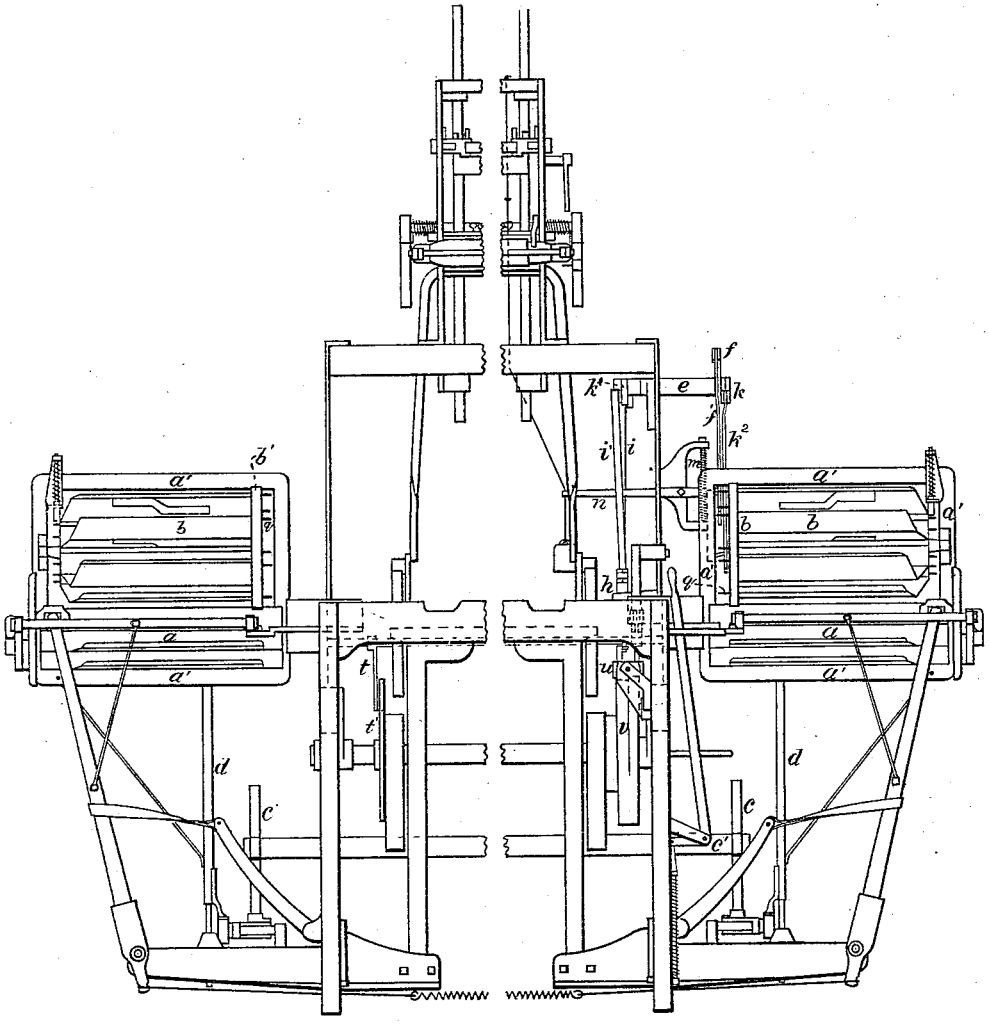
3 Sheets—Sheet 1.

P. HICKEY & C. W. MILES.

SHUTTLE-BOX MECHANISM FOR POWER LOOMS.

No. 192,580. Patented July 3, 1877.

Fig. 1.



Witnesses;

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J. F. Maxwell.

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3 Sheets—Sheet 2.

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Fig. 3

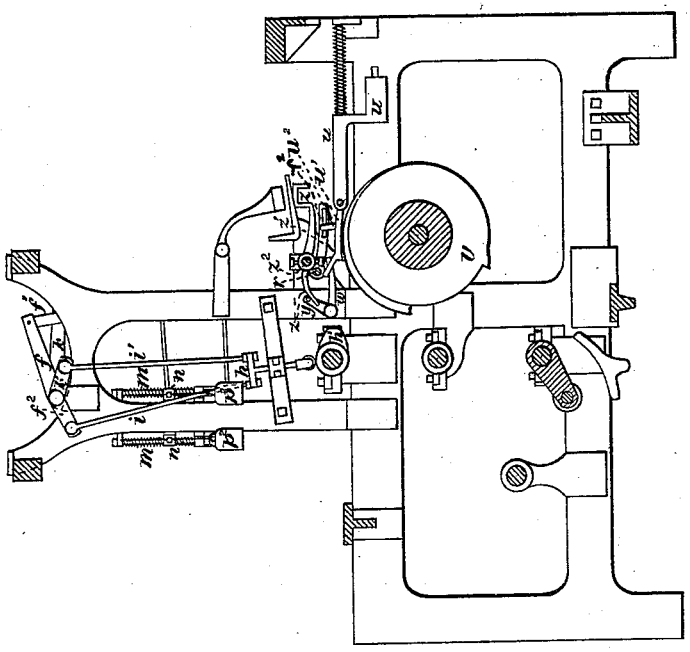
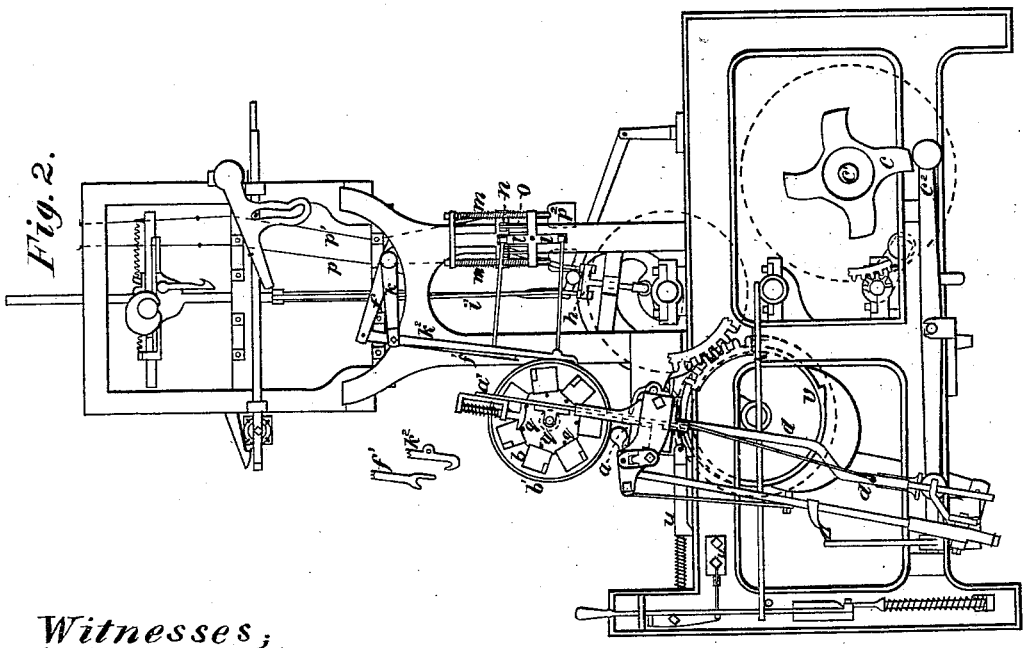


Fig. 2.



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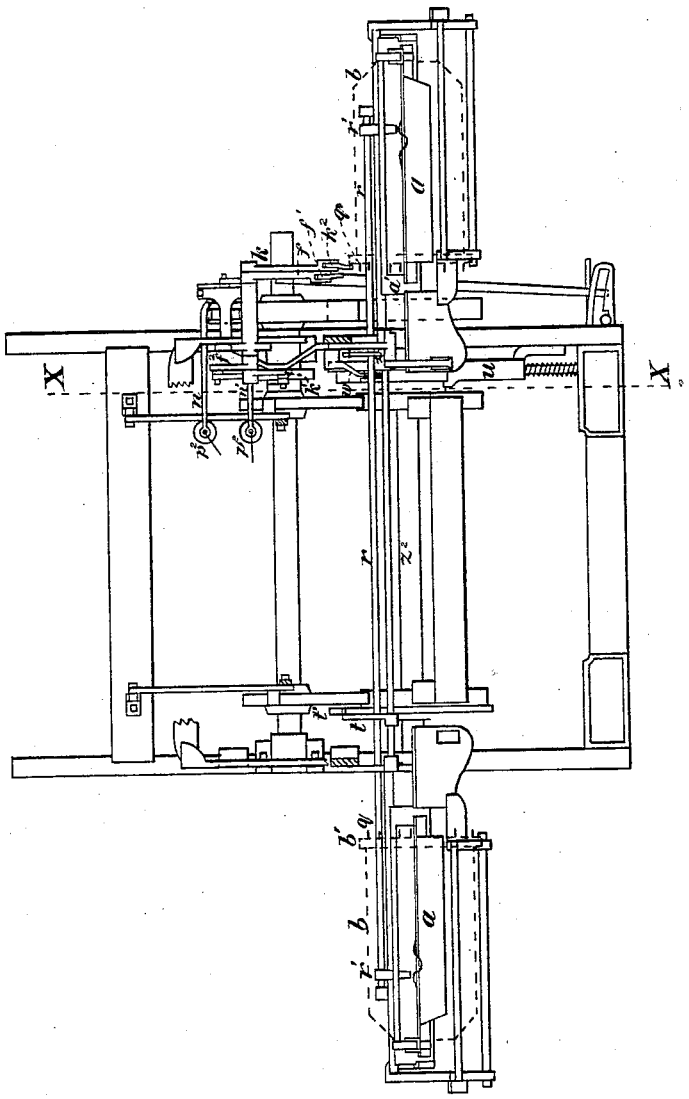

Fig. 4.

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UNITED STATES PATENT OFFICE.

PATRICK HICKEY AND CHARLES W. MILES, OF AUBURN, NEW YORK.

IMPROVEMENT IN SHUTTLE-BOX MECHANISMS FOR POWER-LOOMS.

Specification forming part of Letters Patent No. **192,580**, dated July 3, 1877; application filed November 27, 1876.

To all whom it may concern:

Be it known that we, PATRICK HICKEY and CHARLES W. MILES, of Auburn, New York, have invented certain Improvements in Power Carpet-Looms, &c., of which the following is a specification:

These improvements relate to those parts of a loom connected with the arrangement and operation of the shuttle-boxes, by which greater accuracy, durability, and certainty are attained in the working of the loom, with a simple and compact arrangement of shuttle-boxes that reduces the power required to drive it, and enabling us to work the shuttles in regular continuous rotation, or in alternate or reverse order, as desired.

The construction of the improvements is shown in the following drawings, in the several figures in which the same letters designate like parts.

In the drawings, Figure 1 is a front elevation of the loom. Fig. 2 is a side elevation, (right-hand side.) Fig. 3 is a sectional elevation on dotted line *x x*, Fig. 4. Fig. 4 is a top plan with jacquard, &c., removed.

In the drawings the parts that are old are omitted, except so far as they illustrate the connection of the new parts with the loom.

The details of the devices on the left-hand side of the loom, like those on the right, are omitted.

Our shuttle-boxes consist of a series of boxes, *a*, in a sliding frame, *a'*, that rises and falls in a permanent frame affixed to each side of the loom, independent of the lay, so that either box, as required, can be brought in line with the race on which the shuttle crosses the loom. The boxes *a* are surmounted by a cylinder, *b*, composed of shuttle-boxes arranged around a common center hung in the frame *a'*. This arrangement includes a large number of shuttles in compact form, convenient of access, and, being detached from the lay, great stability and perfection in their movement are secured, which increases their durability and simplifies their construction and operation, and tightens the weft-thread in beating up.

The cylinder *b* turns on an axis at its outer end, and its inner end is surrounded by a collar, *b'*, in which it revolves, without a central axis at that end, leaving the inner end next to the lay free and unobstructing the weft-threads by an axis, around which they would be liable to become entangled and soiled.

The sliding frame *a'* is raised and lowered by a cam, *c*, on the end of shaft c^1, (see Fig. 2,) actuating a lever, c^2, connected with frame *a'* at its front end by a rod, *d*. The cam *c* is formed to correspond with the number of boxes *a* which it has to work. The cylinder *b* revolves, while frame *a'* is stationary, with the box of the series *a* next the cylinder *b* on a level with the race, by means of the following devices: A tubular bearing, *e*, Fig. 4, is affixed to the frame supporting the jacquard. In this bearing *e* a hollow shaft is fitted, having on its outer end a radial arm, *f*, projecting forward from which a hook, f^1, (see Fig. 2,) hangs. On the inner end of the same shaft is a radial arm, f^2, that extends backward, the end of it being connected by a rod, *i*, with a cross head, *h*, which is made to slide up and down by a cam, *h'*, giving a proper, accurate, and corresponding motion to the hook f^1. A second shaft passes through the hollow one, and has similar arms affixed to its outer and inner ends, but both projecting forward. The outer arm *k* has a hook, k^2, appended to it. The inner arm k^1 is connected with cross-head *h* by a rod, *i'*, like arm f^2. By this arrangement of parts it will be seen that the hooks f^1 and k^2 are reciprocated up and down in opposite directions at every revolution of the cam *h'*. One of the hooks, f^1, is united with the top, the other, k^2, with the bottom, of the vertical arms of the cross *l* by rods, the cross being pivoted at its center on a stud projecting from a small frame affixed to the side of the loom. To the horizontal arms of this cross *l* vertical rods *m* are attached, surrounded by spiral springs, that hold the cross in position when at rest, at which time the hooks f^1 and k^2 play up and down clear of the pins *q* on the shuttle-box cylinder *b*, there being the same number of pins as boxes. Two horizontal levers, *n n'*, pivoted on the frame at right angles to the cross *l*, are united to its horizontal arms on each side of the center by links *o*. Through eyes in the inner ends of these levers cords *p* p^1 pass, to the lower ends of which weights p^2

are affixed, their upper ends being connected with the jacquard above, in the usual way of harness-cords, with knots that can be trapped by means of the ordinary needles and pattern-cylinder governed by the pattern-card, as is well understood by experts. When either of the cords p or p^1 is trapped it raises the corresponding lever n and turns the cross l on its axis. This, by its connection with the hooks, thrusts one forward and the other back, bringing the forward hook into action with one of the pins q on the cylinder above named, and turns it one box.

It will be noticed that the hook k^2 is formed (see detached parts, Fig. 2) to catch the pin q on its upward movement. The other, f^1, catches as it descends. The cylinder is thus turned in opposite directions, determined by the hook brought into action. This movement takes place when the frame a' and cylinder b are at rest.

By the above-described construction and arrangement of parts an accuracy in working the shuttles is insured, with a much greater latitude and variety of motion, with less power to work the loom than heretofore, and with great stability and durability of the parts.

The improvement of the stop-motion may be described as follows: u is the sliding bar connected with the spring-shipper. This bar slides on the inside of the loom-frame, having two pawls, u^1 u^2, jointed to the rear end, that are actuated by the stop-cam v. u^1 connects with the thread-stop. It is held up when the weft-thread is running properly by a finger, w, pivoted to the loom-frame. On this finger a pin projecting from pawl u^1 rests, by which the finger raises it. This pin slides on the finger w when the loom is stopped without deranging the parts. The finger w is connected by its hub with another finger, y, that is in contact with the grid-lever z, operated by the weft-thread, as well understood by weavers. The fulcrum to which lever z is affixed is a rod, z^2, extending across the loom in rear of the lay. It bears a similar grid on the other side of the loom. The grids are kept open while the shuttle is passing by means of a finger, t, affixed to rod z^2, that rests on a cam, t', on the lay-shaft x. (See Fig. 4.) The other pawl, u^2, is connected with the shuttle-binders by means of a single rod, r, extending straight across from the shuttle-binder on one side to that on the other. It turns in fixed supports. A finger, r^1, is affixed to rod r opposite each shuttle-binder, and rests against it, so that when the binder is forced back by the shuttle the rod is turned. Just inside the loom-frame, by the pawl u^2, an arm, r^2, extends out from rod r. This arm has a slot in it, in which a pin rests, projecting from the pawl u^2, by which it is held up when the shuttle is properly boxed on either side. This device of a single straight rod for connecting the shuttle-binders with the stop-motion is more simple, direct, and perfect than others we are acquainted with.

We are aware that looms have been heretofore made with the shuttle-boxes, both rotating and sliding, detached from the lay, and placed in a frame on each side of the loom in which they work, or in which is placed revolving boxes mounted in a stationary frame, surmounted by drop-boxes adapted to slide in said frame. We do not claim either of those features, therefore; but

What we do claim is—

1. In combination with a stationary guiding-frame, a sliding frame, a', adapted to work in guides in said stationary frame, and carrying a series of non-rotating boxes, a, surmounted by a series of rotating boxes, b, and mechanism, as described, for raising and lowering said slide-frame and for turning said rotating boxes, the several parts being constructed and arranged as and for the purposes specified.

2. The combination, with the rotating cylinder provided with lugs or pins q, of the hooks f^1 k^2, governed by the pattern mechanism and connecting and operating mechanism, as described, whereby the hooks may be brought into engagement with and revolve the cylinder when it is in a state of rest, as and for the purposes specified.

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