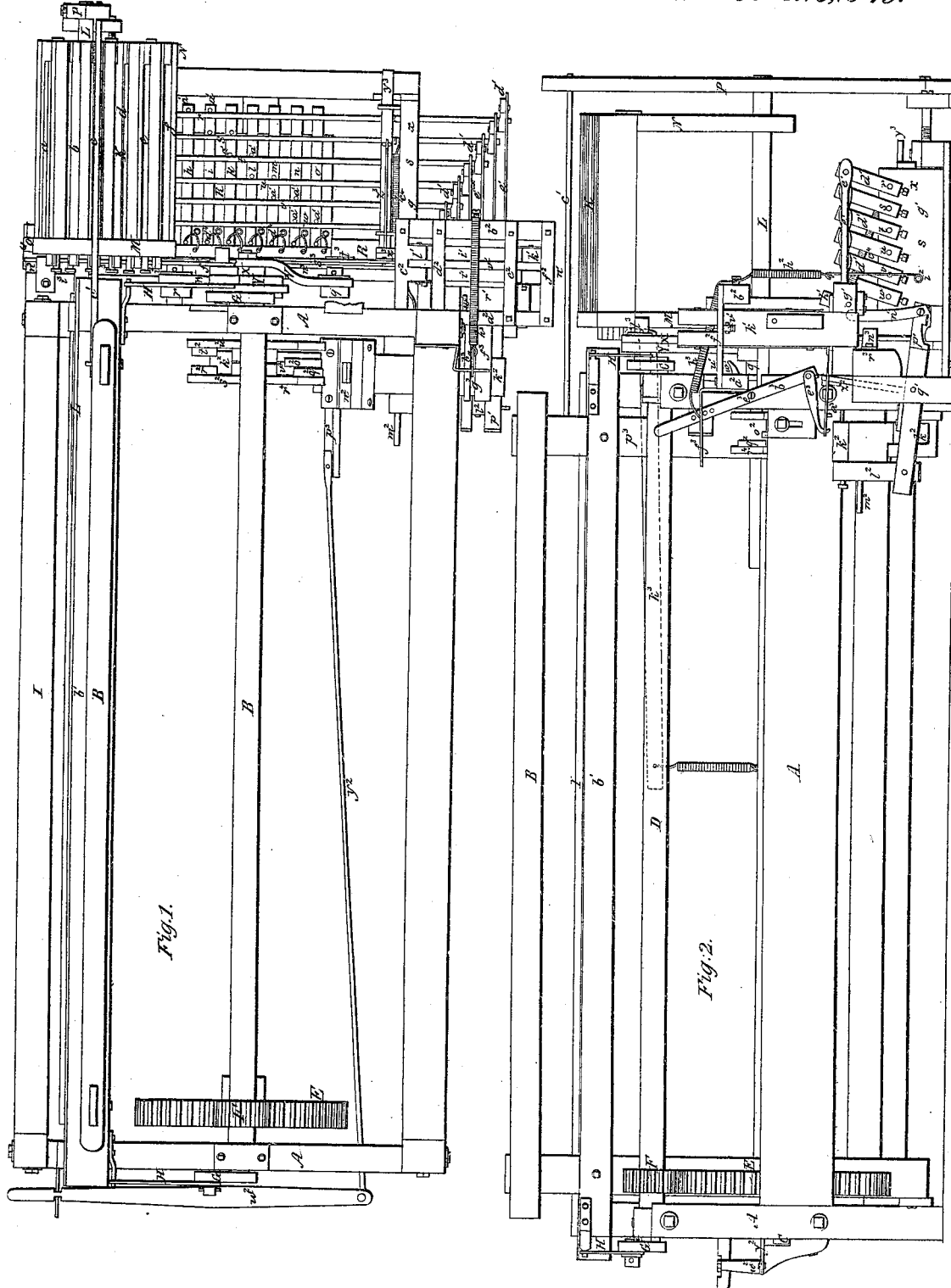


J. Reynolds.
Shuttle Box.

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Fig. 4.

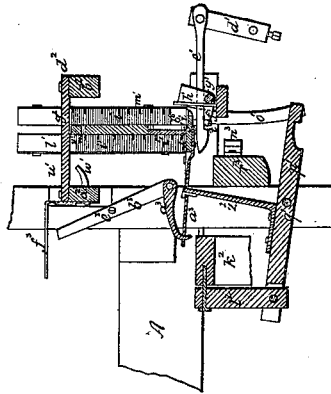


Fig. 8.



Fig. 7.

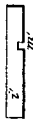


Fig. 9.

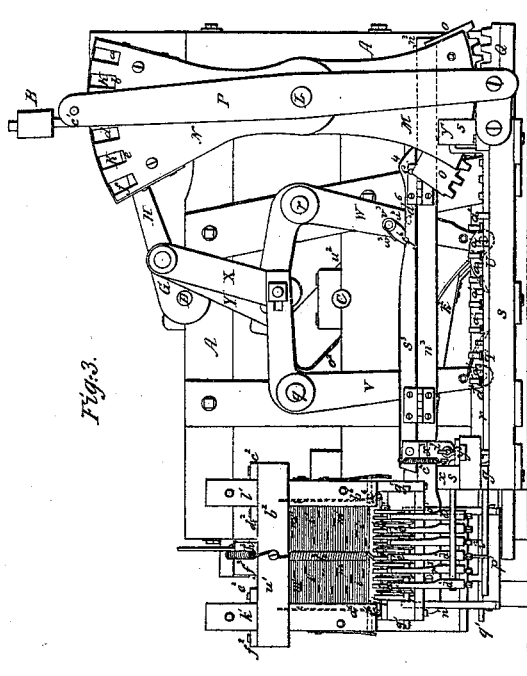
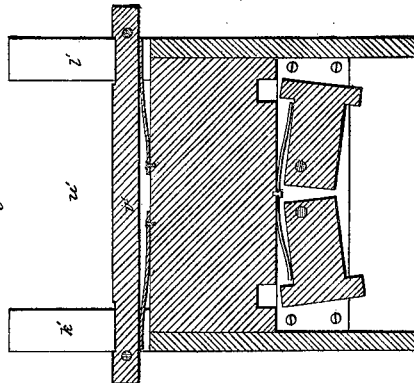


Fig. 3.

Fig. 5.

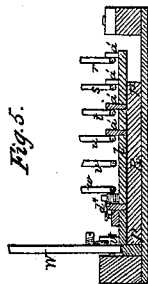
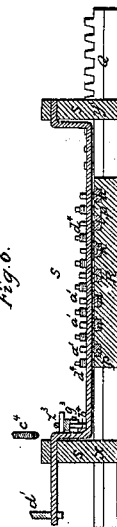


Fig. 6.

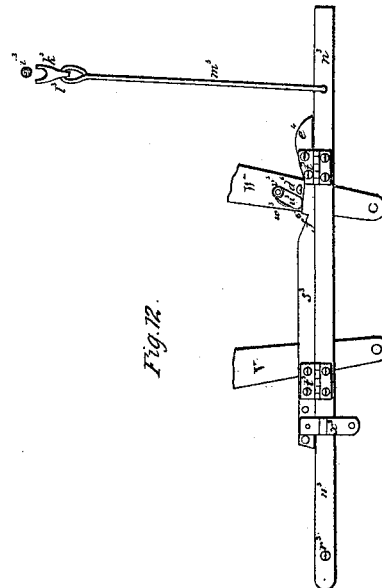
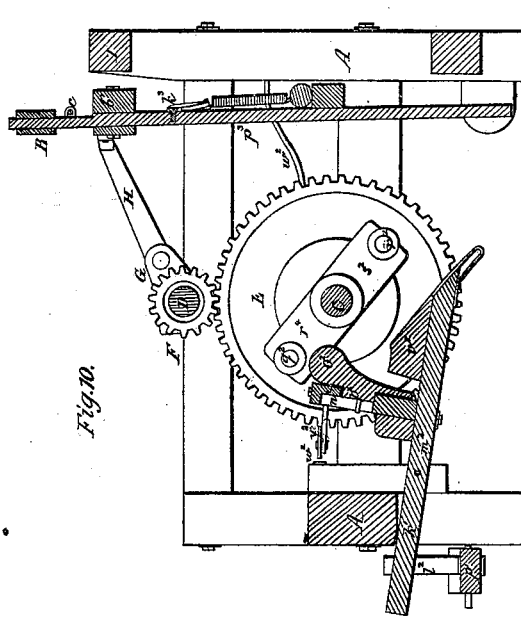
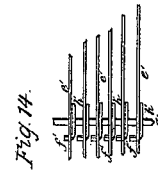
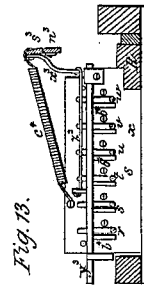
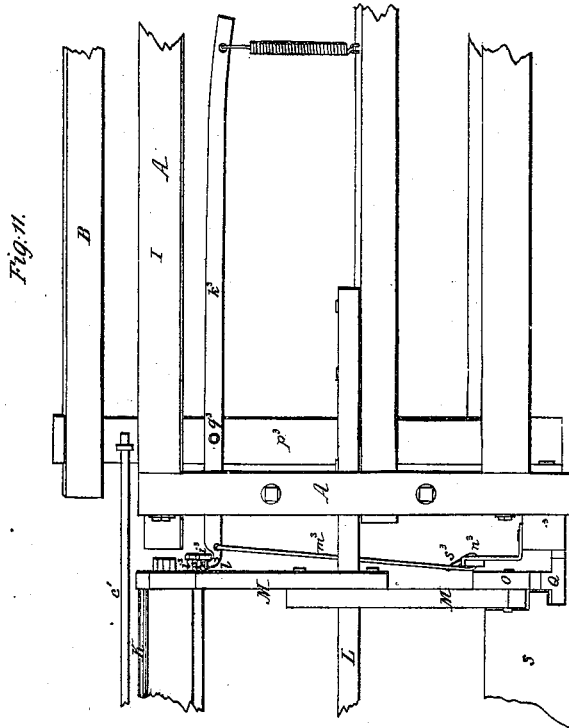


J. Reynolds. Shuttle Box.

Sheet 3-3 Sheets.

N^o 6,797

Patented Oct. 16, 1849.



UNITED STATES PATENT OFFICE.

JOSEPH REYNOLDS, OF PROVIDENCE, RHODE ISLAND.

LOOM FOR FIGURED FABRICS.

Specification of Letters Patent No. 6,797, dated October 16, 1849.

To all whom it may concern:

Be it known that I, JOSEPH REYNOLDS, of Providence, in the county of Providence and State of Rhode Island, have invented
5 a new and useful Improvement in Looms for Weaving Figured Fabrics; and I do hereby declare that the same is fully described and represented in the following specification and accompanying drawings,
10 letters, figures, and references thereof.

Of the said drawings Figure 1, denotes a top view of a loom frame having my invention applied to it, many of the parts of the loom not immediately connected with
15 the said improvement not being represented. Fig. 2, is an elevation of the warp beam side of the loom. Fig. 3, is an end elevation of it. Fig. 4, is a transverse and vertical section of the series of notched plates, and mechanism for operating them as will be
20 hereinafter explained. Fig. 5, is a transverse and vertical section of the slide board, and its system of slides. Fig. 6, as a longitudinal and vertical section of the said slide board, its slides, and one of the bent
25 levers directly over the same. Such other figures as may be necessary to a full explanation and delineation of the machine or improvement will be hereinafter referred
30 to and described.

The object and advantage of my improvement over all other plans in use for changing shuttles is that my plan has the full control of series of shuttle boxes applied to
35 either one, or both ends of the lay as may be required, and that I can set the pattern plates to weave any pattern which may be designed in stripes, or when connected with the jacquard is well adapted to carpet weaving
40 or any kind of figures such as landscapes or pictures of any kind where different colors are required in the weft. The pattern plates being set according to the design are put in motion by some movement of the loom which (through the connection of machinery from the pattern
45 plates to the shuttle boxes) causes such shuttle to be moved and kept in its proper place to be thrown, as may be required in order
50 to accomplish the design. The pattern may be varied from a few inches to ten yards or more, without any of the great inconveniences of the long chain, such as the great amount of labor in making and altering it

to different patterns, and the great space it occupies in its operation. Whereas all other plans for changing shuttle boxes are very limited in their power of moving the boxes containing the shuttles, they being confined (I think) wholly to the movement of
60 one shuttle box at a time that one being always the next box to the one in actual operation, or that one from which a shuttle is being ejected. Therefore they cannot be adapted to the weaving of a great variety
65 of figured fabrics, without the assistance and close attention of the operator to keep the run of the pattern, either by counting the picks or measuring the stripes while they are being woven, and to change the shuttles
70 by hand when the pattern required it.

A in Figs. 1, 2, and wherever else in other figures placed indicates the frame of a loom; B the lay; C the driving shaft; D, the crank shaft; E and F, the connecting gears of the
75 driving and crank shafts; G, G, the cranks of the crank shaft, and which are connected to and operate the lay by means of the connecting rods or bars H, H; I is the breast beam, the whole of the above being
80 constructed and made to operate in usual way.

K, is a series of shuttle boxes, made up of any suitable number of boxes *a, b, c, d, e, f*, arranged parallel to one another in a
85 longitudinal direction, and in the arc of a circle in a transverse direction, as seen in the drawings. The said series of shuttle boxes is supported on a rocker shaft L, by means of two arms M, N, one of which is
90 longer than the other, and has a gear or tooth sector O, affixed on its lower end. The shaft L is a stationary one it being fixed to the framework, and to a standard P, and made to pass through the arms M, N, and so as to allow the arms to move with a reciprocating motion on it. The toothed sector O, engages with a horizontal toothed rack Q, which projects from a movable carriage or slide-board R, supported or applied to and within a frame S, so as to be
100 capable of being moved both toward and away from the end bar *g*, of the frame. The said carriage or slide-board has a series of parallel slides or bars *h, i, k, l, m, n, o*,
105 arranged on it, each of the said bars being let into a groove or recess *p*, made in the slide board in such manner that the top

surface of the bar and the slide-board may be in one plane. The arrangement of the said bars on the carriage, and a section of the grooves *p p* &c. are seen in Figs. 1, 5 and 5 and 6. The said slide-board or carriage and bars operate in connection with two pawls T, U, jointed respectively to the lower ends of two bent right angular levers V, W, which turn on fulcrum *g, r*, and have their upper arms jointed respectively, to the lower ends of two connecting rods X, Y, whose upper ends are jointed to one of the cranks G, G, of the crank shaft D. At each revolution of the said crank shaft the lower arms of the levers V, W, are made to depart from and approach toward one another.

The system of slide bars *h, i, k, l, m, n, o*, are operated by a series of bell crank levers *r, s, t, u, v, w*, which are supported by and turn in two upright cheeks *x, y*, and are arranged over the slide-board as seen in the drawings. Each of said levers consists of a long rod, bent between its ends, as seen between the two cheeks *x, y*, in Fig. 3. It works against two pins or studs *a', a'*, projecting upward respectively from two adjacent slide bars as seen in Figs. 1 and 3. The object of each of the said bell crank levers, is to slide back or outward the two slide bars against whose pins *a', a'*, it rests.

This it does when it is turned or rotated in its bearings in the cheeks *x, y*. When the slides are so drawn or forced back, they leave parts of the two recesses in which they are placed open, and so that when either of the two pawls T, U, is moved over either of the recesses it will drop into the same, and by so dropping will so engage its lever with the slide-board as to enable it to move the slide board with it when it moves on farther. This movement of the slide-board it will be seen in consequence of its peculiar connection with one of the arms of the series of shuttle boxes, will cause the said series to move on their turning shaft and so as to bring some one of the shuttle boxes or that one which may be desired, into line with the top of the race beam *b'*, and so as to enable the shuttle which may be in such box, to be thrown out of it by the action of the throw of the picker. The rod on which the picker slides is shown at *e'*, in Figs. 1, and 2. A retractive spring *d'*, is fixed to each of the slide bars *h, i, k, l*, &c. The opposite end of the race beam may have either one or two shuttle boxes applied to it. If it has but one that one should be stationary or fixed to it. When two are used they may be made movable, so that each one may be brought alternately in range with the race beam. The object of two shuttle boxes is to enable a person to weave what is termed "shot about," or that kind of weaving where the shuttle is thrown into the

warps but once, and not back again before another shuttle having a different color in it, is so thrown into or through them.

The employment of two movable shuttle boxes is common to such looms as are used for "shot about" weaving, and forms no part of my invention. I have however thought proper to allude to it in the manner which I have in order to explain the easy adaptation of my improvement to weave the "shot about" fabrics.

On one end of each of the bell crank levers is an arm *d'*, which is made to extend upward at right angles to the lever, and to have a long hook *e'*, jointed to it. The said hook near its front end rests on a horizontal bar *g'*, and a small pin or projection *f'*, see Fig. 14, made to extend from one side of a small upright lever plate *h'*, which turns on the rod or bar *g'*, the whole being arranged as seen in Fig. 4. The several lever plates *h' h'*, &c., operate in connection with a series of pattern plates *i', i'*, &c., disposed as seen in section in Fig. 4. There are two ranges or packs of these pattern plates arranged side by side, and having their ends respectively sustained in two upright grooves or recesses of two posts *k', l'*. Each pattern plate is a small rectangular plate of metal, or other proper material, made either with or without a square notch *m'*, in one edge of it, as seen in Fig. 7, which is a representation or top view of one of the said plates. One pack of the pattern plates rests on two spring latches *a'', b''*, which are placed directly over two arms *n', o'*, that extend upward from and are jointed to a lever *p'*, which turns on a horizontal pin or fulcrum *q'*, seen in Fig. 2. The other pack rests on a horizontal slide plate or carriage *r'*, which has a ledge or shoulder *s'*, for the lower pattern plate to abut against, the said ledge being made of a height a little less than the vertical thickness of the pattern plate. The carriage or slide plate is to be properly fixed in such manner as to enable it to be moved in a horizontal plane underneath the pack of slide-plates, and with a reciprocating motion such as will separate the lowest slide plate of the pack from the pack, and move it toward and underneath the other pack, and against the series of lever-plates *h', h'*, &c., and far enough to move them on their common fulcrum or supporting rod, and in such manner as to lift up all, or all but one of the hooks *e', e'*, &c. When any pattern plate is made with a notch or recess *m'*, (such notch being so arranged as to receive some one of the lever plates when the pattern plate is moved toward and against them) the pattern plate will not move the lever plate which may enter the said notch or notches. Consequently the hook *e'*, connected with such lever plate, will remain down on the

rest bar g' , while the other or remainder of said hooks will be elevated above or off the said bar. Whenever such is the case the hook that is so down on the rest bar will be caught by a horizontal bar t' , (which is fixed to the under side of the carriage or slide plate as seen in Fig. 8, the said figure being a front end view of said carriage r') when the carriage r' , is moved backward, and will be drawn back with the carriage, and in such manner as to so turn or move the bell crank lever belonging to said hook, as to cause it to move two of the slides of the slide board R, far enough to so uncover their recesses as to permit or cause the pawls to drop into them while moving as before described, one of the pawls by means of its lever being made to move the slide board in one direction, and the other pawl being made to move it back again. While the lowest pattern plate is being raised up by the action or elevation of the arms n' o' , it is forced against the spring latches a^6 , b^6 , and so as to cause them to separate asunder until the plate passes above their shoulders, which taking place the latches spring toward one another and hold the plate on their shoulders c^6 , c^6 , and thereby prevent it and the pack above it from falling down below the said shoulders whenever the arms n' , o' , are again depressed. By means of the lever p' , the front pack of pattern plates is elevated a short distance after each operation before described; that is to say after the lower pattern plate has performed its office, such elevation of the pack takes place to an extent sufficient to carry the upper slide plate of said pack into such a position that it will be taken by a horizontal and movable frame u' , and moved over and past a spring bar v' , and directly over and upon the top of the other pack, there being a small projecting finger or stud w' , inserted in one side of the frame u' , and so curved as to permit the pattern plates to pass under it and down upon the top of the pack below it. This finger as above described is only a guide to direct the plate on to the descending pack and to prevent it from afterward rising upward so as to be in the way of a succeeding plate.

The frame u' , made as seen in Figs. 1 and 2, that is to say of two parallel bar a^2 b^2 , and four transverse ones c^2 , d^2 , e^2 , f^2 , rests and moves on the spring bar v' , (the said spring bar being supported at or near its two ends on springs fixed in the frame as seen in Fig. 9, which is a longitudinal and vertical section of the bar and its springs, and the posts of the frame which upholds the springs). Each of the bars d^2 , e^2 , is made with a shoulder g^2 , whose office is to act against the pattern plate and crowd it back when the frame u' , is moved back or toward the end of the loom frame. A spring h^2 , affixed to the

frame u' , and an arm i^2 , projected from one of the cheeks x , y , serves to draw the frame u' , down upon the front pack of pattern plates.

The lever p' is moved upward, (in order to elevate the outer pack of pattern plates) by means of a lever k^2 (which is connected to it by a rod or bar l^2 , jointed to both levers) and an arm or cam so applied to the lever k^2 , as to raise and depress its inner end as occasion may require. Fig. 10, denotes a transverse and vertical section of the loom frame, and exhibits the lever k^2 , and the mechanism by which it is operated, which mechanism I shall now proceed to describe.

The lever k^2 , turns up and down on fulcrum or pin m^2 , and has a standard or arm n^2 , raised on its inner arm; the said standard being made to support a cam o^2 , which is affixed to a slide p^2 , so fitted to the arm, as to be capable of being moved laterally either into or out of the way, orbit, or path of revolution of two rollers q^2 , r^2 fixed respectively on arms s^2 , s^2 extending from the driving shaft; or into or out of the way, orbit, or path of rotation of one roller t^2 , fixed on another arm u^2 , extended from the driving shaft, as seen in Fig. 1. From the inner arm of the lever k^2 , an arm v^2 , projects as seen in Fig. 10. This arm is struck and depressed by each of the rollers q^2 , r^2 , while they are descending through the lower part of their orbit of revolution, the depression of the arm causing a simultaneous depression of its lever. The slide p^2 , is connected to a hand lever w^2 , by a rod y^2 , as seen in Fig. 1.

I would here remark that by the employment of the two rollers q^2 , r^2 , their arms s^2 , s^2 , and the slide p^2 , and its cam, we can operate the series of shuttle boxes faster (viz twice as fast) than we can when we employ the single roller t^2 , and its arm u^2 . Therefore we can either cause the shuttle to pass across the race beam and back twice, or but once as occasion may require; each shuttle box remaining stationary in position for the throw of the shuttle.

The forward and back movements of the slide plate or carriage r' , are effected by means of an arm s^2 , which extends up from the lever p^2 , and passes through a hole made in the tail a^3 , of the slide plate. The said tail piece of the slide plate is connected with a lever b^3 by a connecting link c^3 the said lever being made to turn on a fulcrum at e^3 , and to extend up through a slot g^3 , made through the tail piece f^3 of the slide frame u' . A spring h^3 , is affixed to the upper part of the lever b^3 , and to the outer part of the frame u' . When the upper arm of the lever b^3 , is pressed forward it moves the frame u' , forward or in the same direction. When said arm of said lever is moved in the oppo-

site direction, it will draw upon the spring connection k^3 , and draw or move the frame u' backward. A spring connection is used instead of a solid rod in order to prevent accidents which might otherwise occur.

The next part of the mechanism to be described is a contrivance for preserving the position of each shuttle box during the time the shuttle is being operated. A series of pins or screws i^3 , i^3 , &c., is made to extend from the inner side of the inner arm which supports the series of shuttle boxes; the said pins being arranged at equal distances apart. One end of a long lever k^3 , has a forked projection l^3 , extending from it, which is raised up against and receives in the fork some one of these pins, when the series of shuttle boxes are made to assume any required position. Previous to their being moved this projection is lowered down from the pin against which it may happen to be. Fig. 11, represents a front view of this lever and a portion of the series of shuttle boxes, their inner arm, and the rod m^3 , by which the lever is connected with another lever n^3 , the said connecting rod being jointed to both levers. Fig. 12, is an external view of the lever n^3 . Fig. 13, is a vertical and transverse section of it taken near its rear end and so as to exhibit an elevation of the slide y^3 , its projections, and the bell crank levers against which the latter work. The lever k^3 , turns on a fulcrum or pin inserted in the sword p^3 , of the lay, the same being seen at q^3 , Fig. 11. The lever n^3 turns on a fulcrum r^3 , at its rear end, and has a long plate s^3 hinged to it by hinges as seen at t^3 , t^3 . This plate works in connection with a little spring pawl u^3 , which is fixed to the lower part of the lever W , by a pin v^3 , on which it turns freely. It has a spring w^3 , applied to it and the pin in such manner as to press it (the pawl) down toward a vertical position and against a stud d^6 , inserted in the side of the lever. The plate s^3 , has an arm x^3 projecting down from it, the said arm being connected to a horizontal slide or bar y^3 , by a rod z^3 , jointed at its two ends to the said arm and the slide. The bar y^3 , slides freely in a longitudinal direction, and has a series of pins or studs b^4 b^4 &c., extending down from it, each pin being made to act against one of the bell crank levers r , s , t , u , v , w , which are situated with respect to it as indicated by their sections in Fig. 13. A retractive spring c^4 , is applied or fixed to the plate s^3 , and the cheek x . From the above it will be seen that when either of the bell crank levers is turned in a direction outward from the loom, the slide y^3 , will be moved longitudinally by it, and in a direction away from the loom frame thereby causing by its draft on the rod z^3 , the plate s^3 , to assume a vertical position in such manner as when the lever to which the pawl u^3 ,

is hung is moved in a direction toward the warp beam side of the loom, to cause the little spring pawl u^3 , to come in contact with a projection e^4 (made on the top part of the plate s^3), and thereby depress the long arm of the lever n^3 , and in consequence thereof draw the lever k^3 away from the pin i^3 , against which it may happen to be, and by so doing leave the series of shuttle boxes free to be moved by the action of one of the pawls T, U, when next moved toward one another. While the bell crank lever is returning to its original position the contractile power of the spring c^4 , restores or draws the plate s^3 , into an inclined position, and out of the way of the little pawl u^3 . The object of the spring of the little pawl u^3 is to enable the pawl to rise up and not depress the lever n^3 during the next or return movement of the lever which carries the pawl. When the pawl has effected the entire depression of the lever, it passes into a notch f^6 made in the plate s^3 and this notch will trip the pawl, should the plate by any accident not be brought into an inclined position. Thus the pawl during its return movement effects a depression of the lever n^3 . I consider the disconnected pattern plates of the two packs hereinbefore described as a novel feature in weaving whether this be operated as before described or in any other way or whether they have a notch or hole in them or a projection on them provided they are for the purpose substantially as described, viz., for a pattern or time giver either applicable to changing the shuttle boxes as above specified or as applicable to changing heddles, for which purpose they may also be employed.

Having now described the whole of my improvement, I would remark that the two packs of pattern plates, (made to operate together so that while a plate from either pack is being moved from it to the other pack, and one pack depressed and the other elevated a corresponding distance,) are a novel feature in weaving machinery. They possess a great advantage over pattern prisms and chains of cards, such as are used in the Jacquard apparatus, and various other kinds of machinery for weaving figured fabrics. By means of the system of pattern plates and their appendages, as above specified, I am enabled to have such complete control of the series of shuttle boxes as to be able to bring up into line with the race beam any one of the shuttle boxes at any time it may be desirable.

What I claim therefore as my invention is—

1. A combination of machinery, composed of the following elements and applied to a series of shuttle boxes, for moving or operating them as specified. The first element of combination is the series or two packs of pattern plates. The second element is the

two x slide or moving frames by which the plates are moved horizontally as above described. The third element is the machinery for moving the pattern plates in vertical
 5 directions, one set being moved upward, and the other set downward substantially as specified. The fourth element is the system of hooks e' , e' , &c., their lever plates h' , h' &c., bell crank levers, and connections. The
 10 fifth element is the slide board R, and its series of slides h , i , k , l , &c., and their projecting pins and appliances as above described. The sixth element is the system of bent levers V, W, pawls T, U, and mecha-
 15 nism for moving the same as described. The seventh element is the toothed sector and rack, which connects the long arm of the series of shuttle boxes with the slide board R.

2. I also claim the combination of ma-
 20 chinery applied to shuttle boxes, and for the purpose of preserving the position of the series while any shuttle thereof is in opera-

tion, the said combination consisting of the series of pins i^3 , i^3 , &c. the fork lever h^3 , the lever n^3 , and its hinged spring plate s^3 , 25 the slide y^3 , and its pins or studs, the spring pawl u^3 , and their appurtenances, the whole being made to operate together substantially as above specified. I wish it distinctly understood that I do not intend to confine 30 my claims to the construction or form given to each element of combination as above described, but intend to vary the same as circumstances or necessity may require, while I do not change its character or principle of 35 operation.

In testimony whereof I have hereto set my signature this nineteenth day of May A. D. 1849.

JOSEPH REYNOLDS.

Witnesses:

R. H. EDDY,
 FRANCIS GOULD.