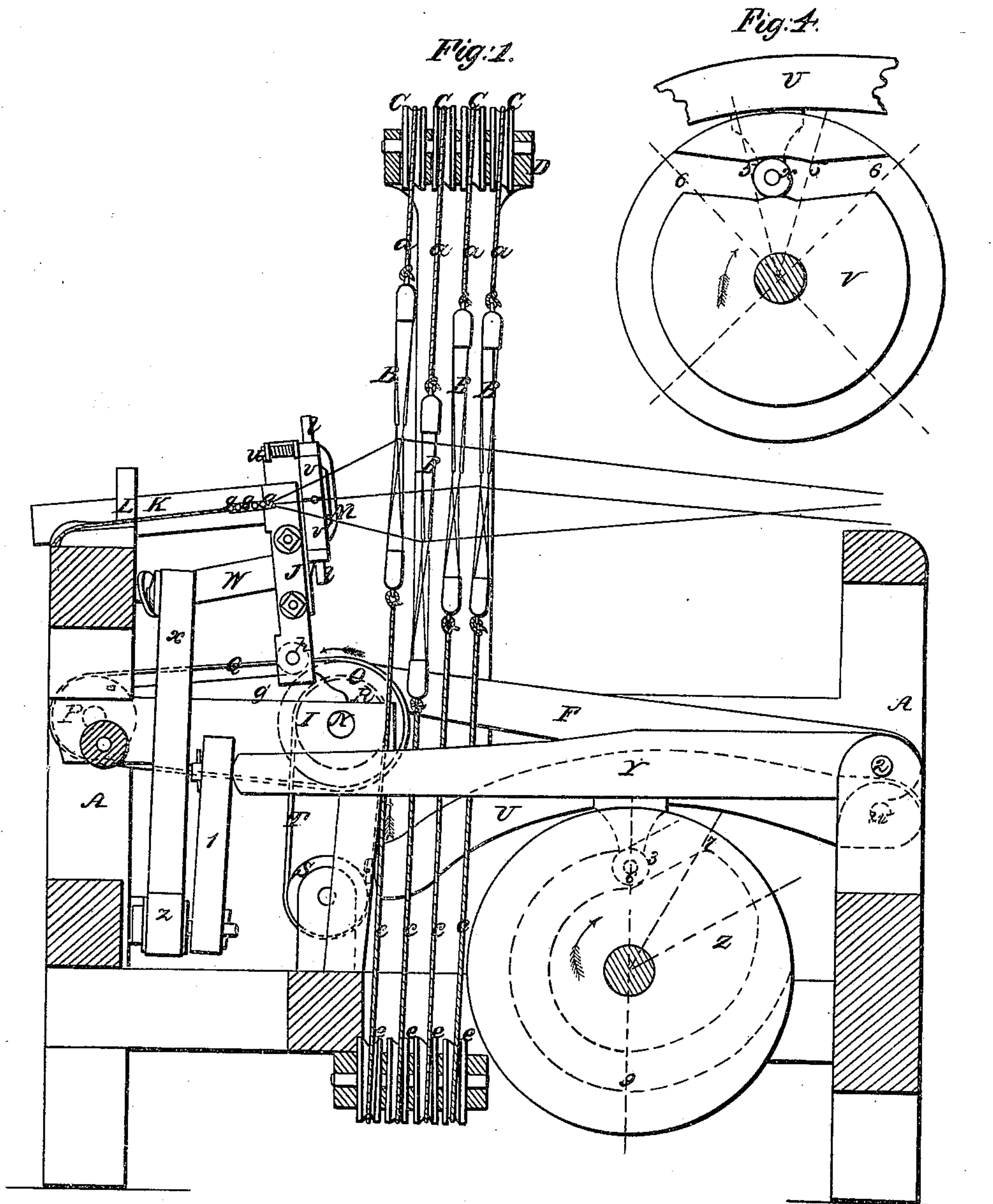


Sheet 1-3 Sheets.

S. Richardson
Weaving Pile Fabric.

Nº 9,188.

Patented Aug. 10, 1852.



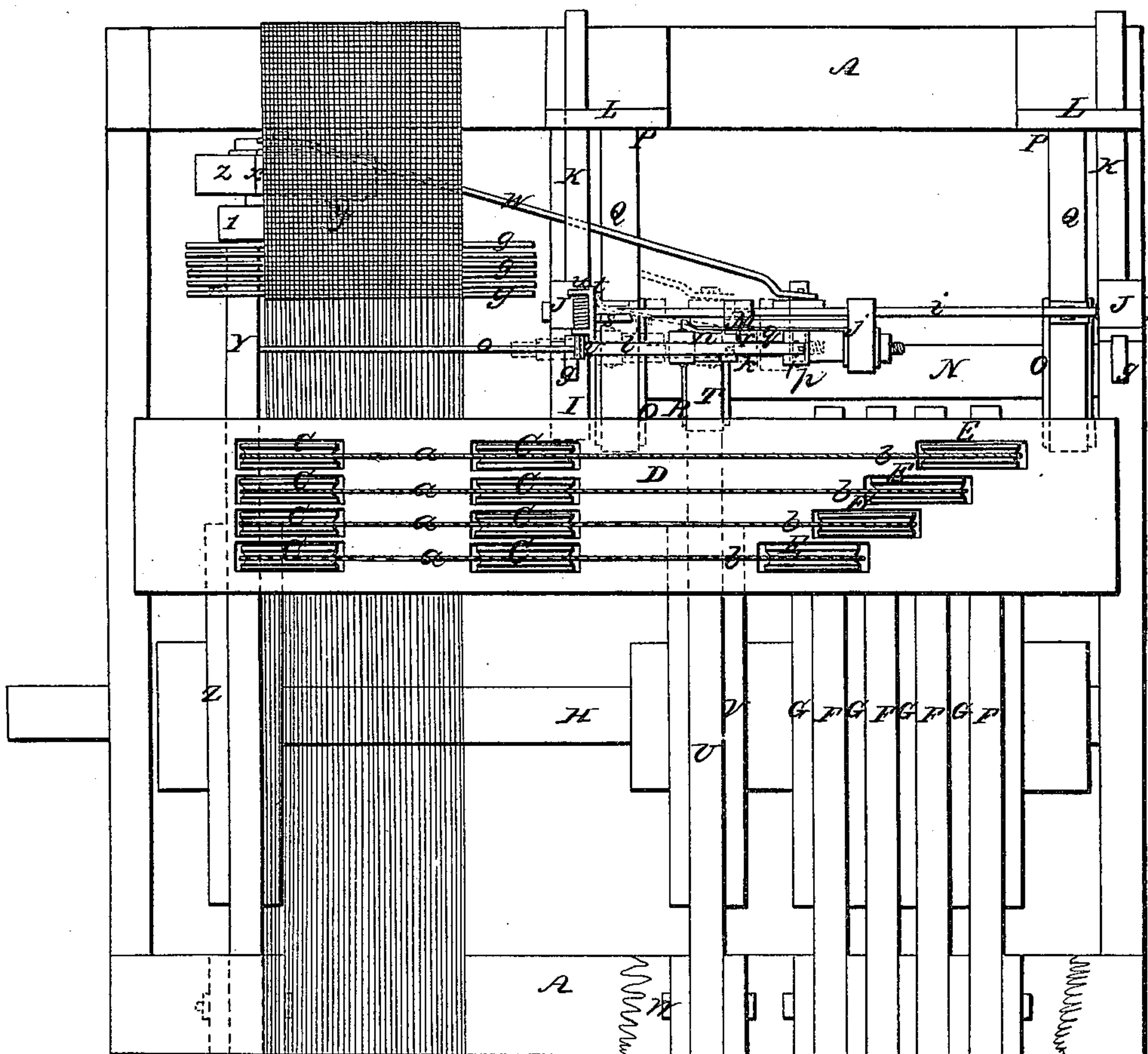
Sheet 3-3 Sheets.

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Fig: 3.



UNITED STATES PATENT OFFICE.

SAMUEL RICHARDSON, OF CLAREMONT, NEW HAMPSHIRE.

LOOM FOR WEAVING PILE FABRICS.

Specification of Letters Patent No. 9,188, dated August 10, 1852.

To all whom it may concern:

Be it known that I, SAMUEL RICHARDSON, of Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Power-Looms for Weaving Piled and Looped Fabrics; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a loom with my improvements; the side of the framing is supposed to be removed or cut away to show the working parts. Fig. 2 is a transverse vertical section of the same, seen from the back of the loom. Fig. 3 is a plan of the same. Fig. 4 exhibits one of the cams.

Similar letters of reference indicate corresponding parts in each of the several figures.

These improvements relate chiefly to the peculiar construction and to the mode of operating, the pincers which draw out and insert the wires which are placed between the ground and pile warps, for the purpose of raising the loops which form the pile.

The loom shown in the drawing is for weaving carpets with three warps, two for the ground, and the facing or pile warp. The number of leaves of harness employed is four, one for the lower warp, two for the middle, and one for the facing or pile warp.

The framing A, A, of the loom is made of the most suitable form to carry the working parts, and the warps are beamed on separate rollers as is usual in such weaving. The four leaves of heddles B, B, B, B, are each suspended at the top by two cords a, a, see Fig. 2, passing over two pulleys C, C, hung in the heddle rail D; these cords are both connected to a single cord b, which passes over one of a series of pulleys E, E, E, E, and is connected to one of a series of treadles F, F, F, F. The heddles are connected at the bottom also, to the same treadles, by single cords c, c, c, c, passing around pulleys d, d, d, d, and e, e, e, e. The treadles F, F, F, F, are hung on fulcras, f, f, and are operated upon by four cams G, G, G, G, upon a shaft H, which derives rotary motion through gearing from the lay shaft (not shown), at the speed of one to four of the lay shaft; these cams are of such form and so arranged as to cause the treadle to operate the heddles and open the shed at

the proper time for the shuttle to pass. It will be seen that the warp and heddles are placed at one side of the framing. This is to leave room on the other side for the pincers and the mechanism which operates them.

Near the front of the loom, there are two ways g, g, on which the carriage which carries the pincers travels; one of these ways is upon the top of one of the side rails of the framing, and the other upon a short rail I, which is placed on purpose to support it. The carriage above spoken of consists of two standards J, J, which are mortised at their lower ends to receive rollers h, h, which rest and run upon the ways, and are connected together by two transverse parallel horizontal bars i, i. Each standard J, has a guide arm K, attached in front, which works through a guide L, secured upon the breast beam, and keeps it in proper position. The pincers are attached to a sliding head M, which slides upon the bars i, i, lengthwise. This block has a small standard j, at one end, in which is secured a spindle k, which is parallel to the bars i, i. The two limbs l, l, of the pincers work each on a separate fulcrum m, on opposite sides of a socket n, which fits to the spindle k, so as to slide freely upon it. The back ends of l, l, or the ends opposed to the jaws, are attached by links o, o, to a pair of lugs p, p, secured one above and the other below the spindle k, and the jaws are opened and closed by moving the sliding socket n, along the spindle k which moves the links o, o, nearer to or farther from a position perpendicular to the spindle, and draws the back ends of l, l, together or forces them apart. The pincers are so arranged upon the spindle as to open up and down.

There is a spring q, attached to the standard j, see Fig. 3, which lies along in front of the pincers and has a small stud r, attached to it, which it always tends to force toward the spindle; when the pincers are closed, and this stud passes behind the socket n, it prevents its moving toward the standard j, and thus prevents the pincers being opened. There is a small catch s, attached to one of the standards J, of the carriage, by which this spring is thrown forward, and the stud released from the socket, to allow the pincers to open, as will be hereafter explained. Attached to the standard J, which is nearest the warp, there is a small plate t,

to which are attached suitable ears to form the bearings of small pivots u, u , to which are attached a pair of flaps v, v ; around the pivots u, u , are wound spiral springs which operate on them in such a manner as to close the flaps or make their edges meet. The axis of the spindle, k , if extended, would pass through the jaws of the pincers and through the joint formed by the meeting of the edges of the flaps, which are prevented opening toward the pincers, by stops on the plate t , but allowed to open from the pincers when the closing tendency of the springs are overcome by the pressure of the pincers passing between them. These flaps are for the purpose of closing the pincers, and their operation will be made intelligible in the explanation to be hereinafter given of the combined operation of the different parts.

Behind the pincers carriage, a shaft N , is hung in suitable bearings, carrying two pulleys O, O , of equal diameter. Around these pulleys and around two pulleys P, P , under the breast beam, run two endless bands Q, Q ; these bands run close within the standards J, J of the pincers carriage, and the said standards are attached to them by any secure means. Upon the shaft N , there is another pulley R , around which and around a pulley S , whose axle is hung in fixed bearings below R , runs an endless band T . This band T , is connected to the end of a treadle U , whose fulcrum is at w , in the back part of the framing; and to this treadle is appended a friction roller x , which works in a groove in a cam V , upon the shaft H , which carries the harness cams. The revolution of the cam operates upon the treadle at the proper time to raise and depress it and move the pincers carriage back and forth upon the ways g, g ; the upward movement of the treadle causing the band T , to turn the pulley R , shaft N and pulleys O, O , in the direction of the arrows shown on or near them in Fig. 1, and cause the bands Q, Q , to drive the carriage forward, and the downward movement causing them to move in the opposite direction and drive the carriage backward.

The sliding head M , is connected by a connecting rod W , to one arm x , of a right angled lever, which works on a fixed fulcrum y , secured in the lower front rail of the framing, the other arm z , of the said lever being connected by a connecting rod 1, to the end of a treadle Y , which treadle works on a fulcrum 2, in line with the fulcrum of the harness treadles. To the treadle Y , is appended a friction roller 3, which runs in a groove and way on a cam Z , upon the shaft H . The revolution of the cam Z , operates on the treadle Y , so as to cause it at suitable times to rise and fall, and in rising and falling it acts upon the lever x, z , through the con-

necting rod 1, and causes the said lever through the connecting rod W , to move the sliding head M , back and forth on the bars i, i , toward and from the warp. A number of wires 9, 9, are represented in the cloth and one is shown in the pincers being inserted between the warps.

As the accuracy of the working depends in a great degree upon the proper setting out and arrangement of the cams V and Z , it will be well to direct attention to their form. The way or groove in which the roller travels in V , is concentric to the axis for three fourths of the circumference see the division by red lines in Fig. 4. The remaining fourth of the circumference is divided into three parts the middle part of which between 5, 5, is concentric but nearer the axis, the other two parts to 6, 6, being steps from 5, 5, to the larger concentric part. In Z , the way for one half the circumference is concentric to the axis, and dividing the remaining half into sixths, the second sixth to the right from 7 to 8, is concentric to the axis, but farther off than the larger concentric part; the first sixth forming a straight step from 6, to 7, uniting the two concentric parts and the remaining four sixths being in the shape of an easy curve from 8, to 9, where it joins the first named concentric part. The two cams are arranged in relation to one another so that the part 5, 5, of V , is acting on its treadle, at the same time that the part 7, 8, of Z , is in operation of its treadle each of the said parts being one twelfth of the circumference. The above description of the cams will enable the operation to be understood.

The parts being all described I will now proceed to describe their combined operation. The shaft H , rotates in the direction of the arrow shown in Fig. 1, and when the cams are in the position represented, the friction roller 3, has nearly finished the descent of the step 6, 7, of the cam Z ; and the treadle Y , has nearly finished its downward motion, and by its operation on the lever x, z , is drawing the pincers toward the warp, and inserting a wire in the open shed, the pincers being kept closed on the wire by the pin r , acting on the socket n . The friction roller x , is on the inner concentric part of the way on the cam V , and the treadle U , is held down and stationary, which keeps the pincers carriage in its most backward position and holds it stationary. The pincers are just entering between, and opening the spring flaps v, v . When the wire is far enough through the warps, the end of the spring q comes in contact with the catch s , and is thrown forward (as shown in red lines in Fig. 3,) releasing the pin r , from contact with the socket n , and the front of the said socket coming in contact with the plate t , will be stopped while

the spindle continues moving toward the warp, this by throwing the links *o, o*, toward the axis of the spindle, draws the back ends of the pincers together and opens the jaws and releases the wire which is then seized by the closing warp and secured by the next pick. By the time the wire is released the roller 3, reaches the bottom of the step, and arrives at the point 6, on the cam Z, and then coming to the concentric part, keeps the treadle Y, stationary and holds the pincers in the position shown in red in Figs. 2 and 3, the roller *x*, then commences ascending the steps 5, 6, of the cam V, and raising the treadle U, causes the bands T and Q, to move the pincers carriage forward on the ways, the pincers being all the time open to allow them to pass the wires which are in the web, until they reach the most forward wire when they stop, as the roller *x* has then reached the top of the step and is on the larger concentric part of the cam. Both the treadles are now stationary for some time, the pincers and pincer carriage are also stationary, until the roller 3, passes the point 9, on the cam Z, and commences ascending the curve. The ascent of the curve raises the treadle Y, and the treadle operating on the lever *x, z*, throws back the sliding head M, and the pincers from the warp. As the pincers commence their movement they are closed upon the forward wire in consequence of their being slightly arrested by the friction of the ends of the flaps *v, v*, while the spindle draws upon the links *o, o*, and throws out the back ends of their limbs; as they draw the wire, their bite upon it, is by reason of the manner in which the limbs are connected to the spring, increased by the resistance caused by the friction of the wire in the web. Soon after the commencement of the withdrawing of the wire, the spring *q*, is clear of the catch *s*, and the pin *r*, catching behind the socket *n*, makes

the grip of the pincers secure. By the time the roller 3, reaches the top of the curve and arrives at the point 8, where the cam is concentric, and it (the roller 3,) becomes stationary, the wire is drawn entirely out, and then the roller *x*, on the treadle U, has reached the point 6, on the cam V, and commences descending the step, drawing down the treadle and throwing back the pincers carriage. When the roller *x*, reaches the bottom of the step and arrives at the concentric part of the cam, and brings the carriage to a standstill, the roller 3 on the treadle Y, passes the point 7, on the cam Z, and commences descending the step drawing down the treadle Y, and by the operation of the said treadle upon the lever *x, z*, drawing the pincers toward the warp and inserting the needle in the open shed of the warp. From this point I commenced tracing the operation so that it is now supposed to be intelligible. The continued operation is a repetition of the above, the pincers always drawing out the most forward wire and inserting it behind the others.

The lay of the loom is not shown as it is not considered necessary for the explanation of the improvements. The pincers carriage only moves back and forth once for every four strokes of the lay, being kept stationary close behind the breast beam during three out of every four strokes.

What I claim as my invention and desire to secure by Letters Patent is—

The spring flaps *v v* or their equivalents which open and close the pincers upon the wires, and support the wires after they are drawn from the loops and carried to a proper position to be inserted between the sheds of warp and guiding them into the same substantially as described.

SAMUEL RICHARDSON.

Witnesses:

JOHN I. PRENTISS,
EBENEZER E. BAILEY.