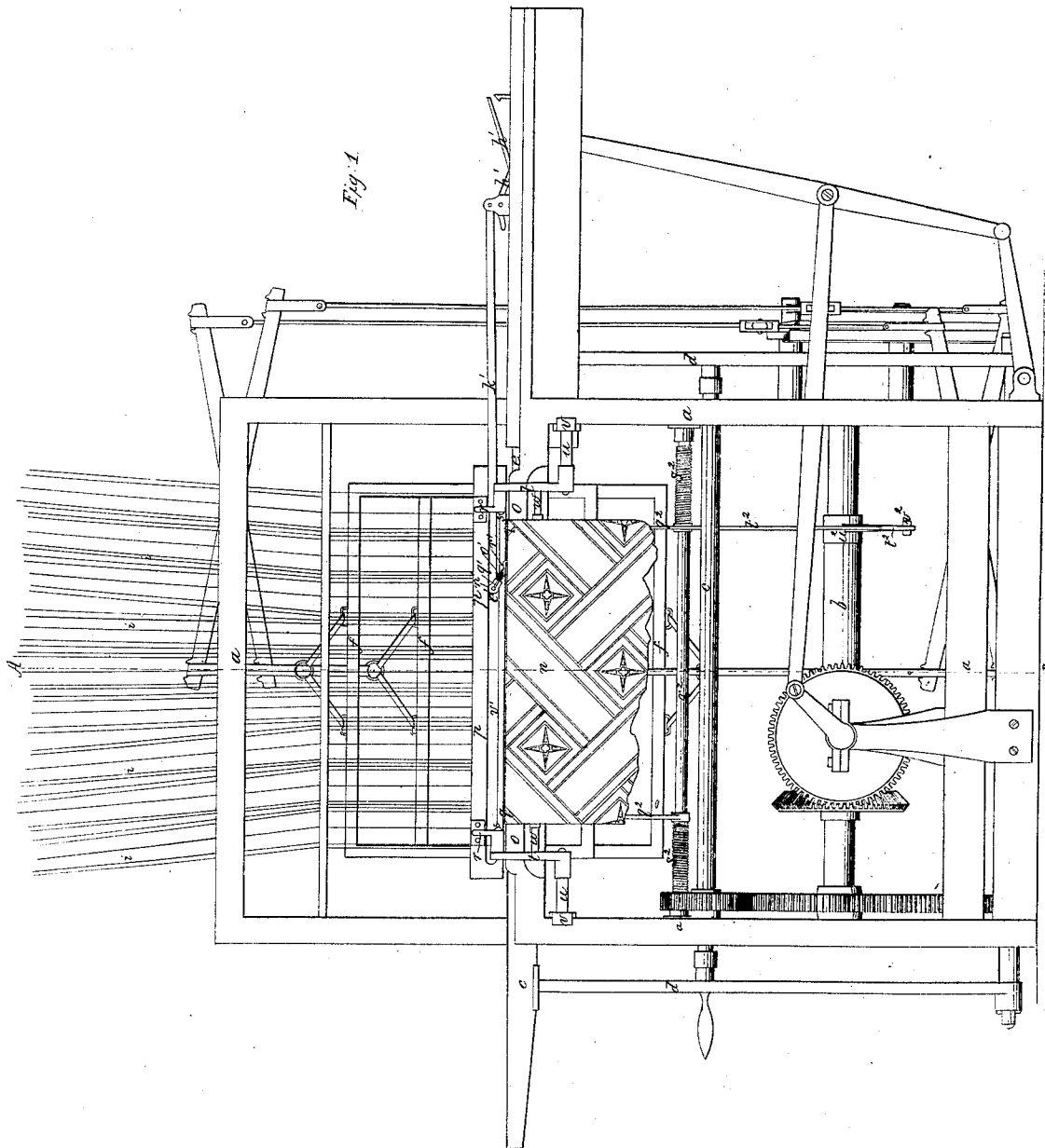


E. B. Bigelow.
Cut Pile Fabric Loom.

Sheet 1-5, Sheets.

Nº 11,803.

Patented Oct. 17, 1854.

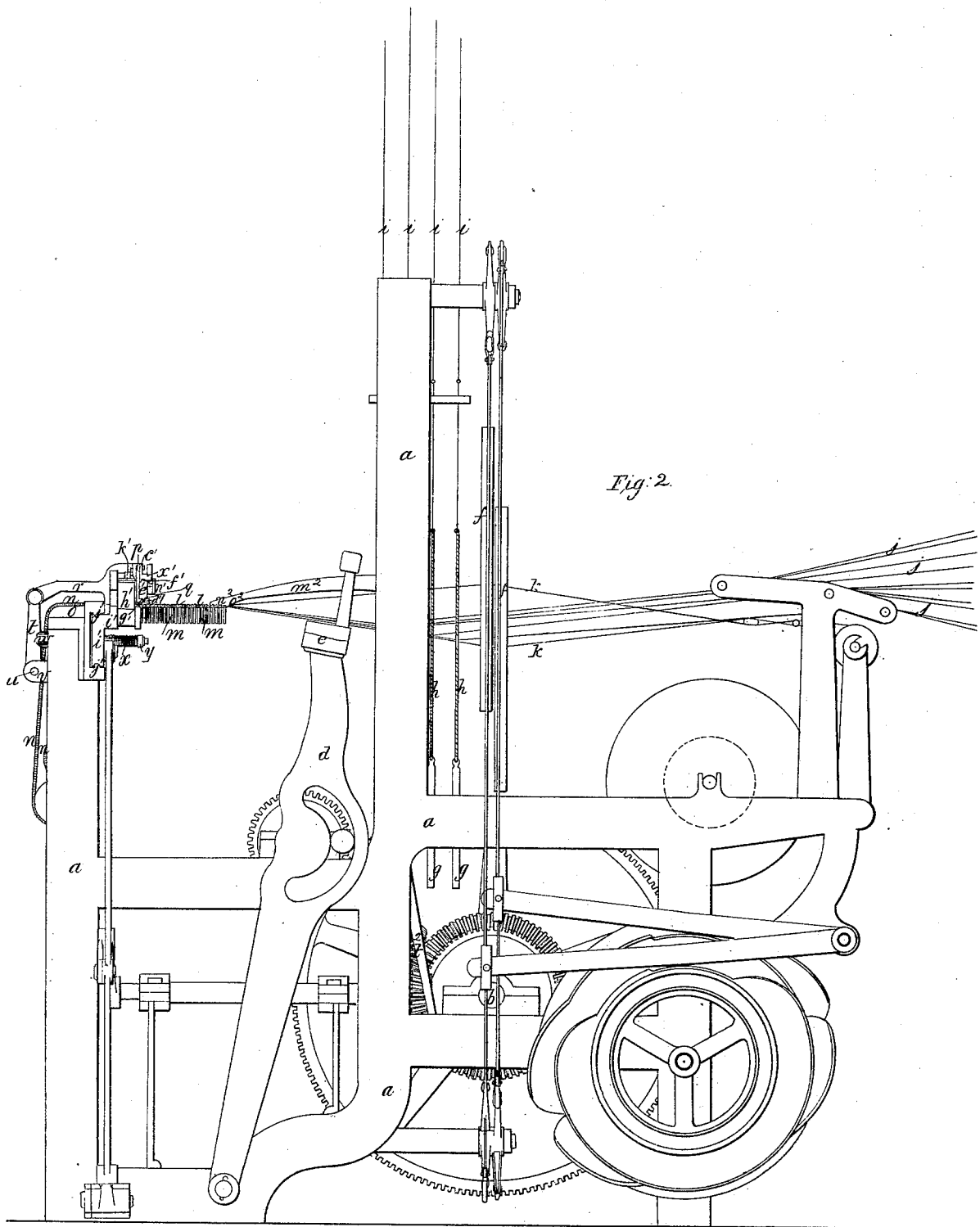


E. B. Bigelow.
Cut Pile Fabric Loom.

Sheet 2-5 Sheets.

N^o 11,803.

Patented Oct. 17, 1854.

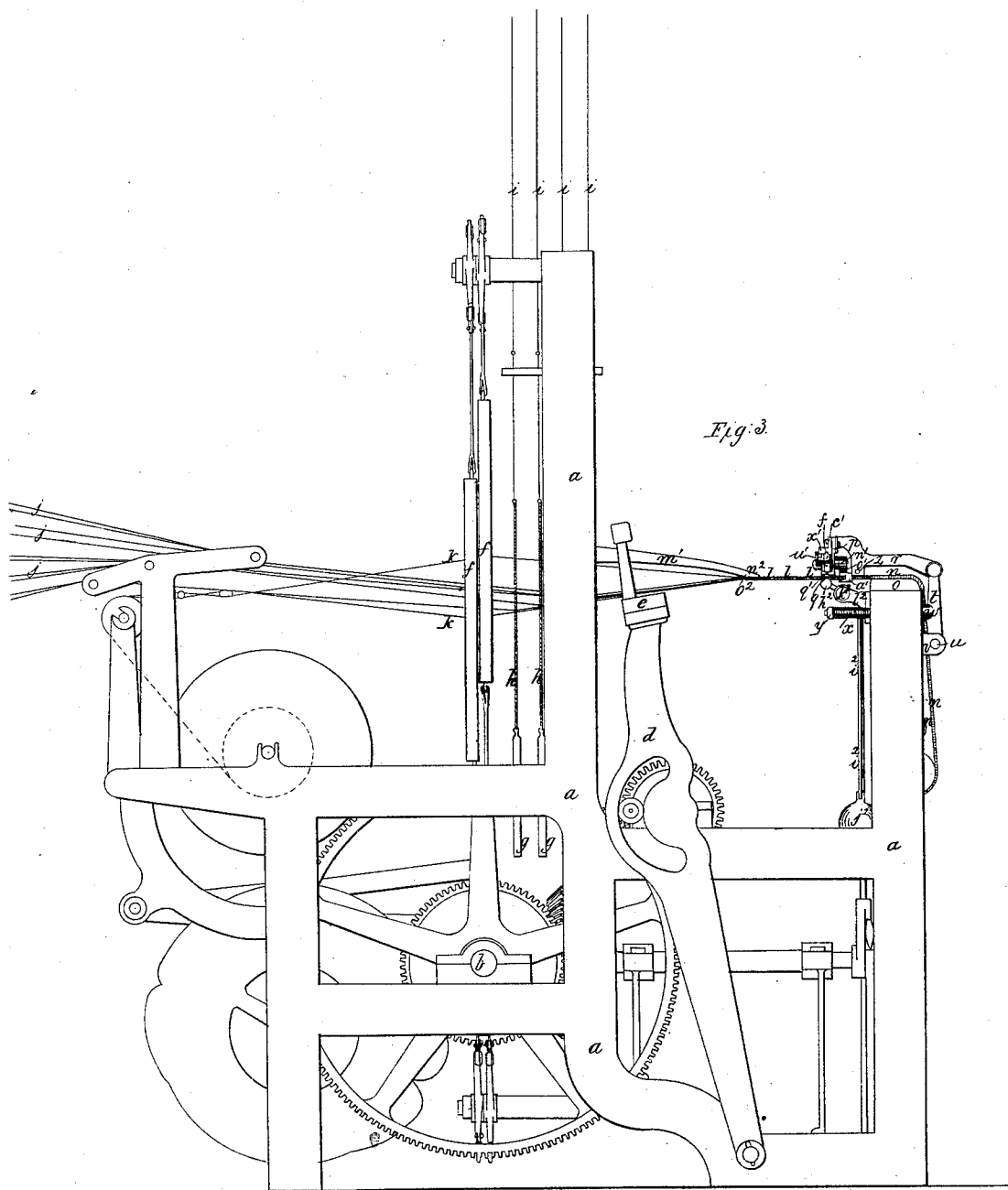


E. B. Bigelow.
Cut Pile Fabric Loom.

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N^o 11,803.

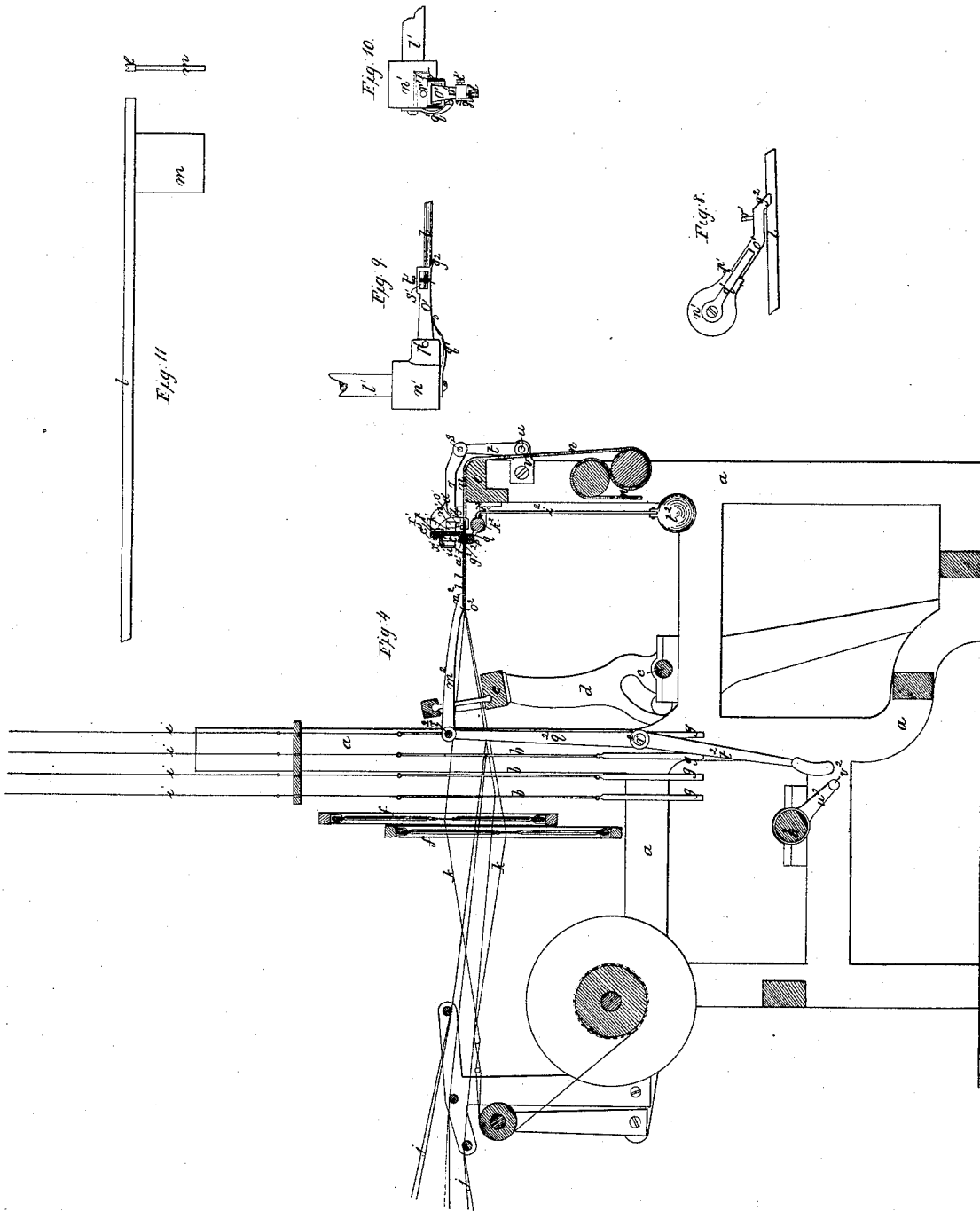
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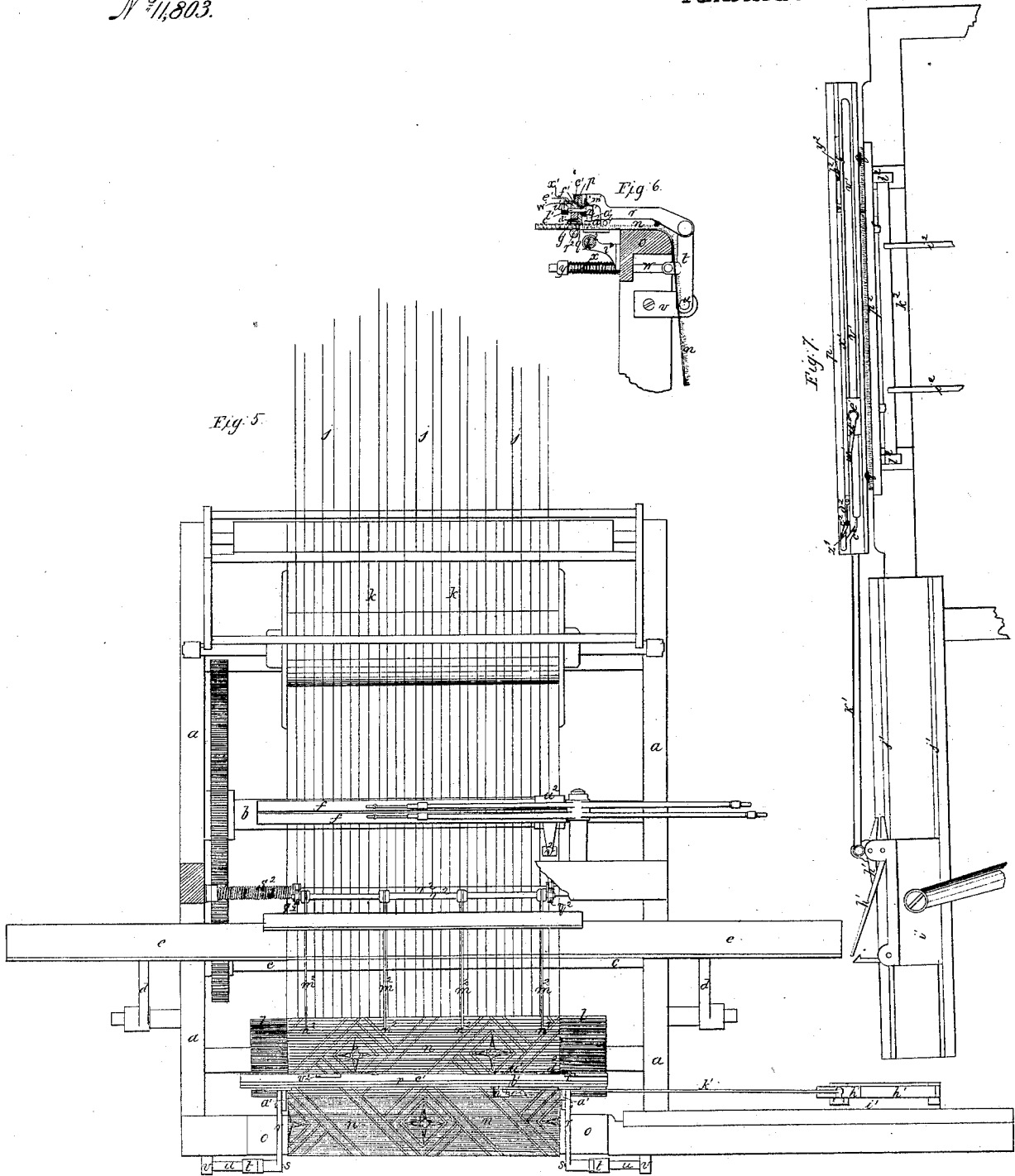


E. B. Bigelow. Cut Pile Fabric Loom.

Sheet 5-5, Sheets.

N^o 11,803.

Patented Oct. 17, 1854



UNITED STATES PATENT OFFICE.

E. B. BIGELOW, OF CLINTON, MASSACHUSETTS.

LOOM FOR WEAVING CUT PILE FABRICS.

Specification of Letters Patent No. 11,803, dated October 17, 1854.

To all whom it may concern:

Be it known that I, ERASTUS B. BIGELOW, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in the Power-Loom for Weaving Velvet or Cut Pile Fabrics over Wires, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, in which—

Figure 1, is a front elevation; Fig. 2, is a right hand end elevation; Fig. 3, a left hand end elevation; Fig. 4, a vertical section taken on the red line A, B, on Fig. 1, looking to the right; Fig. 5, is a plan with the comber beard and top girth removed; and Fig. 6, is a section of breast beam and cutting apparatus; Fig. 7, is back view of cutting apparatus; and Figs. 8, 9 and 10, a full sized view of the cutting knife and guide; and Fig. 11, a side view of a wire with weight attached.

The same letters indicate like parts in all the figures.

My improvements relate to the mode of cutting the loops or terries which have been woven on wires to form a velvet or cut pile fabric. The wires on which the terries or loops are formed are like those usually employed in the weaving of velvet pile fabrics, that is they are flattened or oval shaped with a groove in their upper edge of sufficient depth, to allow the knife to travel therein without coming in contact with the metal.

As the mode of withdrawing and inserting the wires during the operation of weaving forms no part of my present invention it is not deemed necessary to describe it, nor the other parts of the loom which are well understood any further than is necessary to exemplify my improvements. I would remark however that my improvements may be applied either to looms which work a limited number of wires permanently attached on a carrier, or to looms which work an optional number of wires by an apparatus which successively grasps and releases them. In all attempts heretofore made to cut the loops or terries on wires, by the power loom, the cutting knife has been made to traverse a bar or car-

riage affixed in a stationary manner to the frame of the loom, and much difficulty has been experienced in making the cutting knife and the wire on which the loops are to be cut work in conjunction with each other, as the position of the wires relative to any given fixed point or line in the loom will vary at different times during the operation of weaving from causes not easily controllable.

The nature of my invention consists in the application of a guide or guides to rest against the wire to be cut out and preserve the said movable frame or carriage which supports or carries the cutting knife in a proper position relative to said wire.

Another part of my invention relates to holding the wires up edgewise during the operation of weaving, and consists in the application of hooks or bars in such a manner as to lock on to the side of the wire next to the lathe when said wire is first brought home, and hold it in its position at the face of the cloth, until it is secured by the filling, when they are released to act upon the next succeeding wire.

(*a, a, a*) represents the frame of the loom, (*b*) represents the cam shaft and (*c*) the lathe shaft which are geared together in the usual way.

(*d, d*) represents the lathe swords, and (*e*) the race beam.

(*f, f*) represent the leaves of heddles for the ground warps, and (*g, g, g*) the harness weights, (*h, h, h*) the mails and (*i, i, i*) the jacquard harness cords broken off, all of which parts are operated in the usual way.

(*j, j, j*) represent the figuring warps, and (*k, k*) the ground warps.

(*l, l, l*) represent the wires woven into the cloth to form the loops or terries to be cut.

(*m, m, m*) represent weights which project from the under sides of the wire to keep them groove side up.

(*n*) represents the cloth which passes over the breast beam (*o*) to the take up motion in the usual way.

The movable frame or carriage (*p*) which supports or carries the cutting knife is formed of a thin bar of iron with the projections (*c'* and *d'*) on the side next to the lathe as seen in the cross section in Fig. 6. The projections (*c'*, and *d'*) are provided with grooves to guide the reciprocating bar which moves the cutting knife as herein after described. The movable carriage (*p*)

is placed across the cloth parallel to the wires to be cut out, and rests upon the small pieces of metal (q, q, q) which are screwed to its bottom edge and serve as shoes to diminish the friction as it slides upon the cloth. To keep the frame or carriage (p) in the proper position relative to the wire to be cut out and at the same time allow it to move with the cloth at the beat of the lathe and adapt itself to the varying conditions of the loom, two horizontal bars ($r', r,$) one on either side of the cloth—are employed the back ends of which are screwed to the front side of the frame or carriage (p) while the forward ends are supported by and may turn on their respective stud pins (s', s).

(t', t) represent upright arms or levers the upper ends of which carry their respective stud pins (s, s) while their lower ends are supported by, and may turn on the stud pins ($u' u$), which project inwards from their respective stands ($v' v$) bolted to the frame of the loom.

($w' w$) represent rods which are connected at their forward ends by a stud pin to their respective upright levers (t, t) and extend backward through holes formed in the flange of the breast beam (o'). On the rear ends of the rods (w, w) the helical springs ($x^2 x$) are placed, the forward ends of which rest against the flange of the breast beam (o) and the other ends against their respective stops or collars ($y^2 y$).

From this description it will be obvious that the springs (x, x) have a tendency to draw the frame or carriage (p) toward the lathe and that their action may be graduated by adjusting the collars (y, y) on the rods (w, w).

The next part of my invention to be described, may be understood as follows:—From the under side of the horizontal bars (r, r) the projections (z, z) extend downward as shown in Figs. 4 and 6, (a', a') represent guides which are screwed to the inner side of their respective projections (z, z) and are formed with an open recess or slot ($b' b'$) in the ends which present themselves toward the wires (l, l, l) of a suitable size and depth to receive two or more of said wires as shown in Figs. 4 and 6. The object of the slots ($b' b'$) is to embrace the wires so as to hold them in their proper position after the loops or terries are cut from them until they are grasped by the apparatus which may be employed to transfer them. The guides ($a' a'$) rest against the last of the series of wires (l, l, l) and preserve the frame or carriage (p) always in the same position relative to the wire to be cut out, and as the guides ($a' a'$) are kept against the wires (l, l, l) by the constant action of the springs (x, x) the whole may move together in unison with the cloth; and when a wire is drawn

out to be reinserted under another portion of the figuring warps, the apparatus readily adapts itself to the required position to act upon the next succeeding wire to be cut out, that is the springs (x, x) force the frame or carriage (p) back until the guides ($a' a'$) rest against the wire as before.

The mode of operating the cutting knife will now be described.

(e') represents a reciprocating bar which moves the cutting knife to cut the loops and slides to and fro across the cloth in the grooves (f' and g') in the projections (c' and d') before mentioned.

(h') represents the pincers for drawing the wires, and (i') the pincer stand. The pincer stand (i) traverses the ways ($j' j'$) and as both the pincers (h') and the stand (i') are operated in the usual way no further description of them is deemed necessary.

(k') represents a rod which connects the reciprocating bar (e') with the pincer stand (i') so that the same motion which draws the wires operates the cutting knife.

(l) represents a shaft which extends through and turns in the tubular bearing (m') in the reciprocating bar (e').

(v') represents a slot or opening in the frame or carriage (p) to allow the tubular bearing (m') to pass to and fro. On the forward end of the shaft (l') the hub (n') of the arm (o') which carries the cutting knife is affixed. The arm (o') is connected to the hub (n') by a hinge joint at (p') which is provided with a stop which prevents the arm (o') from moving toward the wires beyond a given point.

(q') represents a spring which presses the arm (o') constantly in the direction of the wires.

(r') represents the cutting knife for cutting the pile which is formed in the usual way and is put through a rectangular opening (s') in the enlargement on the end of the arm (o') and may be secured in its place and adjusted by the screw (t'). The double acting or compound joint which connects the cutting knife (r') with the reciprocating bar (e') consists in part of the shaft (l') by turning which the cutting knife may be inserted and withdrawn from the grooves of the wires, and in part of the joint (p') which allows the arm (o') to move laterally to adapt the knife to the inequalities in the wires.

To depress and elevate the arm (o'), to insert and withdraw the cutting knife (r'), into and from the groove of the wire, the arm (u') is affixed to the rear end of the shaft (l'). The arm (u') is provided with a pin or roller (w') at its outer end which projects from its side toward the frame or carriage (p). The projection (c') before mentioned has an enlargement (w') which serves as a guide to the roller (w'), a section

of which may be seen in Fig. 6, and a side view in Fig. 7, which represents the back side of the movable frame or carriage (p). The enlargement (x') extends the whole length of the frame (p) but is cut away at (y') to allow the roller (w') to pass from the lower to the upper side of it, and also at (z') to allow the said roller to pass back again from the upper to the lower side of the said enlargement (x'). When the reciprocating bar (e') moves from left to right as seen in Fig. 7, or from right to left as would be understood from Figs. 1 and 5 to carry the cutting knife (r') to cut the loops or terries the guide (a^2) guides the roller (w') from the lower to the upper side of the enlargement (x') and thus raises the cutting knife (r') from the wire (l) while the latch (b^2) falls down to close the opening (y') so that when the sliding bar (e') is moved back to the opposite side of the loom the roller (w') will be carried over the opening (y') along the upper side of the enlargement (x') and thus keep the cutting knife free above the wire; but when the reciprocating bar (e') has nearly finished its return movement, the roller (w') presses down and passes over the latch (c^2) which when passed is thrown up again by the spring (d^2) to open the passage (z'), then as the sliding bar (e') moves forward to cut another row of loops or terries the latch (c^2) aided by the guide (c^2) guides the roller (w') down to the under side of the enlargement (x') which brings the cutting knife into the groove of the wire as before. The lever or arm (u') is prevented from falling too low by the spring (w^2) which presses the roller (w') against the under side of the enlargement (x'); and is prevented by its own gravity from rising too high when the roller (w') is on the upper side of the enlargement (x'). From this description it will be obvious that as the roller (w') passes from the upper to the lower side of the enlargement (x') and vice versa, the cutting knife (r') will be successively inserted into and withdrawn from the grooves of the wires to be cut out.

To direct the cutting knife (r') to and guide it in the grooves of the wires may be described as follows: viz—(g^2) represents a guide which projects downward from the under side of the enlargement on the end of the arm (o') and is slightly beveled on the side which presents itself to the wires so that when the arm (o') is depressed to bring the cutting knife (r') into action the beveled part of the guide (g^2) feels as it were against the side of the wire to be acted upon and adopts the said cutting knife to the groove of said wire; then as the reciprocating bar (e') moves to cut the loops or terries the knife (r') and the guide (g^2) move together in unison with each other; and said

guide (g^2) is pressed against the side of the said wire by the spring (g') which preserves the said cutting knife (r') during the whole operation of cutting in a proper position relative to said wire, whatever may be its inequalities. By adjusting the cutting knife (r') relative to the guide (g^2), and the guides ($a' a'$) relative to the frame or carriage (p) the position of the knife (r') may be adapted to any thickness of wire.

To counteract the weight of the frame or carriage (p) and at the same time allow it to move with the cloth the rod (h^2) is placed under the cloth and drawn upward by the straps ($i^2 i^2$) and weights ($j^2 j^2$) acting on the shaft (k^2) which turns in the stands ($l^2 l^2$). As a substitute for this apparatus a fixed support may be employed, where it is not required to have the cloth move up and down by the shedding of the warps.

The last part of my invention to be described relates to holding the wires with their edges upward during the operation of weaving. In weaving terry fabrics by the power loom with flat or oval shaped wires, the terry warps, especially in Brussels and Wilton carpets in which each thread has a separate strain put on it, have a tendency to pull the wires down on their sides after they have been beat up by the lathe. To prevent this I employ hooks or bars in such a manner as to lock on to the sides of the wires next to the lathe when they are successively brought home to the face of the cloth, and hold them in their proper position with their edges or grooves upward, until they are respectively secured by the warps being tied in over them by the filling.

($m^2 m^2 m^2$) represent the hooks or bars, which may vary in number to suit the character of the wires to be used. The forward ends of these hooks are formed with a notch the top part (n^2) of which rests on the top or upper edges of the wires, while the lower part (o^2) extends downward to act upon the wires ($l l l$) as shown in Fig. 4. The hooks or bars ($m^2 m^2 m^2$) are slightly curved to clear the warps and allow the wires readily to pass under them, and extend backward through the spaces of the reed between the dents, and terminate in a head through which the shaft (p^2) passes to support them. The said hooks ($m^2 m^2$) are secured from sliding endwise on the shaft (p^2) but are allowed to turn freely upon it. The shaft (p^2) is supported by the arms ($g^2 g^2$) which are affixed to and extend upward—one on either side of the warps—from the shaft (r^2). The shaft (r^2) extends across the loom under the warps and is supported at either end by bearings which are bolted to the frame. ($s^2 s^2$) represent helical springs on the shaft (r^2) the

action of which tend to force the arms ($g^2 g^2$) forward and press the hooks or bars ($m^2 m^2 m^2$) against the side of the wires to be acted upon by them. After a wire thus held has been secured by the terry warps, the hooks or bars ($m^2 m^2 m^2$) are slightly drawn back at the time when the lathe beats up the next succeeding wire, which releases their forward ends, and allows them to rise up as the said succeeding wire passes the part (o^2) and fall again by their own gravity until the part (n^2) rests upon the tops of the wires, then the springs ($s^2 s^2$) are allowed to force the hooks or bars ($m^2 m^2 m^2$) against the wire thus introduced in the same manner as before. The hooks or bars ($m^2 m^2 m^2$) are drawn back to act upon each succeeding wire as aforesaid by the lever (t^2) which is affixed to the shaft (r^2) and extends downward forward of the cam shaft (b).

(u^2) represents an arm on the cam shaft (b) which carries the roller (v^2) near its outer end. At the proper stage of the operation the roller (v^2) acts upon the lower end of the lever (t^2) and overcomes the action of the springs ($s^2 s^2$) and releases the hooks or bars ($m^2 m^2 m^2$) as above set forth; then when the lathe has carried the wire beyond the part (o^2) the roller (v^2) relieves its action on the lever (t^2) and allows the springs ($s^2 s^2$) to force the hooks or bars ($m^2 m^2 m^2$) against the wire to hold it in its position before the lathe recedes from it.

It will be obvious to any one acquainted with machinery that the form and arrangement of the parts above described may be variously modified within the principle of my invention, as for example, the guide (g^2) which works in unison with the cutting knife instead of being applied to the side of the wire next to the breast beam, it may be applied to the opposite side and press against that part of the wire from which the loops have been cut; or it may be applied to that part of the wire from which the loops have not been cut and press against them. The guide (g^2) may also be so shaped and placed with respect to the wire as to fill and travel in the groove of the wire instead of pressing on either side thereof. Instead also of the guide (g^2) pressing or acting in any manner upon the wire to be cut out; it may press against the next adjacent wire or any one of the series, so long as said wires are kept uniformly at a given distance apart in the cloth, but I have found the form specified to work best in practice.

In weaving some fabrics it may be desirable to have a series of cutting knives arranged side by side in a frame with a guide to direct them in the grooves of the wires, and cut several wires out at one operation, said knives being operated either by hand or power in which case the slots or openings

($b' b'$) in the guide ($a' a'$) should be deep enough to receive and hold all the wires thus cut out until they are drawn out to be reinserted. When a single wire is cut out at one operation as above described, and the several motions for operating the wires are so timed relatively to each other that the pincers shall grasp them before they are liberated by cutting all the loops, the guides ($a' a'$) may be used without any recesses or openings being formed in them. Instead of placing the shaft (p^2) which supports the bars or hooks ($m^2 m^2 m^2$) back of the lathe, it may be placed over the cloth forward of the lathe, in which case the hooks or bars ($m^2 m^2 m^2$) would pull against the wires instead of pushing as in the form above specified.

All the parts of my invention may be used in connection with each other as above specified, or they may be used separately, or in combination with other improvements, without affecting their character; but so long as any one part is used to accomplish the same end by substantially the same means, it will partake of the nature of my invention.

Having fully described the various parts of my invention, and pointed out some of the modifications I contemplate making therein, what I claim as new and desire to secure by Letters Patent is

1. The method of adapting the cutting knife to the proper position relative to the wire to be cut out, under the varying conditions of the loom, by making the frame or carriage which supports or carries the said cutting knife movable substantially as specified.

2. I also claim in connection with said movable frame or carriage which supports or carries the cutting knife a guide or guides to rest against the wire to be cut out to preserve said frame or carriage and cutting knife in a proper position relative to said wire substantially as specified.

3. I also claim connecting the cutting knife with the reciprocating bar by means of a double acting or compound joint substantially in the manner and for the purpose specified.

4. I also claim in combination with the reciprocating bar (or its equivalent) with which the cutting knife is connected, the employment of a guide which shall move in unison with said cutting knife, to insure its proper position relative to the wire to be cut out, substantially as specified.

5. And finally I claim the method of preventing the wires from being drawn down on their sides, by means of hooks or bars substantially as specified.

ERASTUS B. BIGELOW.

Witnesses:

ALFRED KNIGHT,
C. STEVENS.