3 Sheets. A. URBAHN. Improvement in Looms. Sheet 1.

No. 123,210. Patented Jan. 30, 1872.

Fig. 1.

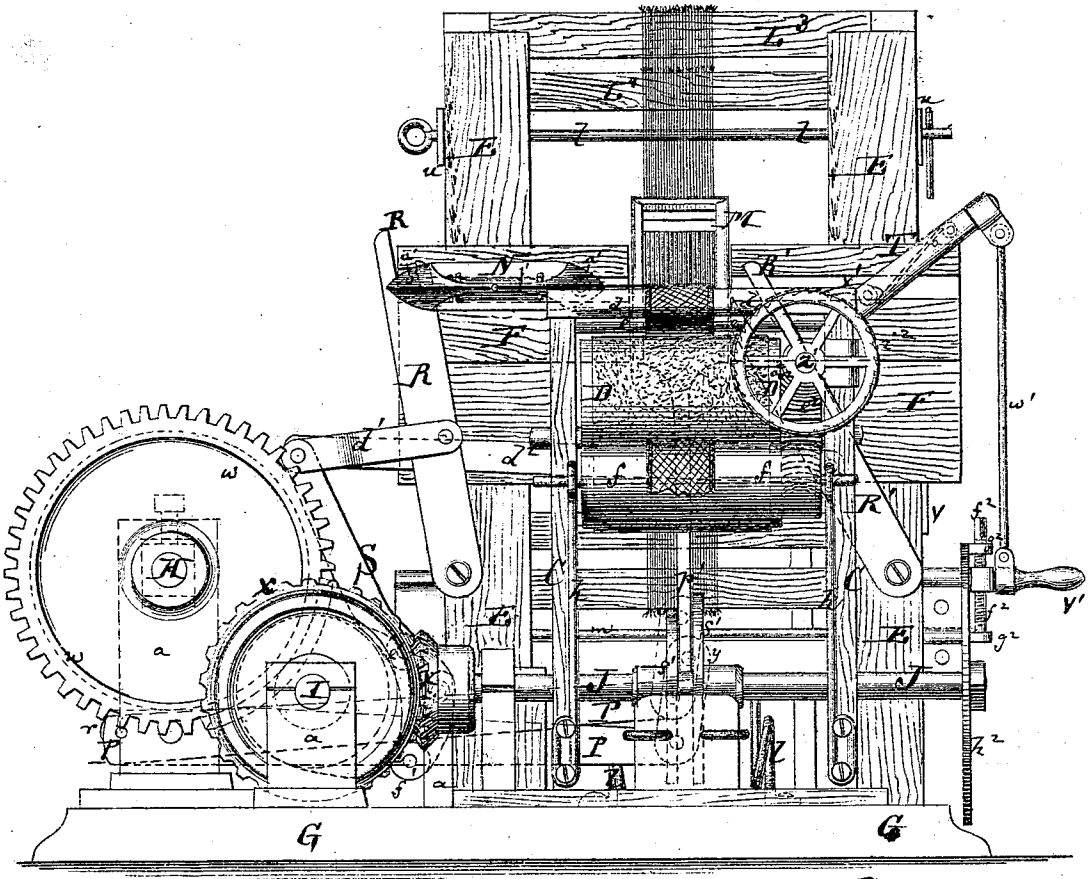


Fig. 2.

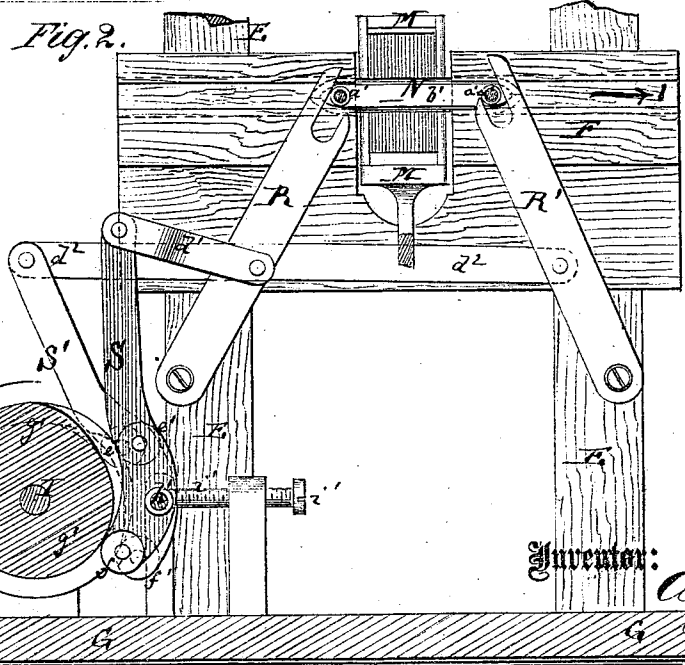


Fig. 3.

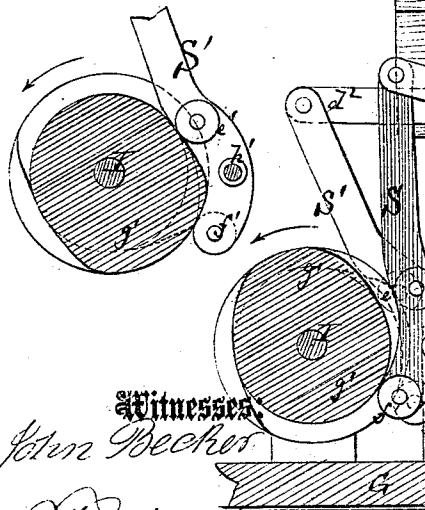
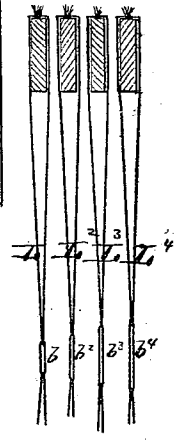


Fig. 4.



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3 Sheets. A. URBAHN. Improvement in Looms. Sheet II.

No. 123,210. Patented Jan. 30, 1872.

Fig. 5.

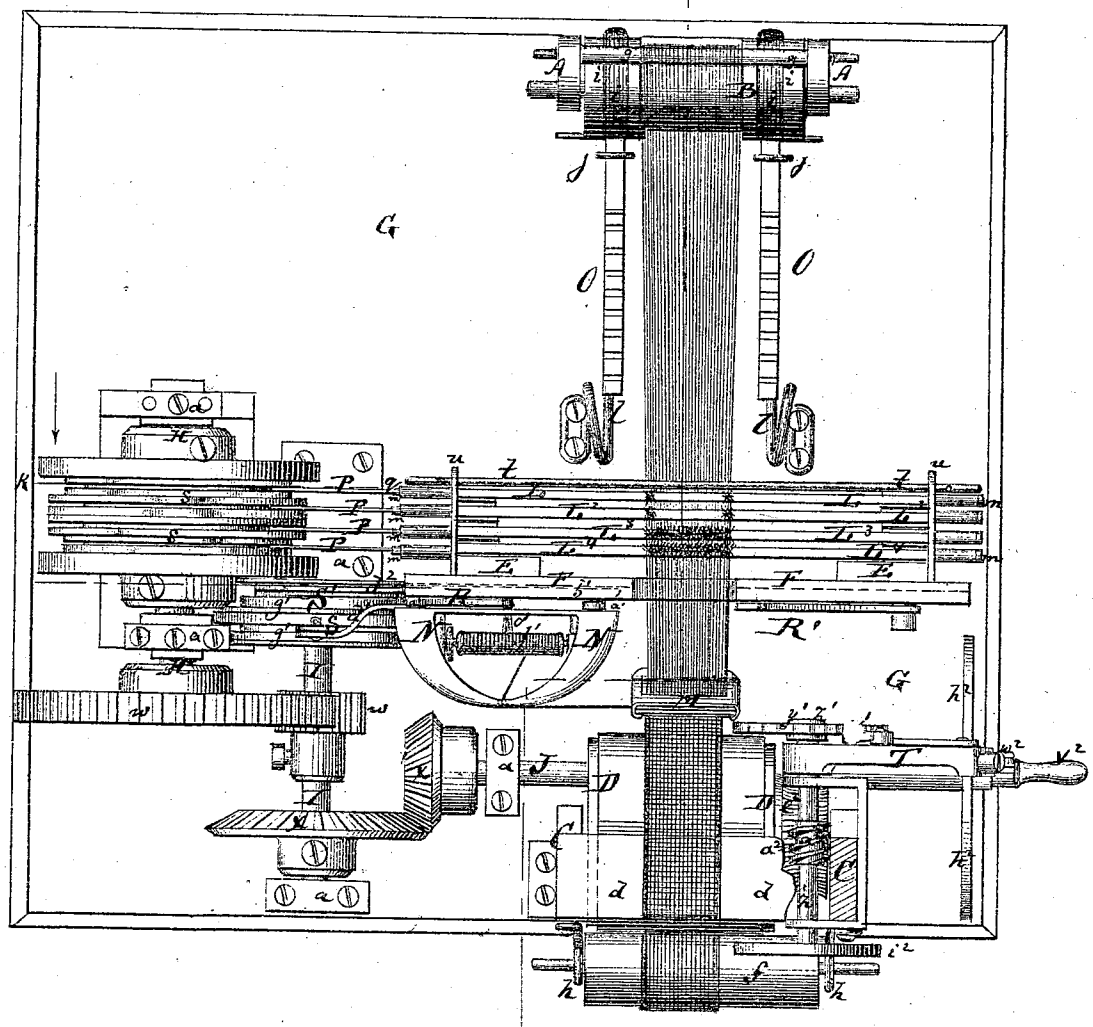


Fig. 7.

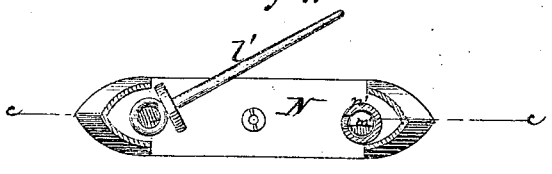


Fig. 6.

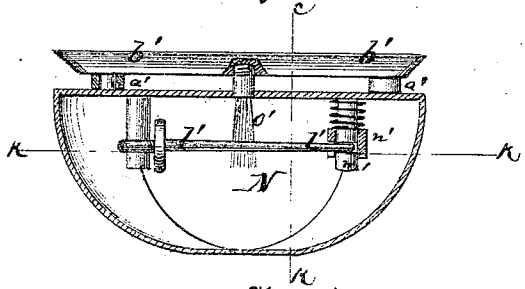
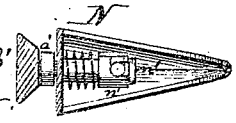


Fig. 8.



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3 Sheets. Sheet III.

A. URBAHN. Improvement in Looms.

No. 123,210. Patented Jan. 30, 1872.

Fig. 9.

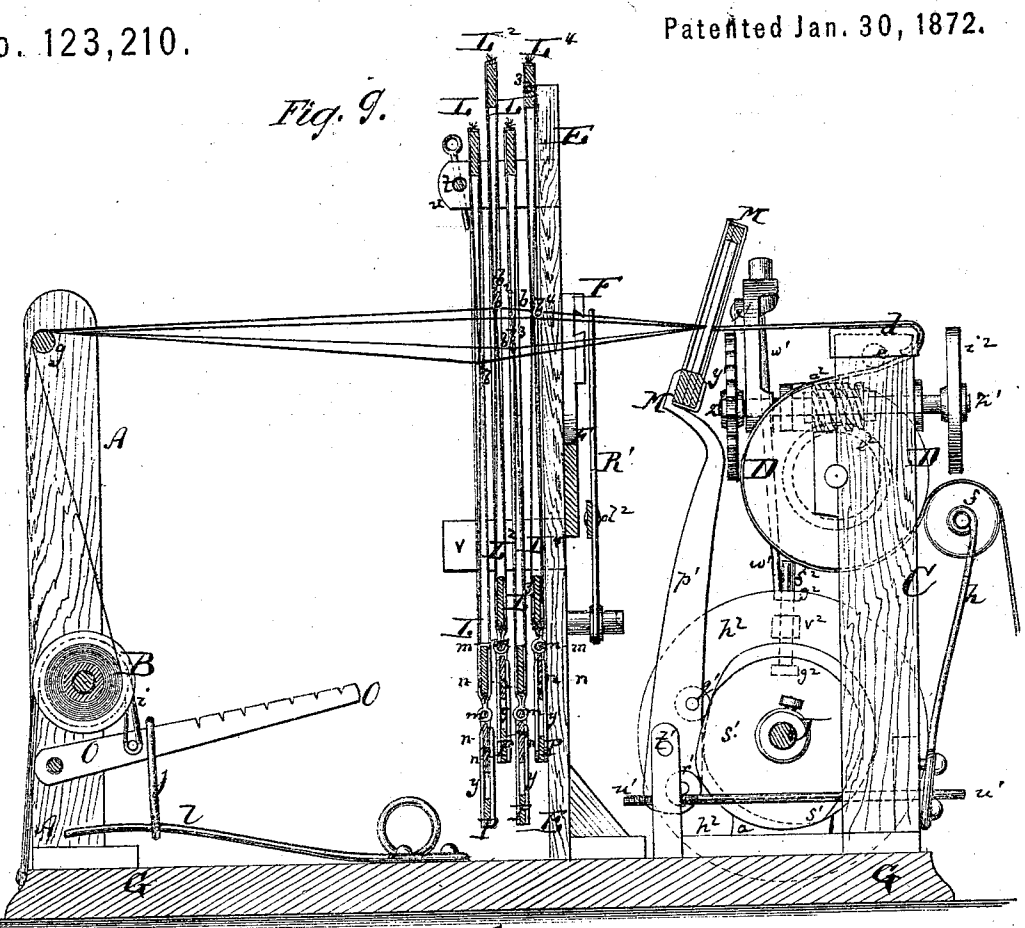


Fig. 10.

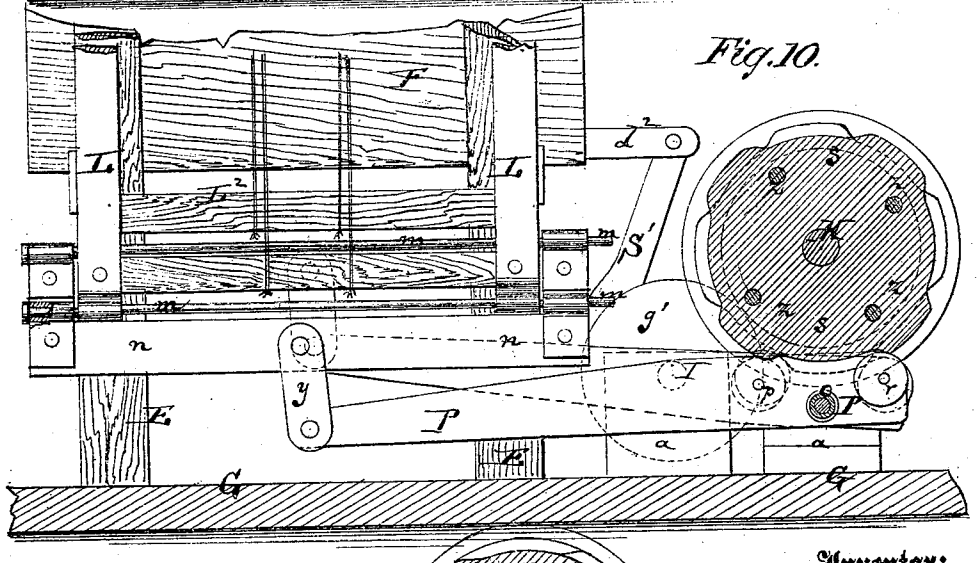
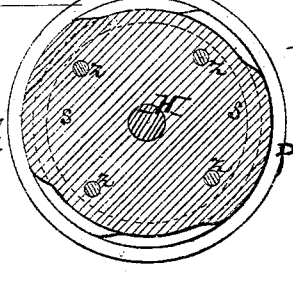


Fig. 11.



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UNITED STATES PATENT OFFICE.

ALWILL URBAHN, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. 123,210, dated January 30, 1872.

Specification describing a new and Improved Loom, invented by ALWILL URBAHN, of Paterson, in the county of Passaic and State of New Jersey.

This invention relates to a new arrangement of the working mechanism of a positive-motion loom for weaving goods of less width than the length of shuttle. The object of the invention is to produce more reliable and effective action than heretofore, and also to provide for an easy adjustment of all parts and a most absolute control of the shuttle.

The invention will first be fully described in connection with drawing, and then be clearly pointed out in claim.

In the accompanying drawing, Figure 1 represents a front elevation of my improved loom. Fig. 2 is a detail front view, partly in section, of the shuttle-race and mechanism for moving the shuttle, showing the cams that move one of the shuttle-levers. Fig. 3 is a face of the cams for moving the other shuttle-lever when in the same position that is shown in Fig. 2. Fig. 4 is a detail section through the heddles, showing the varying length of loops. Fig. 5 is a plan or top view, partly in section, of the loom. Fig. 6 is a horizontal section, on an enlarged scale, of the shuttle, the line *c c*, Fig. 7, indicating the plane of section. Fig. 7 is a longitudinal vertical section of the same on the line *k k*, Fig. 6. Fig. 8 is a transverse section of the same on the line *c k*, Fig. 6. Fig. 9 is a vertical transverse section of the loom taken on the plane of the line *q q*, Fig. 5. Fig. 10 is a longitudinal section of the same on the line *k q*, Fig. 5, and showing the cams for moving the harness. Fig. 11 is a face view of a pair of cams for moving one of the front heddles.

Similar letters of reference indicate corresponding parts.

A in the drawing represents the frame-work for supporting the warp-beam B. C is the frame-work for supporting the cloth-beam D. E is the frame for holding the shuttle-race F, and constituting the harness-guide. All these frames are firmly secured to a supporting-bed or floor, G, from which also project blocks or posts *a a*, which are the bearings of the three main shafts H, I, and J of the loom. L L^2 L^3 L^4, &c., are the heddles in suitable number. M is the batten carrying the reed-frame, and N the shuttle. The warp is wound around the beam B, passes over a rod or roller, *g*, through the loops *b* b^2 b^3 b^4, &c., of the heddles, respectively, through the wires of the reed, and after having received the weft, is as a complete web, drawn over a round-edged but stationary friction-plate, *d*, held on the frame C, thence under a friction-roller, *e*, and over the cloth-beam D, which has a surface covered with sand-paper, or otherwise roughened to take proper hold of the fabric and feed it automatically ahead. Finally, the fabric is passed between the cloth-beam and a roller, *f*, held by its spring-bearings *h h* firmly against D, over said roller *f*, and allowed to hang down therefrom, all as clearly shown in Fig. 9.

As far as described the loom differs but little from ordinary power-looms in its general principle of operation. But the manner of carrying the various movements and actions differs considerably, as will be hereinafter more fully set forth.

The warp-beam B, Fig. 9, has friction-bands *i i* applied to both ends, one end of each band being affixed to the bed G or frame A, while the other end is fastened to a lever, O, there being two such levers, one for each band. Each lever O is by means of a strap, *j*, connected with a spring, *l*, whose free end is under the fulcrum of the lever, so that the more the strap is shifted toward the free end of the lever the nearer will it also come to the fast end of the spring. The increased power is thereby doubled, once on account of enlarged leverage, and again by reason of the shortening and consequent strengthening of the spring. The straps *j* may be connected with screws or other means, to be adjusted with extreme nicety, for varying the tension of the warp. The beam B by being held down by bands at both ends is properly balanced and cannot tilt, as is frequently the case with the ordinary warp-beams held down at one end. The levers O O may be set at right angles to the beam B, or parallel, or at any suitable angle to the same, as may appear most convenient.

Each of the heddles is at its lower end hinged by a pin, *m*, Fig. 10, to a bar, *n*, which, by a link, *y*, or other means is connected with a lever, P. There are as many levers P as there are heddles, one for each. All these levers turn on one pin, *o*, which is vertically under

the shaft H, and have friction-rollers p and r in contact with the edges of cams $s\,s$, that are mounted upon said shaft H. The rollers p are on one, the rollers r on the other side of the shaft H, in contact with its cams, as is clearly shown in Fig. 10. There is on the shaft H one pair of cams for each lever P, the roller p being in contact with the edge of one, the roller r with the edge of the other such cam, while the body of the lever is between both. The cams of each pair are so arranged that when one bears on its roller, moving it down, the other cam will permit the other roller to work up. The lever is thus balanced by having an equal share of power applied on both sides of its fulcrum, and at equal distances from the same. By having the cams shaped to impart a certain number of oscillations to the several levers P P, respectively, during one rotation of the shaft H, the heddles are moved up and down with absolute force in such manner and respective number of strokes as to set and arrange the threads for the shed in conformity to the design to be produced. Whenever a new arrangement of threads is desired for a new design, the cams are arranged in conformity to the latter, and serve, therefore, the same purpose as the chain on the Jacquard looms. Any wear of the cams s or rollers p r can be overcome by setting the shaft H further down, for which purpose its bearings are made vertically adjustable, or else adjusting the fulcrums of the levers P further toward the shaft in equivalent manner. The levers P for the front heddles are shorter than those for the back heddles, so that the up-and-down motion of the latter will slightly exceed that of the front heddles. This insures the necessary parallel position of the yarn in the shed which would not occur if the up-and-down motion of the back heddles was equal to that of the front heddles. The same object can be obtained by gradually shortening the loops b^3, b^2, and b, as indicated in Fig. 4. The shorter loops will set their yarn higher and lower than the longer, and thereby produce the desired arrangement of shed. In front the heddles are guided on the frame E, Fig. 9. Their upper parts are guided at the back, or rather held in the right position by means of a removable rod, t, Fig. 1, which hangs in ears u, that project backward from the frame E. Whenever a thread breaks the rod t is easily withdrawn, allowing the heddles to be swung down on their pivots m, Fig. 10, so that the injury may be conveniently repaired. By also withdrawing the pins m the heddles can be entirely removed and conveniently replaced by others whenever a new pattern is to be produced. The ears u above and similar ears v v at the lower part of the frame E serve as guides for the edges of the several heddles, and prevent their longitudinal displacement while in operation.

The requisite rotary motion is imparted to the shaft H by means of gearing w, Fig. 5, from the shaft I, which, by bevel gear-wheels x x, or equivalent means, receives motion from the driving-shaft J. When two looms of my construction are placed side by side, but one shaft, H, for both may be used, the levers P P in such case extending through from one loom to another; one end of each moving up when the other swings down. In such case the two ends of each lever would balance each other and ease the motion, and two fabrics can be made without much addition to the power that would be used for one.

I consider the peculiar motion which is imparted to the heddles from levers below a great improvement on the ordinary harness motion, since it is decidedly positive, and precludes all possibility of confusion. The several disks $s\,s$, constituting the cams, are held together by screws z in such manner that they can be easily shifted to vary the motion of the heddles. The shuttle N, Fig. 6, is, by pins a^1 a^1, connected with a plate, b^1, which is its carrier, and slides in the grooves of the race-way F. The pins a^1 carry friction-rollers. Two levers, R R′, forked at their upper ends and pivoted to the frame E at their lower ends, serve to impart the requisite motion to the shuttle. These two levers are, by rods d^1 d^2, respectively, connected with levers S and S′, which each carry rollers e' and f^1, in contact with actuating-cams g', that are mounted upon the shaft I. The cams g' are arranged in pairs for each lever S S′ in the same manner, substantially, as the cams s are arranged on the shaft H. The pair of cams pertaining to one lever act on both rollers e^1 f^1 of such levers above and below the fulcrum h^1 of the latter. Any wear of contiguous surfaces can be rectified by means of a screw, i^1, which adjusts the front fulcrum of the levers S S′. The cams g^1 are so arranged by having part of their edges made circular that only one of the levers S can move at a time. The upper ends of the levers R R′ are forked to take hold of the rollers on the pins a^1, the inner prong of each fork being shorter than the outer, to facilitate its entrance and escape from under the pin a^1. The shuttle is longer than the width of fabric to be made, and one lever, R, is on one, the other lever, R′, on the other side of the warp, directly in front of the race-way. When one lever, R, has pushed the shuttle partly through the fabric, as in Fig. 2, it has brought its end within reach of the fork of the other lever, R′, which now begins to move and continues moving the shuttle in the same direction, arrow 1, Fig. 2, the lever R, meanwhile, being motionless. When the shuttle has completed its race the motion of R′ is reversed, and the shuttle moved back toward R. When the pin a^1 strikes the long arm of the fork of R the lever R′ continues and the lever R resumes its motion until after the short prong of the fork of R has fairly taken hold of the pin, when R′ is arrested and the motion entirely controlled by the lever R. Thus one lever is always stationary when the other moves, except just at the time of transferring the shuttle from one lever to another, when

the pushing-lever continues its motion to disengage its short prong, while the other lever profits of such continued pushing motion by bringing its short prong under the roller a^1 and thereby getting ready to pull the shuttle. This is a very positive reliable motion of the shuttle. By its means I am enabled to keep the shuttle in continuous motion, and to extend its strokes even beyond the ordinary run. Thus while the batten is making its entire motion and the shed is being reversed, the shuttle continues to move and draws the weft tight after having deposited the same, thereby producing a perfect finish of selvage and greater firmness of fabric. The spool j', Fig. 5, holding the cop of yarn within the shuttle, is fitted upon a rod l', Fig. 6, which is hinged in the shuttle at one end, while its other end is supported on a lug, m', that is secured within the shuttle. The lug m' is notched vertically to receive the end of the rod l', and carries a transversely-sliding sleeve, n', which is notched horizontally, and by a spring pushed over the supported end of the rod l'. The latter is thus doubly locked. It can be swung up to permit the withdrawal of the spool by pushing the sleeve n' off, so that the end may be lifted clear from the lug m'. When the spool has been applied the rod is pressed down upon the beveled end of the sleeve, crowding the same back to clear the notch in the lug m', entering the said notch, and then allowing the sleeve to be pushed forward over the end of the rod by the spring to thereby lock said rod. This lock is effective, not only in itself but also by being transverse during motion, as it prevents the spool from working loose during the rectilinear movements of the shuttle. A brush, o', fixed within the shuttle, serves to apply friction to the spool, and prevents it from unwinding too fast. The batten and reed M, Fig. 9, is affixed to a shank, p', which is pivoted near its lower end, and provided with double rollers q' and r', that bear against the edges of a double cam, s'. This cam is mounted upon the driving-shaft J and actuates the rollers q' and r', and the lever p', substantially in the same manner as the cams s and g^1 actuate their respective levers. Wear is counteracted in this case by sliding or swinging the fulcrum i' of the lever p' by means of a screw, u'. The two disks of the cam s' are so shaped as to give the necessary motions in substantially the ordinary manner to the reed and batten. The driving-shaft J, which receives rotary motion by suitable mechanism, has a projecting crank-pin, v', Fig. 1, which, by a rod, w', is connected with a lever, T. This latter carries a pawl, x', actuating a ratchet-wheel, y', Fig. 5, on a shaft, z', and imparting intermittent rotary motion to the ratchet-wheel by means of the continuous rotary motion of the shaft J. A worm, a^2, Fig. 5, on the shaft z', gears into a worm-wheel, e^2, which is mounted upon the shaft of the cloth-beam D. Thus the latter receives its motion for feeding the warp ahead in connection with the friction-roller f. The degree of such motion is regulated by means of a screw, f^2, which works in projecting lugs g^2 g^2 of a wheel, h^2, on the shaft J and holds the crank-pin v'. By turning the screw f^2 the crank-pin can be set nearer to or further from the center of the shaft J, to give less or more motion to the take-up mechanism, and thereby regulate the fineness of the fabric. The shaft z' has a hand-wheel, i^2, whereby it can be turned backward whenever it is desirable to slacken the warp or repeat the throwing of weft through portions that may have been made imperfect owing to some imperfection of the weft yarn.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The friction bands i i, applied to the ends of the warp-beam B, and combined with the levers O, straps j, and springs l, substantially as herein shown and described.

2. The heddles L L^2, pivoted at their lower ends by rods m to bars n n, which are moved up and down by power applied from below, as specified.

3. The removable guide t, in combination with the back of the heddle-frames, pivoted at their lower ends, as specified.

4. The arrangement of heddles having loops or eyes b b^2 b^3 b^4, of varying lengths, those of each frame having their loops or eyes shorter than those in advance, as specified.

5. The levers S S′, carrying the rollers e^1 f^1, and combined with the cams g^1 and levers R R′, when constructed and operated substantially as and for the purpose herein shown and described.

6. The combination of the transverse movable horizontally-notched sleeve n', within the shuttle, with the vertically-notched lug m', and hinged rod l', substantially as herein set forth and described.

7. The take-up mechanism, consisting of the crank v', rod w', lever T, pawl x', ratchet-wheel y', and worm and wheel a^2 and e^2, all arranged substantially as described, and combined with the cloth-beam D, and friction-roller f, as specified.

8. The combination with subject-matter of the claim immediately preceding, of the screw f^2, working on the wheel h^2, for setting the crank v', and thereby regulating the motion of the take-up mechanism, as specified.

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