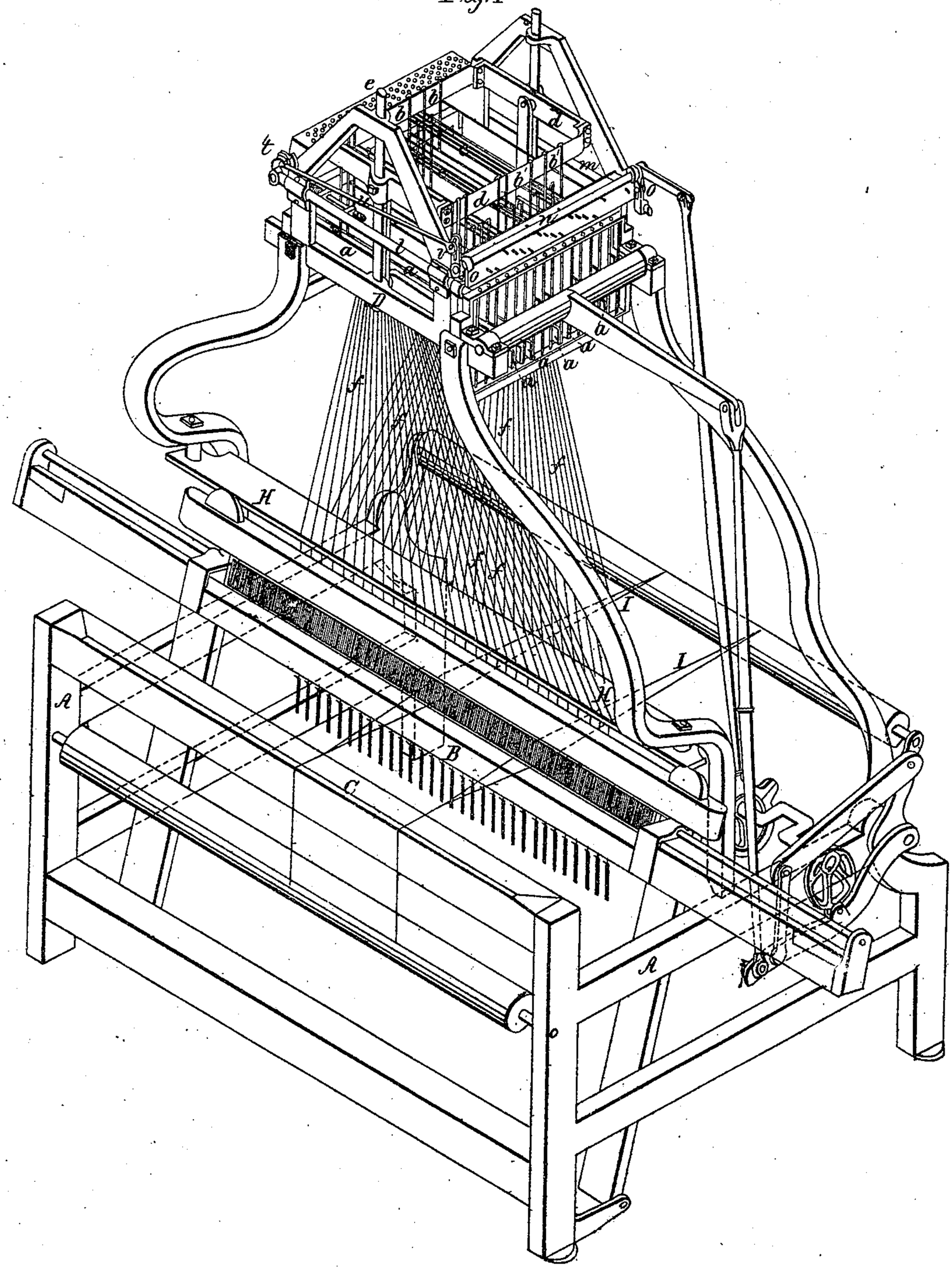
No. 7,861. PATENTED DEC. 24, 1850.

S. T. THOMAS & E. EVERETT.

LOOM FOR WEAVING FIGURED FABRICS.

3 SHEETS—SHEET 1.

Fig. 1



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3 SHEETS—SHEET 2.

Fig. 2

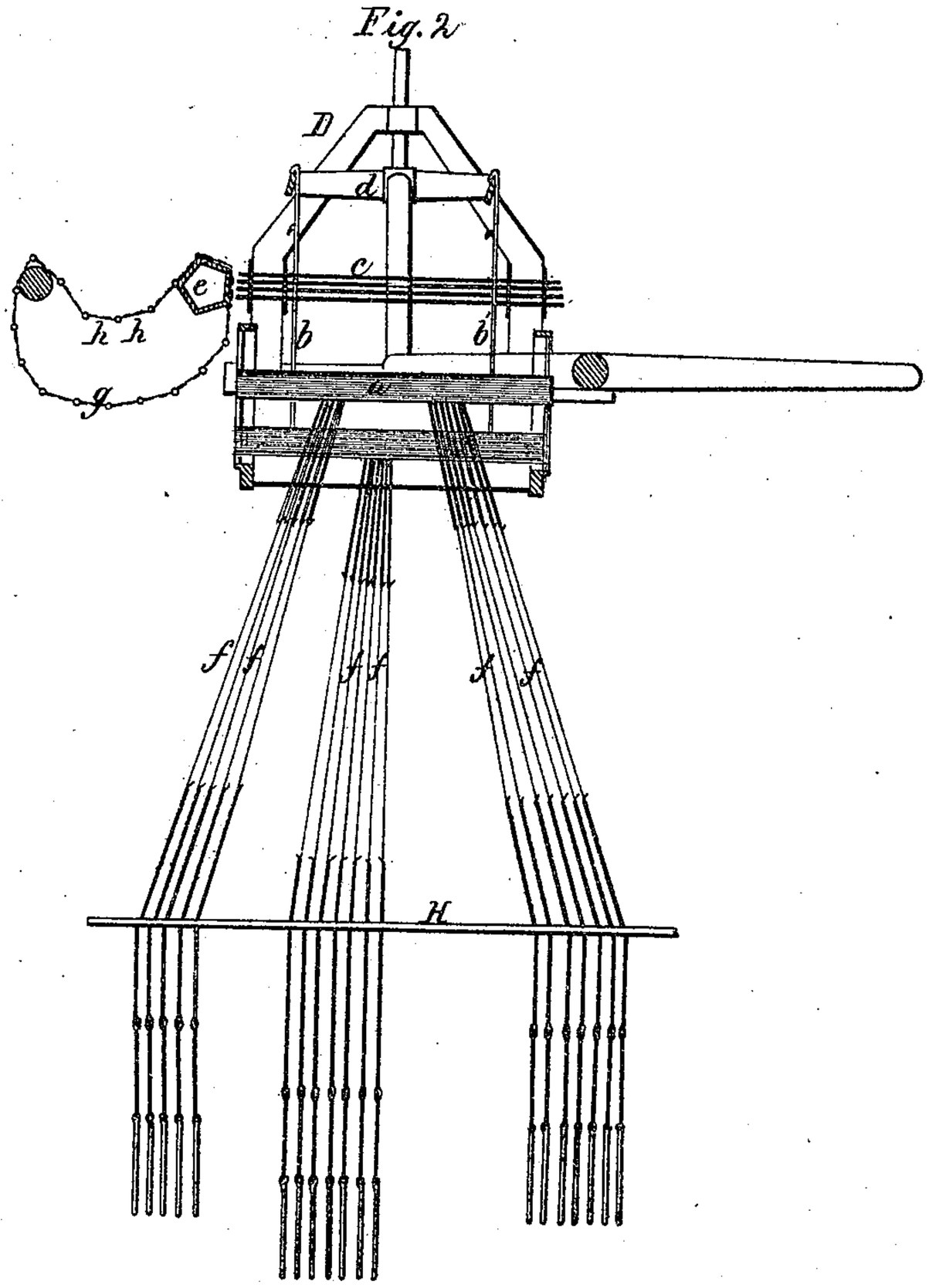

Fig. 4

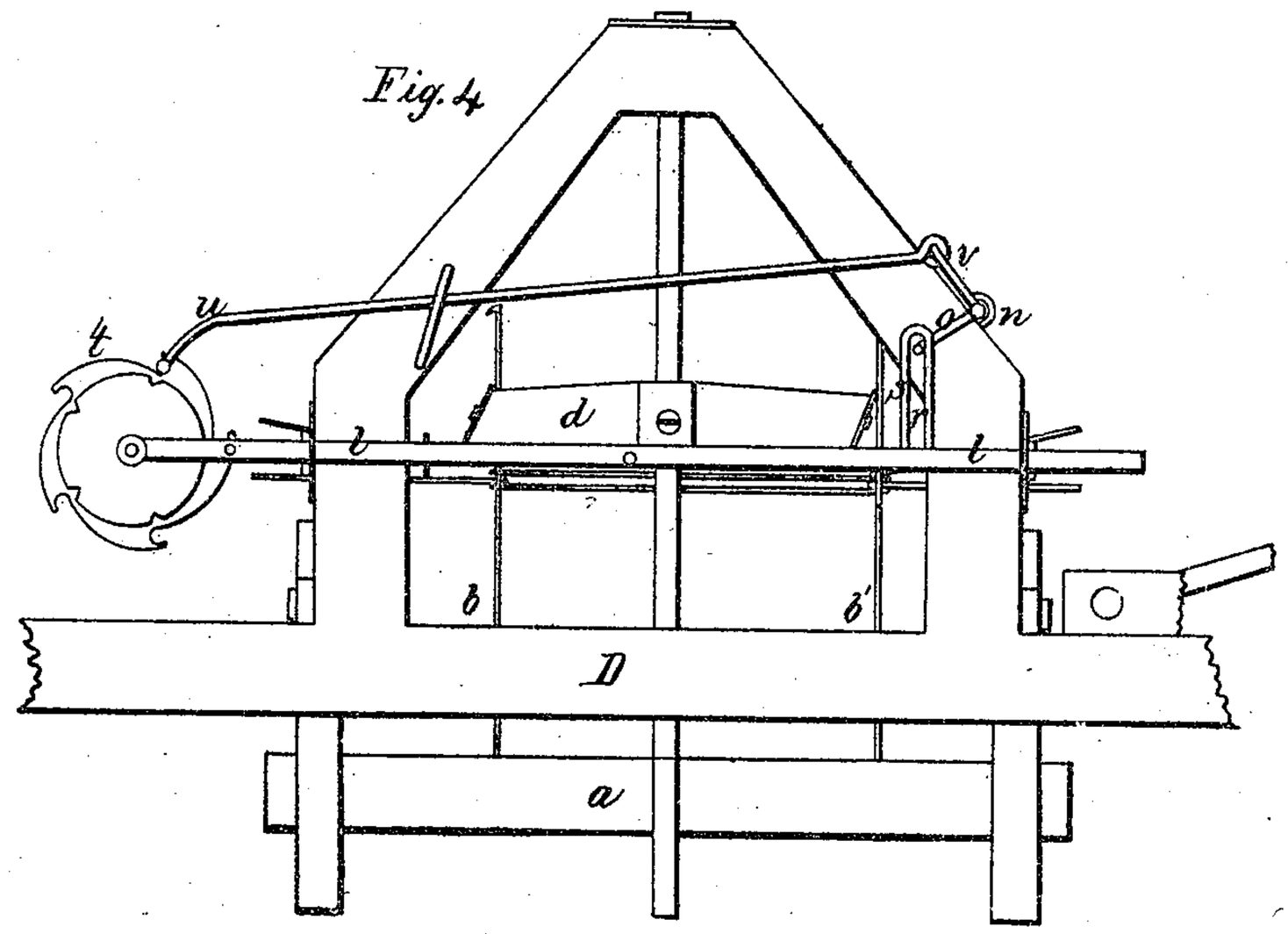

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Fig. 6

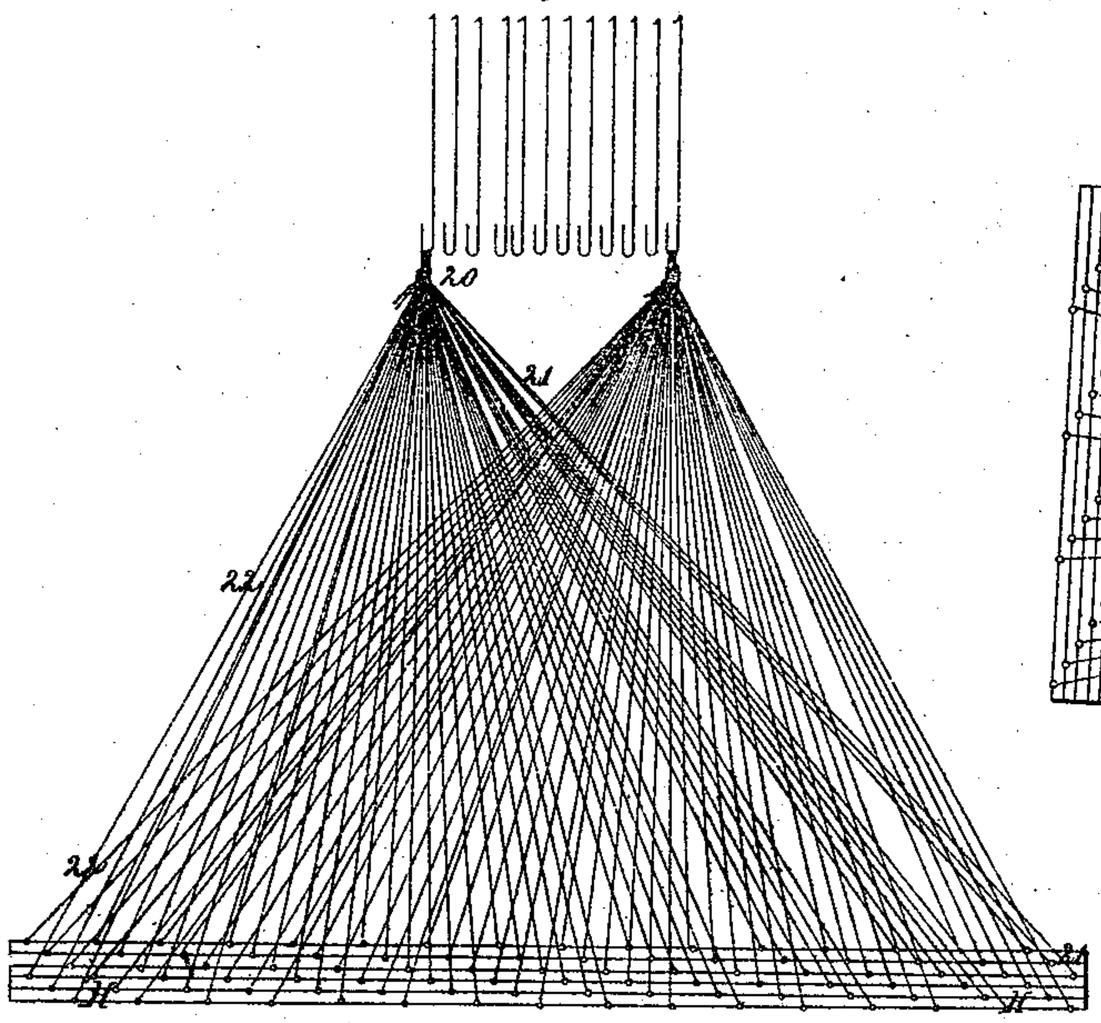


Fig. 5

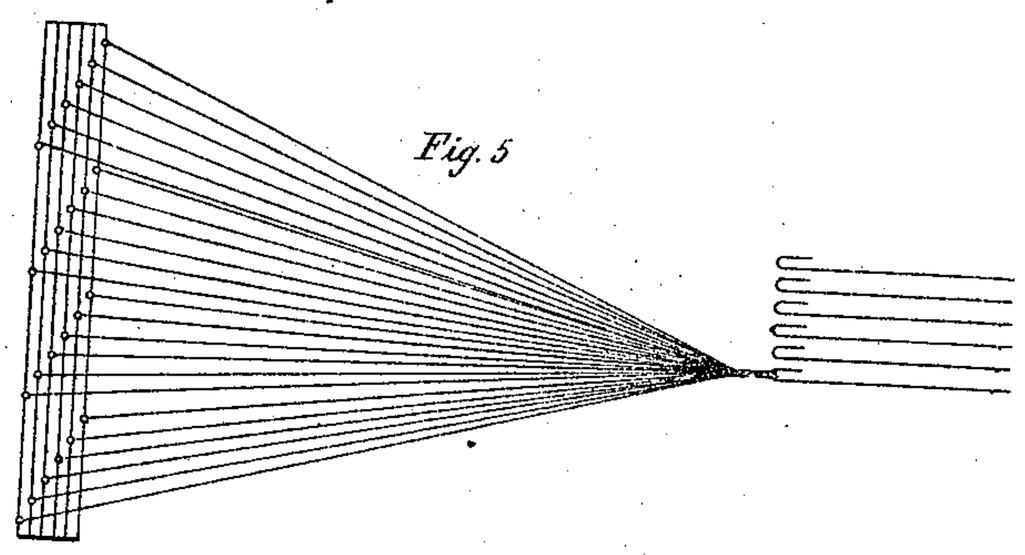


Fig. 7

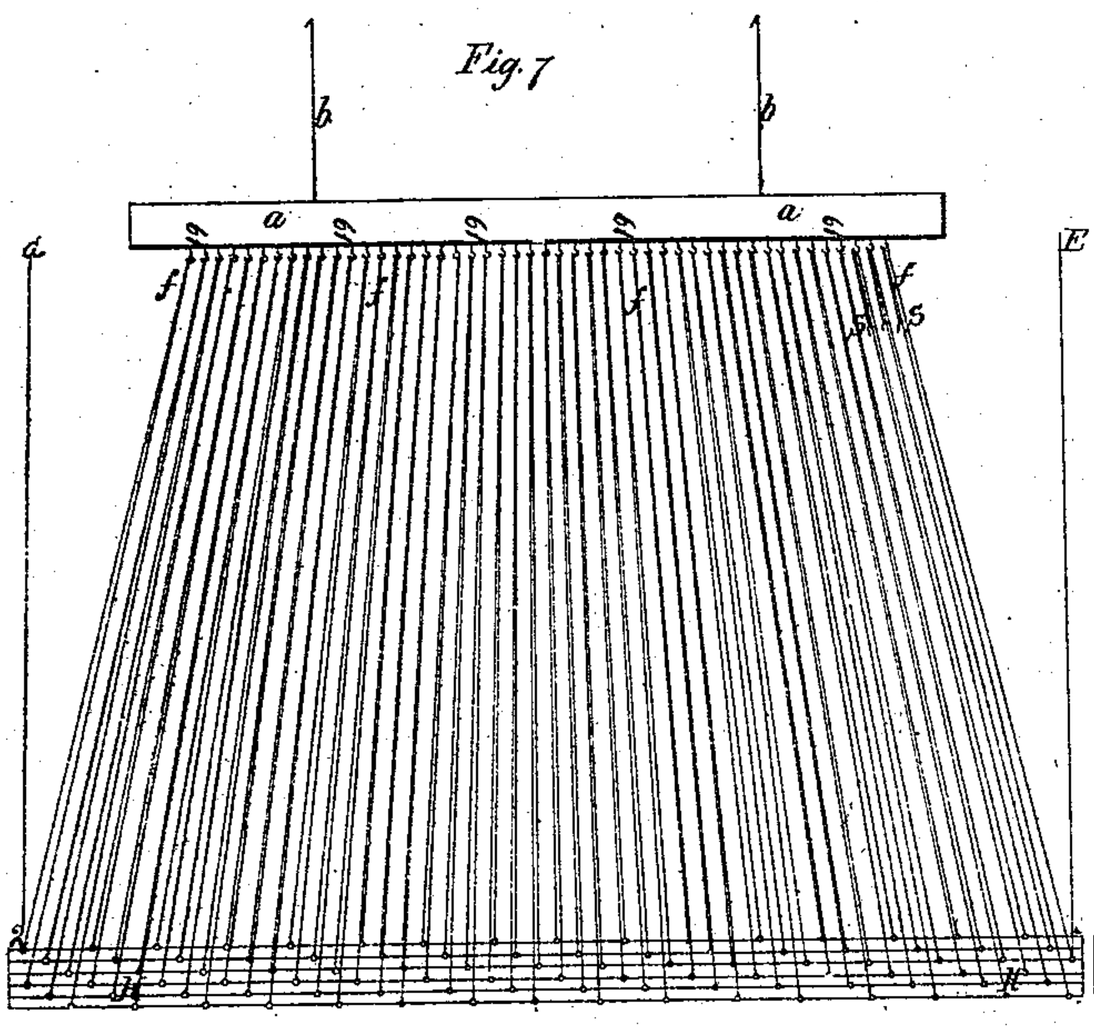


Fig. 8

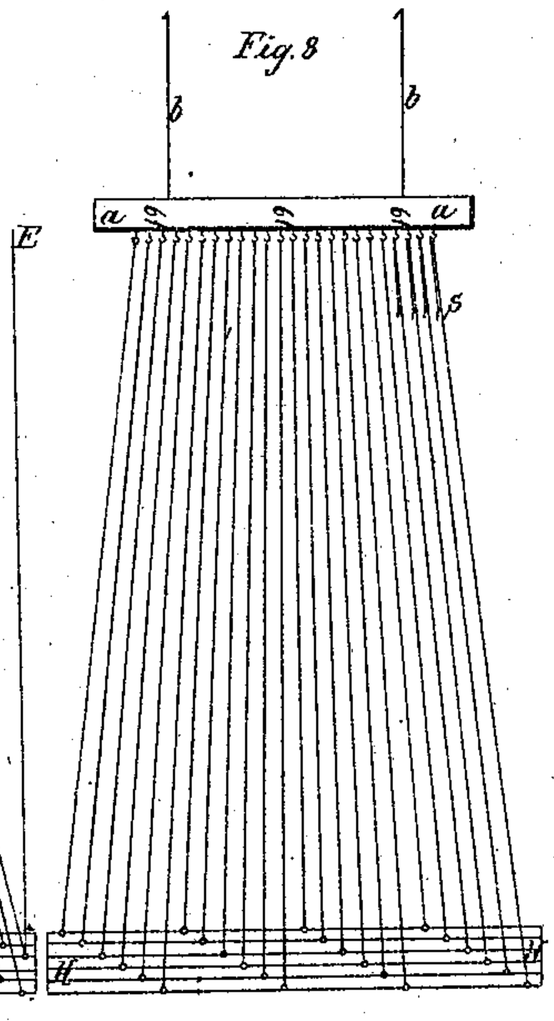
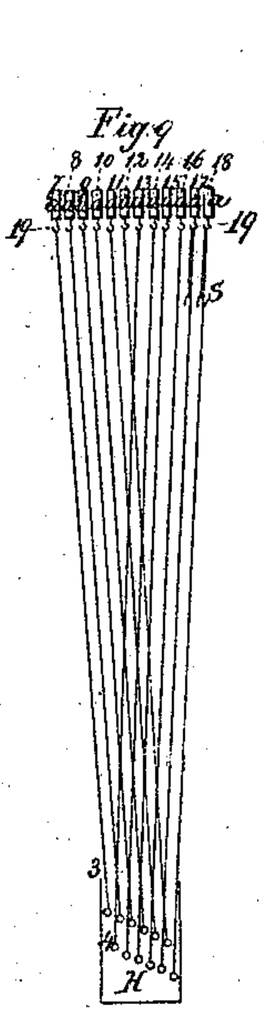


Fig. 9



UNITED STATES PATENT OFFICE.

SAML. T. THOMAS, OF LOWELL, AND EDWARD EVERETT, OF LAWRENCE, MASSACHUSETTS.

LOOM FOR WEAVING FIGURED FABRICS.

Specification of Letters Patent No. 7,861, dated December 24, 1850.

To all whom it may concern:

Be it known that we, SAMUEL T. THOMAS, of Lowell, in the county of Middlesex, and EDWARD EVERETT, of Lawrence, in the county of Essex and State of Massachusetts, have invented a new and useful Improvement in Looms for Weaving Figured Fabrics by Means of the Jacquard Apparatus; and we do hereby declare that the same is fully described and represented in the following specification and accompanying drawing, in which, upon Sheet No. 1—

Figure I represents an isometrical perspective elevation or view of a loom fitted up with our improvement. Fig. II is a section taken transversely through the pattern prism and the Jacquard apparatus. Fig. IV represents a side view of the slide rod,—the frame work which supports it,—the ratchet gear of the pattern prism,—the draw pawl thereof and the machinery that operates the slide-rod and the pawl.

Our first improvement on the Jacquard loom consists of an arrangement and combination of harness-shafts or bars, as a substitute for the knot-cord, by which arrangement we distribute the many mail cords or heddles of the knot-cord at any required distance apart, and disconnected from each other, along the length of the horizontal harness shafts or bars, by which a very material advantage is gained, as we thus produce a much less angle upon the mail-cords or heddles, thereby giving a more uniform strain upon the warp which renders the loom applicable to broad work; also, by rendering each mail-cord or heddle independent of every other mail-cord and capable of being transferred from any one harness shaft to any other harness-shaft or bar, the operator is enabled to change the mountings or cording with greater facility than by the mode heretofore adopted.

Our second improvement is to be found in the peculiar means or manner of producing the rotary movement of the pattern prism.

In Fig. I, of the drawing A denotes the loom frame; B the lay of the loom; C the breast beam, and D the frame of the improved Jacquard apparatus. In the ordinary harness fancy loom the heddles through which the threads of the warp are drawn, are connected to a series of harness shafts, which are arranged near to, and just above and below the threads of the warp. Such a disposition of these harness shafts, owing to the size and room occupied by each one of them, renders it often very difficult to introduce into a loom such a number of them as may be desirable to employ in the weaving of certain figured fabrics, the great amount of room occupied by the harness-shafts when so disposed, not only prevents the workman from obtaining free access to the warp threads when a breakage occurs, but also renders it difficult to obtain a necessary motion of the back harness in order to insure the required amount of opening or shed of the warp without producing an undue strain upon the warp that is carried by the back harnesses. In the Jacquard loom the several mail-cords or heddles are fastened together at their upper end in a compact bundle or hank, usually termed a knot-cord, there being the same number of knot-cords as there are needles, or distinct movements of the warp.

In our improvement we dispense with the use of this knot-cord, and in its stead we employ a series of bars or shafts, as seen at *a*, *a*, Figs. 1 and 2, each of these bars being supported by two vertical rods *b b′* which have hooks on their upper extremities. The said wires *b b′* pass through the eyes of a horizontal wire *c*, against one end of which the pattern cord of the prism is made to operate in the usual manner. The lifting frames of the several hook wires are seen at *d*, and the pattern prism at *e*.

The drawings upon Sheet No. 2 are intended to illustrate the position of the hole-board, mail-cord, harness shaft, and knot-cords. Fig. 5 shows the position of one knot-cord as used in the Jacquard loom, for narrow cloth, and Fig. 8 shows our improvement on the same; both being front views. Fig. 6 shows the position of two knot-cords, as used in the Jacquard loom for wide cloth, and Fig. 7 shows our improvement on the same; both being front views. Fig. 9 shows an end view of the harness shafts, mail cords and hole-board as improved by us and herein described. The horizontal harness shafts or bars *a*, *a*, Figs. 7, 8 and 9 on Sheet No. 2 are of such a length as to extend, when desired, over the whole breadth of the warp or web, and have at nearly equal distances apart and throughout their whole length hooks 19—or pins or holes so made or affixed as to receive the upper ends of the mail-cords or heddles, which are attached to the hooks, pins or holes by a loop, or in any

other convenient manner. By this arrangement we distribute the many mail cords or heddles of a confined hank or knot-cord 20, at nearly equal distances apart and disconnected from each other along the length of one of the said bars, as seen at 19—19.

It will be perceived, by reference to Fig. 6, that the mail-cord 21—20 is of greater length than the mail cord 22—20 and that the angle H—21—20 is much less than the angle H—22—20; in consequence of this difference the motion of the knot-cord 20, when it is raised vertically by the action of the Jacquard apparatus, does not lift the mail cords at opposite ends of the hole-board H to the same vertical height with reference to each other; the eyes, with their respective threads of warp, do not occupy one horizontal plane, which it is desirable that they should do, and which result we attain by the use of the horizontal harness bar with its attached parts as herein described.

When the length of the harness-bar *a*, *a*, is equal to the whole breadth of the web, 1, *f* (Fig. 6) would take the position 1, E, and the mail cord 2, *f*, would take the position 2, G, and every one of the mail-cords, as seen in a front view, would be perpendicular to the hole-board. Whatever may be the length of the harness-bars all crossings of the mail-cords or heddles is avoided, (as seen in the front view) in every style of mounting that may be required. We consider this last described improvement as essentially important in the weaving of broad goods, such as shawls, table-cloths, &c. upon power looms; the lateral vibratory motion of the warp being prevented, and the strain upon the threads of the warp that form the selvege being no greater than in the middle of the web.

The horizontal harness bars *a*, *a*, Fig. 9 being placed side by side and parallel with each other, the operator can, at pleasure, transfer the mail-cords or heddles from one bar to another, so as to produce almost any mounting required, without materially altering the position of the mail or eye; thus, the mail-cord 3,—7 may be placed in the position 3—13, and 4—13 may take the position 4—7; in this manner the looms may be changed from one style of goods to another that requires a different mounting or tye, with great despatch and at a trifling expense.

A loop is shown at S, Fig. 7 and 9, so formed at the top of the mail-cord as to allow of a slight variation of their length when the changes last referred to are required. The greatest deviation from a vertical line that can be made by any one of the mail-cords, occurs when the cord that is attached to the front harness-shaft 7 is applied to the back harness shaft 18. The hole-board or guide-bar H is constructed in the same manner and occupies the same position as in the common Jacquard loom. The employment of the series of harness bars in connection with the guide bar H, admits of an increase in the number of the said harness bars to any extent which may be desirable it being understood that our improvement is particularly applicable to broad looms for weaving figured fabrics, in which a repetition of the figure or pattern occurs at short intervals.

The pattern prism bar has its journal supported by two horizontal slide rods *l*. *m*. Fig. I, which are simultaneously moved by arms *o*, *o*, which extend downward from a horizontal shaft *n*. The shaft *n*, is shown in Fig. IV and as having the arm *o*, extending from it, and with a crank made to enter an elongated vertical slot *p*, made in a piece of metal *s*, extending upward from the slide-bar *l*. The ratchet wheel of the pattern prism is seen at *t*, and its pawl at *v*. The said pawl having a hooked end, when it operates it gives motion to the ratchet wheel and being jointed at its other end to an arm *v*, extending from the rocker shaft *n*, as seen in the drawings. The said rocker shaft having a reciprocating rotary motion imparted to it, it will cause the slide bars *l*, *m*, to move longitudinally back and forth, and so as to carry the pattern prism with them. At the same time motion will be imparted to the draw pawl in a direction opposite to that in which the slide rods are moved;—that is to say whenever the slide rods are drawn backward, the pawl will move forward, and vice versa. From the same it will be seen that the movement of the hook of the pawl from one tooth of the ratchet wheel to the next succeeding tooth, is compounded or made up of the advance movement of the pattern prism and its slide rod, and the forward movement of the pawl; consequently the pattern prism moves but half the distance and half the velocity that it would were no longitudinal movement given to the pawl. This not only enables us to operate the loom at a greater velocity, and produce a greater quantity of cloth in a given time than we otherwise could, but it greatly reduces the vibratory motion of the pattern cord, making its action steady and uniform.

We are fully aware of the facilities and advantages resulting from the use of the Jacquard loom, as heretofore constructed, and we do not intend to convey the idea that it is to be superseded by our invention, when figures of great size are to be produced, and which require the use of from two hundred to six hundred or more needles, or knot cords;—but its great utility begins to be developed at the point where the harness-fancy-loom ceases to be useful, (especially when driven by power) and it is most

available for the purposes herein described when operated with from twenty to eighty needles.

What we claim and desire to secure by Letters Patent is—

1. The improvement on the Jacquard loom, as herein described, to wit:—the horizontal harness-shaft or bars, of such length as may be desired, (according to the width of the cloth) upon which the several mail-cords or heddles, which constitute the harness or entire mountings are distributed, at any required distance from each other:—together with their hooks, pins, loops or holes, upon or in which the several mail-cords or heddles, which are caused to be raised or operated upon by one needle or distinct movement, are separately fastened or attached.

2. We also claim the improvement for producing the rotation of the pattern prism;—the same consisting in combining with the machinery which advances the pattern prism other mechanism, which at the same time shall produce a movement of the draw-pawl in an opposite direction, as described.

S. T. THOMAS.
EDWD. EVERETT.

Witnesses:
HARRISON G. BLAISDEN,
JOHN P. ROBINSON.