2 Sheets--Sheet 1

G. CROMPTON.

Shedding-Mechanism for Looms.

No. 162,904. Patented May 4, 1875.

Fig. 1.

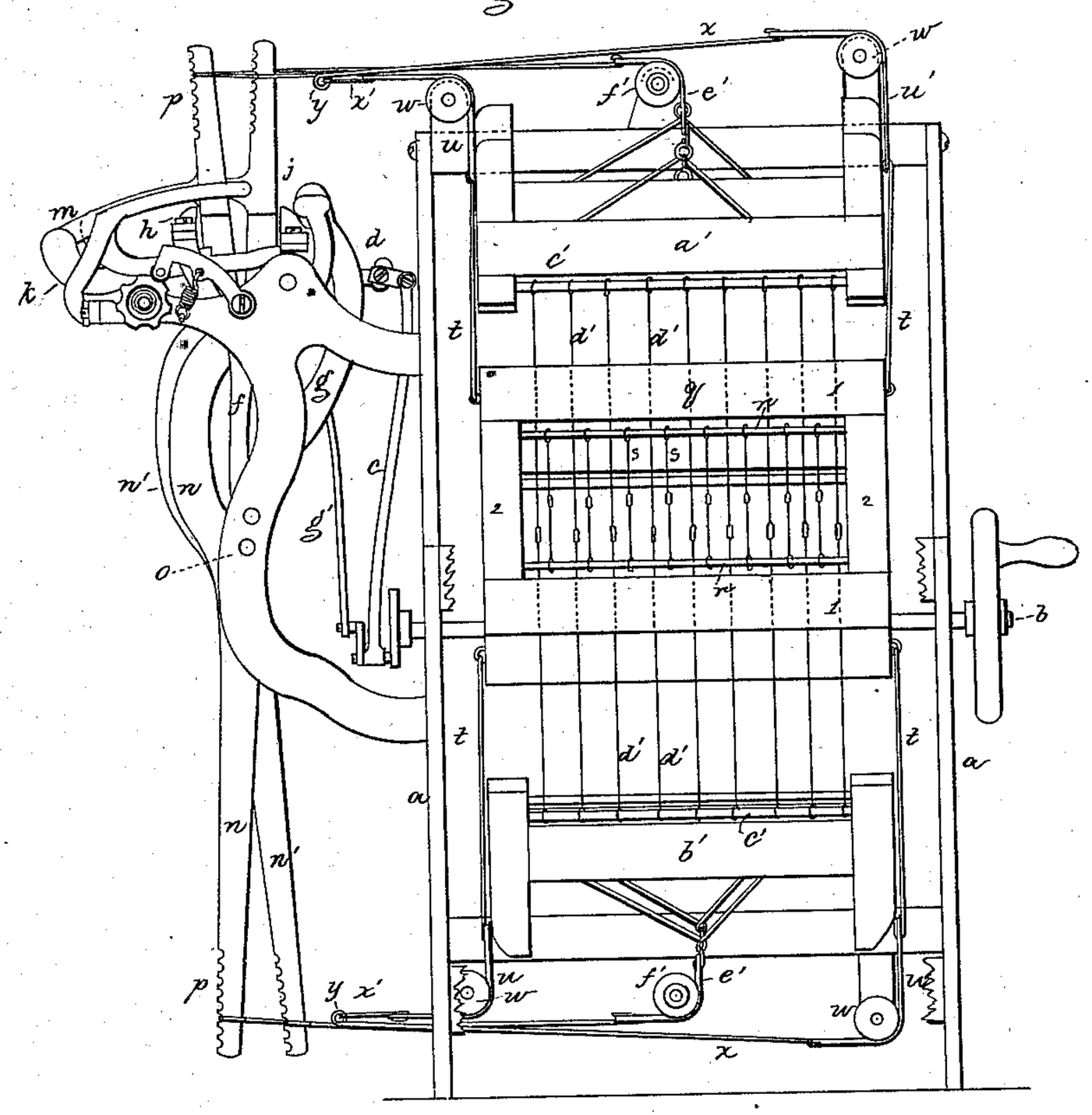
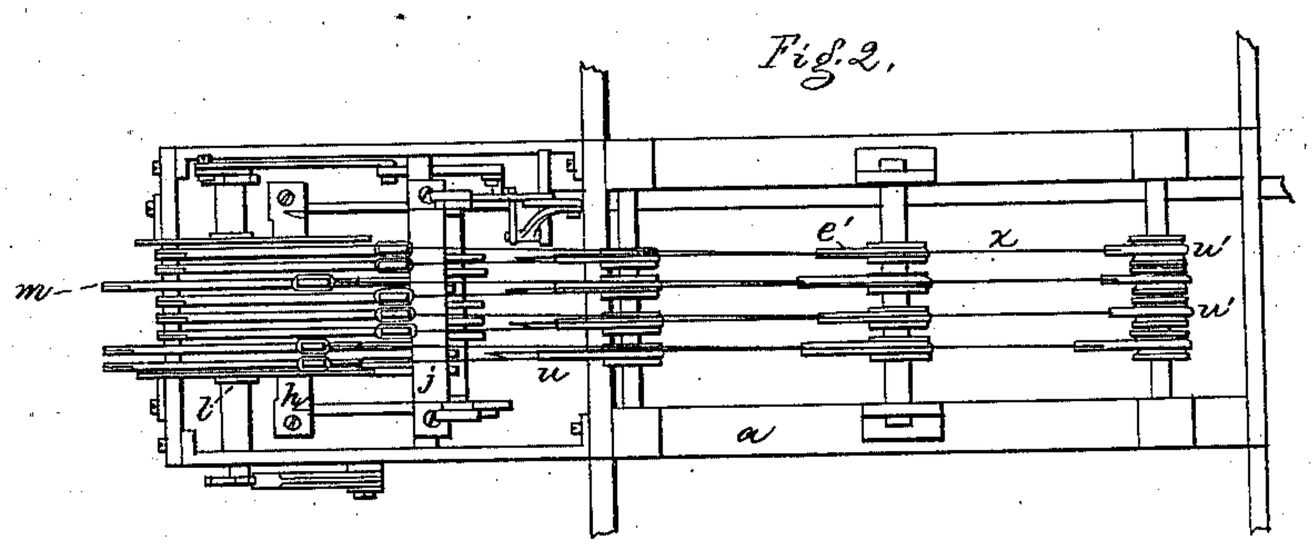


Fig. 2.



Witnesses.

L. H. Latimer.

Wm. Pratt.

Inventor.

George Crompton

PER Crosby & Gregory Atty's.

2 Sheets--Sheet 2.

G. CROMPTON.

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Fig. 3.

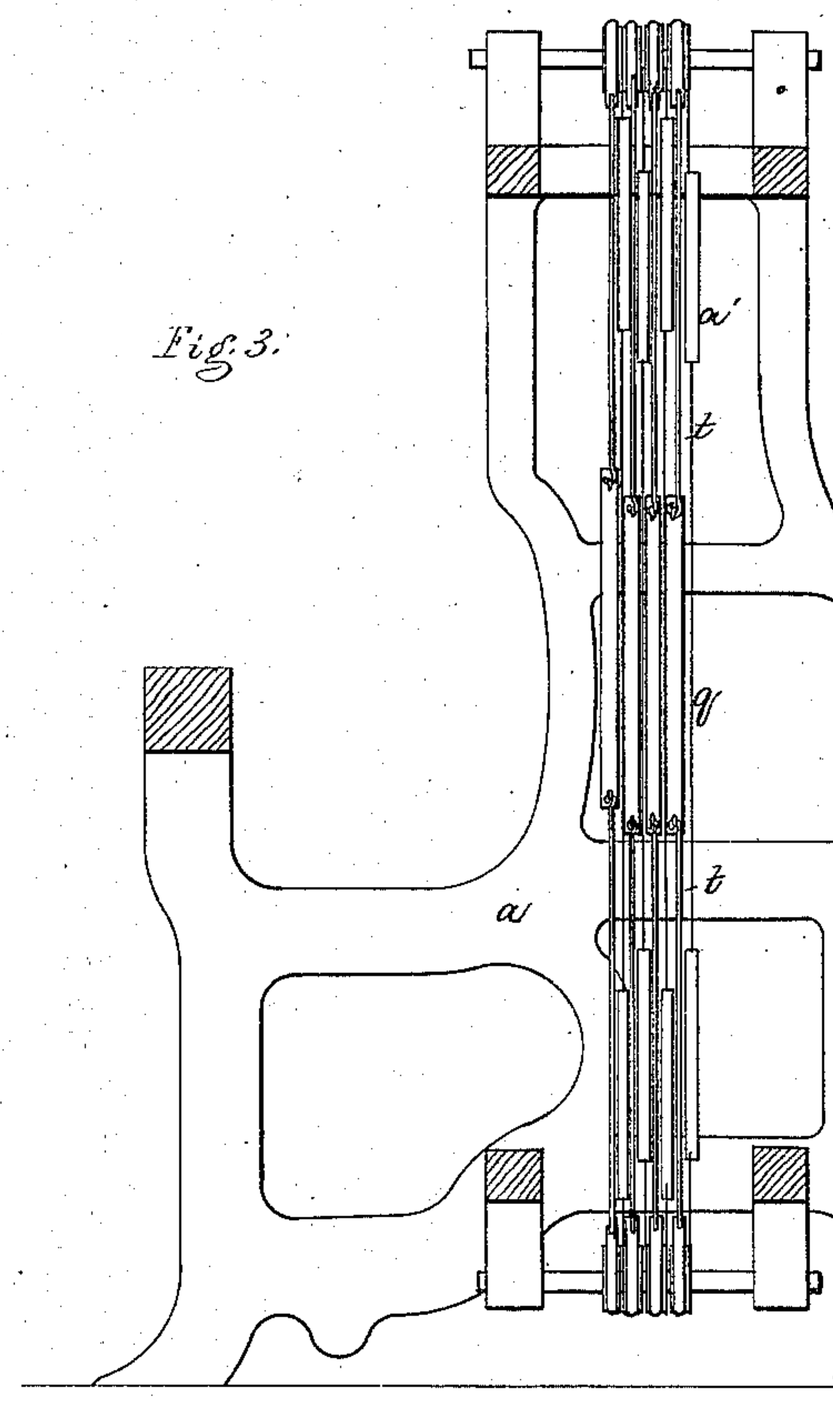


Fig. 6

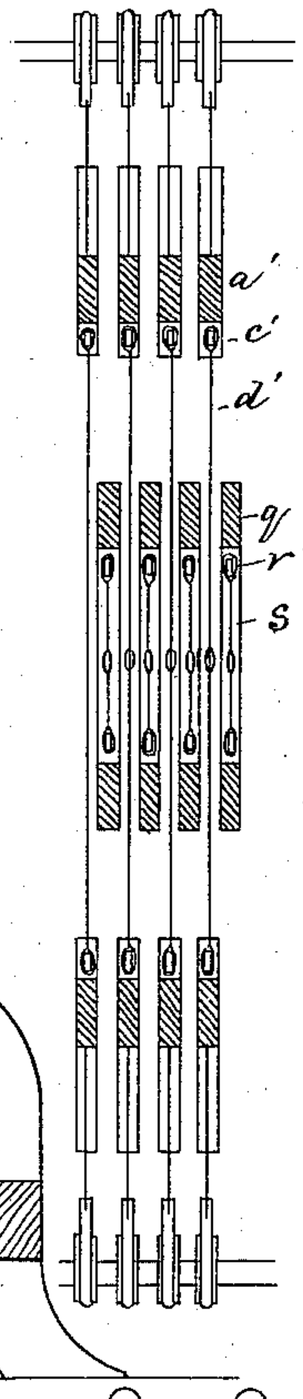


Fig. 5.

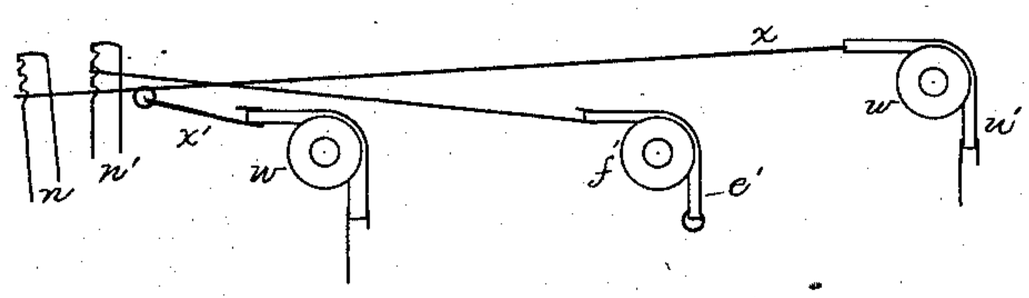
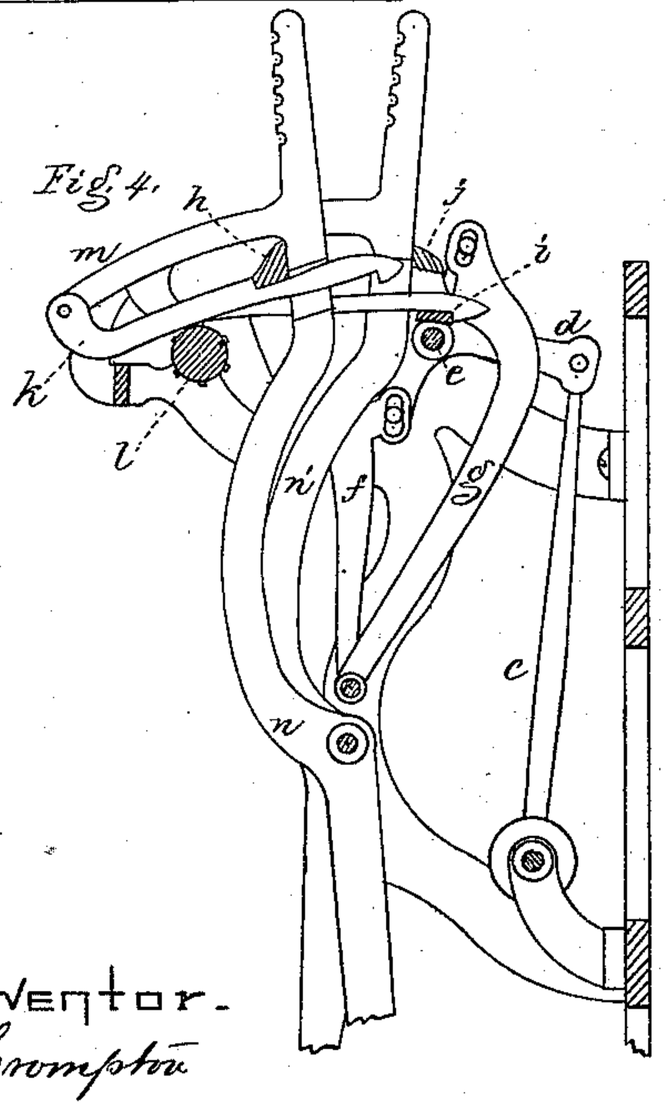


Fig. 4.



Witnesses.
L. H. Latimer.
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Inventor.
George Crompton
per Crosby & Gregory Atty's.

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UNITED STATES PATENT OFFICE.

GEORGE CROMPTON, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN SHEDDING MECHANISMS FOR LOOMS.

Specification forming part of Letters Patent No. **162,904**, dated May 4, 1875; application filed April 6, 1875.

To all whom it may concern:

Be it known that I, GEORGE CROMPTON, of Worcester city and county, in the State of Massachusetts, have invented Improvements in Fancy Power-Looms, of which the following is a specification:

This invention relates to the shedding or harness mechanism of fancy looms for weaving wool and cotton, or other fibrous material; and has for its object the arrangement of the heddle-frames so as to economize space and enable the production of patterns more complex and difficult in design than are now commonly woven on fancy looms.

This my invention consists in the combination of interior and exterior heddle-frames, substantially as described, with jacks or levers controlled by pattern mechanism to move the heddle frames or carriers to form sheds.

In fancy looms, as heretofore constructed, the heddle frames or carriers have been arranged the one immediately back of the other in a series, and it is not practical (for instance, in woolen-weaving) to use more than twenty-four heddle-frames; but with this my invention, besides the usual quantity of heddle-frames, I employ any number of exterior heddle-frames from one to twenty-four, preferring, however, to use as many exterior as interior heddle-frames. These exterior frames are shown as two-part frames, connected with each other by the heddles, and the frames of both sets of heddles are placed and move in the same vertical plane, or as nearly so as possible. The heddles of the two-part frames extend between adjacent interior frames, and so by this compact arrangement of heddle-frames and heddles it is possible to enlarge the figuring capacity of looms, and enable the production of more difficult and complex patterns than can now be produced in looms having only adjacent heddle-frames.

Figure 1 is a front view of a loom provided with my improvement, the breast-beam, lay, and other parts being omitted to clearly show the construction and position of the harness-frames. Fig. 2 is a top view. Fig. 3 is an end view. Fig. 4 is a detail view of the jacks and levers for moving the harness or heddle-frames. Fig. 5 shows details of cording for each heddle-frame; and Fig. 6 shows section through exterior and interior heddle-frames.

The frame of the loom is designated by the letter *a*. It may be of any well-known construction, and in connection with the frame is employed a lay operated by the crank-shaft *b*. The crank-shaft *b* is, by link *c*, connected with an arm, *d*, of a rock-shaft, *e*, having a double set of arms, provided with pins to enter slots in lifter and depresser carrying arms *f g*, which carry the lifter, depresser, and evener bars *h i j*, which engage the notches of the hooked jacks *k*, the jacks being selected by the action of the pins or protuberances of the pattern-cylinder *l*, or chain or other pattern-surface of ordinary construction. The hooked jacks in this instance of my invention are connected with projections *m* of the vertical side levers *n n'*, having their fulcrum at *o*, and provided at bottom and top with cording-notches *p*, to adjust the point of attachment of the heddle-frame cordings to separate the warps to form an even shed.

Instead of connecting the hooked jacks to vertical levers, as shown, they may be connected, as seen in United States patents Nos. 137,898 or 51,928 or 9,377, and the hooked jacks be changed in shape to correspond with such patents.

The interior heddle frames or carriers *q*, of any desired number, preferably under twenty-four, are arranged in a series. Each frame is preferably made with top and bottom rails and side pieces 1 2, and carries heddle-bars *r r*, for receiving the end loops of the heddles *s*; and the frames are, by links *t*, connected at bottom and top with cords *u u'*, passing over pulleys *w*. A wire connection, *x*, leads from cords *u'* to alternate jacks *n*, and wires *x'*, connected with cords *u*, hook into eyes *y* of wires *x*, and in this way both ends of the interior series of heddle-frames are raised and lowered together. The upper and lower parts *a' b'* of the two-part heddle frames or carriers have heddle-bars *c'* to support the ends of the heddles *d'*, which are made long enough to extend from one to the other bar, and the rails and bars of these parts *a' b'* and the rails of the interior frames are sufficiently distant from each other to permit them in all their extreme

movements to avoid touching each other. The heddle-eyes of the exterior and interior frames are, when the upright levers are evened by the evener *j* and the evening side of lifter *h*, in substantially the same line, and the warp-threads, when drawn through said eyes, are in a horizontal plane. The parts *a' b'* are connected at bottom and top with cords *e'*, passing over pulleys *f'*, and connected, by wire links or otherwise, with the alternate levers *n'*, so that each lever *n* raises and lowers the interior and the levers *n'* the exterior heddle-frames. These pulleys, instead of being stationary, as shown, may be adjustable, as shown in United States patent No. 59,972.

The exterior two-part frame might be made with connected side pieces connected together and projecting outside of the side pieces 2 of the interior frames. There are at top and at bottom three pulleys for each pair of interior and exterior frames, and they are placed in line with each other. Under my arrangement two frames occupy substantially the space heretofore occupied by one frame. Should it be desired to throw the exterior frames out of action, or any number of them, it is only necessary to disconnect them from the levers, and the loom will then operate substantially as does the loom described in United States patent No. 140,894. Alternate rows of pins on the pattern-cylinder or chain control the hooked jacks of the alternate levers *n n'*.

I denominate each exterior and interior heddle-frame as a duplex heddle-frame, and these interior and exterior frames and heddles are arranged one back of the other in a series.

The pattern-cylinder is operated from link *g'*, through a pawl and ratchet.

Instead of employing the series of upright levers, it is evident I might employ without departing from this invention, notched jacks, as shown in United States patent No. 141,768, such jacks being moved by means of lifter and depresser bars, and connected, as above described, by cording with the exterior and interior harness-frames; or I may employ any other well-known forms of notched jacks capable of being attached by cording, or by levers to the exterior and interior harness-frames.

My invention is not confined to the specific means shown and described for imparting motion to the exterior and interior heddle-frames, the gist of my invention being the employment, in fancy looms, as hereinbefore described, of a series of exterior and interior heddle-carrying frames, and also of such frames controlled in their movements by lifters and depressers and pattern mechanism; and especially the combinations of two series of heddles, here shown of different lengths, the longer ones in the exterior frames passing between the interior frames containing the shorter heddles, so that the space (ordinarily vacant) between the parallel rows of the interior frames is occupied by heddles proceeding from and sustained by exterior heddle-frames. The increase of parallel rows of heddles being obtained by utilizing this vacant space, and practically making a twofold increase of the harness or heddle figuring capacity of fancy looms, and thereby bringing them one step nearer to the extensive designing facilities of the jacquard-loom.

However mounted, whether with wire, tin, or cord and mail heddles, I maintain the principle of my invention to be, first, in two series of harness frames or carriers, on which are mounted two series of heddles, one series of heddles being the first and third harness, and so on, and the other series being the second and fourth, and so on, respectively, to the rear row of heddles, the heddles of one set passing between the rails of the other set, and also the employment of lifting and depressing and pattern mechanism, as usually employed in fancy looms, to give movement to exterior and interior harness or heddle frames, and their respective heddles.

I claim—

1. In a fancy loom, a series of exterior and interior heddle-frames, the interior frames being arranged in the same, or nearly the same, vertical planes as the exterior, and provided with heddles, and adapted to operate the warp, substantially as set forth.

2. The combination of a series of exterior and interior heddle-frames and heddles with pattern mechanism, elevators and depressers, and notched jacks, placed in position by the pattern mechanism, and adapted to operate exterior and interior heddle-frames, substantially as described.

3. The vertical levers, connected alternately with and combined with the series of exterior and interior heddle-frames, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. CROMPTON.

Witnesses:

J. A. WARE,

J. B. SYME.