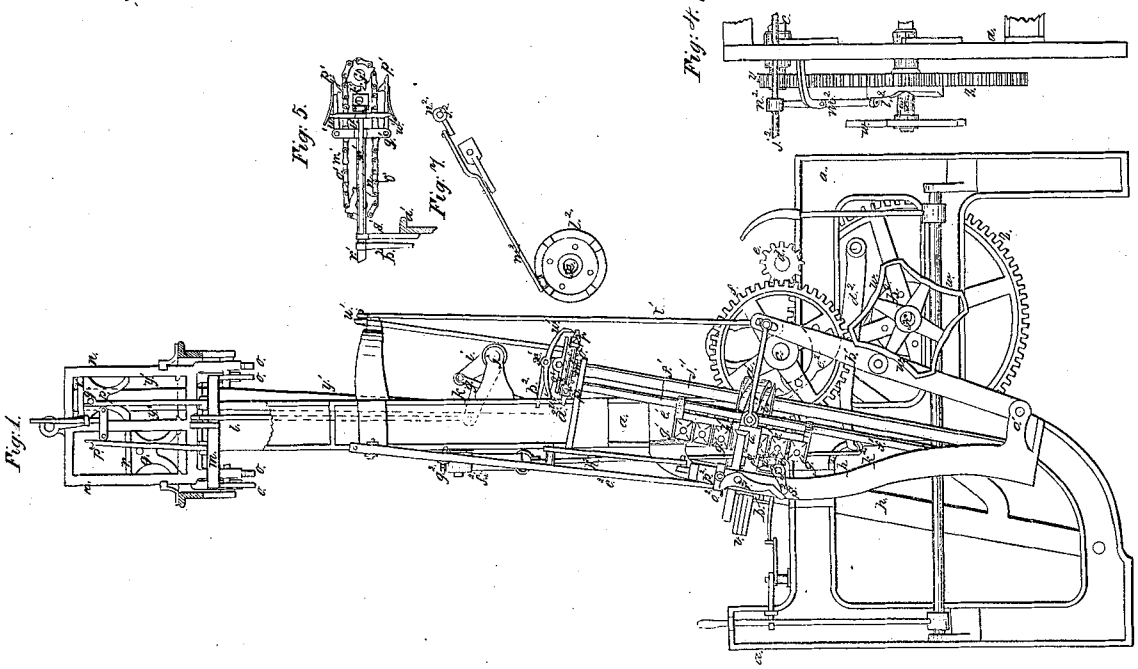
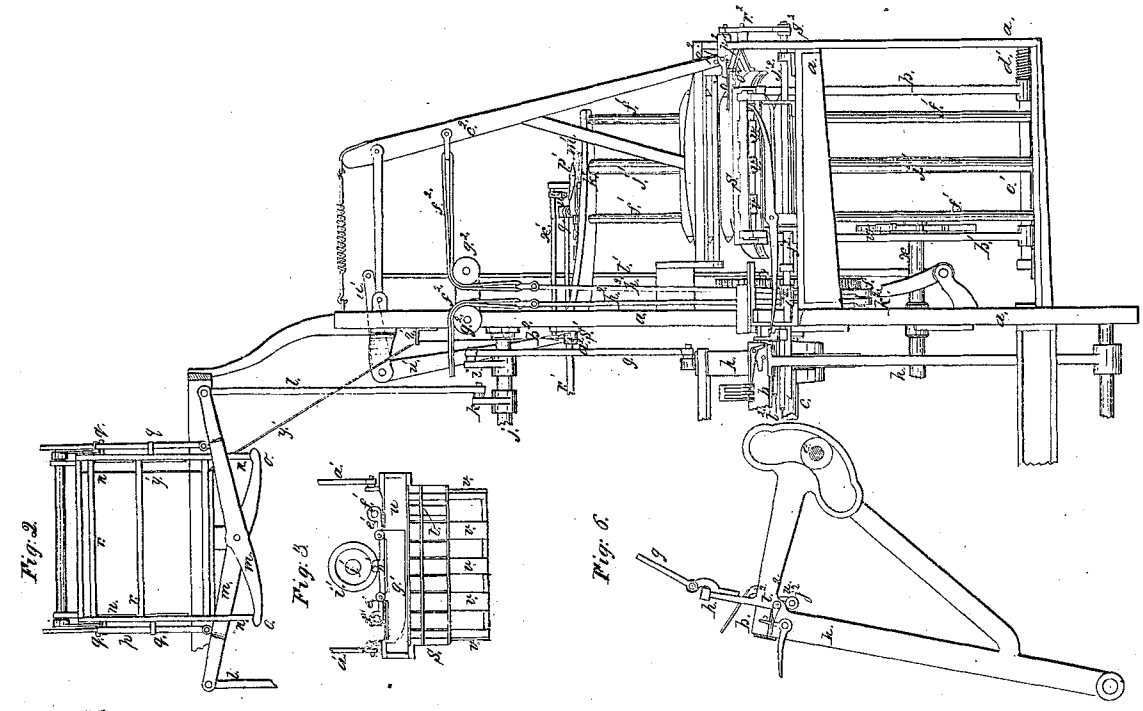
H. Skinner.
Power Loom.

No. 89,694. Patented May 4, 1869.





Witnesses.

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HALCYON SKINNER, OF YONKERS, NEW YORK, ASSIGNOR TO ALEXANDER SMITH, OF SAME PLACE.

Letters Patent No. 89,694, *dated May* 4, 1869.

IMPROVEMENT IN POWER-LOOMS FOR WEAVING CARPETS, &c.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HALCYON SKINNER, of Yonkers, in the county of Westchester, and State of New York, have invented certain new and useful Improvements in Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is an elevation of the right-hand side of a loom, with my improvements attached; and

Figure 2 is a front elevation of the right-hand side only, the method of mounting the jacquard being represented in section in both figures.

The sectional figures will be referred to hereafter.

The same letters indicate like parts in all the figures.

My said invention relates to improvements in jacquard-looms, for weaving two and three-ply carpets, and other figured fabrics, some of the said improvements having reference to the jacquard-mechanism, and others to the mechanism for shifting and operating the shuttles.

In the accompanying drawings—

a represents a suitable frame, and *b*, the lay, which is operated by cranks on the lay-shaft *c*, which receives motion from the driving-shaft *d*, (see fig. 1,) by a pinion, *e*, and cog-wheel *f*.

The motions of the jacquard are derived from the lay by a connecting-rod, *g*, extending from the upper end of one of the swords, *h*, of the lay, to an arm, *i*, on a rock-shaft, *j*, mounted in the frame, about midway between the upper part of the lay and the bottom of the jacquard.

And this rock-shaft has two other arms, *k k*, to which are connected two connecting-rods, *l l*, that are in turn connected with the outer arms of two rocking-frames, *m m*, both of which rock on the same axis centrally, under the jacquard.

The frame *n* of the jacquard is fitted to slide vertically in the upper part of the frame *a*, and rests on the two arms, *o o*, of each of the two rocking-frames, so that when the two arms, *k k*, of the rock-shaft *j* are drawn down, the jacquard-frame is lifted, and *vice versa*. And to the outer parts of the rocking-frames *m m* are connected the two sets of shifting-hooks, *p p*, formed to engage pins, *q q*, projecting from the ends of the two trap-boards, *r r*, and which are to be shifted in the usual way, to take either of the two trap-boards, both of which are adapted to slide in the jacquard-frame. From this it will be seen that, as the jacquard-frame is lifted up with one of the trap-boards, the other trap-board descends, and *vice versa*, the harness being thereby balanced, or nearly so. And as the motion for operating the jacquard is taken from the lay with an intermediate rocking-shaft, having arms placed at an angle relatively to each other and to the lay and jacquard, as represented, the shifting of the warps and opening of the shed are effected in a very short space of time, and the shed remains full open for the passage of the shuttle for a longer space of time, than by any other mechanism before known, without the use of cams, thereby avoiding the wear and tear incident to the use of cams.

The mechanism for shifting the shuttles is mounted at the sides of the loom, one set on each side, and in line with the shuttle-race of the lay, when thrown back.

The shuttle-boxes *s*, (see fig. 3,) one on each side, are formed each with two parallel compartments, *t* and *u*, the one, *t*, in front being for the reception of the shuttles belonging to, and which have to be returned to the opposite side, and the back one, *u*, to receive and deliver the shuttles, when required to be changed.

These shuttle-boxes are fitted to slide back and forth on and between a series of bars, or ways *v*, placed at right angles to the length of the boxes; and the upper surfaces of these bars or ways constitute the bottom of the rear compartment, *u*, when in line with the shuttle-race of the lay, but they do not extend back far enough to form a bottom to this shuttle-box, when thrown back to deliver and receive a shuttle.

At each back movement of the lay, these shuttle-boxes are moved either forward or back, that either the front or the rear one may be in line with the shuttle-race when a shuttle is to be thrown.

And this back and forward motion is controlled by a cam, *w*, on each end of a shaft, *x*, which receives motion from a pinion, *y*, (see fig. 4,) on the lay-shaft *c*, that engages a cog-wheel, *z*.

As represented in the drawings, the said cams have four projections and depressions, and the cog-wheel *z* is to the pinion *y* as eight to one.

Each shuttle-box is connected by two joint-links, a^1, with two arms, b^1, of a rock-shaft, c^1, and one of the said arms carries a roller, which is kept against the periphery of the cam by the tension of a spring, d^1 (See fig. 2.)

On each side of the loom, and back of the shuttle-boxes, there is a frame, e^1, (see figs. 1 and 3,) fitted to slide on two parallel rods, or ways f^1, and each of these frames carries a series of horizontal parallel shuttle-shelves, g^1, (see fig. 3,) the number in the series being equal to the greatest number of shuttles which may be required.

The rear face of this frame is provided with a rack, h^1, which engages the threads of a worm, i^1, on a shaft, j^1, by the turning of which the shuttle-shelves are depressed or elevated, as required for the shifting of the shuttles. But before proceeding to the description of the mechanism for elevating and depressing the shuttle-frames, it is important to state that the position of the shuttle-shelf, relatively to the shuttle-boxes, is such that at all times when the rear shuttle-box *u* is thrown back, one of the shuttle-shelves forms the bottom of that shuttle-box, and the shuttle-shelf frame is elevated or depressed while the shuttle-box is in its position, so as to lift one shuttle out of the box, and draw up another into it, or *vice versa*.

The upper end of the worm-shaft j^1 is provided with a chain-wheel, k^1, (see fig. 5,) having cogs to receive the links of a chain, m^1, which extends around another wheel, n^1, that turns on a fixed stud.

It is by this chain that the worm-shaft is turned to the right or left, to shift the shuttle-shelf frame, and for this purpose, the chain is provided with projecting pins, o^1, placed at a distance apart sufficient to turn the worm-shaft at any one operation to the extent required to elevate or depress the shuttle-shelf frame a distance equal to the space between the top of one shelf and the top of the next.

The chain is operated by either one of two dogs p^1, (see fig. 5,) one on each side of the chain, which dogs are hinged by their rear ends to a cross-head, q^1, on the end of a rod, r^1, that slides horizontally in suitable holes in brackets s^1. (See figs. 2 and 5.)

At each beat of the lay, this rod is reciprocated by a crank-pin on one end of the lay-shaft, from which a connecting-rod, t^1, extends to one arm of a bell-crank, u^1, from the other arm of which another connecting-rod extends to, and is connected with the rod r^1.

The two dogs are held out by springs v^1, shown by red lines in fig. 5, so as to clear the pins on the chain, and one or the other is caused to engage the chain, to move the shuttle-shelf frame up or down, by means of two arms, w^1, of a rock-shaft, x^1.

If the rock-shaft is turned in one direction, one of the arms, w^1, will push the corresponding dog toward the chain, to engage one of the pins, o^1; and if turned in the opposite direction, the other arm will make the other dog engage a pin on the chain, and when turned half way, both dogs will clear the chain.

The periods for shifting the shuttles are determined by the jacquard by means of a cord, y^1, both ends of which are attached to the jacquard-frame. The two parts pass through separate holes in one of the trap-boards, thence through guide-holes in a bracket, z^1, and around a guide, a^2, (see fig. 2,) below; and one part of this double cord is attached to an arm, b^2, of the rock-shaft, so that if one side of this double cord is trapped by the jacquard, the shaft will be turned in one direction, to cause one of the dogs to engage the chain; and when the other part of the cord is trapped, the other dog will be caused to engage the chain; and when neither part of the cord is trapped, as the jacquard is lifted, both sides of the cord are drawn up, to turn and hold the rock-shaft, so that its arms will permit both dogs to clear the chain.

The mechanism, as above described, is duplicated, one set on each side of the loom, but the hooks on the dogs are reversed.

The two picker-staves, c^2, for driving the shuttles, are operated by a single picker-lever, d^2, (see fig. 1,) which is depressed by a cam, e^2, (see fig. 1,) at one end of the lay-shaft c, the said lever being held up to the cam by a spring.

Two or more shuttles have to be driven successively from one side of the loom, and then two or more from the other.

The mechanism in the accompanying drawings is arranged for two; but for weaving three-ply carpets, and fabrics of that class, from three to four are required to be thrown successively from each side.

The picker-staves are connected each by a strap, f^2, passing over a roller, g^2, and attached to one of two picker-rods, h^2, which slide in a bracket attached to the frame, and near the lower end, they slide also in holes made in a plate, i^2, attached to a horizontally-sliding rod, j^2. (See figs. 1, 2, and 6.)

The lower ends of the said picker-rods are formed each with a projecting spur, or lip, k^2, so that when the picker-lever d^2 is depressed, it will act upon the lip, or spur, k^2, of one of the said rods, to operate one of the picker-staves, c^2, and the said picker-rods, h^2, are shifted so that one or the other of them will be placed in line with the picker-lever by the sliding of the horizontal rod j^2; and the shifting of this rod is effected by a face-cam, l^2, (see figs. 4 and 7,) on one end of the shaft x.

The said cam acts on one end of a lever, m^2, the other end of which is linked to the rod j^2, at n^2, and the said lever is held to the face of the cam by the tension of a spring.

As before stated, the shaft x makes one revolution to eight of the lay-shaft; and the cam l^2 is so formed, that during one-quarter of the revolution, the horizontal rod j^2 will be held at one end of its range of motion, that two shuttles may be driven in succession from one side of the loom, and then shifted to the other side, and there held during the next quarter of the revolution, that two shuttles may be driven from the opposite side of the loom, and so on. From this it will be seen, that by changing the cam or the gearing, the rod can be shifted, and held so as to vary the order and succession of the throw of the shuttles to any extent required.

The momentum of the shuttles in boxing is checked by the resistance due to the tension of a spring, o^2, (see fig. 2,) one on each side, applied above the shuttle-box, so as to bear on the top of the shuttle. But it is desirable to relieve the shuttle from this pressure at the time of driving, and for that purpose the said springs o^2 form each the part or elongation of a lever, p^2, that turns on a fulcrum-pin, q^2, (see fig. 2;) and the outer end of the said lever is lifted and held up or liberated by one arm of a short lever, r^2. There is one such mechanism on each side of the loom.

When the shuttles are to be thrown from one side, they are to be freed from the tension of the spring, and the spring on the other side should be in place to arrest the shuttles when boxing, and *vice versa*.

To accomplish this, the horizontal rod j^2, before described, is extended entirely through the whole width of the loom, and is provided at each end with a cam, s^2, (see figs. 1 and 2,) to act on the levers r^2, that force down or liberate the check-springs o^2; and these two cams are at such distance apart on the rod j^2, that when one is in position to act on its corresponding lever, r^2, the other will clear its lever r^2, and *vice versa*, and these are brought into the required positions by the sliding of the rod, to bring the one or the other of the picker-rods h^2 in line with the picker-lever d^2, but on the reverse side. And the said cams s^2, or rather the one or the other of them, is caused to act on its lever r^2, to depress the spring, by the turning of the rod, which is effected by a rod, t^2, (see figs. 2 and 6,) on the back of the lay, which, as the lay reaches the end of its back motion, strikes an arm, u^2, (see figs. 1 and 6,) on the rod j^2, and this turns the cams, so that the one which happens to be in position will operate the corresponding lever, to depress the spring, to check the shuttle in boxing.

I have above described, and represented in the drawings, the mode of application of my said invention which I have tried with success. I do not wish, however, to be understood as limiting my claims of invention to such mode of application, as that may be varied by the substitution of equivalent means, without changing the mode of operation, as for instance, instead of communicating motion to the rock-shaft with its two sets of arms interposed between the jacquard and the lay, the first motion may be taken from a crank on the lay-shaft, instead of from the lay, as it will be obvious that substantially the same motion can be given to the rock-shaft from the one as from the other, my invention consisting in the interposition of the rock-shaft with its two sets of arms placed at an angle, by means of which I am enabled to completely open the shed, as the lay moves back, in less time, and to keep it open during a longer time than by any other arrangement.

And so with the number of shuttle-boxes. I have

described and represented but two on each side; but it will be obvious, that, instead of being made with two, they can be made with three or four, as may be required for the kind of fabric desired to be produced, making corresponding changes in the other parts of the loom, as indicated.

I do not wish to be understood as claiming the horizontally-sliding shuttle-boxes, or the vertically-sliding shuttle-shelves, or their combination.

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

1. The arrangement for communicating motion to the jacquard from the lay, or equivalent part of the loom, by the interposition of a rocking-shaft with two sets of arms, at an angle with each other, substantially as and for the purpose described.

2. The mechanism, substantially as described, for operating alternately the two picker-staves, or either of them. two or more times successively, for the purpose set forth.

3. The mechanism for relieving the shuttles from the pressure of the check-springs, when they are to be thrown, substantially as and for the purpose described.

4. The mechanism by which the shuttle-shelves are shifted, which mechanism consists of a cogged rack, engaged by a worm on a shaft, turned by a chain, which is actuated by either of two reciprocating hooks, thrown in or out of action by the jacquard, as and for the purpose described.

5. The mechanism, substantially as described, for elevating and depressing the shuttle-shelves.

HALCYON SKINNER.

Witnesses:

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CHAS. M. DE LACY.