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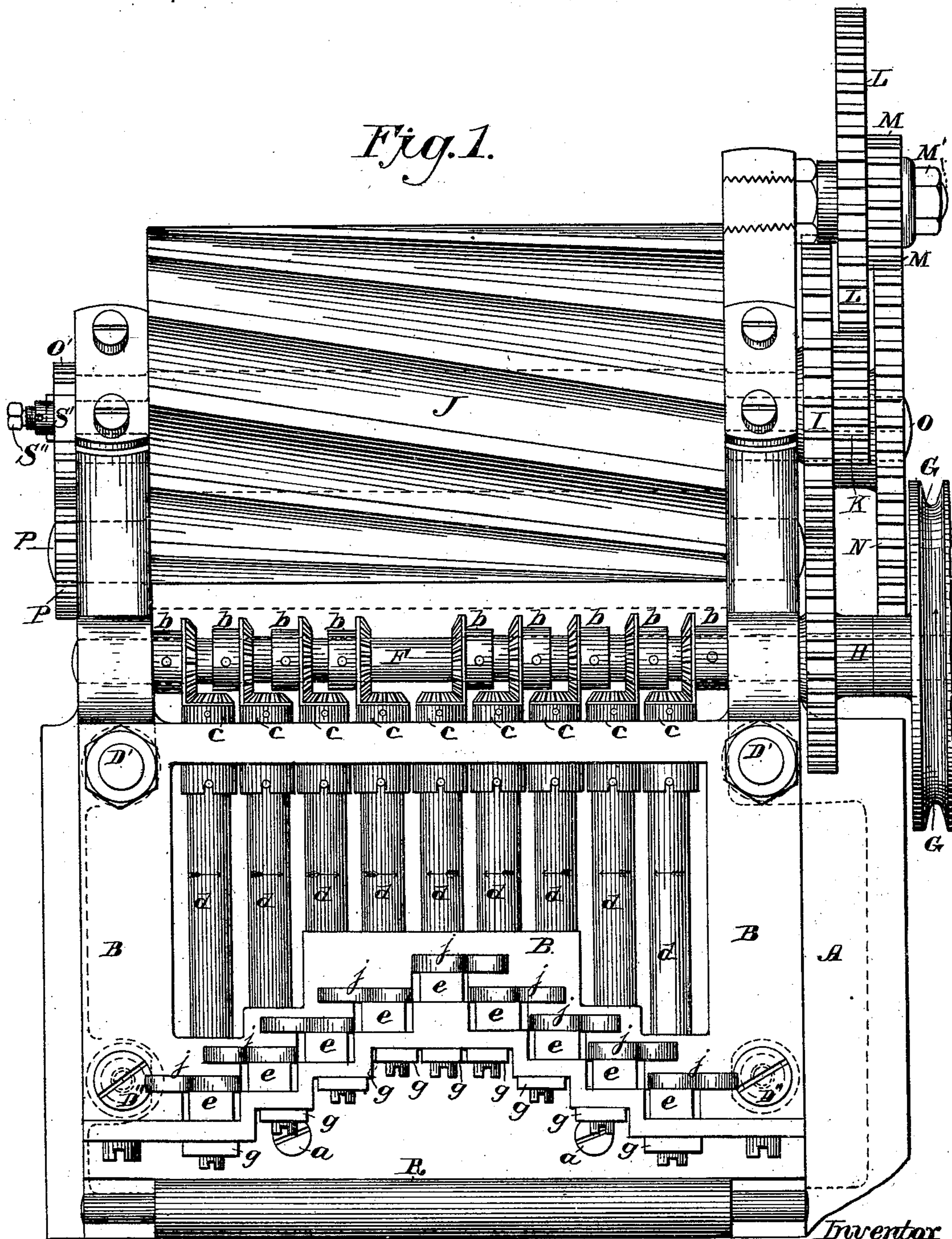
J. RANGE.

MACHINE FOR CLIPPING LACE, &c..

No. 353,587.

Patented Nov. 30, 1886.

*Fig. 1.*



Attest  
Jas J. Panner  
Philip H. Harris

James Range by  
A. Pollok  
his attorney

(No Model.)

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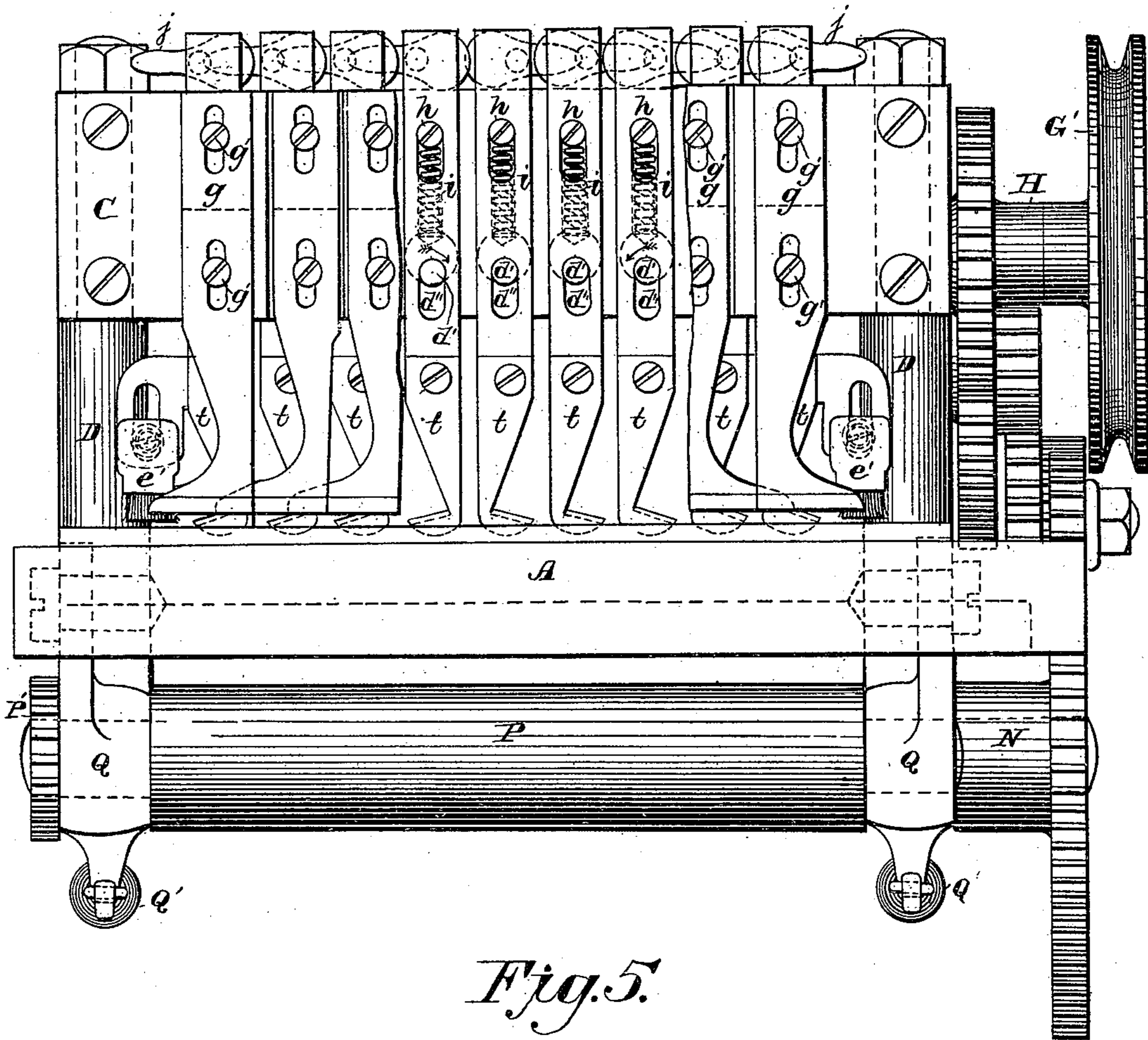
J. RANGE.

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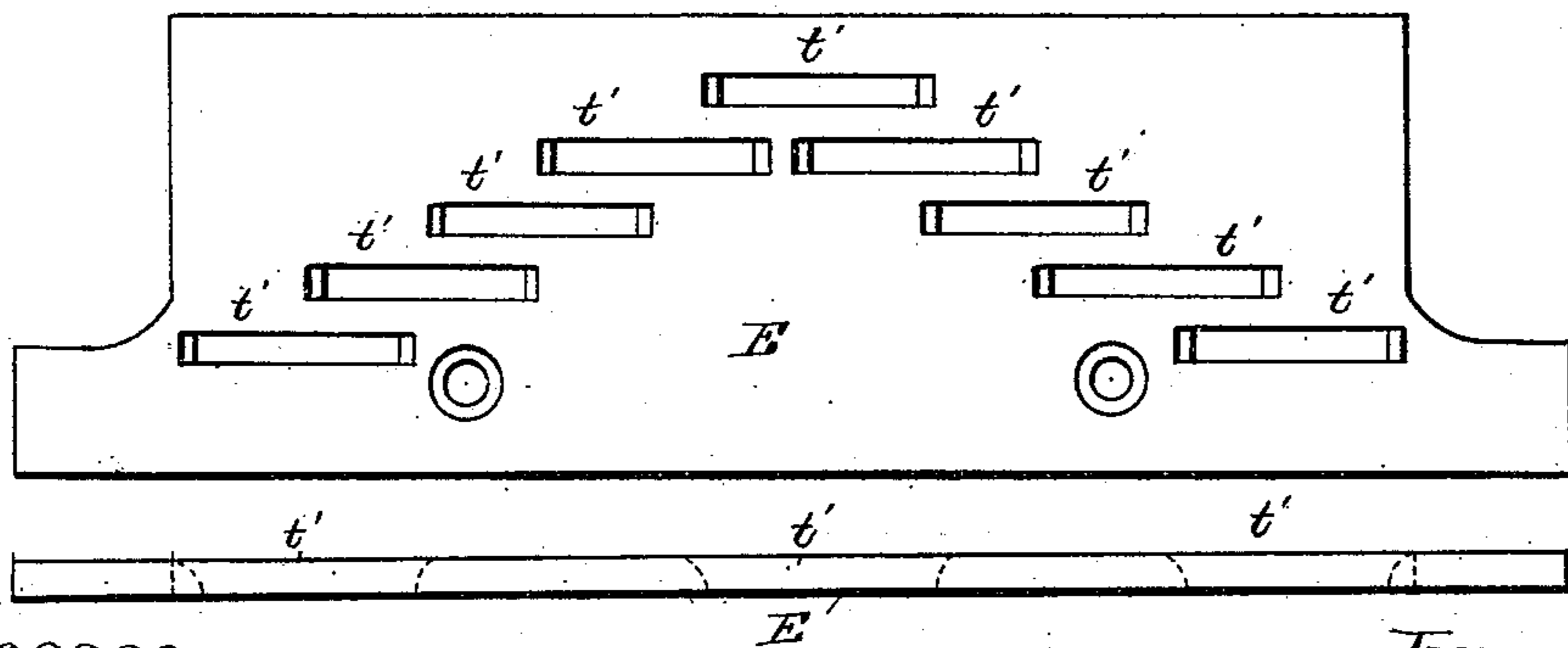
No. 353,587.

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*Fig. 2.*



*Fig. 5.*



Witnesses

Wm. J. Panner  
Philip Hamo

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his attorney.

(No Model.)

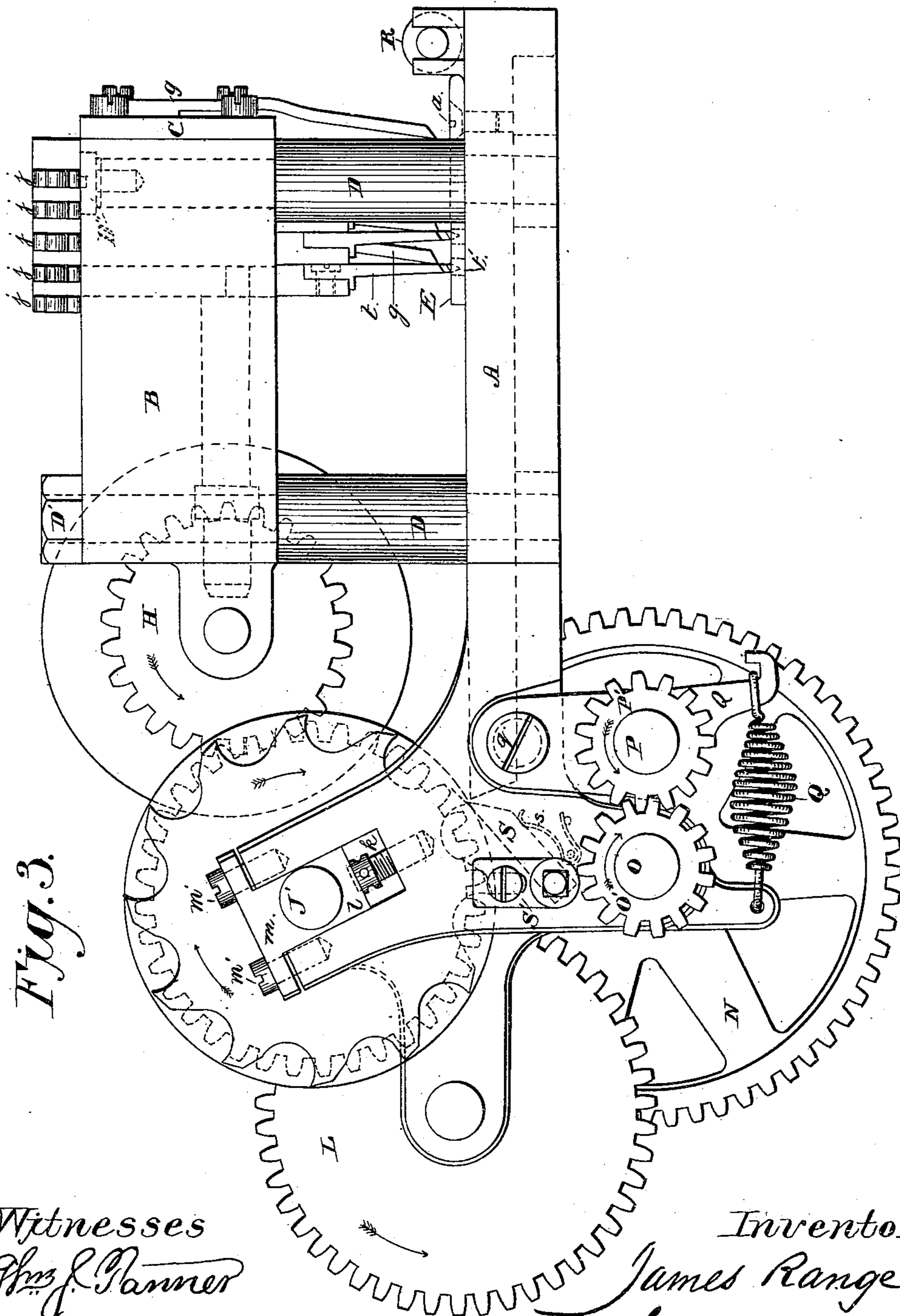
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(No Model.)

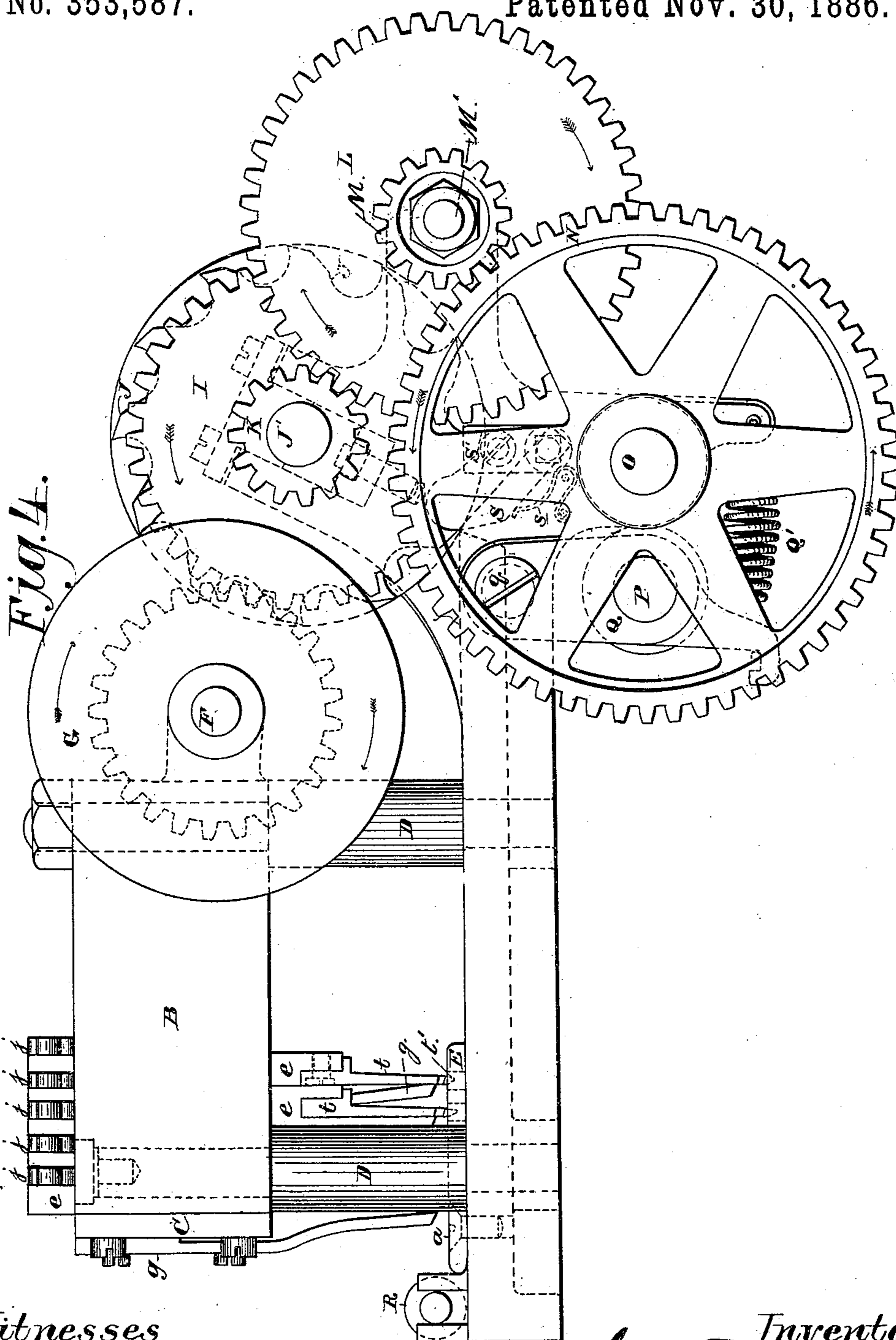
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his attorney.

(No Model.)

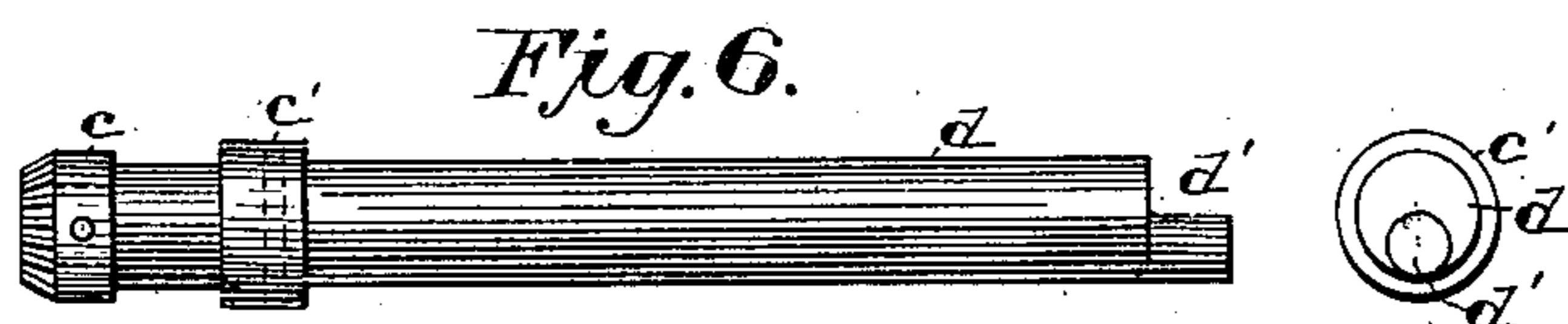
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J. RANGE.

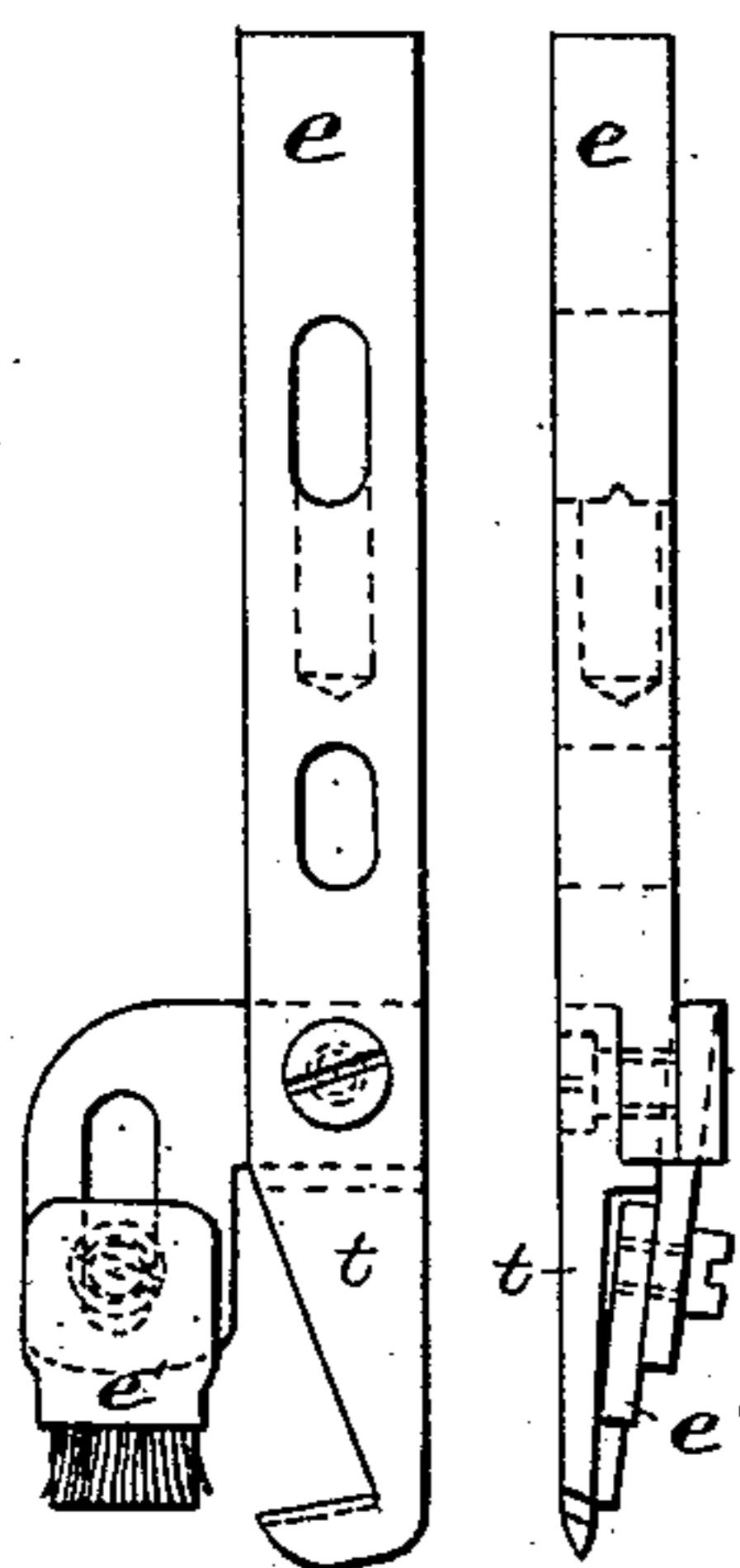
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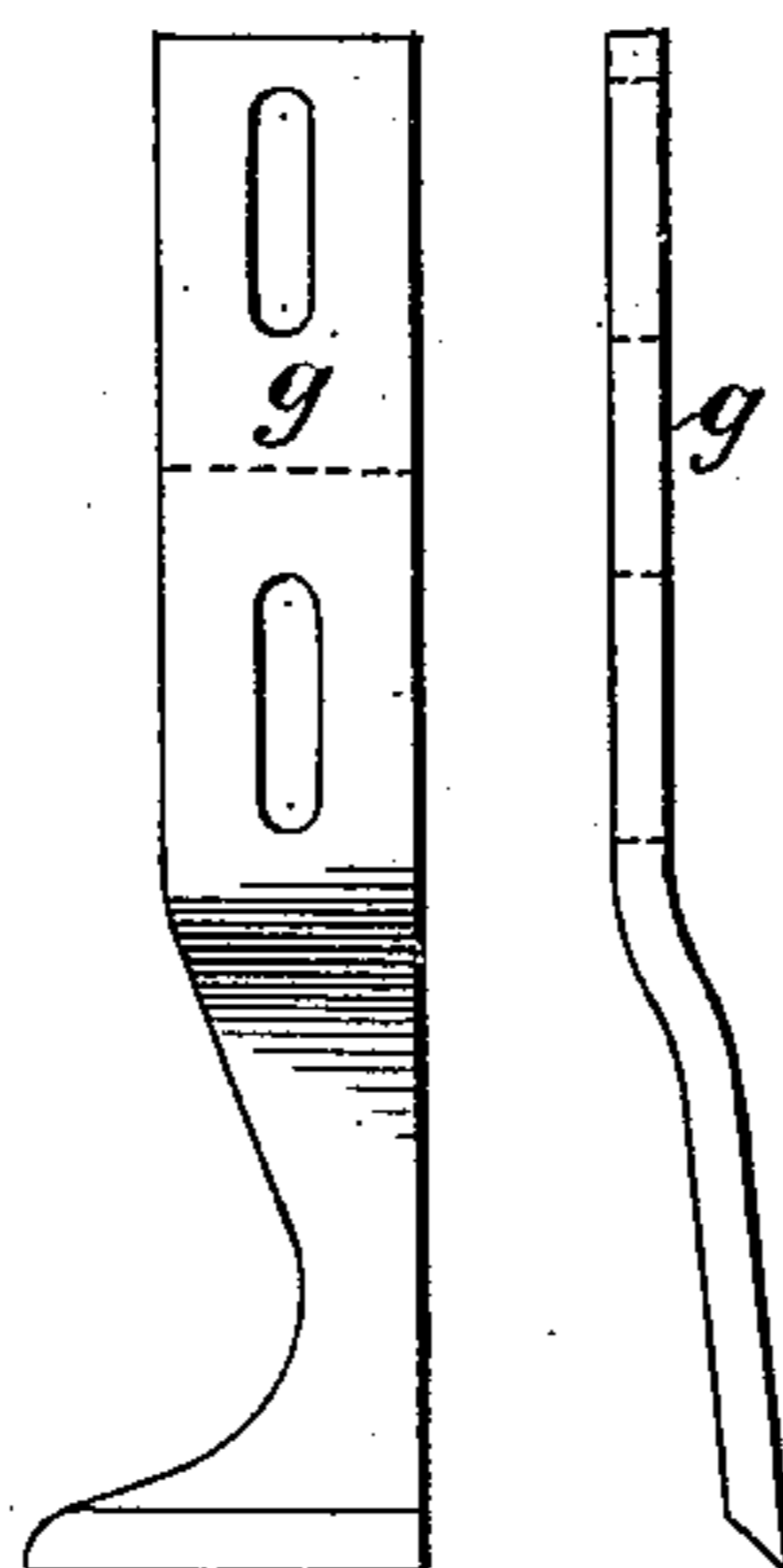
Patented Nov. 30, 1886.



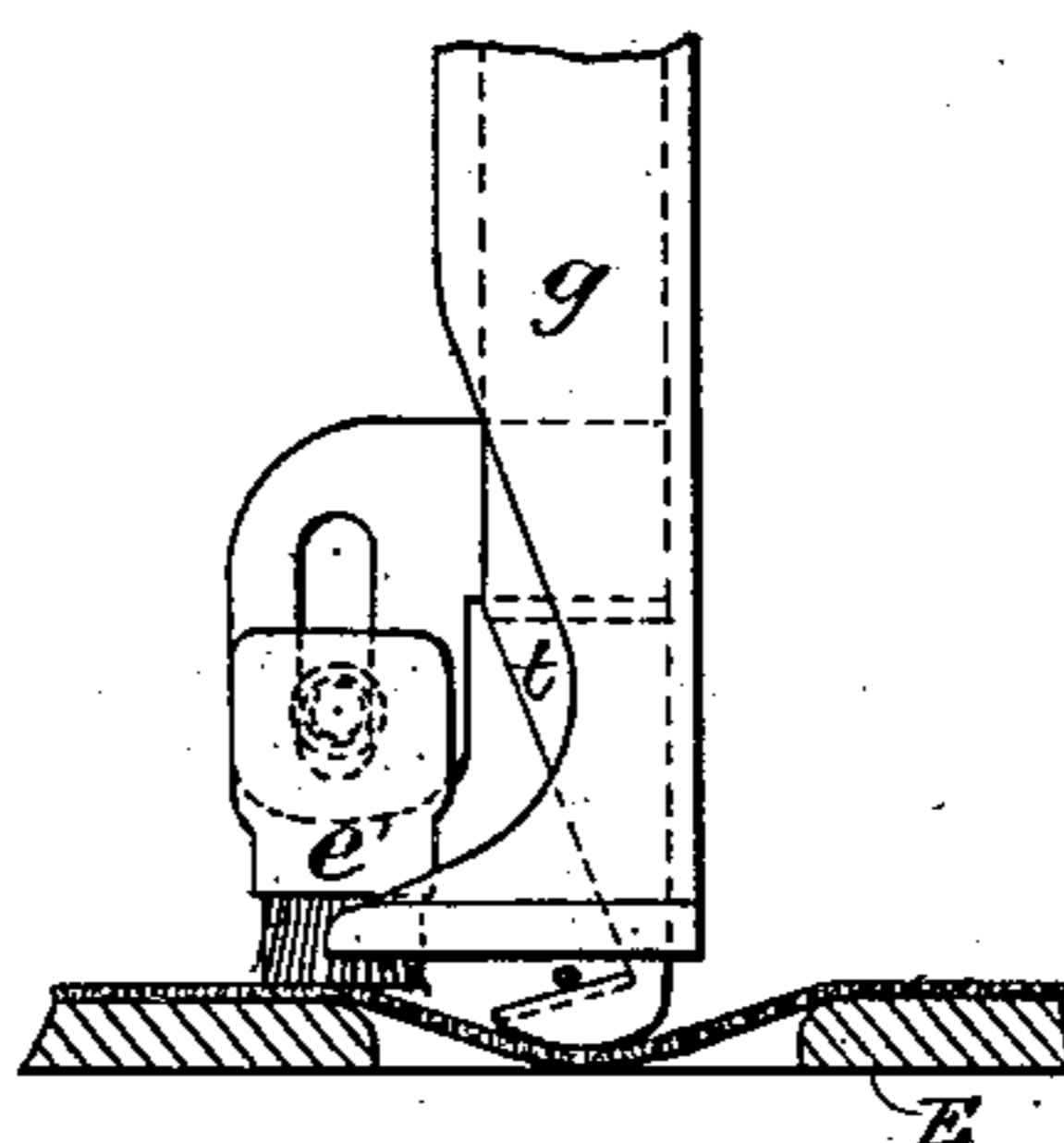
*Fig. 7.*



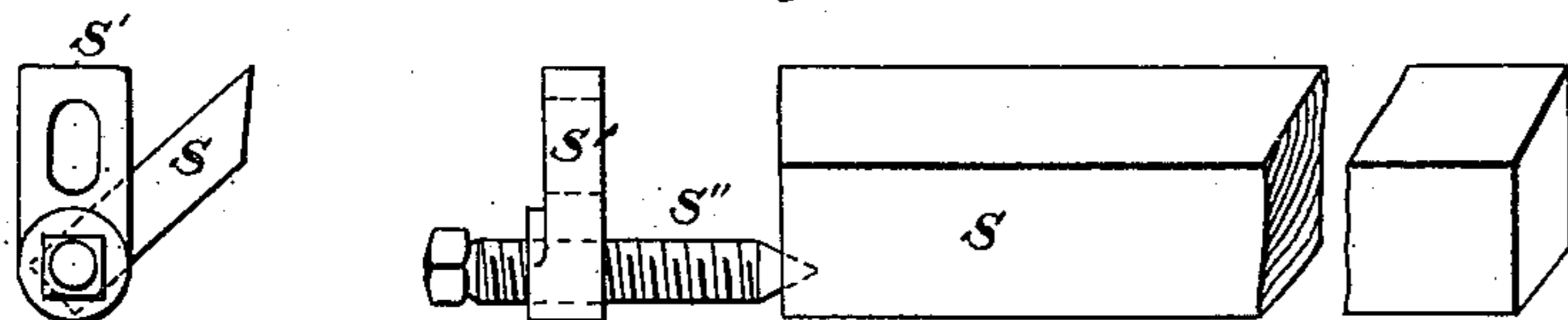
*Fig. 8.*



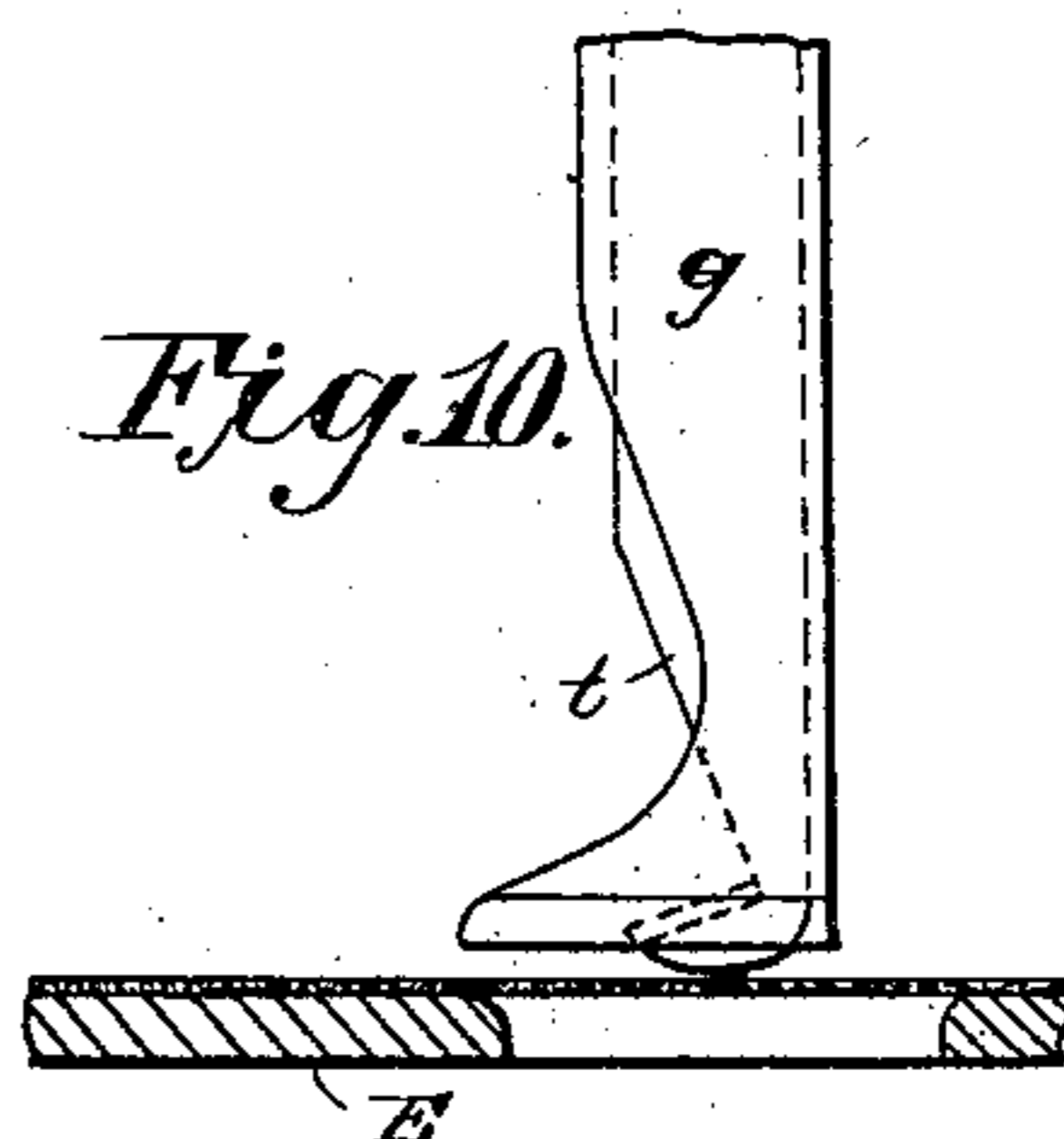
*Fig. 11.*



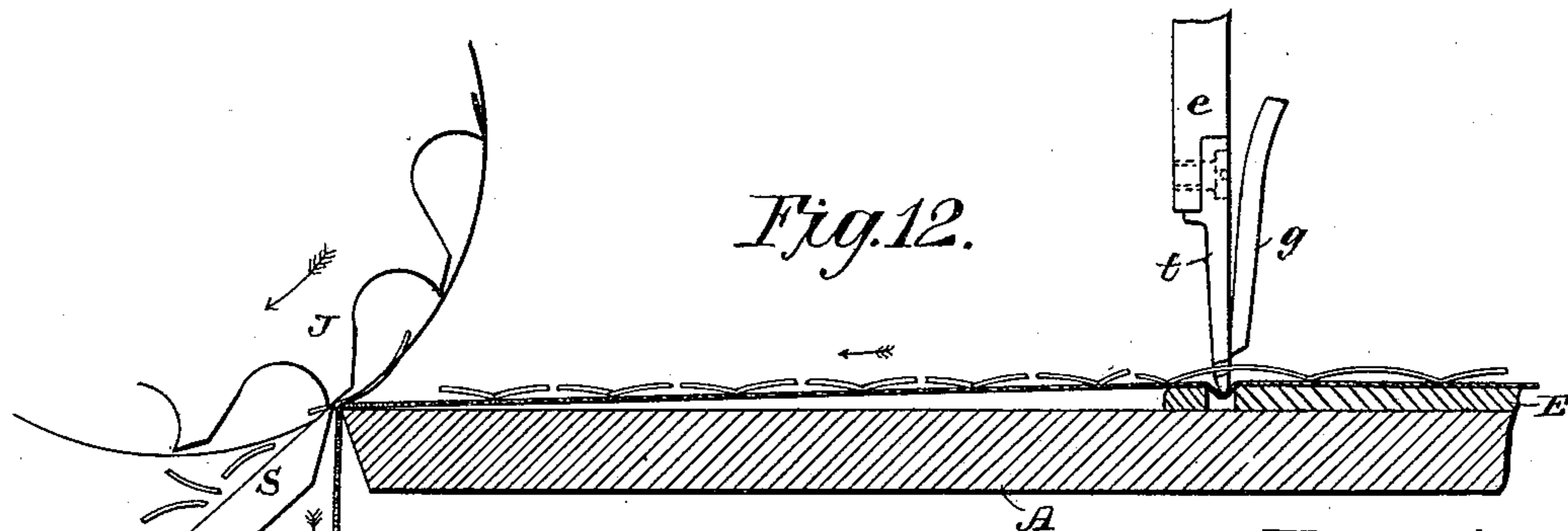
*Fig. 9.*



*Fig. 10.*



*Fig. 12.*



Witnesses

*Wm. J. Tanner*  
*Philip Harris*

Inventor

*James Range*  
by *A. Pollok*  
his attorney.

# UNITED STATES PATENT OFFICE.

JAMES RANGE, OF NOTTINGHAM, ENGLAND, ASSIGNOR TO THE WILLCOX & GIBBS SEWING MACHINE COMPANY, OF NEW YORK, N. Y.

## MACHINE FOR CLIPPING LACE, &c.

SPECIFICATION forming part of Letters Patent No. 353,587, dated November 30, 1886.

Application filed April 26, 1884. Serial No. 129,460. (No model.) Patented in England December 31, 1884, No. 17,103; in France January 8, 1885, No. 166,323, and in Germany January 17, 1885, No. 33,937.

*To all whom it may concern:*

Be it known that I, JAMES RANGE, of Nottingham, England, have invented a new and useful Improvement in Machines for Clipping Lace and other Fabrics, (which has been patented in Great Britain by Patent No. 17,109, dated December 31, 1884; Germany by Patent No. 33,937, dated January 17, 1885, and France by Patent No. 166,323, dated January 8, 1885,) which improvement is fully set forth in following specification.

This invention relates to mechanism for clipping from lace and other fabric the loose threads or floats which connect the figures with each other. Heretofore this has been done by raising the floats or loose threads from the fabric and then cutting the same as near as may be to the ends where they are connected with the fabric.

In the present invention a new mode is adopted. The floats are cut at any intermediate point—say at the middle—leaving the connection at the ends with the fabric intact, and then the threads, now fastened at one end only, are mowed off.

It is evident that a variety of means, more or less differing in detail, could be used for cutting the floats in the first instance, and also for mowing off the other threads afterward. It is preferred, however, to use the following instrumentalities:

First. A reciprocating picker inserts itself between the float and the fabric and thus separates it from the latter, and one or more cutters then act upon the raised float at or near where it is bent over the picker. The picker supports the float against the action of the cutters, co-operating with them in cutting the thread. In this respect the picker differs in its action from that described in my application of even date herewith, (officially numbered 129,459,) and in my British Patent No. 1,214, of 1883, which latter simply separated the float from the fabric, and did not assist in cutting the thread.

Second. The reciprocatory picker co-operating with one or more cutters, as just explained, is given a rising and falling as well as a back and forth movement.

Third. The picker is provided with a blade or cutter, which assists in cutting the floats.

Fourth. The picker is moved against the co-operating cutter or cutters to sever the float, the said co-operating cutters being held stationary.

Fifth. A series of reciprocatory pickers are used which act simultaneously upon a number of rows of the floats, instead of on a single row, as in my aforesaid application and British patent.

Sixth. The series of reciprocatory pickers are divided into gangs which act from the center toward the edge of the fabric, so that there is no danger of the point of any picker catching the edge of the fabric. The arrangement is also advantageous in that the pickers assist in keeping the fabric smooth.

Seventh. Further, to assist in smoothing the fabric, the pickers are provided with brushes which bear upon the fabric, and are moved outwardly with the pickers as these take up or lift the floats.

Eighth. For mowing off the cut floats a ledger-blade is combined with a rotary knife which is revolved faster than the fabric is fed. The two co-operate very like the knife and ledger-blade of the ordinary lawn-mower.

Ninth. In order to make the cut floats stick out from the fabric so as to be more certainly acted upon by the mowing apparatus the fabric immediately in front of the ledger-blade is bent over the edge of the plate or bar.

Tenth. The ledger-blade and rotary knife extend the full width of the machine, so as to mow off at one time the several rows of floats previously cut by the series of pickers and cutters.

The invention further comprises the combination of the foregoing elements with each other and with other parts of the machine, as hereinafter set forth.

The following is considered to be the best mode of applying the principle of the invention.

In the drawings which form part of this specification, Figure 1 is a plan of a machine constructed in accordance with the invention; Fig. 2, a front elevation; Figs. 3 and 4, views

in elevation from opposite ends of the machine, and Figs. 5 to 12 detail views.

A is the frame of the machine, to which is fastened by means of the screws *a* the picker-plate E. In this plate are slots *t'*, into which the lace is depressed by the action of the pickers, so that they may get under the floats and separate them from the body of the lace.

To the frame A is attached by means of the four stud-standards D the picker-frame B, in brackets or extensions of which is journaled the shaft F. This shaft carries at one end the grooved band-pulley G and gear H, and between the two bearings the nine beveled gears *b*. These gears engage the nine beveled pinions *c* upon the outer ends of the shafts *d*, which are journaled in the picker-frame at right angles to the shaft F. At their forward ends each is turned down so as to form an eccentric, *d'*, as seen in Figs. 2 and 6. These eccentrics extend into the slots *d''* in the nine picker-carriers *e* and give thereto a back and forth as well as an up and down motion. At the lower end of the carriers *e* are attached the cutting-pickers *t*. These picker-carriers at their upper ends have a slot allowing them to move vertically upon the stud-screws *h*, the downward movement of the picker-carriers being effected by the spiral compression-springs *i*. These bear at their upper ends against the screws *h*, and at their lower ends against the picker-carriers. They cause the carriers to descend with the eccentrics *d'*.

When it is desired to put the pickers out of action, the eccentric lifters *j*, attached to the upper end of the picker-carriers, are lifted into a vertical position, when the eccentrics *d* merely produce a sidewise but no endwise movement of the pickers. This arrangement is provided in order to prevent the action of the pickers upon the lace at any desired point, or, in case the lace is narrower than the machine, to avoid the unnecessary wearing of the cutting-edges by their acting together when there is no necessity for their doing so.

The frame B is held to the standards D by means of the nuts D' at the back end, and at the forward end by the countersunk nuts D''.

In Fig. 2 a portion of the front plate, C, to which are attached the stationary blades *g*, by means of screws *g'*, is broken away, so as to show the construction and action of the picker-carriers in relation to the eccentrics and springs, as before described.

It will be observed that the pickers and the stationary blades which act in connection with them are so arranged, as seen in plan, Fig. 1, that they stand in zigzag or diagonal lines, beginning at the center of the machine and running forward and toward each side. By this arrangement, combined with the crosswise movement of the pickers, the whole surface of the lace is successively covered by the action of the pickers, and the same surface is acted on one or more times in succession by the pickers, according to the speed with which

the fabric is fed through the machine. A slow feed is preferred, so as to give the pickers more than one chance to get under and separate the floats from the lace before it has passed beyond them. The pickers move when in action in an elliptical course with the longest axis horizontal, and as the picker advances to take up a float its upper or cutting surface passes, as will be seen in Fig. 11, about even with or slightly below the upper surface of the picker-plate. This action bends the body of the lace down into the slot *t'*, as seen in Fig. 12, and, by drawing the lace, tends to bow the float up and away from the lace and allow the picker to get under it. The continued forward and upward movement of the picker brings the float in contact with the upper stationary blade, *g*, and severs it.

The stationary blades are attached rigidly to the face-plate C by means of the upper screw, *g'*, while the lower screw is used to spring the blade into proper contact with the picker *t*. (For the shape of the stationary cutters see Fig. 8.) Each picker *t* has the cutting-edge in the plane of the side adjacent to the co-operating cutter *g*, (see Fig. 12,) and thus constitutes a shear cutter or blade of a pair of shears, (the cutter *g* being the other shear-blade.)

The rotary knife J, which is journaled in bearings adjustable in slots in the frame A, is given a rotary movement by means of the gear I engaging with gear H on main shaft F.

The feed-rolls O and P are turned with a slower motion through the gears and pinions K L M N, at the right-hand end of the machine. At the left-hand end the two feed-rolls are geared together by the spur-gears O' P'. The feed-roll O is journaled in holes in the frame A, but feed-roll P is journaled in the swinging bearings Q Q—one on each side of the machine—which are suspended from the stud-screws *q q*, and the rolls are held in contact with each other by means of the spiral tension-springs Q' Q'. The rotary cutter or knife J acts against the ledger blade S, which, as shown in dotted lines in the two side elevations, Figs. 3 and 4, is kept in contact with the rotary cutter by the small bow-springs *s s*—one on each side of the machine. The ledger-blade or stationary knife S is pivoted by means of the conical-pointed screws S' S' to the adjustable hanging pieces S', which are attached by screws to the frame A.

The arrangement of the rotary knife and ledger-blade in relation to each other and to the corner of frame A, over the edge of which the lace is drawn in its passage to the feed-rolls O and P, is clearly shown in Fig. 12. The effect of bending the lace over the edge of frame A, as therein shown, is to cause the severed floats as they pass over the edge to project out substantially at right angles to the surface of the lace, and so to be thrown over the edge of the ledger-blade between it and the rotary knife.

As it is desired to pass the lace slowly through the machine, so that the pickers may have several opportunities to pick up each float the feed-rolls are made to turn quite slowly by the arrangement of gearing shown, where pinion K upon the cutter-shaft J' engages in gear L, to which is firmly attached the pinion M, both turning upon the stud M', attached to the frame of the machine, which pinion in turn engages the gear N, attached directly to the feed-roll O.

The rotary knife or cutter J, as will be seen, can be adjusted for wear or to bring it nearer to or farther from the corner of bed A, near which it passes, by means of the adjusting-screws k, on which the lower half of the journal-box l rests. The upper journal-box, m, is adjusted in contact with the cutter-shaft J' by means of screws m'.

Attached to each picker-carrier e is an arm carrying a brush, e'. The brush is placed in front of the picker-point, and when the picker is forced down it presses upon the fabric, and when the picker is moved outward it is moved in the same direction and smooths and stretches the fabric in advance of the picker. It may be made of bristles or other suitable material adapted to exert a yielding pressure upon the fabric, and may be of any ordinary or suitable construction. These brushes, in some cases, can be dispensed with. They are fastened in place by screws, so as to be readily removable.

It will be observed that owing to the arrangement of beveled gears and pinions which move the picker-shafts, the shafts on each side of the center are given a movement in opposite directions, as shown by the arrows. In this way the pickers are caused in their downward movement to work from the center toward the edge of the lace.

The front end of the picker-frame B is made in a succession of steps, and the face-plate C is also arranged in the same manner, space being left between the two for the action of the picker-carriers e, and the face-plate C supports on its outer face the stationary blades g. The lace or fabric passes under the heavy roller R, whose journals are held in slotted uprights or brackets, the slots being vertical, (see Figs. 2 and 3,) so that it will press upon the lace.

It is evident that modifications may be made in details without departing from the spirit of the invention, and that parts of the invention may be used separately.

Having now fully described my said invention and the manner of carrying the same into effect, what I claim is—

1. The combination, with the fabric supporting and feeding mechanism, of devices movable over said fabric for lifting and cutting the loose threads thereon independently of the feed movement, means for operating said devices and mechanism for mowing off the cut threads, substantially as described.

2. The combination, with mechanism for supporting and feeding lace or other fabric, of mechanism comprising reciprocating pickers and cutters for cutting the floats or loose threads and mechanism for mowing off the pieces of said threads so cut, which remain attached by one end to the fabric, substantially as described.

3. The combination, with one or more reciprocating pickers having a rising and falling as well as a back and forth movement over the fabric, of mechanism for advancing the said pickers when depressed and for then lifting the same away from the fabric, and one or more blades or cutters placed above the lifting-fingers, so that the floats on the lifting-fingers are pressed between the latter and the said blades or cutters and severed by their conjoint action without tearing or straining the lace, substantially as described.

4. The combination of the cutting-picker with mechanism for moving the said picker and the stationary co-operating cutter, substantially as described.

5. The combination, with means for supporting and feeding lace or other fabric, of a series of reciprocating cutting-pickers and their co-operating cutters supported in a row across the line of feed, and mechanism for operating said pickers simultaneously, so as to lift away from the fabric and cut a series of floating threads, substantially as described.

6. The combination, with means for supporting and feeding lace or other fabric, of a series of reciprocating pickers divided into gangs, the pickers of each gang having the fingers which take up the floats directed away from the center, and operating mechanism for moving the pickers in the two gangs separately, substantially as described.

7. The combination of the brushes with the series of pickers and operating mechanism, substantially as described.

8. The combination, with the series of pickers and their carriers supported across the machine, of the series of shafts of unequal length, the eccentrics at the end of said shafts for operating said picker-carriers, the main cross-shaft, and the gearing for operating the series of shafts from said main shaft, substantially as described.

9. The combination, with the series of pickers and the mechanism for operating the same, of the slotted picker-plate, substantially as described.

10. The combination of the machine-frame, picker-plate, picker-frame, pickers, picker-carriers, springs for forcing down the picker-carriers, series of parallel shafts, eccentrics on said shafts fitting in slots in said carriers, and mechanism for revolving said shafts, substantially as described.

11. The combination of the following elements: machine-frame, picker-plate, picker-frame, series of cutting-pickers, operating mechanism, series of co-operating stationary

cutters, mowing mechanism comprising rotary knife and mechanism for revolving the same, and ledger-blade, feed-rolls, and mechanism for revolving said rolls to feed slowly  
5 the lace or other fabric, substantially as described.

In testimony whereof I have signed this

specification in the presence of two subscribing witnesses.

JAMES RANGE.

Witnesses:

CHAS. H. WILLCOX,  
HENRY B. ROSE.