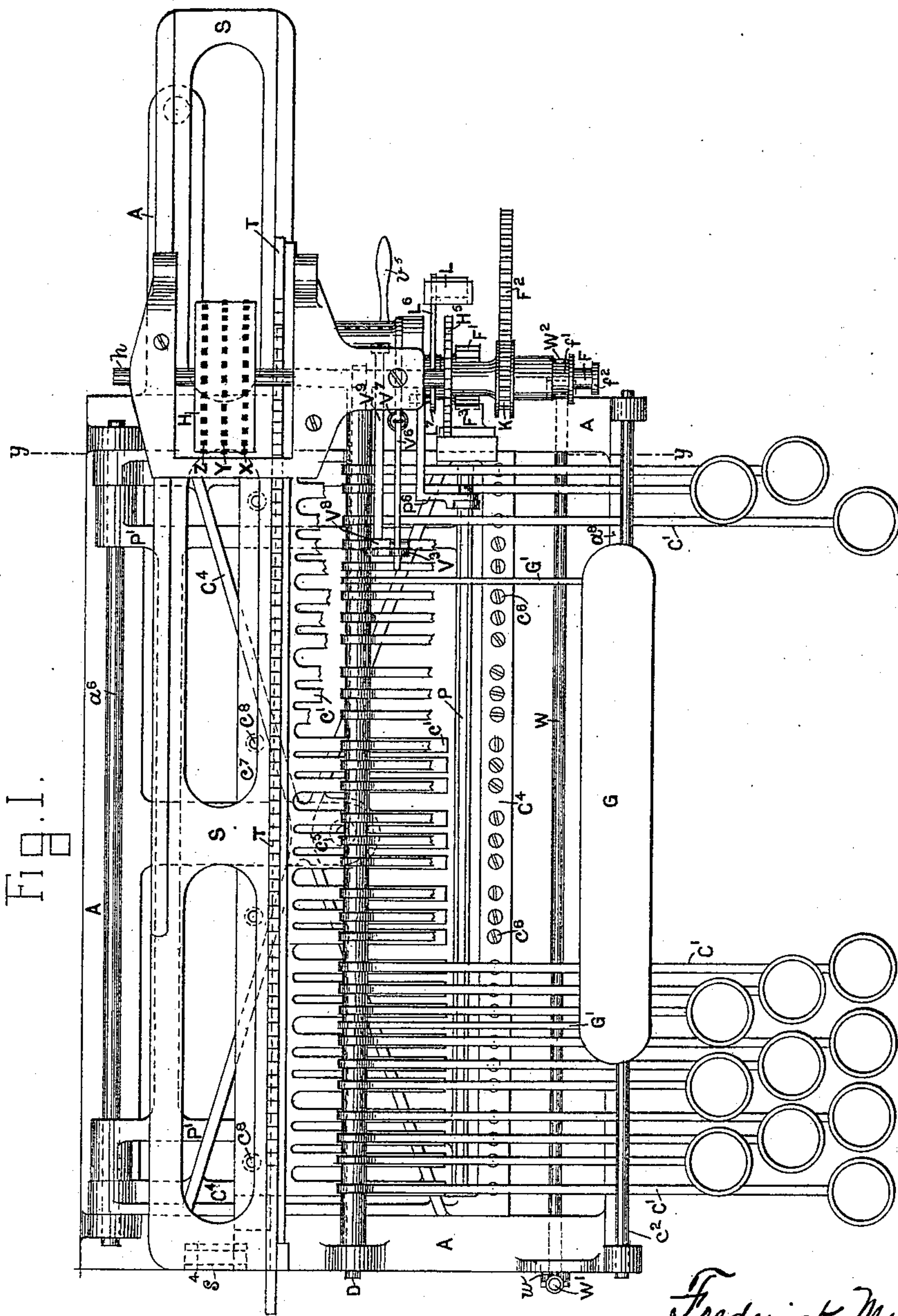


4 Sheets—Sheet 1.

No. 441,687.

Patented Dec. 2, 1890.



Witnesses

James F. Duhamel  
Horace A. Dodge

Frederick Myers  
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By Rodger Lons,  
Attys.

(No Model.)

4 Sheets—Sheet 2.

F. MYERS.  
TYPE WRITING MACHINE.

No. 441,687.

Patented Dec. 2, 1890.

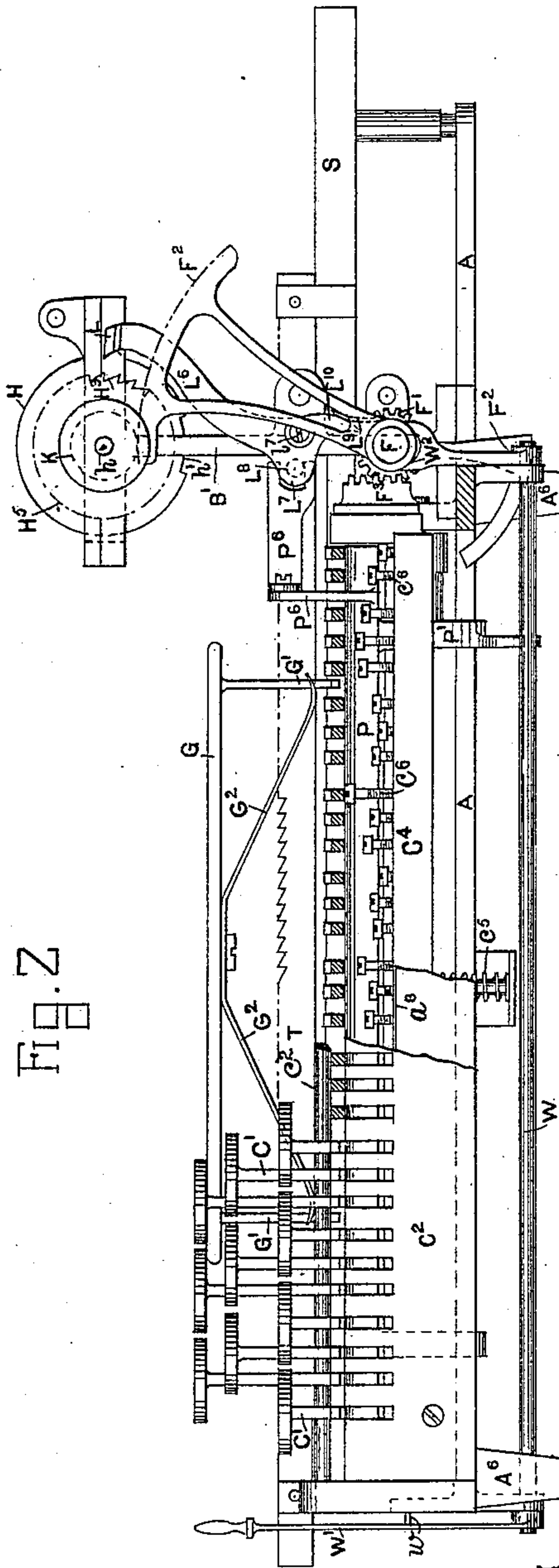


Fig. 2

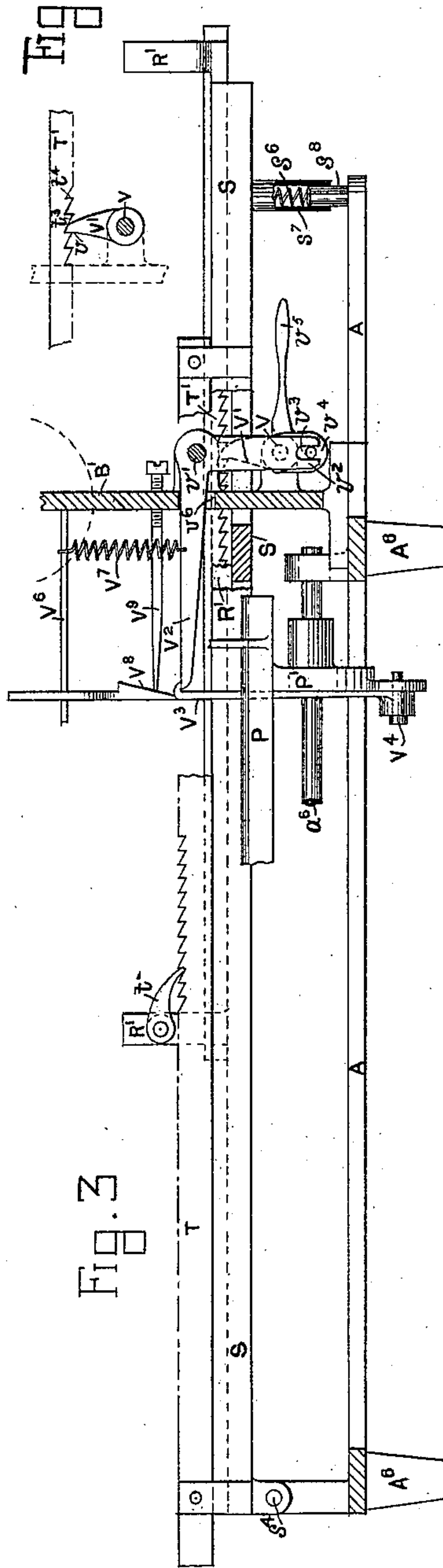


Fig. 3

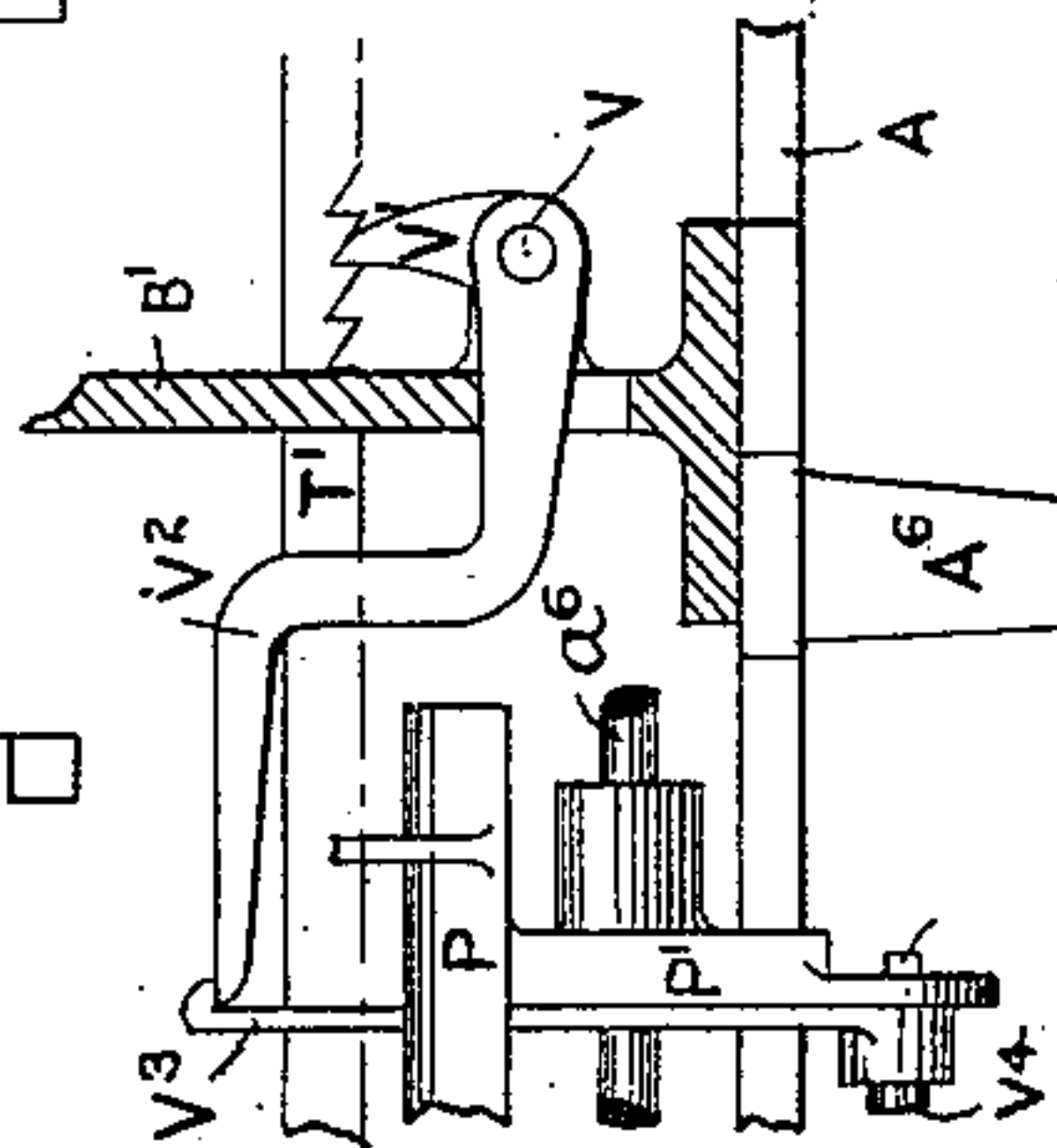


Fig. 4

Witnesses

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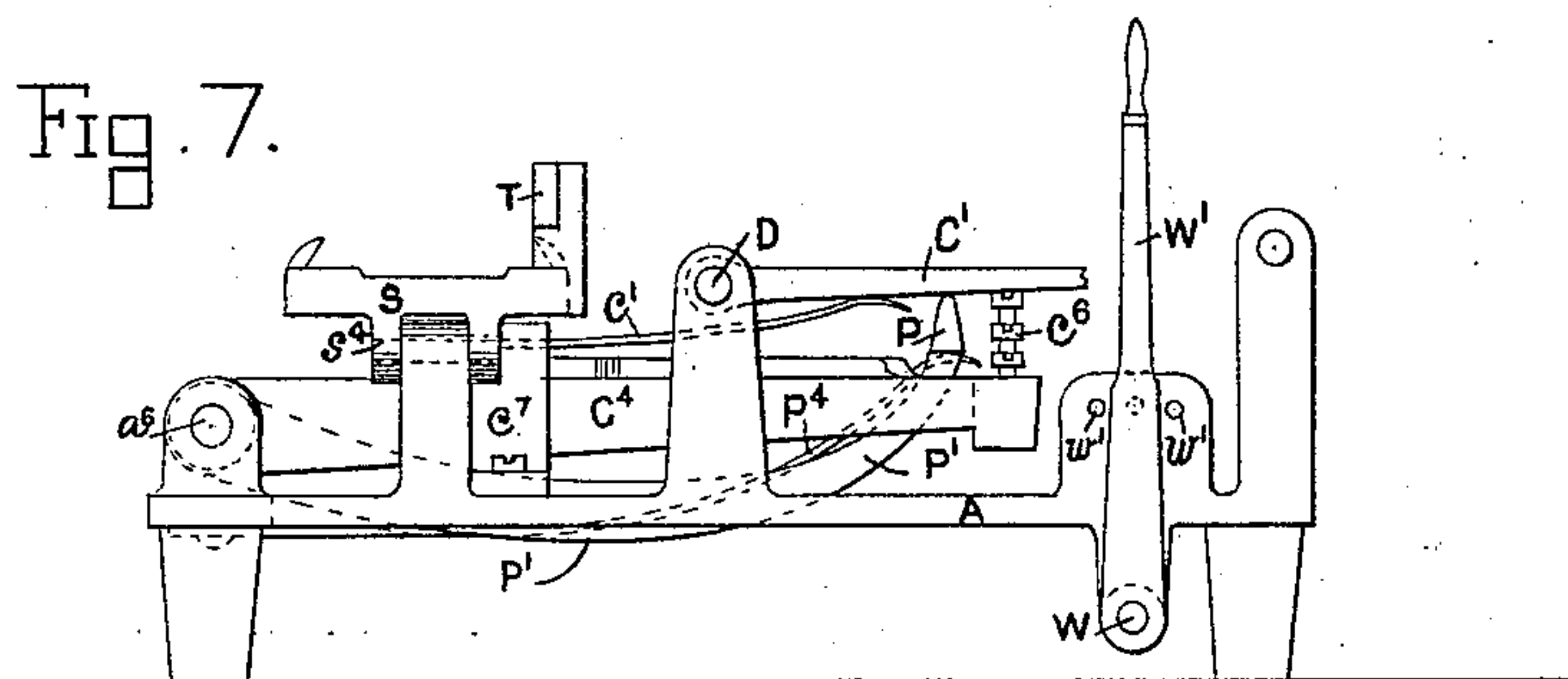
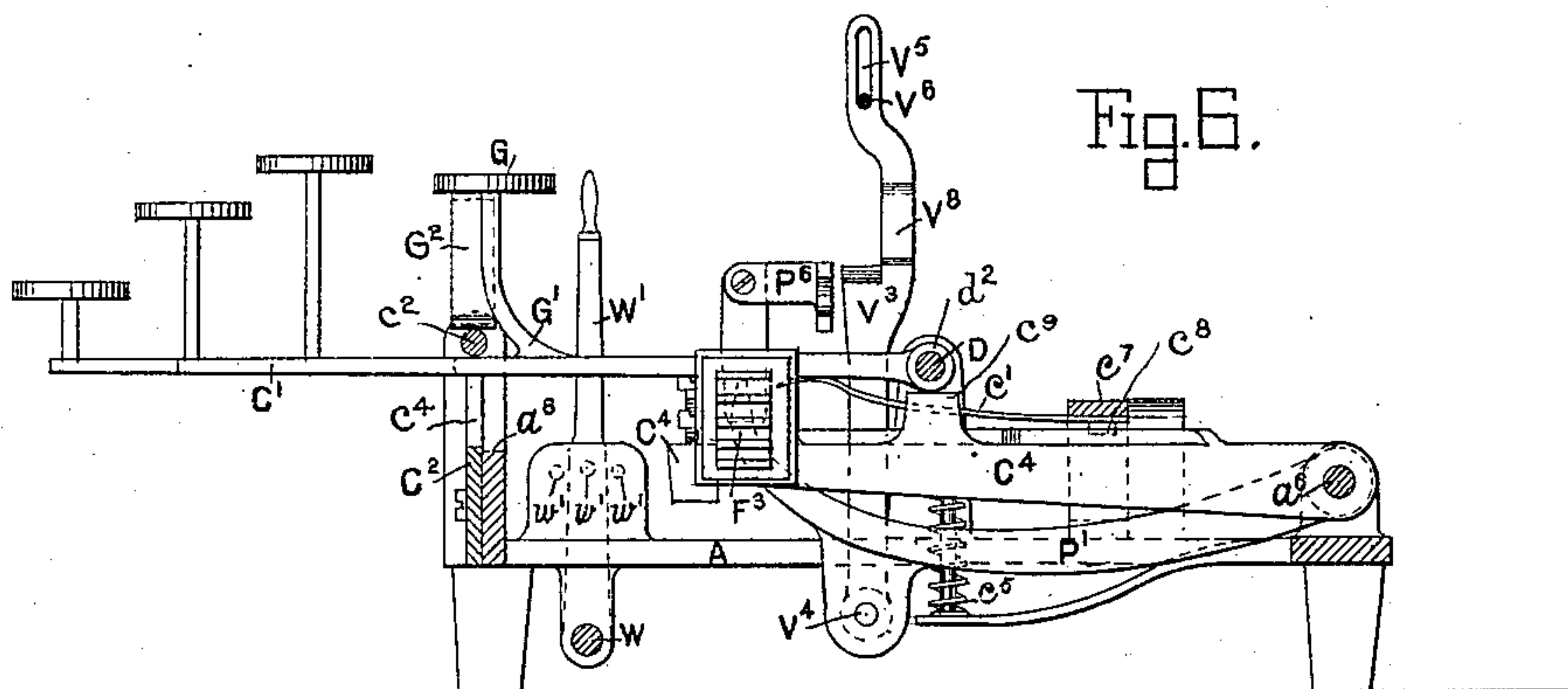
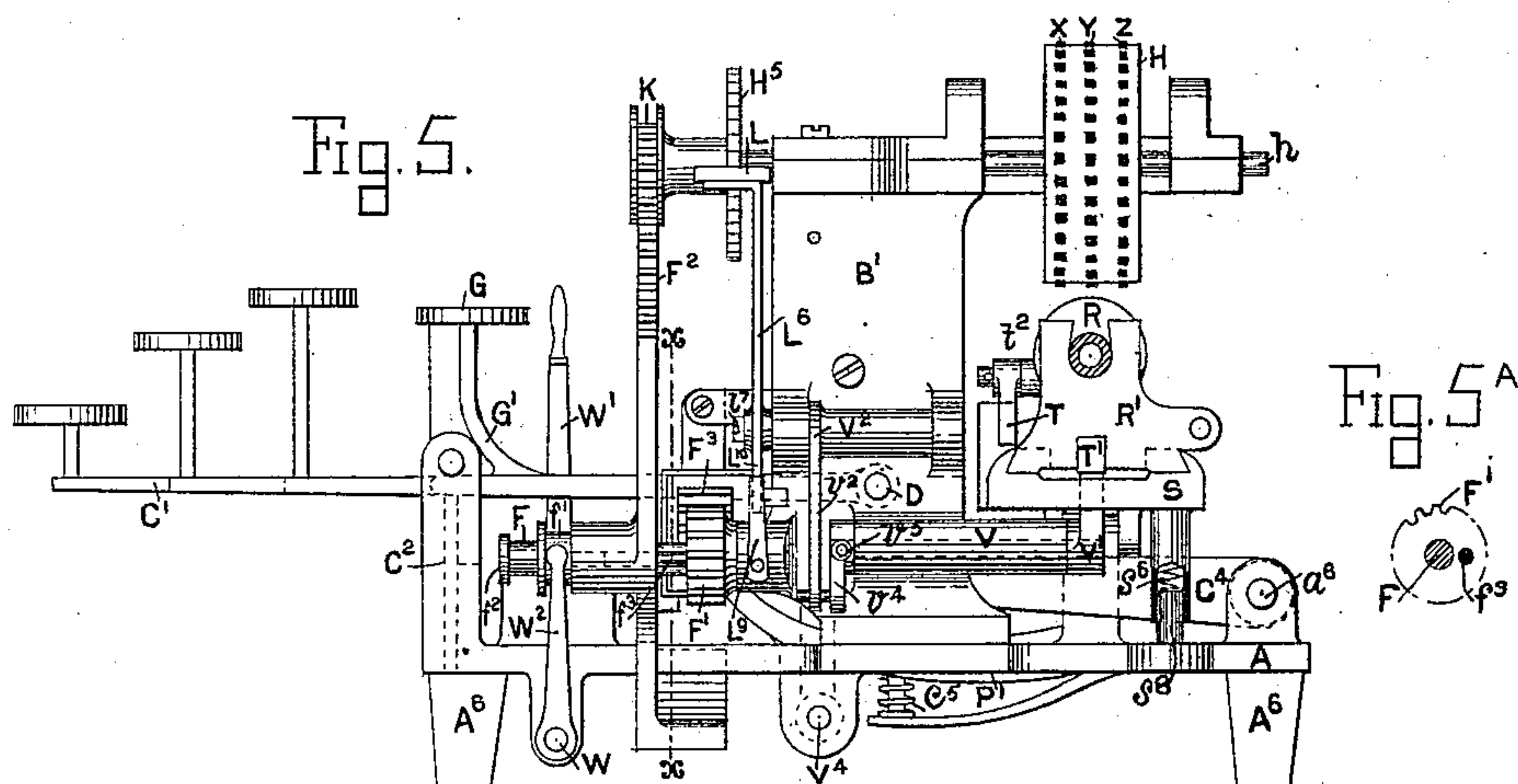
(No Model.)

4 Sheets—Sheet 3.

F. MYERS.  
TYPE WRITING MACHINE.

No. 441,687.

Patented Dec. 2, 1890.



Witnesses

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(No Model.)

4 Sheets—Sheet 4.

F. MYERS.  
TYPE WRITING MACHINE.

No. 441,687.

Patented Dec. 2, 1890.

FIG. 9

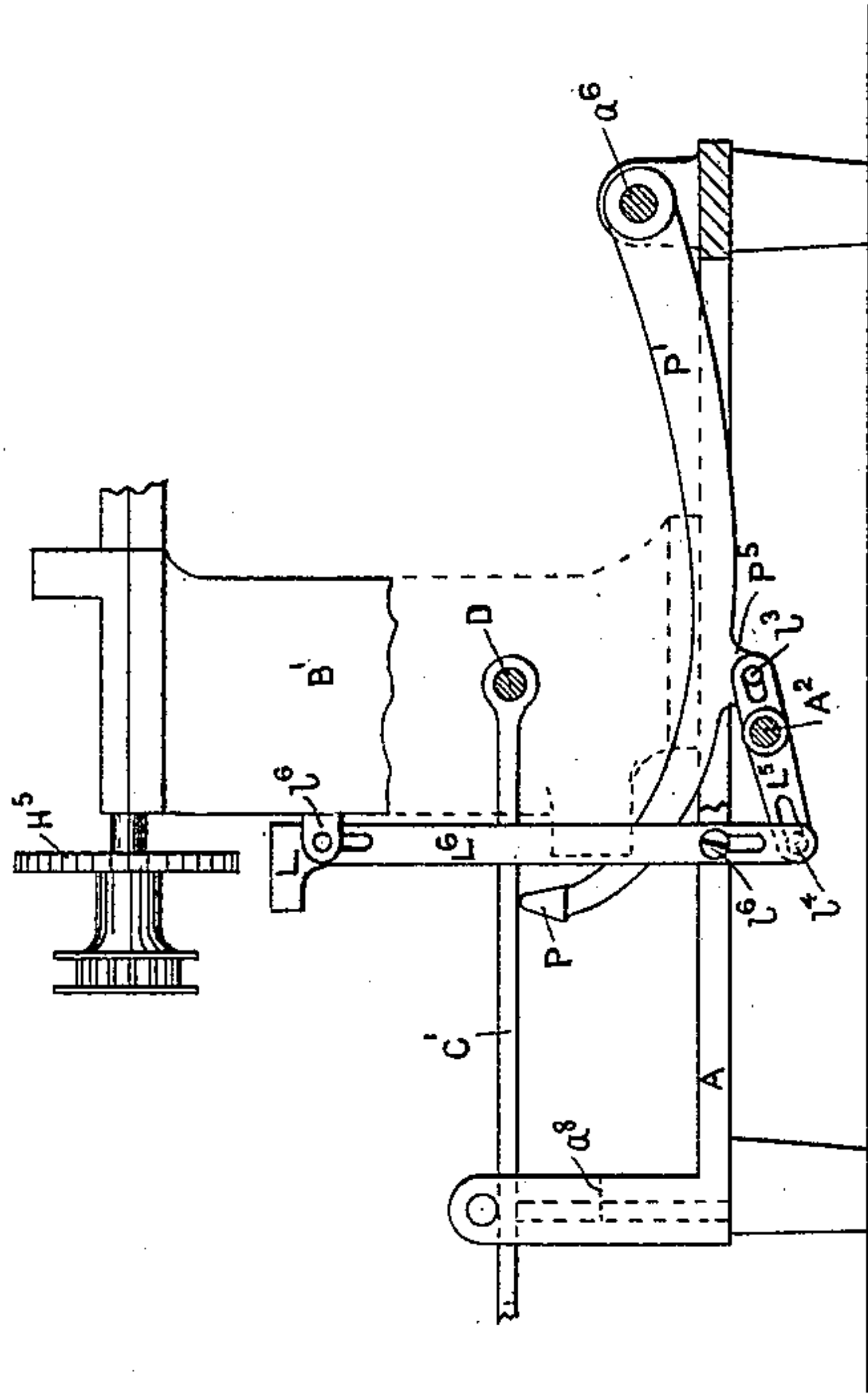
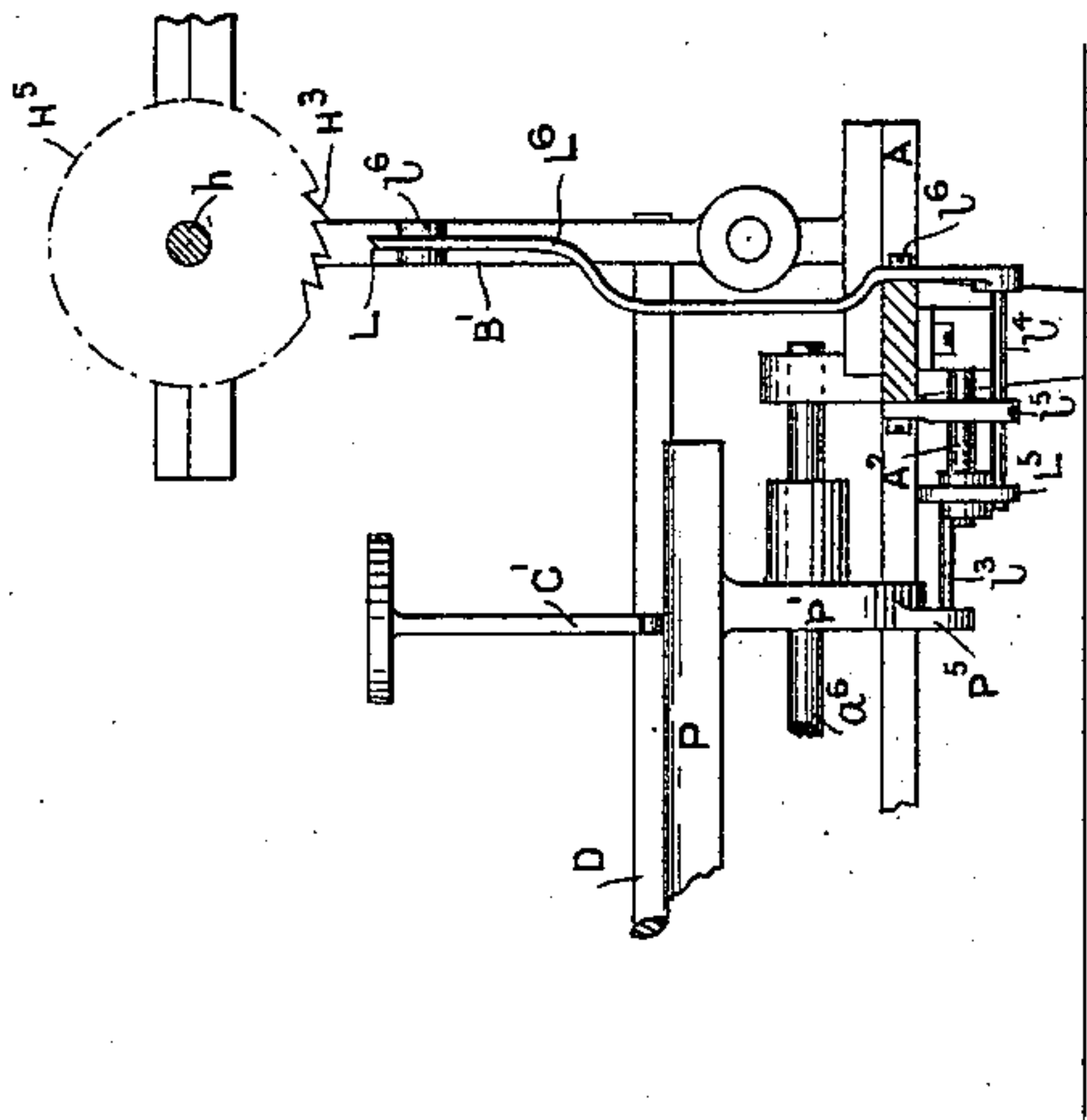


FIG. 8



Witnesses

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# UNITED STATES PATENT OFFICE.

FREDERICK MYERS, OF LIVERPOOL, COUNTY OF LANCASTER, ENGLAND.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 441,687, dated December 2, 1890.

Application filed November 29, 1889. Serial No. 331,972. (No model.) Patented in England November 23, 1888, No. 17,041; in Austria-Hungary April 3, 1889, No. 3,468 and No. 12,668; in France May 22, 1889, No. 198,406, and in Belgium May 22, 1889, No. 86,324.

*To all whom it may concern:*

Be it known that I, FREDERICK MYERS, engineer, a citizen of the United States, residing at Liverpool, in the county of Lancaster, in the Kingdom of England, have invented certain new and useful Improvements in Type-Writing Machines, (for which I have received Letters Patent in England, No. 17,041, dated November 23, 1888; in France, No. 198,406, dated May 22, 1889; in Belgium, No. 86,324, dated May 22, 1889, and in Austria-Hungary, No. 3,468 and No. 12,668, dated April 3, 1889,) of which the following is a specification.

This invention relates to that kind of type-writing machines in which the type are arranged above the paper carriage or platen upon the peripheries of one or more vertical disks, the said disks or each disk (if there be more than one) being rotated into a given position for each type thereon, the relative amounts of such rotation depending upon the relative distances to which the key-levers or mechanism connected therewith are or is depressed. Certain portions of the mechanism are, however, applicable to type-writing machines other than the above.

The machine herein described is in some respects similar to that set forth in my pending applications, Serial Nos. 317,689 and 326,277; and the present invention relates more especially to the adjustment and operation of the platen and its supporting-bed, to the longitudinal adjustment and operation of the type-wheel, to the locking of the type-wheel in its exact position for printing, and to various details of construction.

In the drawings, Figure 1 is a plan of the machine, parts being shown broken away and other parts removed. Fig. 2 is a front elevation with parts in section and other parts removed. Fig. 3 is a sectional elevation similar to Fig. 2, showing the mechanism for operating the platen. Fig. 3<sup>a</sup> shows a modification of part of the mechanism depicted in Fig. 3. Fig. 4 is a detached view of a portion of the mechanism shown in Fig. 3. Fig. 5 is an elevation of the right-hand end of the machine, part being in section. Fig. 5<sup>a</sup> is a section on line *x x*, Fig. 5. Fig. 6 is a transverse sectional elevation on line *y y*, Fig. 1.

Fig. 7 is an elevation of the left-hand end of the machine, the key-levers being taken away and the platen and platen-frame removed. Fig. 8 is a front sectional elevation of a modified arrangement of mechanism for locking the type-wheel. Fig. 9 is a side elevation of the mechanism shown in Fig. 8, parts of the framing, &c., being broken away.

A is the main frame of the machine, provided with suitable feet A<sup>6</sup>.

B' is an overhanging standard mounted upon the main frame A, and adapted to support the type-wheel H, &c. The type-wheel H is rigidly secured upon a shaft *h*, which is capable of both a rotary and longitudinal movement in a manner hereinafter described. The type-wheel is located with its periphery in close proximity to that of the platen R below it. The type are arranged upon the periphery of the type-wheel, preferably in three parallel groups X Y Z, in the same manner and for the same purpose as set forth in my aforecited application, Serial No. 317,689.

C' C' are the key-levers, which are each provided with a suitable finger-key, and are all arranged and mounted in a movable manner upon a fixed lever-shaft D, substantially as described in my pending application, Serial No. 317,689. All the levers are capable of the same amount of downward travel, their upward movement being limited by a check-rod *c*<sup>2</sup> and their downward movement by the rib *a*<sup>8</sup> on the main frame, or by the lower ends of the slots in the lever guide-comb C<sup>2</sup>.

*c' c'*, Figs. 6 and 7, are the lever-elevating springs carried by a bridge-piece *c*<sup>7</sup>, and secured thereto by screws *c*<sup>8</sup>, Fig. 1.

The type-wheel pinion K is rigidly fixed to the shaft *h*, and is connected by suitable gearing—such as F<sup>2</sup> F' F<sup>3</sup>, Figs. 1, 2, and 5—with the type-wheel-operating frame C<sup>4</sup>, which is pivoted at its rear edge, as at *a*<sup>6</sup>, to the main frame, and has its front edge lying transversely below the key-levers C'.

*c*<sup>5</sup>, Figs. 5 and 6, is an elevating-spring for the frame C<sup>4</sup>, the upward movement of which is limited by the contact between the sides of the frame and the shaft D or a collar *d*<sup>2</sup> thereon, as seen in Fig. 6.

As set forth in my pending application, Serial No. 317,689.



rial No. 317,689, the front edge of the frame  $C^4$  is provided with a series of striking-points formed by a series of adjustable screws  $c^6$ , which have their upper ends located at various  
 5 distances below the levers  $C'$ , so that each lever will when fully depressed turn the frame  $C^4$ , and consequently the type-wheel H, into a different definite position, such position being  
 10 required to print with the type represented by the depressed key-lever. The spring  $c^5$  returns the frame  $C^4$  and the type-wheel H into their normal positions when a depressed key is released.

The rotative platen R, the sliding platen-frame  $R'$ , the hinged bed S, carrying the same, the word-spacing device  $G G' G^2$ , the spacing-frame  $P P'$ , and the line-spacing and inking mechanisms (not shown in the drawings) are all substantially the same as were described in  
 20 my pending applications, Serial Nos. 317,689 and 326,277, aforesaid. The bed S is hinged on the horizontal pivot  $s^4$  at its end remote from the type-wheel, and its free end is supported normally on a spring  $s^6$ , which also  
 25 takes the weight of the bed off the printing mechanism when the latter is operated. The said spring is inserted into a tubular projection  $s^7$  on the bed and rests upon the upper end of a pin  $s^8$  on the main frame A. The pin  $s^8$  is  
 30 also inserted into the projection  $s^7$ , and serves to prevent lateral movement in the bed as it rises and falls in the manner hereinafter explained.

The spacing-frame  $P P'$  is pivoted at its  
 35 rear edge, as at  $a^6$ , to the main frame, and is held normally with its front edge P in contact with the under sides of all the key-levers by means of an elevating-spring  $P^4$ , Fig. 7. The frame is thus depressed at each depression of a key-lever.

The hinged bed S may be raised (at or during the completion of a key-lever's travel) to perform the printing operation by the following mechanism, which is used in conjunction  
 45 with a modified form of spacing mechanism: The spacing-rack  $T'$  is fixed with its teeth downward on the under side of the sliding platen-frame  $R'$ . A horizontal shaft V, Figs. 3 and 4, lying below the platen-frame  
 50 and at right angles to its axis, carries a more or less upright arm or pawl  $V'$ , whose salient end  $v$  is adapted to engage the teeth in the said spacing-rack  $T'$ . The horizontal shaft V is connected with a second arm  $V^2$ , Figs. 3  
 55 and 5, preferably longer than the first, and lying in an approximately horizontal position. The arm  $V^2$  is mounted upon a pivot  $v'$  above the shaft, as in Fig. 3, and is connected to the shaft by a depending arm  $v^2$ , which forms  
 60 an angle-lever with the arm  $V^2$ , and is provided at its lower end with a slot  $v^3$ , adapted to engage a pin on a short depending arm  $v^4$ , carried by the said shaft V, or the arm  $V^2$  might be cranked downwardly and laterally  
 65 and attached directly to the shaft V, as in Fig. 3<sup>a</sup>. The former arrangement is, however, preferable. The salient outer end of the

horizontal arm  $V^2$  is engaged by a spring-catch  $V^3$ , Figs. 1, 3, and 6, which is mounted  
 70 upon a pin  $V^4$ , moving with the side  $P'$  of the spacing-frame, the catch being preferably extended upward and provided with a slot  $V^5$ , through which a fixed guiding-pin  $V^6$  projects. A spring  $V^7$  or its equivalent returns the shaft V and arms  $V^2$ ,  $v^2$ ,  $v^4$ , and  $V'$  to  
 75 their normal positions after each operation, and a suitable buffer or stop (such as the upper end of the slot  $v^6$ , Fig. 3, in the type-wheel standard  $B'$ ) may be provided to limit the upward movement of the arm  $V^2$  when  
 80 returned by its spring.

The above-combined arrangement works as follows: The side  $P'$  of the spacing-frame on being depressed draws the spring-catch  $V^3$  downward, and the latter, by its engagement  
 85 with the horizontal arm  $V^2$ , turns the shaft V about its axis to such an extent that the upright arm  $V'$  thereon, by reason of the engagement of its upper end  $v$  with the perpendicular face of a tooth on the spacing-  
 90 rack  $T'$ , moves the latter, and consequently the platen, the necessary distance for spacing a character or word. As soon as the platen has been moved into the proper position the spring-catch  $V^3$  is disengaged from the horizontal arm  $V^2$  by means of a suitable device,  
 95 such as by the contact between the inclined part  $V^8$  of the said catch and a stationary (and preferably adjustable) abutment  $V^9$  on the standard  $B'$ . The arms  $V'$ ,  $V^2$ ,  $v^2$ ,  $v^4$  and the shaft V are now forcibly returned to their  
 100 normal positions by the spring  $V^7$ , and the salient end of the upright arm  $V'$ , in sliding over the inclined back  $t^3$ , Fig. 4, of the adjacent rack-tooth, raises the platen, platen-  
 105 frame, and hinged bed a distance sufficient to press the paper on the platen against the type. The bed and platen drop into their normal positions as soon as the extremity of the upright arm reaches the face  $t^4$  of the rack-tooth.  
 110 Any tendency of the rack and platen to move backward on the return movement of the upright arm  $V'$  may be prevented by a check-pawl  $t^2$  on the platen-frame, which engages a fixed check-rack T on the hinged bed, having  
 115 its teeth facing in the reverse direction to the teeth on the spacing-rack  $T'$ . When it is required to withdraw the platen-frame, the pawl  $t^2$  is thrown back, and the upright arm  $V'$  moves forward till it is clear of the rack-  
 120 teeth by raising the handle  $v^5$ , attached to the short arm  $v^4$ .

When the printing is performed by means of the above combined arrangement, it is preferable to leave a blank space or gap  $h'$  in the  
 125 groups of type on the lower side of the type-wheel, in order that the platen, when raised in spacing a word, may not come in contact with the inked type. This raising of the  
 130 platen is due, as in the case of the printing operation hereinbefore described, to the sliding contact which takes place between the inclined back  $t^3$  of the rack-tooth and the point of the upright arm  $V'$  as the platen-



frame is drawn along by the depression of the spring-raised spacing-key G. The latter is carried by the levers G', mounted on the shaft D, and actuates the rack T' and platen-frame in the same manner as the key-levers C'.

The type-wheel may be moved longitudinally by the following arrangement into any of three given positions, so that each of its three groups of type may, as required, be brought directly over the platen. An operating-lever W' is carried by one end of an oscillatory shaft W, Figs. 1, 2, 5, 6, and 7, mounted upon the main frame A. The other end of the shaft carries an upright arm W<sup>2</sup>, Figs. 1, 2, and 5, the upper forked end of which engages a groove *f'* on the boss of the counterbalanced toothed quadrant F<sup>2</sup> aforesaid. The latter is capable of sliding longitudinally upon its shaft F when operated by the lever W', and such longitudinal movement is transmitted to the type-wheel shaft *h* by reason of the flanges of the pinion K, which gears with the quadrant.

The operating-lever may be provided with a spring pin or catch, which enters one of a series of holes or indentations *w'*, Figs. 6 and 7, on the main frame, and serves to lock the lever in any of its three positions corresponding to the three longitudinal positions of the type-wheel; or the lever W' may itself form the spring-catch by being made thin and flexible in a lateral direction, as shown in Fig. 2, and provided with a projecting pin *w*, adapted to engage the indentations *w'*. When it is required to adjust the type-wheel into another position, a slight forward or backward pressure on the operating-lever W' is sufficient to cause the pin *w* to spring out of an indentation *w'*. The ready adjustment of the type-wheel in its two extreme positions may be assisted by providing the shaft F with a collar *f'*, Figs. 1 and 5, which bears against one end of the quadrant-boss in one extreme position, the opposite end of the boss being adapted in the other extreme position to bear against the pinion F'.

Instead of causing the quadrant F<sup>2</sup> and pinion F' to slide upon their shaft as one piece, as described in my pending application, Serial No. 326,277, I make the pinion a fixture on the shaft, as by that means I obtain a constant amount of rotation in the pinion (and therefore in the type-wheel) for a given amount of movement in the hinged frame C<sup>4</sup>, which was not the case when the distance of the pinion from the frame-axis *a*<sup>6</sup> varied with each longitudinal position of the type-wheel. The rotary movement of the pinion may be imparted to the quadrant by the usual key or feather, or by a pin *f*<sup>3</sup>, Figs. 5 and 5<sup>a</sup>, which is attached to the pinion and passes into a hole in the quadrant-boss.

The type-wheel may be locked during the operation of printing by the following mechanism: A locking-wheel H<sup>5</sup> is fixed upon the type-wheel shaft *h*, and bears on or near its

periphery a series of notches H<sup>3a</sup> or their equivalent, having the same relative angular position as the type on the type-wheel. A locking bar or pawl L<sup>6</sup>, Figs. 1, 2, and 5, is operated from the spacing-frame P. P' in the following manner, and is adapted by the depression of such frame to perform the locking operation in a positive manner prior to the printing operation. The locking-bar L<sup>6</sup> is pivoted upon the standard B', as at *l'*, Figs. 2 and 5, and its upper end is provided with a salient edge L, which is located normally in proximity to and is adapted to engage the side of the locking-wheel. The salient end L is extended outward toward the front of the machine, as shown in Figs. 1 and 5, so that it may engage the locking-wheel in any of its three longitudinal positions. The lower end of the bar L<sup>6</sup> is provided with a short horizontal arm L<sup>7</sup>, which carries a projecting pin L<sup>8</sup>. This pin is engaged by the forked end of an arm P<sup>6</sup>, carried by the bar P of the spacing-frame. (See Figs. 2 and 6.) The distance between the two branches of the forked end of the arm is greater than the diameter of the pin L<sup>8</sup>, and the latter rests normally against the edge of the lower branch, as shown in Fig. 2, so that the locking-bar is not actuated until the spacing-frame has been depressed for a certain distance. The bar L<sup>6</sup> is withdrawn from engagement with the locking-wheel by a spring L<sup>9</sup>, Figs. 2 and 5, which bears against the tail L<sup>10</sup> on the bar and holds the same normally against the side of the standard B'. Each time the spacing-frame is fully depressed the locking-bar L<sup>6</sup> is moved toward the wheel H<sup>5</sup>, and, as the movements of the spacing-frame, hinged frame C<sup>4</sup>, type-wheel, and locking-bar are all arrested at the same moment by reason of the contact of the key-lever with the guide-plate C<sup>2</sup>, it will be obvious that the parts may be so proportioned that the salient end L will arrest and lock the locking-wheel as soon as the type-wheel is brought into its proper position, which is at about the same moment that the spacing-frame reaches its lowest position. By this locking mechanism there is no possibility when the machine is being operated rapidly of the type-wheel being swung beyond the proper point or of its being arrested too soon by the locking-bar. The locking-bar L<sup>6</sup> is withdrawn from engagement with the locking-wheel on the return of the spacing-frame by the spring L<sup>9</sup> aforesaid.

Instead of pivoting the bar L<sup>6</sup> to the type-wheel standard, it may be mounted, as shown in Figs. 8 and 9, in such a manner as to be capable of being reciprocated in a vertical direction, its upper salient end L being extended forward, as before, and placed directly below the locking-wheel H<sup>5</sup> at a suitable distance therefrom.

The side P' of the spacing-frame is provided with a downward extension P<sup>5</sup>. This extension carries a pin *l*<sup>3</sup>, which engages one



end of a rocking-lever  $L^5$ , mounted upon a fixed pivot  $A^2$ . The opposite end of the lever engages a pin  $l^4$ , carried by the locking-bar  $L^6$ .

$l^5$   $l^6$  are guides for the pin  $l^4$  and bar  $L^6$ , respectively. The action of this modified locking arrangement is precisely similar to that described with reference to Figs. 1, 2, and 5.

In describing the foregoing machine and its modifications it has been assumed that the matter was printed from left to right. The machine could, however, with slight modifications be arranged to print from right to left.

I declare that what I claim is—

1. In a type-writing machine, the combination, with a platen, a sliding platen-frame, a platen-frame-supporting bed hinged at one end, as described, a series of keys, and spacing mechanism operated at each depression of a key, of a spacing-rack movable synchronously with said platen-frame and having downwardly-facing teeth with inclined backs, as described, a vibratory spacing-pawl located near the free end of the hinged bed and having a salient end adapted at each successive operation of said spacing mechanism to engage the face of the adjacent rack-tooth and move the platen the required distance, means for automatically releasing said pawl from the control of the depressed key on the completion of the spacing operation, and a device for quickly returning the salient end of the pawl over the inclined back of the succeeding tooth, whereby the spacing and printing operations are successively performed before the release of the key, substantially as described.

2. In a type-writer, the combination, with a platen  $R$ , sliding platen-frame  $R'$ , and supporting-bed  $S$ , hinged at one end, as described, of a spacing-rack  $T'$ , fixed to the bottom of the frame  $R'$  and having on its under side a series of teeth with inclined backs  $t^3$  and approximately perpendicular faces  $t^4$ , a vibratory pawl  $V'$ , located below said rack and having its salient upper end  $v$  adapted at each successive forward stroke of the pawl to engage the perpendicular face of the adjacent rack-tooth, spacing mechanism whereby the said pawl is moved forward the required distance at each depression of a key, and means for quickly returning the salient end of the pawl over the inclined back of the succeeding tooth prior to the release of the key, substantially as described.

3. In a type-writer, the combination, with the platen  $R$ , sliding platen-frame  $R'$ , and hinged bed  $S$ , of a spacing-rack movable synchronously with the frame  $R'$  and having on its under side a series of teeth with inclined backs, as described, a vibratory spacing-pawl located below said rack at a suitable distance from the hinge-axis of the bed and having its salient end adapted at each successive forward stroke of the pawl to engage the face of the adjacent rack-tooth, spacing mechanism whereby the said pawl is moved forward the

required distance at each depression of a key, a spring-catch device forming an element of said mechanism, means adapted to automatically disconnect said device on the completion of the spacing operation, and a device for quickly returning the salient end of the pawl over the inclined back of the succeeding rack-tooth on the disconnection of said spring-catch, substantially as described.

4. In a type-writer, the combination, with the platen  $R$ , sliding platen-frame  $R'$ , and hinged bed  $S$ , of a spacing-rack  $T'$ , movable synchronously with the frame  $R'$  and having on its underside a series of teeth with inclined backs, as described, a vibratory spacing-pawl located below said rack, as described, and adapted at each successive forward stroke to engage the face of the adjacent rack-tooth with its salient end, a spacing-frame  $P P'$ , adapted to be depressed at each depression of a key, a spring-catch  $V^3$ , mounted on said frame, a horizontal arm  $V^2$ , connected with the spacing-pawl and having its outer end engaged by said catch and adapted to be moved downward thereby to effect the forward movement of the pawl, an inclined piece  $V^8$  on said spring-catch, an abutment  $V^9$ , bearing against the piece  $V^8$  and adapted to thrust the catch off the arm  $V^2$  at the termination of its downward stroke, and a spring  $V^7$ , adapted to return both arm and pawl to their normal positions on the release of the catch, substantially as described.

5. In a type-writer, the combination, with the platen  $R$ , platen-frame  $R'$ , and hinged bed  $S$ , of a spacing-rack  $T'$ , fixed on the under side of said frame and having teeth  $t^3 t^4$ , as described, an oscillatory spacing-pawl  $B'$ , adapted to engage said teeth, as described, with its salient end, a shaft  $V$ , carrying said pawl, a depending arm  $v^4$ , fixed on said shaft, a depending arm  $v^2$ , mounted on a pivot above the shaft  $V$  and having a slot  $v^3$  engaging a pin in the lower end of arm  $v^4$ , a spring-elevated horizontal arm  $V^2$ , movable with said arm  $v^4$ , a spring-catch  $V^3$ , engaging said arm  $V^2$  in a direction opposite to the tension of its spring, a spacing-frame carrying said catch and adapted to be depressed at each depression of a key, and means for automatically disengaging said catch from the arm  $V^2$  on the completion of the spacing operation, substantially as described.

6. In a type-writer, the combination of the platen  $R$ , platen-frame  $R'$ , hinged bed  $S$ , spacing-rack  $T'$ , pawl  $V'$ , shaft  $V$ , arms  $v^4 v^2 V^2$ , spring-catch  $V^3$ , spacing-frame  $P P'$ , catch-guiding device  $V^5 V^6$ , inclined thrust-piece  $V^8$ , adjustable abutment  $V^9$ , and returning-spring  $V^7$ , all arranged and combined substantially as described and shown.

7. In a type-writer, the platen  $R$ , sliding platen-frame  $R'$ , hinged bed  $S$ , spacing-rack  $T'$ , fixed to said frame and having teeth on its under side with inclined backs, as described, vibratory spacing-pawl  $V'$ , adapted at each



forward stroke to engage the face of one of said teeth and move the rack and platen-frame forward a tooth-space and adapted at each return-stroke to slide over the inclined back of the following tooth and raise the platen-frame and bed, as described, in combination with a check-rack T, fixed to said bed S and having teeth of a corresponding pitch to those of rack T', and a check-pawl  $t^2$ , mounted on the frame R' and adapted to engage the teeth of said rack T in a reverse direction to the engagement of the rack T', and pawl V', whereby any tendency of the platen-frame to move backward during the return-stroke of the pawl V' is prevented, substantially as described.

8. In a type-writer, the sliding platen-frame R', the rack T' thereon, the vibratory pawl V', engaging the same, the arms  $v^4 v^2 V^2$ , arranged substantially as described and movable synchronously with said pawl, the spring-catch V<sup>3</sup>, mounted on the depressible spacing-frame and adapted to engage the upper side of said arm V<sup>2</sup>, in combination with a handle  $v^5$ , movable with the pawl V', whereby the latter may be moved forward to an abnormal extent and disengaged from its rack when the platen-frame is to be withdrawn, substantially as described.

9. In a type-writer, the combination of a series of depressible key-levers, a spacing-frame P P', adapted to be depressed thereby, a link V<sup>3</sup>, connected at its lower end to the said spacing-frame, an angle-lever V<sup>2</sup> v<sup>2</sup>, having its lateral arm V<sup>2</sup> connected to the upper end of said link, a depending arm  $v^4$ , fixed to a shaft V and engaged, as described, by the depending arm  $v^2$  of the angle-lever, an upright spacing-pawl V', also fixed to said shaft V, and a spacing-rack T', fixed to the sliding platen-frame and having teeth on its under side adapted to be engaged by said pawl at each forward stroke thereof, whereby the spacing operation is accomplished at each depression of a key-lever, substantially as described.

10. In a type-writer, a type-wheel H, a platen R, located at a suitable distance below said wheel, a sliding platen-frame R'; and a frame-supporting bed S, hinged at its end remote from the type-wheel, in combination with a spacing-rack T', fixed to said frame R' and having teeth with inclined backs facing downward, as described, and an upright spacing-pawl V', capable of a to-and-fro movement in a fixed path approximately parallel to the movement of the rack and adapted at each return-stroke to engage the inclined back of the adjacent rack-tooth, whereby the hinged platen-supporting bed is raised the necessary distance to produce an impression, substantially as described.

11. In a type-writer, the combination, with the depressible spacing-frame P P', the platen-frame R', the spacing-rack T' on said frame R', and the vibratory spacing-pawl V',

adapted to engage said rack, as described, of an arm V<sup>2</sup>, movable synchronously with said pawl, as described, a spring-catch V<sup>3</sup>, movable synchronously with the spacing-frame and adapted to engage said arm on the downward movement of the frame, an inclined thrust-piece V<sup>8</sup> on the said spring-catch, and an abutment V<sup>9</sup>, adapted to engage said piece V<sup>8</sup> and thrust the catch outward, whereby the spacing-frame and spacing-pawl are disconnected at the proper moment, substantially as and for the purpose described.

12. In a type-writer, the combination of the sliding type-wheel H, flanged type-wheel pinion K, sliding segment F<sup>2</sup>, gearing therewith, oscillatory arm W<sup>2</sup>, having a forked end engaging a groove in the segment-boss, oscillatory shaft W, carrying said arm, laterally-flexible operating-lever W', fixed on said shaft, lateral pin  $w$  on said lever, and a stationary piece on the machine-frame provided with indentations  $w'$ , having the same number and relative positions as the groups of type aforesaid and each adapted to receive the outer end of said pin, substantially as described.

13. In a type-writer, the combination of the hinged type-wheel-operating frame C<sup>4</sup>, the vertical rack F<sup>3</sup> thereon, the rack-pinion F', mounted loosely upon a shaft F at a fixed distance from the frame-axis, the type-wheel, the toothed type-wheel-operating quadrant F<sup>2</sup>, also mounted loosely on the shaft F and capable of a longitudinal movement thereon to and from said axis synchronously with the longitudinal movement of the type-wheel, and a device  $f^3$ , adapted to transfer the oscillatory motion of the pinion F' to the segment F<sup>2</sup>, substantially as and for the purpose described.

14. In a type-writer, the combination of the type-wheel H, the locking-wheel H<sup>5</sup>, the spacing-frame P P', the locking-bar L<sup>6</sup>, pivoted at its lower end at  $l^7$  and having its upper salient end located in proximity to said locking-wheel, the depending tail L<sup>10</sup> on said bar, the spring L<sup>9</sup>, adapted to press upon said tail, as described, the lateral arm L<sup>7</sup> on the lower end of the bar, the pin L<sup>8</sup> on said arm, and the forked arm P<sup>6</sup> on the said spacing-frame located normally with the lower branch of its fork in contact with the lower side of said pin and having the upper branch of its fork located normally above the pin and adapted to engage the same during the terminal portion of the downward movement of the said frame, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of subscribing witnesses.

F. MYERS.

Witnesses:

EDWARD V. CROOKS,  
GEORGE P. HANNAY,  
GEO. C. DYMOND.