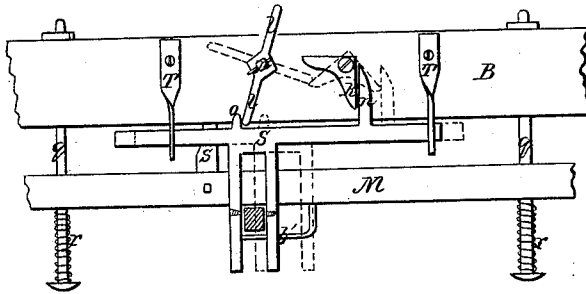


*L. Scofield.*  
*Shedding.*

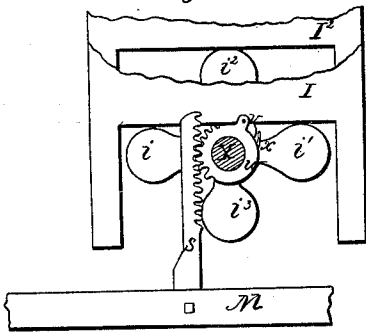
*N<sup>o</sup> 57,444.*

*Patented Aug 21, 1866.*

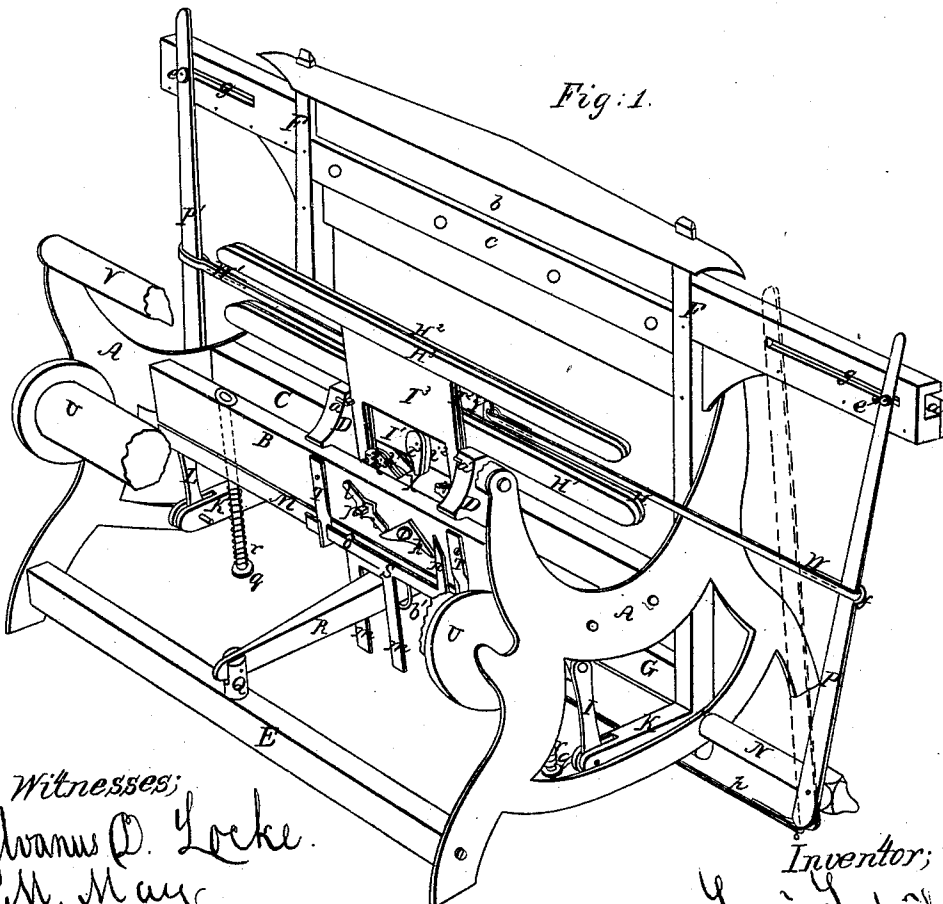
*Fig: 3.*



*Fig: 4.*



*Fig:1.*



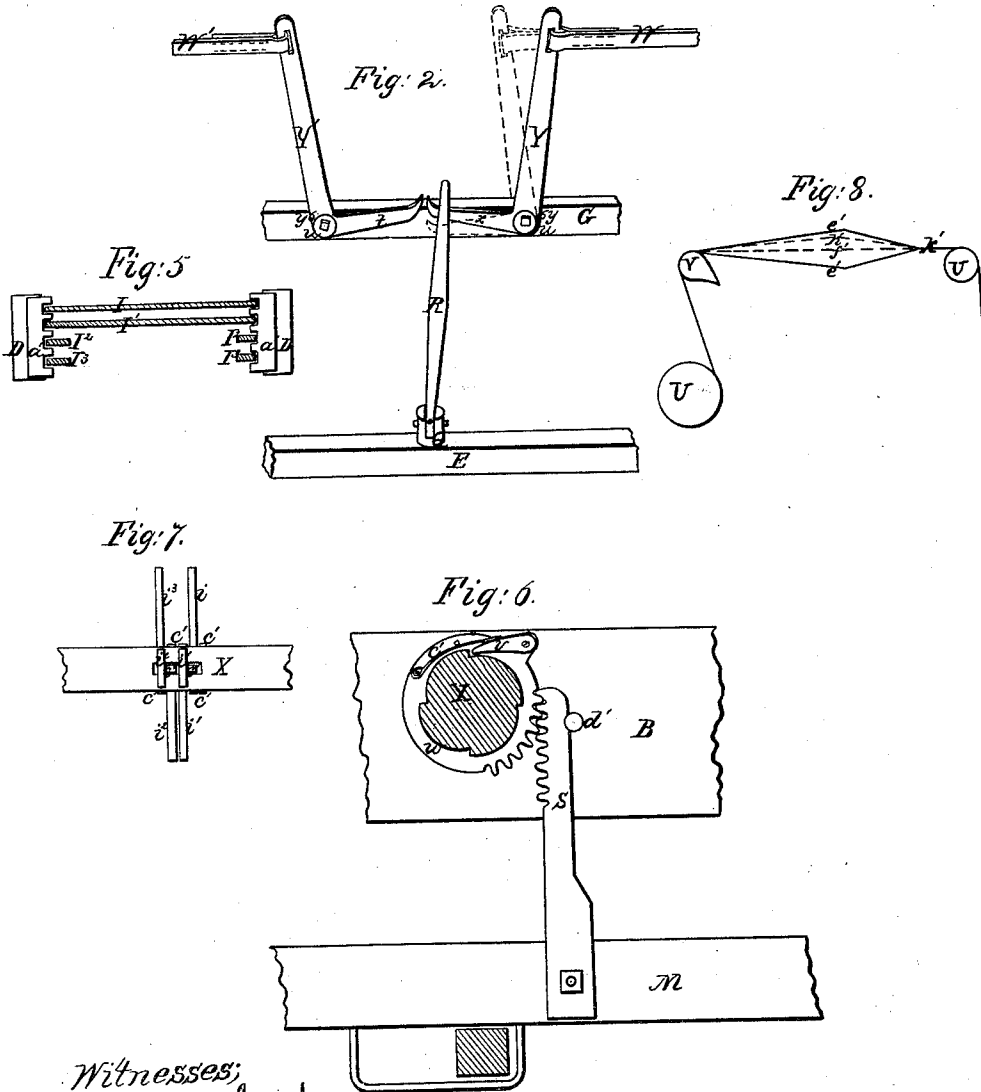
Witnesses;  
 Sylvanus D. Locke.  
 J. M. May

Inventor;  
Geri G. Spield

# L. Scofield. Shedding.

N<sup>o</sup> 57,444.

Patented Aug. 21, 1866.



Witnesses;  
Sylvanus D. Locke  
J. M. May

Inventor;  
L. Scofield

# UNITED STATES PATENT OFFICE.

LEVI SCOFIELD, OF FARMINGTON, WISCONSIN, ASSIGNOR TO HIMSELF AND JUSTON B. WAITE, OF SAME PLACE.

## IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. 57,444, dated August 21, 1866.

*To all whom it may concern:*

Be it known that I, LEVI SCOFIELD, of Farmington, in the county of Jefferson, in the State of Wisconsin, have invented a new and Improved Mode of Making and Operating Looms; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The same letter in each figure refers to the same part.

The nature of my invention consists, first, in providing the shaft to which the cams are attached with longitudinal slots or mortises, for the purpose of adjusting the cams for operating the leaves of the harness differently for different kinds of weaving; second, in operating a shuttle by means of a treadle, one end of the treadle having a vibrating lateral and horizontal motion, the other end of the treadle being pivoted to the frame-work of the loom; third, operating a treadle that operates a picker-staff and shuttle by means of arms that extend from the lower part of the batten or lay, elbow-levers, and a forked horizontal sliding bar, the whole being operated by the reciprocating stepping-bar; fourth, a reciprocating stepping-bar moved vertically by means of projections or levers extending from the frame of the lay or batten; fifth, springs underneath the stepping-bar, whereby an easy and elastic movement is attained and the return of the lay from a state of inertia or dead-point facilitated; sixth, guides to cause the stepping-bar always to rise and fall vertically, however the power may be applied, obliquely or otherwise; seventh, so connecting the batten to the harnesses by means of a stepping-bar, rack and pinion, pawl and ratchet, cam-shaft and cams, and harness-bases that the movement of the batten operates the harnesses.

Figure 1 is a perspective view of my loom. Fig. 2 is a detail drawing, showing the vibrating treadle that alternately moves the elbow-levers that operate the picker-staff that moves the shuttle. Fig. 3 is an elevation of a portion of my loom, showing the manner of obtaining the lateral motion of the treadle. Fig.

4 is a detail drawing, showing how the stepping-bar operates the cam-shaft, also the bases of the leaves of the harness resting on cams. Fig. 5 is a horizontal section of the bases of the leaves of the harness and their guides. Fig. 6 is a view of the cam-shaft and pinion reversed from the view in Fig. 4, the shaft cut in two, showing an enlarged part of the shaft that acts as a collar to keep the pinion in place on the shaft, and also notched to receive the pawl used in revolving the shaft. Fig. 7 shows a cam-shaft with longitudinal mortises to receive cams that may be adjusted for different kinds of fabric to be woven. Fig. 8 shows the warp in position as the shed is formed by the warp when the shuttle passes; also shows by red dotted lines the point of great tension above the center, where the warp in the different leaves of the harness pass each other.

A represents the ends of the frame-work of my loom. B and C are girths, to which are attached the cam-shaft X and standards D D, to which standards guides *a'* for bases I, I', I<sup>2</sup>, and I<sup>3</sup> are attached.

In Fig. 1, U is the yarn-beam, and V the rear breast-beam, broken away the better to show the mechanism of my loom. Girth B has also attached to it elbow-lever K, which is moved by lever l, which lever is attached to the end *p* of the cam-shaft X; also guides T for the sliding bar S; also guides *g*, having thereon springs *r*; also guides *d'*, (shown more particularly in Fig. 6, which also shows more fully the pawl *v* and spring C', to keep the pawl in place, and also the notches in the enlarged part of the cam-shaft, into which the pawl fits,) and as the rack *s*, which fits the pinion *w*, when caused to rise, revolves the shaft X, each of which movements of the shaft is one-fourth part of a revolution.

E is a girth, to which is pivoted one end of treadle R by means of pivot Q, or in any suitable manner to allow the opposite end of the treadle to have a lateral and vertical motion.

F is a part of the lay or batten frame that contains the reed *b* and shuttle-box *a*, the shuttle-box having connected with it, by appropriate slots and grooves, the upper end of the picker-staffs P and P'. G is also a part of the

batten-frame, and connects the lower end of parts F, and has attached to it elbow-levers Y and Y', as represented in Fig. 2, which levers are operated alternately by the treadle R. As the loom is worked each descending movement of the treadle moves the lever, as indicated by dotted lines *t* in Fig. 2, and when thus moved the strap W, which connects the elbow-lever with the picker-staff, causes the top of the staff to throw the shuttle quickly through the open shed of the warp in and to the shuttle-box at the opposite end of the batten, and thus continues to do alternately and with great rapidity as the loom is worked.

H, H', H<sup>2</sup>, and H<sup>3</sup> represent, respectively, the bottom bar of the leaves of a harness, which are attached to the upper edge of the bases I, I', I<sup>2</sup>, and I<sup>3</sup> in any suitable manner.

K K are projections or levers extending from the batten-frame, and are connected by links or bars L, or in any suitable manner, to the stepping-bar M, while the pivot at N allows the batten-frame to be moved back and forth in operating the loom; and it is obvious that as this vibrating motion is produced the end of lever K, being connected with stepping-bar M by the link L, will cause the stepping-bar to rise and fall at each movement of the batten, and the stepping-bar, having the rack S attached thereto, and the rack moving the pinion *v* in connection with the pawl *v* and ratchet in the cam-shaft, will also cause the cam-shaft to revolve, as before described.

The stepping-bar has an elongated loop, *b'*, on its under side, in which the treadle R is allowed to move laterally, as shown particularly in Figs. 3 and 6. This lateral motion is produced by sliding bar S, having projections *m m*, that extend downward, with the treadle between them, the sliding bar having motion imparted to it by the levers *l*, attached to the end of the cam-shaft, coming in contact with the horizontal arm of the elbow-lever K, carrying it downward, which movement brings the vertical arm of the elbow-lever against projection *n*, that extends upward from the sliding bar, carrying the sliding bar to the right, as shown by dotted lines in Fig. 3, and as the shaft is again revolved one-fourth part of a revolution the lever *l* comes in contact with projection Q, and is carried to the left, as shown. Thus at one beat of the batten or lay the cam-shaft makes a quarter-revolution and carries the sliding bar, with the treadle, to the right, and the next beat carries it to the left, and so on alternately, changing the front end of the treadle from elbow-lever Y' to Y, as seen in Fig. 2, at each beat of the lay.

A vertical motion is imparted to the treadle by the rising-and-falling movement imparted to the stepping-bar, as described, each movement downward carrying alternately the elbow-levers Y' and Y to a position similar to that indicated by dotted lines *t* in Fig. 2, which also communicates, through the strap W or other suitable connections, the movement to

the picker-staffs P and P', which throws the shuttle, as before described. The projection extending downward from bases I, I', I<sup>2</sup>, and I<sup>3</sup> of the harness-leaves rises and falls vertically in the guides *a'* and *a'* in Figs. 1 and 5, while the position of the cams and bases is more fully shown in Fig. 4, where base I rests on cams *i* and *i'* and base I<sup>2</sup> rests on the top of cam *i*<sup>2</sup>, which represents one leaf of the harness at its highest point and another leaf of harness at its lowest point, forming the shed in the warp, as shown in Fig. 8 by lines *e'* and *e'*. Now, revolve the cams to the right, and cam *i* elevates base I, with a leaf of the harness, about three-fourths of the entire distance the cam can elevate it, while cam *i*<sup>2</sup> has allowed base I<sup>2</sup>, with a leaf of the harness, to descend only about one-fourth of the distance it is allowed to descend, so that the warp in the different leaves of the harness meet and pass each other, as indicated by red dotted line *h'* in Fig. 8, which, being above the line of the warp on breast-beam V and the web or breast beam U', has a tension much greater than on the line *f'*, and causes the warp in the different leaves of the harness to pass each other freely, thus overcoming a serious difficulty that arises when the warp or the warp and filling become tangled, as breaking threads, shuttle not passing freely, &c. This feature in my loom I deem of great importance. The cams are placed in the slots or mortises in such numbers and places, with blanks to fill the spaces between them, as may be desired, and held by keys, set-screws, or in any proper manner, substantially as shown in Fig. 7, for the purpose of operating the harness to different kinds of cloth.

The springs *r* on the guides *g* are important in tempering the working of the loom to an easy vibratory movement free from shock or jar, and the springs may be made spiral or otherwise, as may be most convenient.

The bases to which the frames for the leaves of the harness are attached (in any suitable manner) fall by their own weight.

It is obvious that as the movement of the top of the lay is made forward toward the web the cam-shaft is moved one-fourth part of a revolution, that the shed for the passage of the shuttle is produced, and in moving the lay from the web the shuttle is thrown from one shuttle-box to the other; and this result is produced four times at each entire revolution of the cam-shaft.

I attach much importance to my manner of producing all the movements described by means of a single cam-shaft and cams placed in the center of my loom, as at once simple, cheap, efficient, not liable to be out of repair, and producing the beneficial results herein mentioned.

I am aware that the leaves of a harness have been raised by cams operating on shoes or projections extending downward from each end of each leaf of the harness, as described in the

patent of William S. Irish, dated March 27, 1855, and I do not claim that or a similar device; but

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

1. A cam-shaft provided with longitudinal slots or mortises to be filled with cams and blanks or their equivalents, in combination with cams and blanks, for the purpose of adjusting the cams in the shaft for weaving different kinds of cloth, substantially as and for the purpose described.

2. A treadle which has one end pivoted to the frame-work of the loom, while the other end has a combined lateral and vertical movement when used to throw a shuttle from a right to a left and from a left to a right direction alternately, substantially as described.

3. Stepping-bar M, or its equivalent, when used to impart motion to a cam-shaft and cams and to the leaves of a harness, when the whole are constructed and operated substantially as and for the purpose described.

4. Stepping-bar M, or its equivalent, in combination with a sliding bar, S, and treadle R, when connected together and operated substantially in the manner and for the purposes described.

5. Stepping-bar M, or its equivalent, in com-

bination with guides *g*, or their equivalent, and springs *r*, or their equivalent, when the whole are constructed, connected together, and operated substantially as and for the purposes described.

6. Sliding bar S, or its equivalent, in combination with treadle R, elbow-lever K, and lever *l*, or their equivalent mechanism, when constructed, connected together, and operated substantially as and for the purposes described.

7. A combination and arrangement of the batten, stepping-bar, rack and pinion, pawl and ratchet, cam-shaft and cams, and bases for the leaves of the harness, when the whole are constructed and arranged substantially as and for the purposes described.

8. A combination and arrangement of the cam-shaft having motion imparted to it substantially as described, a treadle having a vertical and horizontal motion imparted to it substantially as and by the mechanism described, or its equivalent, when the whole are connected together and operated as and for the purpose described.

LEVI SCOFIELD.

Witnesses:

J. M. MAY,  
E. FRANK.