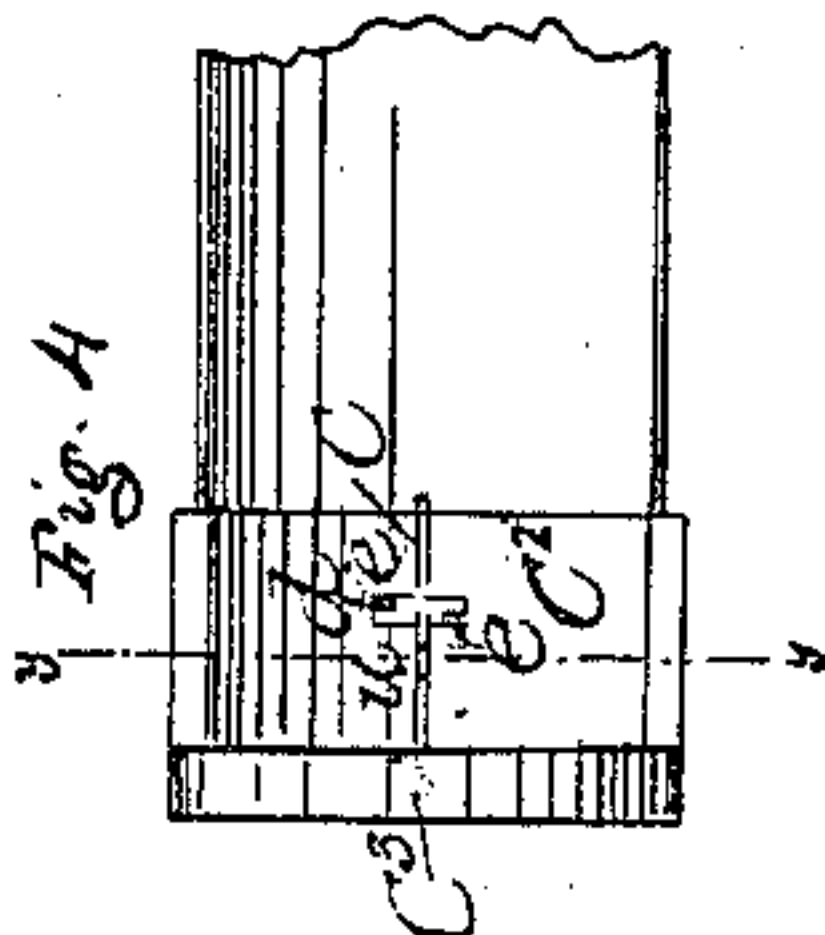
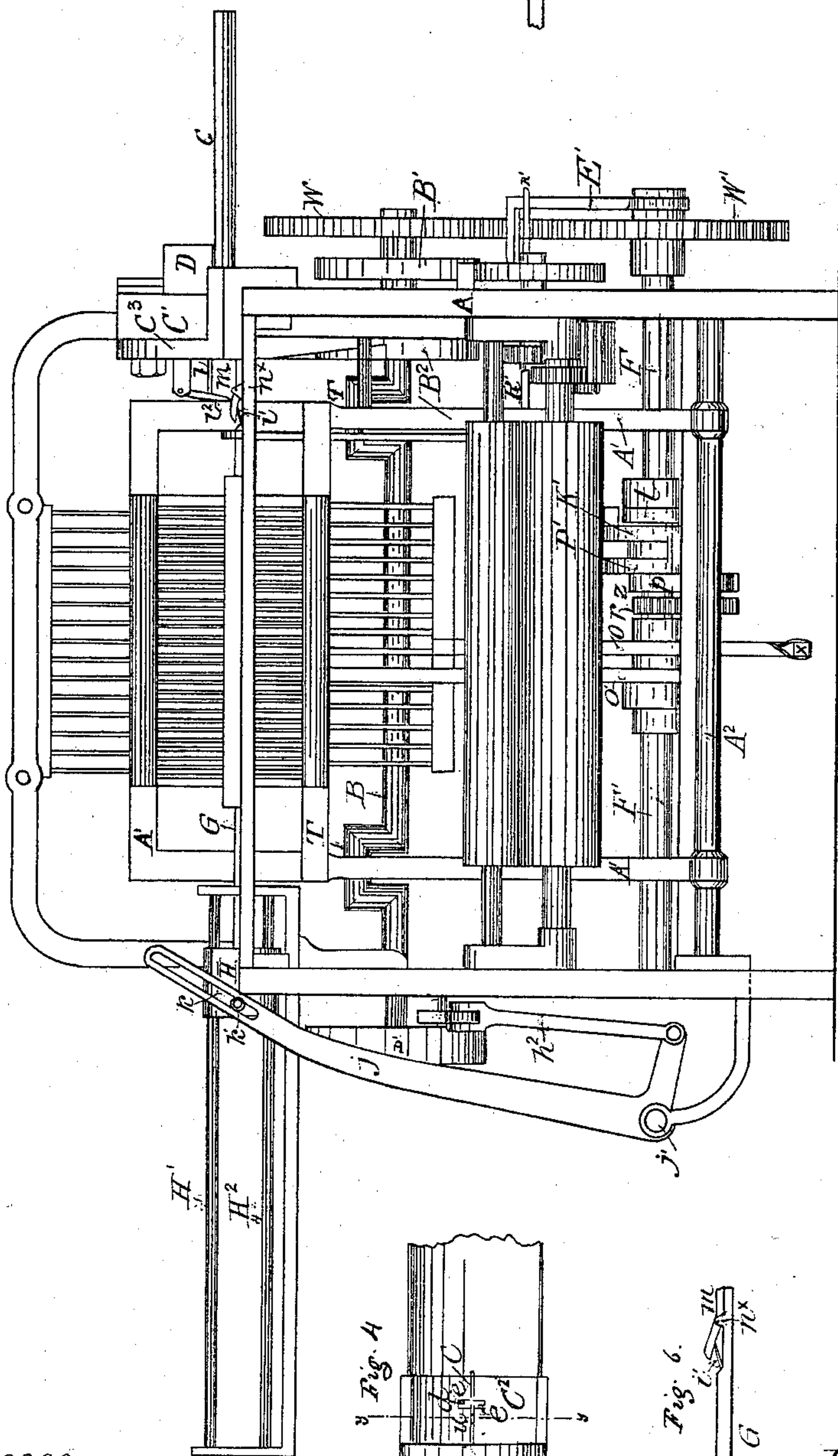
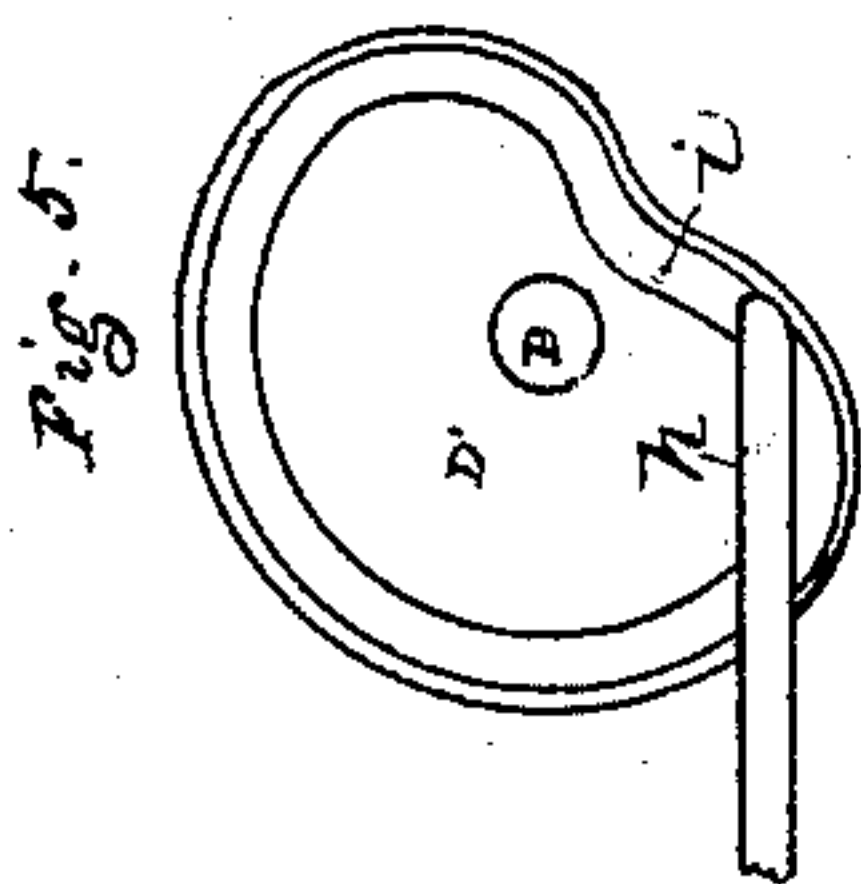


J. C. SMITH.
LOOM FOR WEAVING PALM LEAF.

No. 79,923.

Patented July 14, 1868.



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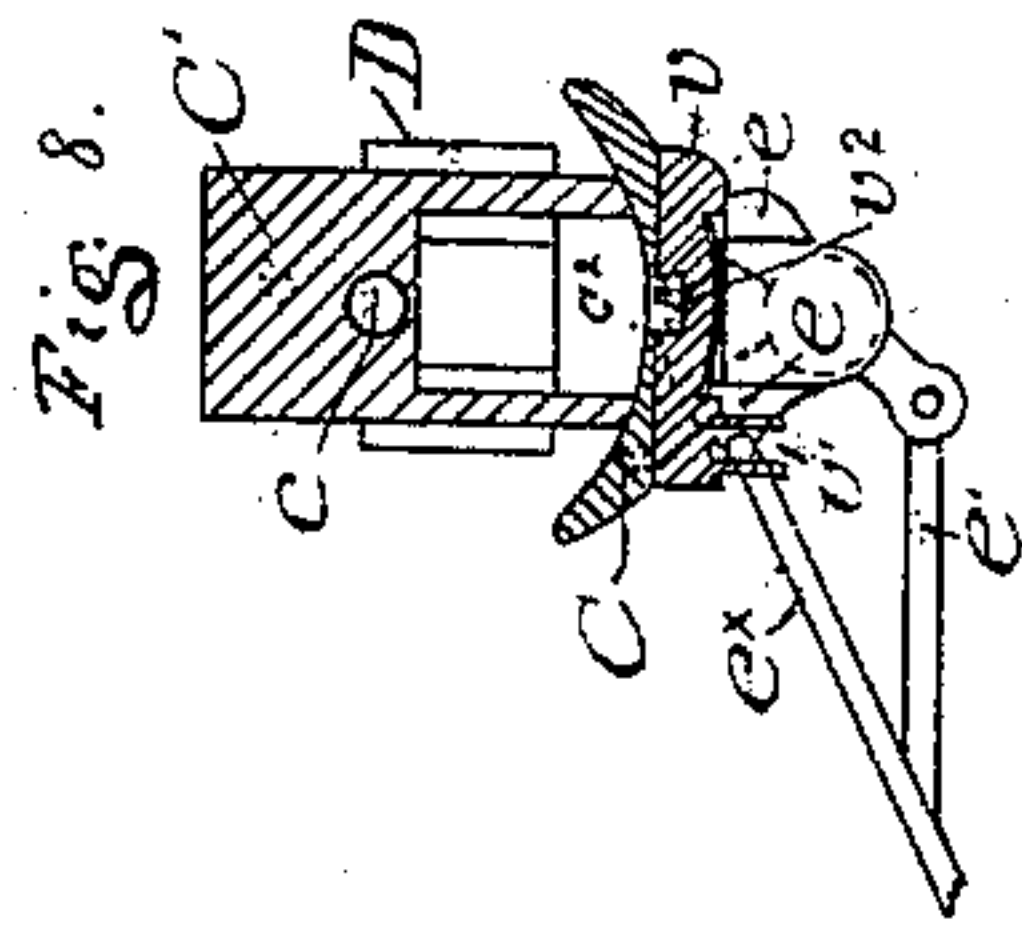


Fig. 2.

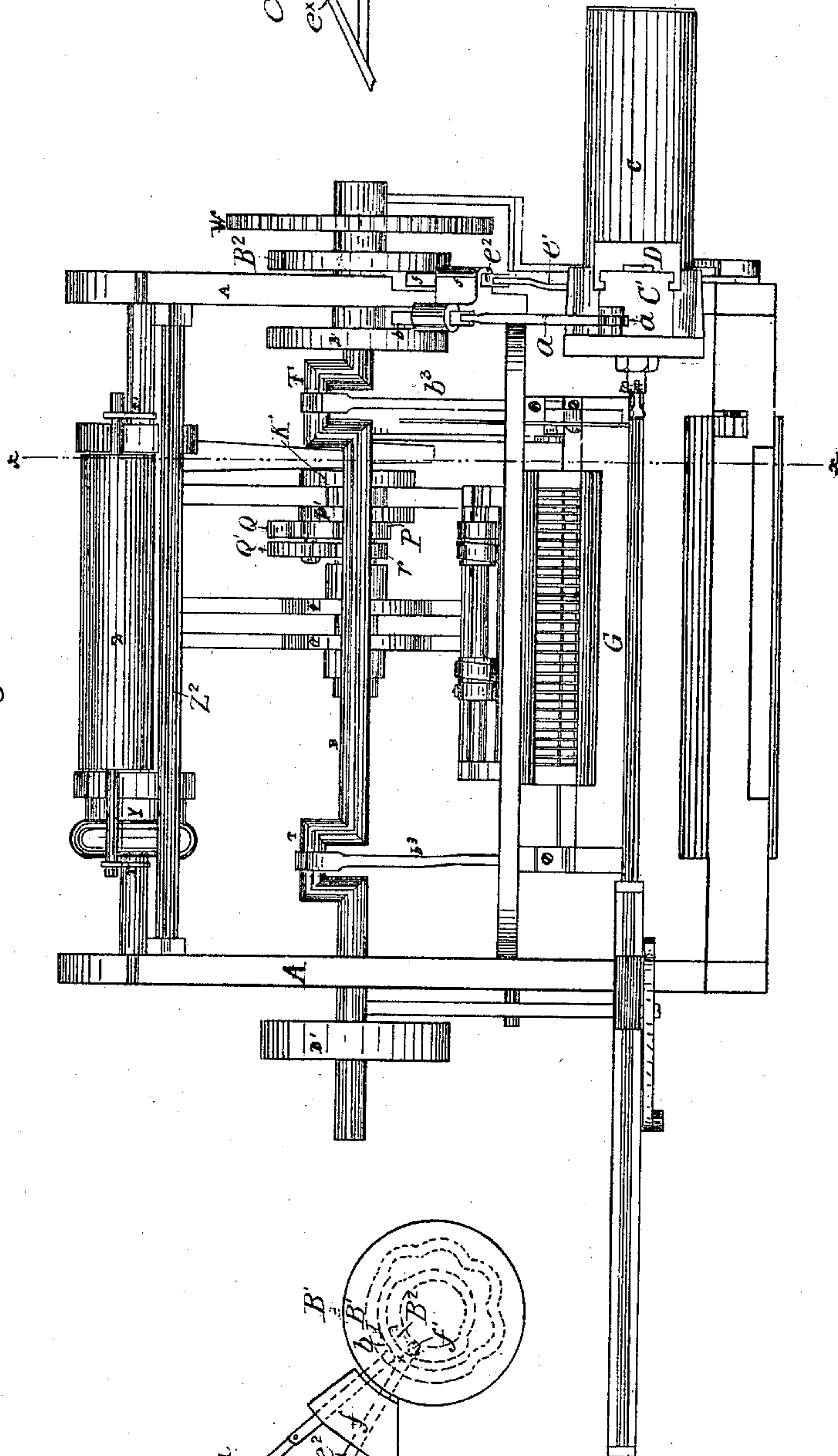
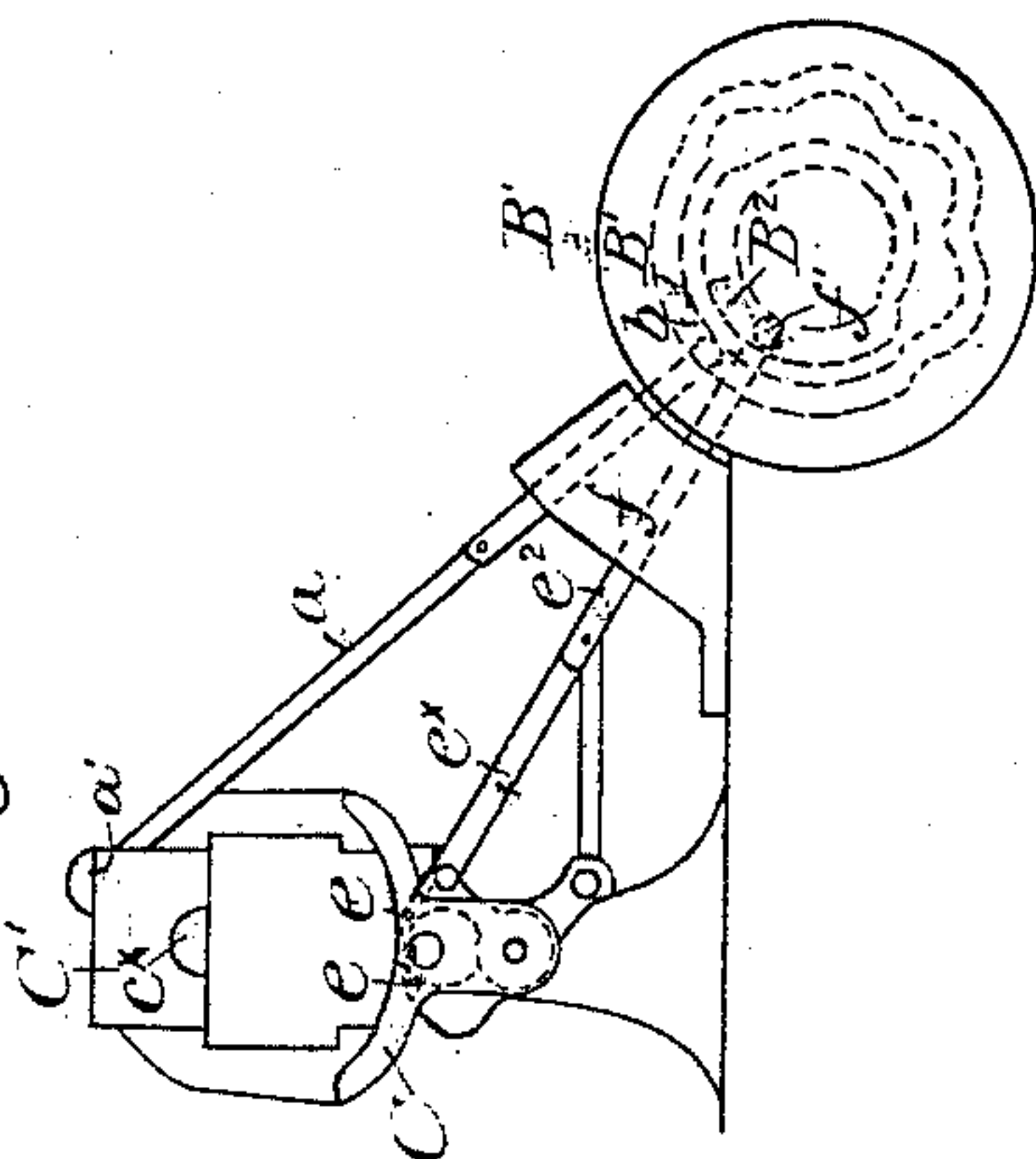


Fig. 1.



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JOHN C. SMITH, OF CHICOPEE, ASSIGNOR TO HIMSELF AND L. D. HILLS, OF
AMHERST, MASSACHUSETTS.

Letters Patent No. 79,923, dated July 14, 1868.

LOOM FOR WEAVING PALM-LEAF.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN C. SMITH, of Chicopee, in the county of Hampden, and State of Massachusetts, have invented a new and useful Improvement in Looms for Weaving Palm-Leaf, and other similar fabrics; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and the letters of reference marked thereon, in which—

Figure 1 is a front elevation of a loom made pursuant to my invention.

Figure 2 is a top view of the same.

Figure 3 is a vertical section through the line *x x*, fig. 2.

Figure 4 is a section of feed-trough C, with the oscillating-box C' removed therefrom, being a top view.

Figure 5 is a detached view of heart-cam D', and a section of the lever-arm *h*, which gives motion to the reciprocating picker-rod.

Figure 6 is a detached view of the pincers or wert-carrier.

Figure 7 is a cross-section of the feed-trough and oscillating-box, showing, also, the connecting-rods to operate the oscillating-box, and the hooks *e e*, and a figure representing the cam-grooves in the two wheels, B¹ and B². As both of said wheels are on the same shaft, with their cam-grooved sides facing each other, one figure is used to represent both, the dotted lines showing the cam-grooves in each, designated by the letters B¹ and B².

Figure 8 is another cross-section of the feed-trough and oscillating-box through line *y y*, fig. 4.

Figure 9 is a detached view of wheel P', with its collar, P, mounted loosely on shaft F, and of star-wheel Q.

Figure 10 is a detached view of the harness-treadles, the cams which operate them, (mounted on shaft F'), and the two gear-wheels Q' and *r*.

Figure 11 is a view of the end of the warp-beam, with the tension-strap and spring passing round said roller, and connecting with the main frame.

Like letters indicate the same parts of the machine in all the figures.

In weaving palm-leaf fabrics, the leaf is first split into thin, flat strips, of uniform width and thickness, and cut into uniform lengths, those composing the woof into lengths equal to the width of the web to be woven. Heretofore, these fabrics have been commonly woven in hand-loom, each strip of the woof being placed by hand in the shed, to receive the blow of the reed. By means of my invention, the necessity of placing said strips in the shed by hand is obviated, as the machine introduces them automatically.

In the accompanying drawings—

A is the main frame, B the driving-shaft, and A' the lay.

C is a concave feed-trough, in which the strips of palm-leaf are laid, in mass, to be fed into the shed.

C' is an oscillating-box, oscillating on a pivot, *c*^x, which is concentric with the concavity in the feed-trough C.

That part of the bottom of the concave trough C which is immediately under the oscillating-box C' is raised by an abrupt offset, *c*², about the thickness of a strip of the palm-leaf as prepared for the web, and through said raised portion of the bottom, in the centre of the concave, there is a longitudinal groove, *c*¹, about the width and depth of a strip of the palm-leaf at its rear end, but cut clear through the bottom of the trough at its front end, forming an open slot.

Said box C is made to oscillate by means of a rod, *a*, pivoted to it at *a*¹, with a stud on the reverse end, working in a cam-groove, *h*, in the wheel B¹, on the main shaft B, and said rod slides in a guide, *f*.

The box C' is open at its bottom, and at both ends, forming a cavity, C², fig. 8, in which the strips of palm-leaf are held, and the whole mass contained therein will necessarily move to the right and left, laterally, on the bottom of the trough C, as the box oscillates therein, and thereby a strip of the palm-leaf is worked down into said groove, and as soon as it is drawn out, another is worked down in like manner.

D is a sliding weight, on the rear end of said box C¹, to keep the strips of palm-leaf pressed down on the bottom of the trough C with an equable and uniform pressure. The bottom of this sliding weight is convex, corresponding with the concavity of the trough C, and it oscillates with the box C¹, being attached thereto by a tongue and grooved connections, so that it will freely slide up and down, without becoming detached.

In the bottom of the trough C, under the oscillating-box, there is an open slot, d, across the longitudinal groove c¹, and from this cross-slot to the front end of the trough C, the groove c¹ is cut clear through the bottom of the trough, forming an open slot.

Two hooks, e e, operate in the cross-slot d, at the proper time, to seize the strip of palm-leaf lying in the groove, and draw it down below the mass, in proper position to be seized by the pincers or weft-carrier, as hereinafter described. These hooks are operated by rods e¹ e^x, both pivoted to a rod, e², working in guide f, and to which motion is given by a stud, f¹, working in a cam-groove, B², in the wheel B², on the main shaft B. The hooks e e seize and draw down a strip of the palm-leaf just before the picker makes its pick, which is effected by the form of the cam-groove in the wheel B².

Immediately under the feed-trough C, and a little in front of the hooks e e, is a sliding bar, v, fig. 8, to which a short sliding motion is given; longitudinally, by means of a pin projecting from the upper end of the rod e^x, working in a slotted projection, v¹, from the under side of said bar v. In the upper side of said bar v is a recess, v², to receive a strip of the palm-leaf when drawn down by the hooks e e. Said bar v so moves in concert with said hooks e e, that when the hooks operate to draw down a strip, the recess v² is immediately under the slot in the bottom of the feed-trough, and receives the strip, but as soon as the strip has been drawn out by the picker, it moves back, so that the straight or plain portion of its upper side comes under the slot, and prevents the next strip entering the groove c¹ from falling too low in the slotted portion thereof. The said recess v² is wider at the bottom than the top, so that if the pincer fails to draw out its strip, the bar v will move without breaking or bending the strip thus left in said recess.

The pincer consists of a pair of pincers, m, on the end of a reciprocating rod, G. This rod moves back and forth through the shed, and it receives its motion from a heart-cam, D', on one end of the driving-shaft B, by means of a lever, h, pivoted to the main frame at h¹, fig. 2, which has a stud at one end working in a groove, i, fig. 5, in said heart-cam D'. The other end of said lever h is pivoted to a connecting-rod, h², the other end of which connecting-rod is pivoted to an angular lever, j, turning on a fulcrum-pivot, j¹, on an arm, a², extending from the main frame A. In the upper end of said angular lever j is a slot, k, embracing a stud, k¹, in a sliding block, H, which carries the reciprocating pincer-rod to and fro, said block H sliding on guide-rods H¹ and H², both of which it embraces.

The pincers consist of a lever-jaw, m, pivoted to the front end of the reciprocating rod G by a fulcrum-pivot, n³. Under the rear end of the lever-jaw m is a spring, i¹, which keeps the front end of the jaw closely pressed down on the end of the pincer-rod, (forming the under jaw of the pincers,) except when pressure is applied to the rear end to depress the spring i¹, and cause the upper jaw to rise.

In front of the plate C³, which covers the front end of the oscillating-box C¹, is a pendent latch, i², turning outward from the box C¹ freely, on a pivot, i³, but prevented from turning in the other direction by a stop-arm, l, the end of which bears against the plate C³.

As the rod G moves forward to take a strip of palm-leaf, the lower end of the latch i², coming in contact with the inclined plane on the rear end of the lever-jaw m, depresses said rear end, causing the jaws to open. The rear end of the lever-jaw m passes the latch i² just as the rod G is finishing its forward movement, when the spring i¹ causes the front end suddenly to close down, seizing the end of the strip, which has been presented for that purpose by the hooks e e. As the rod G moves back, the latch i² swings out freely, and allows the lever-jaw m to pass by without depressing its rear end. As soon as the weft-carrier has drawn the strip to its proper position in the shed, the jaw m passes under a projection from the side-bar of the lay, and the inclined plane on the rear end of said lever-jaw coming in contact with said projection, is depressed, causing the front end to rise, and release its hold upon the strip.

The machine is so constructed and arranged that if, from any cause, the pincer accidentally fails to seize and draw out a strip, the cloth-beam and harness will stop until it makes another and successful pick. I will now proceed to describe the mechanism by which this is effected.

N is a lever, pivoted, at n, to an arm projecting from the side-bar of the lay, next to the feed-trough. This lever is carried to and fro by the lay, and its rear end rides and slides upon the end of an upright lever, R. It has a notch, n¹, on the lower side of its rear end, and an incline, n², immediately in the rear of said notch. When the lay lies back, in the position shown in fig. 3, the lever N rests, near its fulcrum, on the upper end of lever R; which holds said lever N in a nearly horizontal position. As the lay begins to move forward, the pincer begins to recede from the feed-trough, and, if it has seized and drawn out a strip of the palm-leaf, said strip, crossing above the front end of said lever N, will hold it down, causing the notch n¹ to pass the end of lever R without engaging therewith; but, if the pincer fails to draw out a strip as soon as it (the pincer) passes the front end of said lever N, there is nothing to prevent the heavier rear end of said lever from falling down and riding upon the upper end of said lever R. Consequently, the notch n¹ will engage with the upper end of lever R, and draw it forward, causing the cloth-beam to stop revolving, as follows: The cloth-beam E is rotated by means of a pawl, E¹, the rear end of which is connected with a cam on the outer end of shaft F by means of a cam-yoke. The front end of the pawl E¹ engages with a ratchet-wheel, E², geared, by means of pinions o and o', with the cloth-beam E. At each revolution of the shaft F, the pawl E¹, operated by the cam on said shaft F, moves the ratchet-wheel E² the extent of one tooth, and this wheel, by its gearing, rotates the cloth-beam, as before stated. Projecting from the lower end of lever R, at right angles, is an arm, R¹, (shown most distinctly in fig. 1,) which extends a little beyond the outside of the main frame, and under the said pawl E¹. When the

weft-carrier fails to draw out a strip, and the rear end of lever N consequently falls down, so that its notch n^1 will engage with the upper end of lever R, and draw it forward, as heretofore described, said arm R^1 , projecting from the lower end of said lever, will move back under the inclined pawl E^1 , raising its front end, so as to clear the teeth of the ratchet-wheel, and so the cloth-beam will cease to be rotated by said pawl and ratchet-wheel.

I will now proceed to explain how the failure of the picker to draw out a strip stops the harness, as well as the cloth-beam. The harness is operated by means of cams O and O' , mounted on a shaft, F' , which lies in the same longitudinal plane with the shaft F, the inner ends of said two shafts meeting at z. On the inner end of the shaft F is a loose collar or sleeve, P, on which is mounted a wheel, P' . Projecting from the side of this wheel P' is a pin or crank-wrist, p , which engages alternately with four notches or slots, p' , in a star-wheel, Q, revolving on a separate shaft, q , so that, when said wheel P' revolves with the shaft F, it will, at each revolution, turn the star-wheel Q one-fourth of a revolution by means of said crank-pin p engaging with one of the slots, p' , in the star-wheel. On the same shaft with the star-wheel Q is a cog-wheel, Q' , which engages with a pinion, r , on the shaft F' , which operates the harness by means of the cams O and O' . Pivoted to the lower end of lever R, and extending back horizontally, or nearly so, is a rod or arm, R^2 , the rear end of which is pivoted, at r' , to a pendent latch or stop, J. K is a clutch, pivoted to a wheel, K' , which is also mounted on the loose collar or sleeve P. Under one end of this clutch is a spring, s , having its seat in a stud projecting from the side of said wheel K' , which presses a spline or cog, s' , on the other end of the clutch, down upon a fixed collar, t , on the shaft F, so that it will engage with a notch or slot, t' , in said fixed collar, causing the shaft F and its loose collar P, with the wheels P' and K' , to rotate together, except when said clutch is disengaged, as hereinafter described. When the lower end of said lever R vibrates rearward, the pendent latch or stop J also vibrates in the same direction until its lower end rests against the end of a rigid bar, M. While the latch is in this position, it will hold the spring-end of the clutch down, so as to prevent the spline or cog on its other end from engaging with the notch or slot t' , and will also prevent the loose collar P from revolving, as the clutch cannot pass under the end of the latch J while it is in this position, and so the shaft F will rotate without operating the shaft F' , on which the cams that operate the harness are mounted. Now, it will be seen that, if the weft-carrier fails to draw out a strip, the lever N will fall down on the lever R, as hereinbefore explained, so that the notch n^1 will engage the upper end of said lever R, and draw it forward as the lay makes its stroke, thereby causing the lower end of said lever R to vibrate rearward, pushing the latch J back against the end of bar M, pressing down the spring-end of the clutch K, so as to prevent its opposite end from engaging with the notch or slot t' in the fixed collar t on shaft F, and thereby causing said shaft F to revolve without rotating the shaft F' , which operates the harness; consequently, the motion of the harness must cease.

The lay is operated by two cranks, T T, on the main shaft B, with connecting-rods b^3 , so that the lay makes one forward and one backward movement to each revolution of said main shaft. The heart-cam D' , on the end of said shaft, also operates the reciprocating pincer-rod G, so that it makes one forward and one backward movement to each revolution of the main driving-shaft B. The harness is also so geared that it makes but one change to one revolution of said main shaft, or while the weft-carrier goes through the shed and returns. This is effected as follows: The harness is operated by the cams O and O' acting alternately on treadles x and x' . At each half revolution of the shaft F' , one or the other of said cams will operate on its treadle, bringing down the harness, to which it is connected, and, of course, carrying up the other, as they are both suspended by the same straps, passing over pulleys. The shaft F and the main shaft B are so geared together, by means of cog-wheels of equal size, W and W' , that they will rotate alike. Each revolution of the shaft F turns the star-wheel Q one-fourth of a revolution, as has been heretofore explained; and the said star-wheel is so geared with the shaft F' , by means of the cog-wheel Q' and the pinion r , that one-fourth of a revolution of the star-wheel causes one-half a revolution of the shaft F' , and, consequently, one change of the harness to one revolution of the main shaft B, and while the reciprocating weft-carrier and the lay each make one forward and one backward movement. On said star-wheel Q are four concaves, u , between the slots p' . The loose collar P has a notch or cavity, u' , in one side, and, when the star-wheel is making its quarter revolution, the projecting spur of said star-wheel enters said notch or cavity, and so passes the collar P, but during all the remainder of the revolution of said collar P it fits into one of the concavities between the spurs of the star-wheel, and prevents the possibility of its revolving further until the pin or crank-wrist p again comes round and enters one of the slots p' of the star-wheel. By this means, the possibility of any movement of the harness, except at the proper time, is effectually prevented.

On the side-bar of the lay next to the feed-trough, in close proximity to the lever N, is a projecting arm, y , with an open slot, y' , just wide enough to receive the strip and hold it flat, the front end of the lever N bearing against its lower side at the same time, and tending also to prevent it from turning or twisting.

Y is the warp-beam, and Y^1 is a tension-strap, passing round one end of the same, and attached to the main frame A by a spiral spring, Y^2 . Z is a nipping-roller, (the outer surface of which is of rubber or some other elastic substance,) attached to the shaft of the warp-beam Y by means of links Z^1 . These links are so loosely fitted on the shaft of the warp-beam as to allow them to turn thereon; and the journals of the nipping-roller Z have their bearings in the other ends of the said links. The warps are held firmly between the nipping-roller and warp-beam Y, so that they will only be fed forward as the warp-beam revolves, and will not slip between it and the nipping-roller. The tension of the strap and spring, Y^1 and Y^2 , may be adjusted by a temper-screw or any other suitable means, so that the warp-beam shall revolve with sufficient freedom, without causing any undue strain upon the warp. The strips of palm-leaf composing the warp are necessarily of limited length, and require to be spliced as the weaving progresses. Hence, the necessity of the nipping-roller, to hold the warps to their places, by its pressure or pinching, upon the warp-beam, leaving the rear end of those strips which are

in the loom free, so that others may be spliced thereon while they are being woven into the web. Z^3 is a small roller, crossing the frame in front of the nipping-roller, to prevent it from going too far forward.

Having thus fully described my machine and its mode of operation, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a reciprocating weft-carrier, the feed-trough and oscillating-box, constructed substantially as and for the purpose set forth.

2. In combination with the feed-trough and oscillating-box, the sliding weights D' , substantially as and for the purpose described.

3. In combination with the feed-trough and weft-carrier, the hooks e , operating substantially as and for the purpose specified.

4. In combination with the feed-trough, weft-carrier, and hooks e , or their equivalents, the sliding bar v , substantially as and for the purpose set forth.

5. The mechanism, substantially as described, for causing the cloth-beam and harness to stop when the pincers fail to make a successful pick.

6. The slotted arm y , attached to the lay, to receive the strip of palm-leaf, and prevent it from turning or twisting, substantially as described.

7. The lever N , so arranged that it will bear against the lower side of the strip of woof while the same is being drawn into the shed, and thereby tend to prevent it from twisting or turning.

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