J. SCHRACK.

Shuttle-Box Mechanisms.

No. 142,736. Patented September 9, 1873.

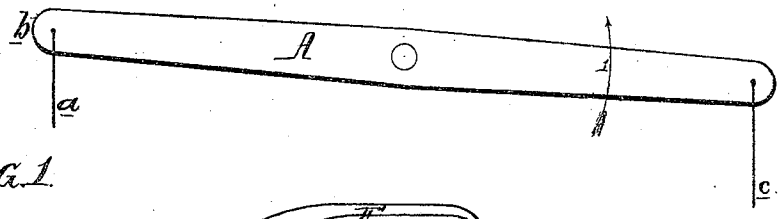


FIG. 1.

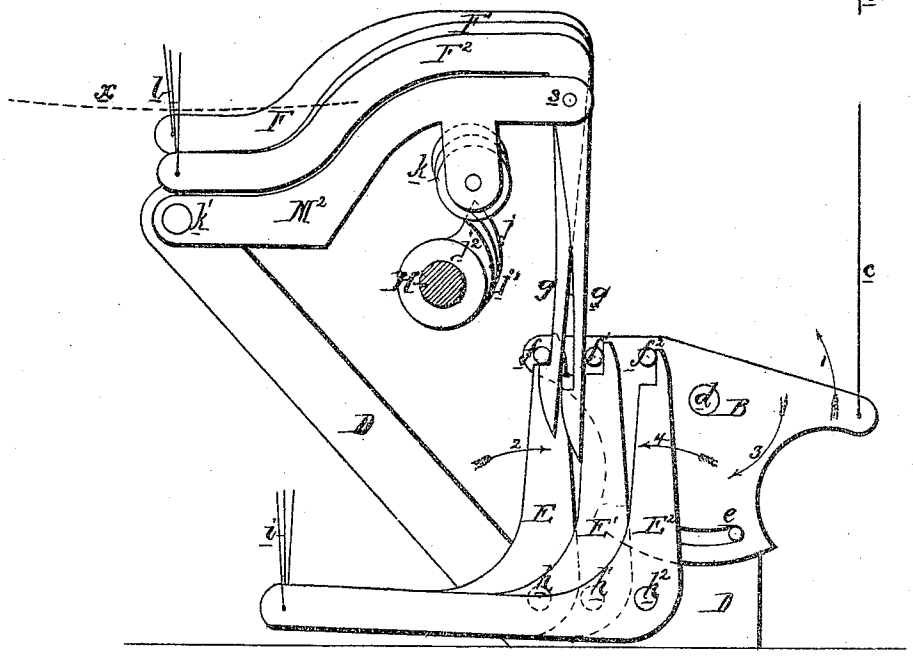


FIG. 2.

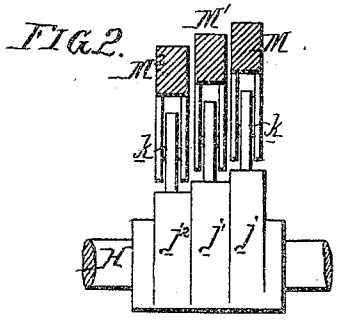
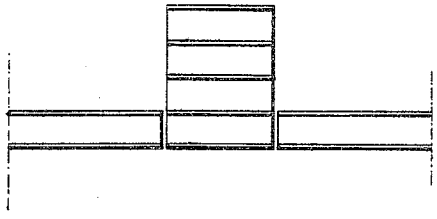


FIG. 3.



John Schrack
by his Attys.
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AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS)

UNITED STATES PATENT OFFICE.

JOHN SCHRACK, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SHUTTLE-BOX MECHANISMS.

Specification forming part of Letters Patent No. 142,736, dated September 9, 1873; application filed June 12, 1873.

To all whom it may concern:

Be it known that I, JOHN SCHRACK, of the city and county of Philadelphia, State of Pennsylvania, have invented Mechanism for Adjusting the Shuttles of Looms, of which the following is a specification:

My invention relates to an improvement in the class of looms commonly used for weaving narrow fabrics, such as suspenders and ribbons, in which the lay carries a number of shuttles arranged in a row for weaving a number of strips of fabric simultaneously, and in which, when several colors are to be used, it is also customary to employ two or more rows of shuttles capable of being raised and lowered on the lay in order to bring any of them opposite the race. The object of my invention is to automatically control these shuttles, when two or more rows are used, by means of jacquard apparatus; and I attain this object through the medium of the combination of devices illustrated in the side elevation, Figure 1, and transverse section, Fig. 2, of the accompanying drawing, which I will now proceed to describe.

The devices, as illustrated in the drawing, are arranged to control and adjust four rows of shuttles, for which three steps or movements are required to change from the lowest to the highest box, or vice versa. (See Fig. 3.) The lay swings from above on a long radius, and occupies about the position indicated by the curved dotted line *x*, and the shuttle-boxes carried by the same are suspended by cords *a* from a lever, A, which should be at least as high up on the loom as the pivoting-point of the lay, with which the extremity *b* of the said lever should nearly coincide, so that the vertical positions of the shuttle-boxes, in respect to the race, may not be affected by their curvilinear movement. The lever A is connected at the extremity of its rear arm by a cord, *c*, to a plate-lever, B, pivoted to the fixed frame D of the loom at *d*, limited in its movements by a pin and slot, *e*, and having three pins, *f*, f^1, and f^2, which project over the notched ends of three bell-crank levers, E, E^1, and E^2, and into the path of the hooked arms *g* of three additional bell-crank levers, F, F^1, and F^2. The bell-crank levers E have separate fulcrums *h*, h^1, and h^2 upon the fixed frame of the loom, are connected at the extremities of their long arms by cords *i* to jacquard apparatus above, and have notched short arms of different lengths projecting upward into the paths of the pins *f*, f^1, and f^2 of the lever B. The weight of the shuttle-boxes on the lay has a constant tendency to turn the levers A and B upon their fulcrums in the direction of the arrows 1, and to consequently lower the pins *f* onto the notched ends of the levers E, the latter, when struck by the pins, arresting the movement of the same, and of the levers A and B, and therefore sustaining the weight of the shuttle-boxes. When the pin *f* rests upon the lever E, as shown in Fig. 1, the front end of the lever A is raised to its full extent, and the lowest boxes and shuttles are opposite the race, as indicated in the diagram, Fig. 3. If the lever E be turned back from the pin by means of the jacquard apparatus, as indicated by the arrow 2, the shuttle-boxes will drop by their own weight, turning the levers A and B in the direction of the arrows 1 until the pin f^1 strikes and rests upon the lever E^1 and the second box is opposite the race, and in like manner the pin f^2 and lever E^2 will sustain the levers B and A in proper position for retaining the third or next to the highest shuttle opposite the race, the highest shuttle being brought into working position by allowing the levers A and B to drop to the full extent permitted by the slot and stop-pin *e*.

It is not necessary that these movements should be step by step, as above described, as any of the boxes may be skipped, and by drawing the whole of the levers E simultaneously back from the pins *f*, by means of the jacquard apparatus, when the parts are in the position shown in Fig. 1, the boxes may be dropped bodily from the lowest to the highest shuttle by one movement.

The mechanism for raising the shuttles is somewhat more complicated, and is as follows: Upon the cam-shaft or bridle-shaft H of the loom (see Figs. 1 and 2) are three cams, *j*, j^1, and j^2, of different degrees of throw, and upon these cams rest the anti-friction wheels *k* of three curved arms, M, M^1, and M^2, all of which have their fulcrums at a point, *k*, on the fixed frame of the loom, and to the outer extremities of the said arms are hung the three bell-crank

levers F, F^1, and F^2, before referred to as having hooked arms *g* extending downward into the path of the pin *f* of the plate-lever B. The long arms of the levers F correspond in shape with and rest by their own weight upon the upper edges of their respective arms M, and when thus depressed their hooks *g* are drawn back from the pin *f*, so that they can rise and fall with the arms M as the latter are vibrated by the cams without striking the said pin *f*, or causing any movement of the lever B. The said levers F are, however, connected with the jacquard apparatus above by cords *l*, and if any one of the same is elevated, and thus turned upon its fulcrum *s* by the said jacquard apparatus, its hooked arm *g* will be immediately drawn into the path of the pin *f*, so that when elevated by means of its arm M and cam *j*, the said hook *g* will strike and lift the pin *f*, and thus turn the lever B in the direction of the arrow 3 to an extent sufficient to permit one of the bell-crank levers E to fall by its own weight into the path of its proper pin *f*, so as to retain the lever and shuttle-boxes in position to which they have been adjusted by the hooked lever F. The whole of the hooks *g* engage with the single pin *f*, so that the lever B may be turned by the same to the extent required to raise the proper shuttle to a position opposite the race. For instance, supposing the parts were in a position exactly the reverse of that shown in Fig. 1, or, in other words, that the highest instead of the lowest shuttle-box was opposite the race, and that it was desired to bring the next to the highest box opposite the race, the horizontal arm of the lever F^2 would be raised by means of the jacquard apparatus, in order to turn the lever and bring its hook *g*, which is the lowest, into the path of the pin *f*, so that when the said lever F^2 was raised by means of its arm M^2 and cam j^2, the hook *g* should strike and lift the pin *f*, and thus turn the lever B in the direction of the arrow 3, and consequently the lever A also to a sufficient extent to raise the shuttle-boxes, and bring the next to the highest opposite the race. During this movement the lever E^2 would turn by its own weight in the direction of the arrow 4, and thus bring its upper notched end directly beneath the pin f^2 of the lever B, so that when the lever F^2 was released by the jacquard apparatus, and had fallen to its original position on the arm M^2, so as to draw back its hook *g* from the pin *f*, the said lever B would be sustained in the position to which it had been adjusted by the lever E^2 and pin f^2. In like manner the levers F^1 and E^1 would be brought into play to bring the second from the highest boxes into line with the race in raising the said boxes, and the levers F and E, in raising the boxes sufficiently to bring the lowest shuttle into line.

The principal advantages possessed by my invention are that the whole of the changes in the position of the shuttles are effected automatically by means of the jacquard apparatus, and that any required changes can be made without loss of time, as any of the boxes can be skipped, as desired.

The devices described may be duplicated at the opposite ends of the lay, and be arranged to operate simultaneously; but when the lay is short, the said devices arranged at one end of the same only will be found sufficient.

My invention, it will be evident, can be applied to ordinary drop-box looms, as well as to those of the character described.

I claim as my invention—

1. The combination, substantially as described, of the lever A, from which the drop-boxes are suspended, the lever B, its pins *f*, and the series of levers E, controlled by jacquard apparatus.

2. The combination of the two series of levers E and F, controlled by jacquard apparatus, with the lever B and its pins.

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

JOHN SCHRACK.

Witnesses:
WM. A. STEEL,
HUBERT HOWSON.