

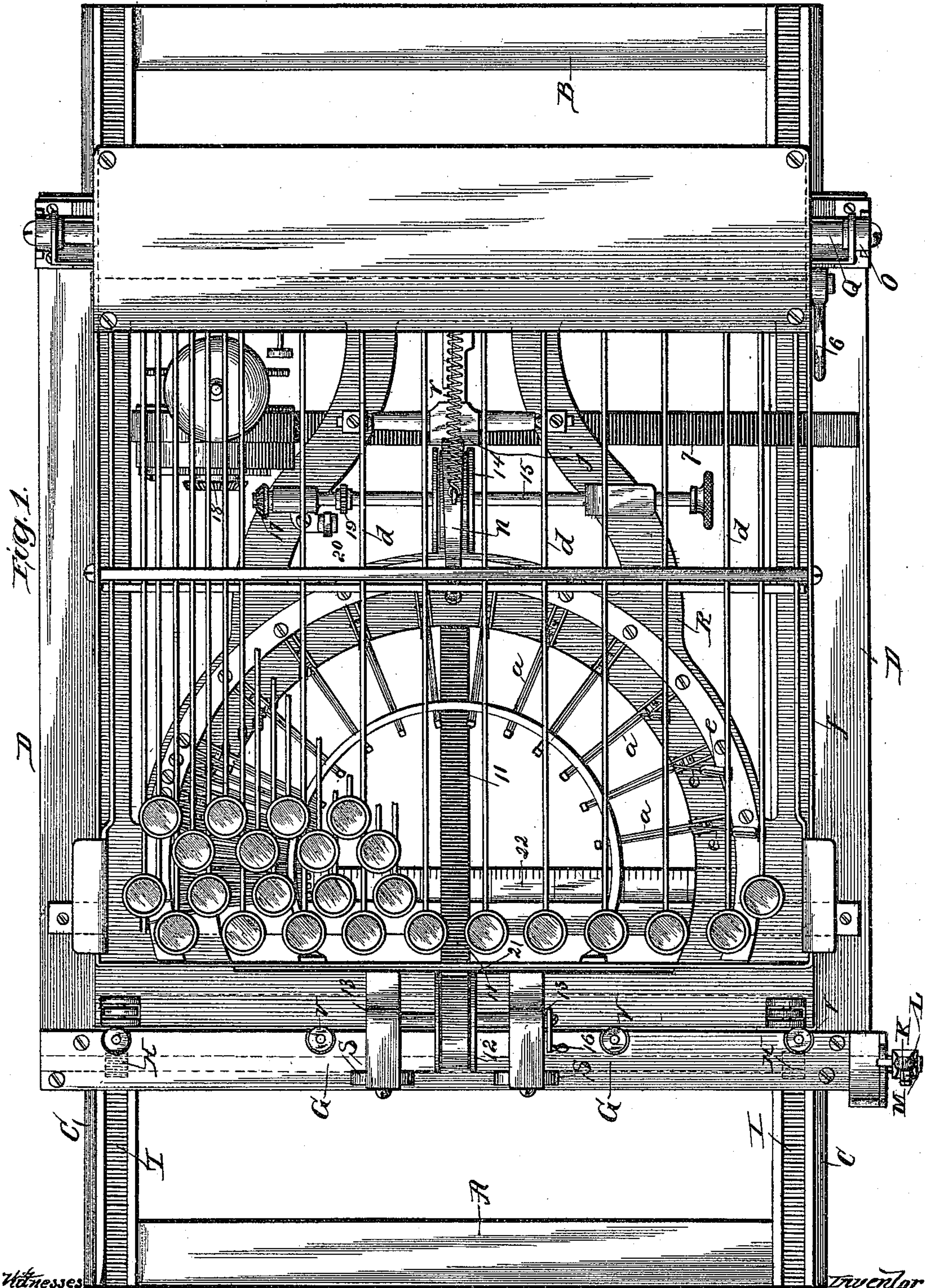
(No Model.)

6 Sheets—Sheet 1.

G. C. ELLIOTT.
TYPE WRITING MACHINE.

No. 440,307.

Patented Nov. 11, 1890.



Witnesses

Y^{rs} M. P. Rheem.
 Mrs. P. Rheem.

By

George Crawford Elliott.
Elliott & Omohundro. ~~1854~~

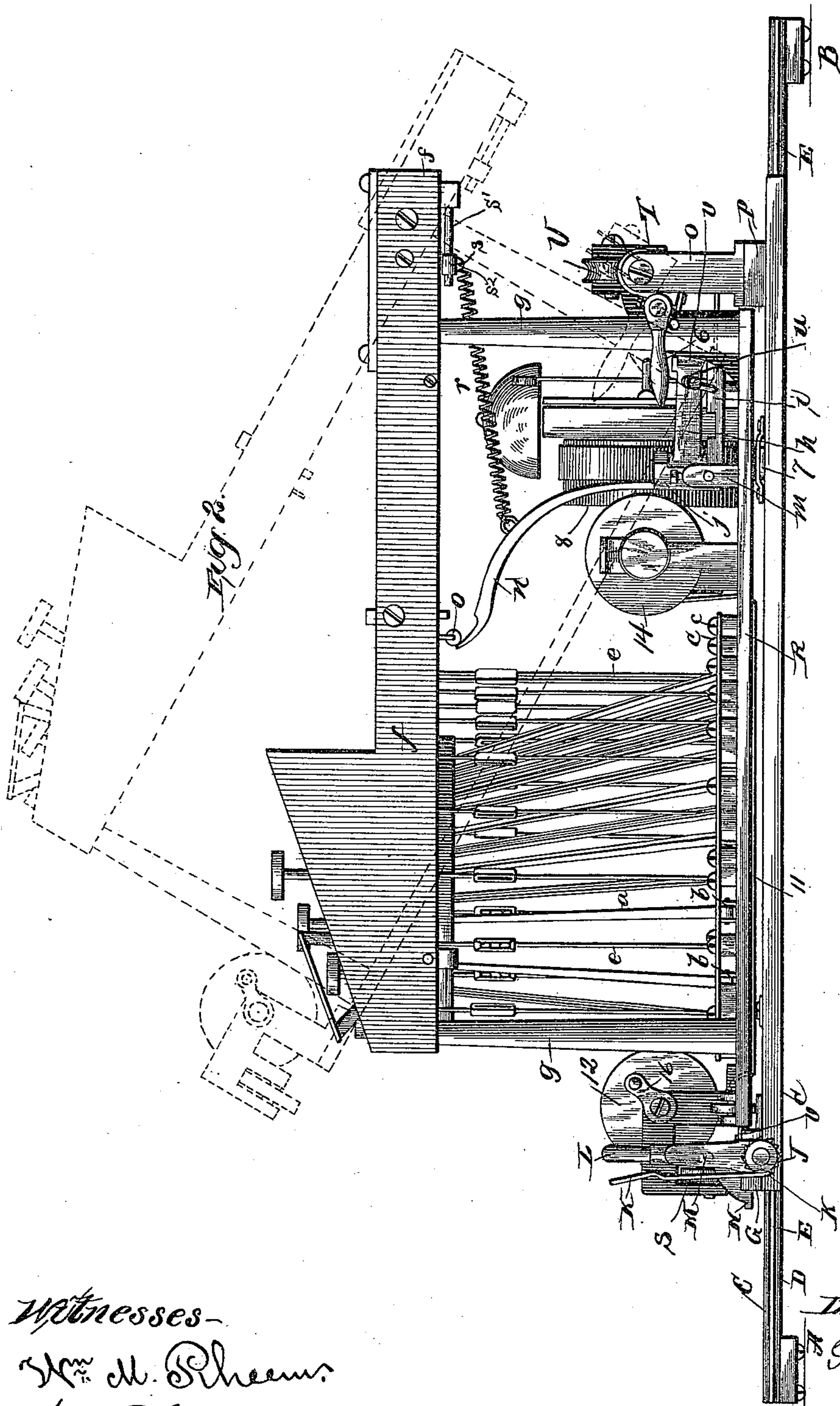
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6 Sheets—Sheet 2.

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(No Model.)

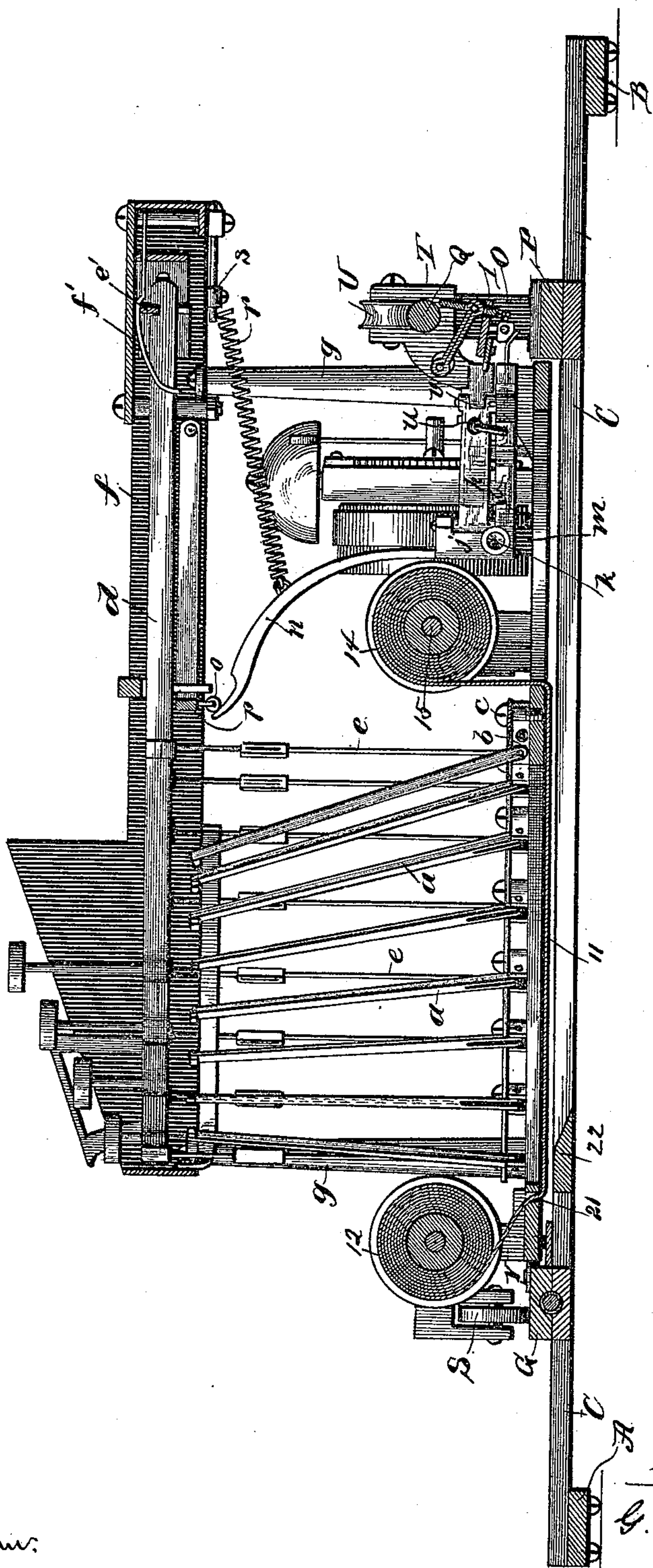
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Fig. 3.



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(No Model.)

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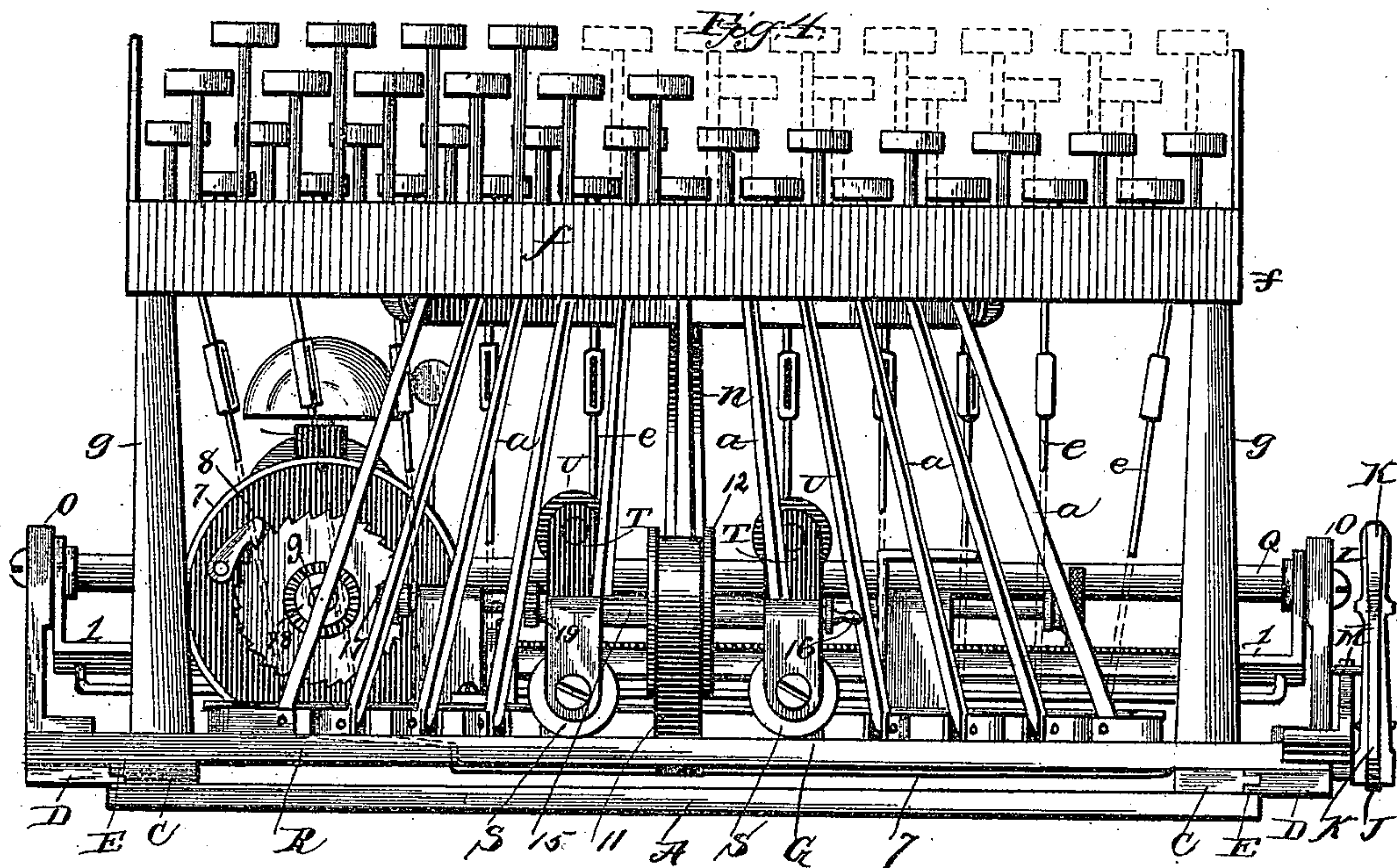
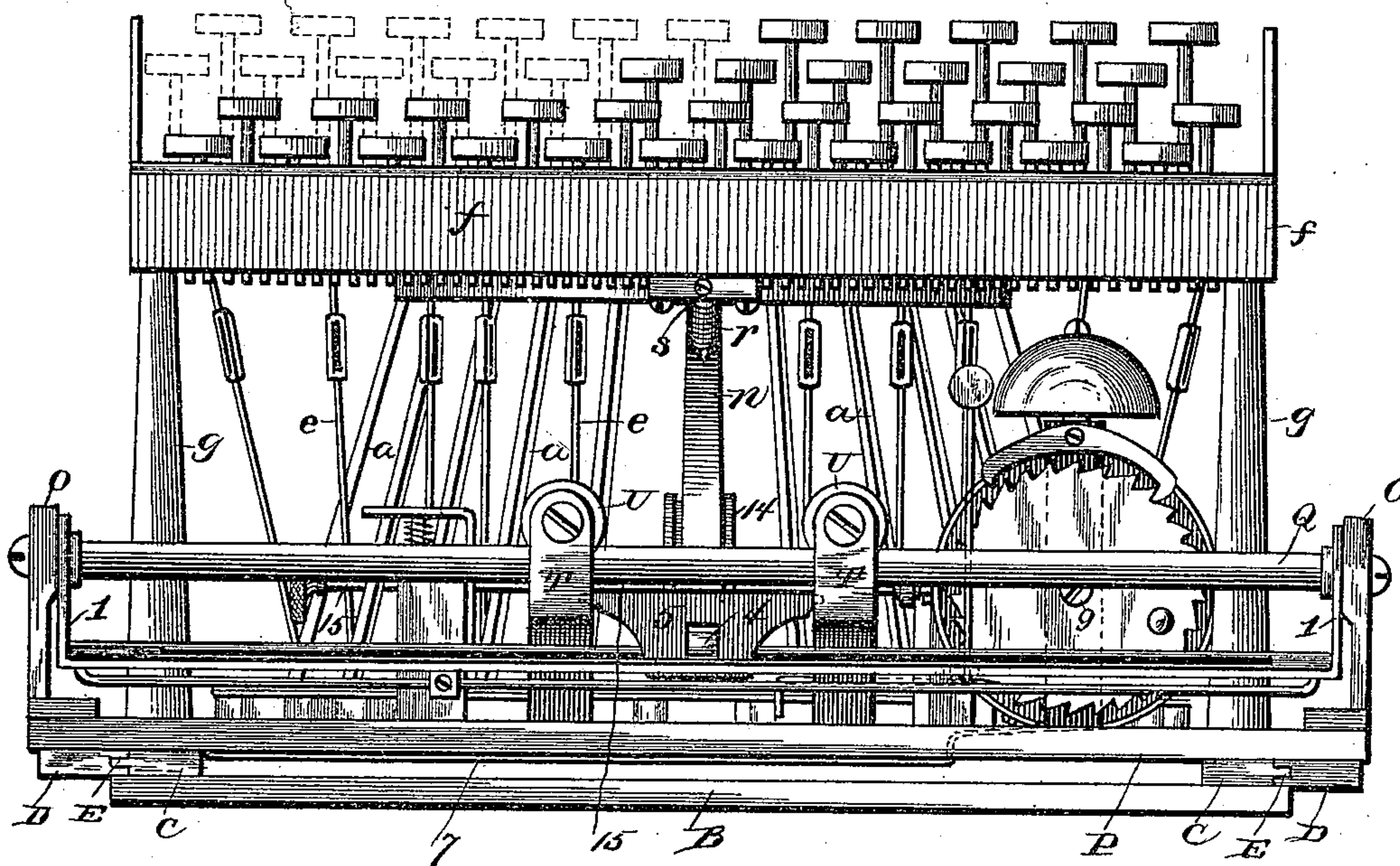


Fig. 5.



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 J. A. [Signature]

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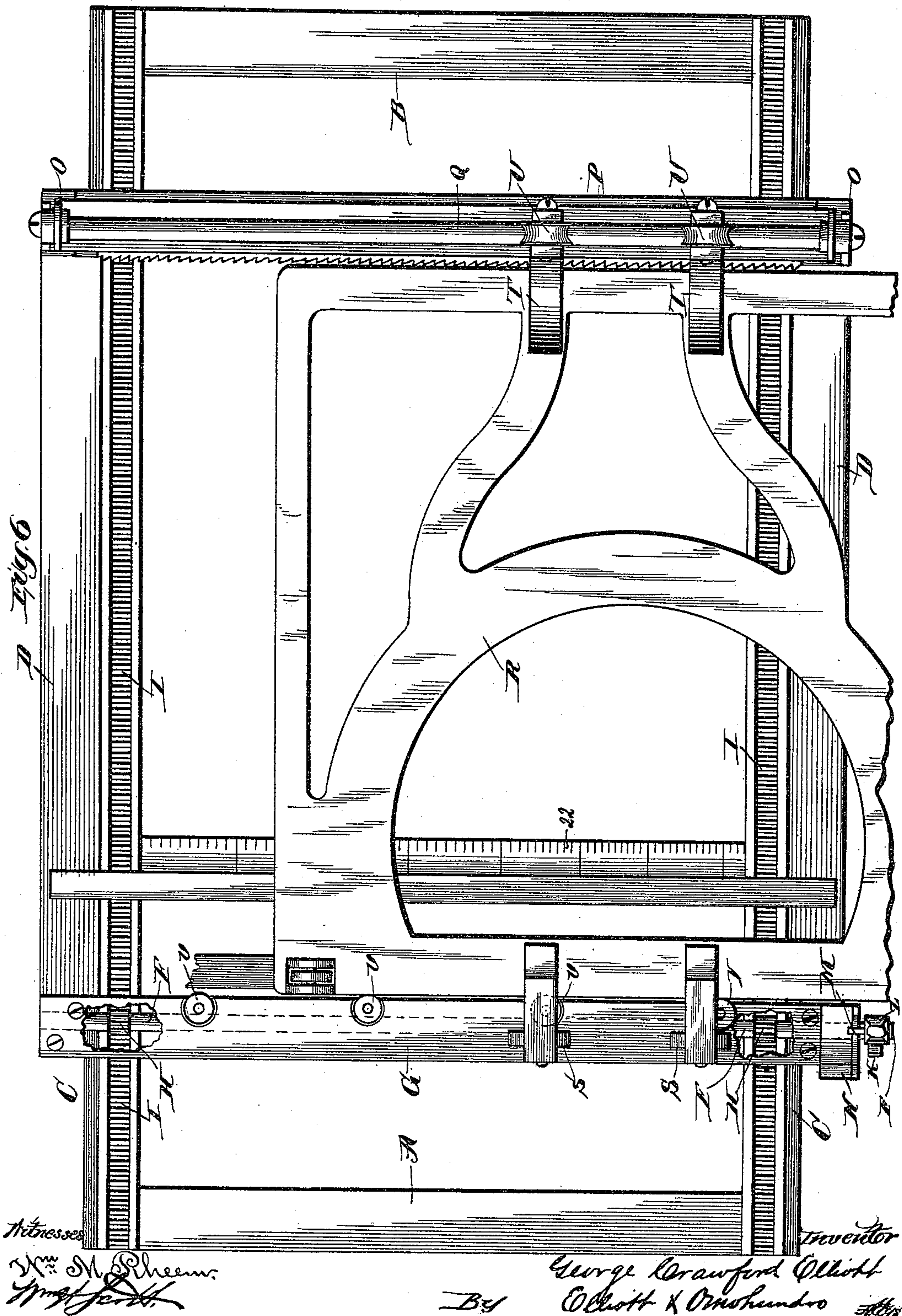
(No Model.)

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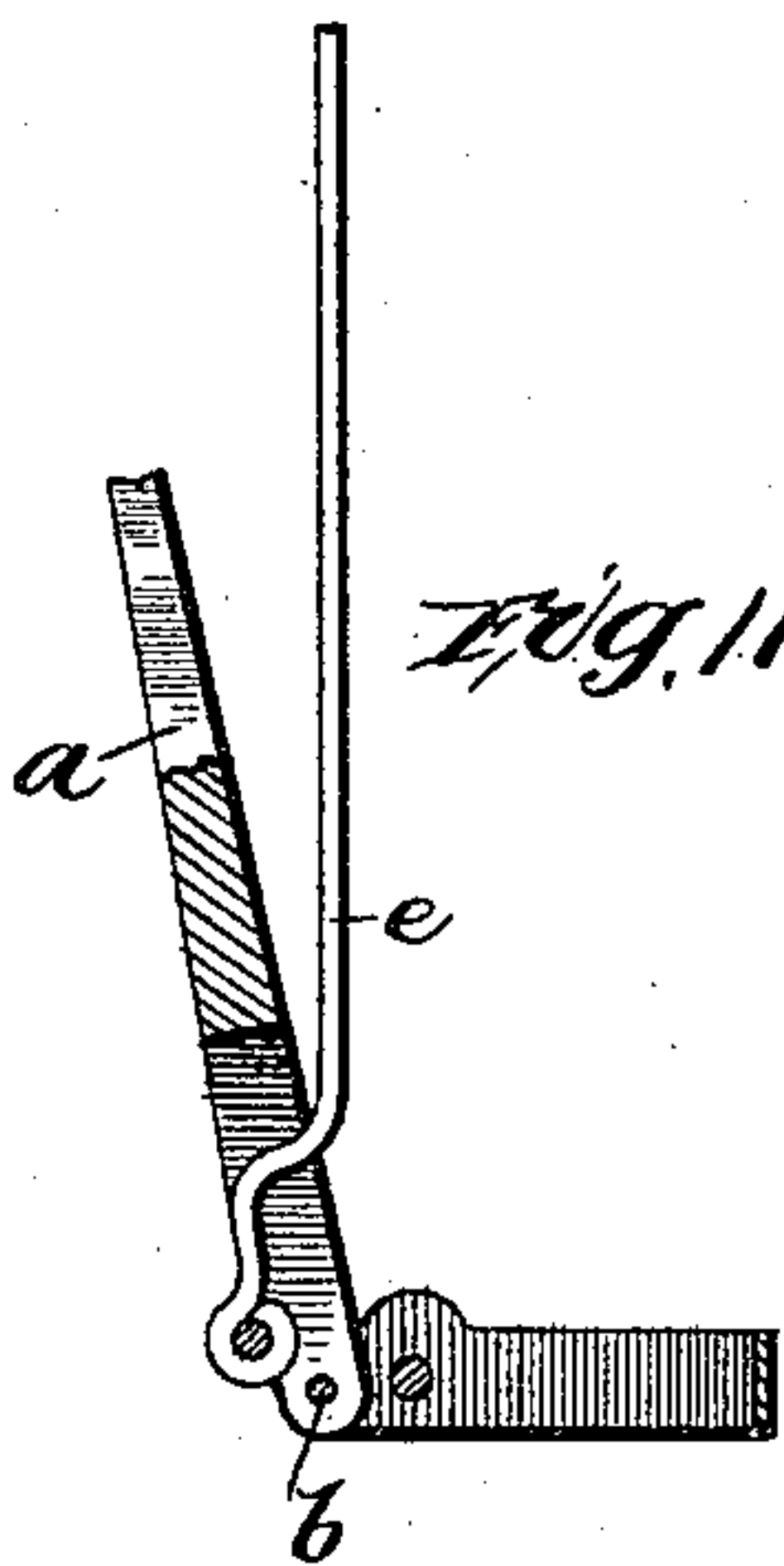
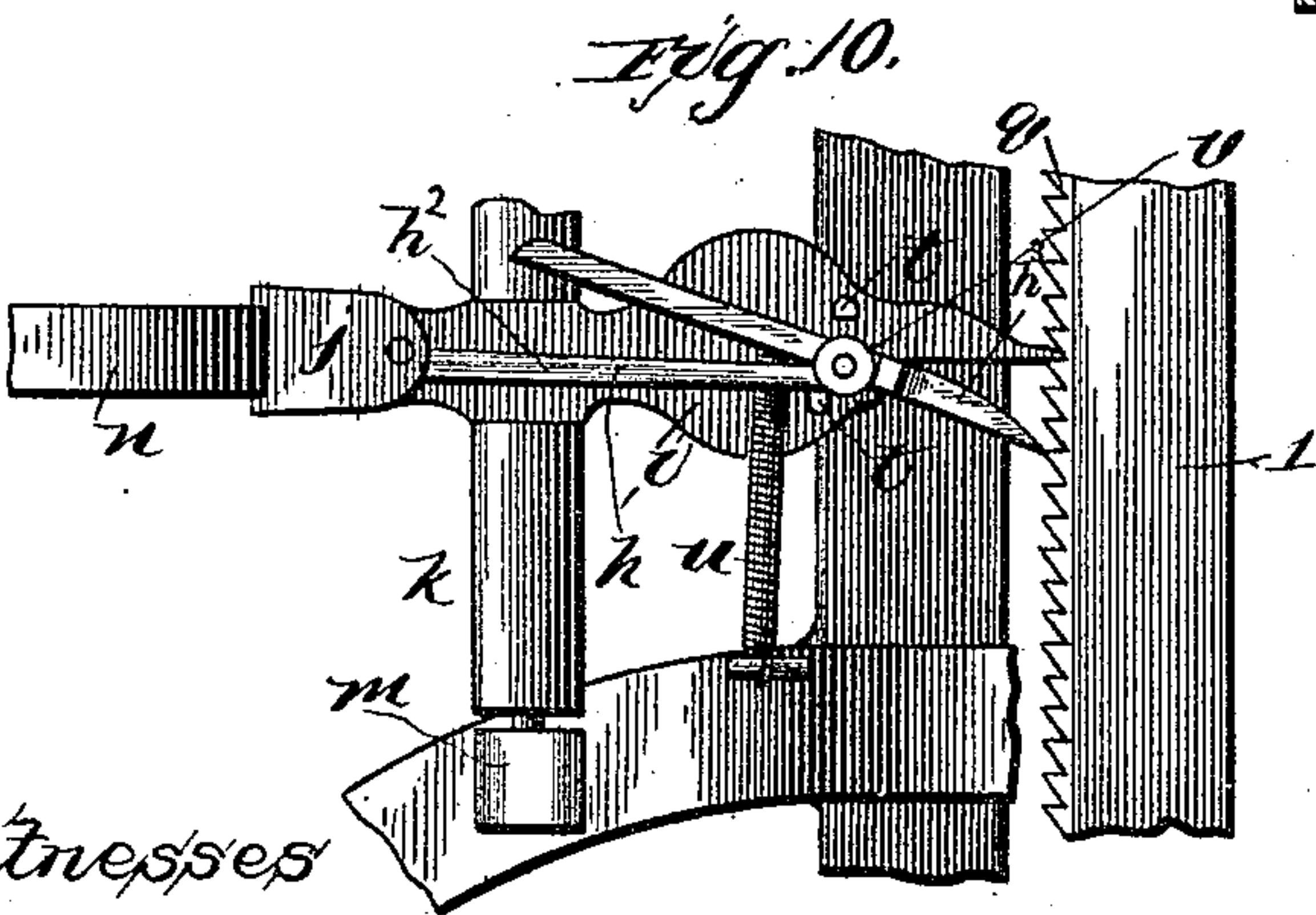
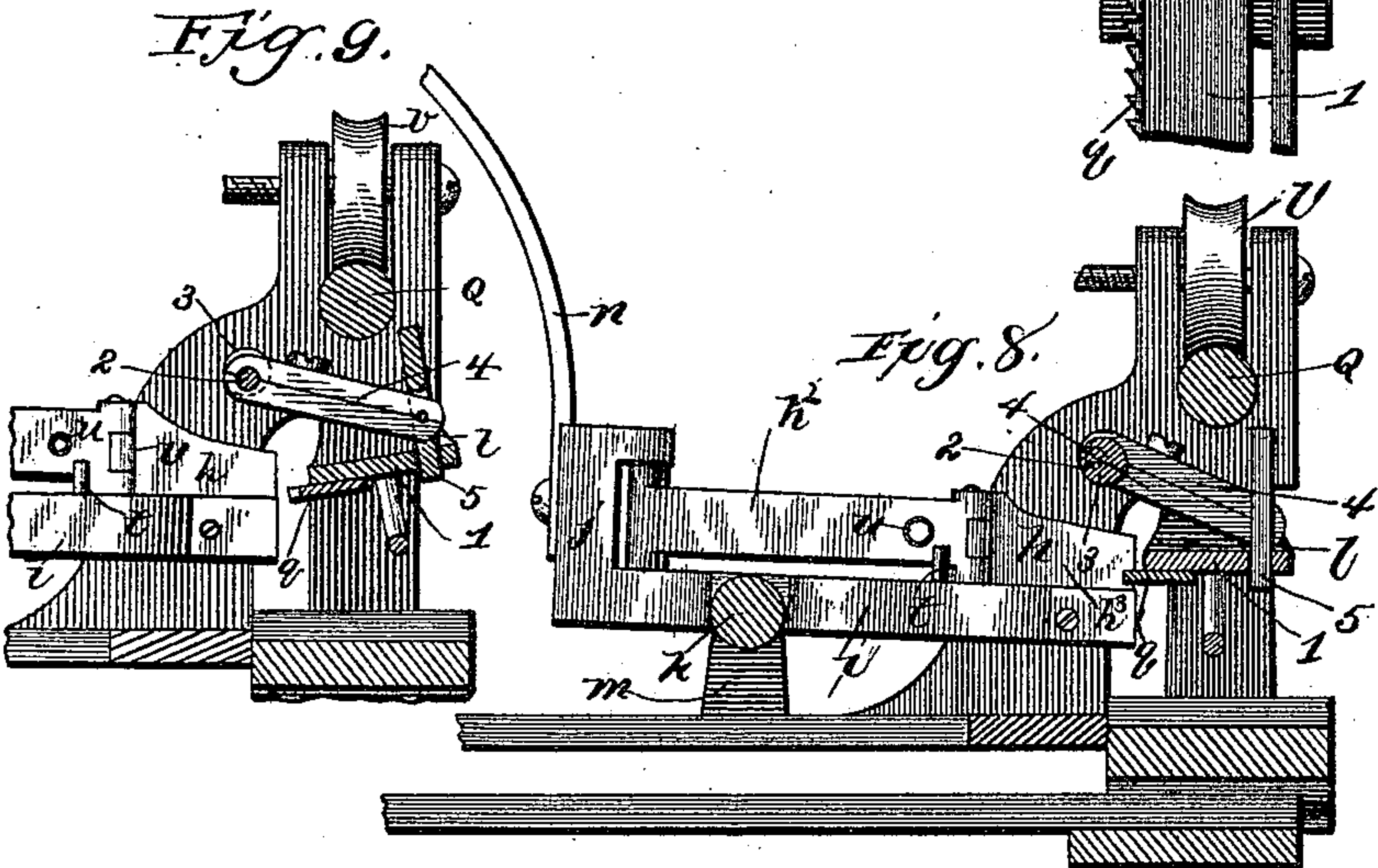
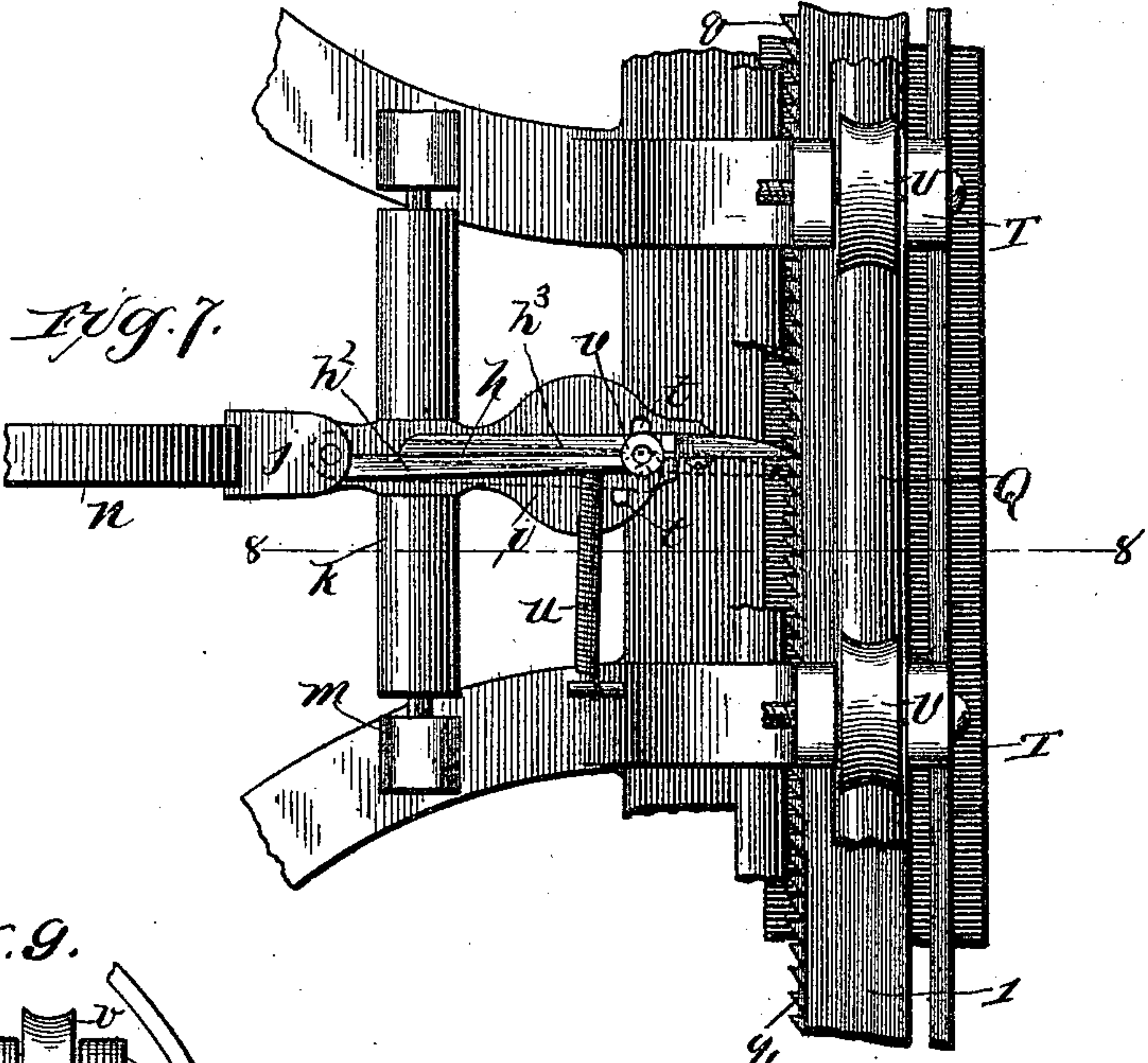
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6 Sheets—Sheet 6.

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By

UNITED STATES PATENT OFFICE.

GEORGE CRAWFORD ELLIOTT, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO LUELLA M. ELLIOTT, OF SAME PLACE, ROBERT BLACKSTOCK AND IRA B. BLACKSTOCK, OF PAXTON, ILLINOIS, AND WILLIAM M. BLACKSTOCK, OF LAFAYETTE, INDIANA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 440,307, dated November 11, 1890.

Application filed March 8, 1890. Serial No. 343,119. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CRAWFORD ELLIOTT, a citizen of the United States, residing in the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to improvements in type-writing machines especially designed for writing upon flat surfaces—such as bound pages of a book—and has for its prime object to materially simplify the construction and correspondingly reduce the cost of manufacture of such machines.

Another object is to have the machine so constructed that the writing may not only be seen at all times and as soon as each letter is made without lifting the printing-carriage, but the number of each letter be indicated upon corresponding scales, whereby the making of corrections and insertions is materially facilitated.

A further object is to have the type-bars arranged about the common center in such manner that the keys of the key-board may be arranged in straight lines and always directly before the operator, and, finally, to provide a novel and effective feed device for the printing-carriage, operated by the key-bars, to provide a novel connection between the key-bars and the type-bars, and to provide certain improved details of construction in the carrying out of my invention and in obtaining these important results, all as illustrated in the accompanying drawings, in which—

Figure 1 represents a top plan view of a type-writing machine embodying my invention; Fig. 2, a side elevation thereof; Fig. 3, a central vertical longitudinal section; Fig. 4, a front elevation of the same; Fig. 5, a rear elevation; Fig. 6, a plan view of the type-carriage and base-frame with the operating mechanism removed, more clearly showing the construction and relative operation of these parts; Fig. 7, an enlarged detail plan view of the feed mechanism for the type-carriage; Fig. 8, a transverse vertical section thereof on the

line 8 8 of Fig. 7, showing the parts in their normal position; Fig. 9, a similar view showing the swinging rack thrown out of engagement, with the feed-fingers in an inoperative position; Fig. 10, a detail plan view of the feed mechanism, showing the movement of the fingers in returning the carriage to its starting position, and Fig. 11 a detail section of the key-bar.

Similar letters and numerals of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A B indicate the front and rear or end bars, and C C the side connecting-bars of the open rectangular base-frame, which is designed to rest upon the open book or other flat surface upon which it is desired to write. Upon this base-frame works a supplemental open rectangular frame of less length but greater width than the base-frame, in order that the side bars D thereof may lie in the same plane with the side bars C of the base-frame, between which there is, preferably, a tongue-and-groove connection E, (see Fig. 4,) by means of which the supplemental frame is connected with and guided in its movements upon the base-frame. This form of connection insures great rigidity in the connection between the two frames as regards lateral movement, which is of especial importance in a machine of this character, but permits the free longitudinal sliding of the supplemental frame upon the base-frame. Upon this supplemental frame the type or printing carriage is carried up and down the page or surface to be printed upon, the movement of the carriage down the page being effected and rendered uniform by means of a cross-shaft F, suitably journaled beneath the end bars G of the supplemental frame, near each end of which is mounted a small pinion H, adapted and arranged to engage a rack I, formed upon or attached to each of the side bars of the base-frame.

Upon one end of the shaft F is mounted a ratchet-wheel J, with which engages a spring-actuated pawl K, attached to a swinging le-

ver L, loosely journaled upon the shaft, the movement of the lever being limited by a pin M thereon engaging a suitable stop N, attached to the end bar of the supplemental frame. This mechanism may, if desired, be duplicated at the opposite side of the machine, although not believed to be necessary, and the stop may be of any other form or graduated, as usual, in machines of this class, for regulating the space between the lines.

In a pair of brackets O at the ends of the rear end bar P of the supplemental frame is mounted a rod Q, which, in conjunction with the end bar G of said frame, (which latter subserves the purpose of a rail,) constitutes the direct supports of the carriage-frame R, the said frame at its forward end being provided with a series of wheels S, suitably journaled therein, running upon the rail, while the rear end of said frame terminates near its center in a pair of hanging brackets T, each encompassing the rod Q and having journaled therein a grooved anti-friction roller U, traveling upon the rod, from which it will be understood that the supplemental frame is carried upon the wheels S at the forward end thereof and the rollers U at the rear thereof.

A lateral twisting of the carriage-frame is prevented by means of a series of horizontal anti-friction rollers V, journaled upon the end bar G of the supplemental frame and bearing against the forward edge of the carriage-frame, as clearly illustrated in Figs. 1 and 3 of the drawings, and a hinge for the carriage for lifting the same so as to fully expose the surface being written upon is furnished by the brackets T and rollers U, which fulcrum upon and swing about the rod Q, as illustrated by dotted lines in Fig. 2.

Toward the forward end the carriage-frame R is provided with a semicircular opening, around which are arranged the type-bars *a*, pivoted at their lower ends to adjustable bearings *b*, secured by screws *c* or in any other suitable manner to the frame, upon the opposite free ends of which bars are secured the type, arranged to strike downwardly through the opening in the carriage-frame to a common center and to a level with the under side of the base-frame, for printing upon the leaves of a book or other flat surface upon which the frame rests. Each of these type-bars is operated by key-bars *d* through the medium of adjustable links *e*, pivotally connected with said type and key bars at its ends, respectively, the key-bars in turn being fulcrumed at their rear ends upon a cross-bar *e'* of an elevated frame *f*, mounted upon posts *g*, projecting upwardly from the carriage-frame R, leaving a clear space between the said frame and the elevated frame; through which the operator may look upon the surface being printed on.

Each key-bar is preferably spring-controlled in such manner that it will return to its normal elevated position, carrying with it the type-bar after each depression thereof,

to which end is provided a stirrup-spring *f'*, supporting and bearing against the under side of each of said bars forward of the fulcrum or pivot thereof, the ends of which springs extend over the bar *e'* and are secured to the frame *f* in any suitable manner.

Each type-bar, as illustrated in Fig. 11, is bifurcated at the pivoted end thereof, and the end of the link or connecting-rod *e* is bent and passed between the branches of the key-bar, so that the pivotal connection between the rod and bar is nearly in a horizontal plane with the pivot of the bar, which construction serves to reduce both the power and movement required for operating the type-bar.

The feed mechanism for producing the intermittent lateral travel of the type-carriage upon its frame consists of a pair of fingers or dogs *h i*, the former pivotally secured to and above the latter, which is secured to the end of or terminates in a bell-crank lever *j*, journaled upon a shaft *k*, bearing in brackets *m* upon the frame R, and is caused to vibrate thereon through the medium of the upwardly and forwardly curved end *n* of said lever, against which strikes an anti-friction roller *o*, secured to a depressible cross-bar *p*, underlying all of the key-bars, so that whenever any one of said keys is depressed it causes a corresponding depression of the bar *p* and vibration or rocking of the said lever. The fingers *h i* are arranged to alternately engage a pivoted and movable rack *q*, the finger *h* normally remaining in engagement with the rack through the medium of a spring *r*, secured at its ends, respectively, to the free end *n* of the lever and to an adjustable block *s*, sliding upon guides *s'* and secured in any adjusted position by means of the screw *s²*, for adjusting the tension of the spring, which serves to elevate and return the lever to its normal position after being depressed. The other finger *i* normally lies in a plane below the rack, but is elevated into engagement therewith upon the depression of the opposite end of the lever to which it is secured, which action simultaneously elevates the finger *h* above and out of engagement with the rack.

As before stated, the dog *h* is pivotally secured to and carried by the finger *i* or the lever operating the same and vibrates between two pins or stops *t* upon the lower finger, being actuated in one direction by the pull of a spring *u* and in the opposite direction against the tension of such spring by the actuating force of the spring operating the carriage, to be described farther on, so that when the finger *h* is elevated above the rack the spring will cause the same to move forward and register with the next tooth in advance on the rack, and when the finger is again depressed to its normal position it will engage the next tooth; and by reason of its vibration, before described, permits the carriage to move forward the length of a single tooth.

To permit the free and quick return of the

carriage after finishing a line, the finger *h* is formed in two parts or knuckled at *v*, as shown, the outer end portion *h*³ being thus pivotally connected with the inner portion *h*², and the spring *u* being attached directly to the outer portion, but inside of the pivot thereof, so that when the carriage is moved backward the outer end portion of the finger will swing upon the knuckle-joint therein and permit the dragging of the finger over the rack-bar, the same spring serving to restore the finger to its normal operative position immediately the backward motion ceases. It is also desirable that the carriage should be capable of being moved quickly along the line in the direction in which the writing is done without the necessity for advancing tooth by tooth along the rack, to which end I have the rack pivotally secured to and hung from the rod *Q* by means of a hanging frame 1, to which the rack is secured, so that the rack may be swung back out of engagement with both of the fingers. This action may be accomplished in numerous ways, but preferably by means of a cam or crank shaft 2, journaled in the brackets *T* upon the carriage-frame, with the crank or cam portion 3 of which is connected one end of a connecting-rod 4, the opposite end of which is pivotally secured to an arm or plate 5, pivoted at one end to said brackets and at its opposite end projecting through a slot in the hanging frame 1, so as to have a sliding connection therewith which will permit the operation of the frame with the carriage in any position. Obviously the arm or plate 5 might be dispensed with and the connecting-rod 4 be directly or indirectly connected with the hanging frame in any other suitable manner.

Upon the outer end of the shaft 2 at the side of the carriage is fixed a handle or lever 6 for convenience in rotating the shaft, by means of which the rack may be readily thrown out of engagement with the fingers and the carriage permitted to move freely along the line under the influence of its actuating-spring. The intermittent travel of the carriage along the line is preferably produced by means of a strap 7, secured at one end to the side bar of the supplemental frame and at its opposite end by a spring-actuated casing 8, mounted upon an arbor 9, journaled in a suitable post cast with or rigidly secured to the frame *R* at the opposite side of the machine, to which casing and arbor are respectively secured the ends of a coiled spring, (not necessary to be shown,) the tension of which may be increased or diminished by means of a pawl-and-ratchet connection 10 between the arbor and post, and causes the casing to normally tend to revolve upon the arbor. The rotation of the casing under the influence of its spring winds the strap thereon, and when the carriage is released by either of the fingers before described causes a lateral movement thereof relative to the supplemental frame upon which it is carried.

The carriage is provided with a narrow inking-ribbon 11, adapted and arranged to be automatically wound from a spool 12, journaled in suitable brackets 13 upon the front end bar of the carriage-frame, onto a corresponding spool 14, mounted upon a shaft 15 to the rear of the semicircular opening in the carriage-frame, so that the ribbon extends longitudinally of the frame, spanning the opening and at a right angle to the movement of the carriage, thus exposing to view the letters as rapidly as made. The spool 12 is designed simply as a storage-spool, upon which the ribbon may be wound by means of a crank 16; but the spool 14 at the rear of the opening in the carriage-frame is the feed-spool, and the ribbon is automatically wound thereon through the action of the spring-actuated casing 8 by means of a beveled gear 17 upon the end of the spool-shaft 15, meshing with a corresponding beveled gear 18, loosely journaled upon arbor 9 and having a pawl-and-ratchet connection with the casing 8, so that while the carriage is advancing the ribbon will be automatically wound upon the spool 14; but in returning the carriage after completing its movement the pawl-and-ratchet connection permits the rotation of the casing in the reverse direction without affecting the ribbon, which is held taut during the reverse movement of the carriage by a ratchet 19 upon the shaft 15, engaged by a spring-actuated pawl 20, pivoted to the post in which the shaft is journaled.

For convenience in winding the ribbon back upon the forward spool 12 the shaft 15 is made capable of endwise movement, so that the beveled gear 17 and the ratchet 19 may be disengaged, and thus permit a free rotation of said shaft.

The ribbon from the spools passes down through slots 21 in the carriage-frame and then spans the opening in the frame lying on the under side thereof in close proximity to the surface being printed upon, the distance shown in the drawings being considerably exaggerated for clearness of illustration.

To the supplemental frame is secured a scale 22, extending between the side bars thereof with its edge lying just forward of the line on which the type prints and beneath the inking-ribbon, thus numbering the letters as printed.

It will be observed that the keys of the keyboard are arranged in a series of straight lines on planes slightly above one another. This arrangement is far more compact in form and effective in operation than if the keys were arranged in a circle, besides being more convenient of manipulation. The writing done by the machine is exposed to the view of the operator almost as rapidly as the letters are made, the last one or two only being covered by the inking-ribbon.

A type-writing machine constructed in accordance with my invention combines many advantages over the prior forms of machine,

chief among which are its durability, effectiveness, and economy in construction, requiring no more than ordinary adjustment and having no delicate or complicated mechanism to become easily deranged.

In the operation of my machine, and particularly upon thin paper, either in book or sheet form, a sheet of yielding material, preferably rubber, is inserted next below the sheet receiving the type impression, so that no marring of the next sheet below can result from the action of type. The type are opposed by a yielding resistance, thus not only promoting their rebound from the paper, but the clearness of their impression thereon.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a type-writer, the combination, with the base-frame, a supplemental frame longitudinally movable upon the base-frame, and means for actuating said supplemental frame, of a type-carriage laterally movable upon the supplemental frame, anti-friction rollers supporting said carriage at the front and rear thereof, the latter constituting a pivot-connection between said supplemental frame and type-carriage, and a series of anti-friction rollers interposed between the forward edge of said carriage and the supplemental frame, whereby a lateral twisting of said frame is prevented, substantially as described.

2. In a type-writer, the combination, with the base-frame, a supplemental frame longitudinally movable thereon, and a type-carriage laterally movable upon said supplemental frame, provided with a semi-circular opening, about which the type-bars are arranged, of a pair of spools located to the front and rear of said opening, the rear one of which is mounted upon a longitudinally-movable shaft, an inking-ribbon having its ends attached to and wound upon said spools, a spring-actuated casing journaled upon the carriage-frame, beveled gears connecting said casing and shaft, and a strap secured at its ends, respectively, to said casing and the supplemental frame, whereby the inking-ribbon will be automatically fed by the movement of the type-carriage, substantially as described.

3. In a type-writer, the combination, with the base-frame, a supplemental frame longitudinally movable thereon, and a type-carriage laterally movable upon said supplemental frame, provided with a semi-circular opening about which the type-bars are arranged, of a pair of spools located to the front and rear of said opening, the rear one of which is mounted upon a longitudinally-movable shaft, an inking-ribbon having its ends at-

tached to and wound upon said spools, an arbor journaled upon the type-carriage, a rotatable spring-actuated casing loosely mounted upon said arbor, a beveled gear, also loosely mounted on said arbor, meshing with a corresponding beveled gear upon said shaft, a pawl-and-ratchet connection between the beveled gear on the arbor and the casing, and a pawl-and-ratchet connection between said shaft and the carriage-frame, whereby upon an endwise movement of said shaft it will become disengaged and free to rotate, substantially as described.

4. In a type-writer, the combination, with the laterally-traveling type-carriage and a stationary rack, of a finger pivoted upon the carriage and normally out of engagement with the rack, a second finger pivoted upon the first finger and normally in engagement with the rack, said finger being jointed, stops for limiting the vibrations thereof, a spring secured at one end to the outer portion of said finger inside the pivot thereof and at its opposite end to said carriage, and means for actuating the first-mentioned finger through the medium of the key-bars, substantially as described.

5. In a type-writer, the combination, with the laterally-traveling type-carriage, a pair of pivoted fingers carried thereby, and means for operating the same through the medium of the key-bars, of a swinging rack adapted and arranged to be normally engaged by one of said fingers, a crank-shaft journaled upon the carriage, and a rod secured to the crank portion thereof at one end and having a sliding connection at its opposite end with said rack, whereby the latter may be swung upon its pivots out of the path of movement of both of said fingers, substantially as described.

6. In a type-writer, the combination, with the laterally-traveling type-carriage, a pair of pivoted fingers carried thereby, and means for operating the same through the medium of the key-bars, of a pivoted hanging frame provided with a longitudinal slot, a toothed rack secured thereto in position to be normally engaged by one of said fingers, a crank-shaft journaled on and movable with the type-carriage, and a connecting-rod secured at one end to the cranked portion of the shaft and at its opposite end to a plate pivoted upon the carriage, the free end of which works in the slot in said hanging frame, substantially as described.

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