

(No Model.)

3 Sheets—Sheet 1.

R. E. MORRIS.

TYPE WRITING MACHINE.

No. 355,703.

Patented Jan. 11, 1887.

Fig. 1.

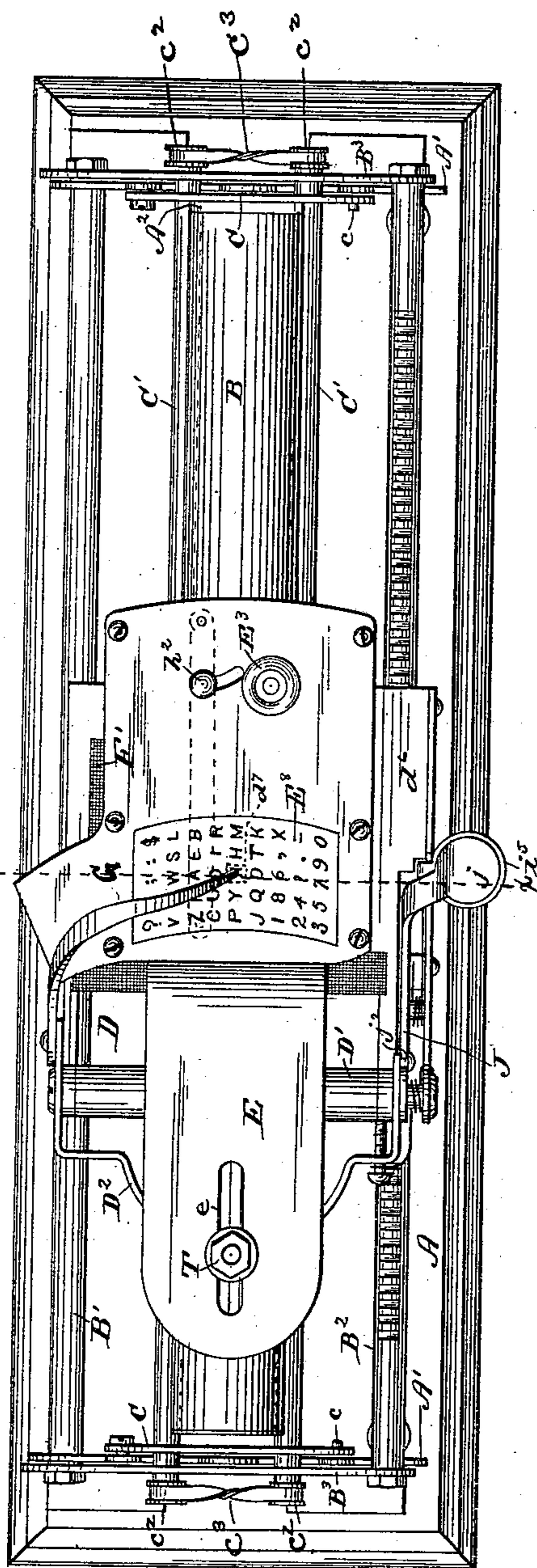
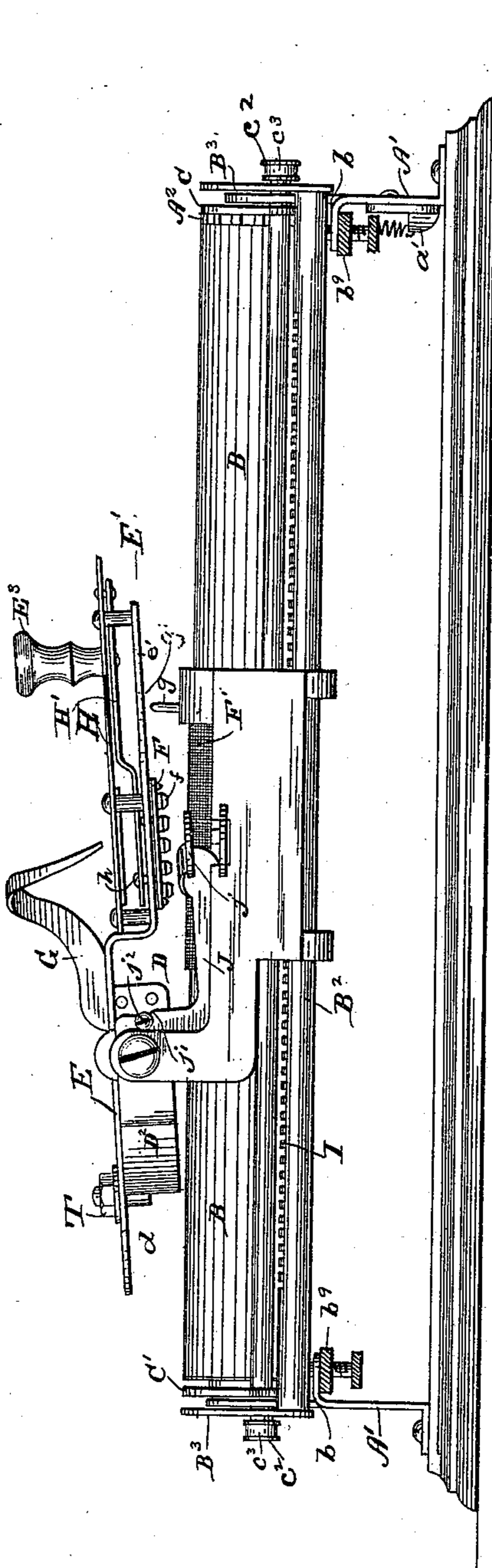


Fig. 2



Witnesses.  
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A. J. Stewart,

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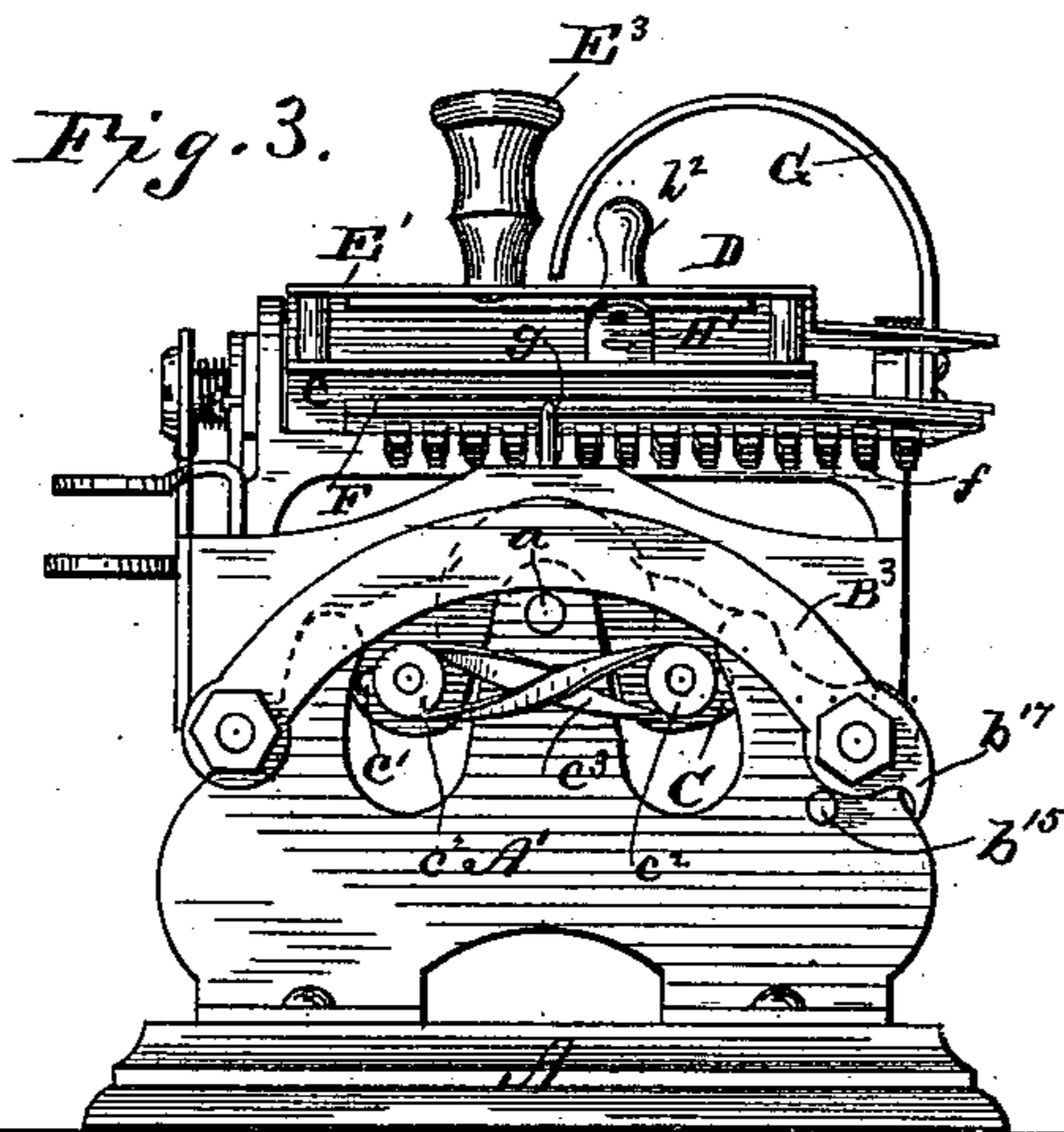
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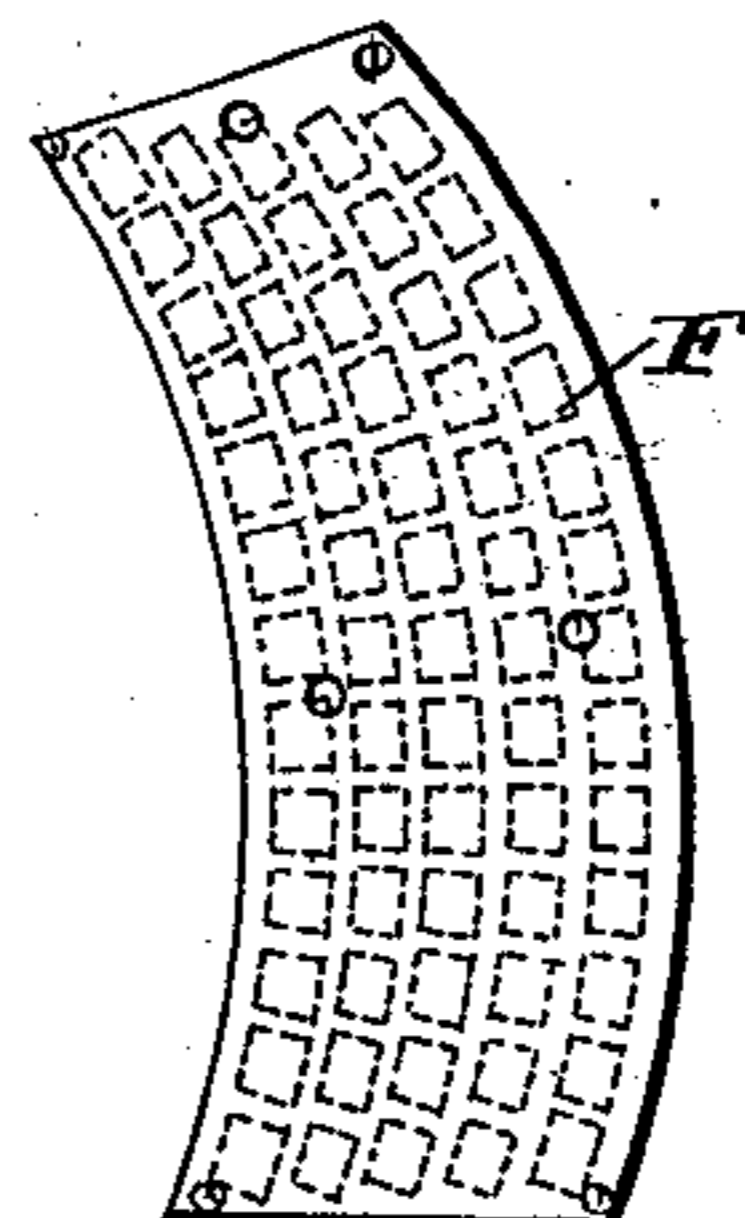
R. E. MORRIS.  
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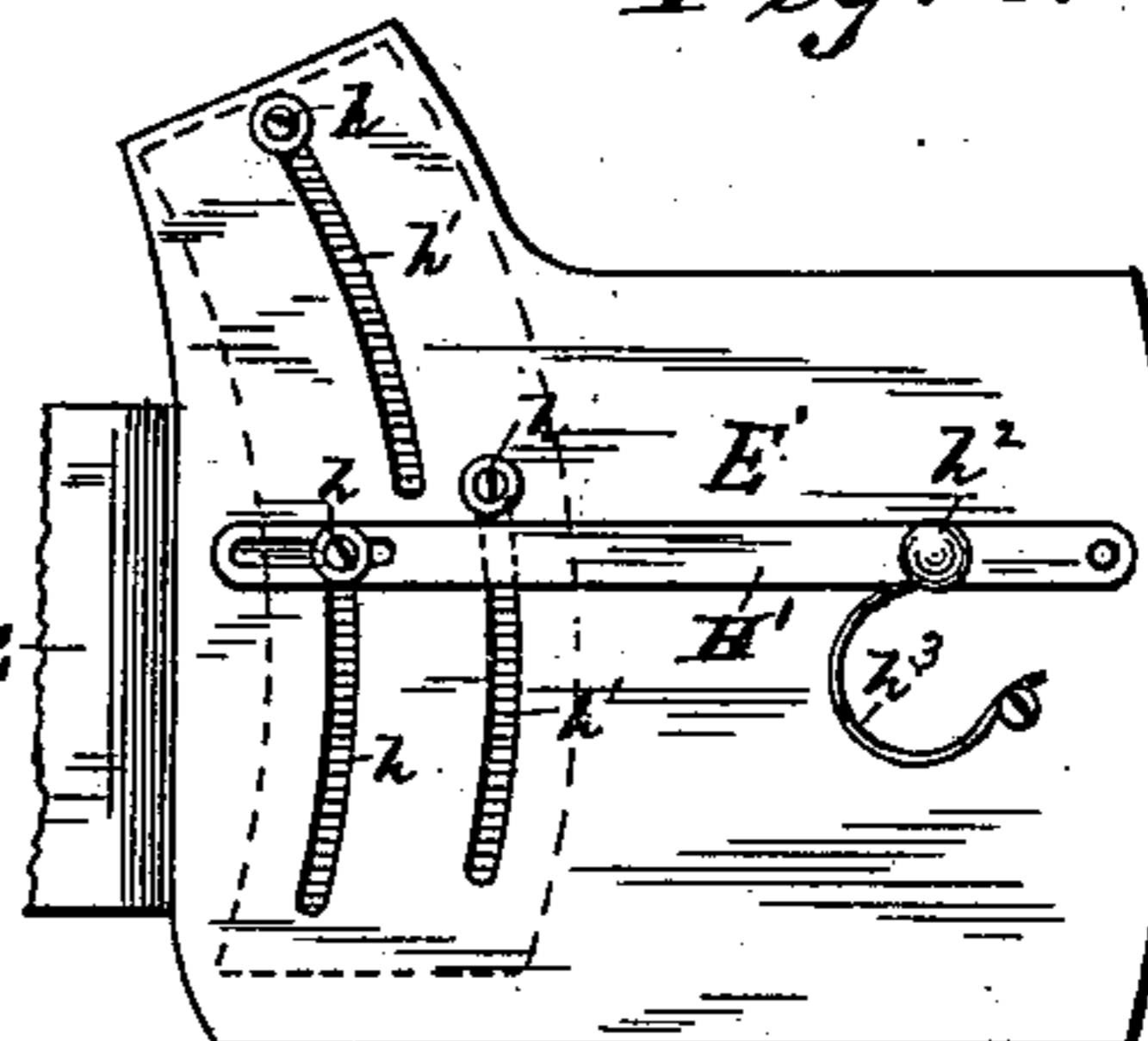
Patented Jan. 11, 1887.



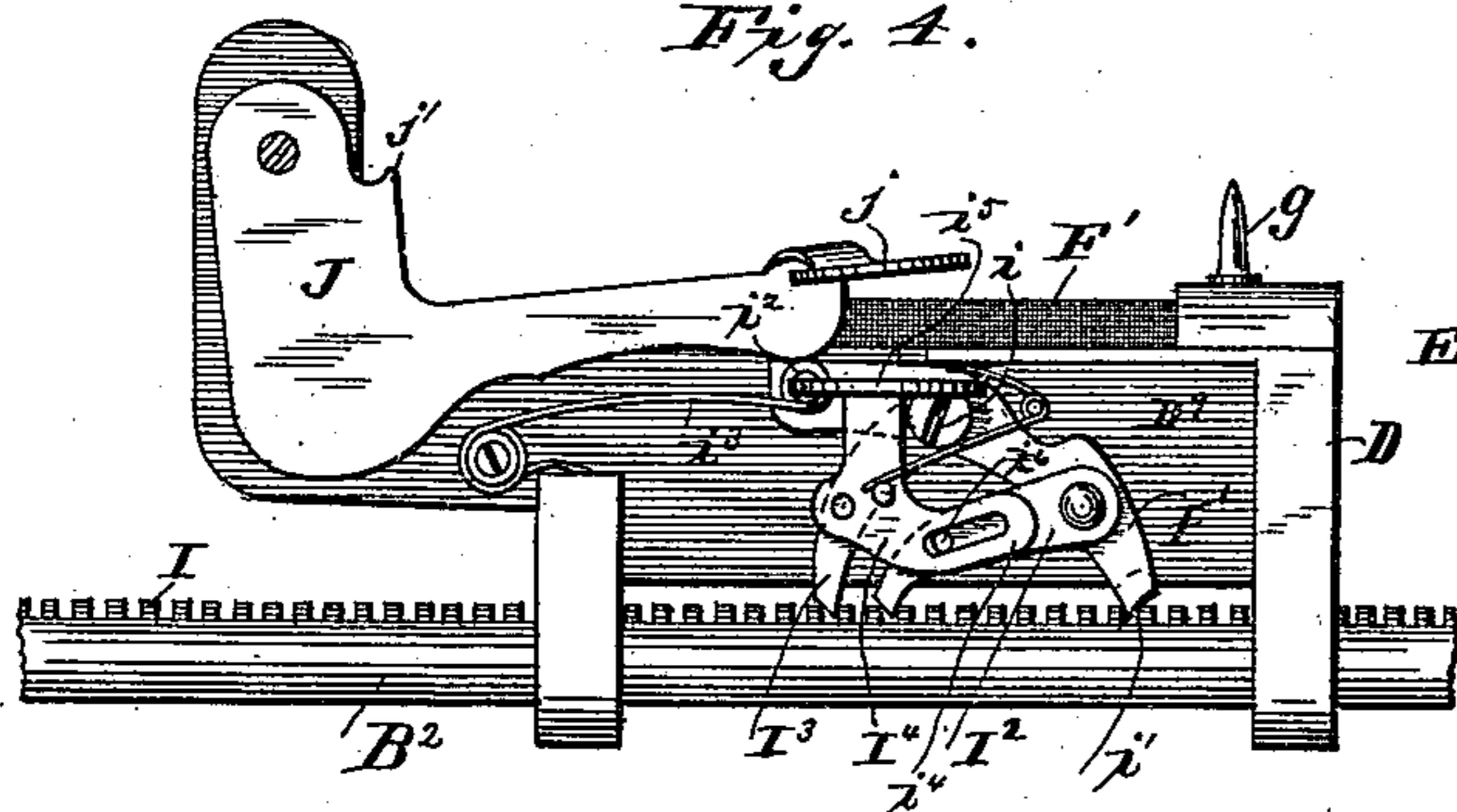
*Fig. 5.*



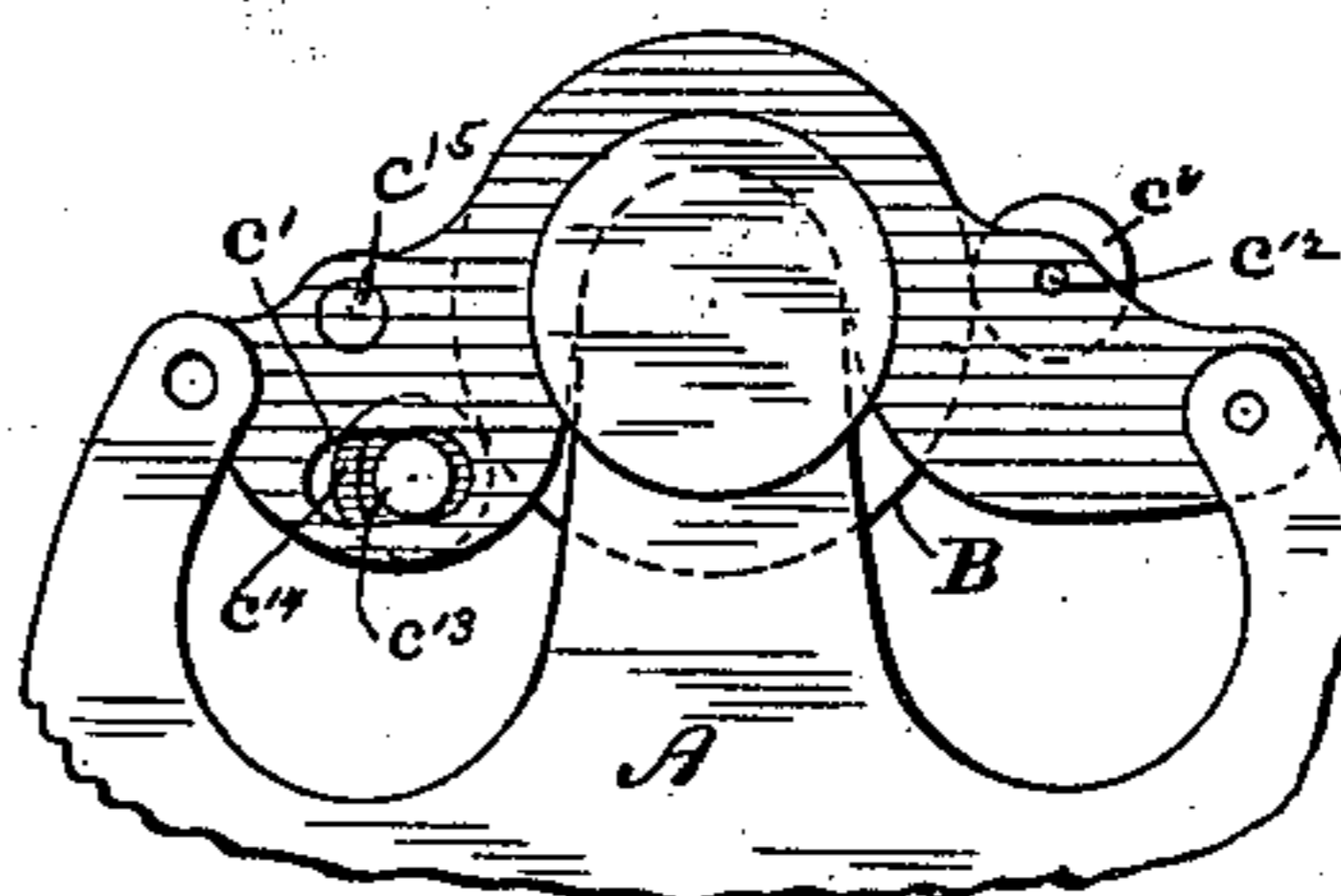
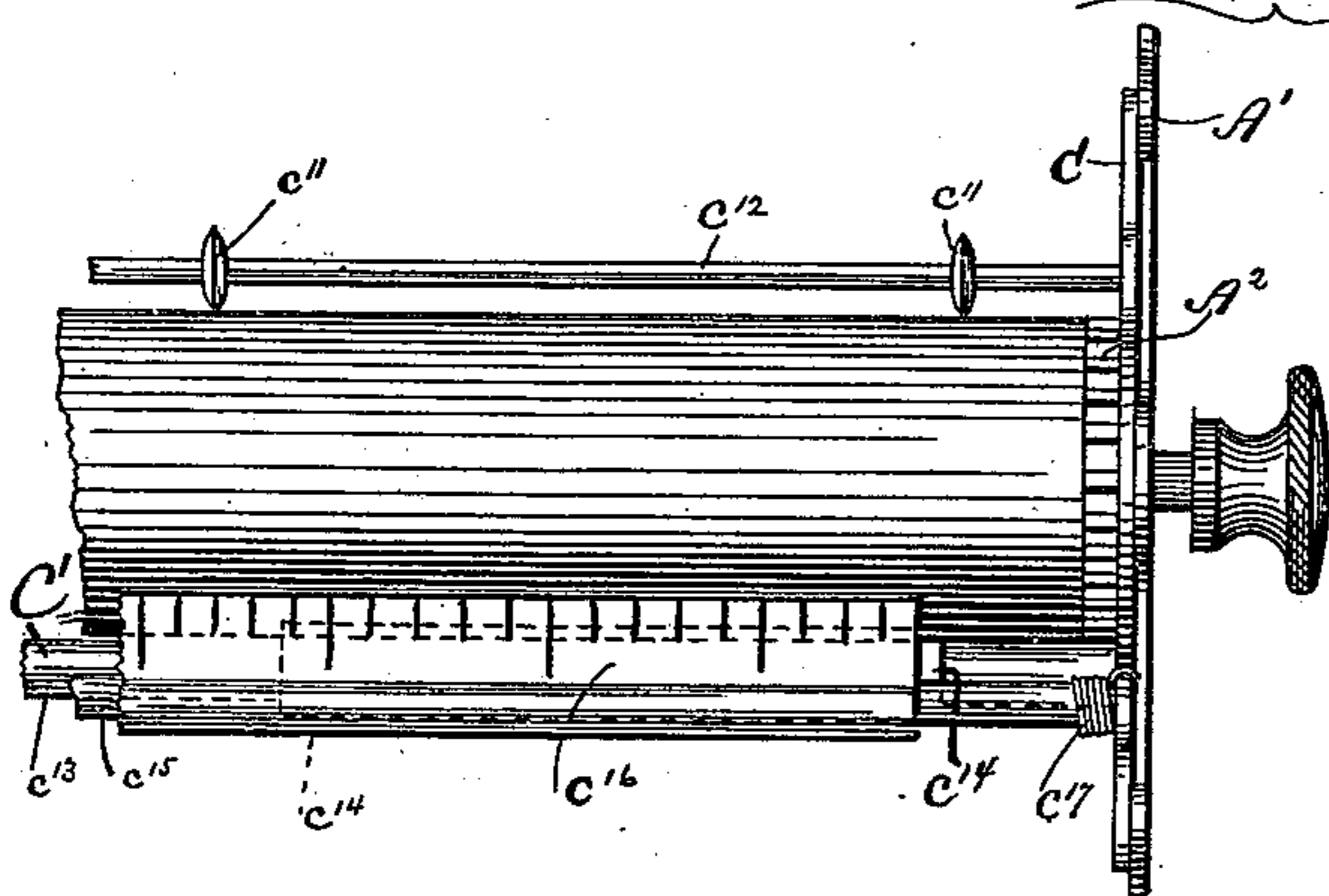
*Fig. 6.*



*Fig. 4.*



*Fig. 7.*



Witnesses.  
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(No Model.)

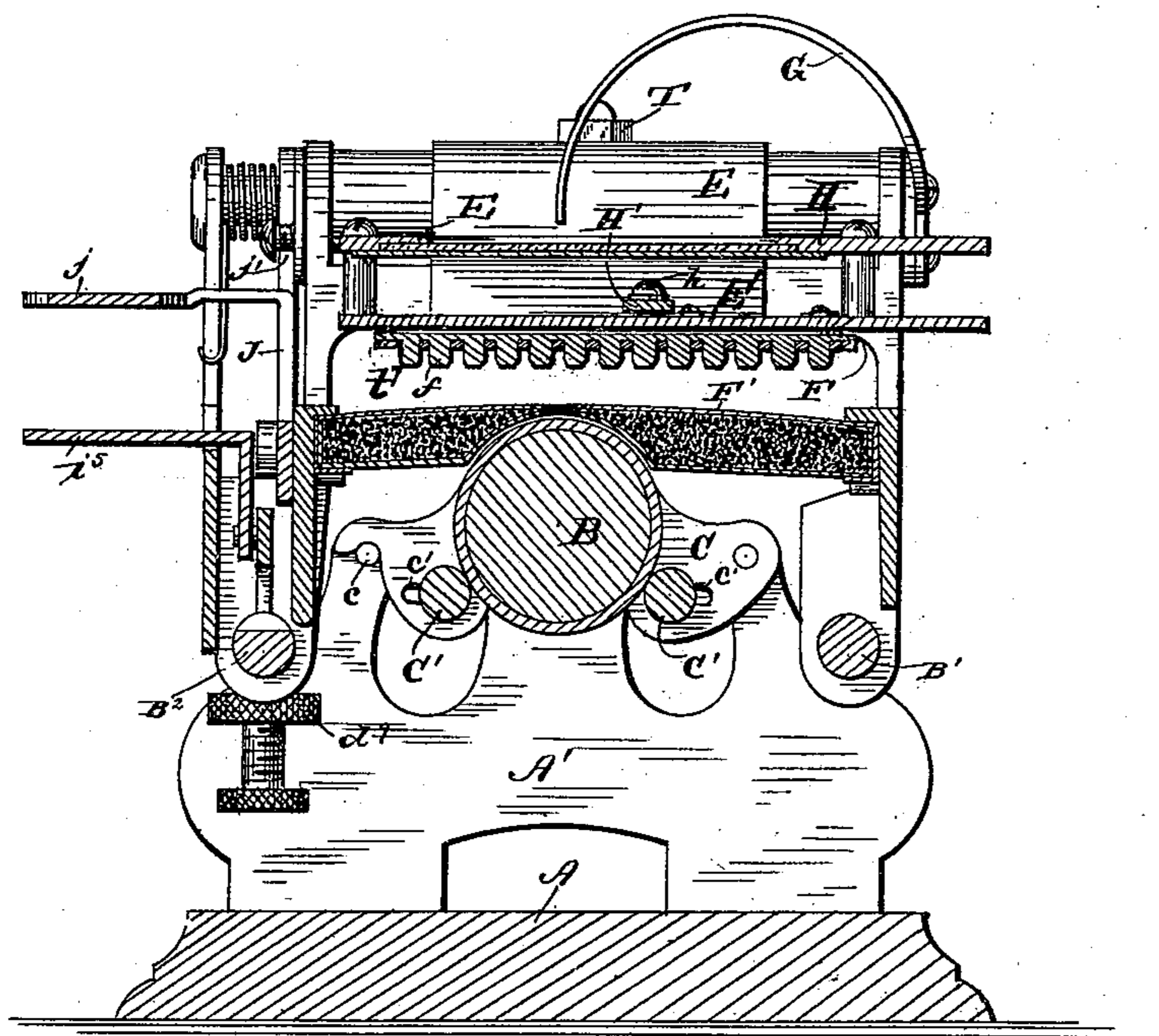
3 Sheets—Sheet 3.

R. E. MORRIS.  
TYPE WRITING MACHINE.

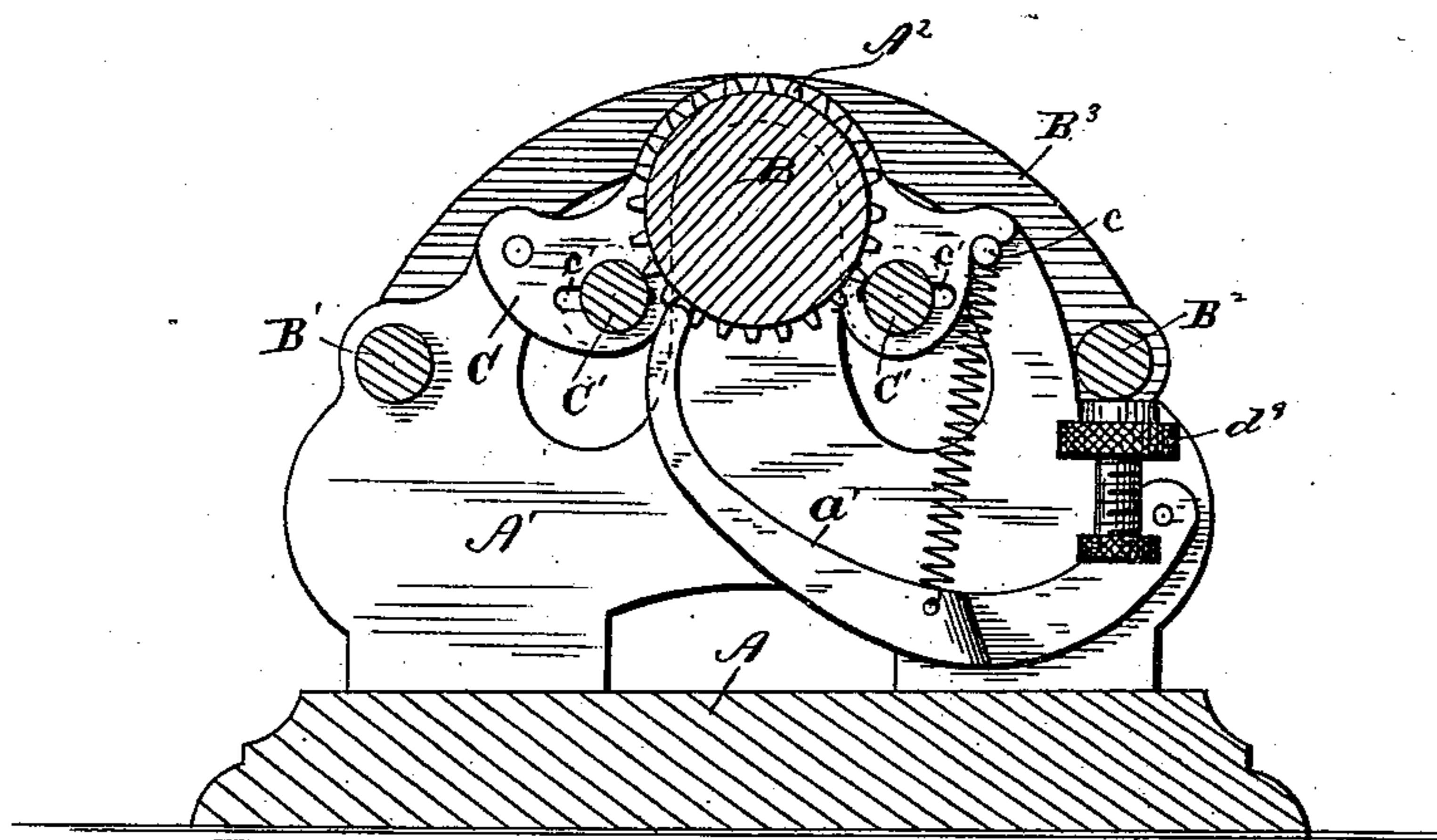
No. 355,703.

Patented Jan. 11, 1887.

*Fig. 8.*



*Fig. 9.*



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# UNITED STATES PATENT OFFICE.

ROBERT ERASTUS MORRIS, OF WICHITA, KANSAS.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 355,703, dated January 11, 1887.

Application filed June 14, 1886. Serial No. 205,093. (No model.) Patented in England February 1, 1886, No. 1,454.

*To all whom it may concern:*

Be it known that I, ROBERT ERASTUS MORRIS, of Wichita, in the county of Sedgwick and State of Kansas, have invented certain new and useful Improvements in Type-Writing Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to certain improvements in that class of type-writers or printing-machines described in my application No. 171,773; and it consists in certain novel combinations, constructions, and arrangements of parts, as hereinafter described, and pointed out in the claims, whereby the machine is simplified and its operation improved.

In the accompanying drawings, Figure 1 is a plan, and Fig. 2 a side elevation, of my improved machine. Fig. 3 is an end view of the same. Fig. 4 is a detached view of the feeding devices. Fig. 5 is a diagrammatic view of the type-plate. Fig. 6 is a detached view of the devices for actuating or setting the type-plate. Fig. 7 illustrates a modified but preferred form of holding devices. Fig. 8 is a sectional view taken on the line  $x x$  of Fig. 1, looking toward the left; and Fig. 9 is a view of one of the end plates, showing the roller in section and the pawl for limiting the motion of the roller.

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

Upon a bed-plate, A, two standards or uprights, A', are erected, each provided with a central bearing,  $a$ , to receive the journals of the roller B, which latter is furnished with a notched or toothed disk, A<sup>2</sup>, co-operating with a spring-pawl,  $a'$ , serving to determine the feeding movement and to hold the roller in adjusted position. The two uprights A' are also connected by rods or bars B' B<sup>2</sup>, lying parallel to each other and to the roller B, one of said bars, B', being journaled in the uprights, while the other, B<sup>2</sup>, is supported in open bearings  $b$ , and rests upon set-screws  $b^9$ , whereby the height of the printing mechanism above the roller B is adjusted, as hereinafter explained. The bars B' B<sup>2</sup> are connected together at each end by plates B<sup>3</sup>, which

serve to maintain the bars in their proper relative positions when the frame composed of the bars B' B<sup>2</sup> is raised to uncover the roller, the bar B' operating as the pivot upon which the frame turns when thus elevated. A latch may be employed, if desired, for retaining the bar B<sup>2</sup> in the open bearings during the printing operation, to prevent the accidental raising of the frame, and pins  $b^{15}$  on the uprights A' engage lugs or projections  $b^{17}$  on the plates B<sup>3</sup>, to sustain the frame when thrown back.

Pivoted to the inner faces of both uprights A', at a point in rear of the roller B, is a yoke, C, whose front may, if desired, rest upon a pin or shoulder,  $c$ . These yokes C are formed with elongated slots or bearings  $c'$ , on opposite sides of the roller B, to receive the journals of the smaller rollers, C', the latter being provided with pulleys  $c^2$  at each end, over which are placed elastic belts or bands  $c^3$ , uniting the corresponding ends of the rollers C'.

The rollers C', preferably located slightly below the axis of roller B, are held firmly in contact with the paper by means of the elastic bands  $c^3$ , the latter also serving to insure the simultaneous rotation of both of said rollers when the roller B is rotated to feed the paper forward, and thereby insure the proper advance of the latter. The yokes C, carrying the rollers C', being pivoted to the standards, as described, can be raised above the roller B, to facilitate the insertion or removal of the paper, the rollers C' yielding laterally to pass the roller B. The rollers C', being impelled toward each other by elastic pressure devices when mounted in the yoke C, below the center of the roller B, as described, operate to hold the yokes pressed down, and at the same time to hold the paper tightly down over the roller B; but, if desired, catches may be applied to the yokes for holding the rollers C' in contact with the paper and the roller B, as will be readily understood.

It is not essential to the operating of the paper-holding mechanism that both of the rollers C' should be thus mounted in slotted bearings, nor that belts should be employed for effecting a simultaneous rotation of said rollers, as it is found in practice to be sufficient if one of the rollers C' be thus sustained in slotted bearings and provided with springs for pressing it toward the roller B in such man-

ner that as the yokes C are brought down the movable roller C' will be forced back as it passes the center of roller B, and will be forced inward toward and against the roller B after passing the center of the latter, and thus not only press and hold the paper, but also retain the yokes down in position. Such a modification of the paper-holding device is shown in Fig. 7, wherein the front roller C' only is mounted in the slotted bearings in the yoke C, while the rear roller is replaced by a series of loose rings or disks,  $c^{11}$ , mounted upon a rod,  $c^{12}$ , secured to the yokes C. The rod  $c^{12}$  is sufficiently elastic to cause the rings  $c^{11}$  to be held in yielding contact with the paper on roller B when the yokes are turned down.

The roller C' is composed of a stiff bar or rod,  $c^{13}$ , provided near each end with an elastic covering,  $c^{14}$ , which bears against the paper when placed on roller B at or near the opposite edges without touching the central portion, whereby a more even and uniform motion of the paper is obtained. Above the rod  $c^{13}$  is arranged a second rod,  $c^{15}$ , secured at each end in one of the yokes C, and provided with a plate,  $c^{16}$ , upon which is marked a scale whose divisions correspond with the spaces in the feeding mechanism, said scale serving to locate the letters as printed. Springs  $c^{17}$  are arranged to bear upon the ends of the rod  $c^{13}$ , so as to press the latter toward the roller B, as described.

The devices thus far described constitute an efficient and convenient mechanism for holding and adjusting the paper during the printing operation, which latter is preferably performed by devices, such as hereinafter described, supported upon the rods B' B<sup>2</sup>, and adapted to be reciprocated thereon longitudinally of the roller B; but other forms of printing mechanism may, as is obvious, be advantageously used therewith.

Located above and extending across the roller B is a frame, D, resting upon but free to slide longitudinally of the bars B' B<sup>2</sup>, said frame carrying the printing and feeding mechanism.

The printing mechanism is constructed and applied as follows: At one end of the frame D is journaled a roller, D', lying transversely across and above the roller B, and upon the axis of this roller D' is hung a yoke, D<sup>2</sup>, carrying a pin,  $d$ , provided with a head or nut, T. Resting upon the roller D', and with the pin  $d$  projecting through a longitudinal slot,  $e$ , is a plate, E, the opposite or forward end, E', whereof is widened and depressed to bring it nearer the roller B. The plate E is thus rendered adjustable both radially and laterally about the pin  $d$ , and is free to vibrate upon the axis of roller D' to elevate and depress the end E', said roller being mounted upon the axis of the yoke D<sup>2</sup>, and serving to diminish the friction of the plate E thereon when the former is reciprocated back and forth, as hereinafter explained.

The type-plate F, provided with separate

impression-faces or type,  $f$ , preferably composed of rubber or other yielding material, is attached to the lower surface of the extension  $e'$  of plate E, and above the latter are formed or affixed a series of characters corresponding to those of the types  $f$ , both as to their relative arrangement on the plate F and their assigned form or value, said series of characters constituting an index.

Mounted upon or secured to the top plate,  $d^6$ , of the frame D, and beneath the faces of the type, is an inking-surface, F', with which, as the plate E is moved, the type are brought into contact, and in said plate  $d^6$  and the pad thereon, immediately above the roller B, is formed an opening,  $d^7$ , through which the type are projected, one at a time, as the plate E is depressed.

The inking-surface F' may consist of a pad or strip of some suitable textile fabric—such as the ordinary inking-ribbon—stretched upon the plate or frame  $d^6$ , so that as the type-plate is oscillated and depressed during the operation of printing, the faces of the type will be brought down upon said inking surface or pad.

To the frame D is secured a pointer, G, whose end is carried over and above the index E<sup>8</sup> on the plate E', so that when any given character upon the index is brought under the end of the pointer the corresponding type will stand above the opening  $d^7$  and in position to be impressed upon the paper lying upon the roller B.

In order to insure the proper alignment of the characters in printing and to guide and position the plate E as the impression is made, a tapered pin,  $g$ , is secured to the frame D below the plate E', and the latter is provided with a series of holes,  $g'$ , corresponding in number and relative position to the types  $f$ , so that when said plate is depressed the pin  $g$  will enter one of the holes  $g'$ .

The plate E' is provided with a knob, E<sup>3</sup>, or other convenient form of handle, to facilitate the manipulation of the plate back and forth or from side to side, to bring the different types into position and to impress them upon the paper.

The type are preferably applied to the plate in curved lines, and they may be arranged either upon concentric arcs or upon a series of arcs having the same radius, and in either case each individual letter or character should be so disposed that it will stand at right angles to a line drawn from the center of oscillation and passing through the said type when the latter occupies its printing position above the opening  $d^7$ . By such arrangement the distance to be traversed by the type-plate in locating each letter is reduced; but, as is obvious, the type may be arranged in any order desired in parallel, radial, segmental, or other form, so long as each type when brought to the impression-point will stand in proper relation to the line of printing, the registering device and index being correspondingly modified.

In order to enlarge the capacity of the machine without materially increasing its size, and to provide for the ready removal of the type-plate and the substitution of others bearing the same or dissimilar styles of type, the type-plate F is removably applied to the plate E, and is provided with two or more series of type—such as capitals and small letters or type of different sizes or shapes—and provision is made whereby the type-plate can be shifted upon the plate E', and with respect to the registering devices and index-plate, so that one set of type may replace the other. To accomplish this effect the type-plate is supported beneath the plate E upon screws or bolts *h*, passing through curved slots *h'* in said plate E.

Beneath a plate, H, serving as a cover to the end of plate E, and in which the index is supported, is pivoted a lever, H', having a knob or handle, *h*<sup>2</sup>, projecting through an arc-shaped slot in said plate H, and normally held at one extreme of the slot by a spring, *h*<sup>3</sup>. The opposite end of the lever H' is slotted to receive one of the bolts *h* secured to the type-plate. By means of the lever H' the type-plate can be moved, and its position upon the plate E shifted, so as to bring another set of characters within the range of the printing-orifice, index, and registering devices. After each letter or other character has been impressed it is necessary to move the printing mechanism toward the right a distance equal to the width of the character, in order that the next succeeding letter may be impressed. With printing devices such as described, either the support for the paper or the frame or carriage may be moved; but I prefer to reciprocate the printing mechanism longitudinally of the support, and to this end the feed-controlling devices are located upon the frame and operate to advance the latter a determinate distance as each character is impressed, as follows: One of the bars upon which the frame D is mounted, and preferably the front bar, B<sup>2</sup>, is furnished with a series of teeth, I, and upon the side of the removable plate D<sup>9</sup>, applied to the frame D, is pivoted at *i* a link or lever, I', provided at one end with a tooth, *i'*, engaging the rack I, and at the opposite end with a stud, *i*<sup>2</sup>. The lever I' is normally held down into engagement with the rack by a spring, *i*<sup>3</sup>. To the lever I', and in front of its pivot, is hung a pawl, I<sup>2</sup>, whose free end projects backward, and a second pawl, I<sup>3</sup>, standing in the same direction as pawl I<sup>2</sup>, is hung upon the axis of the lever I'. Pivoted to the pawl I<sup>3</sup> is a lever, I<sup>4</sup>, carrying a thumb-piece, *i*<sup>5</sup>, and a slotted extension, *i*<sup>4</sup>, working loosely upon a pin, *i*<sup>6</sup>, on pawl I<sup>2</sup>.

At the end of the roller D', and upon the axis thereof, is hung a lever, J, whose outer end projects above the stud *i*<sup>2</sup> of the lever I', and is provided with a thumb-piece, *j*, located above the thumb-piece *i*<sup>5</sup> of lever I<sup>4</sup>. Upon said lever J, and near its pivot, is formed a shoulder, *j'*, to engage a pin, *j*<sup>2</sup>, on an extension of the yoke D<sup>2</sup>.

The operation of the devices as thus constructed is as follows: When the machine is not in operation the tooth *i'* of the lever I' engages the rack to prevent the forward movement of the printing devices, and the pawls I<sup>2</sup> I<sup>3</sup>, also engaging the rack, prevent movement in the opposite direction. If, now, the printing-plate is depressed to force the type down and into contact with the paper, it will operate through the bolt T on the yoke D<sup>2</sup> to elevate the latter and depress the pin *j*<sup>2</sup>, which is attached in front of the pivot. As the pin *j*<sup>2</sup> is thus depressed it bears against the shoulder *j'* and forces the lever J down and into contact with the stud *i*<sup>2</sup> of the lever I', depressing the rear end and elevating its forward end until the tooth *i'* is withdrawn from contact with the rack, and the point of the pawl I<sup>2</sup> is advanced a distance equal to one or more teeth of the rack, depending upon the amount of feed desired. After the type has been brought into contact with the paper and the plate is elevated the lever I' is forced back to its first position by the spring, and as its forward end descends, the pawl I<sup>2</sup> having taken a new position upon the rack in advance of that previously occupied, the whole frame is pushed forward until the tooth on said lever I' again strikes the rack and locks the frame in position preparatory to the printing of the next succeeding character. By means of the thumb-piece on the lever J this feeding motion can be effected without depressing the type-plate, and thus the spacing between words can be accomplished; and when it is desired to move the frame back or forth to position it, by pressing the two thumb-pieces together not only will the lever I' be actuated and its engaging end freed from the rack, but the pawls I<sup>2</sup> I<sup>3</sup> will likewise be elevated and held above the rack, so as to release the frame.

The feeding devices, as described, being mounted upon the reciprocating frame and above the guide-rods, it does not in any way interfere with the raising or tilting of the frame upon the rear guide-bar, as before described.

The type-plate F, which, as before described, is designed to be removably attached to the plate E', is preferably provided with a series of separate type or impression surfaces of rubber or other elastic material united upon a back piece or plate in the usual manner. As, however, it is difficult in making such a plate to secure the exact spacing of the characters necessary in a machine of this kind, and is equally difficult to retain such a plate, if elastic, in position to insure the proper registering of the characters with the index, I have devised an improved arrangement of parts for holding the type-plate firmly in position in the plate E', and at the same time determine the proper relative position of each type. To this end I provide a plate, *t'*, with a series of holes or openings corresponding exactly in their relative position to the type and the index. The plate *t'* is secured to the plate E by screws

or other form of clamping devices which will insure the proper location of the parts, and the type-plate F is inserted between this plate  $t'$  and the under surface of the plate E', with the type or impression surfaces projecting through the openings in said plate  $t'$  and extending beyond the face of the latter. By this means each type is properly located with respect to the index and impression point, the plate  $t'$  serving as a gage for this purpose, and by tightening up the screws or other clamping mechanism the plate F is held firmly in position on the plate E'.

The inking pad or surface, instead of being made rigid, is composed of or mounted upon an elastic cushion, so that the latter may yield when the type-plate is depressed, as shown in Fig. 8.

I claim as my invention—

1. In a type-writer, such as described, the combination, with the uprights and paper-feeding roller, of the holding-rollers, located below the center of the supporting-rollers, mounted in pivoted yokes, and pressed toward each other and held in contact with the paper by spring-pressure, substantially as described.

2. The combination, with the paper supporting and feeding roller and the pivoted yokes supported at each end of said roller, of the holding-rollers supported in said yokes and movable toward and from the first-mentioned roller and the elastic bands applied to and connecting the corresponding ends of the two holding-rollers and operating to draw these together and cause their simultaneous rotation, substantially as described.

3. The combination, with the paper-supporting roller and the holding-rollers mounted upon pivoted yokes, of the pivotally-attached reciprocating printing mechanism supported upon bars or ways parallel with the first-mentioned roller, substantially as described.

4. The combination, with the paper-supporting roller and the longitudinally-reciprocating printing devices pivoted to one side and extending above the roller, of the yokes, also pivoted to one side, having the slots, the holding-rollers mounted therein, and the elastic bands for drawing the holding-rollers toward the supporting-roller, substantially as described.

5. The combination, with the supporting-roller and its standards, of the parallel rods forming ways upon which the printing mechanism is reciprocated, said rods being connected by yokes and supported the one in closed and the other in open bearings in the standards and on opposite sides of the roller, substantially as described.

6. The combination, with the reciprocating frame carrying the printing mechanism mounted upon the guide-rods, of the lever pivoted to the frame and provided with a tooth and pawl for engaging rack-teeth on one of the guide-rods and the spring for returning the said lever to its starting point after it has been raised, whereby the frame is advanced a

determinate distance at each reciprocation of the lever and locked in position for printing the next succeeding character, substantially as described.

7. The combination, with the movable plate carrying the type-plate and the yoke to which it is pivoted, of the lever provided with a shoulder engaging a pin upon the said yoke, said lever engaging the pivoted lever when the type-plate is depressed to cause the tooth on said lever to be raised from the rack-bar and the feeding-pawl to advance, substantially as described.

8. The combination, with the frame and its pivoted yoke, of the plate carrying the type attached to the yoke, so as to be capable of an oscillating and radial movement with respect thereto, substantially as described.

9. The combination, with the radially movable and oscillating plate carrying the type, of the yoke to which said plate is attached, pivotally mounted on the frame, and the roller supported upon an axis coincident with the pivots of the yoke to sustain the said movable plate and permit of its adjustment and vibration, substantially as described, and for the purpose set forth.

10. The combination, with the pivoted yoke and the plate pivotally supported so as to be free to move radially thereon, of the type-plate and index attached to said movable plate and the pointer co-operating with the index for properly locating the type, substantially as described.

11. The combination, with the plate movable with respect to the printing position, of a type-plate adjustably attached to said movable plate, so as to permit different sets or series of characters to be employed, substantially as described.

12. The combination, with a movable plate by which the characters to be printed are located and impressed at a given point, of a plate provided with a plurality of sets or series of characters movably attached to said first-mentioned plate and an index common to both sets of type for locating corresponding characters, substantially as described.

13. The combination, with a plate movable radially with respect to its center of oscillation, an index attached to said plate, and a pointer co-operating with said index, of a type-plate attached to said movable plate and adjustable thereon in the arc of a circle to bring the several sets of type into proper relation to the pivot and the index, substantially as described.

14. The combination, with the movable plate and the type-plate adjustably secured thereto and bearing a plurality of sets of characters, of the lever pivoted upon the movable plate and engaging the type-plate to adjust the latter, substantially as described.

15. The combination, with the plate carrying the type-plate connected to a pivoted yoke so as to move radially and laterally with respect to its point of attachment, of a lever for oper-

ating the feeding mechanism connected to the yoke, substantially as described, so as to be actuated thereby when the type-plate is depressed, but free to move independently of said yoke, substantially as described.

16. The combination, with the pivoted lever provided with the tooth and pawl engaging the rack, the retaining-pawl, and the lever loosely connected to both of said pawls, of the lever for actuating the first-mentioned lever, whereby the pawls and lever can be simultaneously raised out of contact with the rack, substantially as described.

17. The combination, with the lever pivoted upon the reciprocating frame and provided with the forwardly-projecting tooth and oppositely-projecting pawl for engaging the rack and the retaining-pawl hung upon the pivot of the lever, of the lever loosely connected to both of said pawls and operating, when raised, to elevate both pawls above the rack, substantially as described.

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