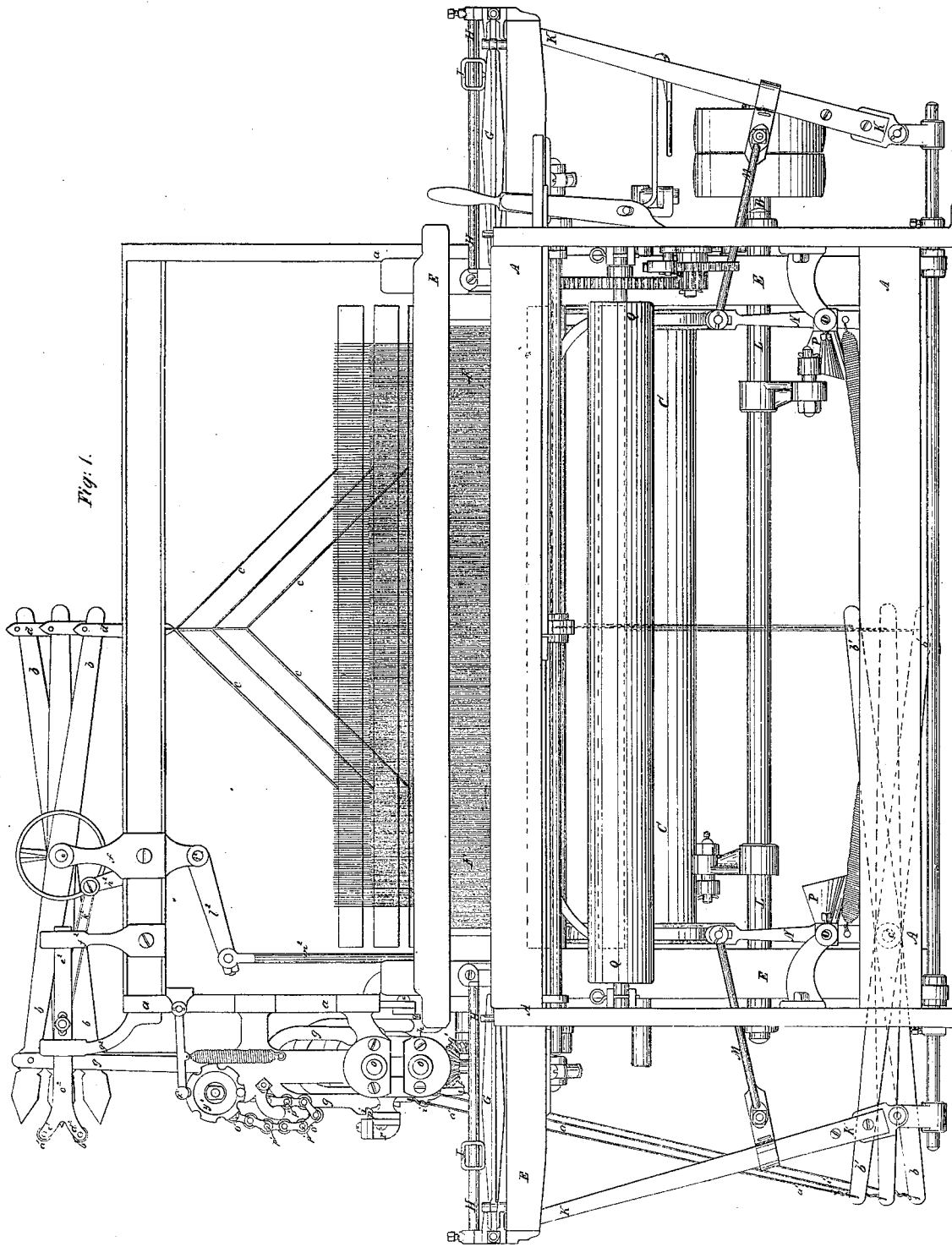


*M. Marshall.*  
*Loom.*

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*N<sup>o</sup> 6939.*

*Patented Dec. 11, 1849.*



Sheet 2-4 Sheets

*Patented Dec. 11, 1849.*

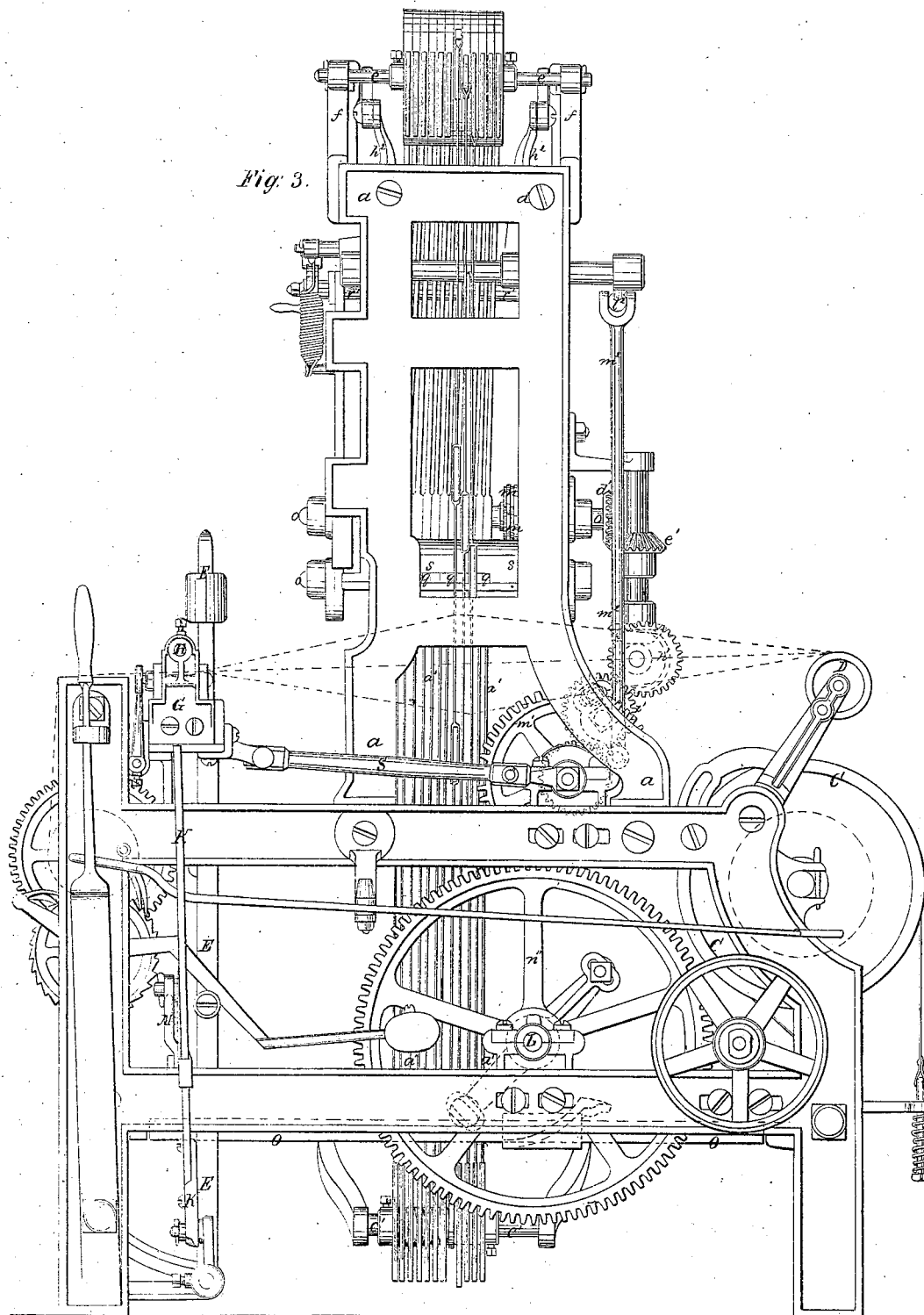


*M. Marshall.*  
*Loom.*

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*N<sup>o</sup> 6939.*

*Patented Dec. 11, 1849.*

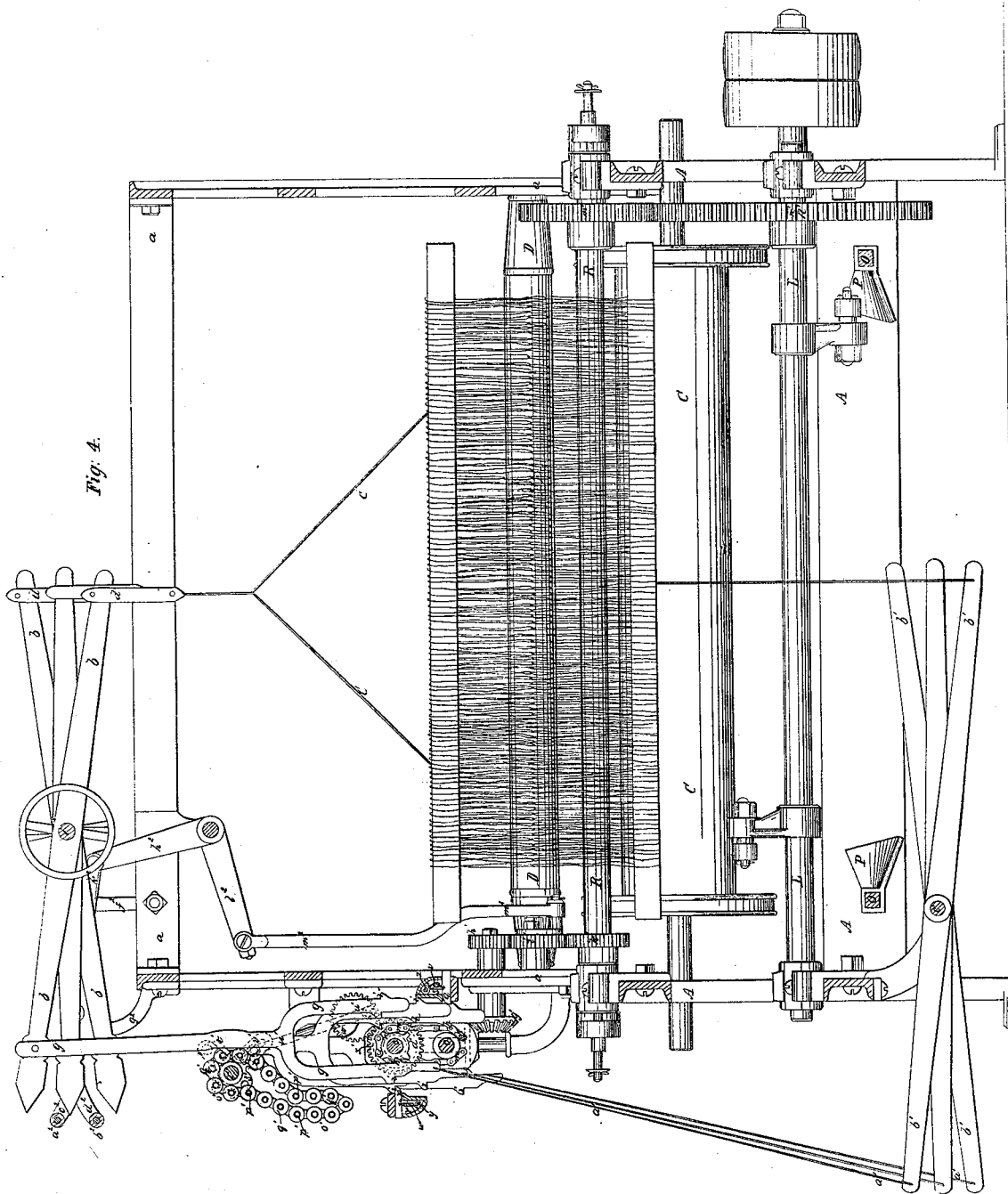


*M. Marshall.*  
*Loom.*

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*N<sup>o</sup> 6939.*

*Patented Dec. 11, 1849.*



# UNITED STATES PATENT OFFICE.

MOSES MARSHALL, OF LOWELL, MASSACHUSETTS.

## LOOM FOR WEAVING FIGURED FABRICS.

Specification forming part of Letters Patent No. 6,939, dated December 11, 1849; Reissued April 24, 1886, No. 947.

*To all whom it may concern:*

Be it known that I, MOSES MARSHALL, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Looms for Weaving all Kinds of Plain, Twilled, and Fancy Cloths, and that the following description, taken in connection with the accompanying drawings hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements by which my invention may be distinguished from others of a similar class, together with said parts as I claim and desire to have secured to me by Letters Patent.

The figures of the accompanying plates of drawings, represent my improvements.

Figure 1, Pl. 1, is a front elevation of my improved loom. Fig. 2, Pl. 2, is an elevation of one end. Fig. 3, Pl. 2, is an elevation of the opposite end; and Fig. 4, Pl. 3, is a vertical section taken at about the center of the loom just in front of the cam shaft hereinafter referred to, and parallel to the front of the loom.

The loom, as represented in the drawings above referred to, is completely equipped for use; but it differs from the best cloth looms now in use, essentially, only in that portion of the machinery which operates the harness, and decussates or shifts the warp. In the common "cam" loom, as it is called, when it is desired to change the number of sheds in the warp, in order to vary the pattern of the cloth, it becomes necessary to take the loom apart, and alter the proportion of the gearing which drives the cam shaft. This of course, occasions great delay, and enhances the cost of weaving by this machine. Again, in the "Compton" loom, (so named from the inventor thereof;) all the various sheds of the warp are changed every time the filling thread is passed through with the shuttle, which wears the warp extensively, and thereby injures the fabric, and indeed, renders the loom unsuitable for the weaving of doeskins. In this Compton loom, also, the arrangement is such, that the filling threads always put in when the warp is slack, so that, when the lay beats up the filling, it does not make so close a fabric, as is necessary for satinets, cassimeres and doeskins.

All these difficulties are successfully ob-

viated by my improvements; and in the loom, as I construct it, any number of harnesses and different sheds of the warp, from three to twelve or more, may be arranged, and held stationary, or brought into use, according to the pattern of the cloth or the nature of the fabric to be made.

The elementary features of my improvements, consist, in a series of stationary rests which support the jacks of the harness, when sheds operated by them, are not in use; the chain shafts and lifting and depressing bars, for operating the jacks and harness; and the eveners, (as I term it,) which is composed of two rollers, set in a frame having a reciprocating rectilinear motion, which rollers press against the beveled end of the harness, and assist in shifting the sheds of yarn, and, what is more essential, operate always to keep the levers even, for the proper operation of the cams on the pattern chain.

The detailed construction of the several parts above referred to, and their connected operation, are explained in the sequel; but it will be necessary, in order to avoid confusion, to first refer to the main parts of the loom, which are old, and in common use.

A A A A in the several drawings, is the main frame-work of the machine.

B B is the driving shaft.

C C is the warp bearer from which the warp threads are unwound, and pass over the smaller roller, D D, set just above the one just named.

E E E E is the lay, with its reed, F F, and the shuttle box, G—G, on each side. Over each of said boxes is a picker rod, H H—H H, on which the pickers, I—I, slide forward and back, to throw the shuttle.

K K—K K are the picker levers or arms which move the pickers, said levers being operated from the cam-shaft, L L, through the medium of the connecting rods, M—M, and vertical arms, N—N, extending up from the cross shafts; O O—O O. These cross shafts are rocked, so as to move the picker arms by means of their bearing plates, P P, on which the cams on the shaft, L L, operate, in a manner which is well understood by those engaged in weaving.

Q—Q, Fig. 1, Pl. 1, is the cloth beam on which the fabric is wound after it is woven.

R R is the shaft which drives the lay by means of the crank rods, S S, Figs. 2 and 3, Pl. 2. This shaft also operates the apparatus hereinabove referred to, for springing the harness, which apparatus I shall now proceed to explain.

*a a a a*, in the several figures, is the framework which supports the main portion of the harness or heddle apparatus.

*b b—b b*, &c., are the upper harness levers which are connected to heddles of any number of warps, by means of the cords, *c c—c c*, and double spring plates, *d d* &c., arranged, as shown in Fig. 1, Pl. 1 and Fig. 4, Pl. 3, at one end of said levers. These levers have a fulcrum, and turn on the short cross shaft, *e e*, which has suitable bearings in vertical uprights, *f f*, (Fig. 1, Pl. 1 and Fig. 4, Pl. 3,) which are fastened to the framework, *a a a*, &c. The outer ends of these levers, *b b*, are connected to the several jacks, *g g g—g g g*, by a pivot joint, as shown in the figures last referred to. These jacks are all of them forked at their lower ends, as shown in the front elevation and sectional view, Fig. 4, Pl. 3, of the loom, and have near the bottom of each prong of their forks, *g g*, an interior and exterior step or shoulder, as shown respectively at *h h* &c. and *i i* &c. The interior steps, *h—h*, are operated upon by the elevating and depressing bars, *k k* and *l l*, which extend between the two endless chains, *m m—m m*, operated by the toothed and plain wheels, *n n—n n*, on the opposite ends of the two shafts, *o o—o o*, having proper bearings in the framework, *a a a*, by the revolutions of which shafts the said elevating and depressing bars are operated, and move the jacks and harness levers in a manner which will be well understood.

The exterior steps or shoulders, *i i*, of the jacks, *g g g* &c., are for sustaining such heddles or harness, as are not in use for the formation of the particular fabric which is in process of weaving on the loom, but which are wanted in other kinds of cloth which it is desirable to weave in the same loom. These exterior shoulders drop, or are sustained on the series of rests, *p p p—q q q*, set in hollow boxes, *r r—s s*, arranged on each side of the jacks, and attached to the framework, *a a a*, as shown in the several drawings. Each of these rests has a small tongue, *t—u*, cast on the upper side of those denoted at *p p* &c., and on the under side of those represented at *q q q*, which fits between one side of the box, *r r* or *s s*, and the long plate, *v—w*, extending one across each of said boxes, and attached to a turning rod, *y—z*, having a spiral spring so wound round it, as to press said rest outward. The outer ends of these rests are beveled, or chamfered off a little, as shown in Fig. 1, Pl. 1 and Fig. 4, Pl. 3, so as to

correspond with, or be worked by a similar beveled face, formed on the exterior shoulders of the jacks, as shown in the figures before referred to. When the jacks are kept in operation by the cams on the pattern chain, (hereinafter referred to,) these rests will be pressed back, and allow the jacks to pass without obstruction, by the arrangement of beveled faces on said jacks and rests, as above described; but, when the jacks are not pressed upon by the cams on the pattern chain, they will be supported on said rests, as hereinbefore suggested. The lower outer ends of the jacks are connected by the metallic wires, *a' a'—a' a'*, to the ends of the lower set of heddle levers, *b' b'—b' b'*, which have their fulcrum, and turn on the short shaft, *c' c'*, Fig. 2, Pl. 2, in a manner which is well understood. These wires are stretched in a diagonal direction, so as to draw the shoulders of the jacks, (when they are not pressed by the cams,) over and upon the rests above referred to.

The shafts, *o o—o o*, which carry the elevating and depressing bars, *k k—l l*, and move the jacks, are revolved by means of a bevel gear wheel, *d'*, on one end of the upper shaft, *o o*, which, by means of the bevel gears, *e'—f'—g'*, (arranged as clearly shown in Figs. 2 and 3, Pl. 2,) connects with a system of eccentric gear wheels, *h'—i'—k'*; the former two of which have bearings in proper boxes attached to the framework, *a a a* &c., and the latter of which is arranged on one end of the long shaft, R R, which derives its motion through the medium of the spur-gear wheels, *m'—n'*, from the cam shaft, L L, hereinbefore referred to. The use of these eccentric gears, as will readily be perceived, give a varying motion to the heddles, and are so arranged, as, in "shedding" the warp, to move it most rapidly just when it is shifted, or the two threads of the warps pass the plane of decussation, in order to catch the filling before the lay, which has beat it up, leaves it; thereby making a much closer fabric, than is ordinarily produced.

The pattern chain, as it is termed, is composed of the two endless chains, *o' o'—o' o'*, between which are stretched the cross rods, *p' p' p'*, on which the circular cams or rollers, *q' q' q'*, which may be moved along on said rods, so as to vary the pattern, by operating on different jacks against which they press. This pattern chain, with its rollers and rods, is hung over, and turned with the shaft, *r' r'*, Fig. 2, Pl. 2, which shaft is revolved by means of a ratchet wheel, *s'*, on one end of said shaft, operated by the catch, *t'*, said catch being moved by a crank rod, *u' u'*, shown by dotted lines in Fig. 4, Pl. 3. One end of this crank works in a slot of one arm of the right-angular le-

ver,  $v' v'$ , to the other arm of which the catch,  $t'$ , is connected, as shown by dotted lines in said Fig. 4. The other end of the crank rod is connected eccentrically to the face of the gear wheel,  $w'$ , which is revolved by the gear wheel,  $x'$ , on the upper shaft,  $o o$ , which drives the jacks, as hereinabove explained. The motions of the pattern chain are regulated by the notched wheel,  $y'$ , (on the front end of the shaft,  $r' r'$ ), and spring pawl,  $z'$ , arranged as shown clearly in Fig. 1, Pl. 1.

It now only remains for me to describe the "evener," as I have hereinabove termed it, which works with the heddle or harness lever, so as to assist in shifting the sheds, and to keep said levers in accurate position for the operation of the cams. This evener consists of two rollers,  $a^2 a^2-b^2 b^2$ , which are set, and have bearings in the forked ends,  $c^2-d^2$ , of two horizontal bars,  $e^2 e^2-e^2 e^2$ , said bars being arranged so as to move forward and back in proper guides or holes formed in the upright, and curved supports,  $f^2-g^2$ , attached to the top of the framework,  $a a a$ . These rollers press against the outer beveled ends of the upper harness levers,  $b b-b b$ , shaped, as shown in Fig. 1, Pl. 1 and Fig. 4, Pl. 3, and, as will be palpable, serve the purpose hereinabove suggested. A reciprocating rectilinear motion is imparted to this "evener" by means of the crank arms,  $h^2-h^2$ , on opposite ends of the shaft,  $i^2 i^2$ , (having proper bearings depending from the framework,  $a a a$ ), said crank arms being attached to one end of the connecting rods,  $k^2 k^2$ , the other ends of which rods are connected to the sliding bars,  $e^2 e^2-e^2 e^2$ , as shown in Fig. 1, Pl. 1. The shaft,  $i^2 i^2$ , is vibrated, or rocked, so as to give the requisite motion to the "evener" through the medium of the several parts arranged, or connected as above described, by means of the crank arm,  $l^2$ , and connecting rod,  $m^2 m^2$ ,

the lower end of which is attached eccentrically to the middle wheel,  $i'$ , of the eccentric gears hereinabove referred to, in the machinery for driving the jacks.

Having thus described my improved loom, I shall state my claims, as follows:

What I claim as my invention, and desire to have secured to me by Letters Patent is—

1. The improvement hereinabove described, in the machinery for operating the harness, so that any proper number of heddles may be used, or changed, as desired without taking the loom to pieces; said improvement consisting first, in providing the movable spring rests for supporting the jacks of the harness, when they are not in use, and which are sprung back by the bevel face on the shoulders of the jacks, when they are kept in play by the cams on the pattern chain, the whole arrangement being substantially as hereinabove set forth; and, second, in the "evener," constructed, and operating as herein described, for assisting in moving the upper heddle levers, and keeping them even, so that the cams or rollers on the pattern chain will operate accurately on the jacks, as specified,—meaning to claim the exclusive use of said spring rests and "evener" in a loom, the invention of which is entirely original with me.

2. I also claim the combination of rotating, lifting and depressing bars arranged in endless chains, so as to revolve, as described, with the forked jacks, having internal shoulders, as specified.

In testimony that the foregoing is a true description of my said invention and improvements I have hereunto set my signature this twenty-ninth day of October, A. D. 1849.

MOSES MARSHALL.

Witnesses:

EZRA LINCOLN, Jr.,

HENRY G. CLARKE.