

# E. Burt. Loom.

N<sup>o</sup> 348.

Patented Aug. 8, 1837.

Fig. 1

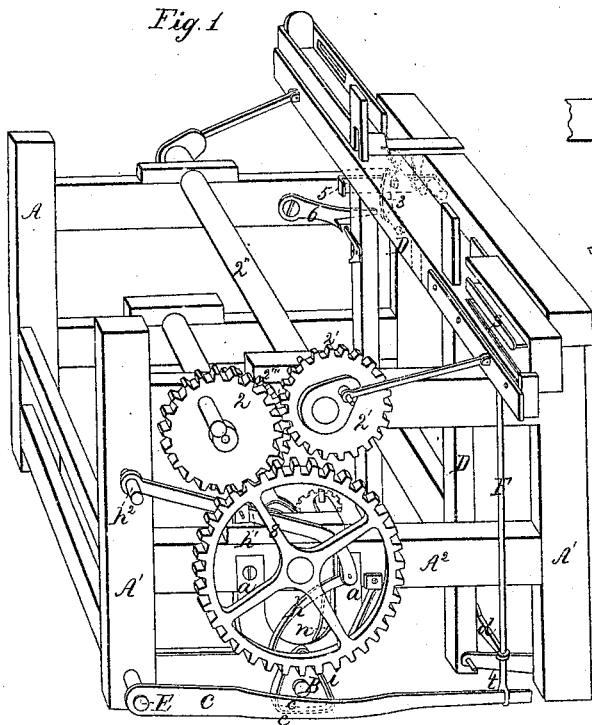


Fig. 2

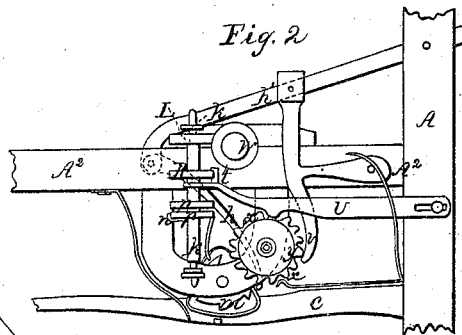


Fig. 3

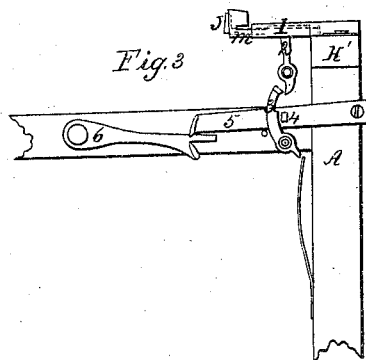


Fig. 6



Fig. 5

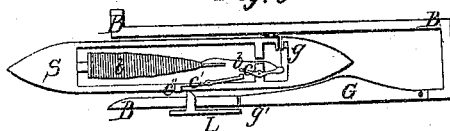


Fig. 4

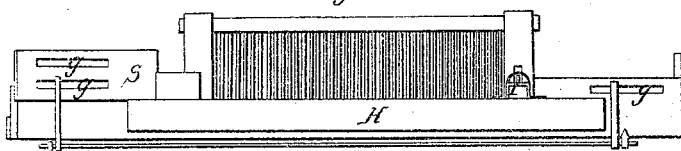
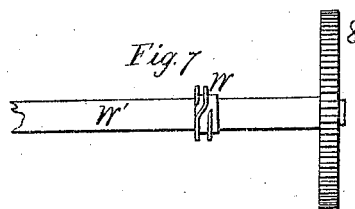


Fig. 7



# UNITED STATES PATENT OFFICE.

ENOCH BURT, OF MANCHESTER, CONNECTICUT.

## COMMON CRANK-POWER LOOM.

Specification of Letters Patent No. 348, dated February 10, 1837.

*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 the common Crank-Power Loom, by means of which check or plaid of two or more colors and of any required figure may be woven, as also may various other articles, such as check handkerchiefs with fancy borders different from the figure in the body and having a dividing line to cut by; likewise twilled check with wool filling for men's wear beat up thick, by an improved motion in the lay; I hereby declare that the following is a full and exact description of my said improvement.

A A in the accompanying drawing represents in the different figures parts of the frame of the common power loom. B, Fig. 1, is a curvilinear cam which revolves upon a pivot projecting from the standard *a, a* attached to the frame of the loom. This cam consists of a flat plate, B, having a rim *i* rising from it, which rim may be about one-fourth of an inch thick and rise three-fourths of an inch. C is a lever having its fulcrum at E and which lever is operated on by the cam B having on it two small friction rollers *c, c*, which embrace its rim and which is consequently obedient to the various curvatures of this rim which are so formed as to act by easy ascents and descents. F is a rod through a slot in the lower end *f* of which the lever C enters at a point nearly opposite to the center of motion of the lay D D. The upper end of this rod is attached to the movable shuttle box S; it passes through guides *d, d*, attached to the sword of the lay. The shuttle box must contain as many divisions, one above the other, as there are shuttles to be used, and which are brought to their places by the curvilinear cam B which of course is prepared according to the required pattern. The end of the lay is cut off in such a manner as to receive the movable shuttle box which has a guide at each of its ends and is balanced by a weight or spring causing it to rise and fall with equal ease. The curvilinear cam has an intermitting motion, being operated on either by a ratchet or an irregular endless screw, as circumstances may indicate, to be presently described. This intermitting motion allows it to remain at rest while the shuttles are thrown.

Fig. 2 represents the arrangement of the moving parts as seen on the inner side of the frame A', A', Fig. 1, that is, supposing the frame to be turned around; these parts therefore are in a direction, the reverse from what they would appear in Fig. 1 were they not hidden by the frame, and other portions of the machinery. The ratchet wheel, *m*, is firmly attached to the back of the curvilinear cam, and it must have as many teeth as there are ascents and descents in the cam. *h*, Figs. 1 and 2, is the hand or claw by which the ratchet wheel is moved, a tooth at a time; this claw is hung upon a lever *h'*, having its fulcrum at *h''* on the frame of the loom. To cause this claw to operate on the ratchet wheel at the proper period for raising or lowering the shuttle box I employ an apparatus, consisting of an arm or lever, which turns horizontally upon a pin or fulcrum with one of its ends bearing upon a figure wheel, while the other, at proper intervals, holds up, or lets go the claw of the ratchet wheel, according as the end, bearing on the figure wheel, rests upon its periphery, or falls into notches thereon. The figure wheel or wheels, are placed upon a vertical shaft which is made to revolve intermittingly, by an irregular endless screw, upon the shaft of the main cam wheel of the loom. *k, k*, is the vertical shaft, which carries the figure wheels, or double figure wheel *p, p*. This shaft has a vertical play equal to the distance *p, p*, on the figure wheel, to allow the end of the horizontal arm or lever to bear upon the periphery, or to fall into the notches, of the one, or the other of these two wheels, dependent upon the required action of the loom.

In Fig. 6 the horizontal arm or lever and one side of the figure wheel are shown, the under side of the girth A<sup>2</sup> being turned toward the eye; *p*, is the figure wheel and *n* the horizontal arm working on its fulcrum *o*, attached to the girth; it may be borne up against the pattern wheel, by a spring or otherwise; the end *n'* of the arm extends across the under side of the girth A<sup>2</sup> to the claw *h*, which it holds up during the time, that the opposite end bears on the periphery of *p*, but suffers it to descend, to another notch on the ratchet wheel, when the arm enters one of the hollows or notches of the figure wheel; one end of the arm is seen at *n*, in Fig. 2 bearing against the figure wheel, and the opposite end, *n'*, is seen in Fig. 1,

bearing against a part of the claw *h*, where it lifts it, or allows it to fall upon the ratchet wheel as required.

In Fig. 2 W, is a section of the irregular endless screw, upon the shaft of the main cam wheel 8, Fig. 1; a top view of this is given in Fig. 7, showing the manner of forming the irregular screw, *w*, upon the cam shaft *w'*, of the loom, upon which is fixed the main cam wheel 8; L, is a toothed wheel on the shaft *h*, into which the screw *w*, takes—causing it to revolve intermittently, as above stated, turning it around, the distance of one tooth, by the oblique part of its thread, in each revolution of the cam wheel. When the curvilinear cam is moved by this screw, which in some patterns will be most eligible, (as before intimated,) instead of a ratchet on the curvilinear cam, and that revolving on a pivot, it is made fast on a shaft, on the upper end of which is a wheel similar to L and like that meshing into the screw, but on the opposite side of it from L, in this case the curvilinear cam will of course lie horizontally. The wheel on the upper end of its shaft will, in some patterns, remain constantly in the screw, to be moved by it at every revolution, and in other patterns, it is disengaged from it, except when required to move when it again enters the screw, by the action of the figure wheel *p*, *p*, and the horizontal arm *n'* changed a little in its position for this purpose. The shaft *h*, I have said, has a vertical play, and this is intended to bring, alternately, the respective sections of the figure wheel *p*, *p*, opposite to the arm *n*, which by riding upon one or other of the figure wheels, and by falling into the indentations thereon, forms the required border, and by its transitions forms the divisions between the handkerchiefs, and then forms the next border, and then on moving back again, forms the body of the handkerchief in a way which will be readily understood by those who are well skilled in the construction and operation of figure looms. The longitudinal motion is given to the shaft *h*, by means of the wheel *x*, and its appendages. This wheel has three more teeth than is equal to the number of times that the figure of the body of the handkerchief is repeated. U is a sliding lever which raises the shaft *h*, by the action of the projections or risers *y*, *y*, upon a hub, or plain wheel making a part of *x*; the projections or risers *y*, *y*, are one tooth apart and their operation on the lever U, will be perceived by inspecting the drawing. The inner end of U, bears against the lower side of the plane wheel R upon the shaft *h*, which plane wheel has one notch or indenture in it into which the pin *t*, of the sliding lever U falls at every revolution of it, and thus permits the claw V to fall upon the ratchet wheel *x*, for the purpose of moving it the

distance of one tooth. The wheel *x* is upon an independent axis, its sole office being the regulating the vertical motion of the shaft *h*, and its appendages. The claw V, is suspended from the same lever, *h'*, which carries the claw *h*, before described, and this lever is raised once at each revolution of the main cam wheel 8, by a pin projecting inwards from that wheel having on it a friction roller, coming in contact with the under side of the lever, which it lifts to the required height.

The wheel *x*, with its appendages for giving or regulating the vertical motion of the shaft *h*, is entirely omitted except in those looms which are designed for weaving bordered handkerchiefs.

To bring the lay down with an increased velocity, I employ two circular toothed wheels 2, 2', Fig. 1, each hung eccentrically upon its shaft, to the extent of an inch or more. These wheels are equal in size, and are equally eccentric, and are made to operate regularly by having the shorter line of the one geared into the longer line of the other, measuring from the centers of their shafts to their peripheries. The shaft 2'', of the wheel 2', it will be seen is the crank shaft which works the lay. The left pulley is on the shaft of the wheel 2, which wheel is in part hidden by a wheel 2''', which is attached to wheel 2, and is upon the same shaft; the shaft however passing through its center; this front wheel meshes into the main cam wheel 8, and gives to it a continuous and equable motion. The aforesaid eccentric wheels are employed in those looms only which are designed for heavy fabrics where this motion is required.

To prevent the occurrence of errors in the figure which would be occasioned by the running of the shuttle without a thread, I have invented what I denominate a thread protection, by which the loom is made to stop of itself whenever a bobbin is spent, or a bobbin thread breaks. Of this thread protection, I employ two varieties, the first of which is somewhat analogous to, but is an improvement upon the plan invented by me some years since, and attached to a loom, jointly patented by me and Oliver D. and Amos H. Boyd; denominated Burt and Boyd's power plaid loom. My improvement upon this plan consists in attaching to the breast-beam, opposite to the aperture in the lay, a hollow rectangular case, within which works a horizontal slider, which slider the bobbin thread forces back; upon each side of this slider and within side of the hollow case, are two pieces of metal, in the form of an L, extending toward the lay, and a little beyond the hollow case, held and regulated by a spring within the case. As the lay comes up the ends of these Ls strike upon the bobbin thread, on each side of the aper-

ture in the lay, and hold the thread fast, so that by the beating up of the cloth the horizontal slider is driven back by the thread unlocking the spring catch that holds up an arm, which if not thus permitted to descend would stop the loom and cast off the belt.

This arm is hung upon the front part of the loom, and extends forward, between the sword and the loom frame, so far as to be even with the back side of the sword, when the lay has moved back about two inches; its end is here bent at right angles either toward the sword of the lay, or upward toward the race beam; a steel plate is made fast, either to the back of the sword projecting a little beyond its outer edge, or upon the back side of the race beam, extending downward below its under side, according as the upper end of the before named arm is bent inward toward the sword, or upward toward the race beam, and at such a point as to meet the rectangular end of the arm, as the lay goes back excepting the arm be unlocked, and its end permitted to descend. This arm is raised and caused to lock, by the lay in its motion forward. To protect the ends of the Ls, and the horizontal slider, a bonnet or cap is put over them, attached to the Ls and consequently moving back and forward with them. In Fig. 3 is shown a view of the principal parts of this first variety of thread protection. H is the end of the breast beam which is supposed to be cut off at H', to show the inside of the frame of the loom A, under it, and the respective parts attached thereto. I is the rectangular hollow case, upon the breast beam, having within it, the horizontal slider *m*, projecting from its end. As the Ls and spring are covered by the bonnet or cap and hidden in part by the hollow case, they are shown by the dotted lines, with their references on the drawing. The lever 2 is connected with the slider, and unlocks the catch 3, from the pin 4, permitting the end of the arm 5 which is raised up by every forward bent of the lay, by means of a lifting pin 6, to fall below the steel plate which is either (as before named) on the sword of the lay, or on the race beam.

My second variety of thread protection is as I believe altogether new in principle, and consists of a simple apparatus within the shuttle itself so arranged as to prevent the shuttle from boxing unless the bobbin thread be entire. Within the shuttle and hung in its side there is a compound lever, the first lever being hung near to that end of the cavity of the shuttle from which the thread is drawn out. The thread passes first through an eye in the end of this lever, and thence out through the bush or thimble into the web. The other lever is hung in a slot or mortise made through the side of the shuttle, extending from the heel of the first lever to the center of the shuttle. One end of this sec-

ond lever is placed under the heel of the first or hung to it by a pin, the other end is made in the form of an L and projects about an eighth of an inch from the outside of the shuttle, being kept in that position by the pressure of a delicate spring when the thread is passing off from the bobbin by the motion of the shuttle through the neck. The end of the first lever having an eye through which the thread passes is brought by its action up to the bush or thimble by which means that end of the second lever which previously projected out from the side of the shuttle is drawn back within its surface, while, should the thread break or the bobbin run out, the spring instantly restores it to its first position, and when it thus enters the shuttle box, the projecting L comes in contact with a horizontal bolt or slider, which is passed over the end of the shuttle guard, just as the shuttle reaches it, and by which it is thus prevented from entering further into the shuttle box. When the shuttle is thus situated, the loom necessarily stops and casts off its belt by the action of the ordinary or common shuttle protection. This second variety of thread protection which is contained within the shuttle itself, is shown in Fig. 5, where S is the shuttle, and *c*, *c'*, the compound lever, that marked *c*, having the hole in its end for the thread to pass through, and by which it will be drawn toward the thimble *g*, causing its opposite end to act upon the lever *c'*, and consequently to extract the projecting end *c''*, within the surface of the shuttle. B is the shuttle box, G, the shuttle guard, L the sliding bolt which passes over the end of the guard G, when struck by the projecting end of the lever *c''*. The shuttle is in this figure represented with the levers in the position they would assume if entering the box with a broken thread.

I have herein described many things common to power plaid looms and which of course, I do not mean to claim as of my invention; but I do mean to claim the revolving curvilinear cam as combined, and co-operating with the horizontal lever, and the perpendicular rod to move the shuttle box in the manner described. I also claim the combination of the irregular endless screw with the vertical shaft and double figure wheel thereon, and the arrangement by which the said vertical shaft is made to move longitudinally for the purpose herein fully shown; and the arrangement and combination of those parts with the common power loom, constituting an improved power plaid loom, for the purposes indicated. I do not claim in the first variety of the thread protection the principle of causing a power loom to stop by the breaking of the bobbin thread, this being covered (as before indicated) by a previous patent, but I claim as my improvement thereon the combination of the

rectangular hollow case, on the breast beam, with the Ls, within it for holding the thread together with the application of the stop lever immediately to the layer.

5 In the second variety of the thread protection I claim as my invention—

The preventing of the shuttle from boxing by the breaking of the bobbin thread, or by

the bobbin being spent, this effect being produced through the compound lever, and the 10 cooperation of the other parts, substantially in the manner described.

ENOCH BURT.

Witnesses:

GEO. W. CHENEY,  
MARY CHENEY.