(No Model.) 4 Sheets—Sheet 1.

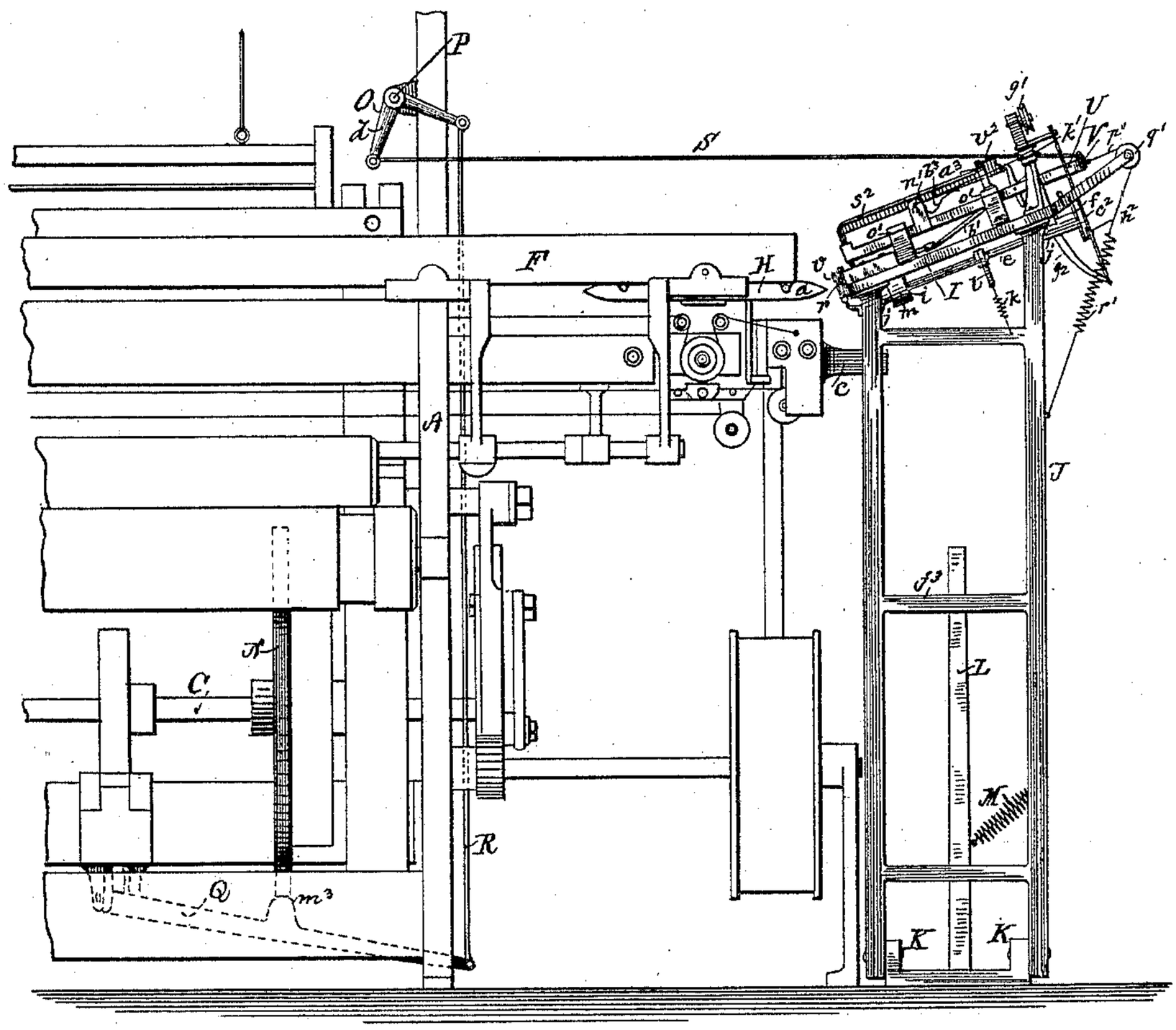
I. LINDSLEY, Dec'd.

C. A. WARLAND, Administrator.

AUTOMATIC FEEDING ATTACHMENT FOR LOOMS FOR WEAVING WITH SHORT WEFTS.

No. 456,973. Patented Aug. 4, 1891.

Fig. 1.



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Estate of Isaac Lindsley Dec'd
By his Attorney
S. Scholfield

(No Model.) 4 Sheets—Sheet 2.

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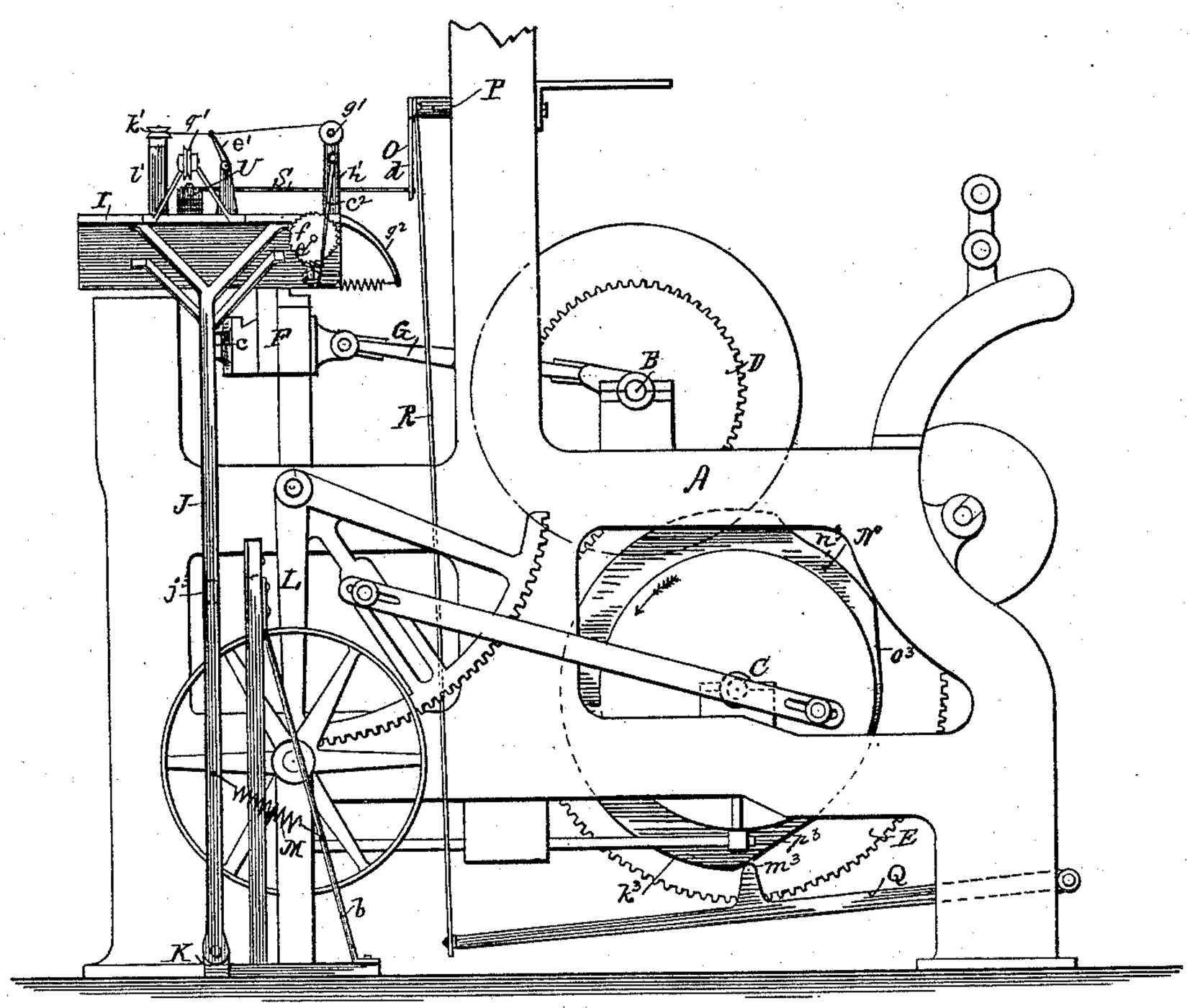
AUTOMATIC FEEDING ATTACHMENT FOR LOOMS FOR WEAVING WITH SHORT WEFTS.

No. 456,973. Patented Aug. 4, 1891.

Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

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AUTOMATIC FEEDING ATTACHMENT FOR LOOMS FOR WEAVING WITH SHORT WEFTS.

No. 456,973. Patented Aug. 4, 1891.

Fig. 3.

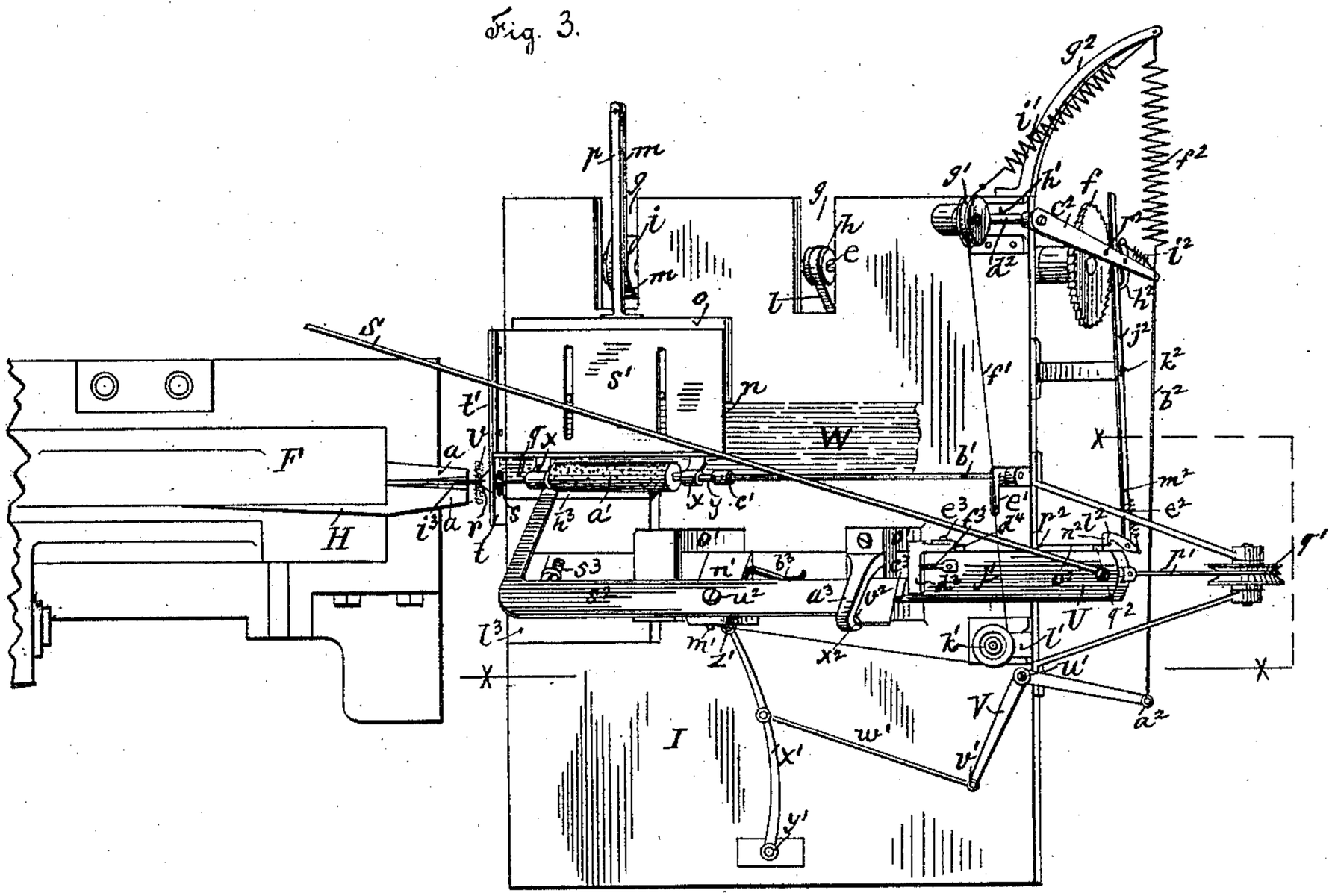
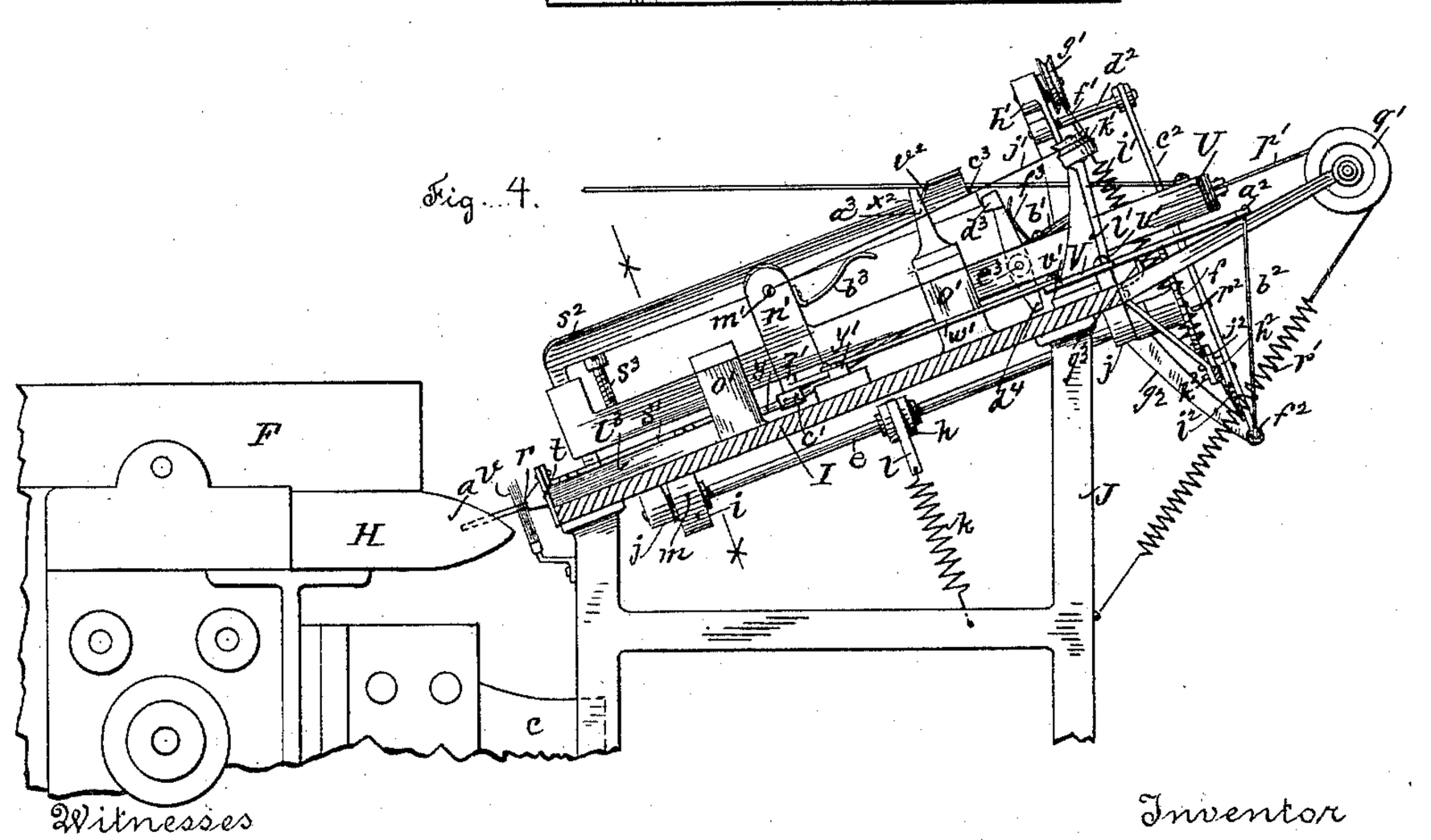


Fig. 4.



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(No Model.) 4 Sheets—Sheet 4.

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AUTOMATIC FEEDING ATTACHMENT FOR LOOMS FOR WEAVING WITH SHORT WEFTS.

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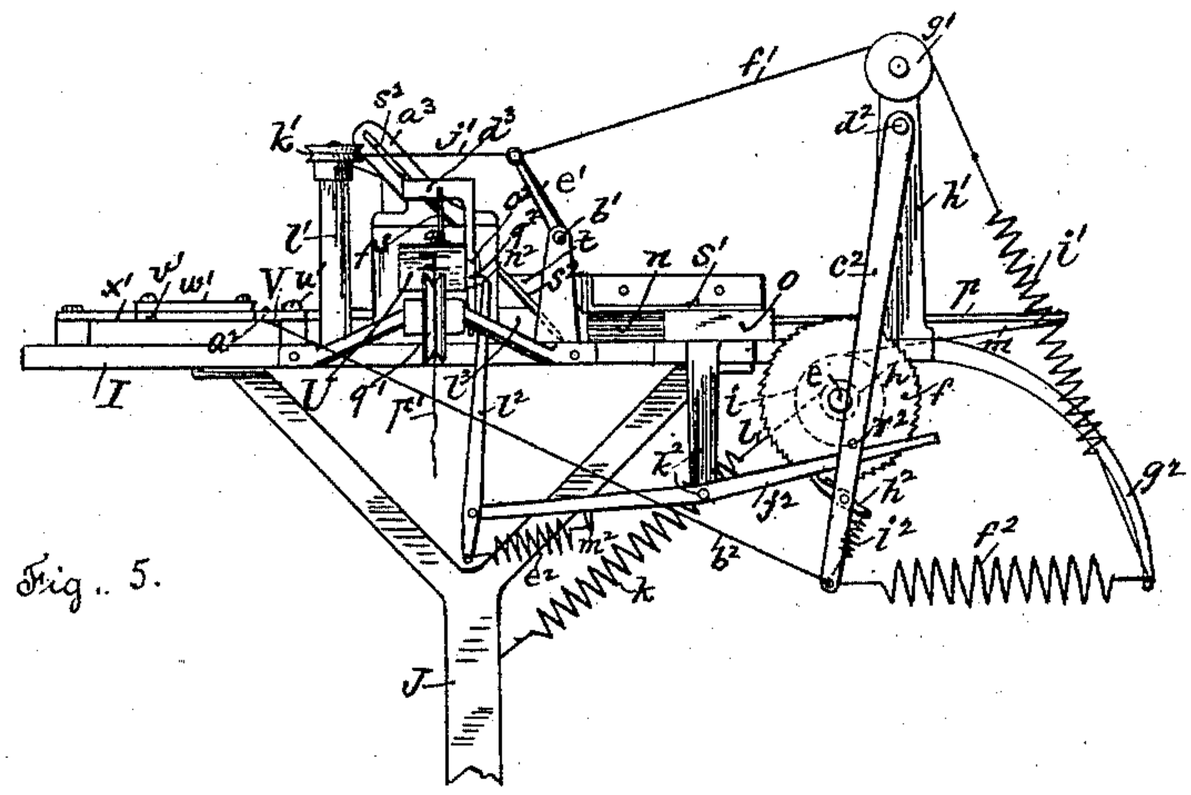

Fig. 5.

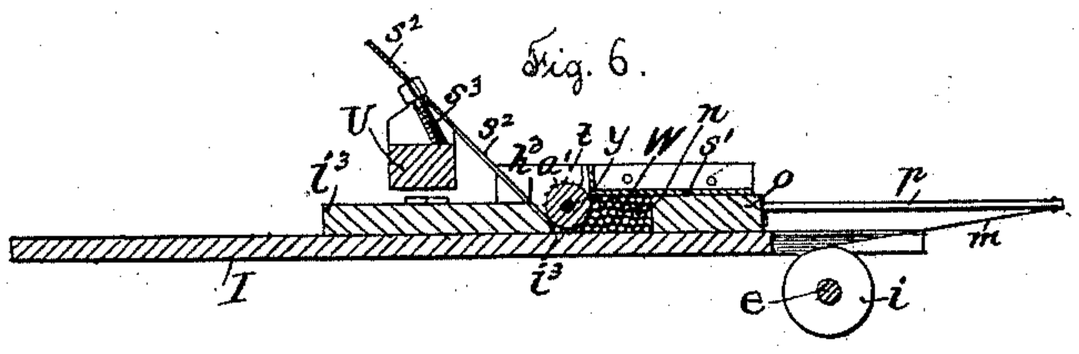

Fig. 6.

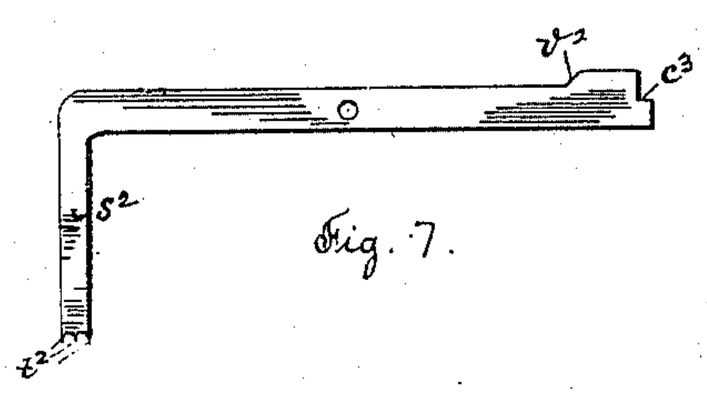

Fig. 7.

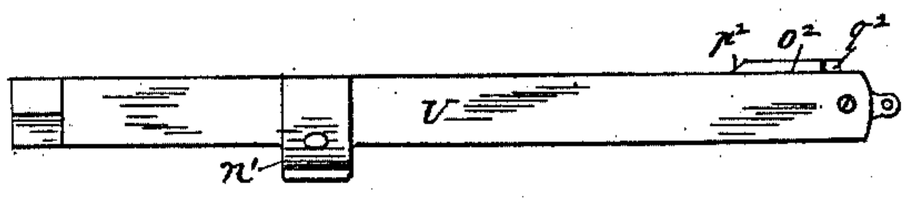

Fig. 8.

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UNITED STATES PATENT OFFICE.

CHARLES A. WARLAND, OF PAWTUCKET, RHODE ISLAND, ADMINISTRATOR OF ISAAC LINDSLEY, DECEASED.

AUTOMATIC FEEDING ATTACHMENT FOR LOOMS FOR WEAVING WITH SHORT WEFTS.

SPECIFICATION forming part of Letters Patent No. 456,973, dated August 4, 1891.

Application filed August 5, 1890. Serial No. 361,146. (No model.)

To all whom it may concern:

Be it known that ISAAC LINDSLEY, deceased, late a citizen of the United States, residing at Pawtucket, in the State of Rhode Island, invented a new and useful Improvement in Automatic Feeding Attachments for Looms for Weaving with Short Wefts, of which the following is a specification.

This invention consists in an improved automatic mechanism adapted to feed the wefts of straw, grass, or other material to a loom for weaving straw matting or similar fabrics, as hereinafter fully set forth and claimed.

Figure 1 represents a detail front elevation of the end of a loom provided with the improved weft-feeding mechanism. Fig. 2 represents a detail end view of the same. Fig. 3 represents an enlarged top view of the feeding mechanism separate from the loom. Fig. 4 represents an elevation of a portion of the same with a vertical section taken in the line *x x* of Fig. 3. Fig. 5 represents an end view taken in the plane of the surface of the table. Fig. 6 represents a vertical section taken in the line *x x* of Fig. 4. Fig. 7 represents a plan view of the carrier for moving the wefts singly to a forward position for engagement with the jaws of the shuttle. Fig. 8 represents a plan view of the sliding bar which supports the weft-carrier.

In the accompanying drawings, A represents the frame of the loom, B the crank-shaft, and C the cam-shaft, which is operated from the crank-shaft by means of the gears D and E, the gear E upon the shaft C being made of twice the diameter of the gear D upon the shaft B.

F is the lay, which is connected with the crank-shaft by means of pitmen G, and H is the shuttle, which is provided with the gripping-jaws *a a* and operated back and forth upon the lay-bed as set forth in Letters Patent of the United States No. 415,723, to which reference is made for a more extended description of the loom and the shuttle.

The downwardly-inclined table I, upon which the feeding mechanism is placed, is supported by the upright frame J, which is pivoted to the brackets K at the floor, and at a short distance from the inner side of the frame J is placed the upright stop L, which serves to limit the inward movement of the frame J and table I, the said inward movement being preferably caused by means of the spiral spring M, which is attached at one end to the frame J and at the opposite end to the inclined brace *b* of the stop L. The outward movement of the frame J and table I against the inwardly-directed action of the spring will be caused by the engagement of the projecting arm *c* of the lay with the side of the frame J, thus carrying the said frame forward to the extreme limit of the forward beat of the lay.

Upon the shaft C of the loom is secured the cam N, from which operative connection is made to the horizontal arm of the bell-crank lever O, attached to the stud P by means of the lever Q and connecting-rod R, and from the downwardly-extending arm *d* of the bell-crank lever O operative connection is made with the rearward end of the sliding bar U of the feeding mechanism upon the table I by means of the connecting rod or chain S.

In suitable bearings *j j* at the under side of the table I is placed the shaft *e*, to the outer end of which is secured the ratchet-wheel *f*, and upon the said shaft *e*, at the openings *g* made in the table I, are secured the small pulleys *h* and *i*, the shaft *e* being caused to rotate by means of a spring *k*, which is secured to the pulley *h* by the winding-strap *l*, and to the pulley *i* is secured the winding-strap *m*.

Within the feeding-channel *n*, formed by the overhanging plate *s'*, is placed the plunger *o*, and from the rear of the said plunger is extended the arm *p*, which is attached to the free end of the winding-strap *m*, the spring *k* and winding-strap *l* thus serving to throw the plunger *o* forward to force the mass of straw wefts held in the channel *n* gradually forward to the feeding-roller *a'*, the forward ends of the straw passing under the downwardly-curved wire guide *q*, which serves to prevent the ends from turning upward so as to miss the delivering-aperture. The delivering-aperture *r* is made at the end of a tapering or conical cavity *s* in the metal plate or head *t*, the aperture *r* being preferably somewhat raised from the plane of the sur-

face of the table, and in front of the aperture r is placed the upwardly-projecting brush v, which tends to prevent the passage of adhering straws with the engaged straw through the aperture r.

The bearing-brackets $x\ x$ serve to support the shaft y of the feeding-roller a', which is provided with a roughened surface for engagement with the straw, the said roller being held with its lower surface at about the thickness of a single straw above the surface of the table and operated by means of the inclined shaft b', which is connected to the shaft y by means of the universal joint c', and upon the outer end of the shaft b' is secured the arm e', to the outer end of which is attached the cord f', passing over the guide-pulley g' upon the standard h' and thence downward to an operating-spring i', connected to the fixed arm g^2, and a cord j', also attached to the outer end of the arm e', passes over the guide-pulley k' at the top of the standard l' and thence to the attaching-screw m' upon the standard n', which is attached to and moves with the sliding bar U, so that when the said sliding bar U is carried backward in its bearing blocks $o'\ o'$, attached to the table I, a partial rotary movement will be imparted to the feeding-roller a' in one direction, and upon the reverse movement of the said sliding bar the roller a' will be caused to turn in the opposite direction.

To the rear end of the sliding bar U is attached the cord or chain p', which passes over the guide-pulley q' and is attached to the spiral spring r' the said spring being adapted to impart the required backward movement to the sliding bar.

The bell-crank lever V is attached to the table I by means of the pivot-screw u', and from the end v' of the lever V connection is made to the lever x' by means of the connecting-rod w', the lever x' being pivoted to the table I at the point y' and jointed to the sliding bar U at the point z', so that upon the movement of the sliding bar in either direction a corresponding movement will be imparted to the bell-crank lever V, and from the end a^2 of the lever V connection is made by means of the wire rod b^2 to the lever c^2, which is pivoted to the stud d^2, projecting from the outer side of the standard h', the said lever being operated in a backward direction by means of the spiral spring f^2, which is attached to the fixed supporting-arm g^2.

To the inner side of the lever c^2 is pivoted the ratchet-catch h^2, which is held in engagement with the teeth of the ratchet-wheel f by means of the spiral spring i^2, and the to-and-fro movement of the lever c^2 will serve to cause a limited backward movement of the plunger o; and in order to disengage the catch h^2 from the teeth of the ratchet-wheel f, so as to allow the plunger o to act upon the mass of straw in the channel n, a disengaging-lever j^2 is pivoted to the stud k^2 and arranged to project over the catch h^2 between the lever c^2 and the side of the ratchet-wheel, and to the inner end of the lever j^2 is pivoted the hook-lever l^2, and to an eye m^2 upon the lever j^2 and to the lever l^2 is attached the spring e^2, which tends to throw the hook n^2 at the upper end of the lever l^2 forward into engagement with the cam-bar o^2 at the side of the sliding bar U, the cam-bar being provided at its forward end with an inclined face p^2, lying in a vertical plane, and at its rear end with a downwardly and backwardly inclined face q^2. A stop-pin r^2 is arranged at the inner side of the lever c^2 to properly limit the downward movement of the hook n^2, so that the same will not pass out of proper engagement with the cam-bar o^2 during the back-and-forth movement of the said bar.

To the inclined upper end of the standard n' is pivoted the weft-carrier s^2, which is preferably bent in angular form, as shown in Fig. 7, and armed at its end with the engaging points or needles t^2, which engage with the straw and serve to carry the end of the same forward to a point within range of the jaws of the shuttle H, the points t^2 being arranged in line with each other and adapted for engagement with a single weft or straw only, so that but one straw at a time will be fed out of the opening r by the movement of the weft-carrier, the said carrier being arranged in an inclined position and pivoted to the standard n' at the point u^2. The rearward end of the weft-carrier is provided with an inclined cam-face v^2, which is adapted for engagement with the bearing-surface x^2 at the upper end of a fixed strap or slotted arm a^3, and the rearward end of the carrier s^2 is thrown upward against the said bearing-surface by means of the spring b^3. The rearward end of the carrier s^2 is also provided with a notch c^3, adapted for the engagement of the catch d^3, the said catch being pivoted to the side of the sliding bar U at the point e^3 and pressed backward, so as to bear upon the extreme end portion of the said carrier, by means of the spring f^3, which is secured to the top of the sliding bar. The catch d^3 is provided with a downwardly-extending arm d^4, which is adapted to engage with a stop g^3, attached to the rear of the table I, and thus at the proper time cause the disengagement of the catch from the notch c^3 at the end of the carrier, and the adjustable stop-screw s^3 will serve to prevent the points of the carrier from injurious engagement with the surface of the table I.

The operation of the feeding mechanism will be as follows: A suitable quantity of the straw wefts W being first placed in the channel n under the overhanging plate s', as shown in Figs. 3 and 6, with the forward ends of the straws abutting against the upright head t', to which the plate s' is attached, and a portion of the straws passed in a single layer laterally under the feeding-roller a' to a point at the junction of the inclined surface h^3 of the block l^3 with the surface of the table, so that a straw i^3 will be located at the angle so

formed in proper position for the engagement of the points of the carrier s^2 therewith, as shown in Fig. 6, then the said straw can be pulled forward, so that the end of the same will project through the opening r to the proper distance for the engagement of the jaws $a\,a$ of the shuttle H therewith. Now upon starting the loom the straw i^3 will be caught by the closing jaws $a\,a$ of the shuttle H and carried through the shed, the table I and the supported feeding mechanism moving back with the lay F under the action of the spring M until the cross-bar j^3 strikes against the stop L, which will bring the table I at rest until the succeeding forward movement of the lay. The elevated portion k^3 of the cam N will upon the rotation of the shaft C serve to carry the sliding bar U forward to its extreme forward position, so that the engaging point of the carrier s^2 will be elevated from the straw weft which was fed forward to start the loom, as above described, the said extreme forward movement of the sliding bar serving to carry the inclined face v^2 at the rear end of the carrier under the bearing-point x^2 of the guiding-strap to cause the said elevation of the carrier from its engaging position, and the carrier will be thereafter retained in its elevated position from the straw during the subsequent backward movement of the sliding bar by means of the catch d^3, which is adapted to engage with the notch c^3 upon the proper depression of the rearward end of the carrier by the inclined face v^2. When the shuttle has passed through the shed to the opposite end of the loom, the crank-shaft B will have made one complete revolution and the cam-shaft C one-half of a revolution, and upon the return movement of the shuttle with a straw fed automatically from the opposite end of the loom the continued rotation of the cam N will, by causing the engaging point m^3 of the lever Q to rise to the depressed surface n^3 of the cam, carry the sliding bar U backward far enough to cause the engagement of the hook n^2 of the lever l^2 with the inclined face q^2 of the cam-bar o^2, thus causing the downward movement of the outer end of the lever j^2 and the consequent disengagement of catch h^2 from the tooth of the ratchet-wheel f, thus allowing the resilient action of the spring k to be exerted by means of the plunger o upon the mass of straw wefts in the channel n, and after allowing sufficient time during the revolution of the cam N for the proper compacting of the straw wefts against the roughened surface of the feeding-roller a' the cam N will allow the engaging point m^3 of the lever Q to rise along the inclined face o^3, and thus cause the sliding bar U to be brought by the action of the spring r' gradually to its extreme backward position, and the said backward movement of the sliding bar will, by means of the arm e' and its connections, serve to cause the forward rotary movement of the feed-roller a' to carry a straw weft properly forward to the required point for the proper engagement of the carrier therewith, and upon the extreme backward movement of the slide-bar U the downwardly-extending arm d^4 of the catch d^3 will engage with the stop g^3, attached to the rear of the table I, and thus operate to cause the disengagement of the catch d^3 from the notch c^3 of the carrier s^2, and then the resilience of the spring b^3 will cause the engaging points of the carrier to be thrown downward to engagement with the straw, which lies at the corner, between the inclined surface h^3 of the block l^3 and the surface of the table I, and upon the continued rotation of the cam N, while the shuttle H is returning through the shed, the action of the rising incline p^3 of the cam N upon the engaging point m^3 of the lever Q will cause the downward movement of the lever Q and the consequent forward movement of the sliding bar U, the said forward movement of the sliding bar serving by its connections to cause the backward rotary movement of the feed-roller a' and the backward movement of the ratchet-wheel f, thus serving to release the engaged straw from the pressure caused by the spring-operated plunger o, so that the engaged straw can be freely delivered to the shuttle; and when the cam-bar has been carried forward to the position shown in Figs. 3 and 4 the carrier will be at the point of rising from engagement with the straw, the straw having been carried to the full extent of its forward movement. The continued slight forward movement of the slide-bar U will then serve to cause the elevation of the engaging points of the carrier from the straw and the locking of the same in the elevated position by means of the catch d^3. The jaws $a\,a$ of the shuttle will now be caused to engage with the projecting straw weft to carry the same through the shed, as before, and the feeding will be continuous until the proper supply of straw in front of the plunger o is exhausted.

I claim as my invention—

1. The combination, with a construction which forms a feeding-channel, and means for pressing the mass of wefts therein laterally toward the feeding-roller, of the feeding-roller adapted to draw the wefts from the mass and carry them sucessively forward to a line for delivery to the shuttle, and mechanism for actuating the feeding-rollers, substantially as described.

2. The combination, with a construction which forms a feeding-channel, and the plunger for pressing the mass of wefts therein laterally toward the feeding-roller, of the feeding-roller adapted for movement in reverse directions, mechanism for actuating the feeding-roller, and means for relieving the mass of wefts in the feeding-channel from the pressure of the plunger upon the backward movement of the feeding-roller, substantially as described.

3. The combination, with a construction which forms a feeding-channel, and means for pressing the mass of wefts therein laterally

toward the feeding-roller, of the feeding-roller adapted to draw the wefts from the mass and carry them forward to the proper line for the action of the weft-carrier thereon, mechanism for actuating the feed-roller, the weft-carrier adapted to force a single weft forward to the proper point for seizure by the jaws of the shuttle, and mechanism for actuating the weft-carrier, substantially as described.

4. The combination, with a construction which forms a feeding-channel, and means for pressing the mass of wefts therein laterally toward the feeding-roller, of the feeding-roller and means for causing the rotary movement of the same in opposite directions, substantially as described.

5. The combination, with a construction which forms a feeding-channel, and means for pressing the mass of wefts therein laterally toward the feeding-roller, of the feeding-roller adapted to draw the wefts from the mass and carry them forward to a proper line for the action of the weft-carrier thereon, mechanism for actuating the feeding-roller, the head provided with a delivering-aperture, the pivoted weft-carrier adapted to engage with a single weft and force the forward end of the same through the delivering-aperture to a proper point for seizure by the jaws of the shuttle, and mechanism for actuating the weft-carrier, substantially as described.

6. The combination, with the head provided with a delivering-aperture, and a weft-carrier for forcing the end of a single weft out of the said aperture, of the brush adapted to prevent an adhering weft from passing out with the engaged weft, substantially as described.

7. The combination, with the weft-carrier for forcing a single weft forward to the proper point for seizure by the jaws of the shuttle, of the lay, the supporting-frame adapted for limited movement with the lay, a cam upon the shaft of the loom for causing the reciprocating and engaging movement of the weft-carrier in timely relation to the movement of the lay, and operative connections between the cam and the weft-carrier, substantially as described.

8. The combination, with the slide-bar, the weft-carrier pivoted thereto, the lay, and means for reciprocating the slide-bar in timely relation to the movement of the lay, of the feeding-roller adapted for movement in reverse directions upon the reverse movement of the slide-bar, substantially as described.

9. The combination, with the slide-bar, the weft-carrier pivoted thereto, the lay, and means for reciprocating the slide-bar in timely relation to the movement of the lay, of the cam adapted to raise the engaging end of the carrier, the catch for holding the carrier in its elevated position, and the stop for tripping the catch, substantially as described.

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