

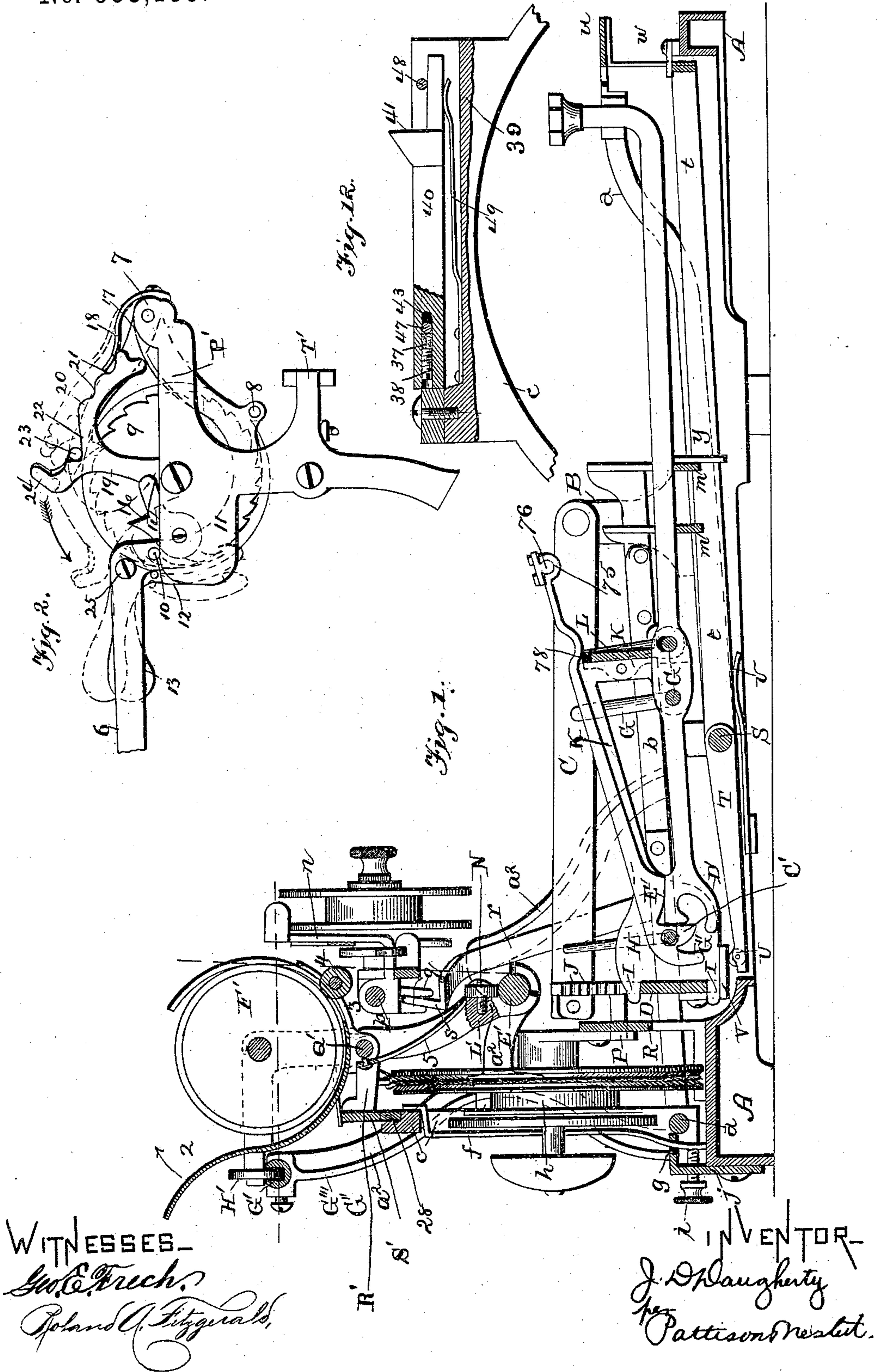
(No Model.)

4 Sheets—Sheet 1.

J. D. DAUGHERTY.
TYPE WRITING MACHINE.

No. 553,153.

Patented Jan. 14, 1896.



WITNESSES.
W. E. French,
Poland C. Fitzgerald,

INVENTOR.
J. D. Daugherty
per Pattison & Nestle.

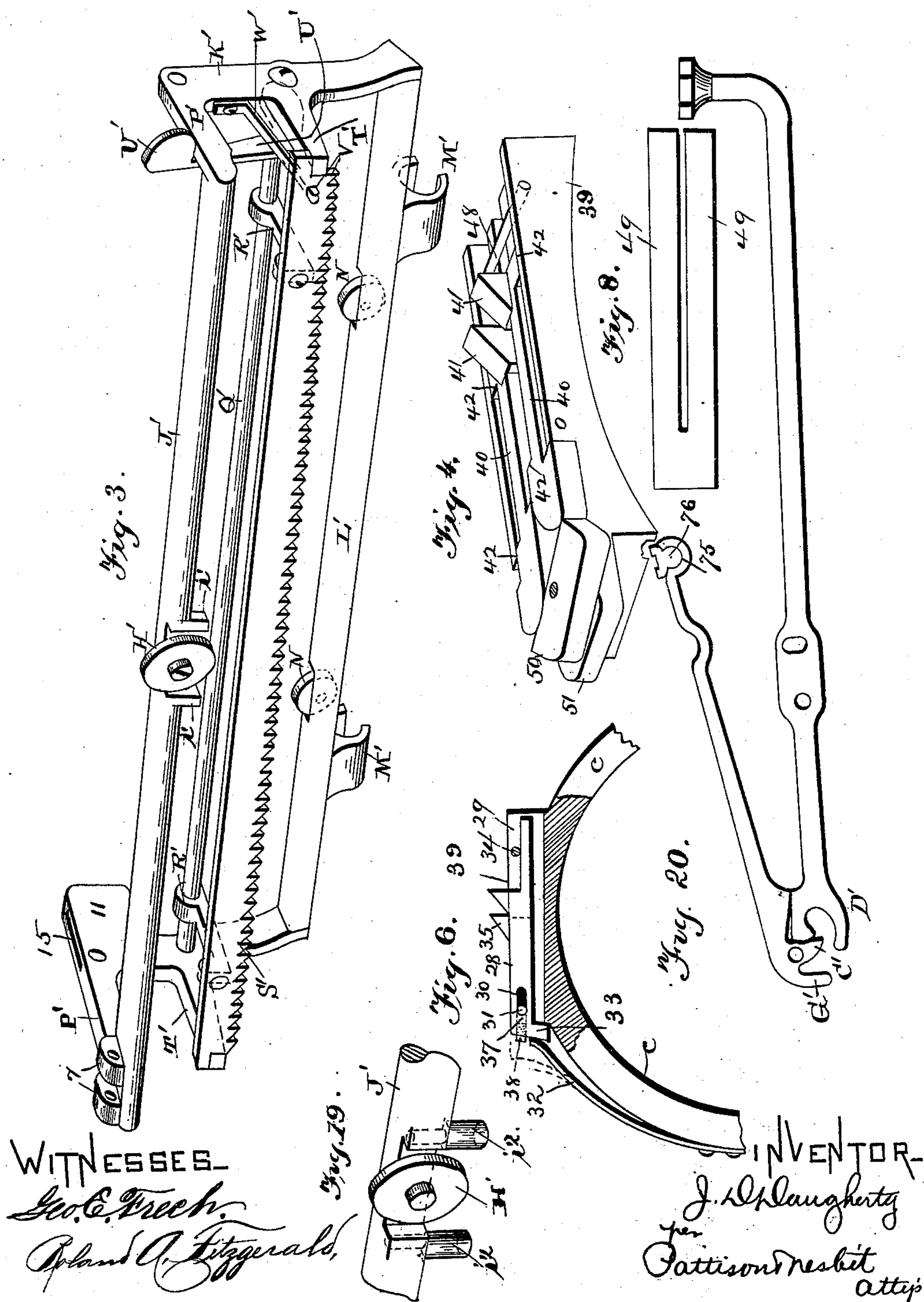
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4 Sheets—Sheet 2.

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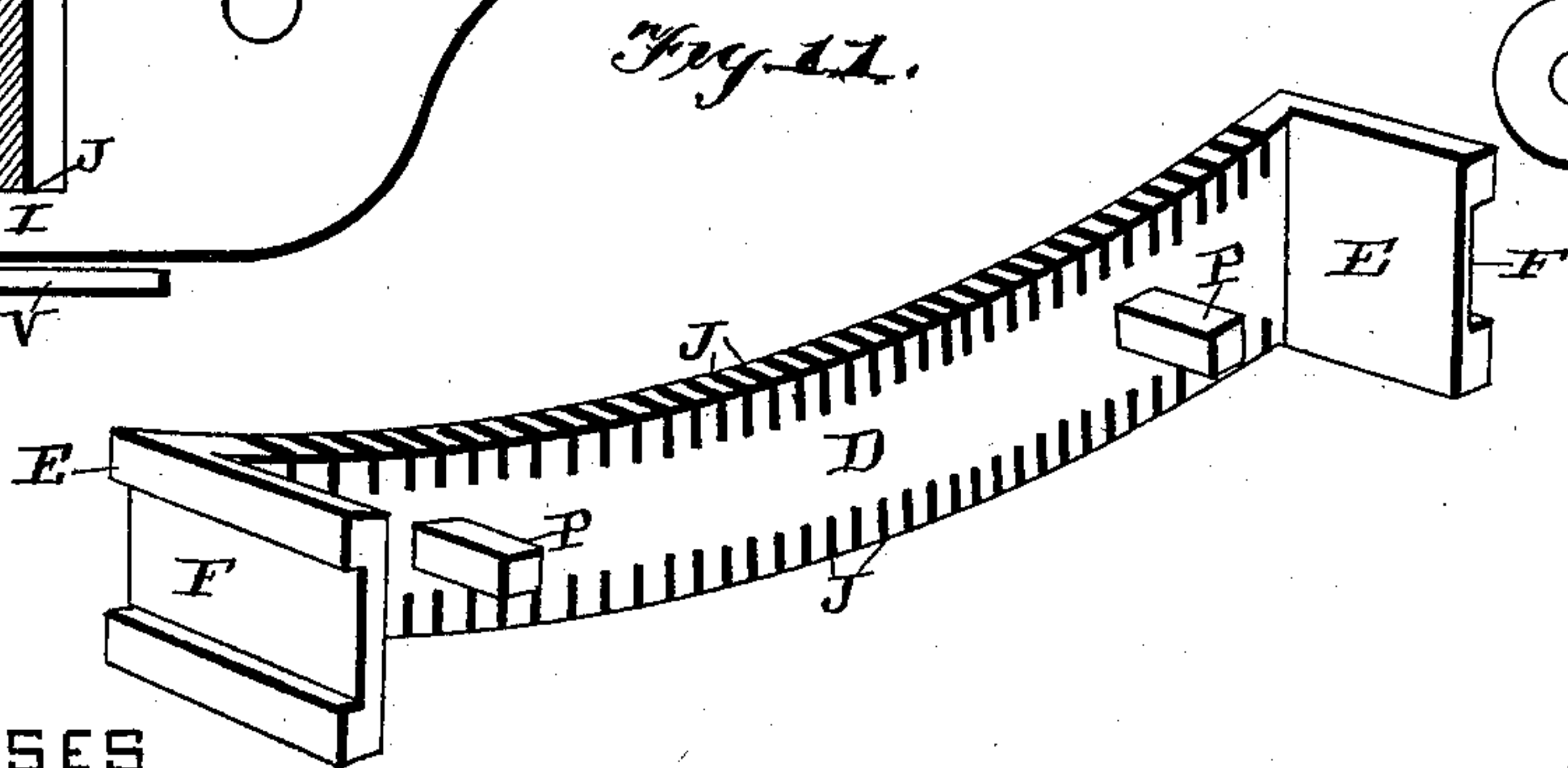
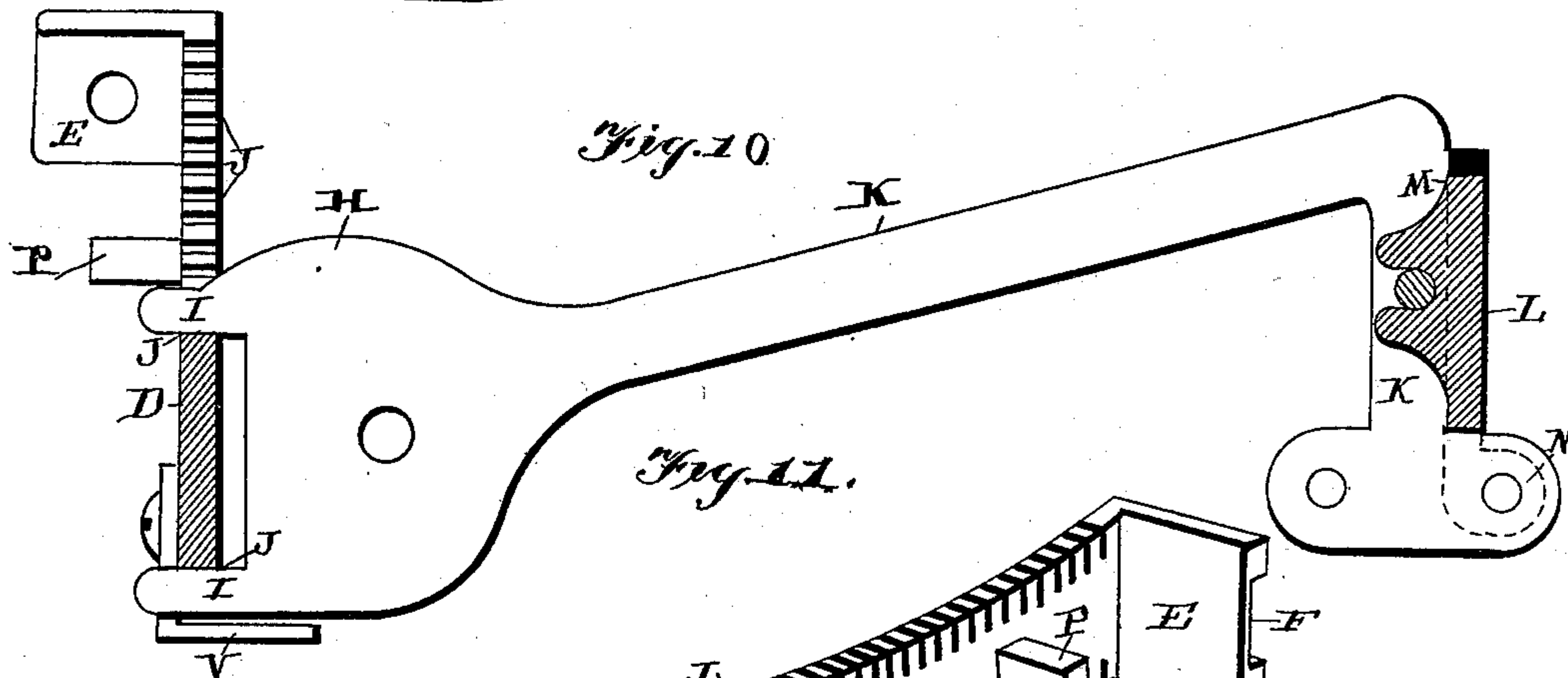
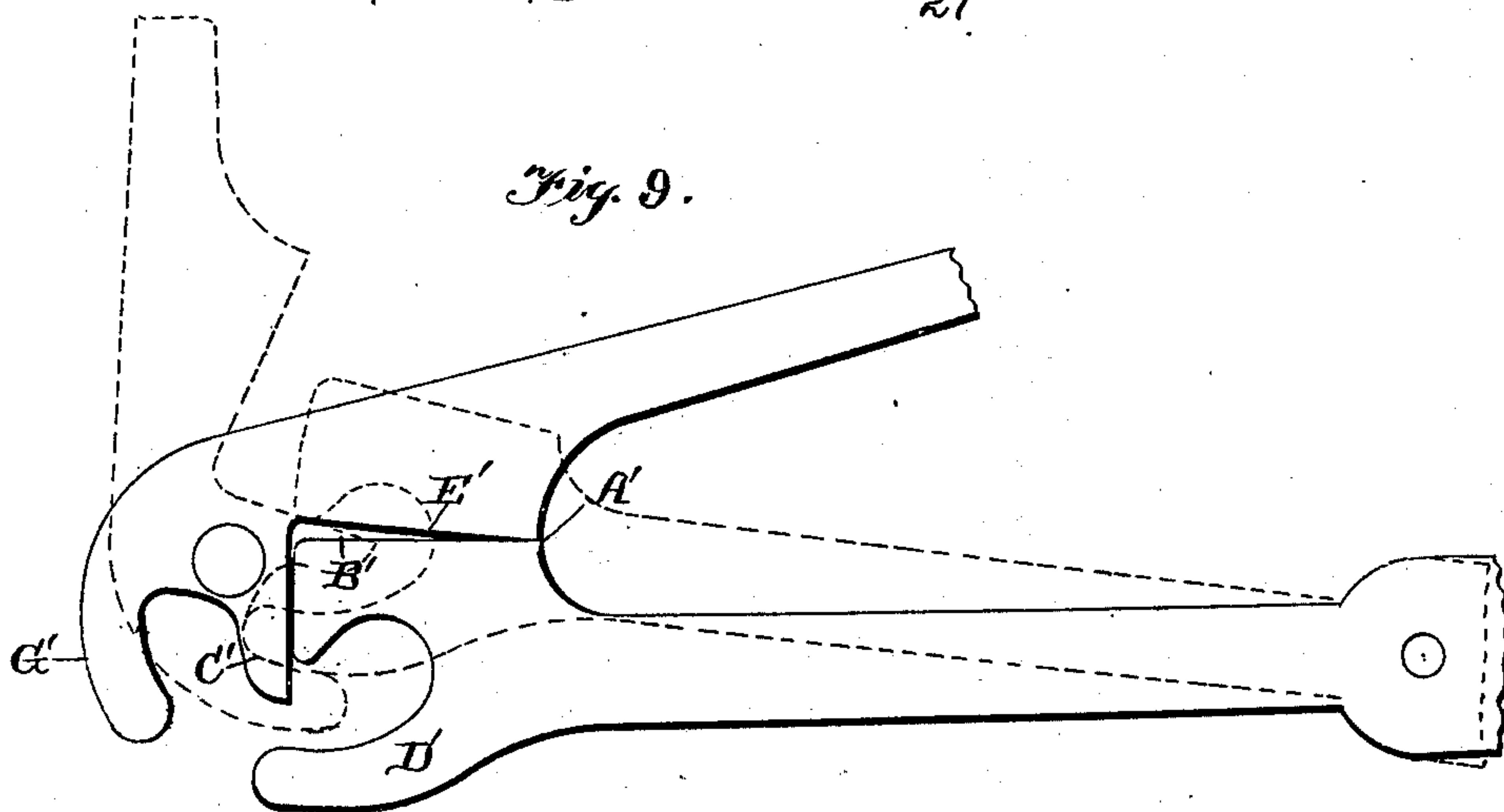
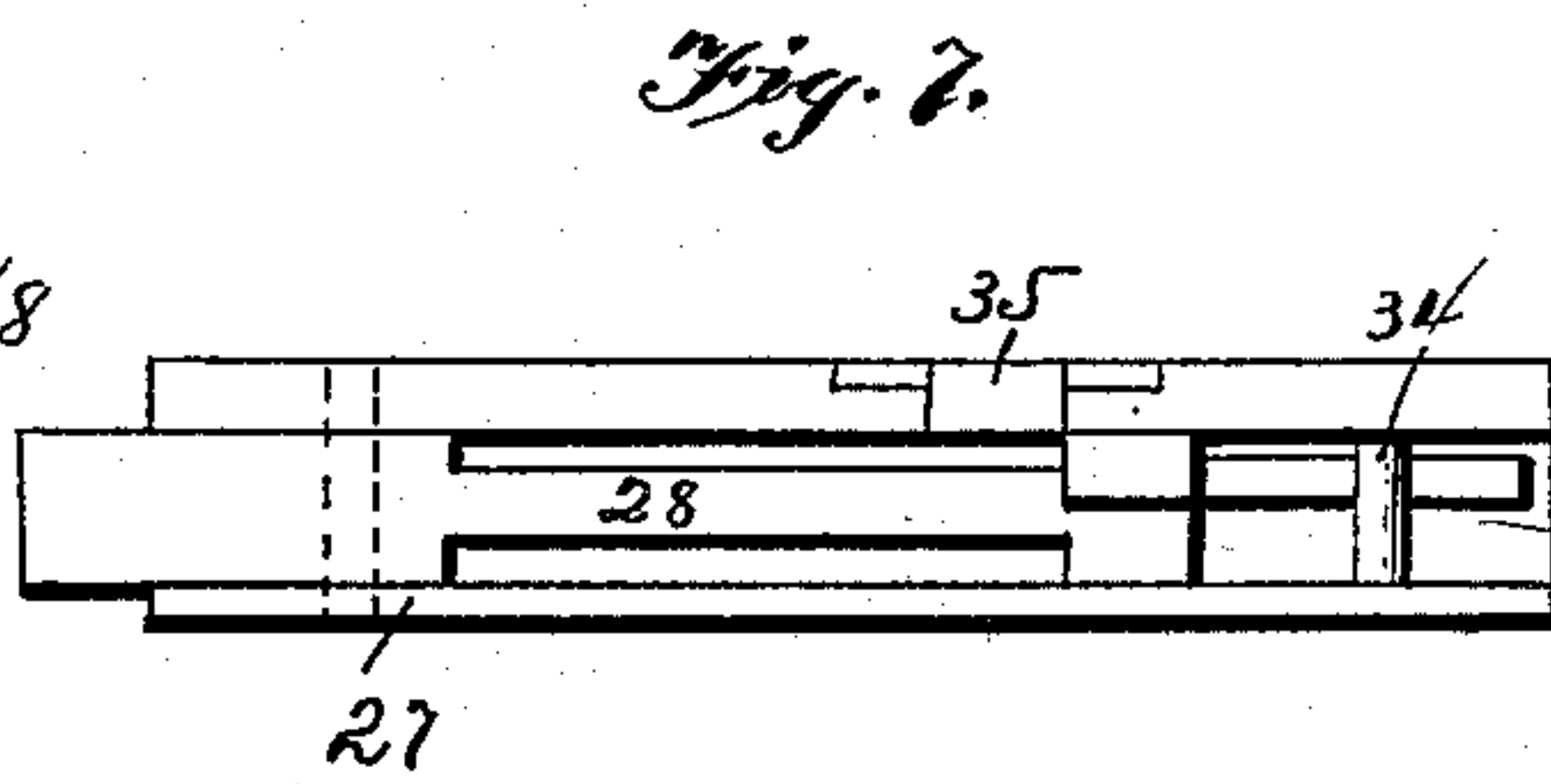
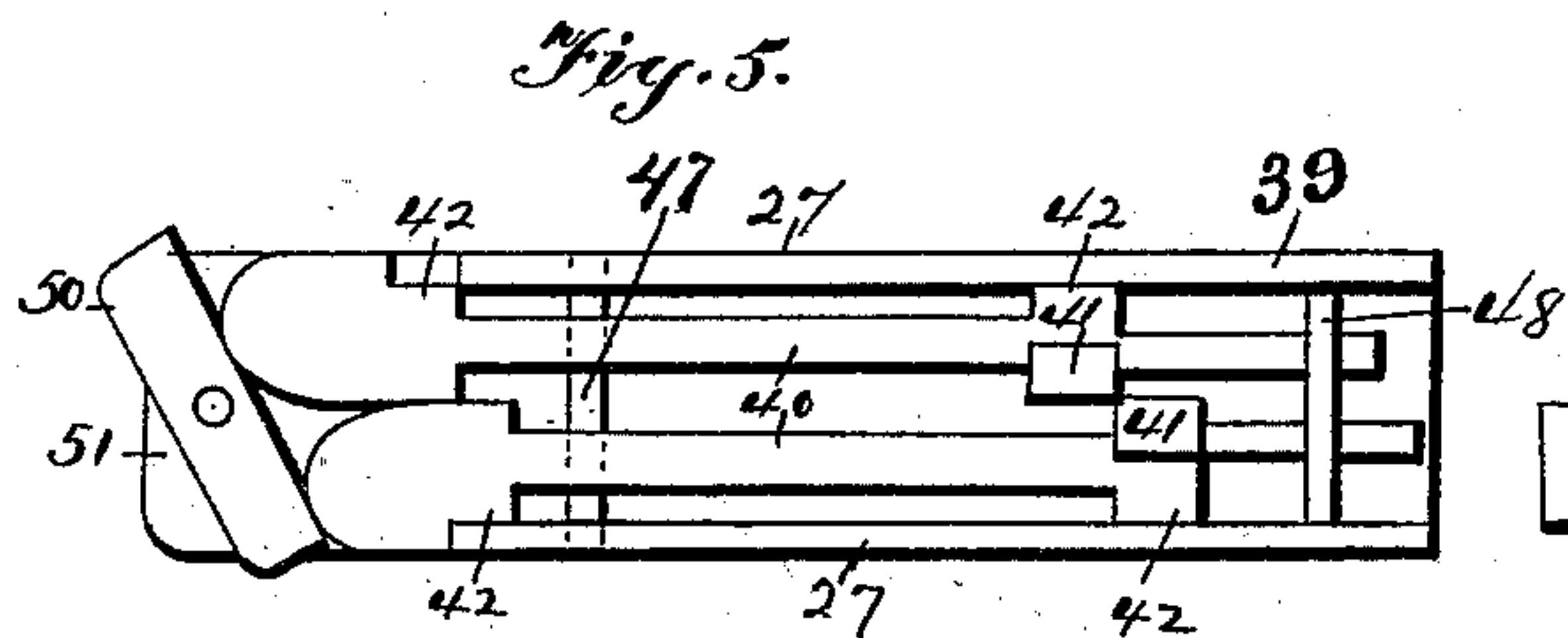
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J. D. DAUGHERTY.
TYPE WRITING MACHINE.

No. 553,153.

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WITNESSES

Geo. E. Treach.

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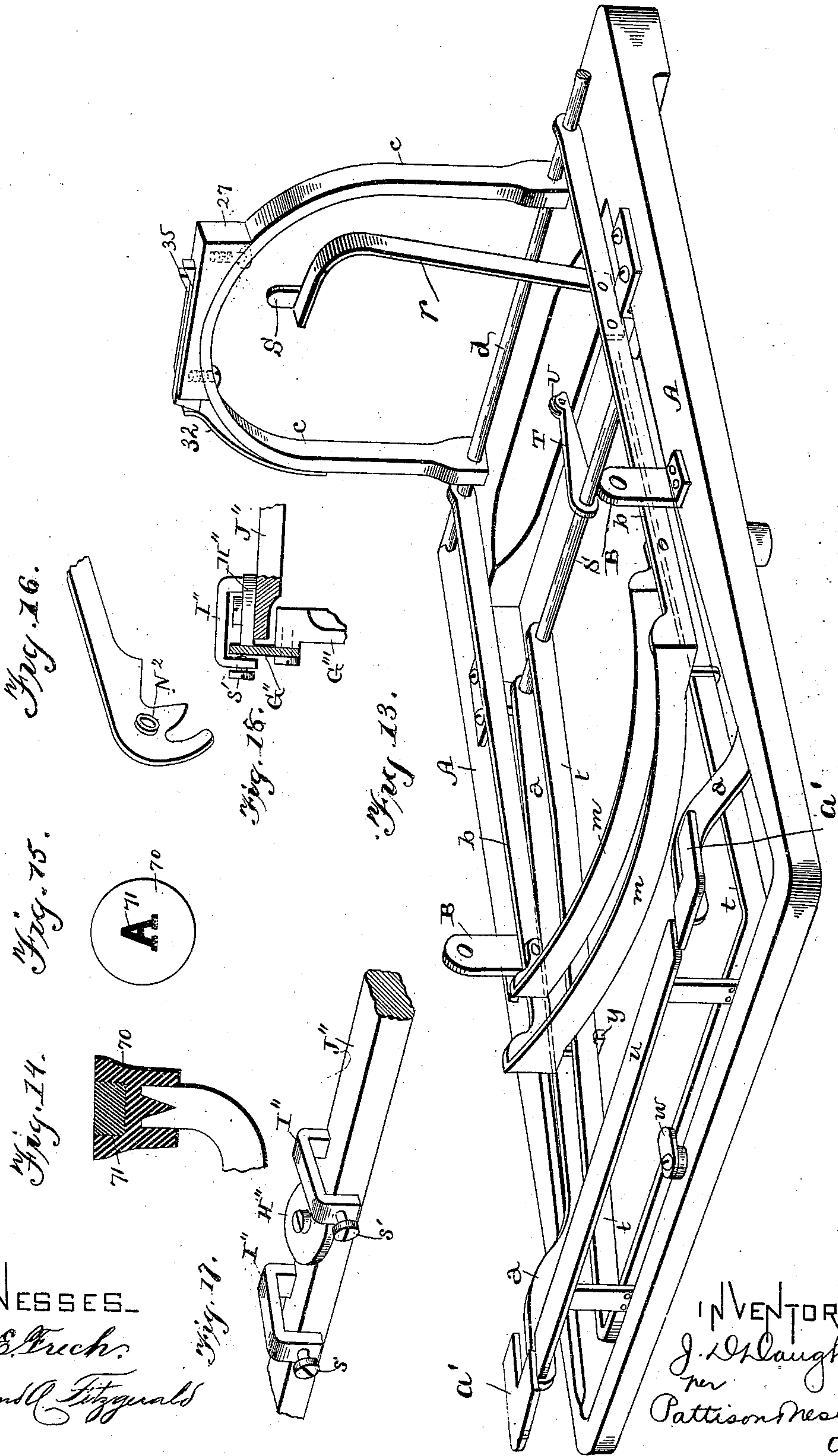
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4 Sheets—Sheet 4.

J. D. DAUGHERTY.
TYPE WRITING MACHINE.

No. 553,153.

Patented Jan. 14, 1896.



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UNITED STATES PATENT OFFICE.

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TYPEWRITING COMPANY, OF PITTSBURG, PENNSYLVANIA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 553,153, dated January 14, 1896.

Application filed February 25, 1893. Serial No. 463,687. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. DAUGHERTY, of Kittanning, in the county of Armstrong and State of Pennsylvania, have invented certain
5 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 invention, such as will enable others skilled in the art to which it pertains to make
10 and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in type-writing machines, and is an improvement upon the construction shown in Patents
15 No. 457,258, granted August 4, 1891; No. 470,990, granted March 15, 1892; No. 481,477, granted August 23, 1892, and No. 478,925, granted July 12, 1892, all of which were
20 granted to myself; and the present improvements consist in certain features of construction whereby improved results and simplicity of construction are obtained, all of which will be fully described hereinafter, and particularly pointed out in the claims.

One object of my present invention is to so construct the carriage that the necessary play and freedom are allowed to secure easy and rapid movement thereof without having said
30 freedom, play or shake affect the alignment in writing, which is a common and a serious fault in most of the type-writing machines now on the market, in which the shaking and jumping movement of the carriage produces
35 a sidewise or torsional shake, which causes quite a variation in the alignment of said machines.

Another object of my present invention is to so construct the carriage that the printing-point is practically directly over the supporting-rail thereof, so that any backward or forward movement of the carriage owing to the necessary play to permit easy and rapid endwise movement so essential to rapid writing
40 will not perceptibly raise or lower the printing-point, owing to the fact that said point is in a vertical radius of an arc of a circle the center of which is the said supporting-rail.

Another object of this invention is to place
50 the pulling power and the point of resistance (the feed-rack) practically midway between the supporting-rails of the carriage, which is

in a parallel line drawn practically through the center of the carriage, whereby the torsional shake and tremble of the carriage is
55 avoided which is so common in the machines now on the market which have the pulling power at one side of the carriage, thus producing a jumping of the carriage, causing a tremble and torsional shake thereof, which
60 very materially injures the alignment of the writing.

Another object of this invention is to decrease the pressure required upon the key-levers to raise the type-bars, thus making a
65 lighter touch, by the use of a lever of the third class—that is to say, by having the inner ends of the key-levers engage the type-bars between their pivotal points and the ends to be raised—and then to increase or accelerate the movement of the type-bars by the
70 use of a lever of the first class, instead of using a lever of the first class solely, as in my patents hereinbefore referred to.

Another object of my invention is to prevent type-bars flying ahead of the key-levers when being carried to the printing-point and yet allow a rebound of the bars independent of the key-levers to prevent them from interfering in rapid writing, and also to so construct the key-levers and type-bars that all
80 rebounding of the type-bars when they reach their normal position after printing is prevented for the purpose of avoiding interference of the type-bars.

A further object of my present invention relates to the specific construction of certain portions of the machine, which will be fully pointed out hereinafter.

In the accompanying drawings, Figure 1 is a
90 central longitudinal vertical sectional view of a type-writing machine which embodies my invention. Fig. 2 is a detail view of the upper end of the carriage, showing the lever and pawls for rotating and holding the platen. Fig. 3 is a detached perspective view of the carriage with the platen and its operating-lever detached. Fig. 4 is an enlarged perspective view of the feed-dogs. Fig. 5 is a plan view of the same. Fig. 6 is a detail view
100 of a modification of the feed-dog. Fig. 7 is a plan view of Fig. 6. Fig. 8 is a plan view of a split spring for holding the feed-dogs shown in Fig. 4 upward. Fig. 9 is an enlarged view

of the engaging ends of the type-bars and key-levers, the same being shown in their normal position in solid lines and in the printing position in dotted lines. Fig. 10 is an enlarged view of the division-plates and their supporting-bars. Fig. 11 is a detached perspective view of the inner end of the shifting frame. Fig. 12 is a longitudinal section of Fig. 4. Fig. 13 is a perspective view of the base of the machine, showing the arrangement of the universal frame and the shift key and frame. Fig. 14 is a vertical section of a flexible button. Fig. 15 is a plan view of the same. Fig. 16 is a perspective view of the lower end of one of the type-bars, showing the flange at the pivotal point thereof. Fig. 17 is a perspective view showing a modified form of supporting-wheel for the upper end of the carriage. Fig. 18 is a sectional view thereof, showing in connection therewith the bar against which the wheel rests. Fig. 19 is a view of a modified form of depending pins at each side of the wheel H'. Fig. 20 is a detached view of a type-bar and key-lever.

A represents the base of the machine, from the sides of which near the center thereof extend upward the ears B to which the outer ends of the shifting frame are pivoted. The opposite ends of this shifting frame C are united by means of a curved cross-bar D, which is provided with rearwardly-extending ears E having longitudinal recesses or grooves F to receive the said ends of the shifting frame, which are held therein by means of screws which pass through the said frame into the ears or lugs E. Extending across the shifting frame and having their ends connected with the side bars C thereof are the curved key-lever pivot-bars G, the arrangement and construction of which are substantially the same as those shown in my said Patent No. 478,925, and which therefore needs no further description in this application.

The division-plates H separating the type-bars have their outer ends enlarged and provided with a recess forming upper and lower projections I, which extend into slits or recesses J, made in the upper and lower edges of the end piece D of the shifting frame. These division-plates then extend outward and upward at a slight angle, and then downward, as shown at K, and have the bars G pass through the lower ends of the portions K. A bar L is provided with slits or recesses M, which receive the portions K of the said division-plates, and at the ends of this bar are the depending lugs N, through which one of the pivot-bars G passes.

By the use of the end piece D, with the recesses J, and the piece L, having recesses M, which extend at the proper angle for the division-plates, the said plates are held rigidly and firmly in position, with the parts K and the enlarged portion H accurately in line, thus preventing any binding of the said division-plates upon the type-bars which rest and move between them. Instead of placing

washers between the pivoted ends of the type-bars, as in my other patents, I provide the type-bars with narrow laterally-extending flanges or collars N², Fig. 17, which hold the type-bars in position between the said division-plates. Projecting rearwardly from the end piece D of the shifting frame are the lugs P, which extend through slots made in the plate R, which extends upward from the base A. The object of the lugs and slots is to limit the upward and downward movement of the shifting frame to bring the type to the printing-point when in an upward or downward position.

Extending transverse of the base A is the shaft S, to which an arm T is rigidly secured, the opposite end of said arm being provided with a friction-wheel U, which engages a shoe V, that is attached to the end piece D of the shifting frame. At each side of the machine, within the base A, are the shift or upper-case bars a, which have their inner ends rigidly connected to the transverse shaft S, so that when either of these shift-bars a are depressed the outer end of the arm U is raised, carrying with it the shifting frame, as will be clearly understood.

The universal frame consists of substantially a horizontal portion b, which extends toward the keyboard, and a vertical portion c, which is at the rear end of the base A, thus making an L-shaped universal frame. The parts b and c are not connected directly to each other, nor are they formed of a single piece, but preferably have their outer and lower ends, respectively, rigidly attached to a transverse shaft d, journaled upon the rear end of the base A.

The feed-dogs, which will be fully described farther on, are attached to the upper end of the vertical part c of the universal frame, so that when the free end of the part b of the universal frame is depressed the upper end of the vertical part c is moved inward. A spring f, Fig. 1, holds the vertical part c of the universal frame normally outward and the part b normally upward. This spring f is made of a piece of flat material and has its lower end passed through a slot g in the projection j, while its upper end is made L-shaped and engages the inner face of the upper portion of the vertical part c of the universal frame. The part c of said universal frame is preferably U-shaped to extend around the spring-drum h, as shown. A screw i passes through a projection j attached to the rear end of the base A and engages the lower extremity of the spring f below the slot g. From this it will be clearly understood that by means of the screw i the tension of the spring f is quickly and conveniently regulated, and thereby the touch of the key-levers regulated to suit the operator, as the key-levers all rest upon or engage cross-pieces m, which connect the outer ends of the horizontal parts b of the universal frame. Owing to the fact that the spring f engages the upper ends of

the vertical portion *c* of the universal frame it requires but a slight tension thereof to hold the frame in its normal position, and owing to the length of the spring *f* a very soft and yet a positive movement of the key-levers is obtained.

The ribbon-feed, the spools and the reverse of the ribbon-feed mechanism are substantially the same as those fully shown and described in my Patent No. 481,477, before referred to, and do not therefore require any further description in this application. So, also, the tilting ribbon frame *n* is practically the same as that shown in the said patent just mentioned, the same being pivoted upon a rod *p* and provided with depending projections *q* instead of a single projection, as shown in the said patent. The means here shown for tilting this ribbon-frame is essentially different from that shown in the said patent in that an arm *r* has its lower end rigidly connected to the horizontal portion *b* of the universal frame, and extends upward with its upper end curved inward and provided with a vertical projection *s*, which extends between the depending lips or projections *p* of the tilting frame. From this it will be understood that when the universal frame is depressed by a key-lever the frame has its upper end moved inward in front of the printing-point, carrying with it the ribbon, and when the key-lever is released and the universal frame rises the tilting frame drops to expose the impression made. The object of this tilting frame for exposing the printing-point has been fully dwelt upon in the patents herein referred to, and I will therefore not repeat it here.

A spacing-frame *t* has its inner end loosely journaled upon the shaft *S* and the spacing-bar *u* supported at its outer end a suitable distance above the base *A*. This frame is held upward by means of a spring *v*, the upward movement of the outer end of said frame being limited by means of an inwardly-extending projection *w*. Extending downward from the universal feed-frame *a* is an L-shaped piece *y*, (Fig. 14,) which extends under the spacing-frame *t*. This allows the universal frame to be depressed by the key-levers without affecting the spacing-key and the spacing key and frame to be depressed, carrying with it the universal frame, without affecting in any manner the key-levers which have their outer ends held up by the weight of the type-bars upon their inner ends. As shown in Fig. 14, the shift-levers *a* have a broad shifting-space *a'* at each side of the keyboard, while the spacing-bar *u* extends across in front of the keyboard between the said shifting arm or upper-case bars.

One of the special features of my present invention as compared with my previous patents is the particular construction of the operating-joint between the type-bar and key-levers, whereby the touch of the machine is made soft and pleasant. In my said patents I show the type-bars raised solely by a pro-

jection at the opposite side of the pivotal point from the weight or bar to be raised, using what is mechanically known as "a lever of the first class." Attention is directed to Fig. 10 of my present application, which shows the type-bar and key-lever constructed to engage each other at a point *A'* between the pivotal point of the said bar and the weight to be raised or lifted, which is the bar itself, thus producing what is known as "a lever of the third class." By means of this construction I gain considerable leverage at the start in the raising of said bar, which enables the said bar to be lifted with much less pressure than where it was raised by a projection at the opposite side of the pivotal point, as in my said patents, which will be clearly understood. By reference to Fig. 10 it will be seen that the upper portion, *B'*, of the key-bar is made substantially straight, while the adjacent edge of the type-bar is curved or cut away so that the type-bar and key-lever engage each other at the point *A'* when the key-lever is first touched, the object of which is that when the bar is first started upward it is lifted at a point farthest from the pivotal point thereof, and as it is raised the engaging-point gradually changes by moving toward the pivotal point, thus increasing the travel of said bar without increasing the travel of the key-lever, as will be seen. Depending from said type-bars is a central projection *C'*, which is engaged by the lower prong, *D'*, of the key-lever about when the part *E'* of the type-bar leaves the upper part, *B'*, of the key-levers, so that the type-bar is given a continuous but yet an increasing movement throughout its entire stroke.

For the purpose of preventing the type-bars traveling ahead of the key-levers, which would be liable to cause a double impression of the bar and interference with other bars moving to the printing-point, I provide the type-bars with an additional prong *G'*, which, together with the central prong, *C'*, forms a socket for the outer ends of the lower prongs, *D'*, of the key-levers. Thus it will be seen that if the type-bar should have a tendency to travel faster than the key-lever the prong *G'* will prevent it from doing so by engaging the under side of the prong *D'* of the key-lever, while at the same time the type-bars are allowed to rebound independent of the key-levers after the impression is made, as in my previously-mentioned patents, which is a very desirable feature. In order to prevent the type-bars rebounding when they return to their normal position, the inner end of the upper prong of the key-lever is made to extend near or against the prong *C'*, so that any tendency of the bars to rebound is prevented by the engagement of the prong *C'* with the inner end of the said upper prong of the key-lever. Any tendency of the bar to rebound does not tend to lift the key-lever owing to the fact that the prong of the type-bar abuts against the straight edge of the key-lever,

which causes an endwise (not a raising) tension or pressure upon the key-lever. This is made more sure by having the adjacent edges of the type-bars and key-levers with substantially straight edges, though this is not absolutely necessary, it being only essential that the prong C' should not extend under the upper prong of the key-lever, but abut against its end substantially in a line with the pivotal point of the key-lever, thus tending to force the key-lever against its pivotal point, so that it will not have any tendency to lift the inner end of the key-lever, but lock it in its normal position, as will be clearly understood by reference to Fig. 10.

It will be understood of course that, if desired, the upper edge of the upper prong of the key-levers may be cut away, so that the key-levers and type-bars will engage each other at first at a point farthest from the pivotal point, instead of cutting the lower edge of the type-bar away for the same purpose.

It will be noticed that the type-bars are shown slightly inclined; but this incline may be increased or diminished without affecting the operation of the above-defined construction so long as the type are below the printing-point of the platen, which places the type-bars in substantially a horizontal position.

Another special feature of this invention is to support the carriage in such a manner that it is allowed sufficient play to secure easy and rapid movement thereof without having the play affect in any manner whatsoever the alignment of the machine and to have the pulling power for the carriage and the point of resistance (the feed-rack) practically in the center of the carriage. It will be seen that a line drawn vertically upward from the lower supporting-bar, E', will intersect the printing-point upon the platen F' and a line drawn horizontally rearward will practically intersect the upper supporting-rail, G', which supports the carriage against lateral movement.

Owing to the fact that the printing-line of the platen is practically in a vertical line above the supporting-bar E' sufficient play and looseness of the supporting-wheel H' and the adjacent guiding depending lips i' (see Fig. 3) may be allowed in the groove of the rail G', thus allowing the carriage a slight lateral movement without affecting perceptibly the alignment of the machine. It is a common fault with type-writers now in use, after they have been sufficiently used to cause wear upon their supporting-bars, to have a lateral trembling or shaking movement, which materially affects the alignment of the machine. Where the printing-line is practically in a radius drawn through the center of the arc of a circle described by the platen when it moves laterally, as in my present invention, a slight oscillation of the platen directly over the center of the arc of the circle will not affect the alignment of the machine, as will be clearly understood. The ob-

ject of the depending guiding-lips i' is to have them form the lateral support for the carriage by moving in the groove of the rear supporting-rail G', thus reducing friction to a minimum and relieving the supporting-wheel H' from all lateral strain. From this it will be seen that the wheel forms a rolling support for the carriage, while the depending lips i' receive the lateral pressure of the carriage and fit sufficiently close in the groove of the supporting-rail G' to prevent any serious lateral movement.

While I here show the depending lips i' as being formed as a part of the rod J' of the carriage, it will be understood that they may be pins i², Fig. 20, passed through the said rod J' and made removable to have new and larger ones inserted to take up wear, and if pins be used they may be oblong, as shown, so that a slight turn of the pin will cause it to take up any wear thereof or any wear of the groove in the rod G'. This carriage consists of end pieces K', which have their lower ends curved inward, as shown, to bring them practically directly under the printing-face of the platen, which is journaled in the upper ends of the said pieces K'. A bar L' connects the lower ends of these end pieces K', and this bar is provided at its lower side with the yokes M', which partially encircle the lower supporting-bar E', which is supported by the vertical side standards a², while the weight of the carriage is supported by the wheels N, as clearly shown, the yokes serving merely as a guide to prevent lateral movement of the carriage at its lower end, to prevent its being lifted when the paper is fed, and to hold it in place upon the said bar E'. Extending rearward from the upper ends of the end pieces K' are the arms P', and these arms are connected by the rod J' of the carriage. A rod Q' extends longitudinal the carriage directly beneath the platen F', and upon this rod are journaled the rearwardly-extending arms R', which have connected to their outer ends the feed-rack S', the ends of the feed-rack being cut away, as shown, to rest upon rearwardly-extending arms T' of the carriage. Also journaled upon this rod Q' at one end of the carriage is an L-shaped quick-release key U', which has one end extending upward to form an operating-handle and its opposite end extending rearward and entering loosely a transverse opening V made in the feed-rack S'. By drawing the upper end of the L-shaped release-key U' toward the keyboard of the machine its opposite end is raised, carrying with it the feed-rack, thus lifting it out of engagement with the dog, the same being held downward by means of a spring W', which has its free end resting upon the rearwardly-extending portion of the key U', as clearly shown in Fig. 3.

While I have described the carriage as being provided with a vertical wheel H' attached to the cross-rods J' at the upper rear end of the carriage, I prefer to use the constructions

shown in Figs. 18 and 19. By reference to these figures it will be seen that instead of a slotted bar G' (shown in Fig. 1) I secure to the supporting-standards G''' a vertical bar 5 G'', against which a horizontal wheel H'' engages instead of the vertical wheel H', as shown in the said figure. By means of this construction it will be seen that the wheel H'' will be in constant engagement with the said 10 vertical bar or rod G'', which will prevent all back or lateral motion whatever from the stroke of the type-bar, as will be clearly understood. In this instance, in order to prevent the carriage being lifted forward, I provide the U-shaped arms I'', which extend up- 15 ward, backward and then downward from a bar J'', as clearly shown in Figs. 18 and 19, and the rear downwardly-extending portions of these arms I'' are provided with the inwardly-extending adjusting set-screws s', by means of which set-screws the forward move- 20 ment of said carriage can be readily and accurately adjusted, as is clearly shown in said figures. In this manner I am enabled to take 25 up all lost motion which may occur from wear or otherwise after considerable use of the machine, and the amount of friction is reduced, as will be readily understood, as compared with the vertical wheel used in Fig. 1, 30 owing to the fact that there will be no lateral engagement of the wheel against the said vertical bar G'', the said wheel H'' engaging it only at its periphery and continuously.

Another feature of this invention is to enable the paper to be printed upon to be released for adjustment upon the platen by drawing the upper ends of the paper-guide 2 forward, which is found a very convenient and cheap arrangement. This is accomplished 40 by pivoting curved arms 3 upon the rod Q', the said curved arms extending toward the printing-point and supporting a roller 4, the said roller being held normally in contact with the platen by means of a spring or springs 5, Fig. 1, which have their upper ends rigidly 45 attached to the curved arms 3 and their lower ends resting loosely upon the lower longitudinal bar L' of the carriage. The paper-guide 2 has its inner and lower edge firmly connected 50 with the arms 3, so that when the upper edge of the said paper-guide is moved in the direction indicated by arrow, Fig. 1, the roller 4 is carried away from the platen. By this simple arrangement the operator can draw the 55 paper-guide toward him by a movement of the finger, while the paper is quickly and readily adjusted by the thumbs, or the paper can be grasped with the first fingers and thumbs, while the paper-guide is drawn 60 toward him with the other fingers.

The platen is rotated by means of an operating-lever 6, which has one end pivotally connected to the carriage between the ears 7, curved downward and upward and then 65 extending outward to form an operating-handle. To limit the upward movement of the said lever 6, a lock or stop pin 8 projects in-

ward therefrom to engage the ratchet-wheel 9 secured to one end of the platen F', and a pin 10 projects outward from the said lever 70 and rests upon the upper edge of a forwardly-extending projection 11 at one end of the carriage. This pin 10 limits the downward movement of the said lever. When in the position shown in Fig. 2, a depending pawl 12 75 has its lower end held in engagement with the ratchet-wheel 9 of the platen by the gravity of its upper outwardly-extending end 13, and an upward pull of the lever 6 will rotate the platen a distance equal the two teeth 80 of the ratchet-wheel 9 before the stop-pin 8 engages the said ratchet-wheel. If it is desired to rotate the platen one tooth at a time for a single-line spacing, the space-regulator 14, pivoted in a slot 15, Fig. 3, of the ex- 85 tension 11, is turned forward, so that the shoulder 16 thereof will support the lever 6 by engaging the pin 10. The stop-pawl 17 extends forward from the rear portion of the carriage and is held in engagement with the ratchet- 90 wheel 9 of the platen by means of a spring 18, for the purpose of preventing the platen rotating backward and for the purpose of holding it in place while printing.

It is desirable in a type-writing machine 95 to disengage the pawls 13 and 17 from the ratchet-wheel of the platen, so that the platen can freely be revolved in any direction. In order to accomplish this conveniently I pivot a lever 19 upon the pivotal point of the platen 100 and this lever has a rearwardly-extending arm 20, provided with notches or recesses 21, and with a straight surface 22, upon which rests a pin 23 extending from the pawl 17. Extending upward from this lever 19 is a por- 105 tion 24, by means of which the lever is drawn forward, as indicated by arrow, Fig. 2, when it is desired to move the pawls from the ratchet-wheels to allow the platen to be freely 110 revolved backward or forward. The forward movement of this lever 19 raises the pawl 17 by its pin 23 engaging therewith, and when the double spacing is being used the lever is carried sufficiently forward to have the pin 23 rest in the rearmost notch 21 thereof. 115 When the lever reaches this point the portion 24 engages the pawl 12 just inside its pivotal point 25, thus tilting the pawl, as shown in dotted lines, and throwing it out of engagement with the said ratchet-wheel. The lever 120 19 is shown in this position in dotted lines and the pawls 12 and 17 are moved out of engagement with the ratchet-wheel 9, thus allowing it to freely revolve in any direction. If the lever 6 is adjusted by the spacer 14 for 125 single spacing the lever 19 will of course only be moved sufficiently forward to have the pin 23 of the pawl 17 rest in the first notch 21 of said lever 19, which in this instance will bring the portion 24 in engagement with the pawl 130 12, since the lever 6 will be held in a raised position by the space-regulator 14. The lever 19 is thrown back to its normal position automatically by the lever 6 when it is raised

for rotating the platen, and this is true whether the lever 6 be set for single or double spacing.

Attached to the upper end of the rear vertical portion *c* of the universal frame is a block 27, which is slotted longitudinally to receive the dog or dogs. As shown in Figs. 1 and 6 but a single movable dog is used, while in Figs. 4 and 13 I show two movable dogs, both of which forms will now be fully described.

I will first describe the construction and operation of a feed mechanism consisting of the single movable dog. In Figs. 1, 6 and 7 the movable dog is indicated by figure 28, and this dog, as will be seen, is placed in a longitudinal slot 29 in the block 27, and has one end provided with a longitudinal slot 30, through which the pin 31 passes transversely, the said pin forming a pivotal point for the said dog and a support. A spring 32 has one end attached to the part *c* of the universal frame, the free end of the spring resting upon a depending portion 33 of the dog below its pivotal pin 31. This spring therefore serves two functions, one of which is to move the dog endwise and the other to hold the opposite end of said dog up in engagement with a transverse pin 34. A tooth 35, forming an immovable dog, extends upward from the block 27, as shown, and co acts with movable dog for producing a feed mechanism in connection with the feed-rack *S'*, as will now be described. By reference to Fig. 1 it will be seen that the movable dog 28 is normally in engagement with the feed-rack when the universal frame is at rest, and the endwise movement of the carriage carries the said movable dog endwise against the tension of the spring 32, until stopped by the pin 31, engaging the inner end of the slot 30. When in this position the immovable dog is directly in line with the rigid dog 35, and by a pressure upon the universal frame when a key-bar or space-bar is depressed the upper end of the part *c* of the universal frame is moved inward, carrying the movable dog out of engagement with the feed-rack and the rigid dog into engagement therewith not allowing the carriage to move when the type-bar is being carried upward for an impression. As soon as the movable dog is released it is forced endwise by the spring 32 into the position shown in Fig. 6 and opposite the succeeding tooth of the feed-rack. The upward movement of the universal frame carries the upper end of the part *c* outward, thus carrying the rigid dog 35 out of engagement with the feed-rack, and the movable dog again in engagement therewith, which is immediately moved endwise by the spring-actuated carriage, thus feeding the carriage one space, as will be understood. When it is desired to move the carriage in the opposite direction, the movable feed-dog being normally in engagement with the feed-rack, the dog is forced downward against the pressure of the spring

32, thus allowing the carriage to be moved freely in that direction.

From this description it will be seen that I have an endwise-moving dog pivoted at one end and depressible at its opposite end, the pivotal point being away from the tooth of said dog. While I show the dog pivoted to the left-hand side of Fig. 6, it will be understood that the dog could be pivoted at its opposite end and depressible at the end which is now shown pivoted, a pull-spring for the dog being used, though I prefer it as herein shown. For the purpose of preventing a clicking sound when the dog is moved endwise by the spring 32, I place a piece of rawhide or rubber 37 in the said slot 30, which engages the pin 31 and deadens the sound, as will be understood, the rubber or rawhide being capable of adjustment by means of a screw 38 for regulating the endwise movement of the dog. If desired, the rawhide or rubber may be omitted and the screw itself come in contact with the pin 31 for the purpose of adjusting the dog endwise.

So far I have described a feed mechanism which feeds the carriage the whole space of a letter when a key-lever or the spacing-lever is released. I prefer, however, to provide two movable dogs instead of one, one dog feeding the carriage a half a space when the key-lever is depressed and before the type-bar reaches the printing-point, and the other dog a half a space when the key-lever or space-bar is released, thus producing what I term a "synchronous movement," which prevents the jerking caused by the carriage when it moves a whole space at a time, and to do away with any spring movement or action for throwing the dogs endwise, substituting therefor the movement of the carriage itself, which when in engagement with one dog forces the other dog backward in position to receive the next tooth of the feed-rack, each dog moving half a space at a time, which will now be fully described. This double-dog movement is illustrated in Figs. 4, 5 and 13, in which 39 represents a block capable of detachment from the universal frame by passing the screws through the frame through the under side thereof into the said block. This block is slotted longitudinally for the reception of two endwise-moving dogs which consist of bars 40, having the dog-teeth 41 projecting therefrom between their ends, the said bars having projections 42 at opposite ends which engage, respectively, each other and the walls of the longitudinal groove, as clearly shown in Figs. 4 and 5, for the purpose of reducing friction of the dogs in their movements. These dogs, like the ones shown in Figs. 2, 6 and 7, are provided at one end with longitudinal transverse slots 43, through which the pivotal pin 47 passes, and the use of an adjusting-screw and rubber or rawhide may or may not be used, as shown in Fig. 6, and as also shown in Fig. 13 in connection with the double dogs. The opposite ends of these bars 40 are reduced in thickness, and a

pin 48 passes through the block 27 over their ends to limit their upward movement. A spring 49 is placed in the groove of the block 39 and under the said dogs, the same being divided into two springs, as clearly shown in Fig. 9, one part thereof engaging each dog, respectively, for holding it up in engagement with the teeth of the feed-rack. Fig. 4, as also Figs. 13 and 5, are enlarged views, showing an exaggerated endwise movement of the dogs. A rocking-bar 50 is pivoted between its ends to an extension 51 of the block 39, and which is normally in engagement with the adjacent enlarged ends of the bars 40 of the dogs. From this it will be readily understood that when one dog is moved to the left its enlarged end engages one end of the rocking-bar 50, throwing the opposite end of the said bar in the opposite direction, which moves the other dog in a reverse direction from the one being operated upon. The operation of these dogs for feeding the carriage a half-space at a time is as follows:

Carrying in mind that the dogs move each a half-space at a time, the carriage engaging one dog and the other dog opposite the succeeding tooth of the feed-rack, the lateral movement of the universal frame carries the first dog out of engagement with the feed-rack and the second dog is brought into engagement with the succeeding tooth of the feed-rack, and the endwise movement of the carriage under tension of the usual spring-drum moves the second dog a half a space, which, as before described, moves the first dog in the reverse direction a half-space, bringing it opposite the tooth with which the second dog is in engagement. Now a vibration of the universal frame in the opposite direction brings the first dog in engagement with the tooth with which the second dog is in engagement and the second out of engagement therewith, one dog of course engaging the tooth before the other releases it. This now reverses the operation and the first dog is moved endwise by the carriage, which at the same time throws the second back again, as previously described. In this way the carriage is fed half a space when the universal frame is depressed and before the type-bars reach the printing-point, and a half a space when the universal frame is allowed to rise by the release of a key-lever or of the spacing-bar.

Instead of using a hard button for the key-levers, which is heretofore common, I use a rubber button 70, which is made sufficiently soft to prevent sudden jars from the fingers when the key-lever is struck. These buttons 70 are preferably cast or molded with a depression 71 in their upper face corresponding in contour to the character which it is designed to have the button represent and then this depression is filled in with the rubber of about the same elasticity but of a different color, so that as the button wears the letter will still remain. The outer ends of the key-levers are bifurcated, as shown in Fig. 15, and the

buttons are preferably placed by heating the bifurcated end of the key-lever and forcing the button thereon, the heat from the lever melting the engaging portion of the button so that when it cools the button is cemented thereto. If desired the button may be provided with a split which will facilitate the placing of the end of the key-lever therein, the heat from the said lever melting the rubber sufficiently to close the split after cooling. This button, instead of being formed of rubber, may be made of felt or other soft material which will accomplish the same object.

I secure the type to the ends of the bars by forming a socket 75 circular in form, as clearly shown, and cast integral with the type at the back side thereof a circular portion 76, which fits within the said socket 75, and the socket then clamped tightly against the projection 76 by means of a suitable tool. This makes a very convenient and simple way of attaching the type to the bars. If desired the projections 76 may have a groove in their outer edges and the socket provided with a rib which extends into the said groove, or vice versa, which will prevent the type from having any lateral movement within the socket.

To prevent noise by the rebound of the type-bars against the plate L, which holds the inner ends of the division-plates, I provide a cushion 78 of rubber or felt, as shown in Fig. 1, and which also prevents wear upon the type-bars by striking the metal plate L, as they otherwise do.

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

1. In a type writing machine, the combination of a printing mechanism, two carriage supporting bars, one in a vertical line below the printing point of the platen, and the other behind the platen and in a horizontal line with the printing point thereof, and a propelling device connected with the carriage equi-distant from said supporting bars for the purpose described.

2. In a type writing machine, the combination of a printing mechanism, a carriage carrying a platen, a supporting bar for the carriage below the platen and practically in a line drawn vertically from the printing point of the platen, a second supporting bar in rear of said carriage and practically in a horizontal line drawn from the printing point of the platen, and a propelling device for the carriage connected therewith practically midway between the supporting bars, and practically equi-distant from the printing point and said supporting bars.

3. In a type writing machine, the combination of a printing mechanism, a carriage carrying a platen, two parallel bars, one practically in a vertical line drawn from the printing point and the other practically in a horizontal line drawn from the printing point, a propelling and a feeding device each connected to or engaging the said carriage prac-

tically on a line drawn from one supporting bar to the other.

4. In a type writing machine, the combination of a carriage carrying a rotating platen, a ratchet wheel secured to the platen at one end thereof, an operating lever having one end pivoted in rear of the journal of the platen and extending thereunder to the front of the platen, a stop upon the lever above the upper end of the carriage and resting thereon, and a line regulator horizontally pivoted to the end of the carriage and having an L-shaped recess forming a shoulder adapted to be turned under the said stop.

5. In a type writing machine, the combination of a carriage carrying a rotating platen, a ratchet wheel therefor, an operating lever carrying an operating pawl, a retaining pawl, a device for holding the operating lever upward for single spacing, and a device having a cam surface and two notches adapted to engage the retaining pawl, the parts operating substantially as specified.

6. In a type-writing machine, the combination of a platen, a printing mechanism including a universal frame, a tilting frame pivotally supported midway the length of said platen, and an arm extending upward from one side of said universal frame and curved inward and engaging the said centrally supported tilting frame.

7. In a type writing machine, the combination of a platen, a printing mechanism, a spring drum, a universal frame forming a part of said printing mechanism, the said frame having substantially a horizontal portion extending under the key levers, and a vertical arch extending over said spring drum.

8. In a type writing machine the combination of a platen, a printing mechanism, a universal frame forming part of said printing mechanism and consisting of a portion extending under the key levers and a vertical portion, a vertical spring having its lower end suitably connected and its upper end engaging the upper end of said vertical portion of the universal frame.

9. In a type writing machine the combination of a shifting frame carrying type bars and division plates, the latter having widened ends with projecting prongs, and the end piece for said frame having recesses or slits in its upper and lower edges to receive the prongs of said division plates.

10. In a type writing machine the combination of a shifting frame carrying type bars and division plates with vertical outer ends, the said frame carrying an end piece for holding the inner ends of the said plates, and a piece having vertical recesses in its inner side for receiving and holding the outer vertical ends of the plates.

11. An end piece for the shifting frame of a type writing machine consisting of a piece forming a portion of a vertical circle having rearwardly extending ears at its ends with

longitudinal recesses in their outer faces, radiating slits or recesses in its upper edges, and rearwardly extending lugs or projections between the said ears.

12. In a type writing machine a substantially horizontal pivoted outwardly extending type bar, in combination with a substantially horizontal inwardly extending intermediately pivoted key lever having its inner end engaging directly the type bar at a point between its type and pivotal point, all combined to operate as described.

13. In a type writing machine, the combination of an outwardly extending pivoted type bar, and an inwardly extending key lever beneath said bar, the said bar and lever having approximately parallel engaging surfaces between the pivotal point of the bar and its type, the said engaging surface being cut away for the purpose described.

14. In a type writing machine the combination of a type bar and key lever having a longitudinal variable engaging surface between the pivotal point and type of said bar.

15. In a type writing machine the combination of an inwardly extending key lever, and a type bar extending over the key lever in an opposite or approximately opposite direction, the type bar having an engaging surface between its type and pivotal point which engages the inner end of the key lever, and a projection nearer its pivotal point than said surface for the purpose described, and the key lever having a projection engaging the type bar projection.

16. In a type writing machine the combination of a type bar and key lever, the latter engaging the former near its pivotal point for operating it, and the type bar and key lever having abutting surfaces exerting an endwise pressure upon the key lever by the rebound of the bar for the purpose described.

17. In a type writing machine the combination of a type bar and a key lever for operating it, the said bar and lever having substantially straight abutting surfaces when in their normal position to prevent rebound of the type bar.

18. In a type writing machine the combination of a type bar and a key lever, the key lever having a socket, the type bar having a projection entering said socket and a second projection forming with the first a socket to receive the lower projection of the key lever socket to prevent the type bar traveling ahead of the key lever.

19. In a type writing machine the combination of a printing mechanism, a platen, a shifting frame carrying the type bars of the printing mechanism, a transverse shaft carrying an arm for lifting the said frame, a spacing frame pivoted upon said shaft and carrying a spacing bar at its outer end, and an arm at each end of the shaft outside of the spacing frame, each arm carrying a shift plate at its outer end at each end of the

spacing bar, the inner ends of said shift bars being rigidly connected with the said shaft.

20. In a type writing machine the combination of a carriage and its rack bar, with two endwise moving dogs, one pivoted at one end and one depressible at the opposite end.

21. The combination with a propelled carriage and its rack bar, of a dog carrier moving transverse the said rack bar, and two longitudinally moving escape dogs carried by the said carrier, and adapted to alternately engage the rack by the transverse movement of the carrier, and a rocking bar intermediately pivoted between said dogs and having its opposite ends engaging them respectively, for the purpose described.

22. In a type writing machine the combination of a block having a longitudinal groove, a feed dog moving in said groove, the dog being pivoted at one end and depressible at the other.

23. In a type writing machine the combination of a printing mechanism, two parallel supporting bars, one above and in rear of the other, a carriage having its lower portion resting upon the lower bar and supporting the weight of the carriage, and a wheel at the opposite or upper end of the carriage engag-

ing the upper bar to support the carriage laterally.

24. In a type writing machine the combination of a printing mechanism, parallel supporting bars one above and in rear of the other, a carriage carrying wheels at its lower portion which rest upon the lower bar and support the carriage, and a wheel at the upper rear portion of the carriage engaging the upper bar, and projections from the carriage also engaging the said bar.

25. In a type writing machine, the combination of a printing mechanism, parallel supporting bars one above and in rear of the other, a carriage having its lower portion resting upon the lower bar and supported thereby, and a centrally located wheel at the upper rear portion of the carriage engaging the upper bar, and a projection extending from the carriage at each side of said wheel which also engage the said bar.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES D. DAUGHERTY.

Witnesses:

M. C. DRYER,
E. A. MARSH.