

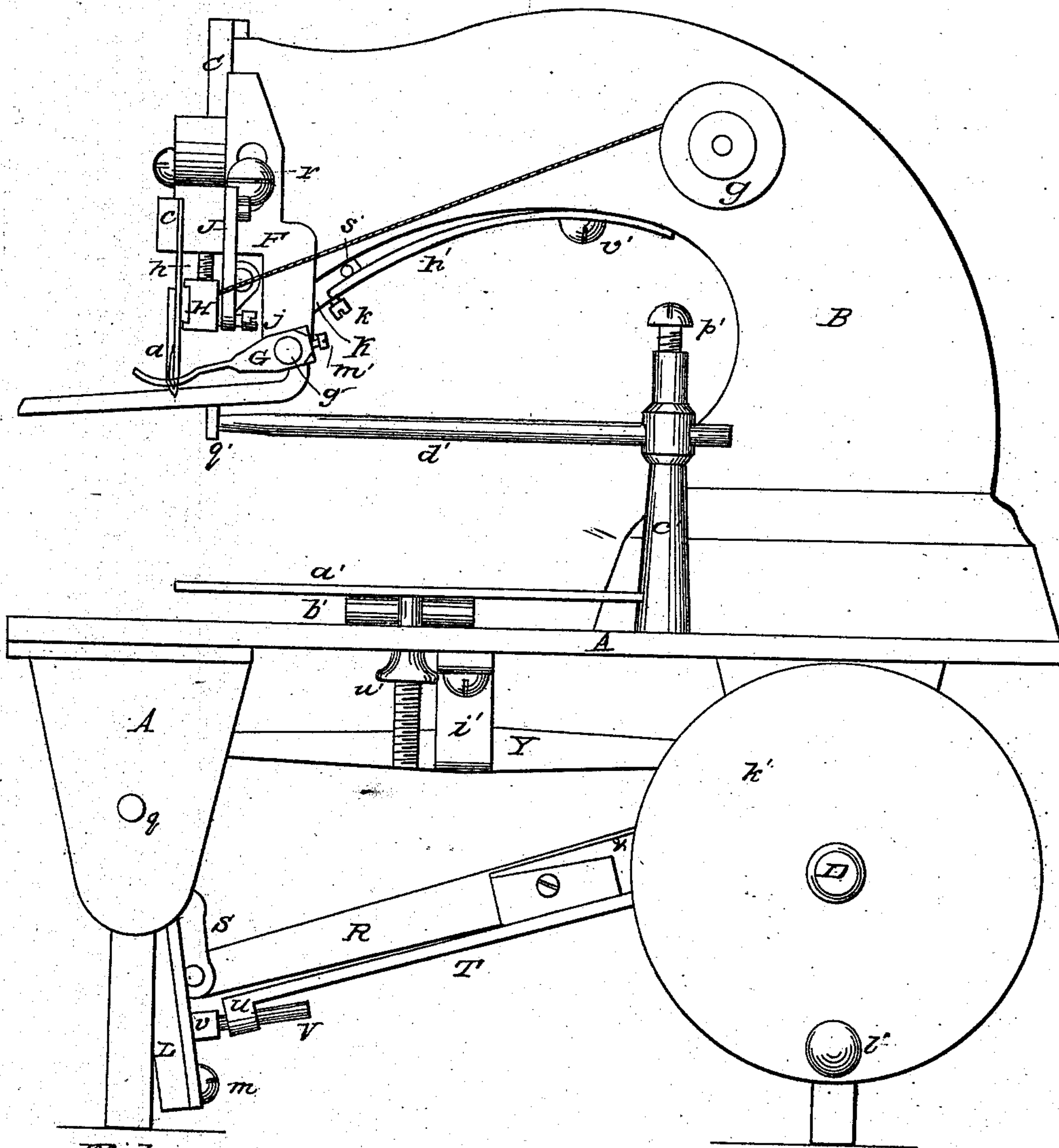
L. HALL.

Machine for Sewing Books.

No. 105,329.

Patented July 12, 1870.

Fig. 1.



Witnesses
W. B. Ely
Alfred Ely.

Inventor
Luther Hall
By A. B. Ely atty.

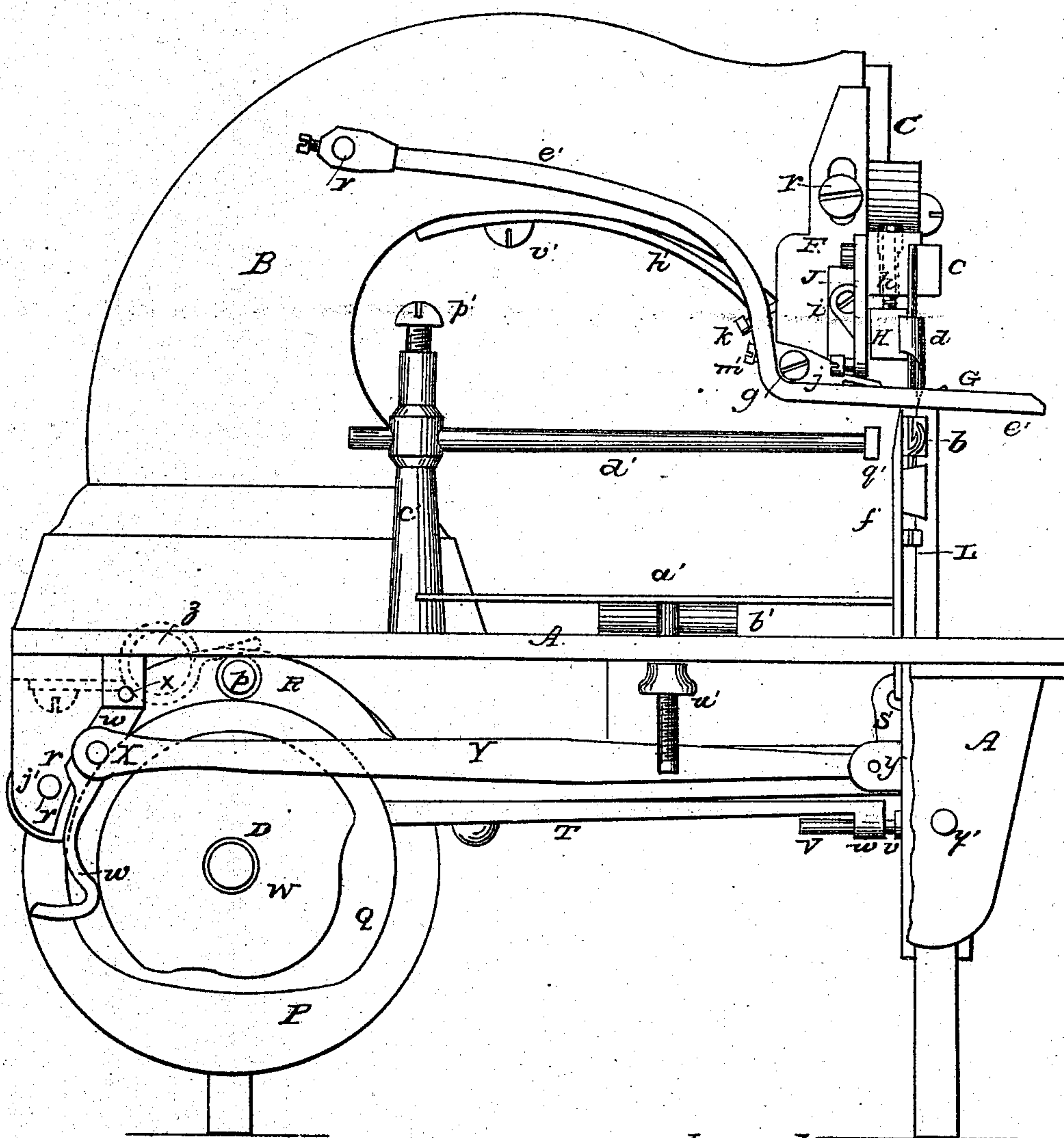
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Fig. 2



Witnesses
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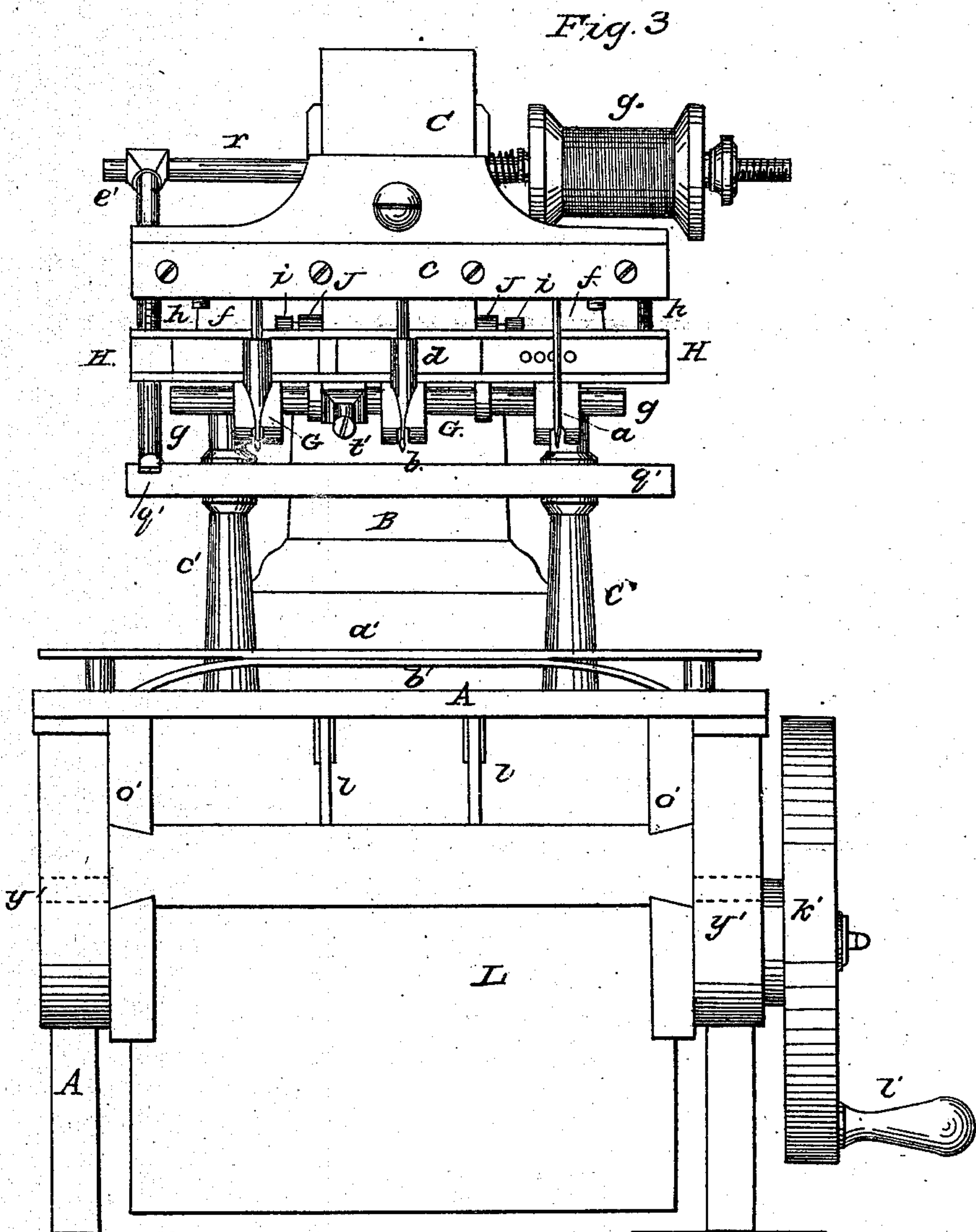
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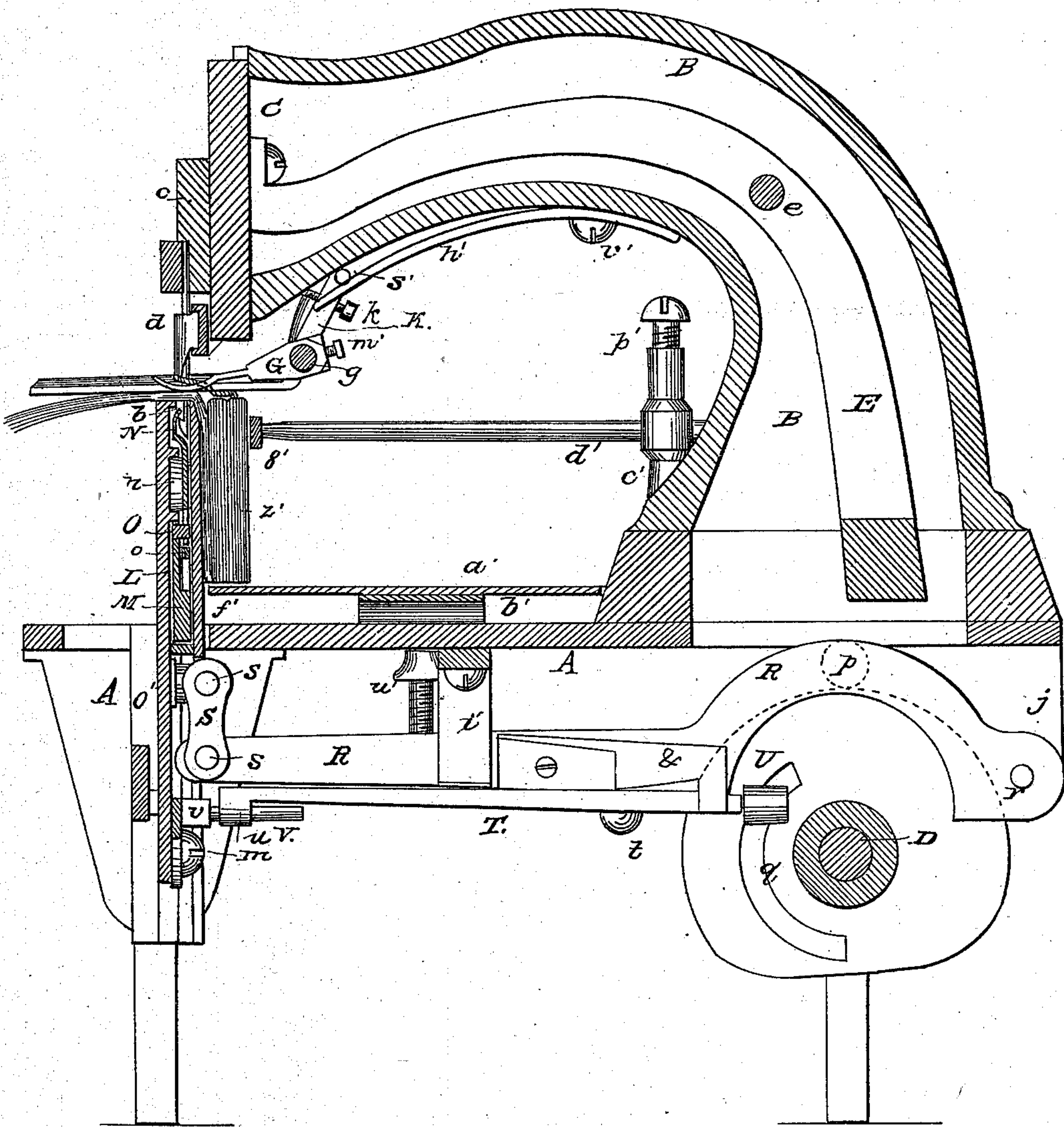
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Fig. 4.



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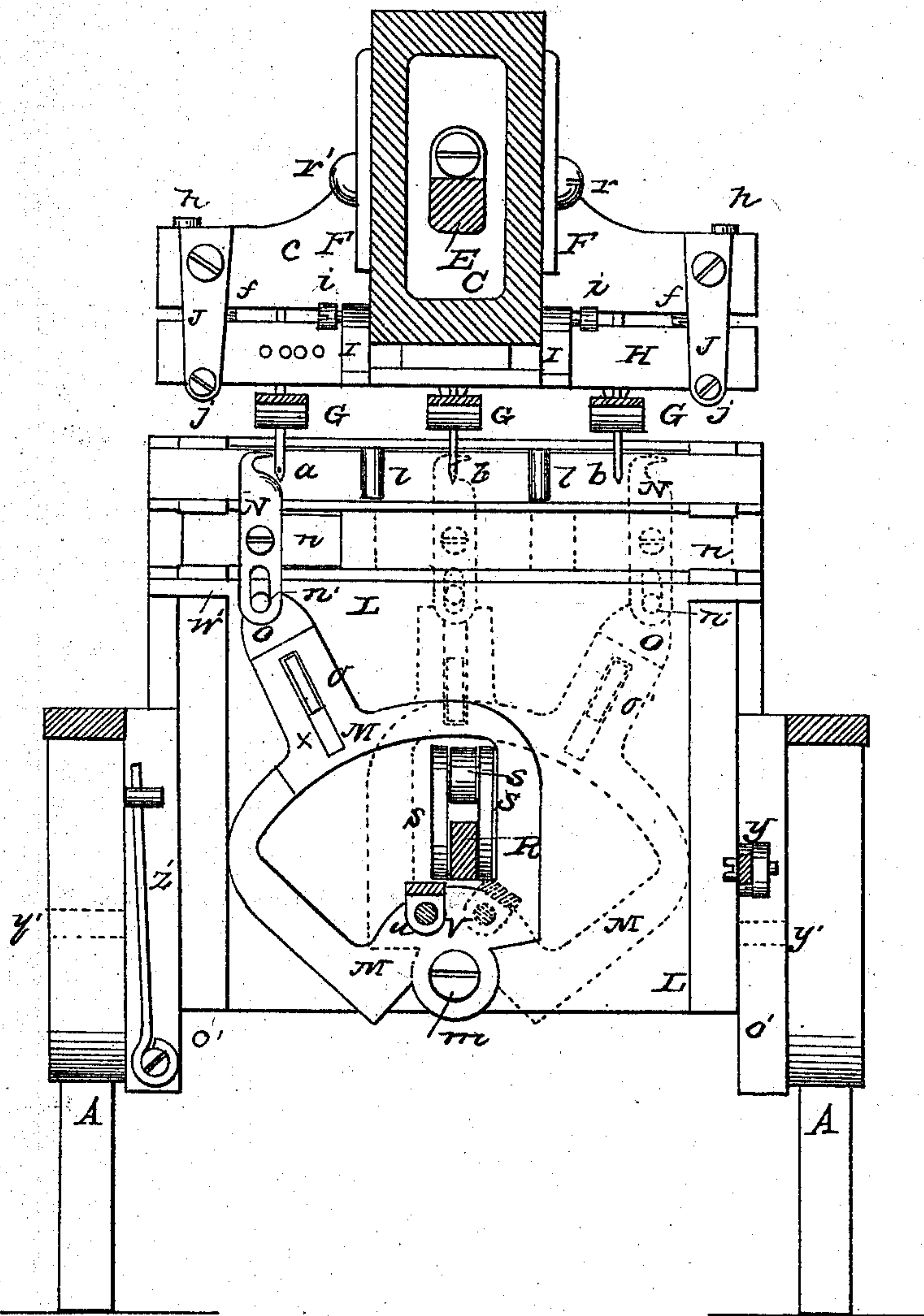
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Fig. 5



Witnesses
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Alfred Ely.

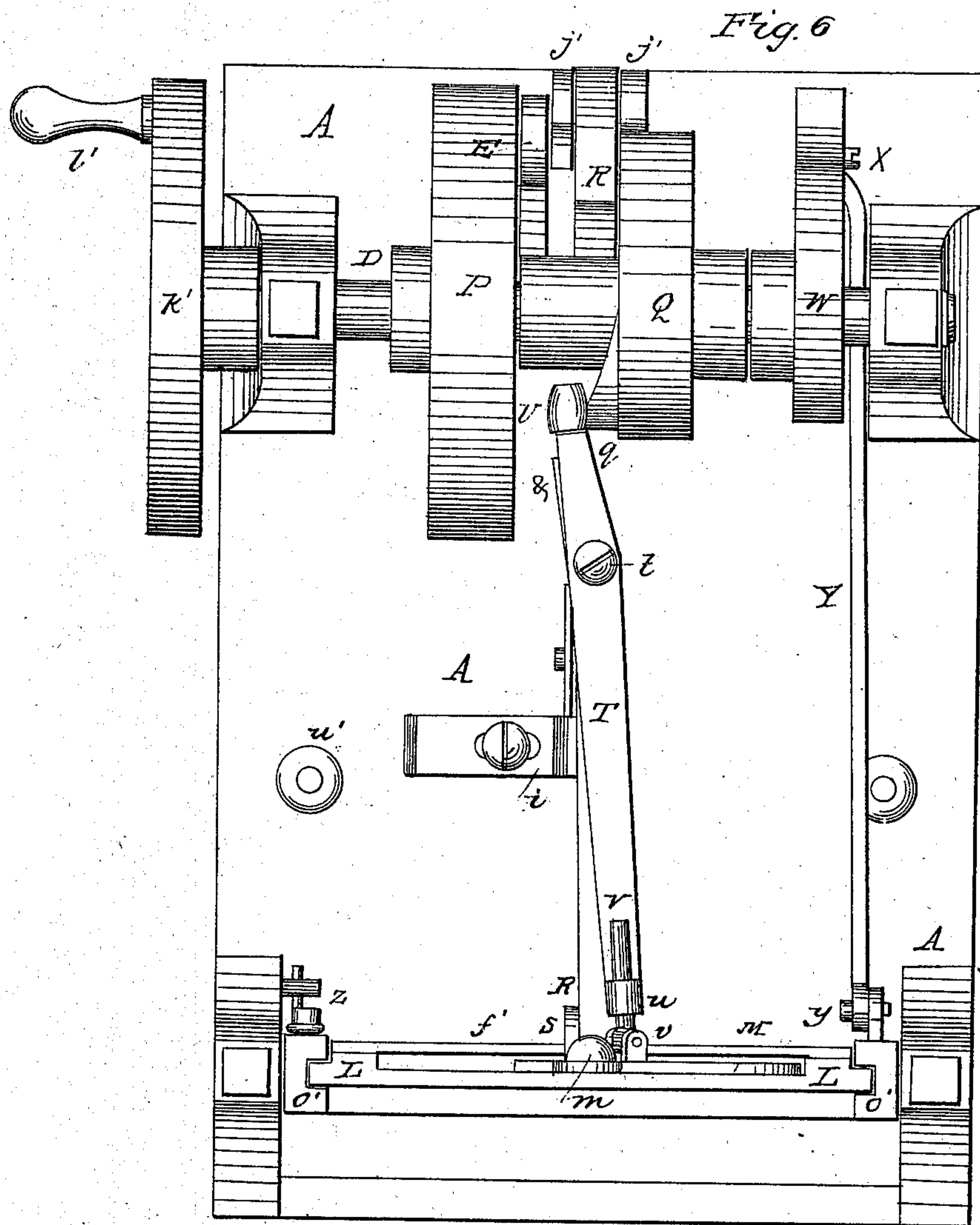
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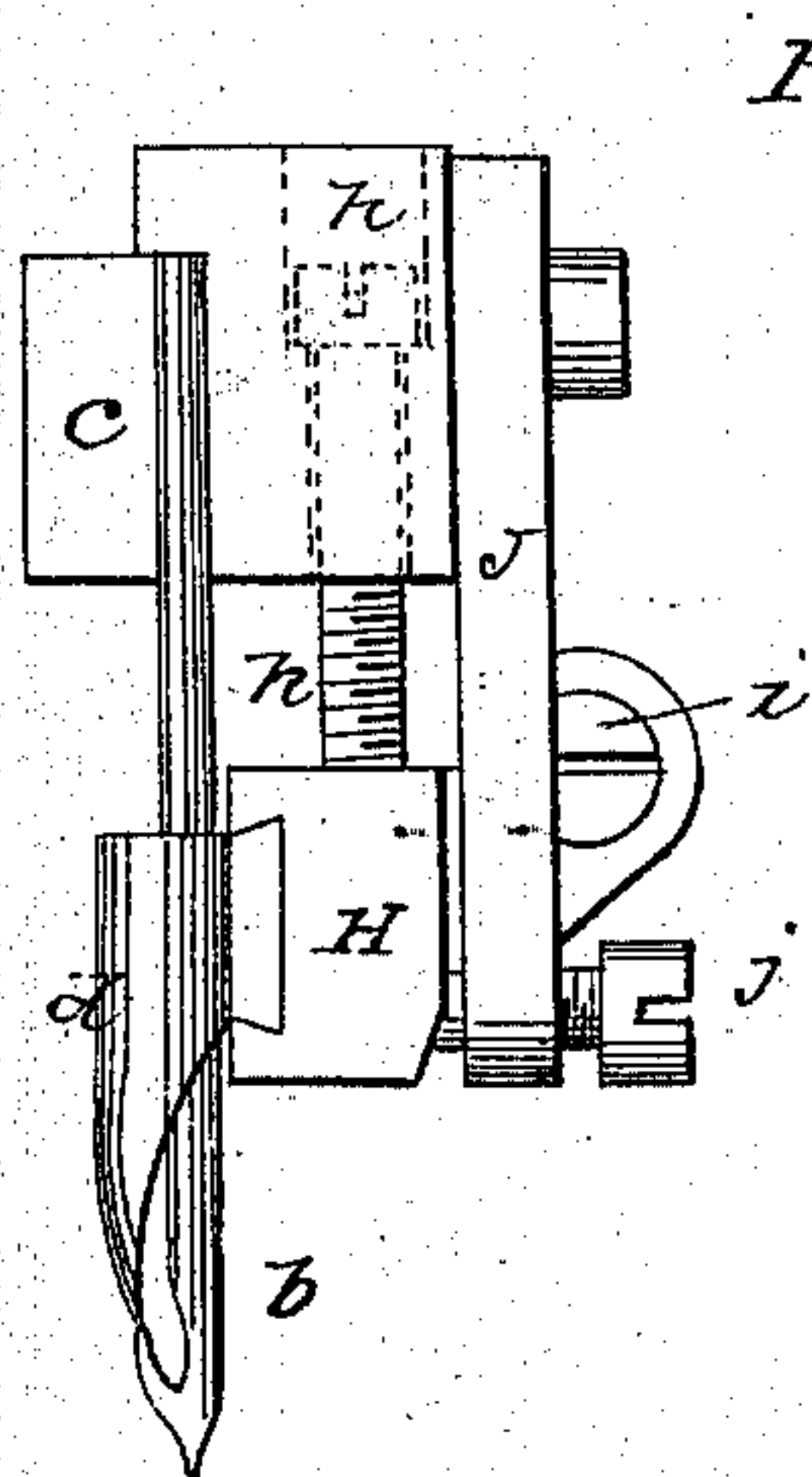
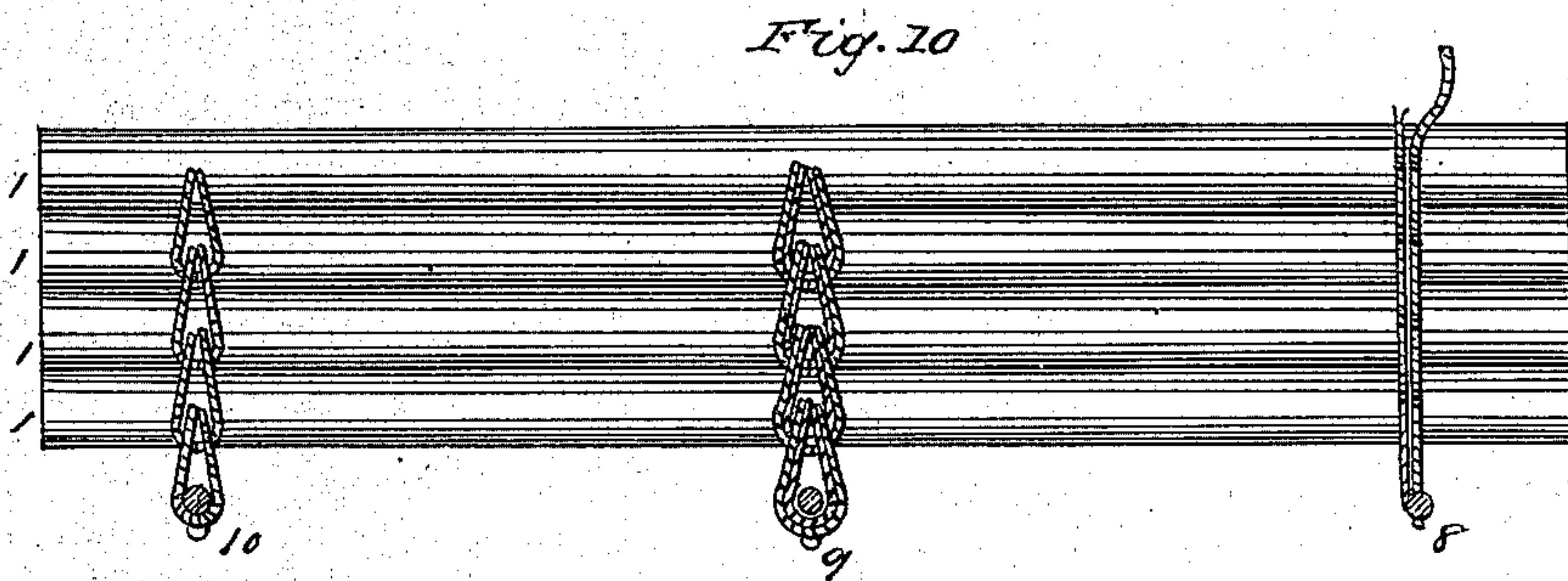
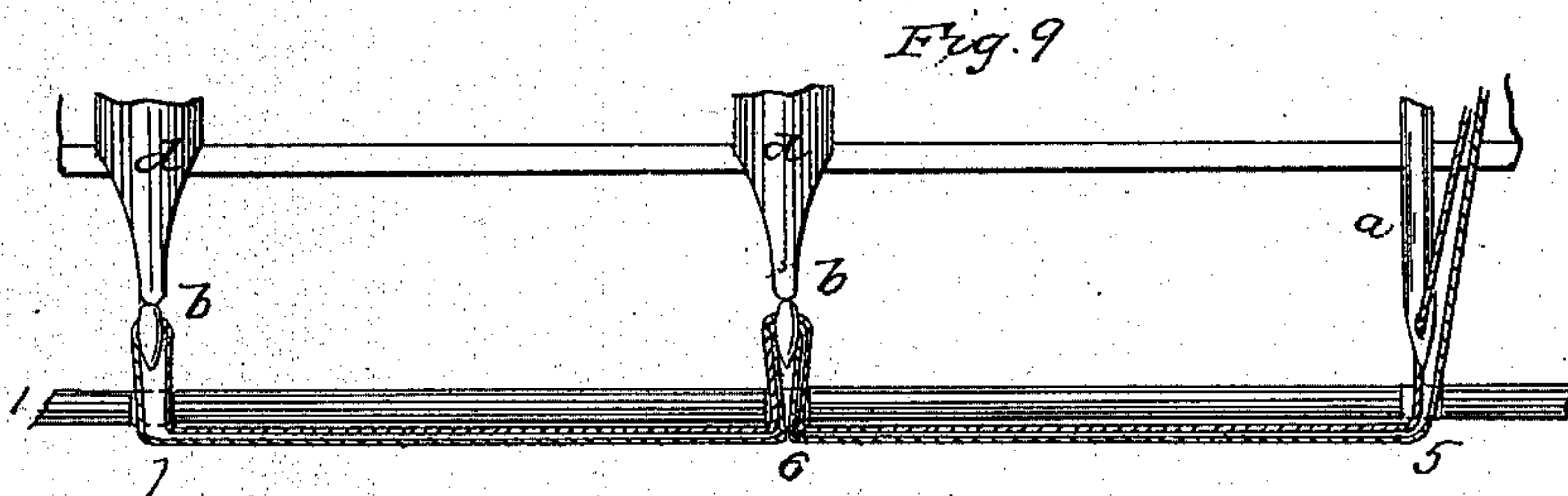
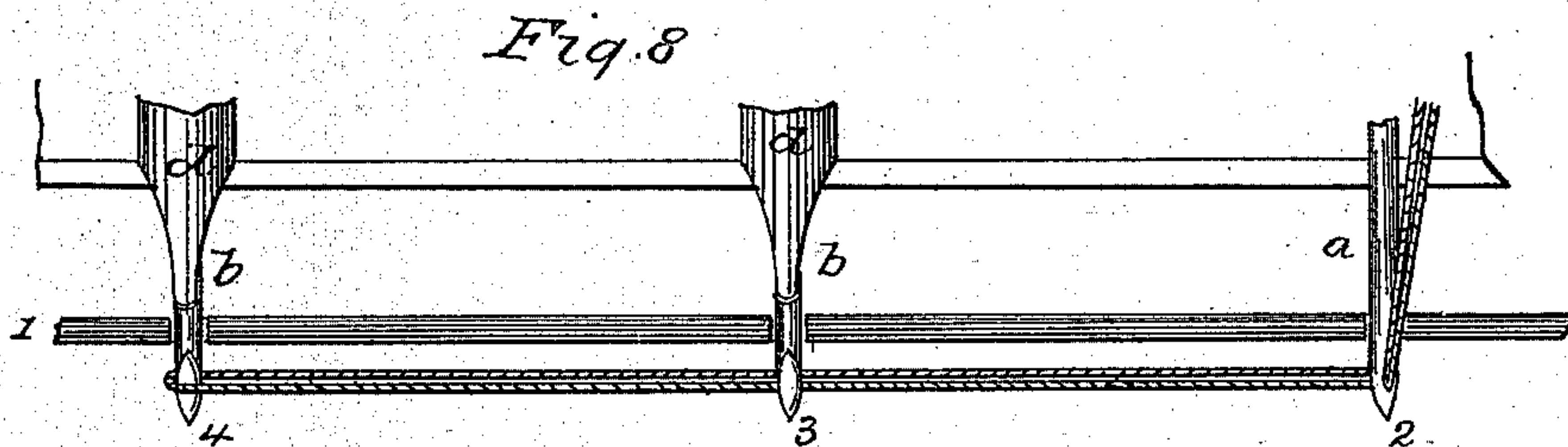
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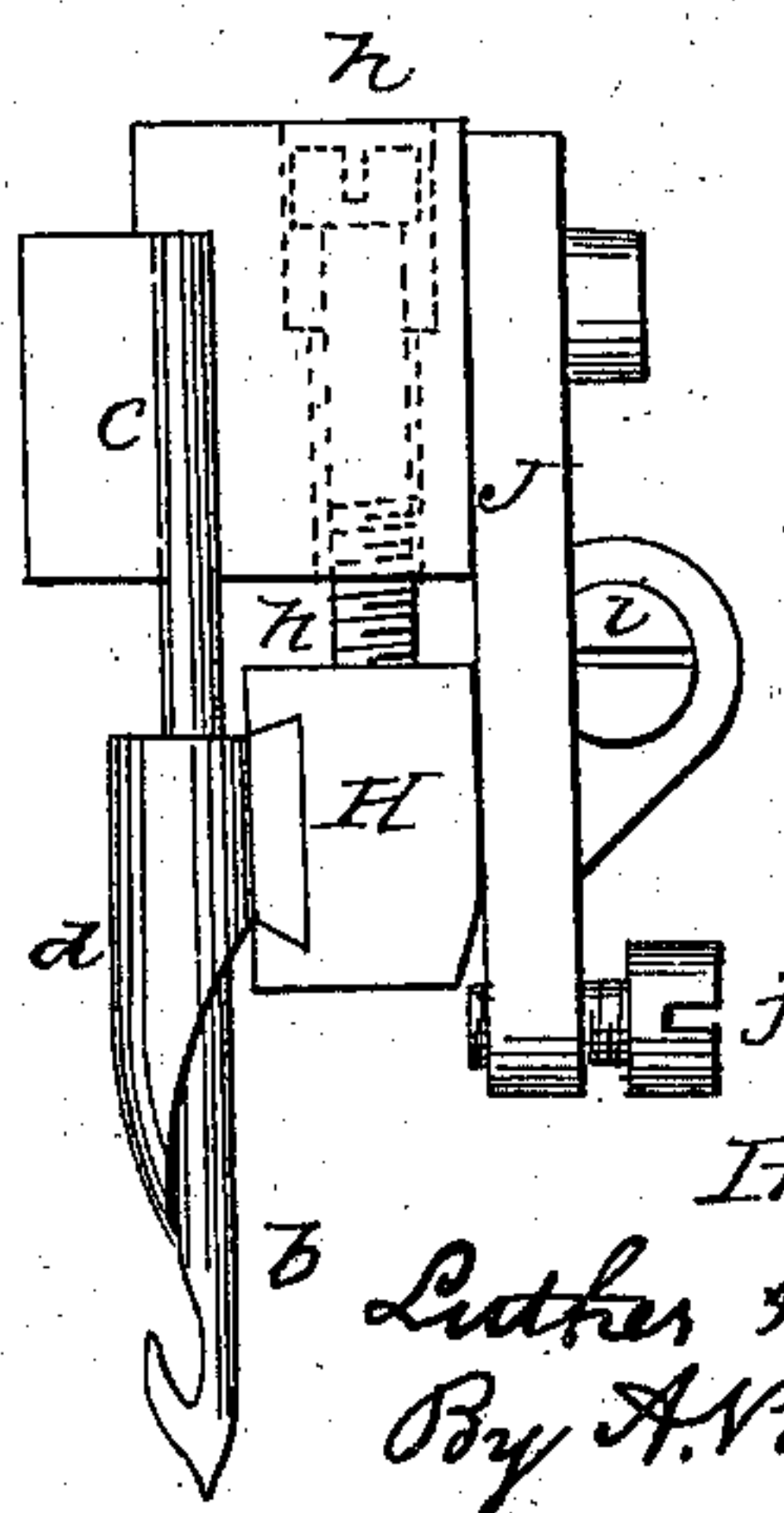
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Witnesses
W. B. Ely
Alfred Ely



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UNITED STATES PATENT OFFICE.

LUTHER HALL, OF BOSTON, ASSIGNOR TO ALFRED B. ELY, OF NEWTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINE FOR SEWING BOOKS.

Specification forming part of Letters Patent No. 105,329, dated July 12, 1870.

Be it known that I, LUTHER HALL, of Boston, in the State of Massachusetts, have invented a new and useful Machine for Sewing Books, of which the following, with the drawing, is a correct description.

The object of the invention is to sew books by machinery, and to use the same thread continuously without cutting, and by carrying it from one signature to another across the backs; and this is accomplished by the combined use of an eye-pointed needle and crochet-needles, and a carrying or distending hook, so that the thread, being carried down between the leaves of the eye-pointed needle, shall be seized by the hook and carried along, so as to be seized by the crochet-needles, and drawn up and held until the next signature is presented for similar action.

In the drawing, Figure 1 is a right-side elevation. Fig. 2 is a left-side elevation. Fig. 3 is a front elevation, with paper-holder down. Fig. 4 is a section of Fig. 1. Fig. 5 is a view of the head, needle, and hook mechanism, seen from the rear. Fig. 6 is a view of the under side of the machine. Fig. 7 are enlarged views of hook, needles, and cast-offs. Figs. 8, 9, 10 are views of the positions of the thread and stitches.

A is the bed of the machine or frame. B is the goose-neck; C, the head, moving up and down, and carrying the needle-bar *c*; D, the main shaft; *h'*, the driving-wheel, and *U* the crank-handle. E is the bent lever, passing up through the goose-neck, and pivoted to it at *e*. It is operated by a slotted face-cam, P, on the main shaft, and operates the head C and needle-bar *c*, in the usual manner.

a is an eye-pointed needle, and *b* are hook-needles inserted in the needle-bar *c*, attached to the head C. F are adjustable plates, attached to the goose-neck directly in rear of the head by screws *r'* passing through slots in the upper ends of the plates. Through the lower ends of these plates passes a rod, *g*, to which are attached adjustable presser-feet G, adjustable to the rod *g* by set-screws *m'*.

K is an arm, also attached to the rod *g* by a set-screw, *t'*, which arm slants upward against the under side of the goose-neck. From its upper end projects a pin, *s'*, against which

presses a spring, *h'*, fastened to the goose-neck at *v'*.

k is a set-screw, passing through K, against the goose-neck, to regulate the pressure of the spring *h* on *s'*, and so on the presser-feet. *d* are cast-offs, acting in connection with the hook-needles *b*. These cast-offs are attached to a bar or frame, H, suspended from the needle-bar *c* by screws *h*, which pass down through holes in the ends of the bar *c*. These cast-offs are adjustable, as to their down drop, by means of the screws *h*, the holes for which in the bar *c* are larger than the screws themselves, (allowing of easy ascent and descent, and also a slight oscillation of the cast-off bar H,) and are counterbored a small distance from the top to a shoulder, upon which, when down, the head of the screw rests, thus fixing the point of descent of the cast-offs.

From the rear of the bar or frame H extend upward two ears, I, through the upper ends of which pass screws *i*, pressing against the outer sides of the end of the goose-neck, in rear of the needle-bar, with sufficient force to hold the bar H suspended by the friction of their ends upon the goose-neck, when not overcome by a positive and greater force, at the same time allowing the cast-off bar H to oscillate on the points of the screws *i*.

f are small screws, projecting downward from the needle-bar *c*, limiting the ascent of H and nearness of its approach to *c*.

J are plates, attached to the back side of the needle-bar *c*, and extending downward and overlapping the cast-off frame H. At their lower ends are set-screws *j*, answering for inclines for the cast-off bar H, to carry the points of the cast-offs away from the shanks of the needles to the points of their hooks.

When the head C and the needle-bar *c* descend, the cast-off bar H being held suspended by the friction of the screws *i* on the sides of the goose-neck, the needles will go below the cast-offs, as in the right-hand figure of Fig. 7. The cast-off frame H will then swing backward, and the cast-offs *d* will be flat against the shanks of the needles. When the needle-bar *c* ascends, the head of the screw *h*, coming to its shoulder in *c*, will cause the cast-off bar to be lifted up, and at the same time as it as-

cends to strike the end of the incline screws *j*. The cast-offs *d* are thus swung outward as the needles rise, so as to close the hooks of the needles *b*, as in the left-hand figure of Fig. 7.

L is a plate of metal, made to rise and fall above and below the table in an oscillating frame, *o'*, supported on pivots *y'* in the frame A, so that as it descends it is drawn back from the perpendicular. Upon the back side of this plate L is a lever-arm, M, pivoted at its lower end to the middle lower edge of the plate L at *m*, its upper end traversing the central part of L from side to side. When the needles are depressed and the plate L is elevated, the upper edge of the plate is above the hooks of the needles.

N is an upright hook or looper, screwed to a small plate, *n*, which traverses across the plate L from side to side in ways. This hook or looper N projects above the hooks and eye of the needles when they are depressed. The lower end of N is slotted at *w'*, as is also the upper end of the lever M at *x'*.

A movable plate, O, slides up and down in front of the upper end of the lever M, being attached to it by a long flat stud, *o*, fitting and sliding in the slot *x'* in M. On the upper end of the plate O is a round stud, *n'*, fitting and sliding in the slot *w'* in N. Thus, as the lever-arm M oscillates on its center *m* across the plate L, the looper N is moved across in a straight line.

l are springs, pressing backward through the plate L in the path of the looper N, to keep it and the thread up to the needles. When the needles descend, the plate L is raised, the looping-hook N seizes the thread brought down by the needle *a*, and carries it across L and the hooks of the needles *b*, so that it can be seized by them. As the hook-needles seize the thread and ascend, N returns back to its former position, to be in readiness to seize the thread again, as before.

P is the slotted face-cam, which operates the bent lever E, which operates the head C and the needle-bar *c*, as in ordinary sewing-machines. Q is a cam, operating a lever-arm, R, which is pivoted at its rear end at *r* to two downwardly-projecting ears, attached to the rear under side of the table, and which, curving over with a roller, *p*, resting on the periphery of the cam Q, extends forward, and is pivoted at *s* to the lower end of a twin-link, S, which link is pivoted at its upper end, *s*, to a stud attached to the rear of the plate L. As the cam Q revolves, the plate L is raised by the action of the lever R and the link S, the link allowing the plate L to oscillate in its frame *o'*.

q is a projecting face-cam on the side of the cam Q. T is a lever arm, pivoted to R at *t*, and having at its rear end a roller, U, running on the cam *q*. *u* is a projection on the front end of T, through which passes a pin, V, which is pivoted to a bracket, *v*, attached to the lever M above *m*. As the cam *q* revolves, the lever M and the hook N are made to move across

the plate L by the action of the lever T, the construction of *u* and V allowing the plate to oscillate in its frame *o'*.

W is a cam, operating a bent lever, *w*, pivoted to the machine at *x*, and through that operating a lever, Y, which is pivoted at its rear end to *w* at X, and at its front end at *y* to the frame *o'* of the plate L. As the cam W revolves, the frame *o'*, in which the plate L slides, is brought to the perpendicular (as the plate ascends) by the action of the lever Y, pivoted to *o'* at *y* above its axes *y'*.

Z is a spring, which, as the plate L is depressed, pushes the lower end of the frame *o'* backward from the perpendicular, throwing the top of L forward of the line of the needles, so that it may be ready to receive a signature on its return before it comes back to the perpendicular under the needle-bar. The frame *o'* oscillates at *y'*.

z is a spring, returning R to its position after the action on it of the cam Q, and aiding to depress L. & is a spring fastened to R, and acting upon T to return it to position after being acted upon by cam *q*, and to carry back the looper N to its position to take the thread. *a' b'* is an elastic table on springs to hold up the signatures, and is adjustable by the screws *u'*. *c'* are standards, through which pass rods *d'*, connected in front by a cross-bar, *q'*. These rods *d'* are held by a spring-pressure screw, *p'*, and the bar *q'* is intended to press against the signatures from the rear to keep them in position.

e' is a bent rod, attached by a set-screw to a rod, *r'*, which is fastened to the goose-neck. It is to keep the signatures even.

f' is a plate screwed on the rear of the plate L, covering the mechanism upon it. The needles descend between the plates L and *f'*.

g' is the spool, hung on a rod attached to the goose-neck. *h'* is a spring on the under side of the goose-neck, pressing upon the pin *s'* of the arm K, and thus pressing down the presser-feet G. *i'* is a bent plate attached to the under side of the table and resting against the lever R, to support it against the strain of its action. *j'* are ears, supporting the rear end of the lever R and to which it is pivoted. *z'*, Fig. 4, are the signatures of the book.

The operation is this: The needle-bar being raised and the plate L with the hook N depressed, the crank is turned, and the plate L ascends at a slant forward by the action of the lever R and spring Z. A signature is then placed over and astride L, which, as it rises, comes to the perpendicular by the action of the lever Y. When L has reached its highest altitude perpendicularly under the needles, it is there held until the needle-bar is depressed by the action of the lever E, the needles passing down through the folds of the paper and between the plates L and *f'*. When down, the eye-pointed needle carrying a thread, the hook or looper N seizes the loop of the thread and carries it across to the other side of L by the action of the lever T. When in that posi-

tion the needle-bar is retracted, and, the central hook-needles seizing the double thread lying across their path, while the outer hook-needle seizes the loop held by the hook N, as in Fig. 8, the thread is drawn up, as in Fig. 9. As soon as the needles are drawn up the cast-offs, which had lain against the shanks of the needles by the action of *j* close upon the hooks, and the loops are thereby confined in the eyes. At this time the spring *z*, acting on the lever R, the plate L descends, swinging out from the signature, which remains suspended at the needles, and the hook N returns back to its starting-place by the action of the spring & on T. The plate L again coming up, another signature is placed on it, and the needles, descending, seize the thread and draw it up through the former loops, as in Fig. 10, except the eye-pointed needle, which carries its thread over from signature to signature. Thus the outer hook-needle makes a chain-stitch with the thread single, the central hook-needles make chain-stitches with the thread double, and the eye-pointed needle makes a straight stitch of two threads, as in Fig. 10.

In Figs. 8, 9, 10, 1 represents the signatures of paper; 2, the thread as carried down and held by the eye-pointed needle; 3, the thread as seized by the central hook-needles, and 4 as seized by the outer hook-needle. 5, 6, 7, show the thread as drawn up through the signature, and 8, 9, 10, the stitches as several signatures are sewed together.

Instead of thread fine flexible wire may be used for sewing purposes, and the use of such wire I claim as my invention. It cannot be used in hand-sewing, but can be used in my machine.

What I claim is—

1. An organized machine for sewing books by a continuous thread, comprising, substantially, a means of holding the paper to be sewed, a means of passing the thread down through the paper, a means of distending the thread underneath the paper, and a means of passing the thread up through the paper, when constructed and arranged to operate substantially as described.

2. The combination, in a sewing-machine, of an eye-pointed needle, a looper, and one or more hook-needles, provided with cast-offs, and operating together, substantially as and for the purposes described.

3. The cast-off, with devices for operating the same, when constructed substantially as and for the purposes set forth, the whole working in combination with the needle, in the manner described.

In testimony whereof I have hereunto subscribed my name.

LUTHER HALL.

Witnesses:

D. A. TITCOMB,
F. W. JACOBS.