

L. FERGUSON.
Weaving Pile Fabrics.

No. 96,570.

Patented Nov. 9, 1869.

Fig. 1

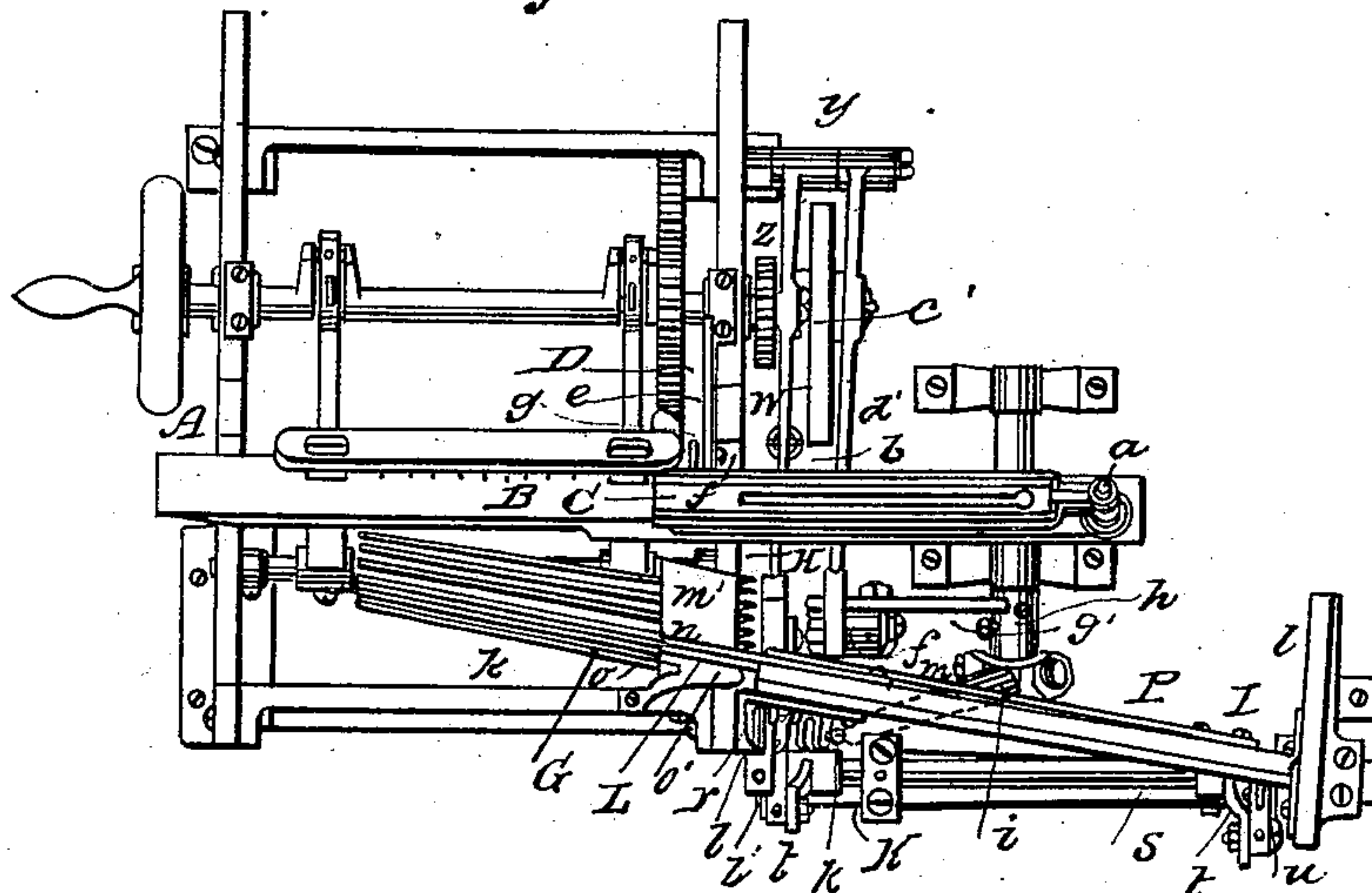
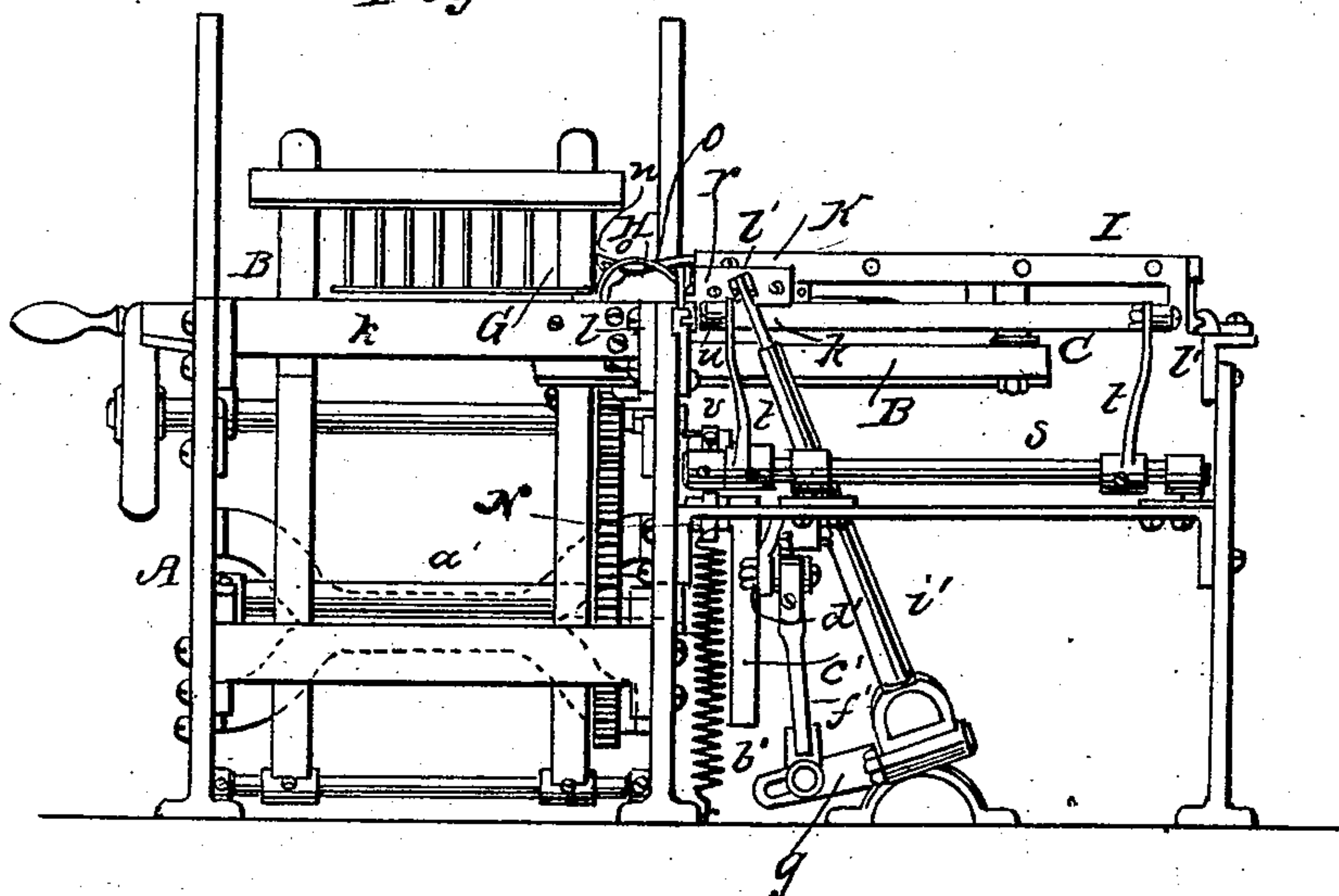


Fig. 2



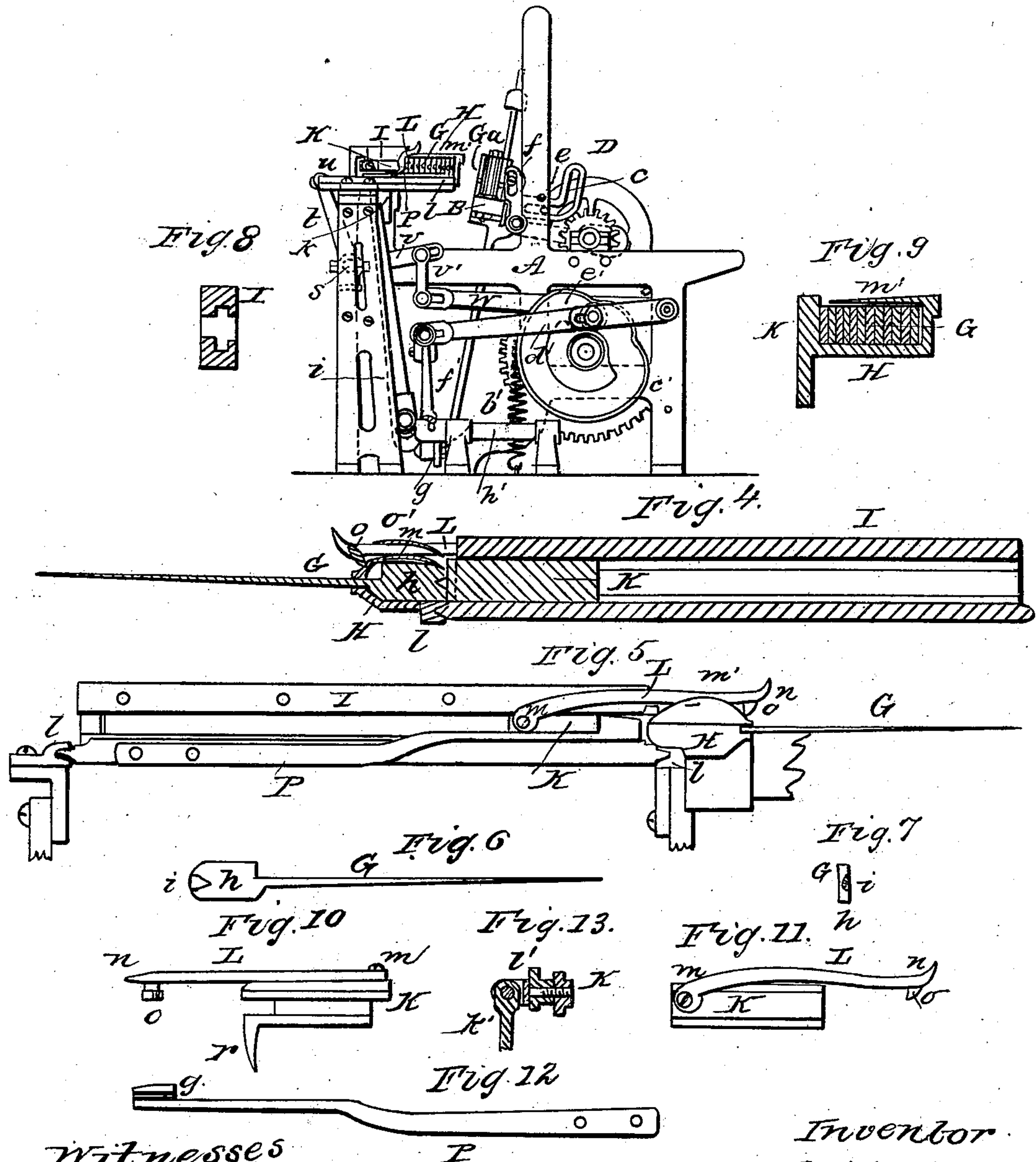
Witnesses
S. W. Piper.
J. R. Knowlton.

Inventor
Levi Ferguson.
by his attorney
R. W. Odely

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N. H. Eddy.

UNITED STATES PATENT OFFICE

LEVI FERGUSON, OF LOWELL, MASSACHUSETTS.

IMPROVEMENT IN LOOM FOR WEAVING PILE FABRICS.

Specification forming part of Letters Patent No. 96,570, dated November 9, 1869.

To all persons to whom these presents may come:

Be it known that I, LEVI FERGUSON, of Lowell, of the county of Middlesex and State of Massachusetts, have made a new and useful invention having reference to Looms for Weaving Pile Fabrics; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 denotes a top view of a loom-frame, with its lay and shuttle-box, and my new or improved mechanism for operating the wires used in forming the pile of the fabric during the weaving of such fabric. Fig. 2 is a front elevation, and Fig. 3 an end elevation, of the same.

Such other figures as may be necessary to a full explanation and comprehension of my invention will be hereinafter specially referred to and described.

In the drawings, A denotes the loom-frame; B, the lay, and C the shuttle-box. The latter, at its outer extremity, is pivoted to the lay, the pivot being exhibited at *a*, and of a character to cause the box to be turned thereon horizontally, or thereabout, so as to enable it, while the lay may be advancing, in order to beat up the weft, to fall back or remain stationary without being carried against the wire-holder H of the wire-operative mechanism.

There is pivoted to the lay, as shown, a bent lever, D, formed and arranged as represented in Figs. 1 and 3. In this lever is a bent slot, *c*, and a straight slot, *d*. A stud, *e*, extending from the loom-frame, enters the bent slot. Another stud, *f*, extended from an ear, *g*, projected from the shuttle-box, enters the other or straight slot. This lever, during and by the movements of the lay, will not only prevent the shuttle-box from being carried against the wire headstall or holder H, but will enable the lay to advance to beat up the weft, and, during the retreat of the lay, will move the shuttle-box into alignment with the race-beam thereof, and maintain it there during the throw of the shuttle into or from such shuttle-box. The series of pile-wires is shown at G as projecting from a stall or holder, H.

Fig. 4 is a longitudinal section of the said stall or holder and the wire-driver carrier I. Fig. 5 is a rear elevation of the same and their supports. Fig. 6 is a side view, and Fig. 7 is a rear-end view, of one of the pile-wires. Fig. 8 is a transverse section of the wire-driver car-

rier. Fig. 9 is a vertical section taken through the stall or holder H in a plane at or about at right angles with the lay. Fig. 10 is a top view, and Fig. 11 an inner side elevation, of the wire-driver and its draft hook or arm.

Each pile-wire G has a metallic head, *h*, on one side of which, and so as to open out at the rear end of the wire, is a notch, *i*. This notch is to enable the front end of a wire, on entering the stall H, to pass freely by the head of the next adjacent wire without being estopped thereby.

The pile-wire stall H projects from the breast-beam *k*, near one end thereof, in manner as represented. Two horizontal and parallel ways, *ll*, support the wire-driver carrier I, it being movable laterally within and between them. The said carrier has a passage leading through it lengthwise, to receive, support, and guide the wire-driver K. This wire-driver is a slide provided with an arm, L, which at its rear end is pivoted to one side of the driver, (the pivot being shown at *m*,) and at the other it is curved or cam-shaped, as shown at *n*.

A hook or projection, O, extending laterally from the arm, near its front end, serves, on a retreat of the driver, to catch upon the head *h* of a pile-wire, so as to cause such wire to be drawn backward or extracted from the woven fabric. A spring-presser, P, grooved on its inner face, and fixed to one side of the carrier I, serves, by pressing against the wire during its retreat and advance, to steady it, the wire moving in the groove of the presser. Fig. 12 is an inner-side view of the said presser, the wire-supporting groove being shown at *g* in such figure.

A horn or curved arm, *r*, termed the "pile-wire adjuster," projects directly from the wire-driver K, in manner as represented. This arm *r* is to insure the proper adjustment of the wires or to keep them in their places, so that none of them may project or be moved back so as to interfere with the retreat of the carrier I. The said carrier has intermittent reciprocating lateral movements imparted to it, it being held at rest while a wire is in the act of being drawn into it, as well as while one is in the act of being expelled from it.

The mechanism for operating the carrier I may be thus described: It consists, in part, of a rock-shaft, *s*, connected with the carrier by arms *t t* and connection-links *u u*, they being jointed together, and the links being jointed

to the carrier. From this shaft an arm, *v*, extends rearward, and is pivoted to a connection-rod, *v'*, which, in turn, is jointed to a lever, *w*, whose fulcrum is at *y*.

A cam, *z*, fixed on the cam-shaft *a'* of the loom-frame, works against a friction-roller applied to one side of the lever *w*, and serves to elevate the lever at the proper times, such lever being depressed at suitable intervals by means of a spring, *b'*, arranged as represented.

On the outer end of the cam-shaft *a'* is a grooved cam, *c'*, to which another lever, *d'*, is applied, a friction-roller, *e'*, fixed to the lever being extended into the groove of the cam. A connection-rod, *f'*, jointed to the lever *d'*, is pivoted to an arm, *g'*, extending from a rock-shaft, *h'*, arranged as represented. Furthermore, a tubular wagstaff, *i'*, pivoted or hinged at its lower end or part to one end of the said rock-shaft, receives a slide-rod, *k'*, which, entering the upper end of the wagstaff, slides freely lengthwise in such wagstaff, and is moved with and by it when the latter is in motion. This slide-rod is pivoted to an ear, *l'*, which projects from, and in turn is pivoted to, the wire-driver K, the same being as shown in Fig. 13, which is a section of the driver and the ear.

By combining the slide-rod with the wagstaff, and joining the said rod to an ear pivoted to the driver, and by pivoting the wagstaff at its lower end to the rock-shaft, it will be seen that the parts will readily accommodate themselves to each other during the movements of the driver-carrier, as well as while it may be at rest, and also while the driver may be in motion, such driver being moved by the wagstaff and its slide-rod during the reciprocating movement of the wagstaff.

While the cam *c'* may be in revolution, it, through the agency of the lever *d'*, the rod *f'*, the arms *g'*, the rock-shaft *h'*, the wagstaff *i'*, and the slide-rod *k'*, will cause the intermittent reciprocating movements of the wire-driver K. During a retreat of the said driver a wire at the rear of the collection of wires will be seized by the hooked arm of the driver, and will be extracted from the fabric and drawn into the carrier, after which the said carrier will be moved laterally toward the lay, and at the extreme of such movement will remain at rest, so as to allow the extracted wire to be advanced by the driver into the decussation of the warps. This advance will next take place, the hooked arm in the meantime being carried in contact with and over and upon the cap *m'* of the wire stall or holder H. The hook of the arm will be projected beyond the said cap *m'*. Immediately after the deposit of the wire between the warps the lay will beat up so as to drive it into place therein. Next, the wire-driver carrier will retreat to its former position, and carry the driver-arm along on the cap *m'*, so as to cause the hook of the said arm to entirely project beyond the front edge of the said cap. Next, the driver will be retracted within its carrier, so as to cause the hook

of the arm to take and catch upon the head of a wire and extract the wire.

A curved guide or spring-guard, *o'*, projecting from the loom-frame over the front end of the cap *m'*, serves to keep the hook of the arm in contact with the wire head while passing through and out of the stall H. The ear, pivoted to the slide-rod and the driver, may, with its connections with the two, be termed a "compound joint." The carrier, slotted lengthwise through both its front and rear sides, and also chambered lengthwise, in manner as described, will receive the hook or projection of the arm of the driver, and while holding it will prevent it from rising out of engagement with the wire head.

The mechanism above explained for introducing the wires into the decussation of the warps and extracting them from the woven part of the fabric while in process of being made by a loom is somewhat analogous to other mechanisms in use for such purpose. It contains, however, important and valuable differences, by which it is rendered of much value and importance, and better in several respects comparatively.

I make no claim to a shuttle-box movable relatively to the lay for the purpose of preventing the shuttle-box, during a beat of the lay, from being carried into contact with the mechanism for operating the wires.

I claim—

1. The combination and arrangement of the double-slotted bent lever D with the lay and the loom-frame and with the shuttle-box, pivoted at its outer end to the lay, the said lever being applied to the shuttle-box, the lay, and the frame of the loom, substantially in manner, and so as to enable it to operate therewith and effect the movements of the shuttle-box, as explained.

2. Also, the arrangement of the stationary guard *o'* with the wire stall H, as described, and with the hooked arm of the driver K, arranged in and to operate with the carrier, as explained.

3. Also, the carrier I, in combination with the hooked arm L, having a projection thereon that moves within the carrier and prevents the hook from rising out of engagement with the wire head while the latter may be in movement within the said carrier.

4. Also, the combination of the slide-rod *k'* and the compound joint, as set forth, or their mechanical equivalent or equivalents, with the driver K and the carrier I, to operate as set forth, and with a wagstaff, *i'*, pivoted to and so as to be actuated by a rock-shaft, *h'*, as described, the purpose of such slide-rod and compound joint being to so connect the driver with the wagstaff as to allow the driver to move within the carrier and to be moved by it and such wagstaff, substantially in manner as specified.

Witnesses: LEVI FERGUSON.

LONDON ADAMS,
R. R. CAMPBELL.