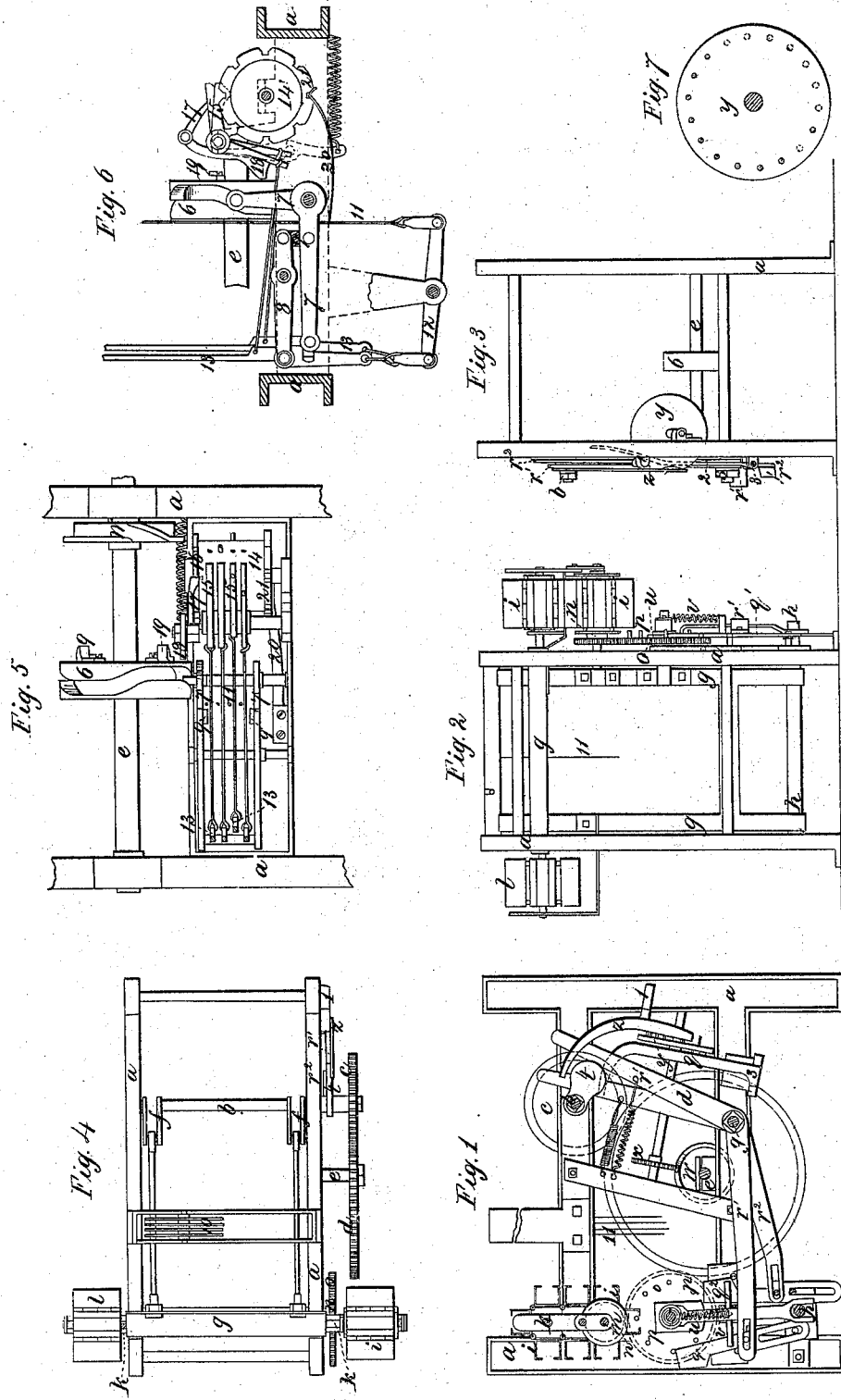


E. Burt. Loom.

No. 7,925.

Patented Feb. 4, 1851.



UNITED STATES PATENT OFFICE.

E. BURT, OF MANCHESTER, CONNECTICUT.

FANCY-CHECK POWER-LOOM.

Specification of Letters Patent No. 7,925, dated February 4, 1851.

To all whom it may concern:

Be it known that I, ENOCH BURT, of Manchester, in the county of Hartford and State of Connecticut, have invented certain Improvements in Fancy-Check Looms; and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the usual manner of making, modifying, and using the same, reference being had to the accompanying drawings, of which—

Figure 1, is a side elevation, Fig. 2, and Fig. 3 end elevations, Fig. 4 a top plan, Fig. 5 an enlarged view of the heddle shifting apparatus, and Fig. 6 a top plan of the same, Fig. 7 an enlarged view of the pin wheel (*y*).

My improvement on the fancy check power loom consists in an indefinite number of shuttle boxes, connected together by joints, at their lower corners, forming them into an endless chain band, by uniting the two ends. This chain is hung upon a square head on a rod running through the race beam, and stretched into a parallelogrammic figure, by another square head, hung on a pivot in the sword of the lay. The running shuttle, *v* on the top, level with the top of the race, the boxes extend downward, on either side of the race to the lower shuttle, which lies bottom upward on the lower square. The advantage gained by this new arrangement of boxes, is the following, 1st, the boxes balance each other, rendering unnecessary the counter balancing weights, or springs, and hence they shift with more ease. 2nd, as the shuttle extends downward toward the center of motion of the lay, consequently the lay, though carrying twenty shuttles, may have as great speed as the plain loom, which cannot be the case, when the shuttle boxes are detached from the lay, and *it*, of necessity brought to a state of rest, while the shuttle is passing through the web, and also a new, and improved mode of operating the heddles, for forming variegated sheds, by the combination of the regular worm, double horizontal rectangular levers, vertical notched levers, pin barrel, new levers, and draw wires, by which combination, the heddles are sprung upwards and downward, to form the shed, and as arbitrarily diverse, in their order, as is affected by the Jacquard machine, in proportion to the number of

heddles employed. The advantage of this mode of operating the heddles, are, simplicity, ease, and accuracy, every motion being positive, and upon trial, found to be perfectly satisfactory.

(*a*) is the frame, to which the several parts are attached. The shuttle boxes (*i*), may be made of sheet metal, bent into a square tube, having a slit or opening in the upper side, for the passage of the picker; these are attached to each other, by hinge joints at their lower corners, or they may be made fast to a flat hinge joint band, and the two extremities joined together by hinge, thus forming an endless chain of boxes, the number of which may be increased indefinitely according to the variety and numbers of colors to be introduced into the required pattern. This chain passes over the square heads of a spindle (*k*), which extends through the race beam (*g*), and has on the other end, a square (*l*), on each square of which, is a shuttle box, forming a square of four shuttle boxes, which revolve with the rods; these boxes receive the shuttles two or more in succession, from the chain of boxes, and then throw them back in the same order, to the chain boxes, weaving, what is called, thread about. The chain of shuttle boxes (*l*) are brought into a parallelogrammic figure by another square headed spindle (*m*), on the end of which is a spur wheel (*n*), which is turned one-quarter of a revolution, (*e i*), one square at each stroke of the lay, and presents a new shuttle to the action of the picker. The wheel (*o*) is exactly double the size, and has double the number of teeth, of the wheel (*n*), and has in its side, eight pins, (*P*), at equal distance from each other, this wheel is moved around the distance of one pin, at a time by the action of the sliders (*q*¹) and (*q*²), pressing upward against one of the aforesaid pins (*q*¹) is lifted by the bent lever (*1*), having its fulcrum at (*s*), and is acted on at its upper end, by the cam (*t*), on the crank shaft (*b*). To cause the wheel (*o*), and the chain of shuttle boxes to move in the opposite direction, the pins (*P*), are acted upon by the slide (*q*²), and the lever (*r*²) which is also operated on by the cam (*t*), the slides (*q*¹, *q*²) in rising strike the shoulder of the limb (*u*), which has a notch that serves to hold the wheel (*o*) stationary, by one of its pins, until required to move, but when either of the slides, (*q*¹ *q*²) rise, to

shift the boxes, they strike the shoulder of the limb (*u*) and lift it from the pin, thus unlocking the wheel (*o*), before striking the pin (*P*) to move the wheel (*o*).

(*v*) is a spring which presses the limb (*u*) down on the pin. On the shaft (*c*) is an irregular worm cam (*w*), the oblique part of the threads, of which causes the spur wheel (*X*) to move around, the distance of one tooth, at each revolution of the cam (*W*), on the shaft of the wheel (*X*), is a flat wheel (*y*), having a circle of pins, which are stuck, in either face of the wheel, according to the desired pattern. The pins on one side of this wheel act upon the tail of the lever (*z*) which has its fulcrum at (1), and the upper end acting on the lever (*r*¹) places it in a position, to be acted on by the cam (*t*). The pins in the opposite side of the wheel (*y*), press on the lever (2), having its fulcrum at (3), which forces the lever (*r*²) into a position to be worked by the cam (*t*) and at the same time throw the lever (*r*¹), out. Thus the levers (*r*¹ *r*²), are acted on alternately, by the cam (*t*), which, by the slides (*q*¹, *q*²), and the wheels (*o* and *n*), cause the shuttle boxes to shift either forward or backward as the figure may require, bringing the requisite shuttle to a position to be acted upon by the picker. In complex patterns, when a great variety of shifts are requisite, I put a chain band, (admitting at the joints, pins on either side), around a small notched pulley, on the shaft of the wheel (*y*), and another notched pulley, hung on the opposite side of the loom, stretching the chain band across the whole breadth of the loom frame; the pins, acting on the levers (*z* and 2) in the same manner that the pins do in the wheel (*y*).

The apparatus for working the heddles, giving them the variety of changes required, in complicated patterns, is described as follows: On the cam shaft (*c*), of the common loom, is a cam wheel (6), having an irregular groove in its periphery, consisting of two oblique offsets, directly opposite each other, in which a steel stud on the ends of the double right angle lever (7) works, which receives a lateral motion therefrom, at every semi revolution of the cam shaft (*c*), and imparts a vertical motion to its other end, the lever (7) is made double, the two sides being made fast on a shaft at the center of its motion, and a bar across the end of the horizontal part another double lever (8) constructed like the foregoing though a little shorter hung, and fastened to a shaft, and a bar across the end of the horizontal part, having its bearings or central motion within, and above, the double lever (7), these are so connected by the links (9), that when the end of the double lever (7) is depressed, by the action of the cam wheel (6), and steel stud, the end of the double lever (8) will

rise (*e. i.*) the bars across their ends will alternately meet each other and recede from each other at every beat of the lay; the harness or heddles are attached, and suspended, in the usual way, to the upper lever beams (10), these parts have been shortened down, in the models, to save room. The wires (11), occupy the place of the heddles, and are attached, at their lower ends, to the lower lever beams (12). The vertical levers and rods (13), join the outer ends of the upper and lower lever beams (10 and 12), and have notches on their outsides, into which the bar on the end of the double lever (8) catches, to lift them, and other notches, on their inner sides, into which the bar of the double lever (7) catches to depress them, above the inner notches is a shoulder which rests on the bar of the double lever (7) when at rest.

The drawing shows the apparatus for only four heddles, but the number may be increased indefinitely; a cylinder (14) is hung on standards, made fast to the frame that supports the double rectangular levers, and at right angles with it, and the cam shaft (*c*), on the surface of the cylinder, are holes, parallel with its axis, equal in number to the heddles employed, and extending around the cylinder (14), at equal distances from each other, and equal in number, to the number of teeth in the ratchet wheel, on its axis, hereafter to be described, into these holes, are stuck pins, where it is required in the pattern to move either of the heddles up while the others move down. These pins act on a series of right angled, or knee levers (15), the other end of which, are connected with the vertical levers and rods (13), and draw them inward and away from the bar of the double rectangular lever (8) which would otherwise lift them, and the notch on the inner side, catching on the bar of the double rectangular lever (7) is by it drawn down, and the heddles between the opposite ends of the levers (10 and 12) are elevated. The cylinder (14) is turned forward at every beat of the lay, bringing a fresh line of holes and pins under the right angle, or knee levers (15), by a ratchet wheel (16), attached to it, having the same number of teeth, that there are holes around the cylinder (14), and turned by a pawl (17) on the end of a cam lever (18), which is thrown forward at each semi-revolution of the cam shaft (*c*), by the projections (19) on the side of the irregular cam (6). The cylinder (14) is held to its place by the spring pawl (20), pressing into the notches of the flange (21), on its ends thus wherever pins are placed in the cylinder (14) the heddles corresponding therewith are made to rise, as the pins come in contact in succession with the heads of the knee levers (15) and the other heddles which correspond to the place

where the holes are left open are left to be depressed by the bar of the double rectangular lever (8).

I have thus fully described my improvement in fancy-check power looms, I have adverted to many things in this description, which I do not mean to claim as new. Some of them are of my own invention, and heretofore used by me, such as the revolving box, shuttle boxes on each end of the lay, to weave threads about, the pin wheel or chain bands of pins by themselves having long since used them all myself and in a word I disclaim together with the forenamed, considered singly, everything pertaining to the common power loom, but

I do claim as my invention

1. The connecting a series of shuttle boxes by joints at their lower corners, or attaching them to a flat jointed chain, and connecting their extremities, so as to form an endless chain of boxes, and bringing them into a parallelogrammic figure, by means of two

square heads of a size to fit the space between the joints of the boxes, or the chain, and hung on journals, one on the end of the race beam, and the other on the sword of the lay, substantially as heretofore described.

2. I claim the combination of the irregular worm the two sets of double rectangular levers the connecting bars and the vertical notched levers, on which the bars operate the pin band and knees and the wires connecting the knees and vertical notched levers, through which, the notched levers are moved forward and backward to embrace the bars giving them, with the heddles, an upward and downward movement, in any irregular manner desired, substantially as described in the specifications constituting a new and advantageous *modus operandi* of forming a variegated shade.

ENOCH BURR.

Witnesses:

HENRY B. WINTER,
MARY H. PIERCE.