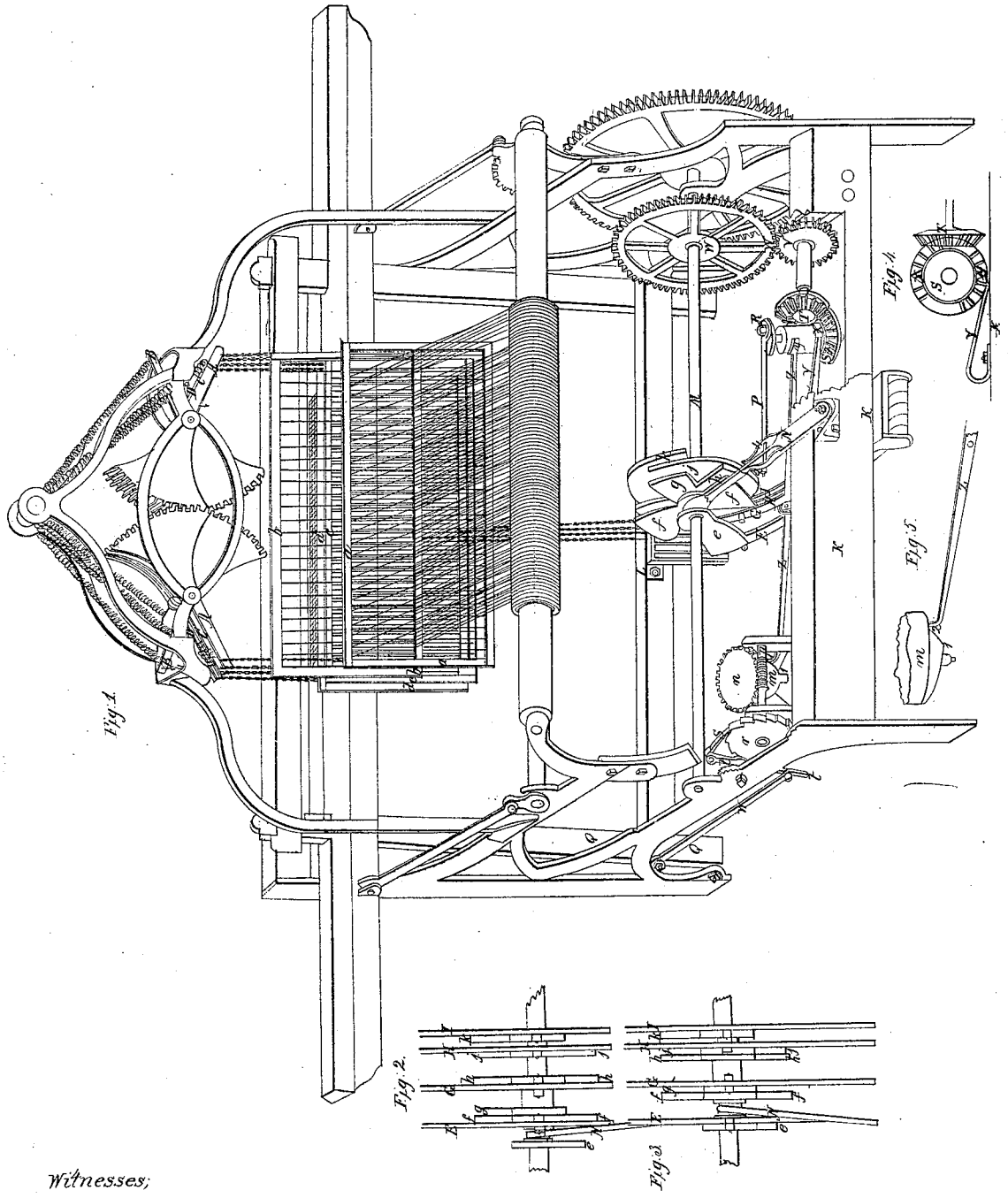
J. O. Leach.

Bag Loom

No. 13,724. Patented Oct. 30, 1855.



Witnesses;

Inventor;

UNITED STATES PATENT OFFICE.

JAMES O. LEACH, OF BALLSTON SPA, NEW YORK.

LOOM.

Specification of Letters Patent No. 13,724, dated October 30, 1855.

To all whom it may concern:

Be it known that I, JAMES O. LEACH, of Ballston, Saratoga county, State of New York, have invented certain Improvements in the Construction of Weaving-Looms, by Which the Ordinary Power-Loom May be Employed in the Weaving of Bags.

I declare the following specification with the drawings hereto annexed as part of the same to be a full and perfect description thereof.

Figure 1 represents in perspective an ordinary power loom, with my improvements added to it, the back of the loom being toward the spectator; Figs. 2, 3, 4, 5, separate views of various portions of the apparatus.

Similar letters in the figures designate the same parts of the apparatus.

The construction and arrangement of the ordinary parts of the loom will be easily comprehended by any person conversant with weaving machinery by inspection of the drawings. Some parts of the ordinary loom machinery not necessary to show the connection between the common loom and my additions are left out of them.

My improvements consist in attaching to the loom certain additional apparatus by which it can be employed in weaving bags in place of the ordinary cloth.

I use four harness frames *a*, *b*, *c*, *d*, of the usual form. As the frames do not work in pairs, one ascending and the other descending, but each one independently of the other, instead of the common method of roller and strap. I substitute levers A, B, C, D, placed above the harness in a suitable frame. These levers, terminate on the inner ends, in toothed sections, each opposite pair cogging into one another, and the outer ends of the pair being attached to the same harness frame A to *a*—B to *b*—C to *c*—D to *d*. These same outer ends with their attached frames are kept habitually in a raised position by springs (spiral are shown in drawings). The frames are depressed by means of treadle levers to which they are attached E, G, H, I, pivoted upon the rear beam of the loom frame at K their outer ends being kept in their proper line of direction by a guide frame on the front beam at L. The treadles are operated by the cams *e*, *f*, *g*, *h*, *j*, *k*, attached to the shaft M. The relative positions of the cams and their mode of operating the treadles is shown in Figs. 2 and 3, Fig. 2 representing them in the position to execute one portion of the work, Fig. 3 after a change has been made to perform another part of the work. The cams *j* and *k* are immovable on the shaft, but *e*, *f*, *g*, *h* are attached to a sleeve sliding on the shaft a distance a little more than the thickness of a cam, in order to bring the friction rollers, attached to the treadles under their proper cams. The form of the cams themselves will be governed by the proper intervals of movements and rest required for the nature of the work to be done as hereafter described and can from that description be easily laid down by any mechanic skilled in loom making.

Every revolution of the shaft M corresponds with two throws of the shuttle, and two changes of the relative position of the harness frame.

If the operation of the machine be traced the cams being started from the position shown in Fig. 2 the changes of the harness successively are as follows: First movement is *a*, *b* up and *c*, *d* down; second movement is *a*, *b*, *d*, up and *c* down; third movement is *a*, *b* up and *c*, *d* down; fourth movement is *a b c* up and *d* down, which as the shuttle moves alternately from right to left and left to right it will be seen would weave a solid web. After weaving thus a short distance by the operation of machinery, to be described, the cams *e*, *f*, *g*, *h*, are shifted to the position shown in Fig. 3 bringing *e* and *g* instead of *f* and *h* to bear upon treadles E, and G. The change thus produced alters the movement of the harness to the following: First movement *a* up *b*, *c*, *d* down; second movement *a*, *b*, *d* up, *c* down; third movement *b* up, *a*, *c*, *d* down; fourth movement *a*, *b*, *c* up, *d* down; by which the warp is made to pass between one thread of the web above, and three below and so keeping its course between distant series of threads that it weaves alternately an upper and lower web connected at its edges—producing if continued a long bag closed at its commencement. After this form of fabric has been continued a proper time, the machinery again shifts the cams to the first

position described, when the web is again woven solid, for a short space, then the cams are again shifted so repeating the changes by which the hollow and solid webs are produced alternately.

When the cloth is taken from the loom, it presents in its length a series of two bags together, separated from two others by a solid web, so that by cutting the fabric across through the center of the hollow part, two bags are the result. Or by cutting across through the solid part and then cutting across through the lengthwise center of the web, two bags will be produced.

The apparatus for making the changes above described consists of the following parts: The shifting lever N which by a forked end lies in a neck of the sleeve to which the cams *e*, *f*, *g*, *h*, are attached operates those cams. Its other extremity is pivoted upon a bracket O extending from the beam K. Just inside of the beam, a connecting rod P extends horizontally to the crank or eccentric R which crank is attached to an upright shaft supported by brackets against the inside of the beams K (part of which beam is shown in the drawing as removed to give a view of the apparatus.) At the bottom of this shaft is a bevel wheel S partially toothed (represented more fully in Fig. 4 which is a plan view). Into this wheel cogs a vertical level wheel T of the same dimensions with S and being completely toothed. This wheel is also supported on a bracket against the beams K. It is on a shaft at the other end of which a wheel V is attached cogging into a wheel W fixed on shaft M. From this arrangement it will be seen that the revolution of shaft M operates the wheel S and its crank R and by it the lever N and thus shifts the position of the cams fixed on the sliding sleeve. If the wheel S was to be kept constantly revolving by its connection with T it would keep the cams continually moving, and consequently never permit time for the weaving apparatus to complete its successive stages of work. To allow the cams to remain in their alternate positions the proper times for each portion of the work, the following device is arranged.

The wheel S (as shown in Fig. 4) has three teeth left out on the opposite diameter to each other so that whenever the wheel T has turned S nearly half around, it ceases to move it farther for want of a cog to act upon, just as it arrives at this point it brings a cam projection X, on the surface of the shaft of the wheel against a stout spring Y which presses upon its inclined face in a way to force it forward in the direction of its previous motion, and carry the cog beyond the vacancy within reach of the wheel T. This is prevented by a projection or stop Y on the shaft of the wheel, a similar one being on the opposite side of the shaft, a little lower down against which the end of the stop lever Z rests.

Lever Z has an upright motion on a pivot at or near its center, and its other end rests upon a horizontal cam *m* attached to the underside of a wheel *n* (see Fig. 5).

The wheel *n* is moved by an endless screw *p* and the screw is attached to a ratchet wheel *r* on the same shaft, which is itself operated by the pawl *s* attached to a lever *l* which is connected by a rod *w* with the upright arm of the lathe frame Q, so that the reciprocating motion of the lathe shall operate the pawl and ratchet.

The point of the cam at 1 raises the end of the lever *z* above the stops *y*. Then the spring Y presses the wheel S into connection with T whose revolution carries it half around and shifts the eccentric, and with it the cam; when half around its further progress being arrested by the stop on the opposite side to *y*, the further movement of *n* allows the lever *z* to drop between the stops, when another half revolution is made by S, which is again stopped by *y*. Every motion of the lathe frame therefore moves the ratchet wheel one tooth. By proportioning the ratchet *t* in its size and number of teeth to wheel *n* the time is regulated during which the divisions of the fabric, from the commencement of one solid web to that of the next is made, and by proportioning that part of the cam from 1 to 2 to the remainder of it, the relative sizes of the solid, to the open part of the web, is effected the cam at 1 playing the eccentrics in the position shown at Fig. 2 and at 2 as shown at Fig. 3.

As the sliding cams move from one position to the other, they can only pass over the treadles while they are upturned over them, whenever, as sometimes happens, the cams are moved while they are down in contact with the treadles their pressure would be so great as to break the one on the other, if provision were not made to relieve the strain. For this purpose the lever P by which the eccentric operates the lever N is not attached directly to said lever, but to a spring or pair of springs 3 and 4 attached to it, so that in case of an undue resistance to its movement, the springs take off the strain until, the cams shall have passed over the treadles, when they will easily pass to their proper place.

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

1. The combination and arrangement of the shifting lever N, connecting-rod P, and eccentric R, operated by the gearing T and S, or their mechanical equivalents, substantially in the manner described, for the purpose of varying the movement of the loom harness, or treadles so as to produce solid

or tubular fabric, with the same warp, and vary the solid or tubular weaving, so as to produce bags of any desirable capacity.

2. The mechanism substantially as herein described for determining and regulating the intervals between the shift of the cams, viz, stops on the shaft of the eccentric governed by a stop-lever, said stop lever being operated by a horizontal cam, which is itself turned by a ratchet wheel whose pawl is driven by the oscillating motion of the lathe; in combination with the partially toothed bevel wheel.

JAS. O. LEACH.

Witnesses:
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WILLIAM A. MILLER.