

Sheet 1-2 Sheets.

N^o 8,656.

Patented Jan. 13, 1852.

Fig. 1.

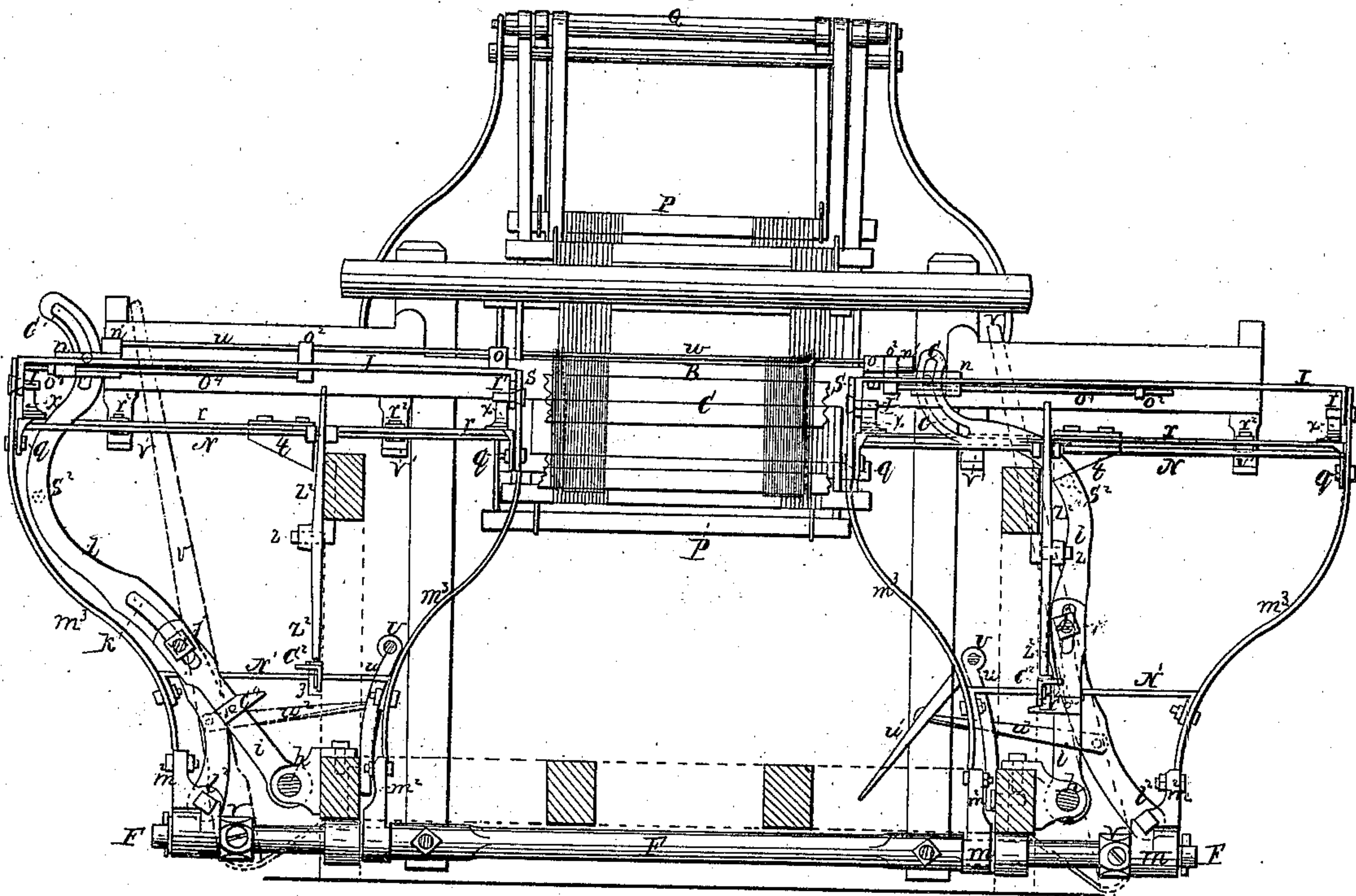
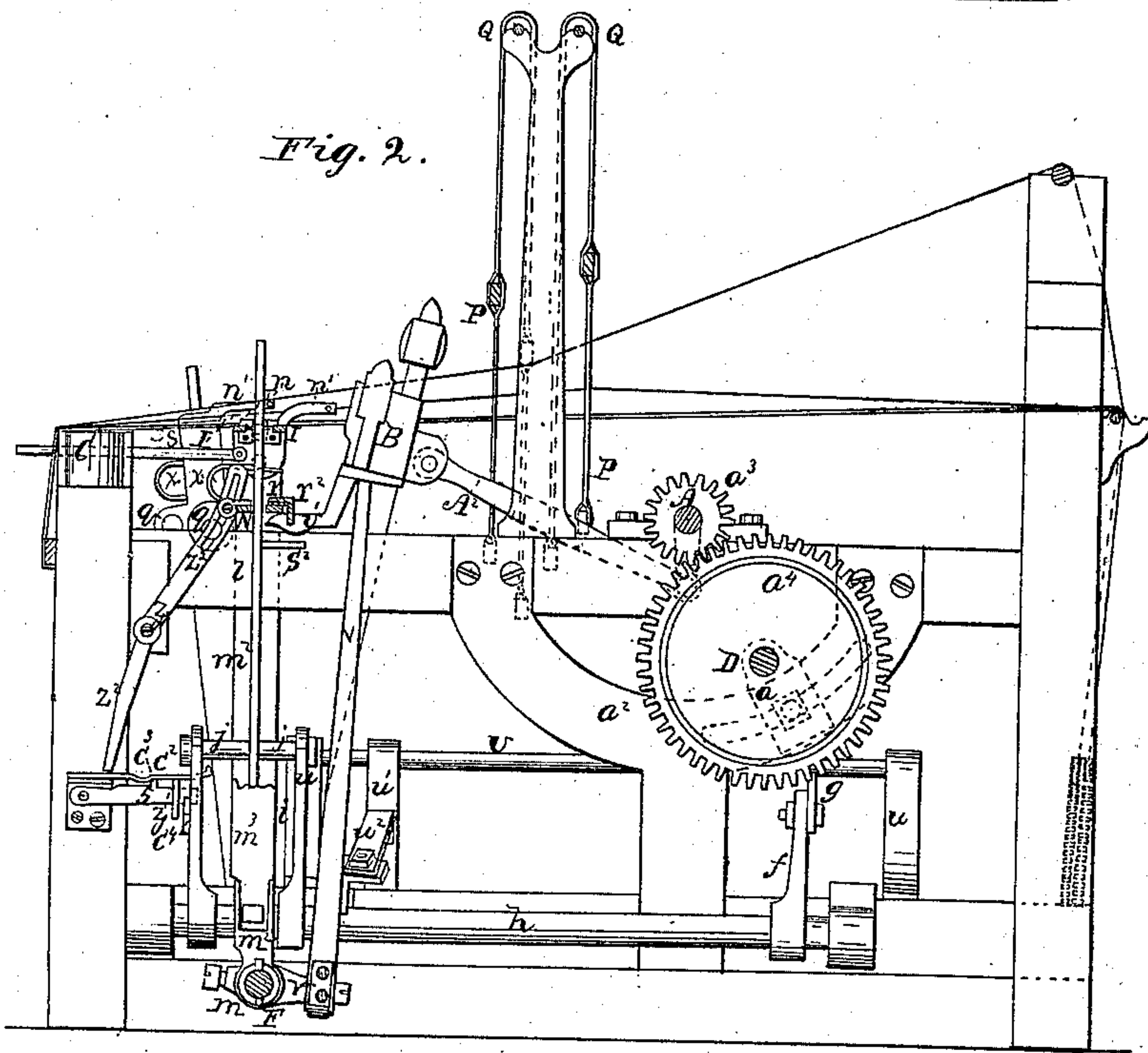


Fig. 2.



C. A. Maxfield.
Weaving Pile Fabric.

Sheet 2 - 2 Sheets.

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Fig. 3.

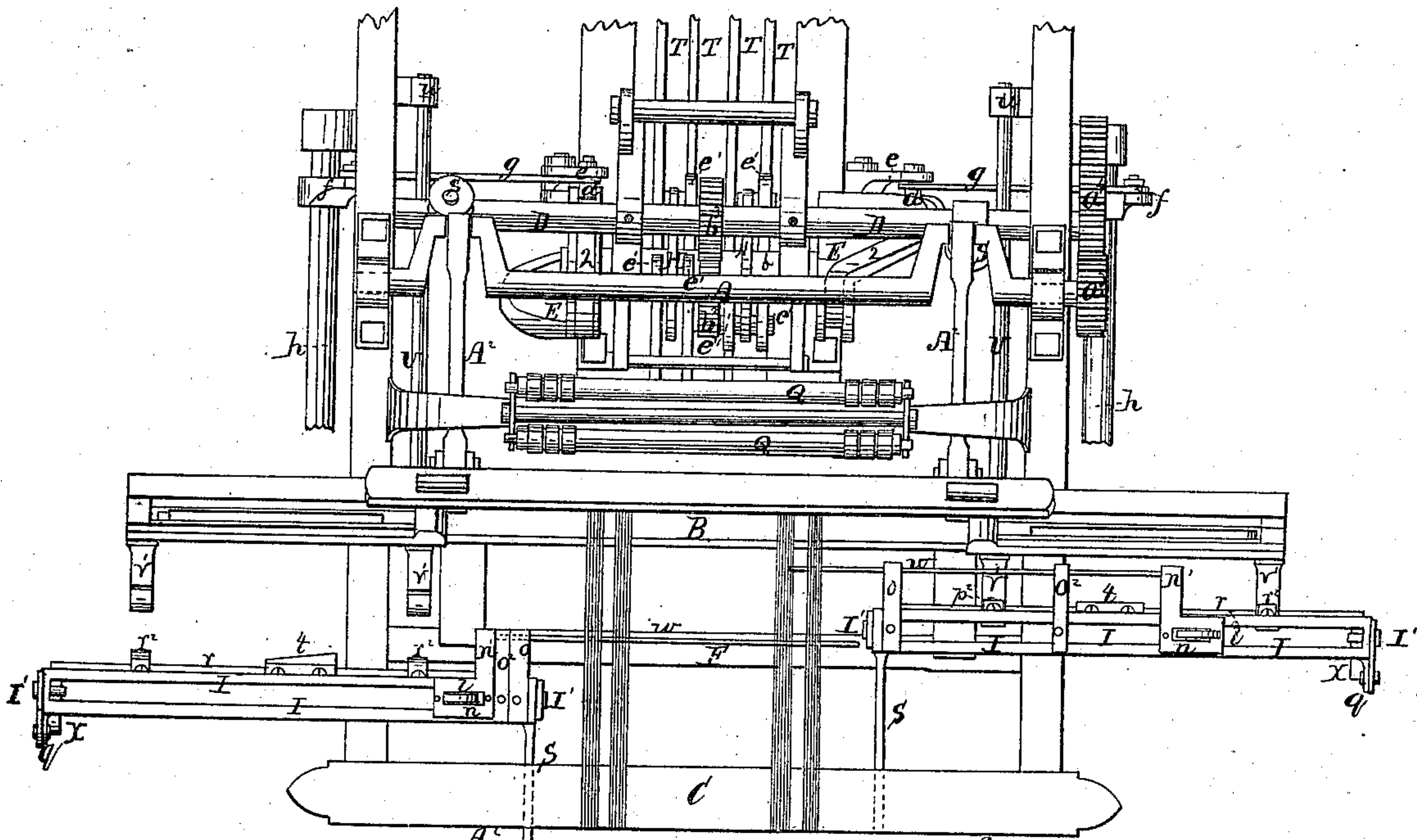


Fig. 4.

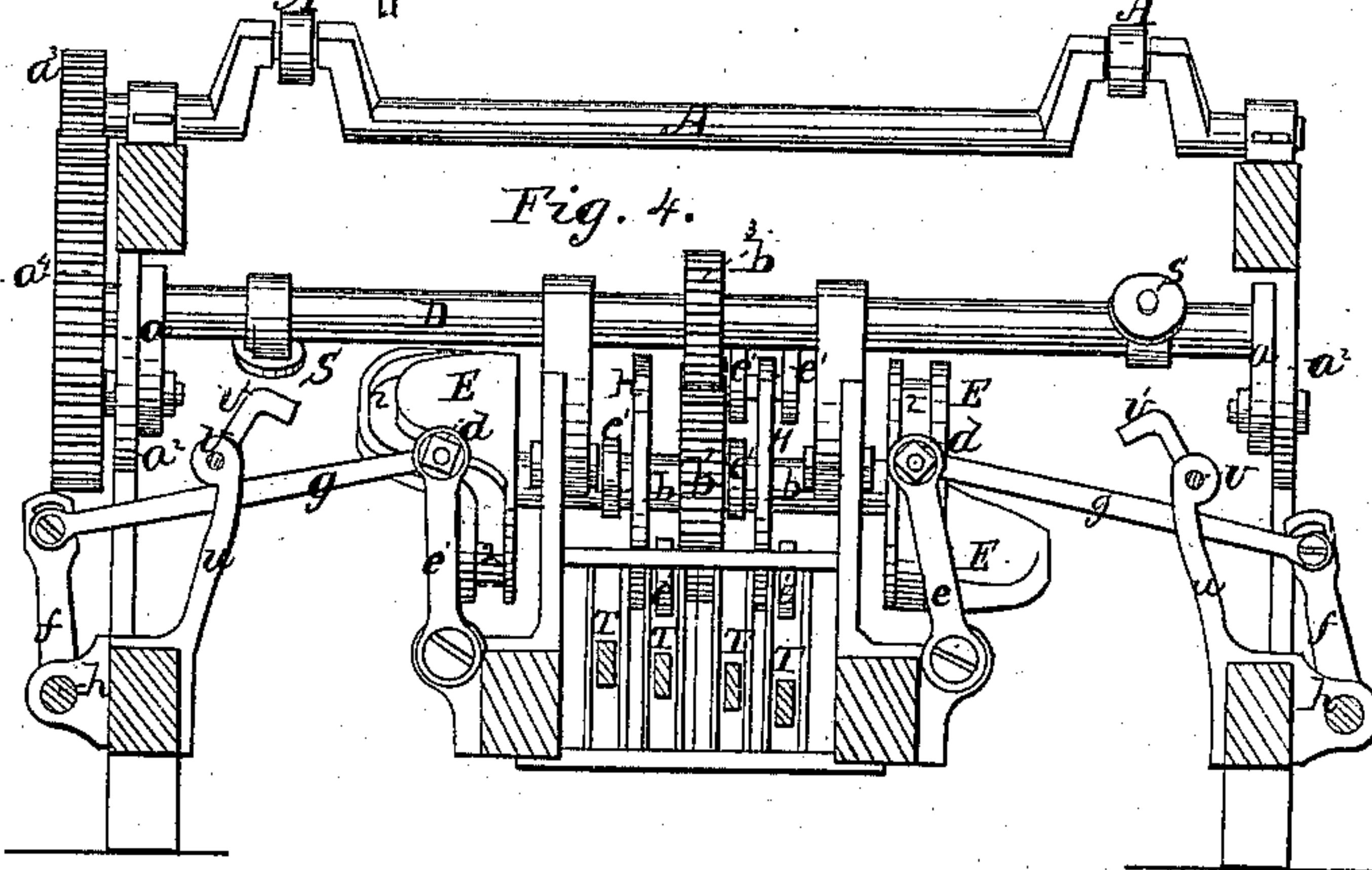


Fig. 5.

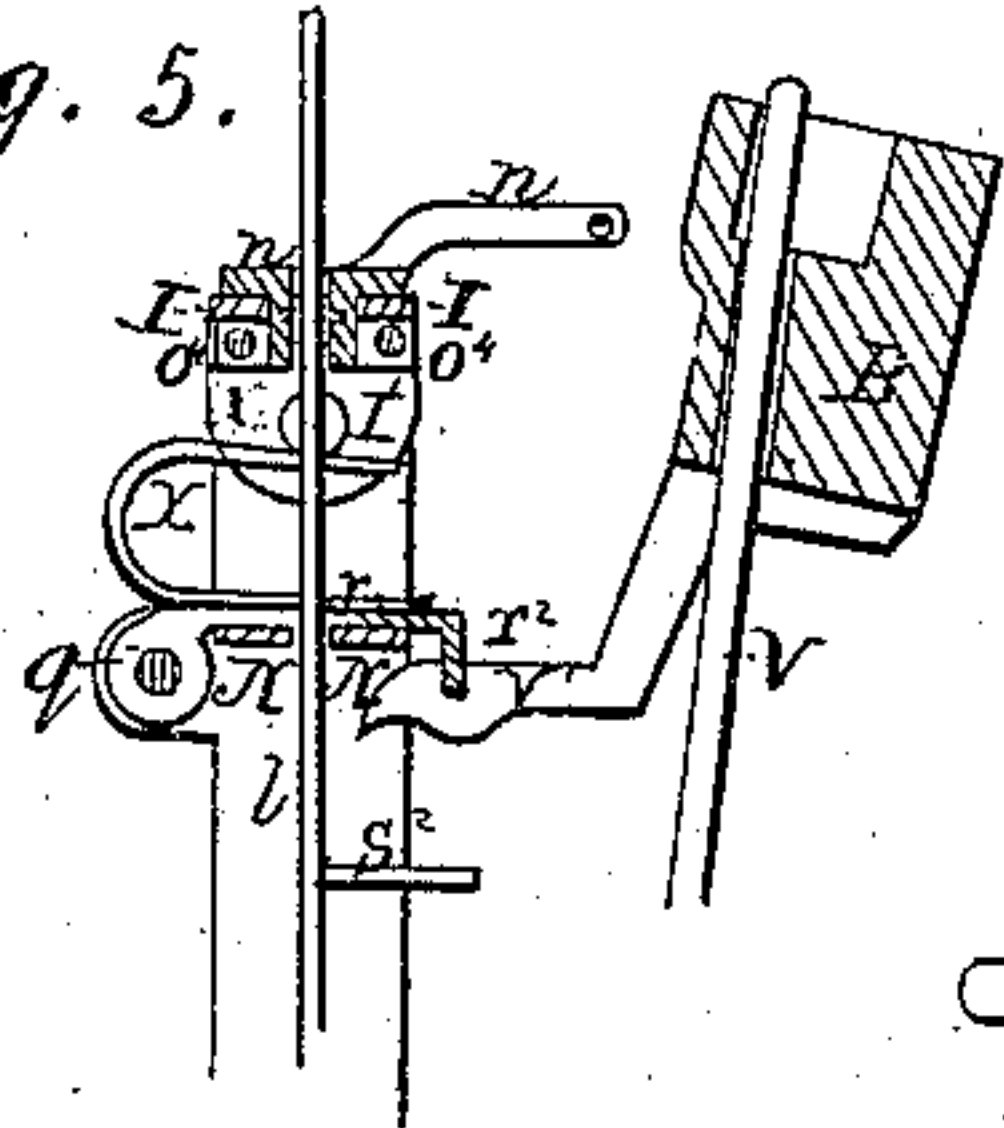


Fig. 6.

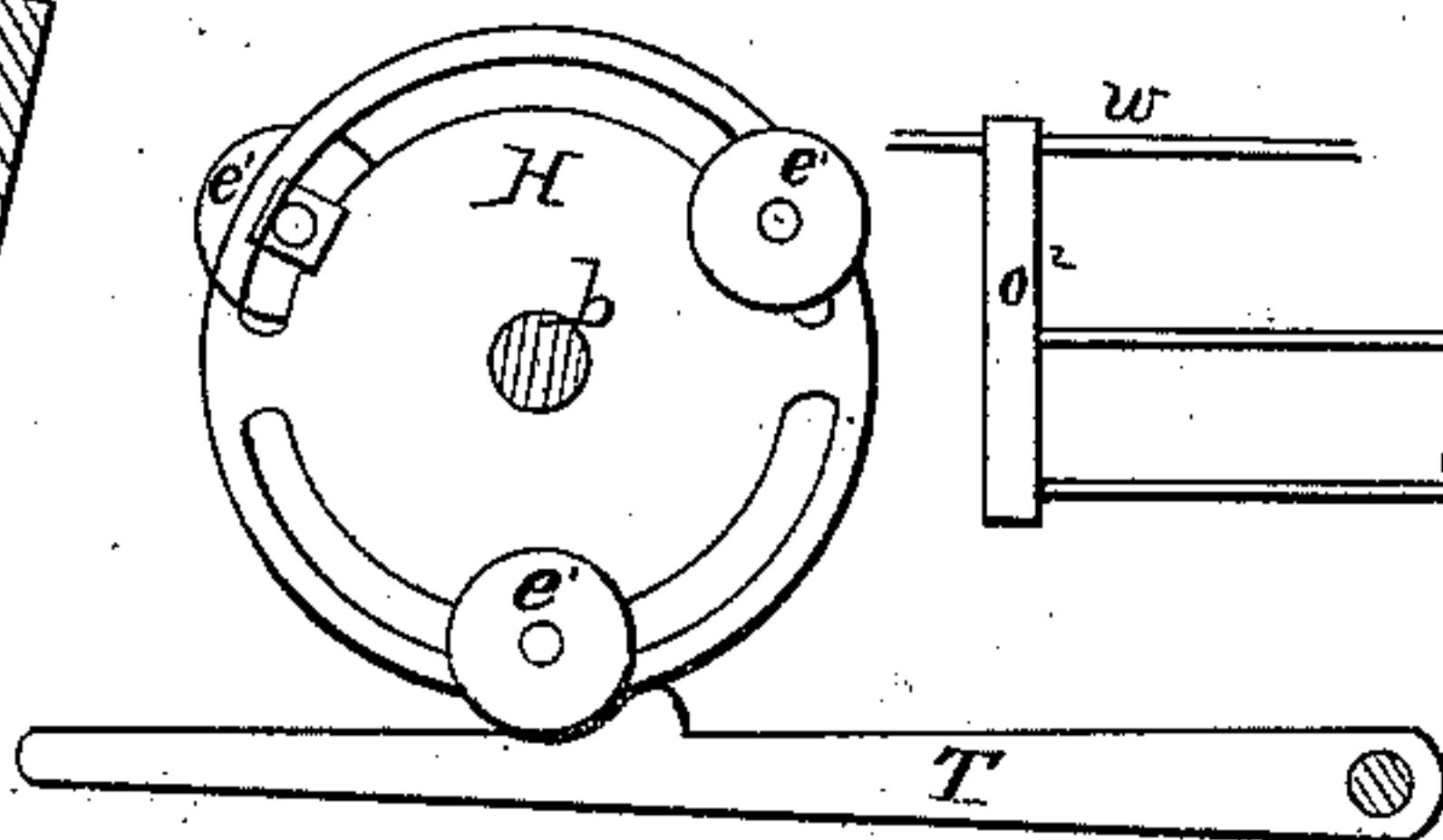
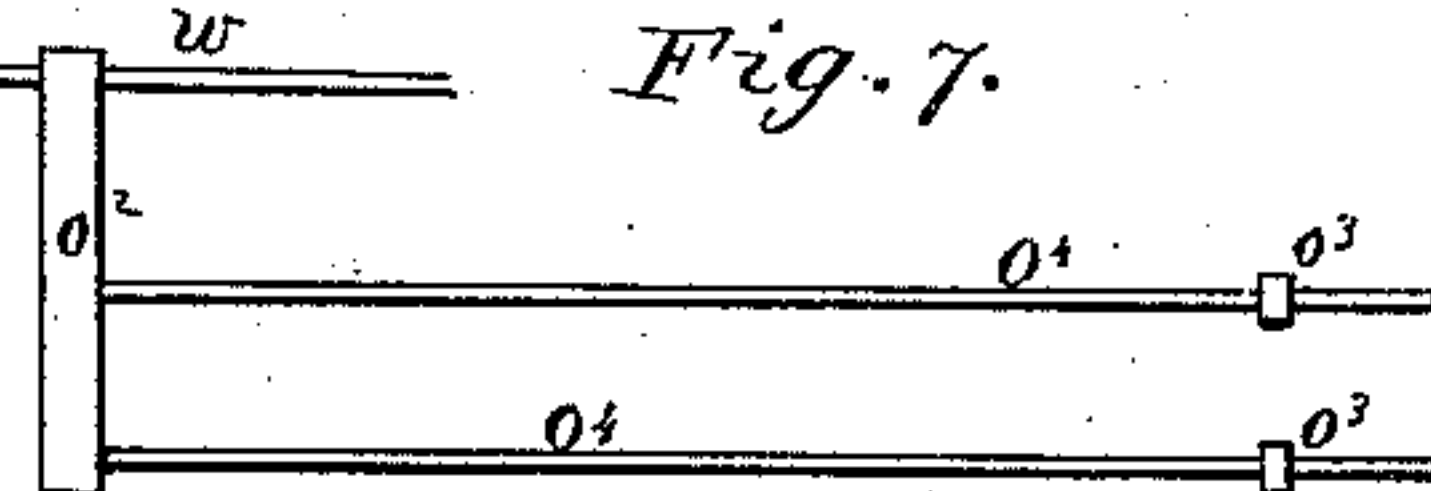


Fig. 7.



UNITED STATES PATENT OFFICE.

CHARLES A. MAXFIELD, OF TROY, NEW YORK.

LOOM FOR WEAVING PILED FABRICS.

Specification of Letters Patent No. 8,656, dated January 13, 1852.

To all whom it may concern:

Be it known that I, CHARLES A. MAXFIELD, of the city of Troy, in the county of Rensselaer and State of New York, have
5 invented certain new and useful Improvements on the Loom for Weaving Pile and Cut-Velvet Fabrics; and I do hereby declare the following to be a full, clear, and exact description of the construction and
10 operation thereof, reference being had to the annexed drawings of the same, constituting part of this specification.

The nature of my invention and improvement consists in the arrangement and employment, on either side of the loom, between the breast beam and the lay, of two
15 vibrating wings, each mounted upon the ends of the lay rock shaft, and moving independent thereof, and of each other, upon which the pile or figuring wires are supported, and operated by means of peculiar
20 curved levers having their fulcra in the base of each wing, and receiving their motion through horizontal side rock shafts, whereby the insertion and withdrawal of
25 the wires is regulated so as to allow any desired number of picks of the woof before the withdrawal of the wire, whereby any degree of firmness is given to the web, while the motion of each wing (for the purpose of carrying the wire from the woven
30 pile when withdrawn in a position to be re-inserted into the open shed) being effected by arms projecting from the lay, and locking with catch plates of each wing at the
35 moment the wire is withdrawn, and simultaneously with its re-insertion the wing is disengaged from the lay and retained in a proper position by means of pivoted holding
40 levers where by the figuring wires are held steadily in the warp during the vibration of the lay.

To enable others skilled in the art to make and use my invention, I will proceed to give
45 a more particular description of the construction and operation thereof.

In the annexed drawings: Figure 1, is an elevation of the front of the loom, the right pile or figuring wire having been inserted
50 into the shed, and the breast beam and front timbers removed in order to show the parts in the rear thereof. Fig. 2, is an elevation of the right side of the loom. Fig. 3, is a top view of the loom. Fig. 4, is a sectional elevation of the rear of the loom. Fig. 5,
55 is a sectional view of the upper portion of

one of the wings as locked to the lay. Fig. 6, is a sectional view of the tread wheel, &c. Fig. 7, is a top view of the arm o^2 , and its rods o^4

Where the same letters of reference occur on the several figures, they indicate the same parts.

A, is the crank shaft from which the lay B, receives its motion through the connecting arms A^2 A^2 , with the several parts of the loom.

C, is the breast beam of the loom.

D, is a shaft mounted in adjustable bearings a in the sides a^2 of the frame below the crank shaft A and receiving its motion from the latter by a pinion a^3 thereon
70 matching with a cog wheel a^4 , on the end of the shaft D, so that the latter makes one revolution to three of the crank shaft A.

b is a short cam shaft mounted in suitable bearings in the frame work at a proper height from the base beams of the frame to allow the treadles to play beneath the same. This shaft b is provided with a cog wheel b^2 matching with a pinion b^3 on the shaft D, whereby the shaft b receives its motion which is one revolution to six of the crank shaft A, for common tapestry carpeting. This short shaft b is situated about one
80 third distant from the rear of the loom, and is provided at either end with a peculiar shaped cam wheel E, placed relatively so as to act successively during their revolution and furnished alike with a groove 2 within which plays an anti-friction roller d mounted in the end of an arm (e), supported by a box or bearing on the central beam of the frame so as to allow its upper end to move right and left with the direction of the groove 2, whereby a similar motion is communicated to a horizontal shaft h (supported in bearings at either side of the frame) by means of a rod g connecting the arm e , with a similar arm f on the rock shaft h , see Fig. 4.

On the front end of each rock shaft h , there is mounted two arms i i , connected at their upper ends by a horizontal rod j , passing through a slot k in the curved lever l , whereby the figuring wires are actuated, at the proper moment.

The lay B is supported in the usual manner by a transverse rock shaft F, secured by hanging boxes.

On the inside of the base side beams of the frame are mounted in studs u two hori-

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zontal rock shafts U, near the rearward ends of which are cam arms U^1 so placed as to receive the action of antifriction rollers S in the ends of arms secured on the shaft D, whereby the said shafts U are made to rock alternately in such a manner as to operate the picker staves V, which are connected to the front ends of said rock shafts U by arms u^1 and straps u^2 for throwing the shuttle.

On either side of the cog wheel b^2 on the short cam shaft b , there is situated a tread wheel H, provided with the requisite number of rollers e^1 (single or in pairs) for depressing the treadles T, which are attached to the rear base beam and connected to the several harness frames P (which may be three or four depending on the fabric to be woven) and which may be arranged in the usual manner and supported by the rolls Q of the arch.

The picker staves V are attached to the lay rock shaft F by suitable bearing arms v , see Fig. 2. On either end of the lay rock shaft F, (which project beyond the sides of the loom a suitable distance) are mounted the wings carrying the pile or figuring wires w , on which the loops or pile is raised. Each of these wings is constructed in the following manner. On the lay rock shaft F, inside of the base beam, and on either end of said shaft F, is placed a box or bearing m , moving loosely thereon, from which project arms m^2 . From the arms m^2 are reared end plates m^3 to a height equal to the breast beam C and curving somewhat after the form of an ogee, whereby the upper ends thereof are distant from each other, about double that of their lower ends; to the upper ends of which plates m^3 are pivoted at I^1 , the bent or right-angled ends of a plate I, constituting two parallel ways I, situated exactly at right angles to, and nearly in the same horizontal plane with the shed of the warp. Upon these ways I there is mounted a sliding plate n , having grooves in its sides corresponding with the ways I and provided with a rearward projecting arm n^1 slightly elevated above the ways I and from the end of which extends the loop or pile wire w in a position to enter the shed when open. From the inner end of each way projects rearward an arm o through which the inner end of the pile wire passes, whereby the latter is guided and supported when being inserted or withdrawn from the warp. From these ways also extends rearward an arm o^2 , through the end of which the wire passes, and whereby the middle thereof is sustained and prevented from vibrating during the movement of its carrying plate n . This sustaining arm o^2 is grooved and made to move over the ways I, with the carrying plate n from the inner arm o , over about one third the length of the ways; the move-

ment thereof inward being effected by the advance movement of the carrying plate n and the outward or receding movement of the carrying plate n strikes against two nuts o^3 secured on the ends of two horizontal rods o^4 , extending from the arm o^2 (beneath the ways) and passing through the lower portion of said carrying plate n , whereby the said arm o^2 is made to move over the ways with the carrier in a position to support and steady the middle of the pile wire. The pile or figuring wires are each operated alternately by means of a peculiarly curved lever l , mounted on a bolt l^2 in the arm m^2 of the bearing box m of the wing and projecting upward between the ways I and through an opening in the carrying plate n and provided with a curved slot c at its upper end within which plays a small anti-friction roller turning on a pin in the opening of the carrying plate n and also furnished with a slot h , through which passes the horizontal rod J of the upward projecting arms i of the side rock shaft h , whereby the insertion and withdrawal of the figuring wire at the proper moment is effected—the slots in the lever l accommodating for its back and forth movement with the carrier n and rod J. Each of these levers l have a movement toward the warp or web sufficient to carry the wires entirely through the open shed. The curved end plates m^3 of the “wings” are braced by horizontal connecting plates N N^1 near the upper and lower ends thereof—said plates having grooves or slots to allow the movement of the lever l .

On the upper connecting or brace plate N and beneath the horizontal ways I, rests a narrow spring plate r pivoted to each curved end plate m^3 by arms q , whereby it is allowed to rise and fall; and is provided at either end with a spring X so curved as to act against the inward projecting pivots I^1 of the horizontal ways I and thereby retain said spring plate r in its proper position whether locked or unlocked to the vibrating lay. From the rearward edge of the spring plate projects two right angled catch plates r^2 , which are made to interlock with grooves formed in horizontal arms v^1 , extending forward from the bottom of the lay beam B, when the latter moves frontward and the pile wire is withdrawn, whereby the said pile or loop wire is carried rearward with the lay in a position to be re-inserted into the shed which is opened simultaneously with said rearward movement of the wire. After the wire is reinserted, it is brought forward to the web or cloth, by the motion of the lay, ready for the first pick—and remains in the web, until the desired number of picks are thrown.

The upper surface of the ends of the pro-

jecting arms v^1 of the lay B are made convex so as to pass beneath and elevate the catches r^2 of the spring plate r . In order that the pile or figuring wires w shall move in a horizontal plane during the vibration of the "wings", there projects from the inner end of the ways I a horizontal rod s through an opening in the breast beam, whereby the said ways over which the pile wires move are always kept horizontal, or in the same plane with the open shed, by reason of being pivoted at I^1 . Simultaneously with the insertion of the wire, a pin s^2 projecting from the curved lever l is made to act against an inclined plate t , whereby the latter with the spring plate r is elevated and held in that position until the withdrawal of the wire;—and the catch plates r^2 disengaged from the arms v^1 of the lay B, which then recedes and vibrates as before, and the "wing" retained steadily in its position in the manner following.

On either side of the frame of the loom and in front of the "wings" is mounted upon a projecting pin z a locking lever Z^2 , the upper end of which being provided with a slot within which works a small pin or roller secured to the edge of the upper connecting or brace plate N to allow the vibration of the lever Z^2 and whereby the "wing" is united thereto:—while the lower end of said lever Z^2 is made to vibrate over a horizontal spring plate c^2 beneath which is a pivoted arm 5 resting in a slot formed in a hanging plate 3 of the spring plate c^2 and from which pivoted arm 5 a stop pin c^3 projects (at intervals above the spring plate c^2) by means of a short inclined plate c^4 projecting inward from the outer arm i of the side rock shaft h ,—thus when the wing is locked to, and moving with the lay B the lever Z^2 will pass freely over the spring plate c^2 and when the wire shall have been inserted by the inward movement of the curved lever l , the plate c^4 of the arm i will pass beneath the end of the pivoted arm 5 and elevate the stop pin c^3 above the spring plate c^2 against which the end of the lever Z^2 strikes, and the spring plate c^2 being also slightly elevated is made to bind against the end of said lever Z^2 (there being a slight cavity in said spring plate c^2 to receive the end of the lever as seen in Fig. 2) whereby the wing with its figuring wire is prevented from moving while the loops are being formed. Should it be desired to open the lower or proper shed for the passage of the shuttle, simultaneously with the opening of the worsted warp for the insertion of the loop or pile wire, the gearing of the shafts A and D must be changed so as to regulate the action of the heddles accordingly.

It will be understood that this loom may be adapted to the weaving of velvet or other

cut pile carpeting, in which case an additional pick or throw of the shuttle will be required; and in addition thereto each wire must be provided with a knife. This change is effected in the following manner. The pinion a^3 on the crank shaft A and the cog wheel a^4 on the shaft D are removed and a pair of gear wheels placed in their stead whose relative size is as two to one, the larger wheel being placed on the shaft D. The cog wheel b^3 on the shaft D must also be removed and a wheel one fourth the size of the wheel b^2 placed in its stead and made to match with the said wheel b^2 ;—the shaft D being mounted in adjustable bearings can easily be accommodated to this change. The cam wheels E E must also be removed from the shaft b and a pair of cam wheels placed in their stead a section whose grooves are made with a sharper angle whereby the anti-friction roller d is deflected from a right line in order to insert and withdraw the wire at the same speed as before described, notwithstanding the speed of the shaft b is decreased while the speed of the crank shaft A is the same.

Instead of the rollers S on shaft D, I secure on the said shaft near each end thereof two parallel projecting arms in the ends whereof are rollers diametrically opposite each other. In the ends of the shaft b (which must be longer than the one represented in the drawings) I secure two cam wheels of the same diameter as the cam wheels E, and provided on their periphery with prongs arranged relatively so as to produce the required action. The object of which is to operate the horizontal shaft U at either side of the loom by means of a horizontal lever about 20 inches long mounted in a box or stud about one third the distance from the end thereof which box or stud is bolted to one of the center base beams. The short end of said lever contains a small roller which is situated directly over the prong cam wheel to receive the action thereof. The long arm of the lever extends to the arm u and is connected thereto by a strap. The object of this arrangement is to operate the cam arm U^1 on the shaft U by elevating said cam arm to receive the action of the rollers on the projecting arms of the shaft D—said cam arms U^1 being held down to allow the roller to pass over the same when not required to act by means of a spiral spring attached to the upper end of the cam arm, and the inside of the lower base beam which has the effect of drawing the arm downward except when elevated by the levers which are actuated by the rotation of the prong cam. This motion being required in order to throw the shuttle twice from one side of the loom, and only once from the opposite side and then allow the shuttle to rest—when the shuttle will be

thrown twice in succession from the side in which it rested and but one from the opposite side and so on alternately throwing two picks in succession from one side and
 5 one pick from the opposite side. There is also added to the tread wheel H a sufficient number of rollers to depress the worsted warp twice and the lower or thread warp once to each wire, which gives three picks
 10 to each wire which is required to weave the best velvet.

Operation of the loom in weaving tapestry carpeting.—Motion being given to the crank shaft A, puts in motion the pinion a^3
 15 which matches into a gear wheel a^4 on shaft D, and by the pinion b^3 and gear wheel b^2 turns the short cam shaft b and with it the tread wheels H, the single rollers e^1 whereof depressing the left, and one of the middle
 20 treadles T, which are connected with the front and back leafs of the harness, thereby bringing the front and back leaf down, the front leaf depressing the coarse chain, and worsted, and the back leaf half of the fine
 25 chain, and simultaneously therewith the middle leaf is carried up containing half the fine chain (operated by straps connecting the arch rolls Q). Simultaneously with this movement the lay beats up the left wire w
 30 against the woven pile, and the shuttle is thrown from the left to the right side of the loom, the anti-friction roller d having traversed the straight portion of the groove 2 of the cam wheel E, which forms about
 35 two thirds the circumference of said cam wheel; and this completes the first revolution of the crank shaft A.

During the second revolution of the crank shaft, the anti-friction roller d will have
 40 been diverted in the groove 2 of the right cam wheel E, at an angle of 55 degrees from the direct line of the groove, whereby the side rock shaft h is operated and the figuring wire w withdrawn from the woven
 45 fabric with the outward motion of the right lever l ; the right treadle T, and the middle one on the left is depressed by the action of the rollers e^1 which carries up the back and front leaves of the harness, the former raises
 50 half of the fine chain, and the latter raises the coarse chain (the worsted being raised by the aid of a roller back of the harness) the middle leaf of the harness is carried down by the middle treadle on the left—the right
 55 treadle draws down the blank harness frame, which action raises the front leaf and simultaneously the shuttle is thrown from the right to the left side of the loom and beat up, the anti-friction roller d has now reached
 60 its greatest divergence in the groove of the cam wheel E.

During the third revolution (the shuttle remaining in the left box) the lay comes forward to the web, and locks itself by the

arms $v^1 v^1$ to the catch plates r^2 of the spring
 65 plate r , whereby the "wing" is carried rearward with the lay,—the roller d in traversing the reverse section of the diverging part of the groove in the cam wheel E, will cause
 70 the arms $i i$ of the rock shaft h to move inward and simultaneously therewith the right wire will enter the open shed, and the pin s^2 of the curved lever l will have elevated the
 75 spring plate r , and thus unlock its catches r^2 from the arms v^1 of the lay B, and allow the "wing" to remain steadily in that position, by means of the holding levers Z^2 . The fourth revolution of the crank shaft is the same as that of the first. The fifth revolution is the same as the second, except the
 80 action is changed to the left side. The sixth revolution is the same as the third, except the action is on the left side. In this manner the operation of the loom is continued; one revolution of either cam wheel E, producing in its turn the same results.

Having thus described my invention and improvement in the loom for weaving pile fabrics. I wish it to be understood that it is not my intention to claim the use of the fig-
 90 uring or pile wires upon which the loops or pile is raised. But

What I do claim to have invented and desire to secure by Letters Patent, is:

1. The employment on each side of the
 95 loom of a wing constructed substantially as described; when mounted upon either end of the lay rock shaft F moving independent thereof, and of each other, and vibrating alternately with each other, in the arc of a
 100 circle scribed from the said rock shaft F, and upon which are mounted the ways I, of the pile or figuring wires; whereby the said wires are carried rearward to be re-inserted into the open shed and thence forward to
 105 the last pick of the woof or weft as described.

2. I also claim causing the wings to recede to carry the wires to the open shed, and then advance frontward with the wires to
 110 the woven pile alternately by the action of the lay itself, each wing being locked to the lay B at the proper moment and disengaged therefrom on the insertion of the wire by the action of the curved lever l as described.

3. I likewise claim pivoting the ways I of each wing and furnishing the inner ends thereof with arms s projecting into openings in the breast beam C, whereby the ways
 120 with the figuring wires are made to maintain a horizontal position, during the vibration of the wings in the arc of a circle as described.

4. I also claim providing each wing with a holding lever Z^2 pivoted to the frame and
 125 vibrating with the motion of the wing and locked by means of a spring plate e^2 and pivoted arm 5 actuated by the advance mo-

tion of the double arms $i\ i$ of the rock shaft
 h when the wire is at rest in the warp,
whereby the wing is retained steadily in its
position until the withdrawal of the figuring
5 wire.

5. I also claim combining the intermediate
sliding arm o^2 , horizontal rods o^4 with the
carrier n and wire w , whereby the middle
of the latter is sustained and prevented from

trembling while being inserted and with- 10
drawn from the web as described.

In testimony whereof I have hereunto
signed my name before two subscribing
witnesses.

CHARLES A. MAXFIELD.

Witnesses:

JOB. S. OLIN,

HUGH BRADY.