow the yarn-beam to give out more yarn.

In the action of the take-up, the yarn is not taken directly from the yarn beam, while the tension does not exceed the degree desired, but is taken from the quantity which is, as it were, held in reserve between the whip roll and the yarn beam by the roll or shaft X′, the cord n, being slack and the yarn beam being held stationary by the friction band V′, but when the tension increases in the slightest degree beyond what is desired, the depression of the roll X′, causes the rear arm of the lever X, to rise and

causes the cord n, to exert an upward pull on the weight V^2, and thus to so far relieve the friction band V′, of the effect of such weight as to reduce the friction on the beam to such an extent that the weight X^2, by its action through the lever on the roll X′, cause more yarn to be let off. The letting off of the yarn ceases as soon as the weight X^2, draws down the rear end of the lever X, far enough to let the band n, slack again and leave the friction band under the uncontrolled influence of the weight V^2. The quantity of yarn let off at once is immaterial, it may be enough for only one pick or for any number, for the proper tension is preserved by the weight X^2, which is made to govern the let-off.

p, is the take-up roll arranged between a lower roll q, and an upper roll r, having their journal boxes fitted to upright slots in two plates Z, Z, secured to the front of the framing A, below the breast beam s.

t, is a tension roll hung in a fold of the cloth or woven fabric between the breast beam and the upper or pressure roll r, behind the rolls p, r. The fabric passes from the breast beam s, under the tension roll, over and around the front of pressure roll r, between the latter and the take up roll, around the front of the latter and between the latter and the bottom roll q. The tension roll t, is loaded by a weight u, suspended from its journals by a stirrup u', and rod u^2, said weight serving at the same time to produce the desired tension on the warp and the requisite pressure on the pressure roll r, to cause the necessary friction between the fabric and the take up roll p.

The take up roll has secured to one end of its shaft p', a ratchet wheel p^2, which is acted upon for the purpose of imparting to the said roll the necessary motion to take up the fabric, by means of a wiper v', on a horizontal shaft v, which is arranged in bearings near the front of the loom, and which receives a slow rotary motion from the cam shaft S, through a band w, and pulleys S′, and v^2.

x, is a retaining pawl operating on the ratchet wheel p^2, to retain the take-up, said pawl working on a pin x', in an arm Z′, that is rigidly secured to one of the plates Z, Z. This pawl hangs over the projecting journal t', of the tension roll t.

y, is a spring for pressing down the pawl toward the ratchet.

To insure the proper operation of the take up, the shaft v, should be driven at such velocity that it if the movement given to the ratchet wheel p^2, by the wiper v', in every revolution of the said shaft were retained by the pawl x, the movement of the take-up roll would be slightly in excess of what is required. The operation is regulated by the action of the weight u, which produces a uniform tension of the cloth and warp independent of the action of the take-up roll. This roll only acts once for several picks, but the weight u, every time the lay beats up, draws over the breast beam a quantity of fabric equal to one pick of filling, and what is so drawn over is taken up from time to time by the action of the take up roll produced by the wiper v', and ratchet wheel p^2.

An unnecessary accumulation of the fabric between the breast beam and the take-up roll is prevented by the slight excessive velocity given to the shaft v, as above described, but a sufficient portion to keep the tension roll t, and weight u, suspended that the proper tension of the warp may be preserved is always there retained by the action of the journal t', of the latter roll on the pawl x, in the following manner. Every time the take-up roll operates, it draws up the roll t, and so long as a certain quantity of fabric remains below the top roll, the journal t', does not affect the action of the pawl which drops into a new tooth of the ratchet wheel and retains the take up, but when the tension roll has been drawn up to a certain point the said journal t', comes close under the pawl, and the next time the ratchet wheel is operated upon and the take up roll turned to take up more fabric, the journal t', rising with the roller t, follows up the pawl as the latter is lifted by the ratchet wheel and holds it up so that it cannot drop back till after the wiper v', has passed out of contact with the ratchet wheel and allowed the latter to turn back and let the weight u, and roller t, draw back the cloth just taken up when the pawl descending with the roller t, falls back into the ratchet notch from which it was last raised. This prevention of the retention of the take up occurs as often as is necessary to compensate for the slight excessive velocity of the shaft v.

The take up may be increased within certain limits to make a less number of picks to the inch, by increasing the weight u, and may be diminished to make a greater number of picks by diminishing the said weight, without altering the velocity of the shaft v, provided the velocity of that shaft is always at least equal to what is required for the take up.

An especial advantage of this take up and let off in its application to narrow-ware looms consists in provision being afforded by the weights X^2, and u, for drawing back any web in the loom, in case of any defective weaving. This provision is allowed in the old fashioned tape looms which have no self-acting take up or let off, but has not been done in the more modern ones with self acting take up and let off.

I do not claim broadly the employing of springs to throw the shuttles of power looms,

neither do I claim controlling the let-off motion by the agency of a movable roll over which the yarn passes after leaving the yarn beam; but

What I claim as my invention and desire to secure by Letters Patent; is,

1. Combining the shuttle driver O, with the treadles Q, Q, by means of springs g, g', a strap f, a rocker P, and cords e', e^2, or their equivalents, the whole applied in connection with each other, and in combination with a locking bar U, and unlocking piece m, to operate substantially as and for the purpose herein specified.

2. The lever X, with its roll or shaft X′, and weight X^2, applied substantially as described in connection with the weight V^2, on the friction band V′, of the yarn beam and operating as herein set forth.

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