

# J. Earnshaw. Shuttle Motion.

N<sup>o</sup> 63,622.

Patented Apr. 9, 1867.

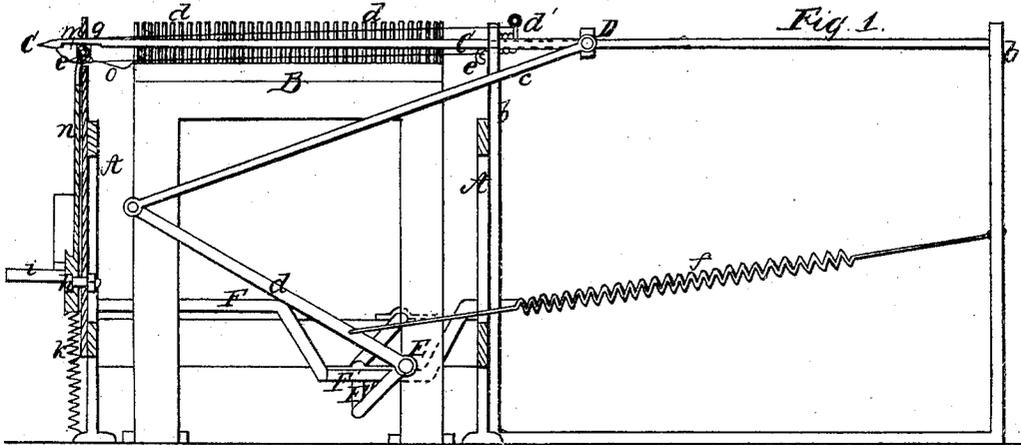


Fig. 2.

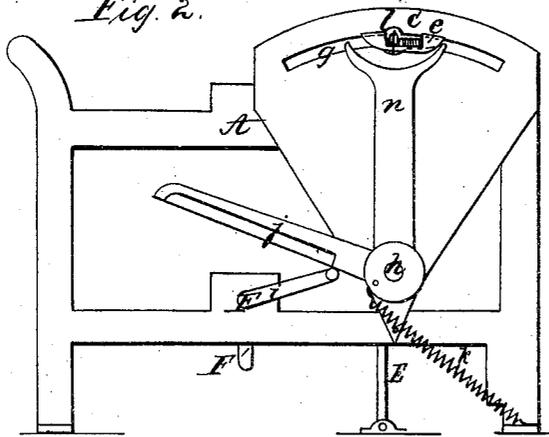
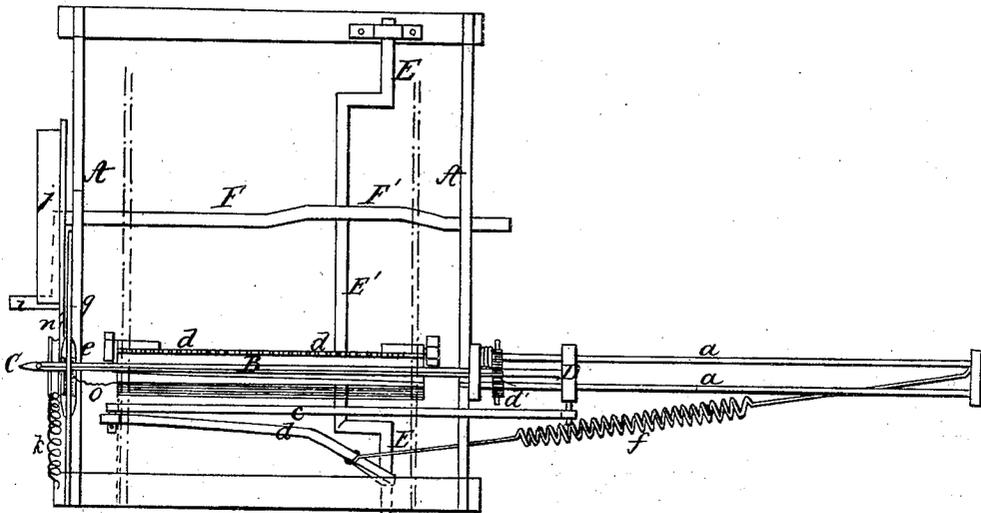


Fig. 3.



# United States Patent Office.

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Letters Patent No. 63,622, dated April 9, 1867.

## IMPROVEMENT IN POWER LOOMS.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN EARNSHAW, of Providence, in the county of Providence, and State of Rhode Island, have invented a new and useful Improvement in Power Looms; and I do hereby declare the following, when taken in connection with the accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view.

Figure 2, a left-hand end view.

Figure 3, a top view.

This invention consists in certain contrivances which are substituted for the shuttle generally employed for the purpose of putting in the filling, and also in an improvement in the reed to enable threads of the warp to be changed from the wrong to the right dents, or to be mended without stopping the loom.

To enable others skilled in the art to construct and use my invention, I will proceed to describe the same as illustrated in the accompanying drawings.

A A is a frame resembling the frame of power looms as generally constructed. B is the lay which is arranged and operated in similar manner as the lay of other power looms, and is made of sufficient weight to beat up the filling, though it need not be made so deep as that of other looms, as no shuttle-race is required. C is a needle or pointed rod whose length must exceed the width of the warp. This needle which is employed to carry the filling through the warp has an eye near the point, and is fitted and secured to a stock, D, which works on two straight horizontal guide bars *a a*, which are supported by two standards *b b* at one side of the loom, the said guides being at such height that the needle may work in a horizontal line through the open shed. The needle-stock D is connected by a rod, *e*, with an arm, *d*, which is rigidly attached to a rock-shaft, E, which is arranged in bearings in the loom frame. This rock-shaft has a crank, E', or, in place thereof, may have an arm, which is situated below a crank, F', or a cam on the harness-shaft or driving-shaft, F, of the loom, and the said crank or arm E' is depressed by the crank or cam F', once during every revolution of the shaft F, sufficiently to give the shaft E such a motion as will cause the point of the needle to carry its double filling thread through the warp far enough to form a loop through which the shuttle (to be hereinafter described) passes. A section of the open shed of the warp is represented in fig. 1 by two rows of blue dots between the dents *d d* of the reed. The filling thread, represented in red, is contained on a spool, *d'*, (see figs. 1 and 3,) which is supported in suitable position at the side of the loom, from whence the needle enters the warp, and from this spool it passes through a suitable tension device, and the eye of the needle and its end are secured at the same side of the loom, being tied temporarily to a fixed hook, *e*, at starting and afterwards being secured by the selvedge of the cloth. The needle in passing through the shed carries the filling thread through it in a doubled state, and as soon as it reaches the end of its movement, a shuttle, *e*, somewhat similar to that used in sewing machines, and much smaller than an ordinary loom shuttle, passes between the needle and its loop of thread, and thus carries a thread, *o*, shown in blue between the two parts of the filling thread so as to retain the filling thread when the needle is drawn back, and thus causes a fast selvedge to be made on that side of the cloth when the shed is closed. The needle is drawn by a spring, *f*, connected to an arm intermediary between the needle and its operating rock-shaft, as soon as the locking of the outer selvedge is effected. The movement of the needle back and forth must be effected in as speedy a manner as possible, as it must be begun and completed during a limited portion of the movement of the lay, and while the shed is well open. The shuttle *e* works in a vertical plane in an arched shuttle-race, *g*, secured to the side framing of the loom, and is driven back and forth by an arm, *n*, which receives a vibrating motion on a stud, *h*, through the agency of a crank or cam, *i*, on the cam-shaft F, acting on a projecting arm, *j*, which arm is kept in contact with the cam by means of a spring, *k*. The shuttle motion is best illustrated in fig. 2. The shuttle carries its thread through the loop of the filling thread, the needle then moves back, and the shuttle resumes its first position to be in readiness for the next pick of filling. The needle, during the movement of the shuttle through the bend or loop of the filling thread, is kept steady by means of a shuttle-notch or recess, *l*, (see fig. 2,) which is provided in the top of the shuttle-race to receive it. In order to insure the formation of a loop for the shuttle to enter I cut away a portion of the

needle, as seen at *m* in fig. 1. The eye of the needle must be so formed that the thread will pass so freely through it, both in going and returning through the cloth, that there will be no danger of breaking the thread, but there must be a sufficient amount of friction between the thread and the eye for the needle in returning to pull taut the loop at the selvage, where the shuttle-thread passes through it. The eye-pointed filling-thread carrier reciprocates in a plane at right angles to the warp, but the eye of the needle is made through it at somewhat of an inclination, that is, the eye at the lower side of the needle is nearer the cloth-making point than that at the upper side, and the eye on the upper side of the needle nearer the reed than that on the lower side; this is for the purpose of laying one of the two threads left by the filling-thread carrier, when it is withdrawn from the shed, nearer the last point of cross of the warp than the other, to insure a perfect parallelism of filling threads and prevent any liability of the same twisting or overriding each other, as would be the case were both the filling threads in the same vertical plane, which would be the case were the eye vertical to the plane of the needle's movement.

The harness may be adapted for plain or fancy weaving in the same manner as in other looms, and no change in the arrangement or operation of the harness is rendered necessary by my new method of putting in the filling.

The improvement of the reed which constitutes one of the features of this invention is one which is only rendered fully practicable by my improved method of putting in the filling. It consists in attaching the dents *d d* by their lower ends rigidly to the lay, and dispensing with the lay cap which enables the warp threads to be changed from one space between the dents to another, or to be taken-upward and replaced in the reed when broken without stopping the loom. This method of attaching the dents cannot be safely employed when a shuttle is used, as it is almost absolutely necessary, in that case, to hang the reed from the cap in such a manner that it may swing back if the shuttle is accidentally arrested in front of it, and caused to interpose itself between the lay and the full point of the cloth.

My improved method of putting in the filling enables the loom to be driven with much less power than where a shuttle is used for that purpose, and saves much expense of wear and tear. The shuttle motion requires more power to operate it than all other parts of a common loom, and is the most expensive part to keep in order owing to its great wear and tear.

Having therefore thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent of the United States, is—

An eye-pointed filling-thread carrier, in combination with mechanism for carrying an interlocking selvage thread, substantially as set forth.

In combination with an eye-pointed filling-thread carrier, and mechanism for carrying an interlocking selvage thread, I claim the reed substantially as described.

The spring *f*, arranged to operate the eye-pointed filling-thread carrier, substantially as described.

The within-described method of weaving by passing a doubled thread of filling between the warp threads, locking the filling by an independent selvage thread, crossing the warps, and binding and beating up the filling, substantially as set forth.

The shuttle *e*, operating in a vertical plane and crossing the head of the filling-thread carrier transversely, substantially as set forth.

The vibrating arm *n*, which actuates the shuttle, in combination with the arm *j*, and lever or cam *i*, for operating it, substantially as described.

The notch or recess *l* in the shuttle-race for supporting or steadying the filling-thread carrier, when the shuttle is passing through the loop of the filling thread, substantially as described.

Providing the eye-pointed filling-thread carrier with a notch *m*, as and for the purpose set forth.

The combination of the needle-stock *D* with guides *a a*, substantially as and for the purpose set forth.

Forming the eye in the needle, as and for the purpose set forth.

JOHN EARNSHAW.

Witnesses:

JOHN E. EARLE,

A. J. TIBBITS.