

5 Sheets—Sheet 1.

No. 367,447.

Patented Aug. 2, 1887.

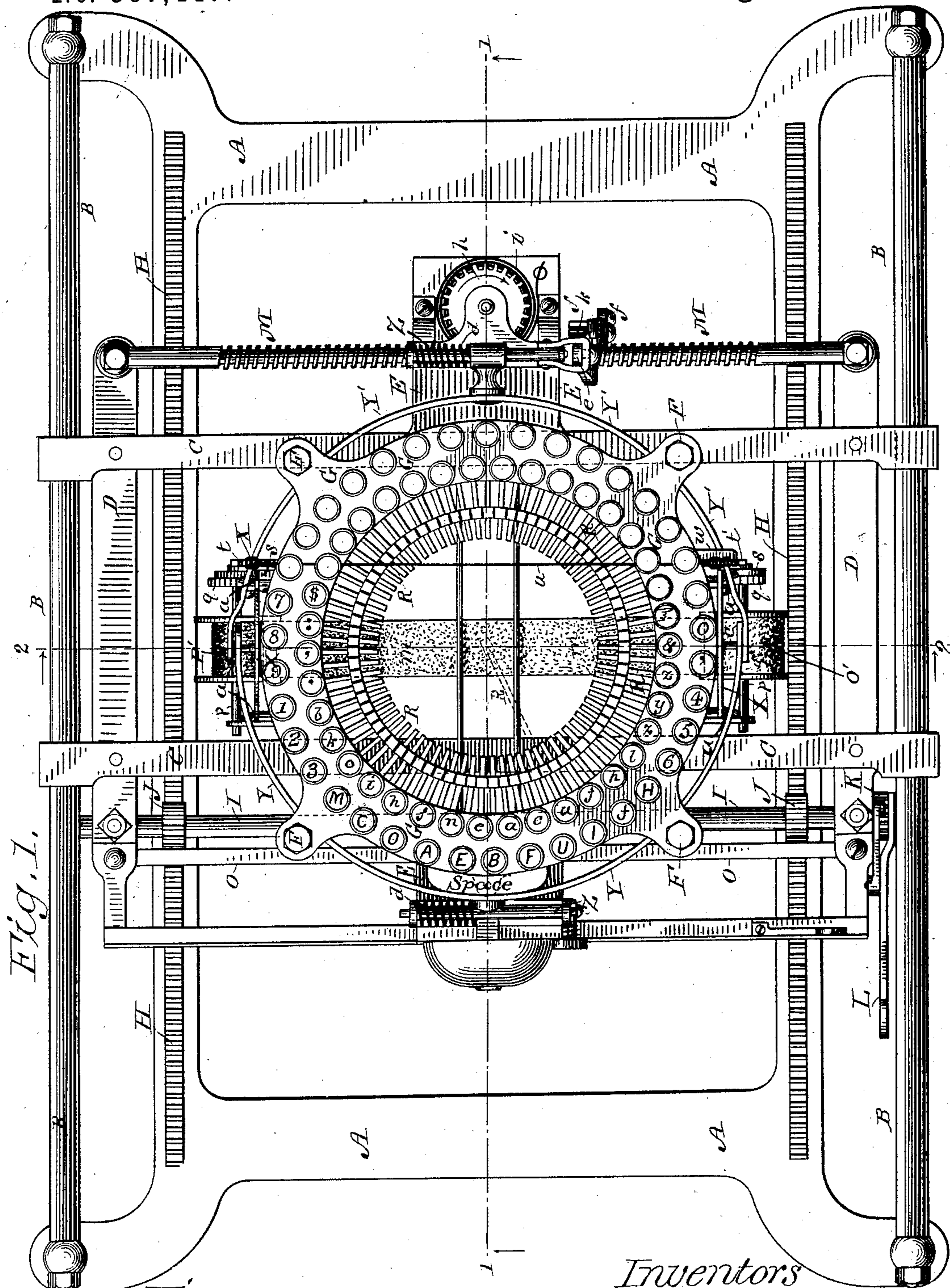


Fig. 1.

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(No Model.)

5 Sheets—Sheet 2.

E. & D. J. ROWLANDS.
TYPE WRITING MACHINE.

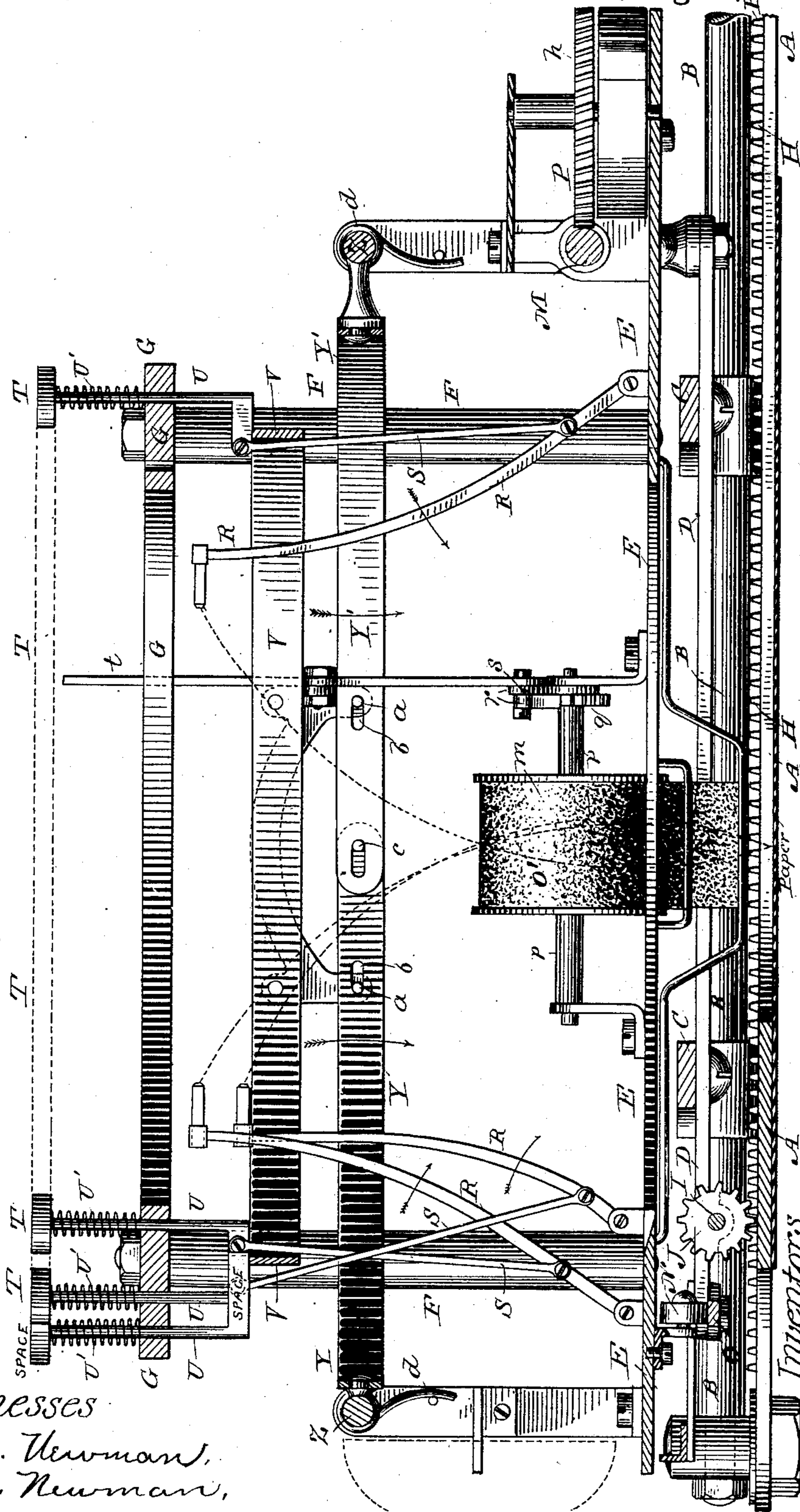
No. 367,447.

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ON LINE 1-1.

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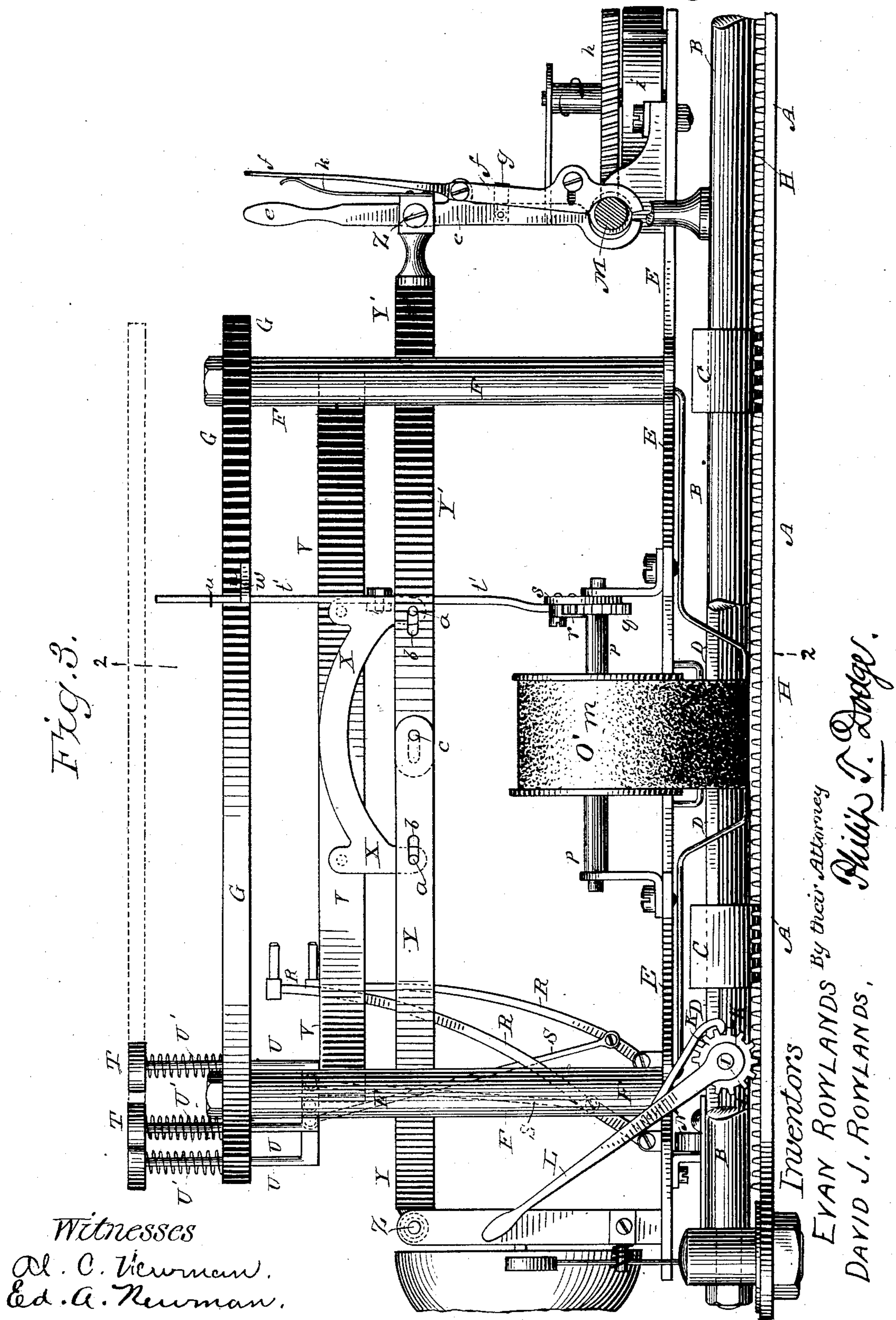
(No Model.)

5 Sheets—Sheet 3.

E. & D. J. ROWLANDS.
TYPE WRITING MACHINE.

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(No Model.)

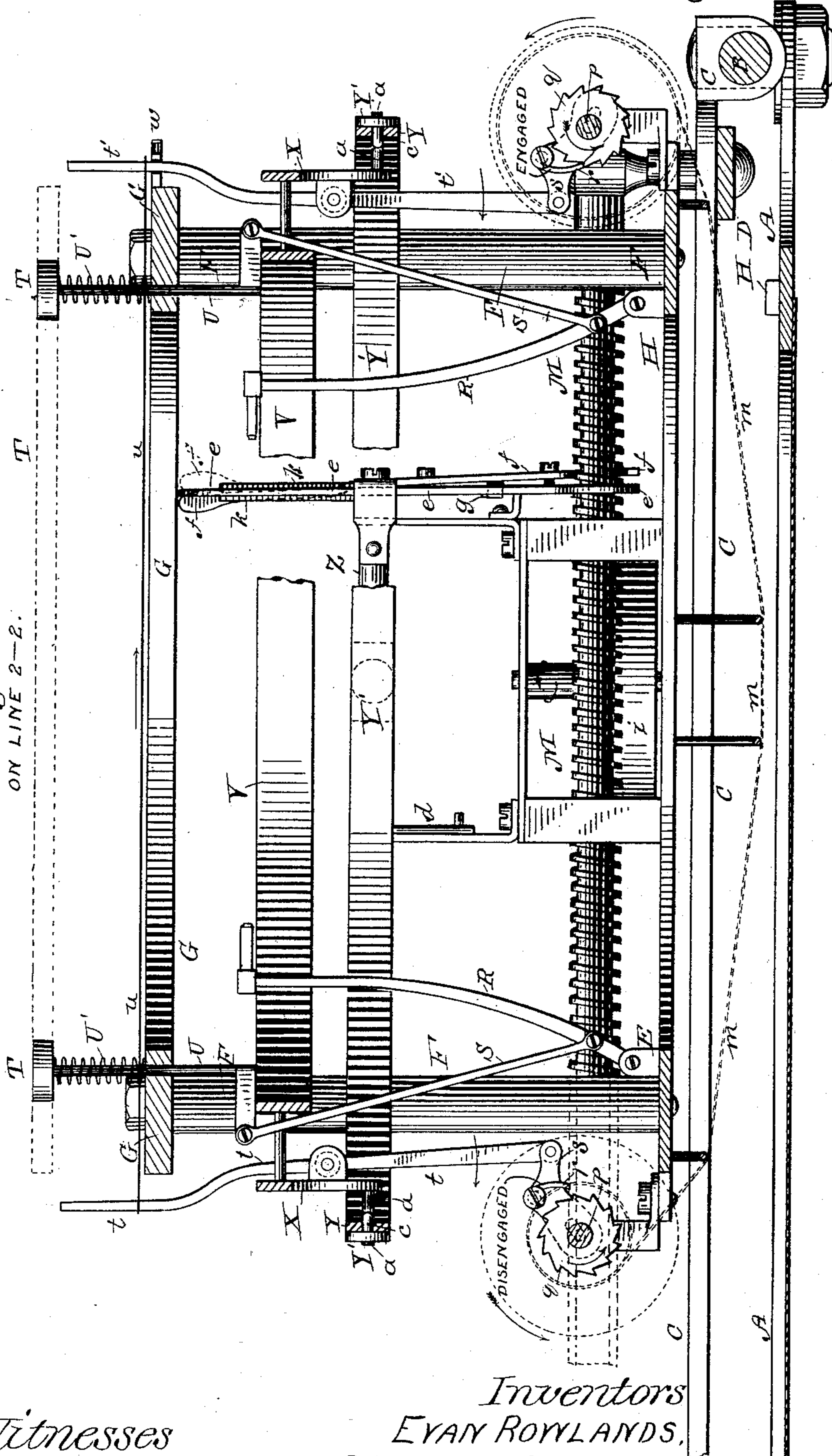
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TYPE WRITING MACHINE.

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Fig. 4.
ON LINE 2-2.



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5 Sheets—Sheet 5.

E. & D. J. ROWLANDS.
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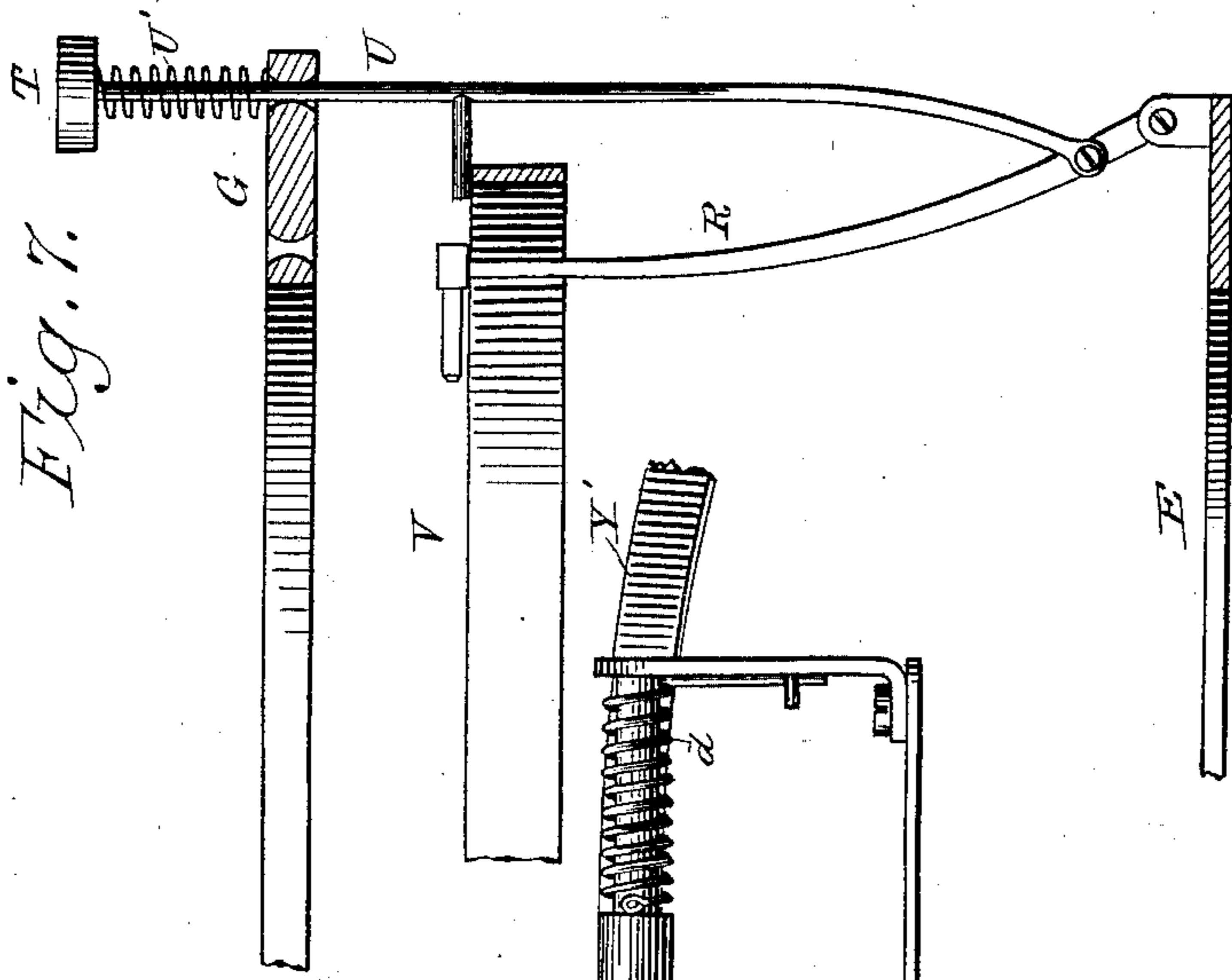


Fig. 6.

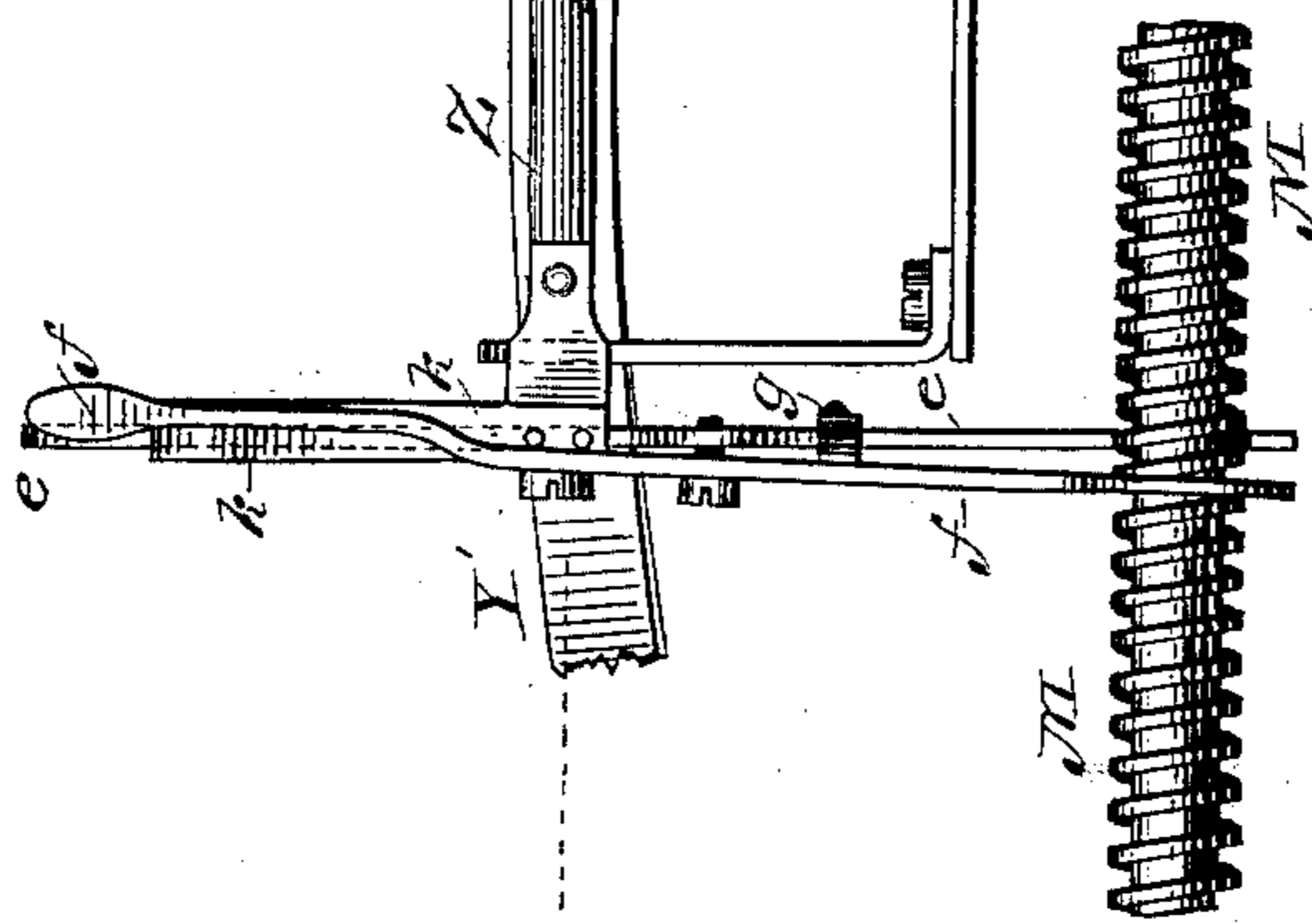
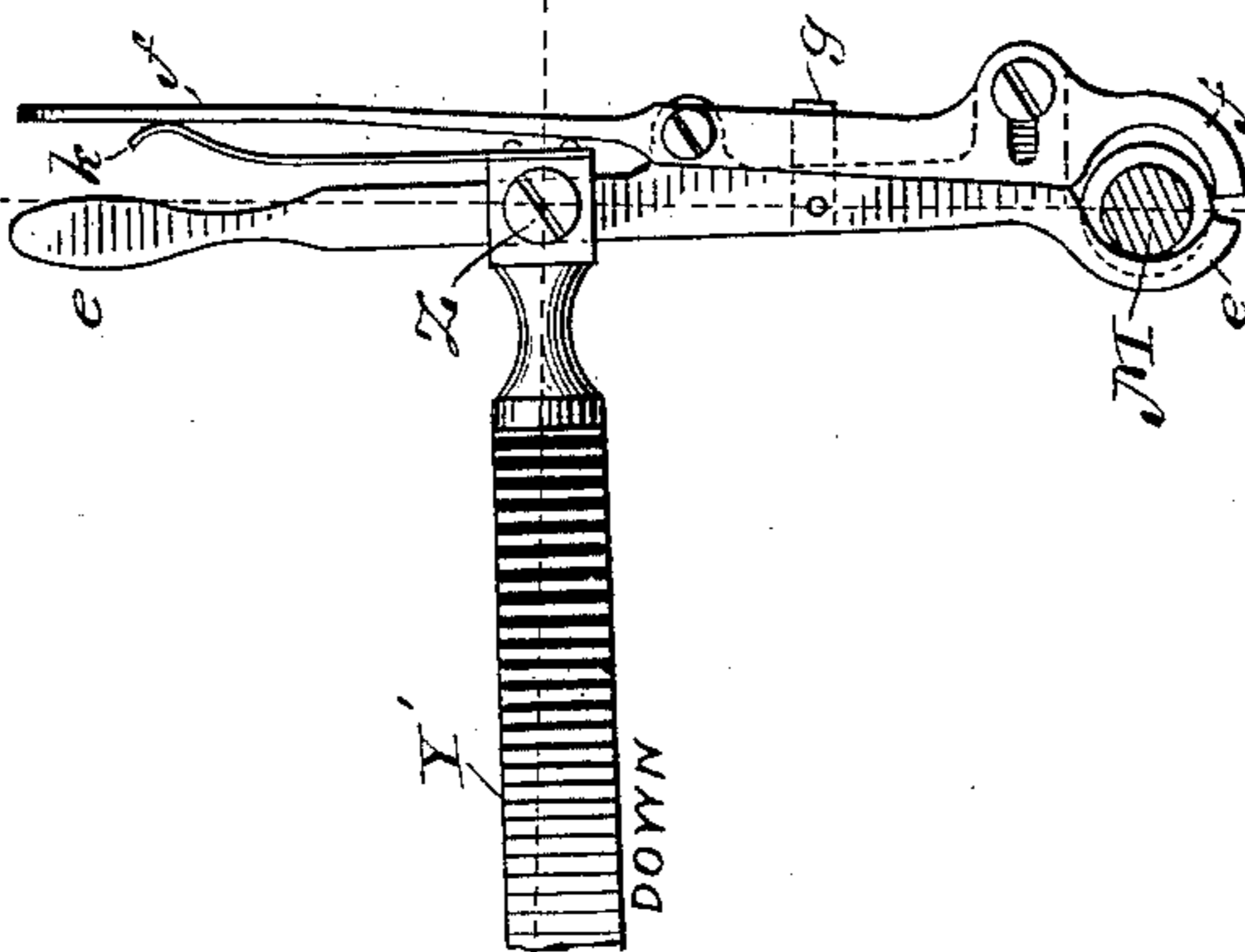


Fig. 5.



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UNITED STATES PATENT OFFICE.

EVAN ROWLANDS AND DAVID J. ROWLANDS, OF YOUNGSTOWN, OHIO.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 367,447, dated August 2, 1887.

Application filed April 13, 1886. Serial No. 198,706. (No model.)

To all whom it may concern:

Be it known that we, EVAN ROWLANDS and DAVID J. ROWLANDS, of Youngstown, in the county of Mahoning and State of Ohio, have
5 invented certain Improvements in Type-Writing Machines, of which the following is a specification.

Our invention has reference to that class of machines in which a series of finger-pieces are
10 connected each with a swinging arm or bar provided with a type, the series of type-arms being arranged to strike upon an ink-ribbon at a common center.

The objects of the invention are, principally, to provide a light, simple, and portable
15 machine and to adapt the same to print on flat sheets, books, or other surfaces on which it may be placed. With these ends in view we provide an open base-frame and mount thereon
20 a movable frame connected thereto by suitable feed mechanism and containing a series of downwardly-acting type-arms, as herein-after more fully explained.

In the accompanying drawings, Figure 1 represents a top plan view of our machine. Fig.
25 2 is a side elevation of the same viewed in the direction indicated by the arrow in Fig. 1. Fig. 3 is an elevation of the same viewed from the opposite side. Fig. 4 is a transverse vertical section on the line 2 2 of Figs. 1 and 3.
30 Fig. 5 is an end elevation of the mechanism for feeding from letter to letter. Fig. 6 is a side elevation of the same. Fig. 7 is a sectional elevation showing a modification of the
35 connection of the finger-keys to the type-writer.

In preparing to construct our machine we first provide a flat base frame or plate, A, of
40 any appropriate form, with an open central space, and mount on opposite sides thereof two horizontal guide rods or bars, B. On the guides B we mount two transverse parallel bars, C, free to slide thereon, and connected with each other by longitudinal bars D, fixed
45 firmly thereto. The bars C and D constitute jointly a rigid frame, which may slide longitudinally over the base-frame. At one end of this sliding frame we erect suitable standards and mount therein a horizontal screw-rod, M,
50 and at the opposite end of the sliding frame we secure thereto a horizontal transverse rail,

O. The rod M and rail O are designed to support the upper frame or carriage containing the printing devices, which will now be described. This carriage consists of an annular
55 bottom plate, E, connected by rigid standards F to an annular top plate or ring, G. This carriage has at one end ears or standards mounted on the screw M, and at the opposite end it is provided with a supporting-roller, N, which
60 bears on the rail O. The carriage thus supported is free to slide transversely on the base-frame in order that it may advance step by step as the successive letters are printed. The rod M serves as a pivot around which the entire carriage may be turned upward when
65 access to its under side or to the parts thereunder is required. The movement of the sliding frame CD upon the base-frame is for the purpose of advancing the printing devices
70 from the place of one line to the next. This movement is effected by providing the base-frame with two longitudinal racks, H, and mounting in the sliding frame a transverse shaft, I, provided with pinions J, which engage
75 the racks. At one end the shaft I carries a ratchet-wheel, K, and the finger-lever L, journaled thereon and provided with a pawl. A spring suitably applied serves to maintain the lever L in an elevated position. When it is
80 depressed, it turns the pinions and causes the sliding frame to advance toward the operator, moving the carriage and printing mechanism a distance equal to the space between the lines. The movement of the carriage laterally on
85 the frame is accomplished by means of the screw-rod M and feed devices connected therewith and with the finger-keys, in a manner presently described.

Referring now to the printing mechanism
90 proper, R represents a series of type-arms arranged in a circular series around the base-plate E of the carriage and pivoted at their lower ends thereto, each arm provided with a type at its free end, and the series so arranged
95 that they will strike in a downward direction through the base-plate and the main frame at a common point.

Each type-arm is pivoted near its fulcrum to the lower end of a link, S, which is in turn
100 pivoted at its upper end to a spindle, U, sliding vertically through the top plate, G, of the

carriage, and provided at the upper end with a finger-piece, *T*. Each spindle is encircled between the top plate and the finger-piece by a spiral spring, *U'*, which acts to urge the same upward and through the intermediate connections to maintain a corresponding type-arm in an elevated position. The depression of a finger-piece will be followed by a sudden downward stroke of the connected type-arm.

We will now describe the connections by which the series of finger-pieces are caused to operate the feed mechanism to advance the carriage from letter to letter. A ring, *V*, is arranged horizontally within the frame beneath the spindles *U*, and in such position that each spindle will act to force it downward. This ring is maintained in its horizontal position and permitted to rise and fall by means of arms *X*, secured to its opposite sides, and each provided at opposite ends with two projecting pins, *a*, which latter are mounted in slots *b* in two horizontal arms, *Y* and *Y'*. These arms are made of semicircular form, united at their inner ends by slots and pins *c*, and sustained at their outer sides by horizontal rock-shafts *Z*, to which they are firmly secured. Spiral springs *d*, encircling the shafts, with one end connected thereto and the opposite end connected to a fixed support, serve to maintain the arms *Y Y'* and the ring *V* normally in an elevated position. The rock-shafts *Z* are sustained in suitable standards on the carriage. When any finger-piece is depressed, the ring *V* and arms *Y Y'* sink, and the arm *Y'* imparts to its rock-shaft *Z* a slight rotation. To this shaft is secured a depending arm, *e*, the lower end of which is made of semicircular form and adapted to engage the screw-rod *M*, before alluded to. When the arms are in their normal elevated position, this arm *e* is out of engagement with the screw; but at this time a second arm, *f*, pivoted to arm *e*, engages the screw at its lower end. The arm *f* is connected to arm *e* in such manner as to have a limited independent motion in the direction of the length of the screw, and is held normally out of line with the arm *e* by an intervening spring, *g*. On the carriage there is mounted a toothed wheel, *h*, which engages the screw-rod, and which has its arbor connected to a coiled spring, *i*, which tends constantly to turn it in the direction indicated by the arrow. The wheel thus actuated tends to turn the carriage constantly toward the right; but the advance of the carriage is prevented by the engagement of arm *f* in the screw. The force of the spring *i* is sufficient, however, to move the carriage until the arm *e* is carried against the arm *f*. Whenever a finger-piece is depressed, the rocking motion of the shaft *Z* causes the arm *f* to be thrown out of engagement with the screw and the arm *e* at the same time to be engaged therewith, the one arm taking hold slightly before the other lets go. As soon as the arm *f* is out of engagement it is advanced by the spring *g* and brought opposite the next thread in the

screw. When the finger-piece is released, the rock-shaft turns to its original position, causing the arm *f* to engage and the arm *e* to disengage, whereupon the carriage advances to the right until the arm *e* again meets the arm *f*, and so on repeatedly, the carriage being advanced step by step by the alternate engagement of the two arms with the screw.

In addition to its lateral movement for feeding purposes, the arm *f* is mounted on its pivot in such manner that its lower end may be separated to an abnormal distance from the arm *e*, so that both arms may be disengaged when the carriage is to be returned to the starting-point at the left side of the machine. A spring, *k*, interposed between the ends of the arms, holds them ordinarily in proper operative relations. While we prefer to use this form of feed mechanism, it is to be understood that it may be replaced by a feed mechanism of any suitable character.

We provide the machine with an ink-ribbon, *m*, which is extended transversely beneath the sliding frame under suitable guides, as shown, and attached at its two ends to winding-drums *O'* and *P'*, located on opposite sides of the machine. Each roll-shaft is provided with a ratchet-wheel, *q*, and operated by a pawl, *r*, on a swinging arm, *s*, having a slotted end mounted on the journal of the roll. These arms are pivoted to the lower ends of upright levers *t t'*, pivoted to the rising and falling arms *Y Y'*, and connected with each other by a cross-wire, *u*, whereby they are caused to move in unison. By moving the levers *t t'* one or the other of the arms *s* will be thrown in such position that its pawl will fail to engage the adjacent wheel, and thus the machine may be adapted to feed the ribbon to the right or left, as demanded. The vertical movement of the arm *Y'*, due, it will be remembered, to the action of the finger-pieces, causes that pawl which is for the time being in operation to turn the adjacent drum and move the ribbon, which is thus advanced step by step. In order to secure the levers *t* and *t'* in their adjusted positions, a notched arm, *w*, is attached to the frame, as shown in Figs. 1 and 4, to engage one of the levers.

In order to give warning when a line of print is nearly completed, we provide the machine with an alarm-bell, *x*, mounted on the carriage, in connection with a pivoted hammer, which will engage a stationary trip on the frame substantially as in other machines.

In addition to the finger-pieces and spindles for operating the type-arms, we provide the machine for spacing purposes with an extra spindle and finger-piece, which act to depress the ring *V*, and thus cause the advance of the carriage without operating a type-arm.

In operating our machine the sliding frame *CD*, with the carriage thereon, is first moved to the upper end of the base-frame *A*. The arms or levers *e* and *f* are then clasped together at the upper end, in order to disengage their lower ends from the feed-screw, and held

in this position until the carriage is moved to the extreme left, when they are released. The finger-pieces representing the desired characters are then manipulated in the ordinary manner, the effect being to advance the carriage to the right and to print the characters in proper succession. When the end of the line is reached, the carriage is again moved to its original position at the left and the lever L operated to advance the carriage in position to print the next succeeding line.

It is to be observed that, owing to the fact that the type-bars strike in a downward direction and the fact that the base-plate is of flat form, our machine may be placed on a table or other flat surface to print, or a sheet placed thereunder or applied to print on the leaves of bound books.

The essential features of our machine are the downwardly-moving type-arms mounted on a carriage, which is in turn mounted movably on a supporting-frame or bed-plate thereunder; and it is to be understood that the details of the frame-work and various minor features of the machine may be modified within reasonable limits at will.

It is preferred to arrange the type-arms and their finger-pieces in two rows or series at the inner and outer edges of the carriage, respectively, in order to economize space.

While it is preferred to construct the carriage of a circular form, as shown, it is to be understood that it may be made of an elliptical or D form, if desired.

In Fig. 7 I have illustrated a slightly-modified construction of the key-operating mechanism, and in this modification the spindles N, instead of being made of the form shown in the preceding figures, are provided with a finger extending from one side to operate on the ring V, this finger taking the place of the shoulder in the preceding forms of the device.

We are aware that type-arms have been pivoted to print by striking in a downward direction, and this we do not broadly claim. Our machine is organized with special reference to its printing on a sheet beneath the lower frame of the machine, and to this end the type-arms are arranged to strike through the base-frame in order to print on a surface thereunder.

Having thus described our invention, what we claim is—

1. In a type-writing machine for printing on a stationary sheet, the combination of a stationary open base-frame, a carriage movable laterally and longitudinally thereon and open at its center, a series of type-bearing arms pivoted in said carriage and arranged to strike in a downward direction at a common point through the carriage and base-frame, finger-keys connected to the respective type-

arms, and a feed mechanism, substantially as described, common to the series of keys, to effect the lateral movement of the carriage. 65

2. In a type-writer, the combination of a movable carriage, the feed mechanism, substantially as described, to advance said carriage step by step, the type-bars and the finger-keys connected thereto, the ring V, arranged to receive the pressure of all the finger-keys, the two arms Y and Y', hinged to the frame and to each other, and connected to the ring V by joints *a b*, the springs to lift said arms, and the feed-controlling lever connected to the arm Y'. 75

3. In combination with the ribbon-supporting drums and their ratchet-wheels, the slotted arms provided with pawls, the levers to operate said arms, and a connection between said levers, whereby they are thrown alternately out of action to cause the feeding of the ribbon in one direction or the other, as demanded. 80

4. In combination with the finger-pieces to operate the printing-keys, the ring V, the arm Y', the ribbon-feeding drums, and the ratchet mechanism to feed said drums, connected with the arm Y'. 85

5. In a type-writing machine, a flat base frame or support, in combination with a series of type-arms arranged to strike downwardly therethrough to the level of the under side of the frame, whereby the machine is adapted for printing on the leaves of books, and for similar purposes. 95

6. In a type-writing machine for operating on stationary sheets, the combination, substantially as hereinbefore described, of the following members: a flat stationary open base-frame, the secondary frame arranged to slide longitudinally on guides thereon and having an open center, a carriage movable transversely on the secondary frame, and also having an open center, a series of type-arms mounted on the movable carriage and arranged to act downward at a common point through the bottom of the carriage, and the secondary frame and base-frame to act upon the paper thereunder, a series of finger-keys mounted on the carriage and connected with the respective type-arms, and a feed mechanism, substantially as described, for effecting the lateral movement of the carriage, also connected with the finger-keys, and an inking-ribbon extending transversely beneath the carriage. 100 105 110 115

In testimony whereof we hereunto set our hands, this 22d day of March, 1886, in the presence of two attesting witnesses.

EVAN ROWLANDS.

DAVID J. ROWLANDS.

Witnesses:

WILSON C. STERLING,

JOHN E. JAMES.