

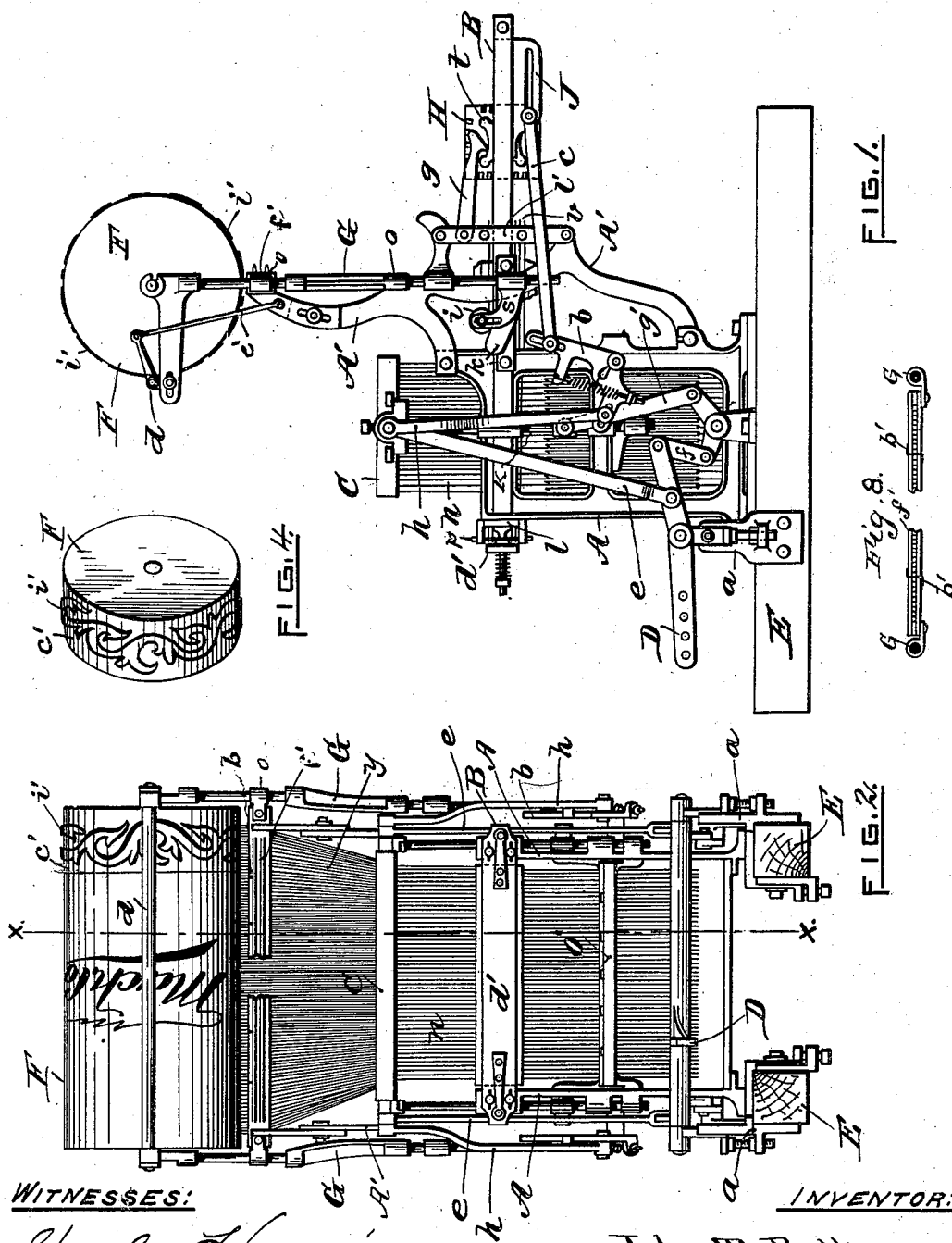
(No Model.)

3 Sheets—Sheet 1.

J. T. BOLTON.
HARNESS MOTION FOR LOOMS.

No. 556,455.

Patented Mar. 17, 1896.



WITNESSES:

Charles Hannigan
E. B. Read

INVENTOR:

John T. Bolton
By Benj Arnold
Atty.

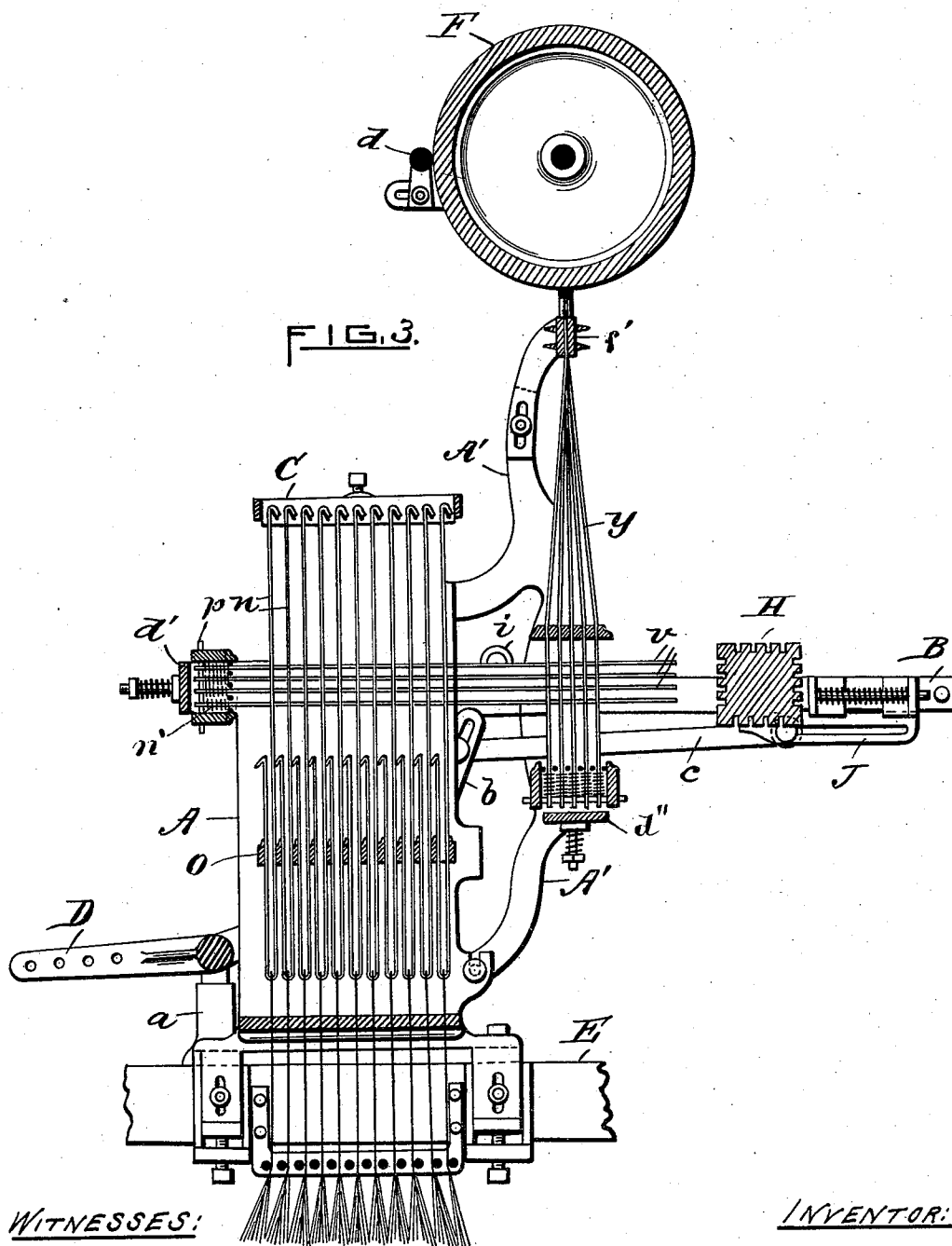
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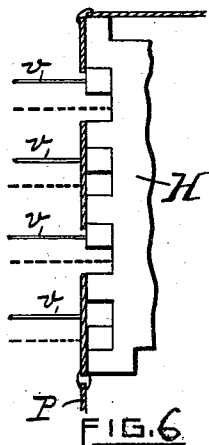
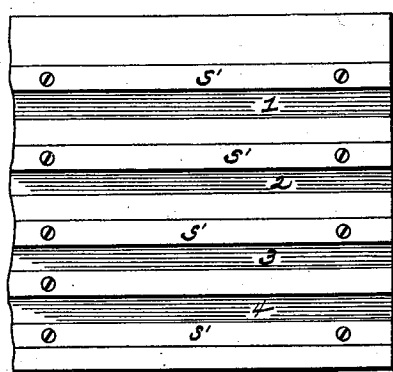
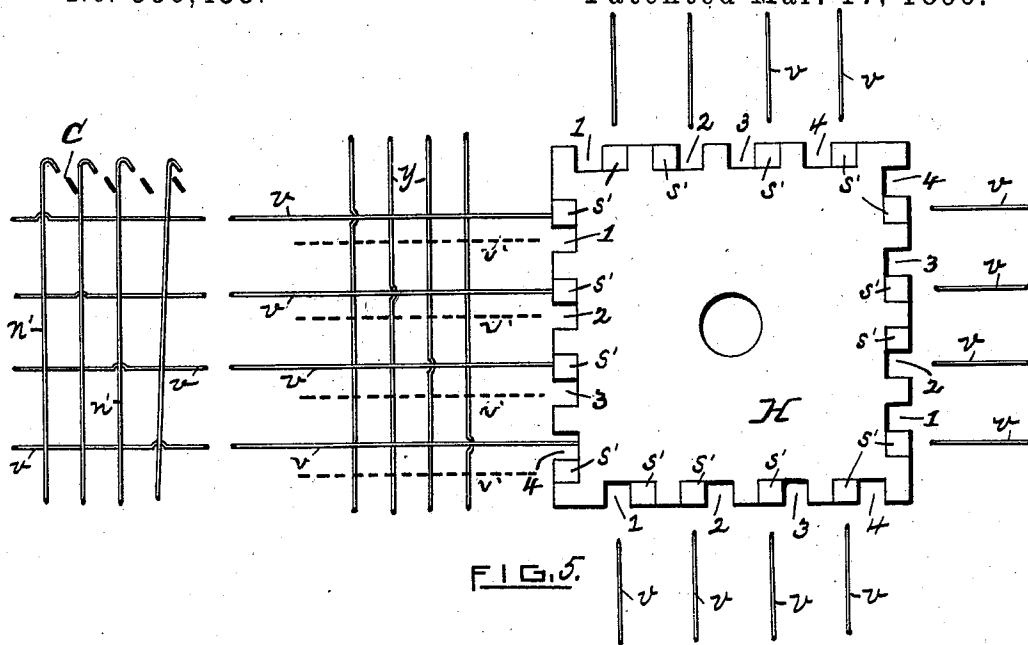
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UNITED STATES PATENT OFFICE.

JOHN T. BOLTON, OF FALL RIVER, MASSACHUSETTS, ASSIGNOR OF ONE-THIRD TO GEORGE GRIME, OF SAME PLACE.

HARNESS-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 556,455, dated March 17, 1896.

Application filed February 28, 1895. Serial No. 539,978. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. BOLTON, of Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Harness-Motions for Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of looms intended for weaving figured fabrics, and comprises an auxiliary mechanism for producing variations in the regular pattern made either by jacquard or by a pattern-block used to select the harness-wires to be operated, or by both jacquard and block combined.

It is fully explained and illustrated in the accompanying specification and drawings.

Figure 1 represents a front elevation of the mechanism that controls the warp-threads of the loom. Fig. 2 shows an elevation of the end to the left in Fig. 1. Fig. 3 is a vertical section of the mechanism shown in Fig. 1, taken on the line *xx* in Fig. 2. Fig. 4 is a perspective view of a section of the pattern-cylinder. Figs. 5 and 6 are diagrams showing the different positions of the needles and pattern-block. Fig. 7 is a face view of a portion of the pattern-block. Fig. 8 is a top view of the bar that holds the upper ends of the needles.

The object of this invention is to produce when weaving a regular pattern an independent figure thereon by the reversal of the movement from front to back and from back to front of certain of the warp-threads, either in the figure or ground of the regular pattern, by means of a pattern-cylinder to select these threads.

In Fig. 1 a front elevation of the mechanism is shown, and the framework and other parts on the opposite side are the same in every respect, excepting the pawl *g* and the ratchet-motion *d*, which are used only on the front. The frames *A* contain the upper and lower griffs, *C* and *O*, with the harness-wires *n*, and other devices which are constructed and operated as shown and described in the United States Patent No. 420,119. The combination is known as the "Stafford motion."

Auxiliary frames *A'* are secured to the frames *A* at the top and bottom of the latter, and are extended up to support the sliding rods *G*, which have bearings in their upper ends to receive the journals of the cylinder *F*. The guides that the rods *G* slide in are attached to the frames *A'* at *o o*, and the rods are moved up with the cylinder by means of arms *s*, secured to the rods by set-screws fast on the rods *G*. These arms *s* carry friction-rolls *i* near their outer ends that ride on adjustable inclines *k*, attached to the horizontal sliding bars *B*. The horizontal bars *B* slide in brackets *l l'*, attached to the frame *A* and auxiliary frame *A'*.

A block *H*, represented as having four sides, but which may have more or less, is held between the bars *B* on pivots in bearings attached to the inner sides of those bars. A pawl *g* is held on a pivot in the frame *A'*, and its free end rests on a casting on the front end of the block. This casting has as many prongs *t* as the block has sides, and the hook end of the pawl catches over one of these prongs when the block slides in, and as the block moves back from the frame causes it to turn over and present another side to the needles *v* when it comes forward again.

A series of horizontal needles *v* that control the harness-wires *n* are held at their left ends by vertical pins *p*, passing through loops made in the ends of the needles, and spiral springs *n'* are placed one on each needle to press it toward the block *H* and the harness-wire connected to it toward the griff-bar that raises it. A board *d'*, held adjustably on the bars *B* by means of screw-nuts on the bars on both sides of the board, makes sure that the needles are all in when the bar moves against them. The other ends of the needles *v* are held free to be moved up or down by the vertical needles *y*, which pass down between the needles *v*, and each needle *y* forms a connection with a needle *v* in the same way as a needle *v* makes a connection with a harness-wire *n*. (See Fig. 5.) The lower ends of the needles *y* are held in like manner to the needles *v* by pins passing through loops in their lower ends and springs to press these needles up, with a board *d''* attached at each end to the rods *G* to make sure that they rise

when the rods do, as before described in the case of the needles *v*. The upper ends of the needles *y* are all brought into a single flat row lying close together to occupy as little room as possible, as described in my United States Patent No. 536,010, and are movably held between two flat bars *f'*. The upper portion of the needles *y* are made flat side-wise to get a larger number of them to lie side by side in a given space. The bars *f'* are supported at their ends by the frames *A'*, and besides being bolted together at their ends have slots sawed down at intervals in their upper edges to receive thin pieces of sheet metal *b'*, that pass between the needles *y* and are headed over at each end to prevent the bars *f'* from spreading apart and allowing the needles to get out of alignment.

The cylinder *F* has a raised pattern of the independent figure made on its surface, as described in my patent before referred to, No. 536,010. It receives the necessary step-by-step motion from a ratchet device *d*, held on an arm at the upper end of the rod *G*. The arm of the ratchet is connected by a bar *e'* to the frame *A'*, and at every rise of the rod and cylinder the latter will be moved around a little to gradually present the pattern on the cylinder to the needles *y*. The cylinder *F* may be made in sections *c'*, one of which is shown in Fig. 4, that border figures may be changed and different combinations produced.

The faces of the pattern-block *H* have grooves or recesses 1 2 3 4 made in them, as shown in Fig. 5. For a weave of three threads up and one thread down, and vice versa, pieces *s' s'* are secured with screws or otherwise in the grooves. These pieces *s'* occupy about one-half the width of the grooves, and by putting them in the grooves 1, 2 and 3, close to the upper sides of the grooves, and in groove 4, close to the lower side, as in the face of the block toward the needles *v* in Fig. 5, three of the four needles *v* shown will be struck by the pieces *s'* when the block *H* is moved toward them and will push those three needles and the harness-wires *n'* controlled by them to the left, so that when the griff *C* rises it will not catch in the hooks of those wires and they will remain down; but the piece *s'* in the groove 4 is placed at the lower side of that groove, and consequently the lowest needle *v* will enter that groove and will not be pushed back, and the hook of the harness-wire controlled by it will be caught by the griff-bar when it rises and will be raised with the thread of the warp attached to it. This will make one thread up and three threads down.

It will be seen that when the needles *y* are pushed down by the raised pattern *i'* on the cylinder *F* the needles *v* controlled by them will be lowered to the position indicated by the dotted lines *v'* in Fig. 5 and the needles opposite the grooves 1, 2 and 3 will enter

those grooves below the strips *s'*; but the needle *v* of groove 4 (see Fig. 5) will be struck by the piece *s'* in the lower side of that groove and will be pushed back and its warp-thread left down, while the warp-threads of the other three needles *v* will be raised, just the reverse of the effect of the former move—that is, three up and one down. The effect may be varied by having a different number of recesses in the block *H*, and by a different arrangement of the strips *s'* in those recesses, still making use of this method of producing the reversal, to which the independent figure is due.

By using the pattern-block in the shape as just described, with the strips *s'* in the recesses and running a set of Jacquard cards with it, as seen in Fig. 6, in which *P* indicates the cards, the ground of one up and three down may be woven, and also a figure produced by the Jacquard cards, and any figure that is raised on the pattern-cylinder may be produced on the regular ground and a figure produced by the cards and pattern-block by reversing the raising and leaving down of the warp-threads—that is, a complete reversal of the ground-weave can be made; but in the Jacquard figure those warp-threads that would have stayed down can be reversed and brought up. Those that are prevented from rising because there is no hole in the card to allow the needle *v* to enter will stay down and appear as "floats" on the under side of the cloth. This arrangement makes it possible to weave several kinds of goods on the one loom, as the pattern-block can be used, as shown in Fig. 5, with or without the pattern-cylinder, or, as in Fig. 6, combined with Jacquard cards.

In Fig. 4 the needles on the four sides of the block show the relative positions of the block and needles as the block turns and presents each face to the needles *v* of Fig. 5.

Having thus described the construction and operation of my improvements, what I claim as my invention is—

In a loom harness-motion, the following instrumentalities: in combination with a series of harness-wires and a griff to move them, a recessed pattern-block to select said harness-wires to be moved, strips to insert in the recesses of the pattern-block, to modify their action, a series of needles connected with the harness-wires and moved by said pattern-block, an auxiliary pattern-cylinder having a raised pattern thereon of the figure to be woven, a series of needles operated by the pattern-cylinder, and having their outer ends arranged in a single row to be operated by the pattern on the auxiliary cylinder, with means for moving said griff, pattern-block, and cylinder, substantially as described.

JOHN T. BOLTON.

Witnesses:

BENJ. ARNOLD,
JAMES E. ARNOLD.