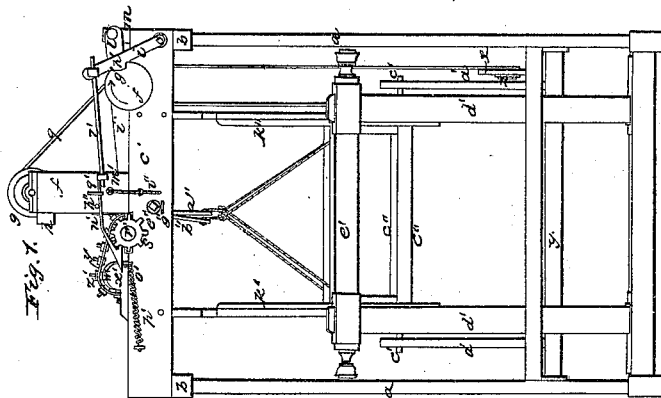
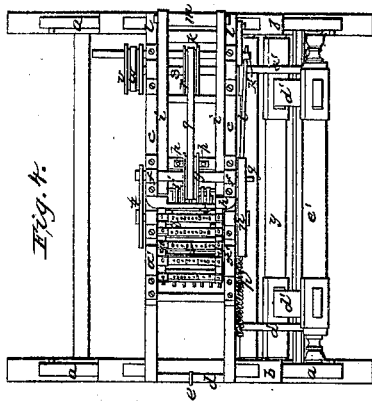
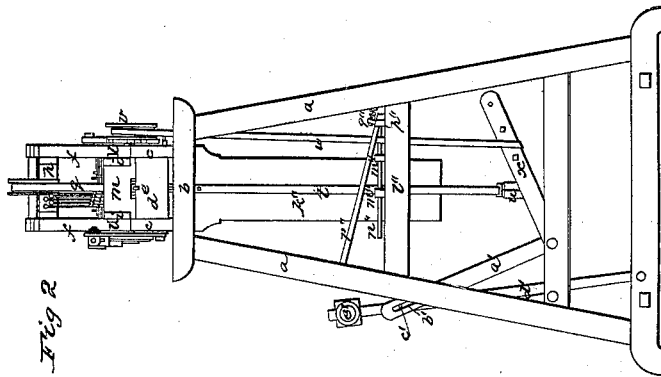
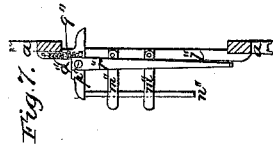
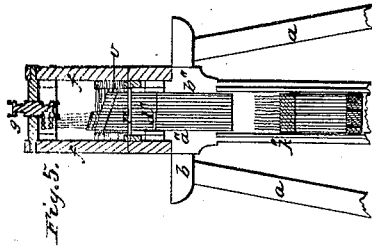
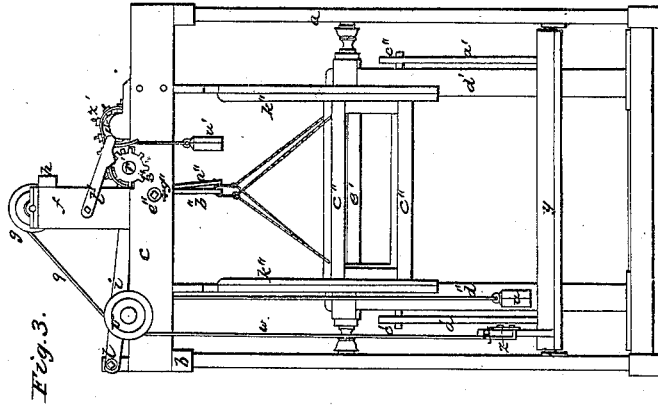
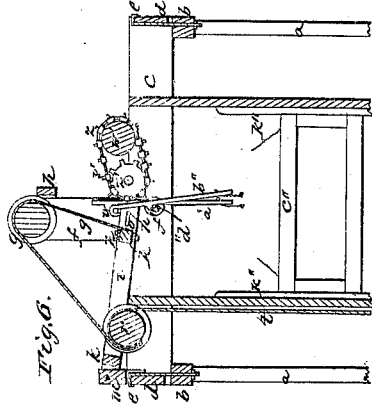


W. Townsend. Loom.

Patented Apr. 26, 1845.

No. 4,015.



UNITED STATES PATENT OFFICE.

WILLIAM TOWNSHEND, OF ROCHESTER, NEW HAMPSHIRE.

HAND-LOOM FOR WEAVING FIGURED FABRICS.

Specification of Letters Patent No. 4,015, dated April 26, 1845; Antedated April 10, 1845.

To all whom it may concern:

Be it known that I, WILLIAM TOWNSHEND, of Rochester, in the county of Strafford and State of New Hampshire, have invented a new and useful Weaving-Machine, which I call "Townshend's Economy Machine for Weaving Fancy-Figured Cloths, &c., upon any Common Power-Loom;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a front elevation of the figuring-machine entire, wherein such parts of the loom are represented as are required to show its connection therewith;—Fig. 2 is a back-elevation thereof,—Fig. 3 is a right-hand end-elevation,—Fig. 4 a top plan of the machine,—Fig. 5 a vertical longitudinal section, showing the hooks hereafter described, &c.;—Fig. 6 is a vertical section through the machine across the loom,—and Fig. 7 represents the shuttle-propelling apparatus.

Construction.—Near or at the front of the loom, and to each side of it, are attached two uprights or standards *a*, inclining toward each other, and being connected at the top by a plate or cap-piece *b*. On the top of these plates, across the loom, is set a frame consisting of two pieces of $1\frac{1}{4}$ inch board *c* edgewise, parallel to each other, and a suitable distance apart to accommodate the machinery hereafter described. At their ends they are connected by two crosspieces *d*, of $\frac{3}{4}$ inch board, which are placed flush with the outside of the plates *b*, and which are held down by bolts *e* which are bent on the top in such a manner as to clasp the upper edge of said crosspieces, said bolts pass through the plates, and, having a screw at the lower extremity, are fastened to the said plates by nuts on their under sides. By thus fastening the frame, it may easily be moved back and forward, as circumstances may require.

Near the center of the frame on each of the side-pieces *c* there is a standard *f* of a suitable height, furnished each with a box on its top in which move the gudgeons of a shaft, which carries a pulley *g* between said standards. Immediately below the said boxes a crosspiece *h* connects the two standards on the left-hand side thereof, to which

the lighter kind of hooks hereafter described are hung by means of cords. To the right of the standards *f*, into the above described frame and between its sidepieces *c*, is placed a vibrating frame, which consists of two side-pieces *i* and two cross or connecting pieces *k* near their ends. Its fulcrum or center of vibration is at the right-hand side of the machine somewhat above the stationary frame, where it moves on gudgeons *l* screwed into the ends of a piece of board *m*, which rises slightly above the aforesaid frame.

Outside of the connecting piece *k*, near the center of the stationary frame, there is a rod *n*, the ends of which enter into the slots *o* in the side-pieces *i*, and wherein they play or move. The position of the vibrating frame, when at rest, is nearly a horizontal one, descending but slightly from its fulcrum to the rod end. On the top of the last-mentioned connecting piece *k* is a short iron plate *p* furnished with two screwbolts and nuts, by means of which a strap or band *q* is fastened to it, which strap passes over the aforementioned pulley *g* between the standards *f*. From the said pulley *g* the strap *q* passes downward (at an angle of about 45 degrees) to and over another pulley *r*, near the right-hand end of the machine, whereto it is fastened. This pulley is fastened to the center of a shaft *s*, resting and moving in boxes on the upper edge of the side pieces *c* of the stationary frame. Under the strap *q* and on the same pulley is fastened another strap *t*, wound partly around it in the same direction, which extends downward and to the lower extremity of which is hung a weight *u*. On the rear-end of said shaft *s*, outside of the frame, there is another pulley *v*, to which a strap or band *w* is fastened, which, after passing once around said pulley (in an opposite direction to the band *q* on pulley *g*) extends down to an arm or lever *x*, which projects from a shaft *y* near the bottom and across the loom, to which lever it is fastened by means of an iron plate *z* furnished with screwbolts and nuts in a similar manner as the strap *q* is fastened to the connecting-piece of the vibrating frame. However this plate has several additional perforations, and the lever or arm *x* has one additional one, for the purpose of adjusting the strap according to circumstances. From the shaft *y*,

near its ends, two other levers a' extend at a right angle with the aforesaid arm or lever a , the upper extremities of which have a slot b' each, by means of which they are hung on pins c' projecting from the swords d' of the lay, near the race-beam e' .

On the front end of the shaft s , outside of the stationary frame, there is fixed a wheel or pulley f' , on one side of which there is an indentation of triangular form as shown at g' , into which a corresponding projection h' on a short lever i' falls, fitting said indentation accurately. The fulcrum of the lever is at its lower extremity, immediately above the plate b on the right-hand side of the machine, and its position, when at rest, is at about 60 degrees with the horizon. Near its upper extremity there are two or more perforations for the admission of a gudgeon on a female screw-box k' with a screw and nut at its end. Into said female screw-box one end of a rod l' (having a screw at each end) is inserted in nearly a horizontal position; the other end being inserted into a downward-projecting flange m' (near the left-hand edge of the front standard f) of a dog n' , which extends beyond a cogwheel hereafter described, bending slightly downward, and having at its point a pin o' to which one end of a spiral spring p' is attached. The other end of said spring is fastened to the side piece of the stationary frame, and in front thereof. The dog n' , when at rest, is supported near the flange m' by a staple q' in the front standard f .

There is a shaft r' , immediately to the left of the standards f , revolving in boxes on the stationary frame, which shaft has a cog-wheel s' on each end and outside of said frame. The one on the back side has a detent or pawl t' catching into it, one end of which pawl is hung to a gudgeon on the outside of the back-standard f , and to the other end there is attached a weight u' . The cog-wheel s' , on the front of the machine, is governed by the dog n' aforescribed.

Inside of the stationary frame, and near its side pieces, the shaft r' has two broad pulleys v' , the inner half of the circumference of which is furnished with cogs for the purpose hereafter described. At a convenient distance from the aforesaid shaft there is another one with a cylinder w' on it, which revolves in boxes x' which may be shifted to a greater or less distance as circumstances may require. Over said cylinder and the broad pulleys v' pass two endless bands y' (one on each end), which are connected by and carry a series of lays or plates z' fastened thereto, and which in width correspond to the space between the cogs, and are as far apart as the width or thickness of the cogs on the broad pulleys v' . These lays or plates are furnished with a row of holes each, corresponding in number

to that of the hooks hereafter described, and into any of which short pins are placed opposite to said hooks.

A row of lifters a'' and b'' are ranged in a line with the rod n and between it and the endless series of plates, to the lower end of each of which is fastened one of the heddles c'' , constructed in any of the usual ways. The lifters a'' , having on them single hooks, are suspended by cords to the above-mentioned crosspiece h ; and the lifters b'' , bearing double ones, are suspended by their lower hooks on a rod d'' , which is fastened to the sides of the stationary frame, through which it passes and on the outside of which it has screws and nuts e'' . Near the inside of each side piece and on said rod there are a couple of friction rollers or washers f'' , which may be adjusted, according to the number of lifters used, by means of thumb-screws g'' which pass through the sides of the stationary frame, and which press against said rollers, and thereby adjust the lifters and cause them to work steady, and the upper hooks v , by which the lifters are raised, are placed on the series of lifters, each one at an increased distance to the one preceding it above the rod n , by which they are lifted, from back to front the back hook, being nearest, and the front ones furthest from the rod n , as shown clearly in Fig. 5. Alongside of the staple q' there is a hole h'' in the standard, in which a pin i'' may be inserted, whenever it is desired to suspend the action of the dog upon the cogwheel. The heddles c'' rise and fall between guides k'' , which are fastened between and to the side of the stationary frame, and which extend downward to an ample distance for the desired purpose. The upper shaft of the heddles is made of wood and solid; but the lower one is of zinc, iron or other suitable material, and hollow for the purpose of being filled with weight of some kind, more or less according to the work to be performed.

To each top-rail l'' of the loom (represented in Figs. 2 and 7) are fastened two short arms m'' , which extend inwardly, nearly to the guides k'' , and can be set out or in by sliding in the said top-rail so as to adjust them, and when adjusted they are held to their place by set-screws or other suitable device in the top-rail. Near their inner extremities they have holes in which pushing-rods n'' are inserted and slide at right angles with said arms. Back of these arms, and on a projection o'' on the inside of the top-rails l'' , is screwed the cross-head p'' of a picker-staff r'' . One end of a spiral spring q'' is fastened to the outer end and to the top of said cross-head, and the other end thereof is attached to the standard a immediately back of it.

The picker-staves r'' extend toward the

front of the machine in a slightly inclined position.

Operation.—Motion is communicated to the machine from a crank-shaft, by means of pitmen or rods, which are attached to the swords d' of the lay, and which causes the lay to traverse forward and backward in the usual manner. In consequence of the levers a' being hung by means of slots to the pins c' , and fastened into the shaft y , said shaft oscillates in accordance with the traverse motion of the lay, causing the arm or lever x to move up and down. When the lay beats backward or toward the heddles, the strap w being fastened to the lever x , which is depressed, causes the pulley v partly to revolve, and by means of the strap q , which winds around and is fastened to the pulley r on the same shaft of pulley v , the vibrating frame is raised. The rod n , moving freely in the slot o , catches the hooks which present themselves, and raises them and the heddles attached thereto. When the pulley f' is turned in the direction of the arrow, the lever i' is forced back, and at the same time the vibrating-frame is raised, as above described, by means of a pulley on the same shaft; as the frame falls its motion is arrested by means of the projection h' above named on the lever i' . At the same time the said lever draws with it the dog n' , which catches one of the cogs of the cog-wheel s' and thus turns the endless plates. By means of the pins opposite to the hooks, said hooks are alternately forced forward, and caught and lifted by the rod n , as aforesaid. These two operations are simultaneous, or very nearly so, the last-described one takes place but an instant in advance of the former. The dog n' , after having turned the endless plates, is drawn back by the spiral spring when the lay beats forward, and at the same time the weight u turning the pulley r and slackening the strap, allows the vibrating-frame to fall back into its original position, being arrested by the hook on the lever i' . The lever i with its weight, and the cog wheel s' on the back of the machine, serve for adjusting the distance of the travel of the

plates z' . The plates z' may be made of metal, wood or horn, the latter material being considered preferable on account of its little weight. By means of the friction-rollers f'' and the thumb-screws g'' the hooks are adjusted laterally, in such a manner as to bring them precisely opposite to the pins on the plates z' .

Just at the termination of the backward beat of the lay, the ends of the race-beam strike the front ends of the pushing-rods n'' , the rear ends of which push against the inner ends of the cross heads p'' of the picker-staves r'' and cause the latter to strike inwardly, viz: toward each other. To the front ends of the picker-staves are attached short straps, which connect them with the pickers, located on the spindle of the race-board-boxes, and by these means the shuttle is propelled. The arrangement of boxes or sliding short arms m'' is for the purpose of adjusting the rods n'' so as to strike nearer to or farther from the picker-staff, on the cross head p'' , to increase or diminish the blow of the picker in weaving wide or narrow cloth as circumstances require.

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

1. The manner of combining the heddles and lay substantially as herein described, by means of the vibrating-frame i and lifters b'' or a' and endless series of plates, constructed and arranged as herein set forth, instead of the usual way by means of cams, treadles, &c., thus simplifying the operation, and consequently producing a saving of expenses.

2. Constructing the double hooks on the lifters b'' in the manner described by gradually increasing the distance between the upper and lower hooks of each one of the series of lifters from back to front, so that the back harness shall be raised higher than the front one, in proportion to its distance from the cloth.

WM. TOWNSHEND.

Witnesses:

THOMAS JOHNS,
FRANCIS BENNE.