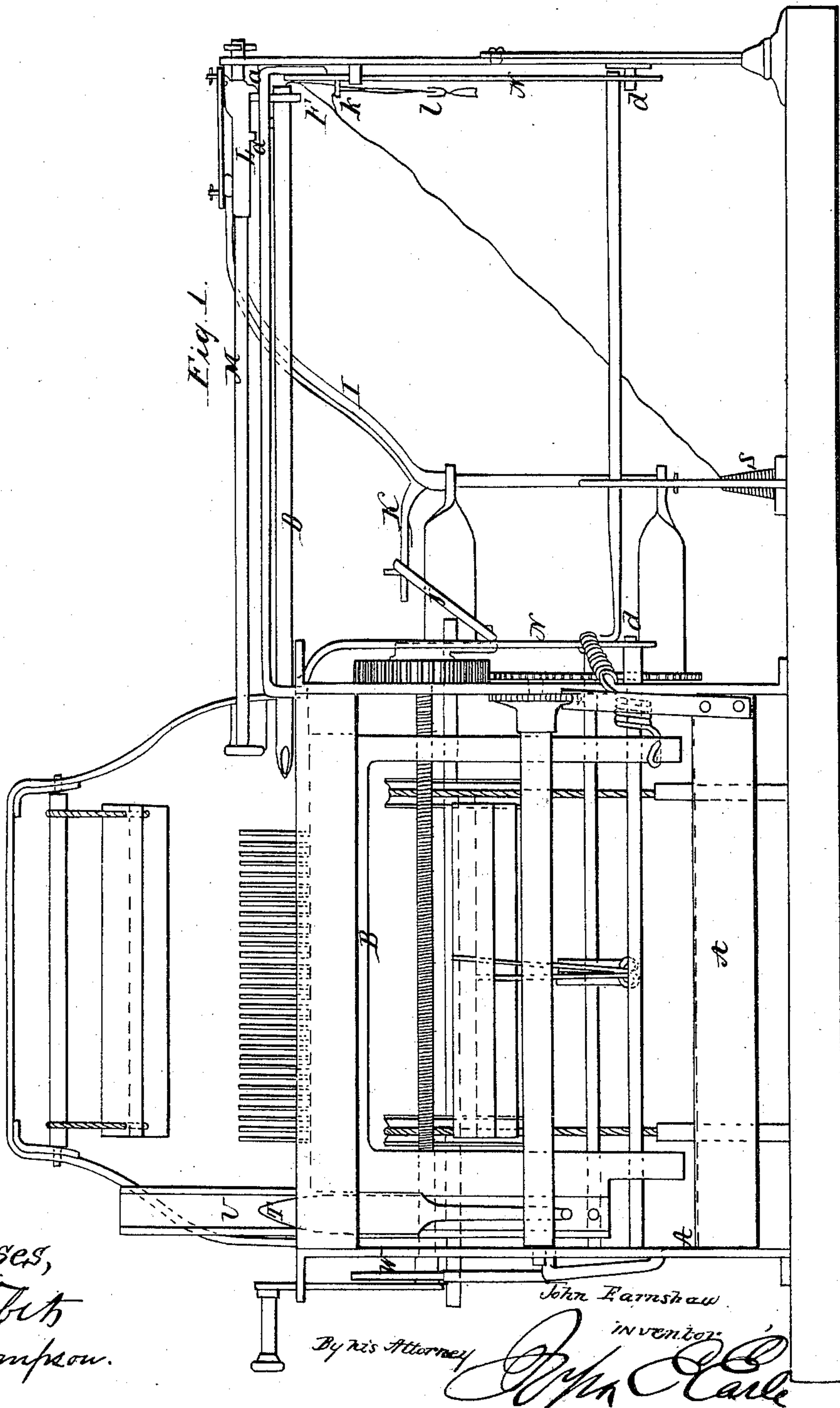


J. EARNSHAW.

Loom.

No. 66,574.

Patented July 9, 1867.



Witnesses,
A. F. Hobbs
E. C. Thompson.

John Earnshaw
inventor
By his Attorney *[Signature]*

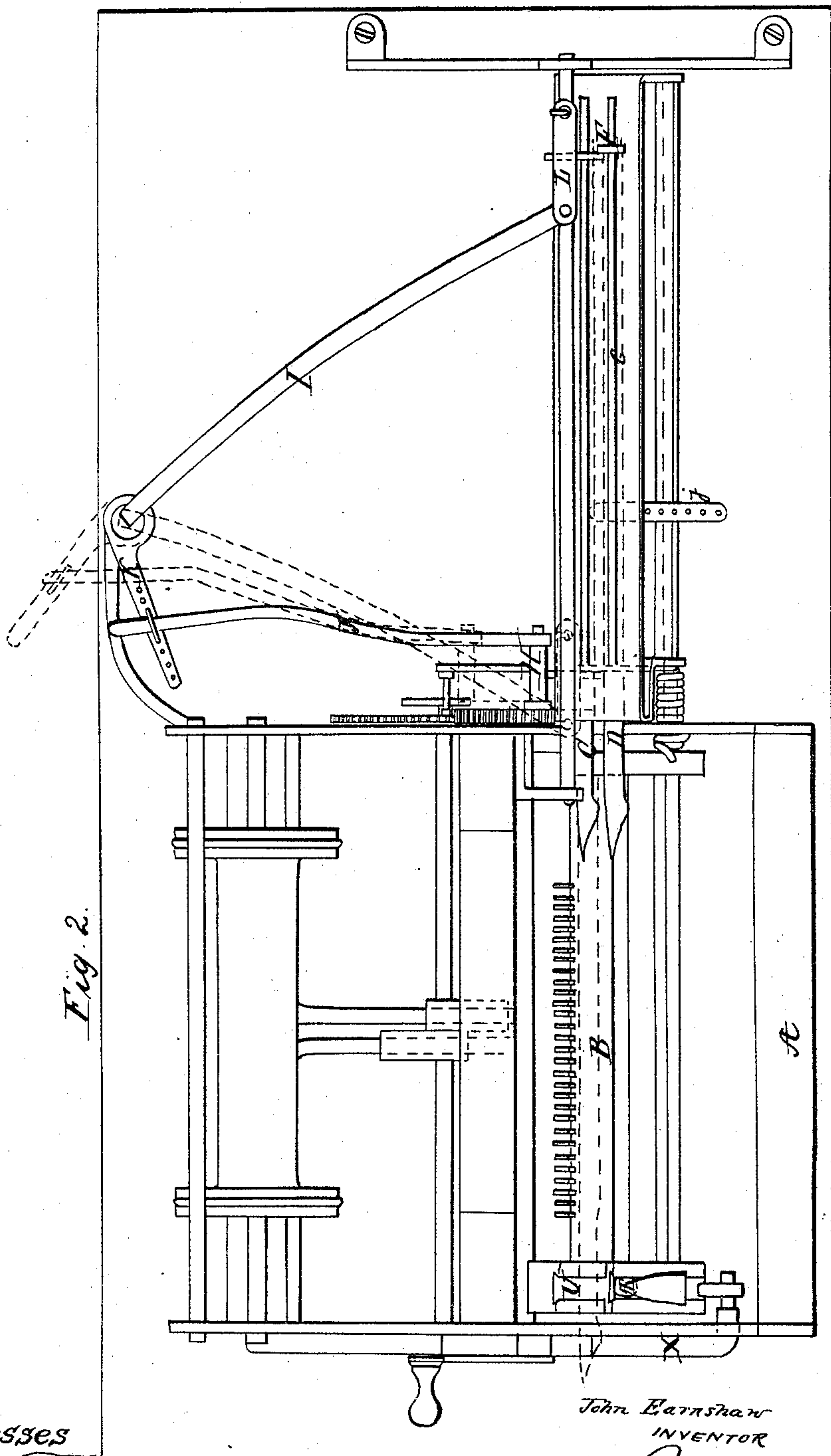
No. 66,574.

J. EARNSHAW.

Loom.

4 Sheets—Sheet 2.

Patented July 9, 1867.



Witnesses

A. J. Hobbs
E. C. Thompson.

By his Attorney

John E. Case

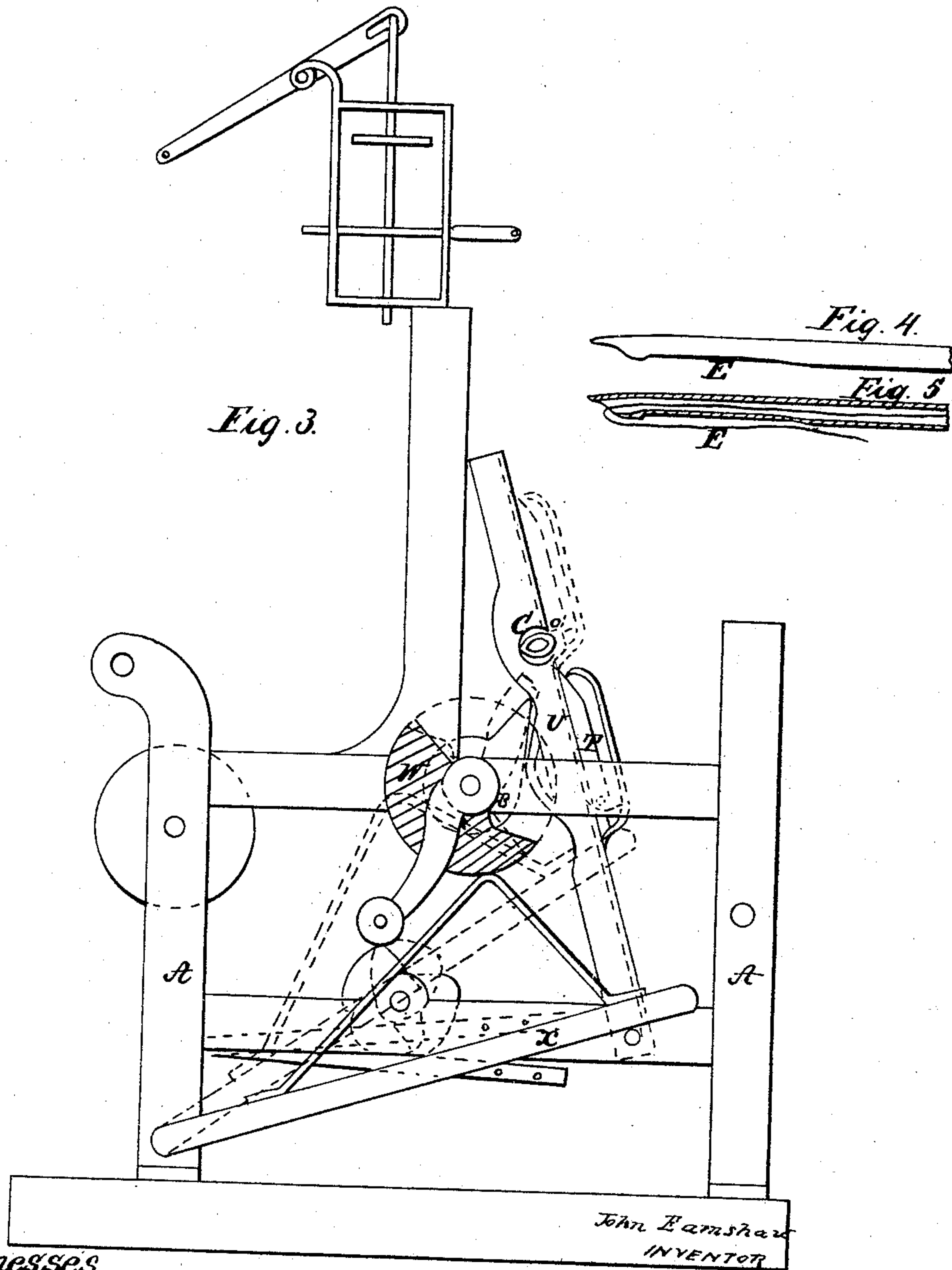
J. EARNSHAW.

4 Sheets—Sheet 3.

Loom.

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A. J. Hobbs
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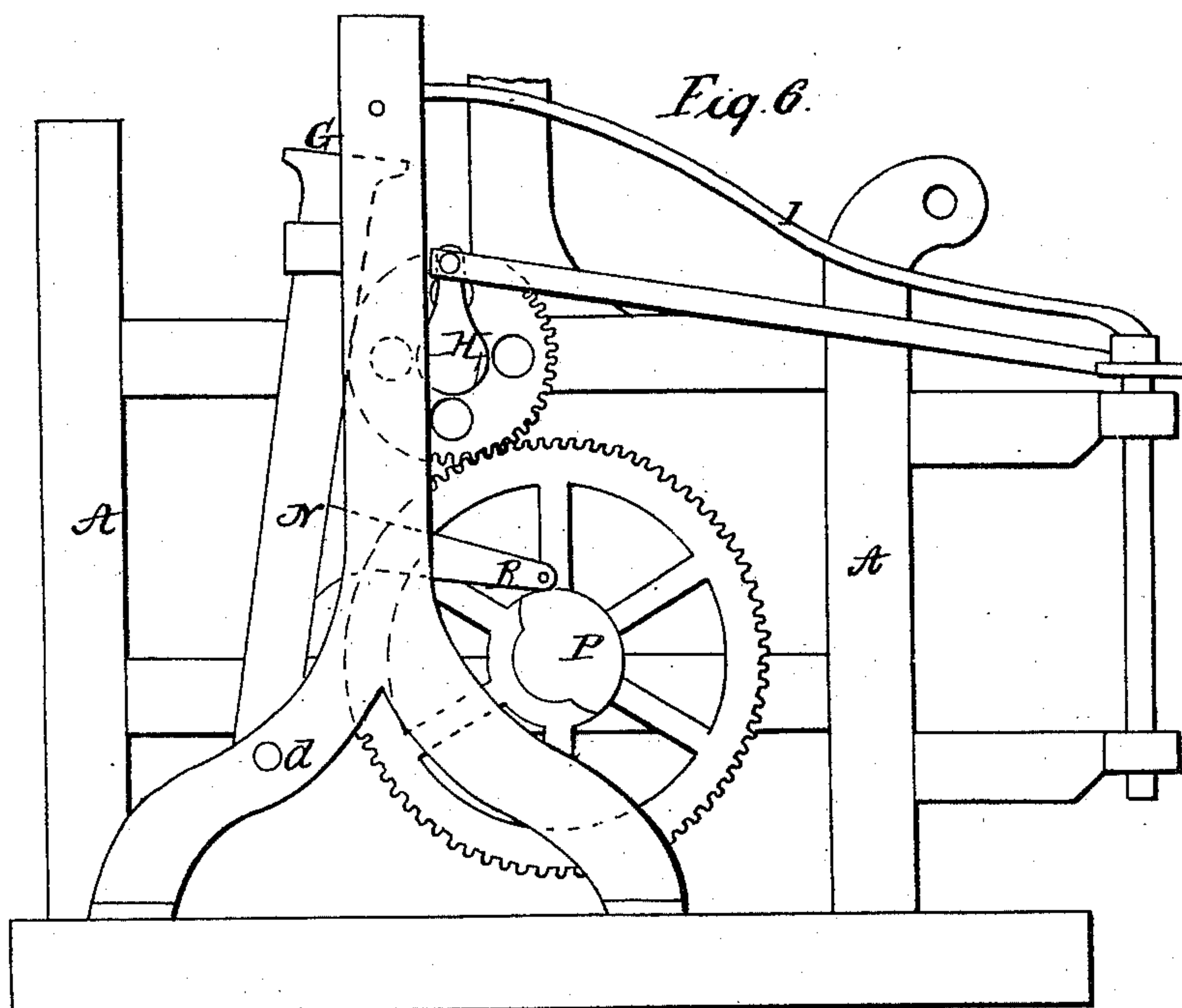
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Loom.

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A. J. Hobbs
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United States Patent Office.

JOHN EARNSHAW, OF EAST GREENWICH, RHODE ISLAND.

Letters Patent No. 66,574, dated July 9, 1867.

IMPROVEMENT IN LOOMS.

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 EARNSHAW, of East Greenwich, in the county of Kent, and State of Rhode Island, have invented a new Improvement in Power-Looms; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view.

Figure 2, a top view.

Figure 3, a left-hand end view.

Figures 4 and 5, the needle or warp-carrier; and in

Figure 6, a right-hand end view.

This invention relates to an improvement in the loom, for which I filed an application for Letters Patent in 1855, and consists, first, in the arrangement of a vertical shuttle, in combination with the weft or filling-carriers; also in the construction of the filling-carriers, and the manner of operating the same.

In order to the better understanding of my invention, as well as to enable others to construct the same, I will proceed to a description thereof, as illustrated in the accompanying drawings.

A is the frame of the loom, similar in its form and construction to ordinary looms; B is the lay, which is arranged and operated in similar manner as other looms, and is made of sufficient weight to beat up the filling, though it need not be made so deep, as no shuttle-race is required; C D are the needles or rods which carry the filling-thread in place of the common shuttle; they may be one or more in number, according to the nature of the fabric to be woven, and are made tubular, as seen in fig. 5, terminating in a point formed so as to pass freely through the warps, which warps are introduced into the loom in the usual manner for looms of common construction. Near the point of the needle the body is reduced, as at E, figs. 4 and 5, for the purpose more fully hereafter shown, and the needle or needles are fitted or secured to a stop, F, which works in a horizontal race, G, (a separate race for each needle,) placed at nearly right angles to the warps, and are caused to run through the warps, as denoted in red, fig. 2, and return by a crank, H, operating the lever I through its connection, J K, which said lever I is attached to a needle-operator, L, and driven to and fro upon a bar or guide, M, said needle-operator being formed with downward projecting studs *a*, which, as the needle-operator traverses to and fro upon its own bar, M, drives one of the needles through the warps and returns it. Any other suitable mechanism may be introduced to operate the needles; for instance, the needles may be placed one above the other in a vertical plane, be guided in a suitable frame or race with the projecting pieces F, extending from the side, to be caught and moved by a carriage. These needles may be raised and lowered either in regular order or any number of needles may be skipped by means of any well-known devices for operating drop-shuttle boxes, or the needles may be arranged in circular revolving boxes, and operated in any desired order in the usual method of operating circular shuttle-boxes. The race G is formed in a plate hung upon a carriage, N, pivoted to the frame at *d*, and is moved to present first one needle and then another, each at its proper time, to be driven through the warps and returned. In this instance the carriage N is actuated by a cam acting upon a lever, R, projecting from the side of the carriage, or by a suitable arrangement of cams as are used in operating drop-shuttle boxes, different-shaped cams being required according to the number of needles used or the pattern desired to be woven. The filling-threads are arranged upon bobbins S or spools at any convenient point, so that the thread may be taken therefrom and passed through suitable tension devices to the hollow needles. In this instance I have shown a tension device, *j*, which consists of a plate having a number of holes through it, and the tension is made greater or less according to the number of holes through which the thread is passed. Any of the well-known modes of producing tension on the threads of sewing machines may be employed. The thread, instead of passing from the tension device directly to the needle, may be passed through an eye, *k*, on the carriage N, and then passed under the pulley *l* of the dancing weight and to the needle; this dancing weight is to take up any excess of slack in the filling-thread, but any well-known take-up device used in sewing machines may be employed instead. This last-mentioned arrangement is shown in red, fig. 1. The end of the threads *zo* passed through the needles is secured in the warps, and the needle driven through between the warps carrying

the thread across, where it is caught by the device hereinafter described, and held while the needle returns; and when the needle has thus passed across and returned it leaves a double filling-thread, which is beaten up by the lay in the usual manner. The device for interlacing and holding the filling-thread consists of a shuttle, T, arranged to move up and down in a race, U, formed upon or attached to the lay, and so as to move back and forth with it, or the shuttle-race may be attached rigidly to the frame opposite to the needles. The shuttle is driven up and down in the said race, as from the position in black to that denoted in red, fig. 3, by the action of a cam, W, through a lever, X, or by an equivalent arrangement. The attachment to the shuttle may be made in any convenient manner, so that the shuttle may pass through the loop formed by the filling-thread as the needle returns, and to insure such positive passage through the loop the needle extends through the warps and passes into a recess, c, in the shuttle-race, so that the recessed portion E of the needle lies nearly flush with the race, leaving the thread a little distance from the face of the recess, as denoted in blue, fig. 5. The shuttle T is provided with a bobbin, and the tension on the thread governed in much the same manner as in sewing machines. The end of the shuttle-thread is drawn from the shuttle and is fixed to the warps so that when the needle is run across, as before described, and while upon the dead-point, or nearly so, and in the recess c in the race, the shuttle T is quickly driven up, passing through the loop, and while the shuttle T is up the needle returns, drawing the loop off the shuttle T, in like manner as does the needle in sewing machines, and the thread of the shuttle T holds the loop, and is drawn by the loop to the edge of the warps; this is beaten up by the lay in the usual manner. When the shuttle T returns, the needle is again passed through, its thread caught and held in like manner. The first needle continues to pass through until, at the proper time, the race in which it operates is moved in proper position to present a second needle to the carrier to be operated in like manner; thus several needles, carrying each a different warp, of different color, or of different material, may at the proper time be introduced and thus form a variety of fabrics.

It will be evident to those skilled in the art that this invention is particularly applicable to the weaving of pile fabrics, inasmuch as the carrier which operates the needle may at the same time introduce and withdraw the pile wires, and it will be equally evident that a jacquard may be attached to the loom as to looms of common construction, and as seen in fig. 3.

By this improvement in the shuttle-race it will be seen that by no possibility can the doubled filling-threads overlies each other, but must always lie in proper position. And by my improvement in the needle, that is, employing a hollow instead of an eye-pointed needle, there is less liability of the filling-thread becoming entangled in the operative mechanism.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is—

1. The shuttle T, arranged to operate vertically and crossing the head of the needle, so as to interlace the shuttle-thread with the filling-thread, substantially as set forth.
2. The employment of two or more filling-thread carriers in combination with a device for catching and retaining the filling-thread at each movement of the filling-carriers, substantially as set forth.
3. A tubular needle or thread-carrier, constructed and operating substantially in the manner herein set forth.
4. The notch c in the shuttle-race, in combination with a filling-thread carrier and shuttle, T, as and for the purposes specified.
5. The depression E, formed at or near the point of a tubular filling-thread carrier, substantially as and for the purpose set forth.
6. The needle-operator L, arranged to operate the filling-thread carriers, substantially as described.

In testimony whereof I have hereunto signed my name this 13th day of March, 1867, in presence of the two subscribing witnesses.

JOHN EARNSHAW.

Witnesses:

A. J. TIBBITS,
E. C. THOMPSON.