

(No Model.)

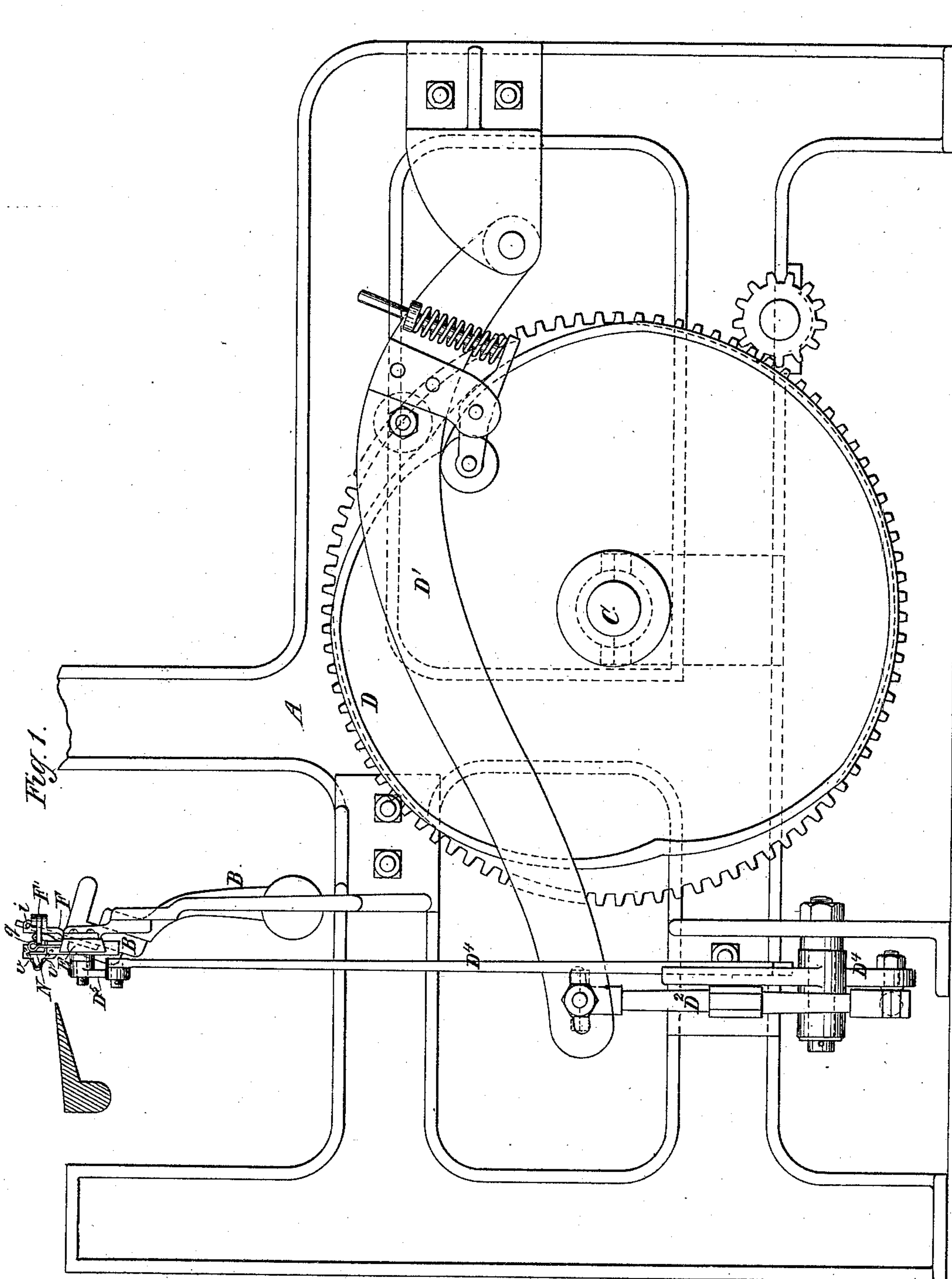
5 Sheets—Sheet 1.

A. L. SKINNER.

NEEDLE LOOM.

No. 330,070.

Patented Nov. 10, 1885.



Witnesses:

Louis H. Whitehead.

Matthew Pollock

Inventor:

Albert L. Skinner
by his Attys
Brown & Hall

(No Model.)

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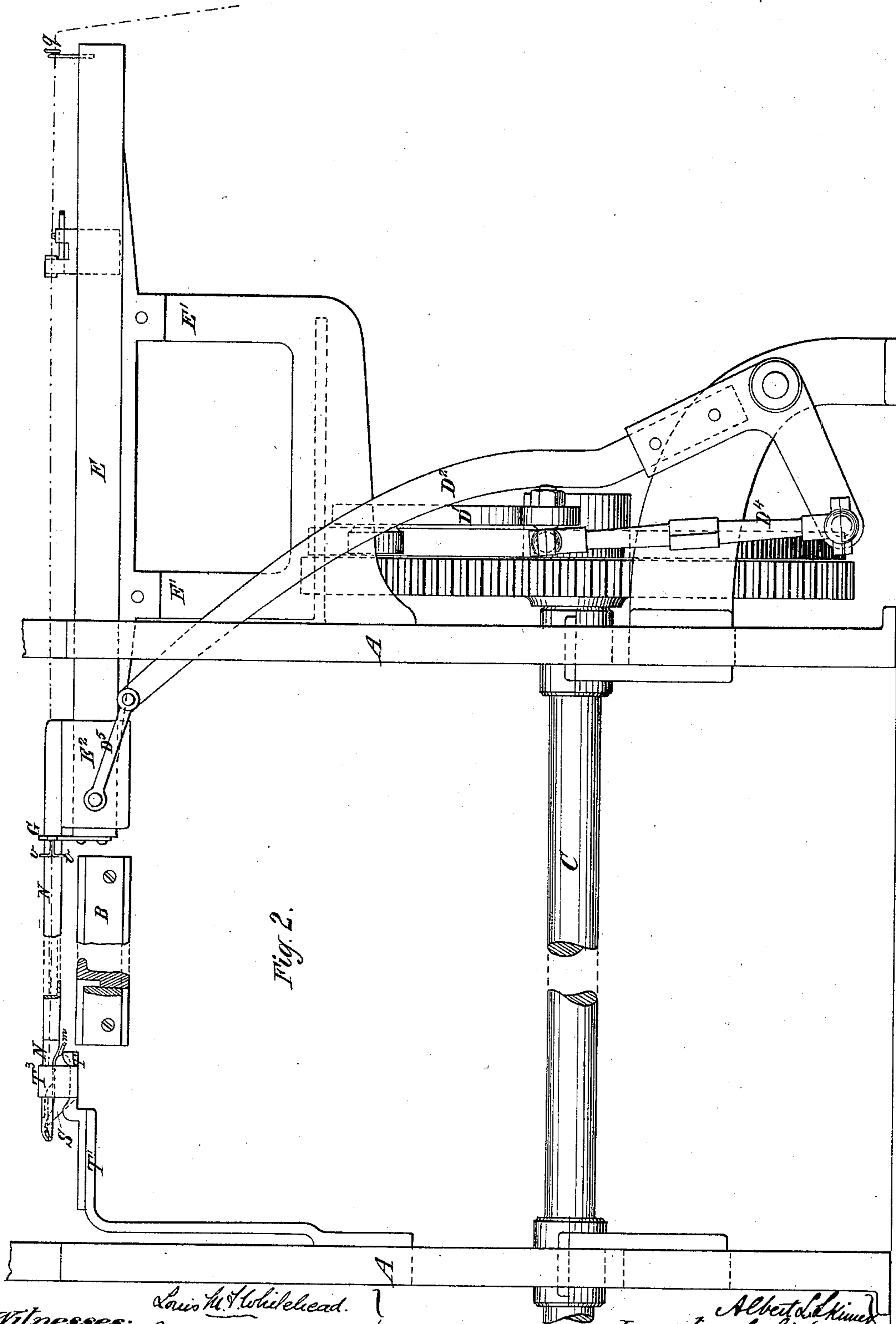


Fig. 2.

Witnesses: Louis M. Whitehead.
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Brown & Hall

(No Model.)

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A. L. SKINNER.

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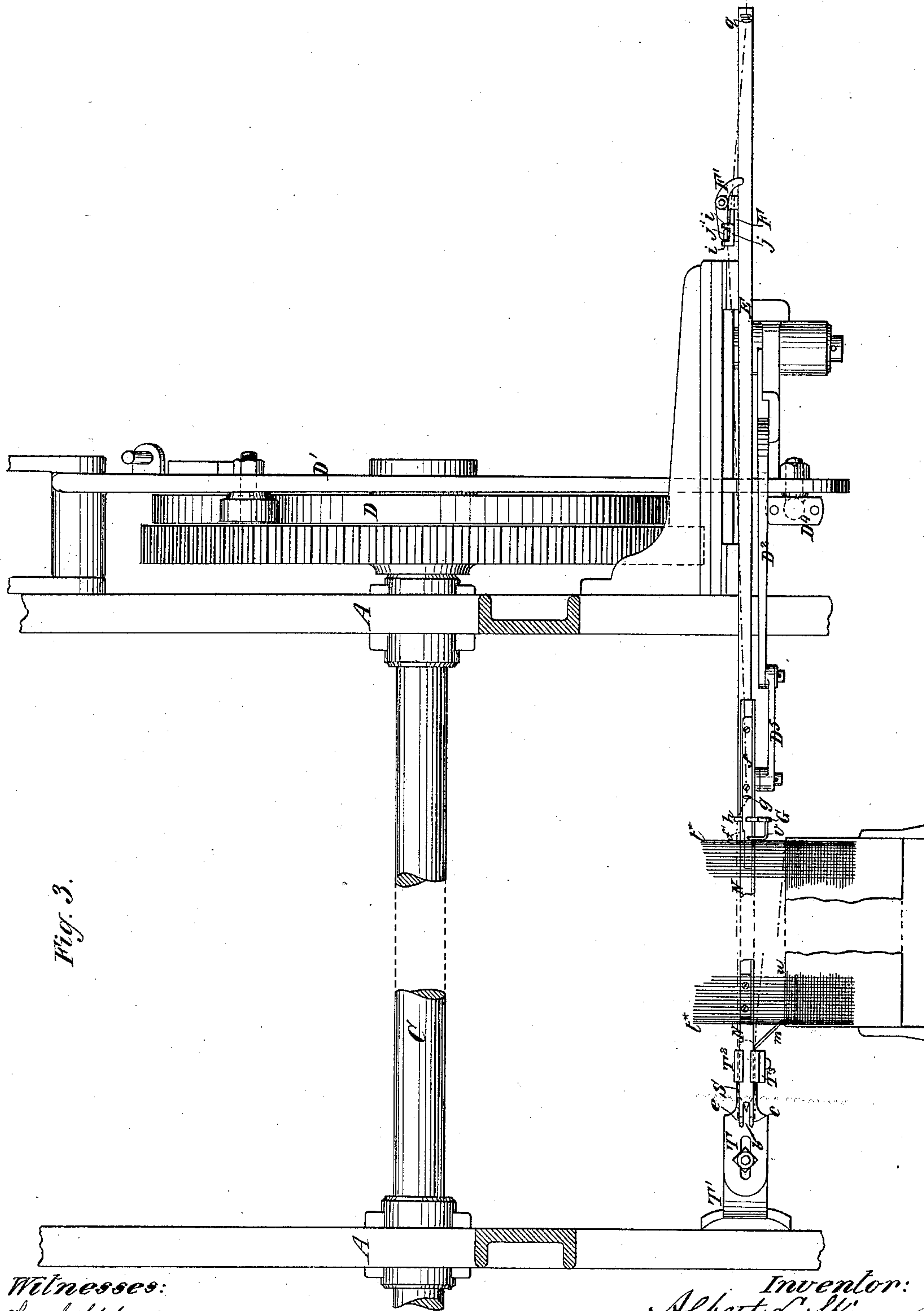


Fig. 3.

Witnesses:

Louis H. Whitehead.

Matthew Pollock

Inventor:

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(No Model.)

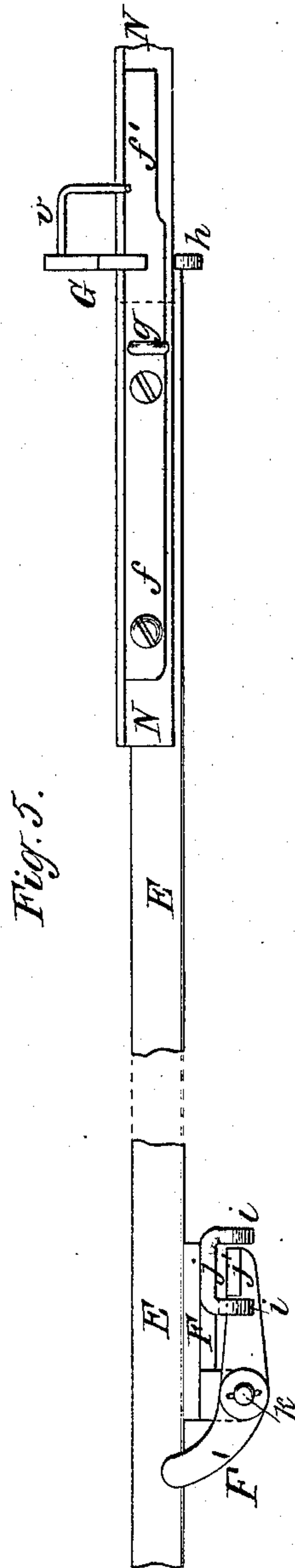
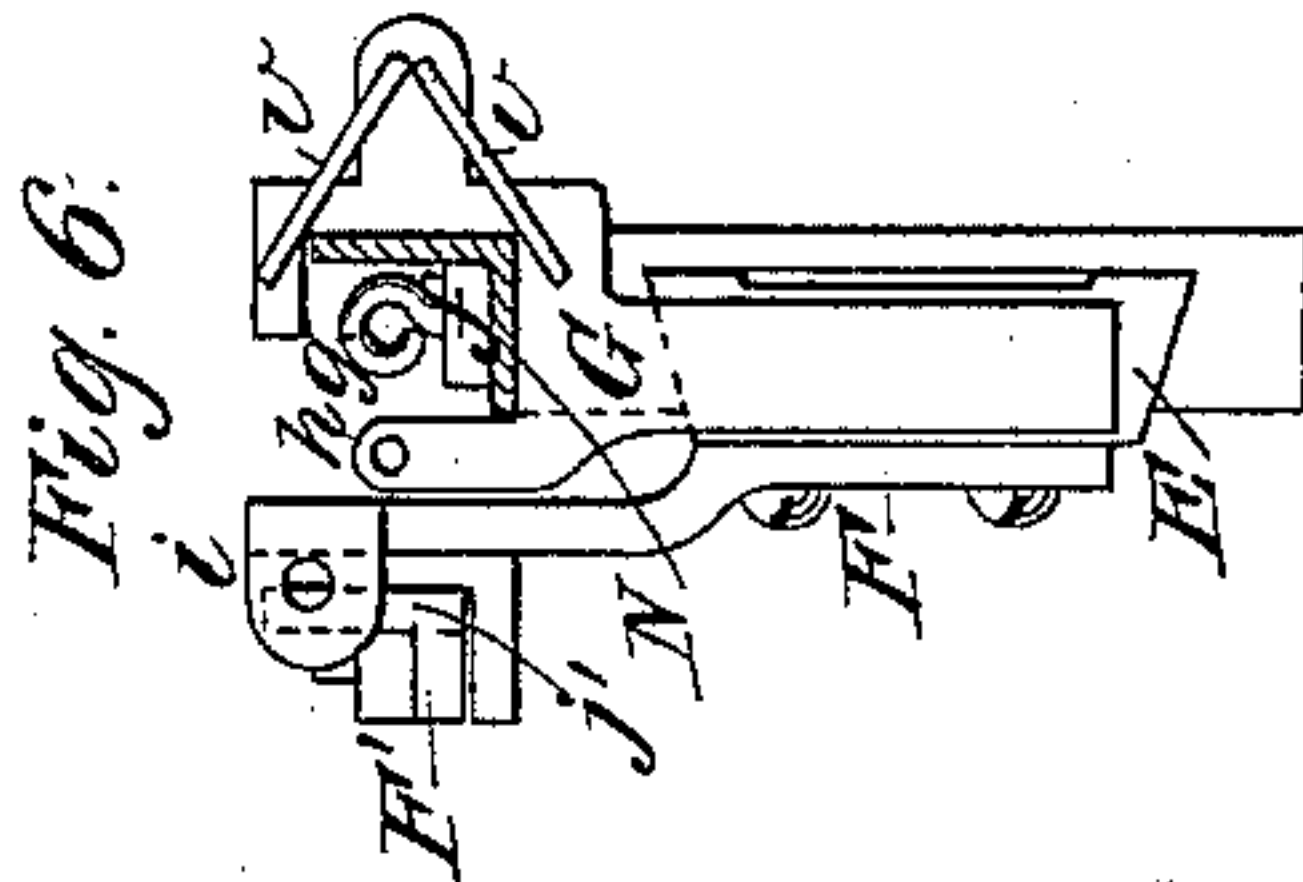
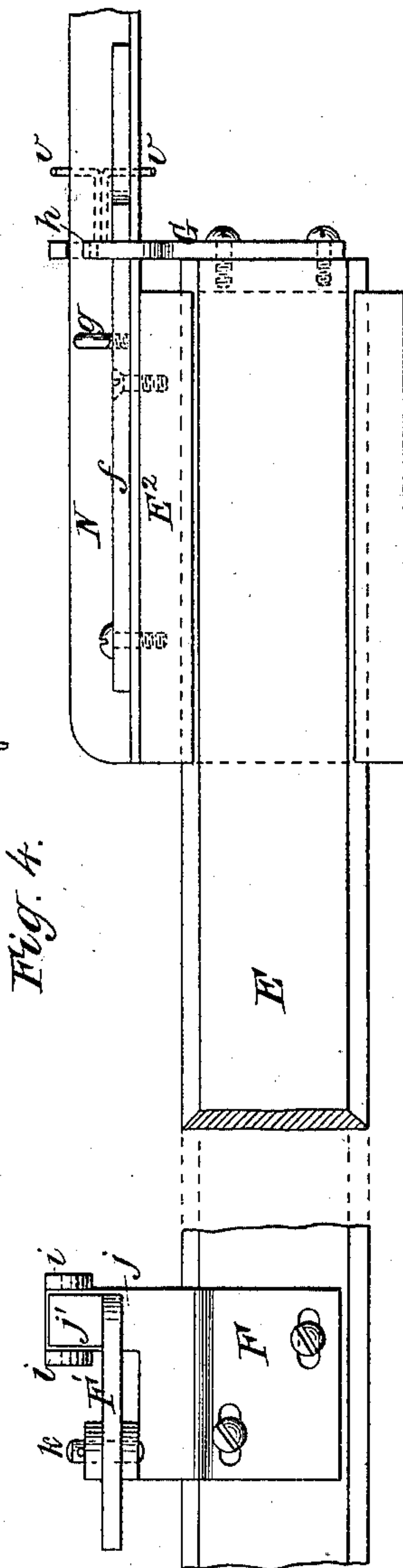
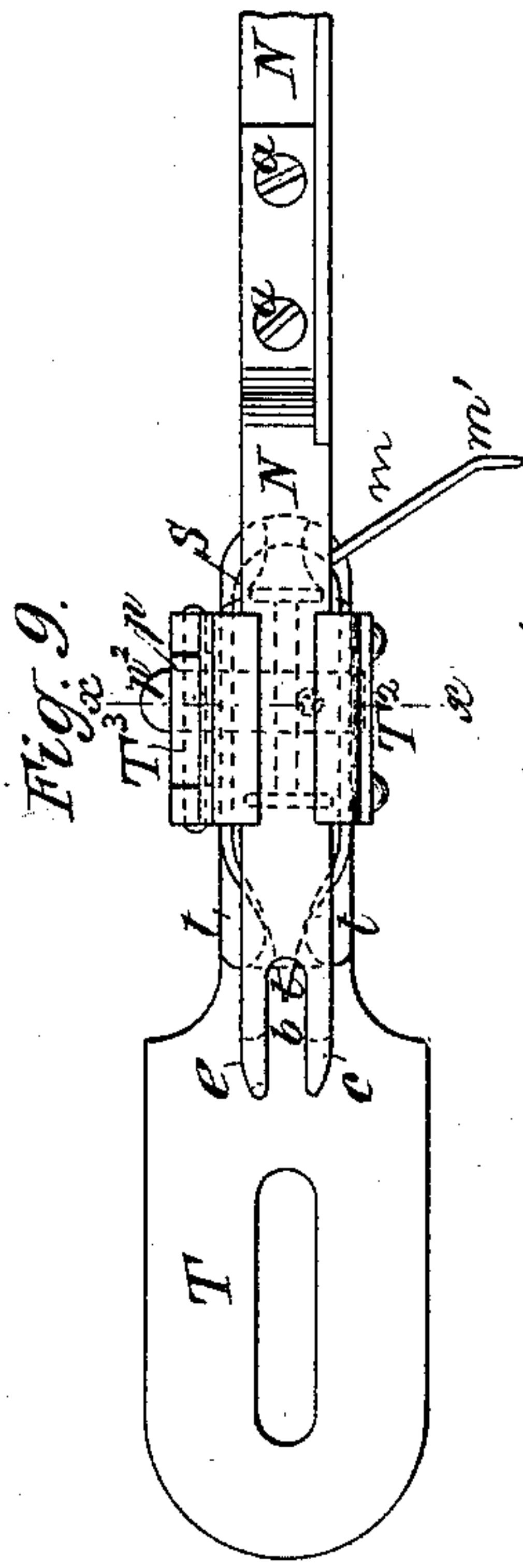
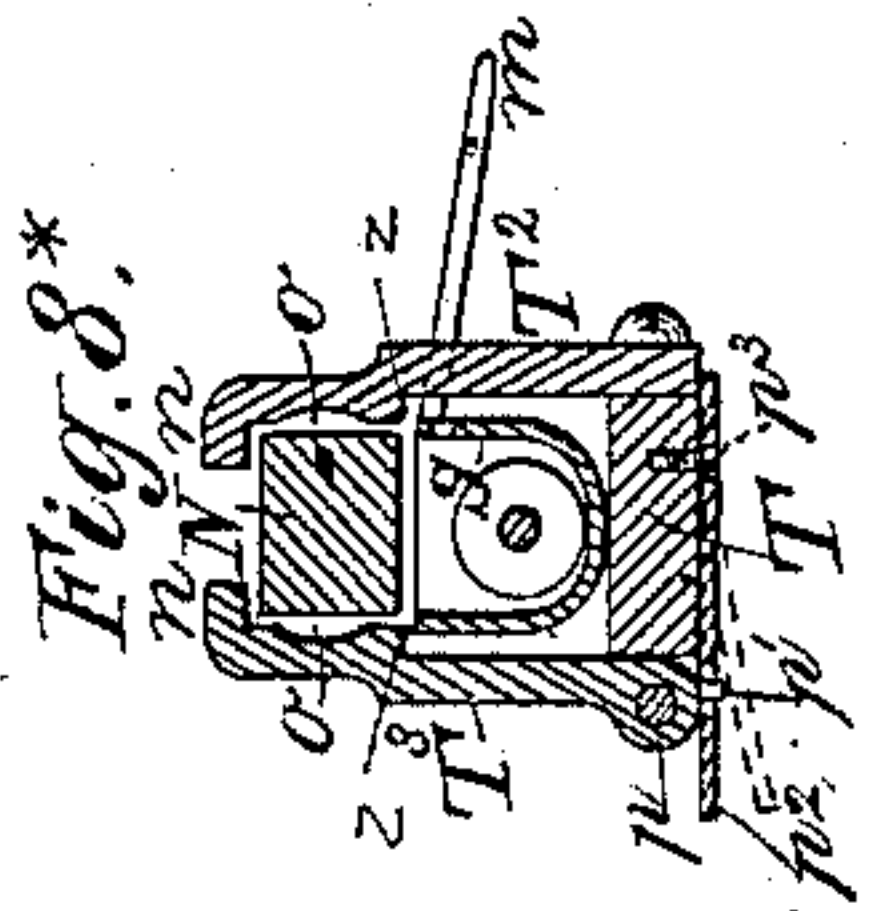
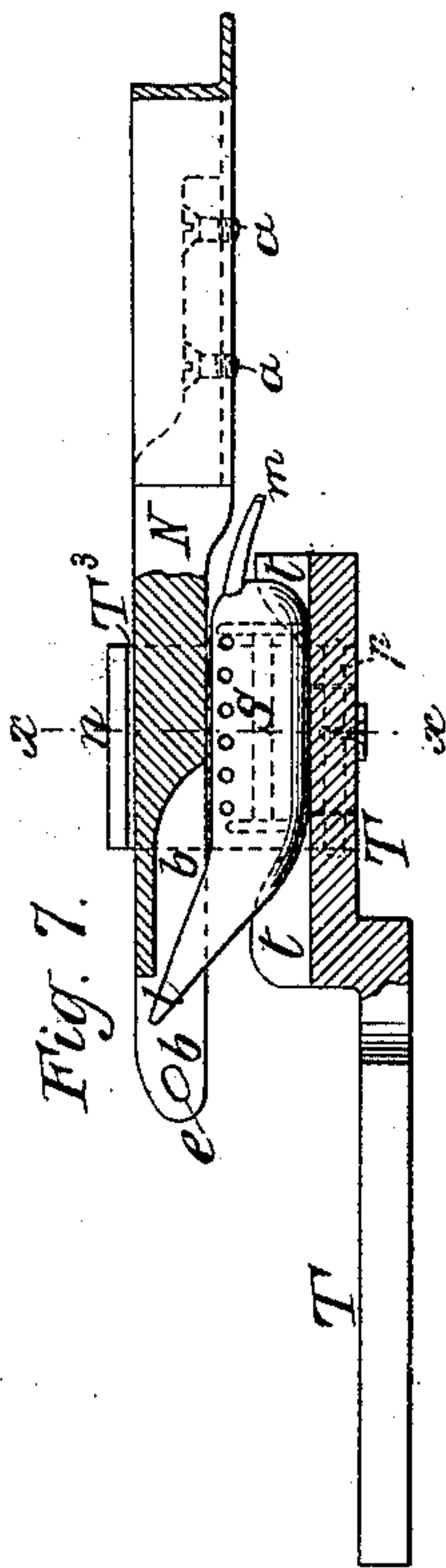
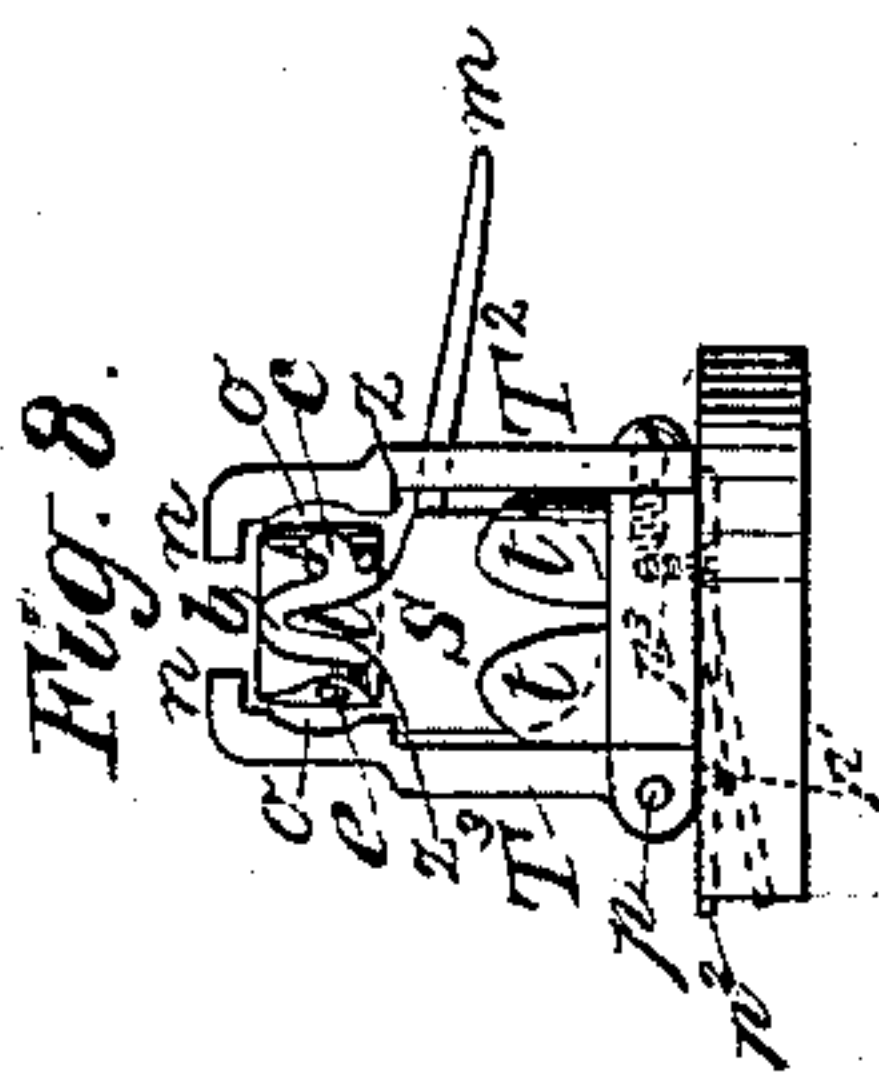
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A. L. SKINNER.

NEEDLE LOOM.

No. 330,070.

Patented Nov. 10, 1885.



Witnesses:

Osundgren
Emil Herter.

Inventor:

Albert L. Skinner
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(No Model.)

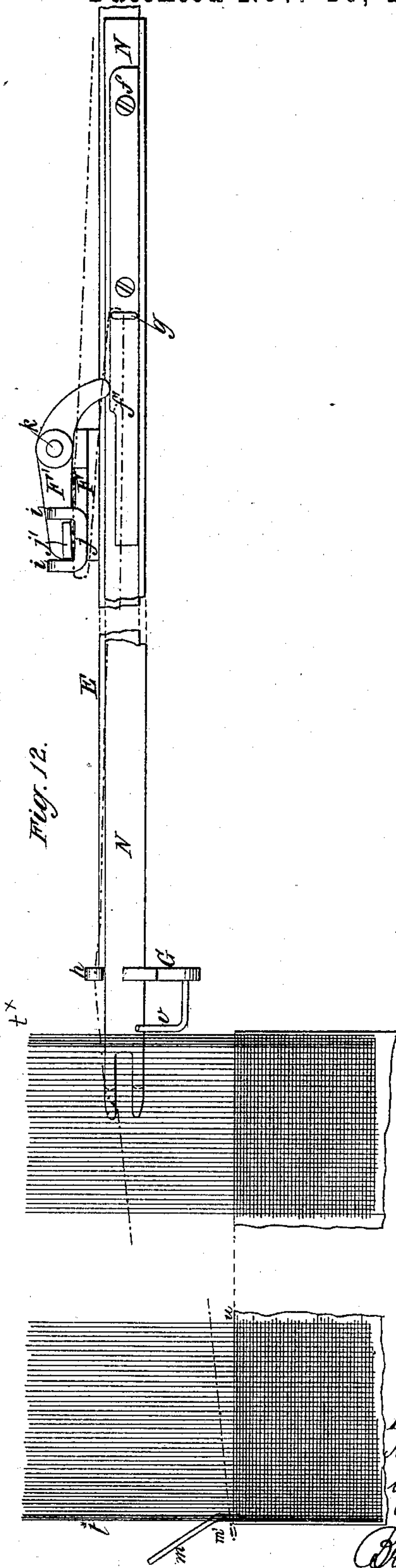
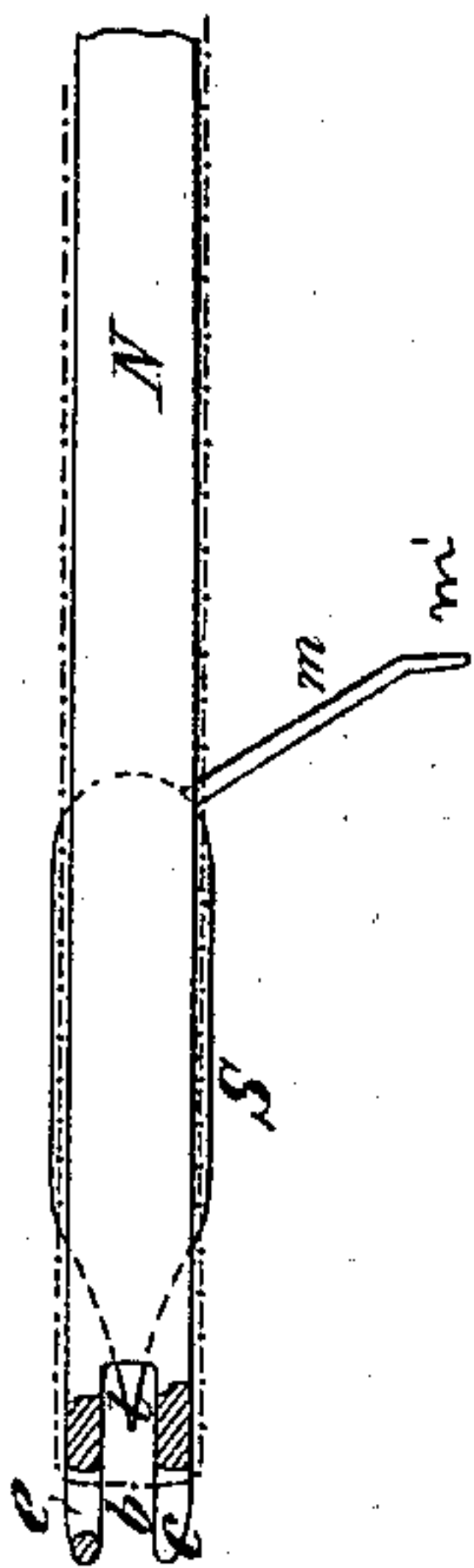
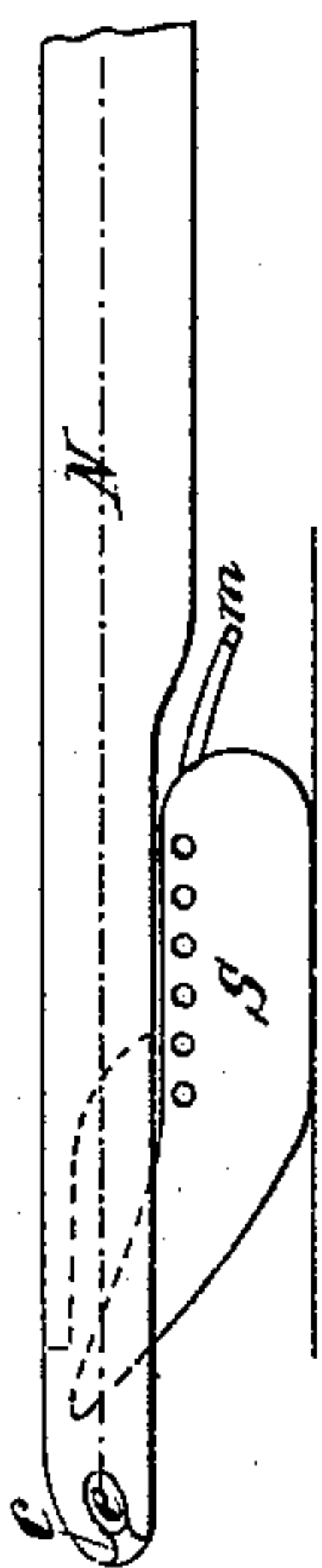
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A. L. SKINNER.

NEEDLE LOOM.

No. 330,070.

Patented Nov. 10, 1885.



Witnesses:

Louis H. I. Whitehead.

Matthew Pollock

Inventor:

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узнав у нас.

Brown & Hall

UNITED STATES PATENT OFFICE.

ALBERT L. SKINNER, OF YONKERS, NEW YORK.

NEEDLE-LOOM.

SPECIFICATION forming part of Letters Patent No. 330,070, dated November 10, 1885.

Application filed March 18, 1884. Serial No. 124,640. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. SKINNER, of Yonkers, in the county of Westchester and State of New York, have invented a new and useful Improvement in Needle-Looms, of which the following is a specification, reference being had to the accompanying drawings.

In what are known as "needle-looms" the weft-thread is carried through the warp by a needle, which doubles it, and a selvage-thread is passed through the loop formed by the doubling of the weft-thread, for the purpose securing and retaining the filling. Such selvage-thread shuttle has sometimes had imparted to it a movement by which it carried the selvage-thread through the aforesaid loop of the weft, and sometimes it has been stationary, while some other device has been employed to carry the said loop over the shuttle for the reception of the selvage-thread.

The object of my invention is to simplify the construction of such looms, and to dispense not only with mechanism for giving motion to the shuttle, but with all special mechanism for transferring the weft-loop over it; and to this end my invention consists, principally, in a novel construction of the needle and the selvage-thread shuttle and a novel combination of the said needle and shuttle, whereby the needle itself, by its ordinary to-and-fro movement, is made to carry the loop of the weft over the shuttle, while the latter is stationary or only moves sufficiently for the weft to pass over and under it.

The invention also consists in certain novel details of construction, hereinafter fully explained, and pointed out in the claims, for the purpose of the better accomplishment of the above operation performed by the needle and shuttle.

Figure 1 is a right-hand-side view of such parts of a loom as are necessary to illustrate my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a plan of the same as seen looking back from the breast-beam. Fig. 4 is a rear view of the needle-slide, the weft-tension-regulating mechanism, and part of the needle. Fig. 5 is a plan of the needle-slide and weft-tension-regulating mechanism and part of the needle as seen looking forward from the back of the loom. Fig. 6 is an end view corresponding with Fig. 5. Fig. 7 is a

front view of part of the needle, the shuttle, and shuttle-seat, the latter and a part of the needle being in section. Fig. 8 is an end view corresponding with Fig. 7. Fig. 8* is a transverse sectional view of the shuttle, the shuttle-seat, and the needle in the plane indicated by the line *xx* in Figs. 7 and 9. Fig. 9 is a plan of the shuttle and its seat and part of the needle. Fig. 10 is a side view of the point of the needle and the shuttle. Fig. 11 is a plan of the same with the point of the needle in section. Fig. 12 is a plan of part of the needle and devices for tightening the weft at the selvages, showing also parts of the warp and web being woven.

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

A is the framing of the loom. B is the lay. C is the cam-shaft, from which the several moving parts of the loom, including the weft-carrying needle N, derive motion. D is the cam provided on said shaft for operating the needle.

E' is a bracket secured to the right-hand side frame of the loom for supporting the straight stationary needle-carriage slide E. This slide is arranged horizontally and parallel with the shaft C, the breast-beam, and the lay, and the needle-carriage E² is fitted to slide freely upon it. The said slide constitutes a guide by which the movement of the needle is confined to a right line. The rectilinearly-moving needle N, which is rigidly attached to the carriage E², is straight, and for the greater portion of its length preferably made of angle-steel, as shown, in order to combine stiffness with lightness; but its point and some portion of its length adjacent thereto are represented as made of a separate piece of square or approximately square transverse section and secured to the angular portion by screws *a a*, as shown in Figs. 7 and 9. The point of the needle, the form of which is best shown in Figs. 7, 8, and 9, is forked by being slotted vertically right through it, as shown at *b*. The front prong so formed is slotted transversely to form a second fork, *c*, and the back prong so formed has provided in it an eye, *e*. The upper sides of the prongs have a downward slope toward the point, as shown in Fig. 7, and their ends are rounded off to prevent them from catching in the warp. Near the

head of the needle, or that end which is secured to the carriage E², there is attached to it, or to the said carriage itself, a cam, *f*, for operating a clamp (which will be presently described) for drawing the loop of weft-thread tight to the selvage of the web; and there is also attached to the upper side of the needle, near the head, an eye-guide, *g*, to receive the weft-thread. To the inner end of the needle-carriage slide E there is secured, as shown in Figs. 3, 4, 5, 6, a small fixed bracket, G, in which there is a thread-eye, *h*, situated behind the needle, and to which there is secured another thread-guide, *v v*, situated in front of the needle. The latter guide *v v* is composed of two elastic wires, which project from the said bracket close together some distance in a direction parallel with the needle, and the extremities of which are turned one upward and the other downward to make a V-shaped fork, as shown in Fig. 6, the said parallel portions and the vertex of the V being about opposite the center line of the needle, and the fork itself being parallel with the warp and very near the selvage *t*^{*} on the side of the warp where the needle enters. On the outer end of the needle-carriage slide E there is a fixed weft-thread guide, *q*.

The weft-clamp above mentioned, which is shown in Figs. 4, 5, and 6, consists of two parts—namely, a fixed jaw, *j*, formed on a plate, F, secured firmly to the fixed slide E, and having two thread-eyes, *i i*, and a movable jaw, *j'*, formed on a lever, F', which is pivoted at *k* to the said plate F.

The needle-operating cam D transmits to the needle the necessary to-and-fro motion by means of levers D' and D² and connecting-rods D⁴ and D⁵; but as this mechanism does not or need not differ very essentially from the needle-operating mechanism used in other needle-looms it needs no further description.

S is the stationary shuttle which carries the selvage-thread, arranged crosswise of the loom and parallel with the needle and just below the path of the needle, so that the point of the latter will pass closely over it after passing through the warps. This shuttle is supported in a bed, T, which is secured to a fixed bracket, T', which is bolted to the left-hand side frame of the loom, or which may be otherwise formed or provided on the opposite side of the loom to that from which the needle enters the warp.

The said shuttle only differs in two particulars from the shuttles commonly employed for the purpose—viz., first, in having its nose *l* somewhat longer than is common, and turned upward to be received in the vertical slot or fork *b* of the needle, as shown in Fig. 7; and, second, in being provided with a long thin tail, *m*, which projects forward and toward the center of the loom in a direction oblique to the length of the shuttle itself and to the warp in the loom, but has its terminal portion *m'* at an angle to its length, so that it will be parallel with the warp in the loom. The said shut-

tle occupies such a position that the said terminal portion of its tail will be close to the selvage of the web that is being woven in the loom, and that the point or extremity of the tail will be a little in front of the line of the fell, as may be understood by reference to Figs. 3 and 12, in which *t*^{*} is the line of the selvage and *u* is the line of the fell.

The shuttle-bed T is provided at its corners with rounded upward projections *t t* to form guards to confine the shuttle longitudinally, and it has attached to its sides two guide-plates, T² T³, which have internal flanges, *n n*, on their upper edges, under which the needle may pass, as shown in Figs. 7, 8, 8*, and 9, during the latter part of its forward movement through the warp. These flanged guide-pieces serve as guides to assist in directing the needle in a right line, and to guide it directly over the shuttle, and also serve to confine it in a downward direction close to the shuttle, and at the same time serve to prevent not only lateral displacement of the shuttle, but to confine it downward to its bed as much as is necessary while the needle passes over it, being provided for the latter purpose with internal shoulders, *z z*, as shown in Figs. 8 and 8*. The inner faces of the guide-plates T² T³ are also slightly hollowed out, as shown at *o o* in Figs. 8 and 8*, to give plenty of room for the weft-thread on opposite sides of the needle, and the said guide-pieces fit so loose to the needle and shuttle as to present no obstacle to their free movement or to the passage of the loop of the weft by the sides of and under the shuttle. The guide-plate T² is rigidly secured to the shuttle-bed, but that T³ is connected with the said bed by a hinge, *p*, as shown in Figs. 7, 8, and 8*, so that it may be easily turned down to provide for the insertion and removal of the shuttle.

In order to secure the hinged guide-plate T³ in the operative position shown in the drawings, it is provided on the bottom of its hinged portion with a pin or projection, *p'*, to engage, as shown in Fig. 8*, in a hole in a spring-catch, *p*², which is attached by a screw, *p*³, to the bottom of the shuttle-bed. To enable the guide T³ to be turned down for taking out and putting in the shuttle, the spring-catch is depressed by the attendant, as shown in dotted outline in Fig. 8*. When the said catch is liberated, after the guide-plate T³ is replaced in its operative position the said catch engages with pin *p'* and locks it.

In weaving the weft-thread is supplied from a bobbin placed on the floor or otherwise conveniently arranged at or near the right-hand side of the loom and it passes, as shown in Fig. 3, where it is shown in a line of alternate strokes and dots, first, through the eye *q* on the needle-carriage slide E, thence through the eyes *i i* and between the jaws *j j'* of the clamp, thence through the guide *g* on the needle and through the guide *h* on the slide E behind the needle, thence through the eye *e* of the needle from the back thereof, and through

the fork *c*, and thence to the selvage on the right-hand side of the loom.

The position of the parts shown in Figs. 2, 3, 7, 9, 10, 11 is that when the needle has just completed its forward movement, which carries the double weft through the shed. It will be understood that the bend of the loop of the weft, which is stretched across the fork *b*, between the eye *e* and the fork *c* of the needle, has passed beyond the point of the shuttle, having been permitted to do so partly by the elasticity of the thread itself and partly by slightly tilting the shuttle to lower its point, and the band of the loop is now lower than the point of the shuttle, so that as the needle returns the loop will pass under instead of over the shuttle, which will thus be caused to pass entirely through it and leave the selvage-thread within it. The loop, in slipping over the heel of the shuttle, will pass onto and be temporarily detained by the tail *m* thereof, and will be so guided by the oblique portion thereof as to be carried forward to the line of the fell, where it will be retained on the terminal portion *m'* close to the selvage while being drawn tight thereon by the retiring movement of the needle, as will be presently explained. The loop of each pick of filling thus retained on the tail of the shuttle will remain thereon until one or more subsequent picks are so caught and retained, and will be finally drawn off by the taking up of the web as the weaving proceeds. By thus retaining several picks on the tail of the shuttle after their loops are drawn up tight the tail is given a support of considerable length in the selvage and held quite firmly, and so made to determine the point to which the loops of successive picks are drawn up, and a tight and very even selvage is obtained. The terminal portion *m'* of the tail of the shuttle is so small, being almost like the point of a needle, that as the loops of the weft slip off it they have no appreciable projection beyond the selvage-thread.

The drawing tight of the weft is effected in the following manner: As the needle continues to retire after its loop has been caught and retained by the tail of the shuttle the eye *e*, at its point, and the eye-guide *g*, near its head, run freely along the back half of the doubled weft until the cam *f* on the needle comes into operation on the tail or outer end of the clamp-lever *F'*, and cause the weft to be clamped by the jaws *j j'*, and immediately after the thread has been so clamped the eye-guide *g* passes the clamp-jaws and draws the thread outward beyond them in the form of a double loop, as shown in Fig. 12, one turn of the said loop coming around the fixed jaw *j* of the clamp *j j'*, and the other around the eye-guide *g*. The slack of the weft is taken up into this double loop by the draft of the eye-guide *g* on the turn of the loop which passes through the said guide, and as the needle continues to move back it continues to take up the slack by the elongation of this loop until the weft is drawn up tight into the selvage on the oppo-

site side of web. Just before the needle completes its retiring movement the recess *f'* of the cam *f* passes the tail of the lever *F*, and so liberates the clamp and leaves the weft free while the lay beats up. As the lay beats up the filling it carries that portion of the weft-thread between the selvage and the eye of the needle into the fork of the V-shaped guide *v* and through the vertex of the V, and between the close parallel front portions of the wires of which the said guide is composed, where the thread is held by the elasticity of the wires in such position that it is sure to be caught in the fork *c* of the needle when the latter advances again.

It will be understood from the foregoing description that the operation of causing the selvage-thread to pass through the loop of the doubled weft is effected by the needle itself without any other appliance either for operating the shuttle or for manipulating the loop. One of the most important agencies in accomplishing this is the arrangement of the shuttle with its length parallel with the needle and transverse to the direction in which the warp runs.

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

1. The combination of a straight weft-carrying needle, guides to confine the said needle to a right line, mechanism substantially as herein described, for moving the said needle rectilinearly to and fro through the warp, a stationary shuttle-bearing, and a stationary shuttle for containing a selvage-thread arranged in said bearing parallel, or thereabout, with the said needle, substantially as and for the purpose herein specified.

2. A weft-carrying needle for a loom, having its point or end slotted to form a fork, having one prong of the so-formed fork slotted to form a second fork, and having an eye in the other prong, substantially as and for the purpose herein described.

3. The combination, with a forked weft-carrying needle, and means, substantially as herein described of operating the same, of a stationary selvage-thread shuttle arranged parallel with and close to the path of said needle and having its point arranged to be received within the fork of said needle, substantially as and for the purpose herein described.

4. The combination, with the weft-carrying needle, and means, substantially as herein described, of operating the same, of a stationary selvage-thread shuttle having a tail, *m m'*, a portion of which is oblique to the direction of the warp in the loom, but the terminal portion of which is parallel with the direction of the warp, for retaining at the same time several of the loops of the weft at the selvage, substantially as herein set forth.

5. The combination, with the straight weft-carrying needle, and means, substantially as herein described, of imparting a rectilinear reciprocating motion thereto, and the stationary selvage-thread shuttle arranged below

the path of and parallel with the said needle, of a stationary shuttle-bed, T, for supporting the shuttle and attached guide-plates T² T³, which confine the shuttle laterally and
5 guide the needle, and which are provided with internal shoulders, z z, for confining the shuttle vertically, and with internal flanges, n n, for confining the needle downward when
10 above the shuttle, substantially as herein specified.

6. The combination, with the weft-carrying

needle having a fork, and having an eye in one prong of the said fork, and a second fork in the other prong thereof, and means, substantially as herein described, for operating the
15 said needle, of a stationary V-shaped or forked guide to direct the weft into the said second fork, substantially as herein specified.

A. L. SKINNER.

Witnesses:

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C. E. SUNDGREN.