

No. 731,532.

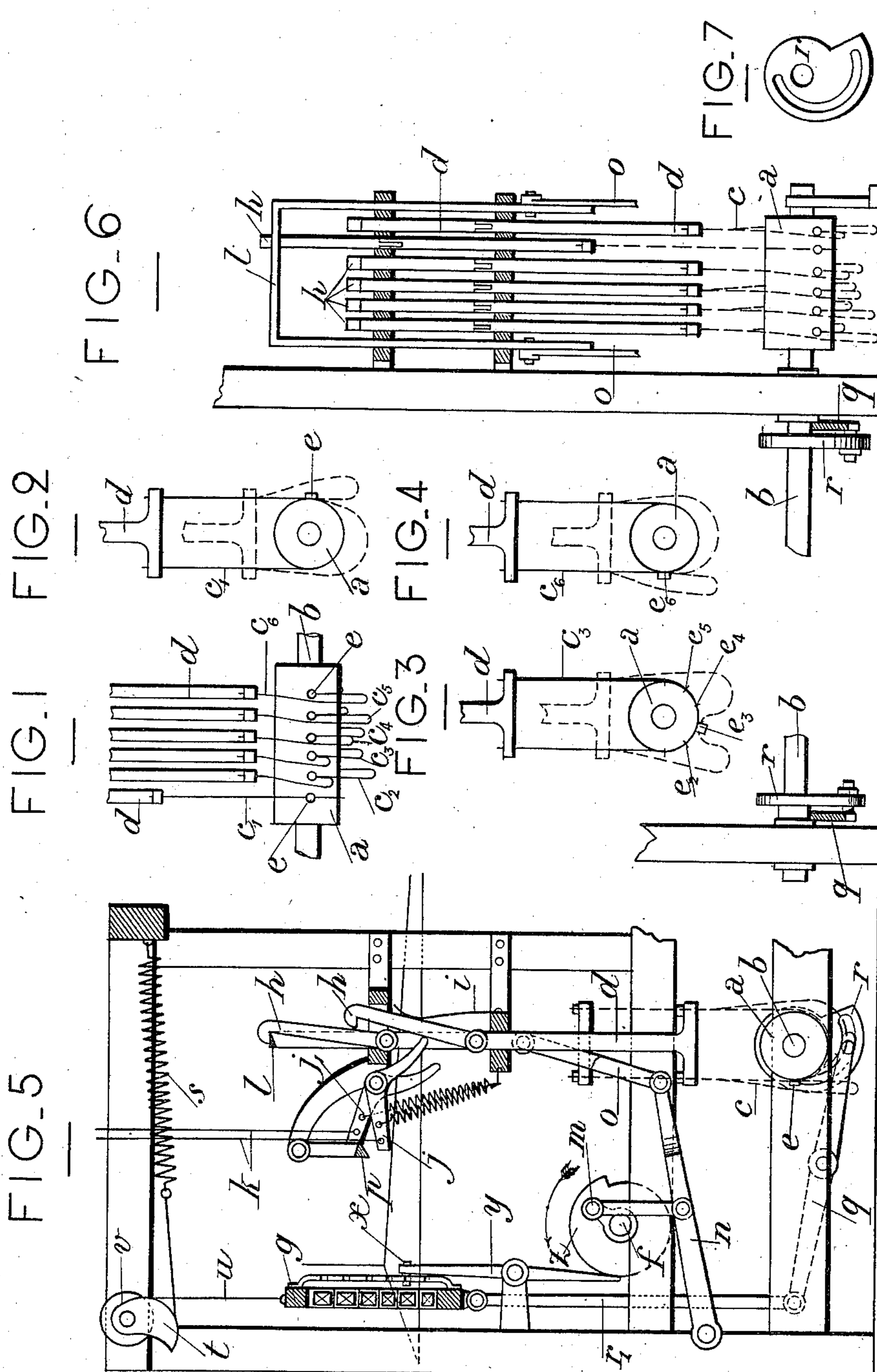
PATENTED JUNE 23, 1903.

A. BARBIER.

SHUTTLE BOX OPERATING MECHANISM FOR LOOMS.

APPLICATION FILED FEB. 26, 1901.

NO MODEL.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

ALEXANDRE BARBIER, OF LYONS, FRANCE.

## SHUTTLE-BOX-OPERATING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 731,532, dated June 23, 1903.

Application filed February 26, 1901. Serial No. 48,950. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDRE BARBIER, a citizen of France, and a resident of Lyons, France, have invented certain new and useful Improvements in Shuttle-Box-Operating Mechanism for Looms, of which the following is a full, clear, and exact description, and for which applications for patents have been made in France on the 30th day of January, 1901, and in Great Britain on the 5th day of February, 1901.

The mechanism forming the subject of the present invention has for its object the changing of shuttles in all kinds of looms for weaving provided with a number of shuttles. This mechanism is characterized by its simplicity and certain action whatever may be the number of shuttles. It requires only a small amount of power, and its operation involves no diminution of speed of the loom.

I will describe the invention by the aid of the accompanying drawings, in which—

Figure 1 is a side view, and Figs. 2, 3, 4 are end views, of the principal operative part, showing the mode of operation of the same. Fig. 5 is a longitudinal section of the mechanism. Fig. 6 is a cross-section of the same, and Fig. 7 is a separate view of one of the cams.

The principal part of the new mechanism is a cylinder *a*, Figs. 1, 2, 3, 4, mounted on a horizontal shaft *b* and operated by a series of chains *c'* *c*<sup>2</sup>, and so on, according to the number of the shuttles. In the drawings six shuttles are represented, but their number may be varied. The chains *c'* *c*<sup>2</sup>, &c., of equal length are attached by their two ends to rods *d* *d*, sliding vertically above the cylinder *a*. They pass around the cylinder and are fixed to it at points *e* *e* on a line parallel with the shaft *b*, but at points in the length of each chain. The stroke of the sliding rods *d* *d* is such that when either of these rods is at the top of its stroke its corresponding chain is fully extended. (See Figs. 2, 3, 4.) The position of the cylinder *a* varies according to the point at which the chain is fixed thereto. Thus the first chain *c'* will bring the line of the cylinder on which the points *e* are arranged to the position *e*. (Indicated at Fig. 2.) The last chain *c*<sup>6</sup> will bring this line to the point *e*<sup>6</sup> to the opposite position,

(see Fig. 4,) and the intermediate chains *c*<sup>2</sup> *c*<sup>3</sup> *c*<sup>4</sup> *c*<sup>5</sup> will bring said line to one or other of the positions *e*<sup>2</sup> *e*<sup>3</sup> *e*<sup>4</sup> *e*<sup>5</sup>, Fig. 3. When the rods *d* are at the bottom of their stroke, the chains *c'* *c*<sup>2</sup>, &c., are slackened sufficiently, as indicated by the dotted lines in Figs. 2, 3, 4 to allow the cylinder *a* to rotate to either of its positions. It will thus be understood that when the rods *d* are at the bottom of their stroke and the cylinder *a* in any position the latter can be brought to any other given position by raising the rod *d*, the chain of which corresponds to such position.

I will now explain how the raising of the rods *d* is effected by jacquard mechanism and how the movements of the cylinder *a* are transmitted to the shuttle-boxes in such manner as to bring to the level of the shed the shuttle required by the design.

In Figs. 5 and 6, *f* represents the driving-shaft of a loom of any known kind, *g* the shuttle-boxes, which slide vertically either on the batten or lathe or on a special framing. The cylinder *a*, to which the chains are fixed as above explained, is carried outside the loom by the cross-shaft *b*, above which slide the rods *d*, to which the chains *c'*, *c*<sup>2</sup>, &c., are attached. To each of these rods *d* is jointed a hook *h*, which is pushed forward by a spring *i* and held backward by a crank-lever *j*, one arm of which is connected by a cord *k* to one of the jacquard-needles. In front of the hooks *h* is arranged a griff *l*, which receives a vertical reciprocating motion by means of a crank *m*, lever *n*, and connecting-rods *o*. This griff usually passes in front of the hooks *h* without touching them; but when the jacquard acts upon one of the cords *k* to raise one of the levers *j* the corresponding hook pushed forward by its spring *i* comes into position to be acted upon by the griff *l*, which in its rising motion carries the hook with it. The hook in rising raises the corresponding rod *d* and chain *c* and causes the cylinder *a* to take one of the positions above indicated with respect to Figs. 2, 3, and 4. The lever *j*, which has been raised to the position *j'*, is caught by a swinging piece *p*, which holds it in this position until the jacquard raises another of the levers *j*. This latter in hooking onto the swing-piece *p* first pushes the latter back and allows the preced-

ing lever *j* to fall, which immediately pushes back its hook. There is, therefore, never more than one hook in position to be taken by the griff *l*. On the shaft *b*, which carries the cylinder *a*, are mounted two cams *rr*, provided with a spiral groove, the form of which is shown at Fig. 7. These cams each operate a two-armed lever *q*, one of which arms carries a pin which engages in the cam-groove, while the other is connected by the connecting-rod *r'* to the shuttle-boxes *g*. The angular motions of the cylinder *a* are thus transformed into vertical motions of the shuttle-boxes. It will thus be seen that the jacquard by raising one of the cords *k* permits one of the hooks *h* to come into position to be taken by the griff *l*. This hook in rising gives to the cylinder *a* a certain position, which in its turn gives a corresponding position to the shuttle-boxes and places in work a shuttle the row of which depends on that of the cord raised.

The weight of the shuttle-boxes *g* is counterbalanced by a spring *s*, attached to a cord wound on a spiral curve *t* in order to compensate the increasing tension of the spring. The boxes *g* are suspended by a second cord *u*, wound upon a concentric curve *v*. The weight of the boxes is thus exactly equilibrated in all its positions, and the mechanism has no more work to do than to overcome friction.

While no force tends to move the boxes *g* when they have been placed in position, it is prudent to insure their exact position, at least during the passage of the shuttle. With this view each box carries a vertical row of holes, into which enters a pin *x*, carried by a lever *y*, operated by a cam *z*. The pin *x* enters the hole of the box when the position of

the latter is fixed by the tension of one of the chains *c*, and it is withdrawn from said hole at the moment when the griff *l*, being at the bottom of its stroke, can be moved to work.

The arrangements of detail above described will necessarily vary according to the kind of loom to which the mechanism is applied.

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

1. In a loom, the herein-described means for changing shuttles comprising a cylinder, a plurality of chains of varying length connected to said cylinder and partially encircling the same, a plurality of hooks attached to the chains, a vertically-reciprocating griff for acting upon said hooks, and means for transmitting to the shuttle-boxes the movements of the cylinder, said means comprising a cam oscillated by the motion of the cylinder, a rocking lever operated by the movement of said cam, and a rod connecting said lever with the shuttle-boxes, substantially as described.

2. In combination, the vertically-moving griffs, a cylinder having connections whereby the vertical movement of the griffs oscillates said cylinder in varying degrees, a cam operatively connected to said cylinder, a two-armed lever having one arm in engagement with said cam, vertically-movable shuttle-boxes, and a rod connecting the opposite arm of said lever with said shuttle-boxes, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ALEXANDRE BARBIER.

Witnesses:

GASTON JEANNIAUX,  
THOS. N. BROWNE.