

(No Model.)

2 Sheets—Sheet 1.

J. O. FRYER.

LOOM FOR WEAVING NARROW FABRICS.

No. 523,114.

Patented July 17, 1894.

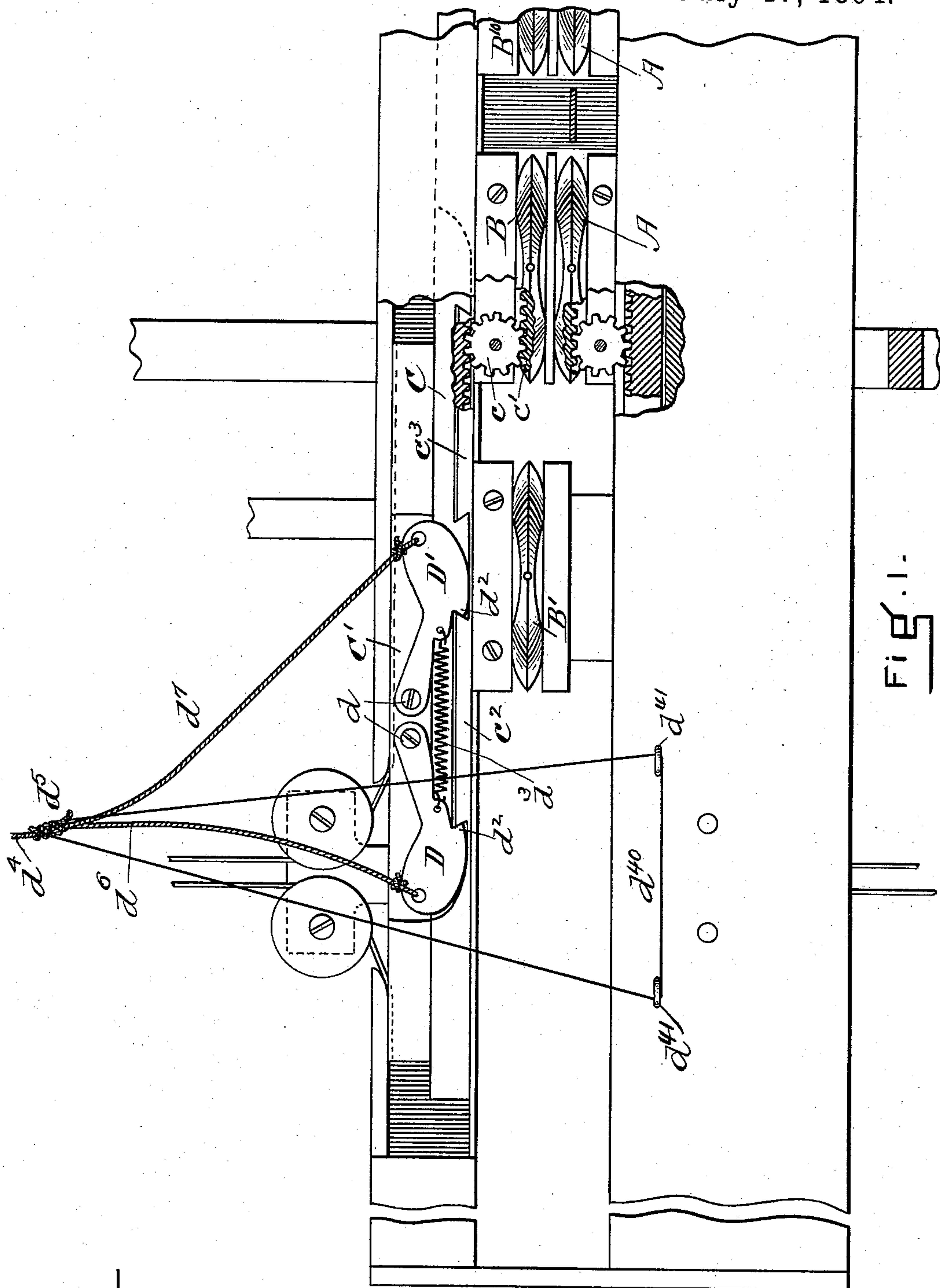


FIG. 1.

WITNESSES  
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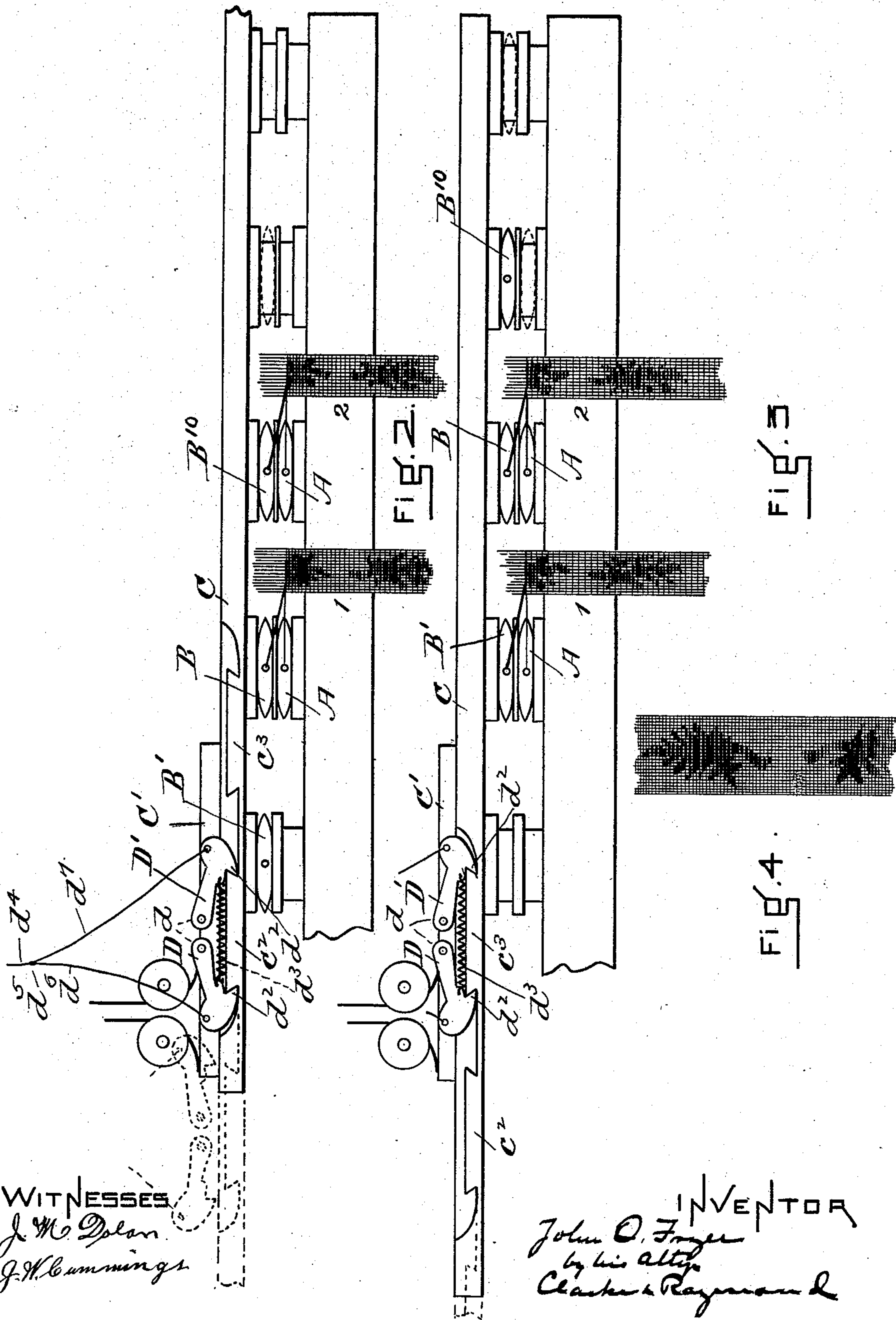
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# UNITED STATES PATENT OFFICE.

JOHN O. FRYER, OF CHELSEA, MASSACHUSETTS.

## LOOM FOR WEAVING NARROW FABRICS.

SPECIFICATION forming part of Letters Patent No. 523,114, dated July 17, 1894.

Application filed December 11, 1893. Serial No. 493,378. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN O. FRYER, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Looms for Weaving Narrow Fabrics, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining the same.

The invention is an improvement upon that described in my Reissued Letters Patent No. 10,379, dated September 11, 1883. In said patent there is described mechanism for working patterns or figures of silk or other material in the face of a fabric while it is being woven and without stopping the weaving of the fabric itself while such pattern is being introduced. This mechanism comprised means for forming alternately a double shed and a single shed, and for throwing the lower or fabric making shuttle at every pick of the loom, and the upper or pattern forming shuttle at every other pick of the loom.

My present invention has to do with the movements of the upper shuttles or those shuttles which weave a pattern or figure in the fabric.

With the organization of said patented machine it is not possible to vary the color of the successive figures or patterns of the fabric, except by feeding with the upper shuttle a thread having sections of different colors. While this will permit a variation in color in a figure or in a succession of figures, it cannot be successfully used for making regular figures or patterns, the colors of which are successively changed. It is of consequence to alternate the colors of the patterns or figures with regularity and precision, and in looms for weaving a single fabric this result is obtained by using two shuttles, each carrying different colored threads and which are alternately used according as it is desired to introduce into the patterns or figure one color or another, and the time of the operation of which shuttles is controlled by the jacquard.

In looms to which I have applied my invention, viz., looms for weaving narrow fabrics, the invention is carried into effect by employing one more shuttle than there are pieces

being woven, each of which shuttles excepting one at one end or the other, is operative, in weaving a pattern first in a fabric at one side and then in a fabric at the other side according as its location or line of action is shifted, and thereby introduces the color of the thread it carries first into one fabric, and then into the other. The color of the shuttle threads is varied as may be required. Upon a change in the color of a pattern due to the transfer of the shuttles, a shuttle at one end of the line is thrown out of operation and the shuttle at the other end of the line is thrown into operation.

My invention relates, therefore, to a loom having shuttles so transferred, and in means or devices for varying the time of the transfer to vary the colors of the designs.

Referring to the drawings,—Figure 1 is a view principally in elevation of a portion of a loom having the features of my invention. Fig. 2 is a view also in elevation, but somewhat reduced in size as compared with Fig. 1, showing one position of the shuttles, and their actuating devices. Fig. 3 is a view of the parts of Fig. 2, showing the shuttles as transferred from the position which they occupied therein. Fig. 4 is a view in plan of a piece of figured webbing or fabric.

The lower fabric forming shuttles A are thrown at every pick of the loom as described in my said patent; the upper or figure forming shuttles B between the end shuttles B' B<sup>10</sup> are thrown at every other pick of the loom as described in my said patent, but their line of action or throw is transferred at will from one fabric to another. The end shuttles B' B<sup>10</sup> are alternately used, that is, when one is in operation the other is inactive. These shuttles B, B' B<sup>10</sup>, in action are thrown by mechanism like that described in my said patent, that is by means of a reciprocating or sliding rack C, the pinions c, secured to the batten rails, and the racks c' upon the shuttles, and the reciprocating or sliding rack C has the same extent of movement; there is no provision, however, in my said patented mechanism whereby the position of the sliding rack may be changed in relation to the shuttles and so as to transfer the shuttles from one position to another and at the same time bring into use an inactive shuttle to



take the place of the next one in order which has been moved over, and I accomplish this result by making the sliding rack C in two parts or sections, one of which (the rack proper) is a long bar with rack teeth on its under side, and the other of which a slide C' is at one end of the loom and is reciprocated or moved by the reciprocating devices ordinarily employed in reciprocating the rack bar of my said patent. This slide C' is connected with or is coupled to the rack C by means of a clutch, and in a manner to permit the point of engagement to be varied. To enable this coupling device to be used, one end of the rack C is extended and there is arranged upon it two clutch sections or parts adapted to be alternately engaged or grasped by the clutch member of the slide C'. These parts are lettered  $c^2, c^3$ . They are in the nature of upwardly extending dovetail tongues in that they are undercut at either side, and they are formed in the body of the bar or by means of plates attached to the bar. The clutch member of the slide C', consists of the arms D, D', each pivoted at  $d$  to the slide C' and each having a hook end  $d^2$  which is adapted to simultaneously engage one of the clutch sections  $c^2$  or  $c^3$  of the rack C. A spring  $d^3$  connects the two arms of the clutch and serves to draw the hooks into engagement with the other member of the clutch, and to hold them in such engagement.

The time of the engagement and disengagement of the slide clutch with the rack C is determined by the jacquard, and the slide clutch arms D D' are connected therewith by means of a draw cord or chain  $d^4$  which divides at  $d^5$ , one section  $d^6$  extending to the arm D of the clutch, and the other section  $d^7$  extending to the arm D'. Any form of jacquard may be used for operating this draw cord or chain and I prefer to use the one described in my said patent, and its operation causes the cord  $d^4$  to be drawn sufficiently to lift at the desired time the said arms D, D' of the slide clutch from engagement with the clutch member of the rack, and to hold the said arms disengaged therefrom so long as may be desired. An elastic cord may be employed to keep the cord  $d^4$  under tension so that it will quickly respond when lowered by the jacquard. This elastic cord is indicated in Fig. 1 at  $d^{40}$  and is divided and passes through eyes  $d^{41}$  attached to the lay. Meanwhile the reciprocation of the slide C' carrying the engaging arms D, D' continues, and at the desired interval they are released by the jacquard, and engagement made with the other clutch member of the rack, over which they are brought by the movement of the slide C', and when said engagement is effected the slide moves the sliding rack C the distance between the centers of the two clutch sections  $c^2, c^3$ , and reciprocates the rack in this new position, thereby causing the rack to transfer the shuttles B from operative relation with one set of weaving devices in forming one fabric to operative

relation with the set next adjacent and forming another fabric, and it also brings one of the end shuttles B' B<sup>10</sup> into play and moves the other end shuttle out of play.

In Fig. 3 the clutch arms D, D', are represented in full lines as engaged with the clutch section  $c^3$  of the rack bar C, which is the one that brings into operation and operates the end shuttle B'. In Fig. 2 the clutch arms are shown in engagement with the clutch section  $c^2$  of the rack C, or the one which moves the end shuttle B' out of action and maintains it out of operation while the end shuttle B<sup>10</sup> at the other end of the line which has been inoperative is brought into action.

In Fig. 2 the shuttles B B<sup>10</sup> are represented as weaving patterns in the fabrics 1 and 2 respectively, and in Fig. 3 the shuttles have been transferred to a position which puts the shuttle B in operative relation with the fabric 2 and has thrown out the shuttle B<sup>10</sup> while the shuttle B' at the other end of the line has been transferred from its inoperative position to the position originally occupied by the shuttle B and is put into action on fabric 1.

It will be understood, of course, that the shuttles carry threads of different colors, and that by their transposition the colors of the patterns or figures of each fabric are varied:— for instance, if shuttle B is weaving a figure in blue on fabric 1, its transfer to operative relation with fabric 2 will cause a figure in blue to be woven therein, and if shuttle B' or B<sup>10</sup> carries red thread, it, upon being brought into play will weave a figure in red in fabric 1 which will follow the previously woven figure in blue. This principle of the transfer of the shuttles can be extended by using extra shuttles at each end of the line and which are brought into play successively by the movement of the line of shuttles sufficiently far to permit them to be brought into play; for every one moved into operation from one end of the line, another shuttle at the other end of the line becomes inoperative. The rack bar would of course have an extra clutch engaging section for each additional shuttle.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a loom for weaving a plurality of separate strips of fabric and having the lay provided with a line of shuttle supports, and shuttles, of which the shuttle at one end is inoperative while the others are in action and means for transferring the shuttles whereby the end shuttle previously inactive is brought into operation, and the previously active end shuttle removed from operation, as and for the purposes described.

2. In a loom for weaving a plurality of separate strips of fabric and having the lay provided with a line of shuttle supports and shuttles, their operating rack bar and means for changing the relation of the rack bar in relation to the shuttles at predetermined intervals whereby the bar serves to transfer the



shuttles and operate them in their transferred positions, as and for the purposes described.

3. In a loom for weaving a plurality of separate strips of fabric and having the lay provided with a line of shuttle supports, and shuttles, and their actuating rack bar, a reciprocating rack bar engaging device adapted to engage the bar in two or more positions, and the time of the operation of which is controlled by a jacquard, as and for the purposes described.

4. In a loom for weaving a plurality of separate strips of fabric, a shuttle lay, having a line of shuttle supports numbering one more than the number of strips of fabric to be woven, shuttles, means for operating said shuttles, and means for changing the operative relations of the shuttles from one support to the next.

5. In a loom for weaving a plurality of separate strips of fabric, having the lay provided

with a line of shuttle supports and shuttles numbering one more than the number of strips of fabric to be woven, the reciprocating and transferring rack bar C having the clutch engaging sections  $c^2$ ,  $c^3$ , the reciprocating slide  $C'$ , and the jacquard controlled clutch carried thereby, as and for the purposes described.

6. In a loom for weaving a plurality of separate strips of fabric and having the lay provided with a line of shuttle supports, and shuttles, and their operating rack bar having the engaging sections  $c^2$ ,  $c^3$ , the reciprocating slide  $C'$  having the engaging hooks D,  $D'$ , adapted to engage alternately the sections  $c^2$ ,  $c^3$  of the rack bar, and the hook disengaging line  $d^6$ ,  $d^7$ , as and for the purposes described.

JOHN O. FRYER.

Witnesses:

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J. M. DOLAN.