

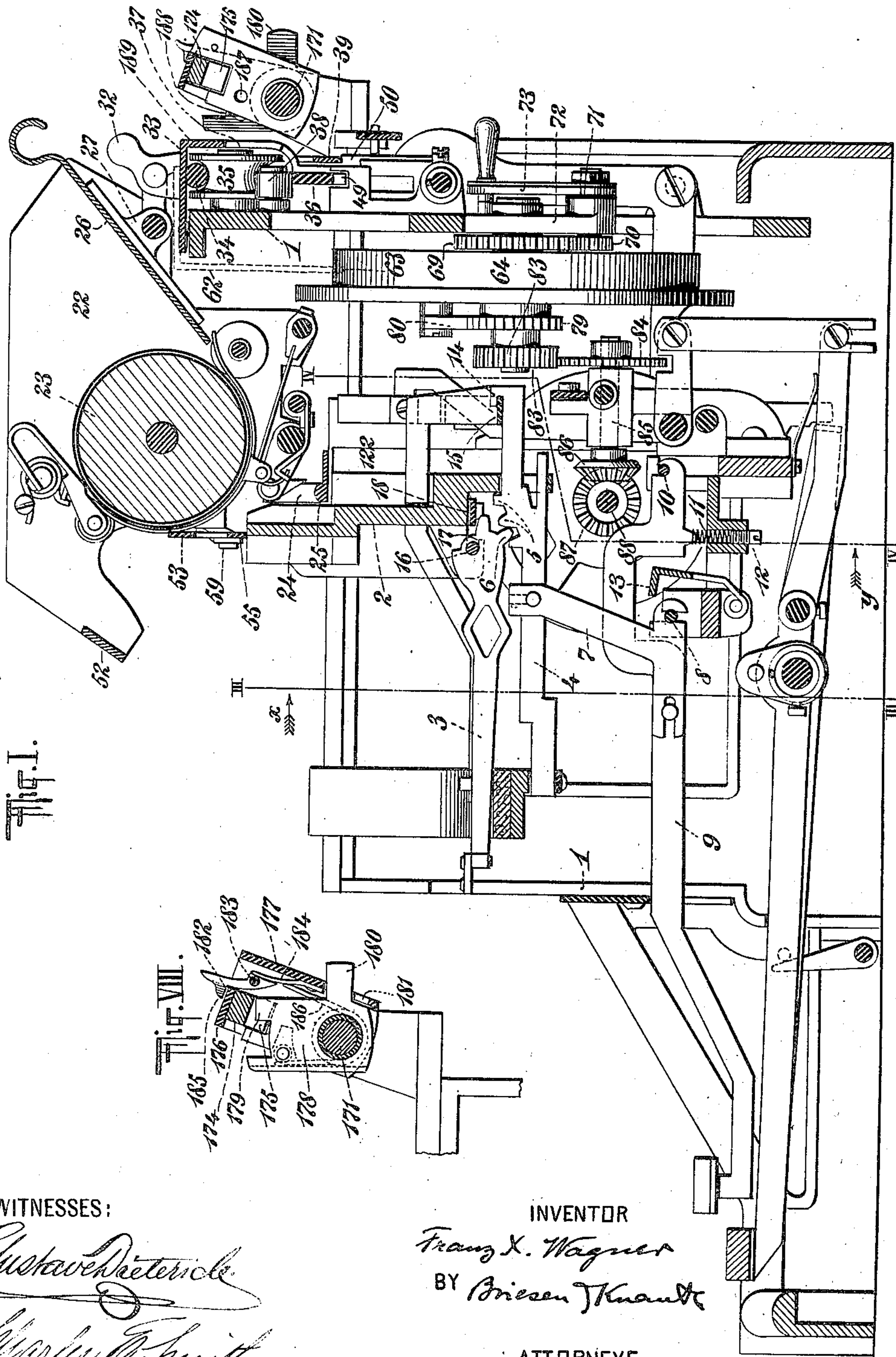
No. 819,963.

PATENTED MAY 8, 1906

F. X. WAGNER.  
TYPE WRITING MACHINE.

APPLICATION FILED JUNE 3, 1901.

8 SHEETS—SHEET 1.



WITNESSES:

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*Charles E. Smith*

INVENTOR

*Franz X. Wagner*  
BY *Briesen Knaut*

ATTORNEYS

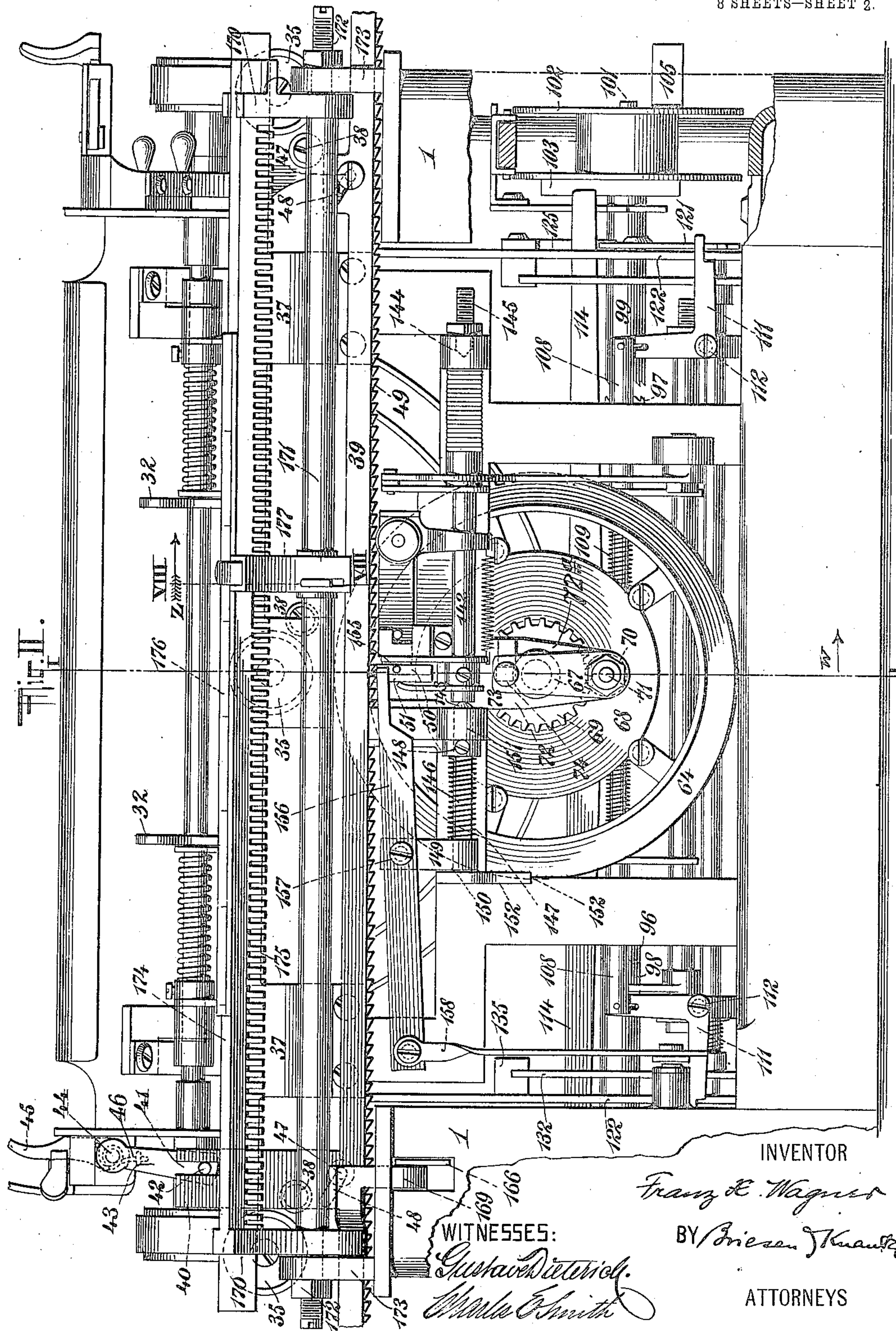


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8 SHEETS—SHEET 2.



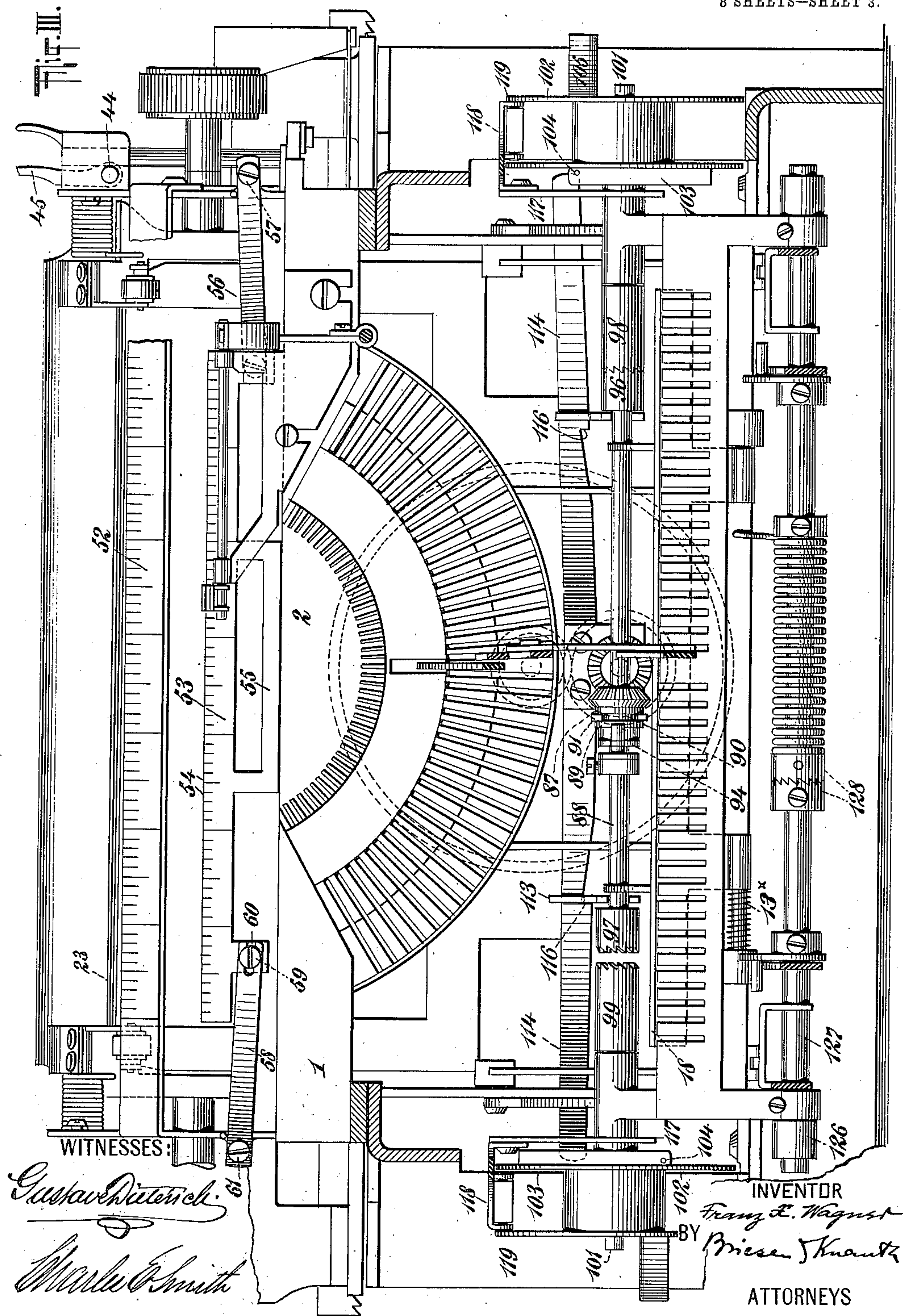


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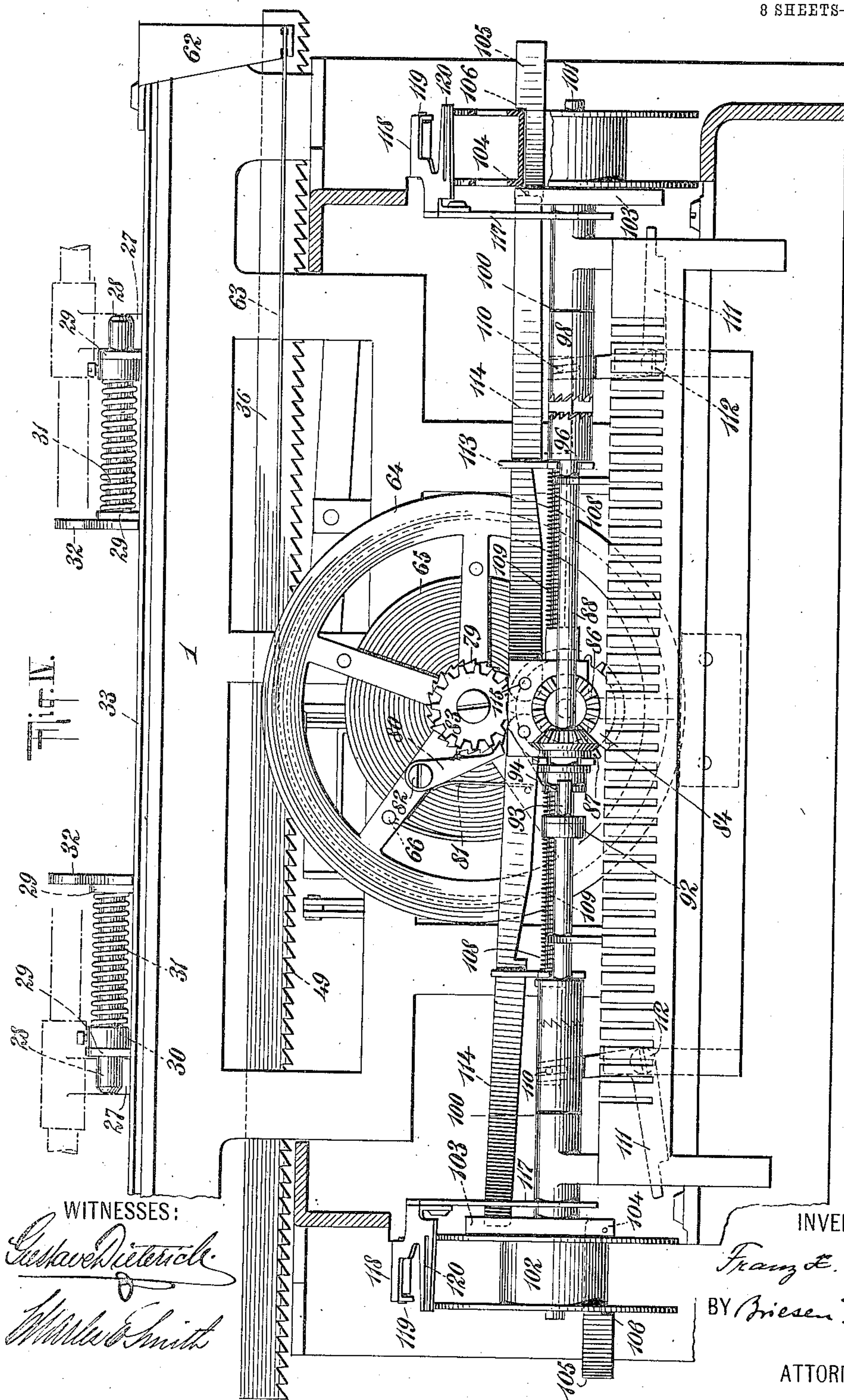
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8 SHEETS—SHEET 4.



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8 SHEETS—SHEET 5.

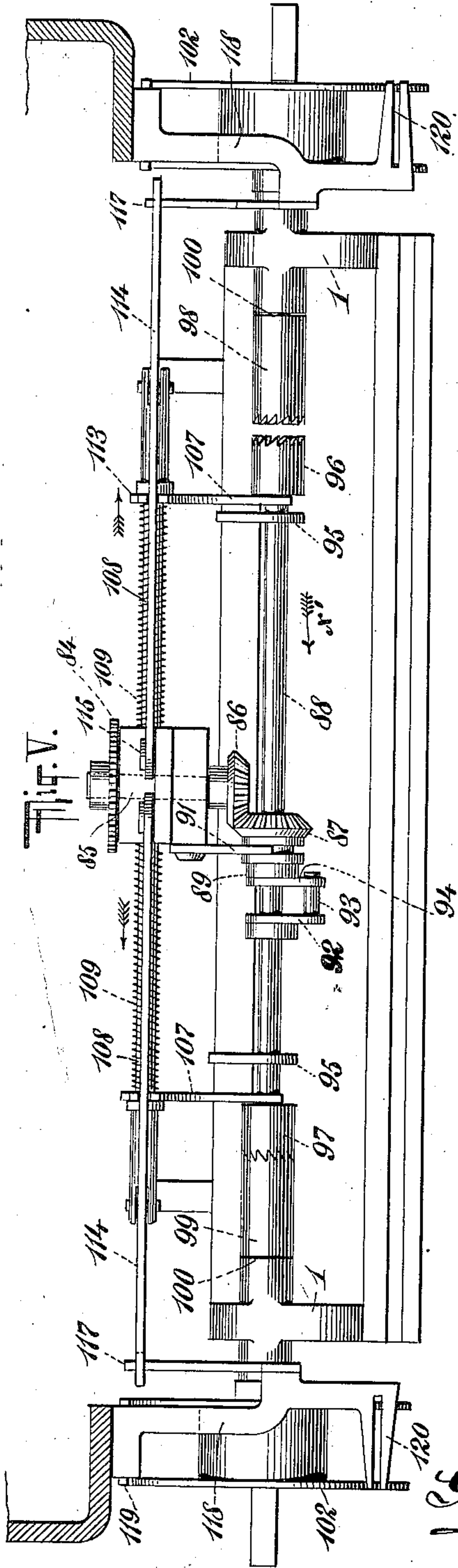


Fig. V.

Fig. VI.

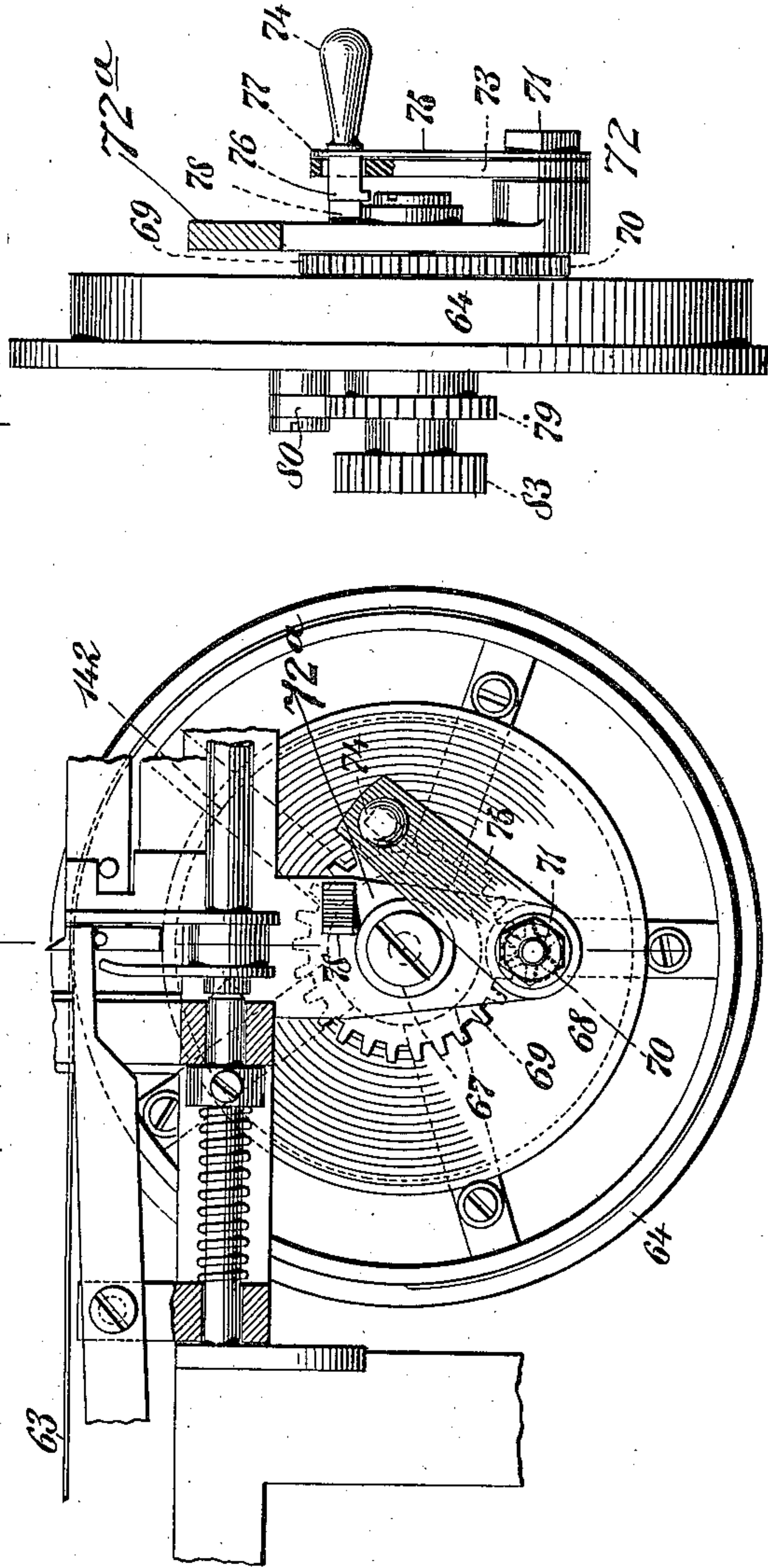


Fig. VII.

Fig. VIII.

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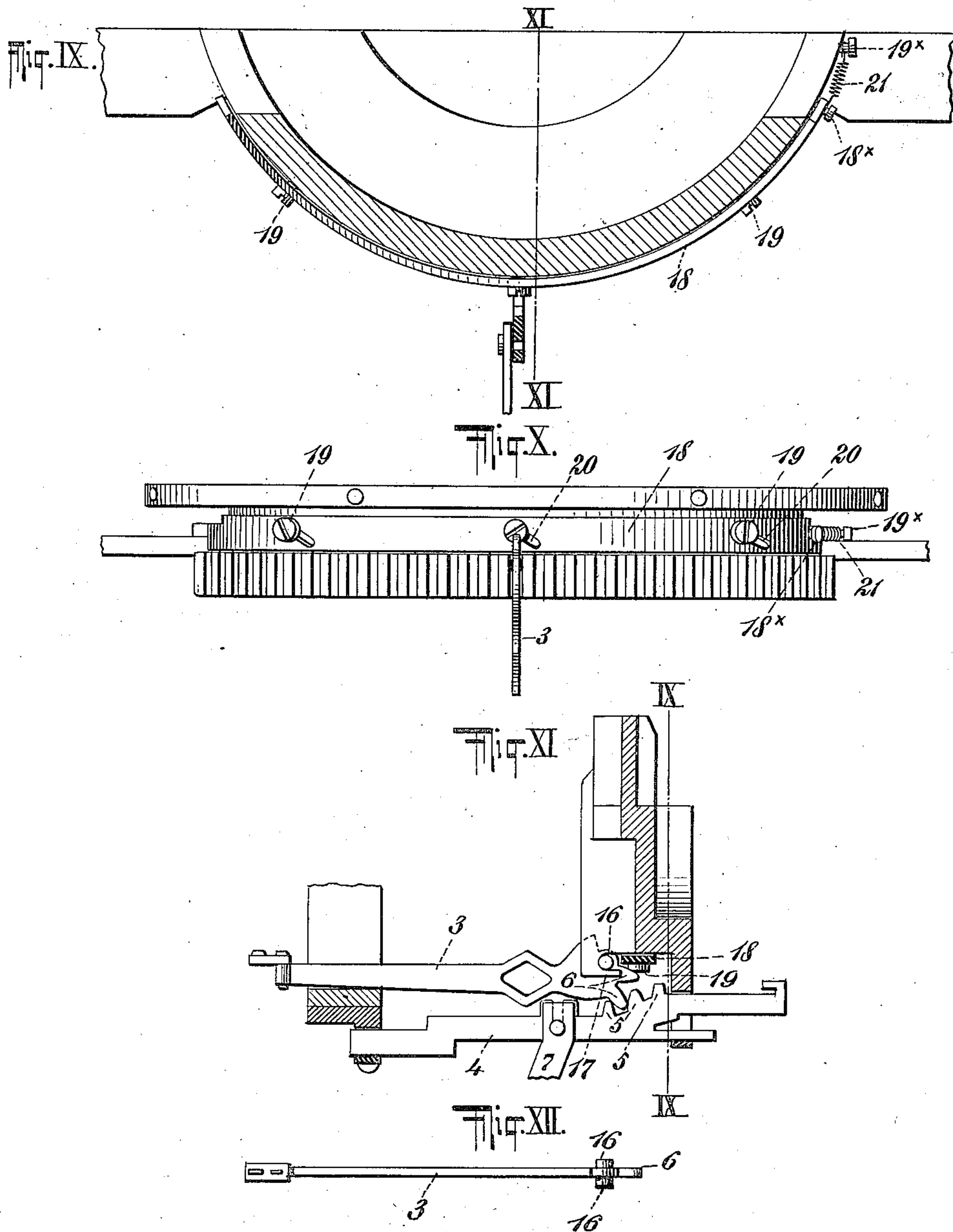
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APPLICATION FILED JUNE 3, 1901.

8 SHEETS—SHEET 6.



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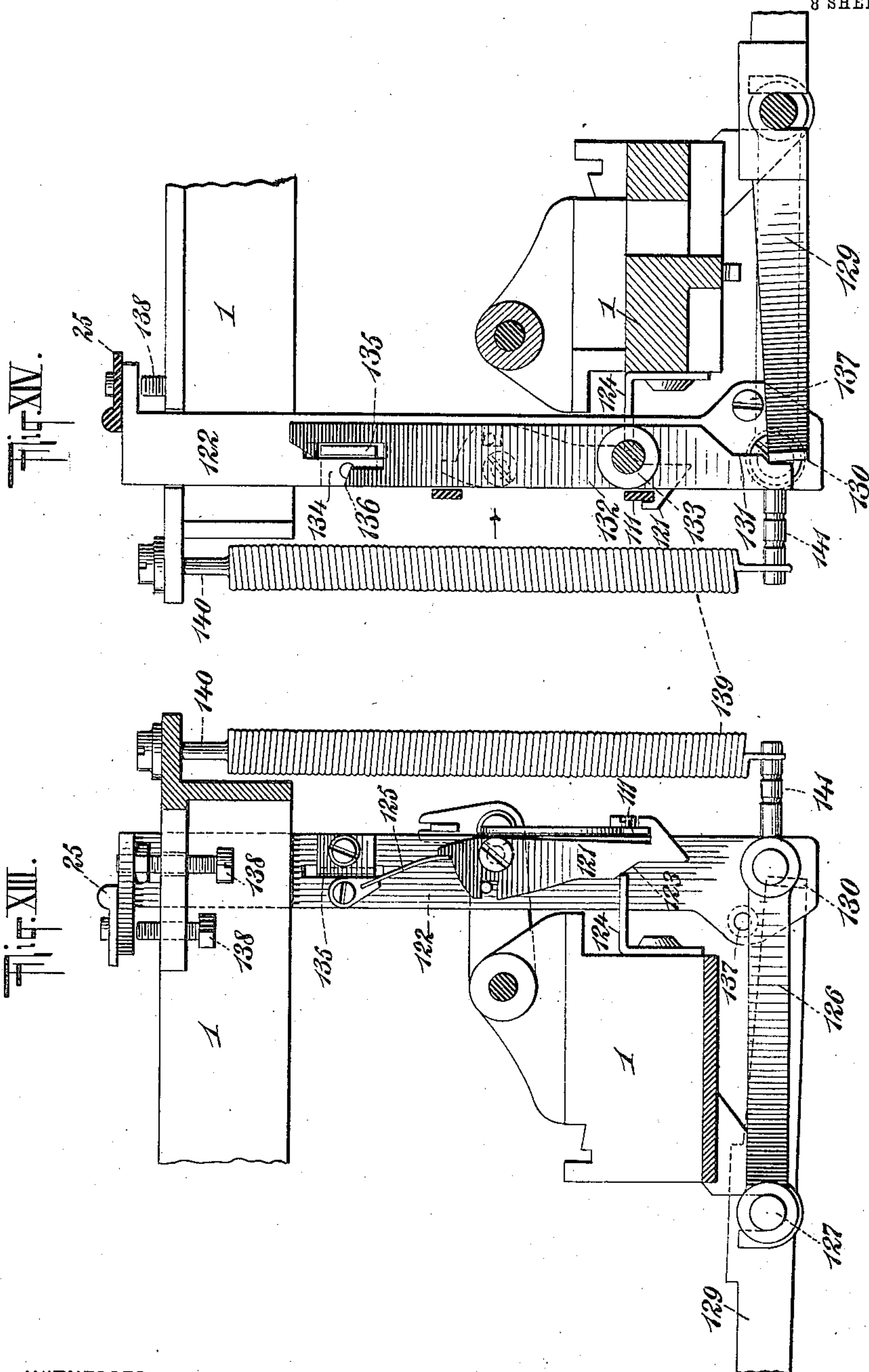
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F. X. WAGNER.  
TYPE WRITING MACHINE.

APPLICATION FILED JUNE 3, 1901.

8 SHEETS—SHEET 7.



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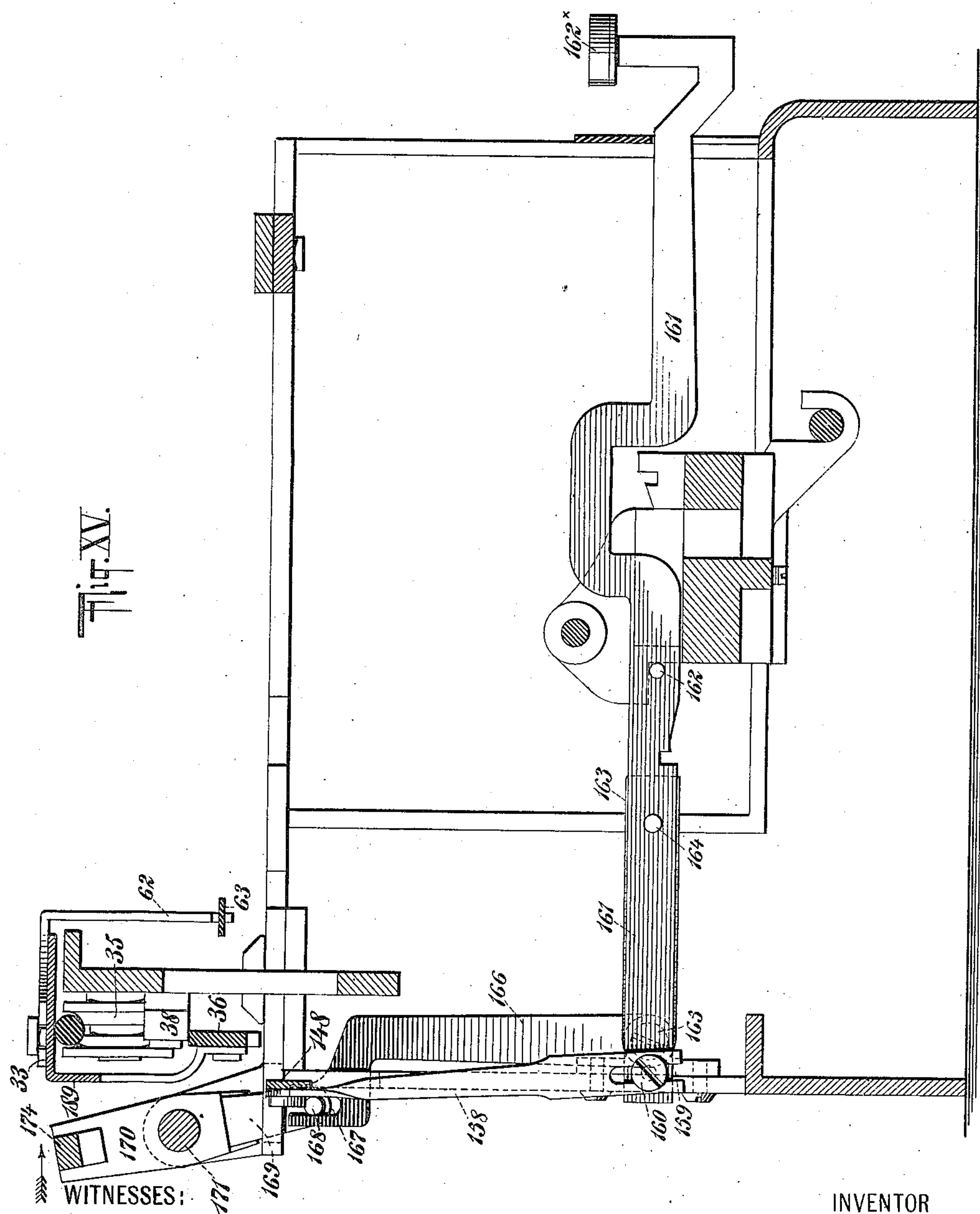
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F. X. WAGNER.  
TYPE WRITING MACHINE.

APPLICATION FILED JUNE 3, 1901.

8 SHEETS—SHEET 8.



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# UNITED STATES PATENT OFFICE.

FRANZ X. WAGNER, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## TYPE-WRITING MACHINE.

No. 819,963.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed June 3, 1901. Serial No. 62,828.

*To all whom it may concern:*

Be it known that I, FRANZ X. WAGNER, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to type-writing machines; and the object of said invention is to provide efficient mechanism whereby the various ends to be attained by said machine may be effectively accomplished.

To these ends my invention consists in the novel arrangement and combination of parts hereinafter described and claimed.

In the accompanying drawings, wherein like numerals designate corresponding parts in the various views, Figure I is a central sectional view of the machine from front to rear, the section being taken on the line I I of Fig. II and looking in the direction of the arrow *w* in said figure. Fig. II is a rear elevation of the machine with parts broken away. Fig. III is a longitudinal sectional view of the machine, taken on the line III III of Fig. I and looking in the direction of the arrow *x* in said figure. Fig. IV is a longitudinal sectional view of the machine, taken on the line IV IV of Fig. I with the carriage removed and looking in the direction of the arrow *y* in said figure. Fig. V is a fragmentary detail plan view of the ribbon-reversing mechanism. Fig. VI is a detail face view with parts broken away of the feed-dog and spring-drum. Fig. VII is a detail edge view of the spring-drum. Fig. VIII is a detail vertical sectional view of the tabulating-stop, the section being taken on the line VIII VIII of Fig. II and looking in the direction of the arrow *z*. Fig. IX is a detail rear view, partly in section, of a portion of the machine to be hereinafter more fully explained, the section being taken on the line IX IX of Fig. XI. Fig. X is a bottom view of the same. Fig. XI is a transverse sectional view on the line XI XI of Fig. IX. Fig. XII is a detail top view of one of the type-bars. Fig. XIII is a detail outside view, partly in section, of certain of the mechanism to be hereinafter described. Fig. XIV is a like view of the same looking from the opposite direction or from the center of the machine. Fig. XV is a detail vertical sectional

view from front to rear of a portion of the machine to illustrate the tabulating mechanism, some of the parts being omitted for the purpose of clearness.

Generally speaking, the invention may be said to be directed to mechanism of the following character: First, mechanism for readily attaching the carriage to and detaching it from the machine, whereby interchangeable carriages can be substituted one for another; second, mechanism for readily attaching the feed dog or dogs to and detaching them from the machine, whereby interchangeable feed-dog mechanism of different characters can be substituted one for another; third, spring-drum mechanism.

In the drawings, 1 designates the framing of the machine, in which the type-bar segment 2 and various parts are mounted. A plurality of type-bars 3 are mounted in the segment 2, though but a single type-bar and action is shown in order to avoid confusion in the illustration. Each of the type-bars 3 coöperates with a slide 4, which is provided with teeth 5, forming a rack-like portion that meshes with the rack-like portion formed by teeth 6 on the type-bar. Each slide 4 is removably connected to an angular lever 7, which is pivoted to a fixed portion of the machine, as indicated at 8. Each lever 7 is likewise removably connected to a key-lever 9, that is pivoted to a fixed portion of the machine, as indicated at 10. Each key-lever 9 is maintained united to its pivot and in the normal position by a spring 11, the tension of which may be regulated by suitable means, such as the set-screw 12. By these means the tension or "weight" on the key-levers can be individually regulated, so that the key-levers which control the side bars may have less tension than is applied to the levers controlling the center bars, thereby equalizing the weight on all the keys. Extending throughout the width of the keyboard and adjacent to the pivots 8 of the angular levers 7 is a pivoted latch 13, which is normally maintained in the locked position by a spring 13<sup>x</sup>. (See Fig. III.) When the latch 13 is moved to the position indicated in Fig. I, it permits the ready withdrawal of any or all of the levers 7 from pivot 8. From an inspection of Fig. I it will be observed that each of the slides 4 is provided with a hook-



like portion 14, at the rear end thereof, which is adapted to engage and move the universal bar 15 with it in the forward movement of any slide. A movement of any slide in the reverse direction may, however, take place independently of said universal bar.

From an examination of Figs. I, XI, and XII it will be observed that each type-bar is provided with lateral projections or pivots 16, which are adapted to be seated in open-mouthed recesses 17, and the pivots of the type-bars are maintained in position in the recesses or bearings by a segmental bar 18. This segmental bar 18 is connected to the segment 2 by the pin-and-slot connection 19 20, the slots 20 being diagonally disposed, so that a longitudinal pressure exerted upon the bar will cause it to move laterally as well as longitudinally. A spring 21 (see Figs. IX and X) is connected at one end to a pin 18<sup>x</sup>, carried by the bar 18. The opposite end of this spring is secured to a pin 19<sup>x</sup>, which is carried by a fixed portion of the machine. This spring normally maintains the bar in the locking position. (Indicated in Figs. X and XI of the drawings.) In order to release any or all of the type-bars, it is merely necessary to apply endwise pressure to bar 18, when the bar will be moved longitudinally and laterally, thereby permitting any or all of the type-bars to be withdrawn from their bearings.

From an inspection of Figs. I, II, III, and IV of the drawings it will be observed that the platen-frame 22 supports a platen 23 and likewise carries suitable cooperating paper-feed mechanism. An antifriction-roller 24 is connected to the platen-frame and is adapted to bear upon a track 25, that is connected to suitable shifting mechanism to move it vertically, together with the platen, for the purpose of upper and lower case printing. To the rear of the paper-shelf 26, which is connected to the platen-frame, is secured recessed studs 27. Each of these recessed studs 27 is adapted to receive a spring-pressed bolt 28, as clearly indicated in Fig. IV of the drawings. The bolts 28 are preferably circular in cross-section in order that the platen-frame may oscillate thereon when the forward portion of the platen-frame is moved for upper and lower case printing. Each of the bolts 28 projects through supporting-studs 29 and is adapted to move longitudinally therein. Between the studs 29 a sleeve 30 is adjustably secured to each of the bolts, and an expansible spring 31 is adapted to bear at one end upon one of the studs 29 and at the other end upon the adjustable sleeve 30 in order to normally maintain the bolt in the projected position. (Indicated in Fig. IV of the drawings.) In this position each of the bolts passes through a cooperating recessed stud 27. The free end of each bolt 28 has secured thereto a finger-piece 32. In or-

der to remove the platen-frame from the machine, it is merely necessary to exert a pressure in opposite directions upon the finger-pieces 32, thereby withdrawing both bolts 28 from the recessed studs 27, when the platen-frame and the parts connected thereto are adapted to be removed and, if desired, another platen-frame, carrying a platen of larger or smaller dimensions, may be readily mounted in place by permitting the bolts 28 to be projected into cooperating recessed studs 27 thereon. It will be observed that what I have termed a "platen-frame," with the parts connected thereto, in reality constitutes the carriage. The supporting-studs 29 are connected to a longitudinally-movable bar 33. This bar 33 has connected thereto a rod 34, which is adapted to bear upon grooved rollers 35, which are pivoted to the framing 1 of the machine. These rollers are preferably three in number, as indicated in Fig. II of the drawings. The feed-rack 36 is carried by depending arms 37, which extend from the bar 33. The upper edge of the rack 36 is parallel to the bottom of the rod 34, and the antifriction-rollers 38 are adapted to bear upon the upper edge of the rack, as indicated in Fig. I, to prevent the bar 33 and the parts connected thereto from being lifted off or out of the machine. The rollers 38 are preferably three in number, and one is located adjacent to each grooved roller 35, so as to form oppositely-disposed bearings for the rod 34 and the upper edge of the rack 36. Parallel with and adjacent to the feed-rack 36 is mounted a vertically-movable release-bar 39. This bar 39 has an upwardly-extending arm 40, (see Fig. II,) which is slotted, as indicated at 41. A pin 42, which is carried by a crank-arm 43, projects into this slot 41 in order to form an operative connection between the arm 40 and the crank-arm 43 and to permit the entire platen or carriage to be disconnected from the machine. The crank-arm 43 is connected to a rock-shaft 44, that has a finger-piece 45 connected thereto. A coiled spring 46 (shown in dotted lines in Fig. II) is connected at one end to the rock-shaft 44 and at the other end to a fixed portion of the platen-frame in order to maintain the crank-arm 43 and the parts connected therewith normally in the position represented in Fig. II of the drawings. The so-called "release-bar" 39 is secured in place by pin-and-slot connections 47 48. The slots 48 are diagonally disposed with relation to the lower face of said release-bar, so that a movement of the finger-piece 45 will cause, through the intermediate connections between the finger-piece and release-bar, a downward movement of the latter to a point where it extends below the teeth 49 on the rack 36. This release-bar 39 is adapted at any position of the carriage to contact with the feed-dog 50. This feed-dog 50 is adapted to move downwardly or in a direction at right



angles to the direction of feed of the rack and to carry with it the other feed-dog 51, so as to release the dogs from the rack, thereby permitting a free movement of the carriage in either direction. To the forward portion of the carriage is secured a scale or index 52, which coöperates with a suitable pointer or index fixed upon the framing of the machine and which constitute the scale and pointer to indicate the location of the carriage. A second indicating mechanism is likewise provided to indicate the printing-line as well as the printing-point in order to readily make corrections and to insert words or characters in blanks, &c. This mechanism (see Figs. I and III) comprises a bar 53, which extends substantially throughout the length of the platen and is provided with indices 54, that are spaced in accordance with the letter-space distance. This bar 53 is provided with a depending portion 55, which is adapted to bear upon the top of the segment 2 and is pivoted at one end to a link 56, which link in turn is pivoted to the platen-frame, as indicated at 57. The opposite end of the bar is united to a link 58 by a pin-and-slot connection 59 60, the opposite end of said link being pivoted to the platen-frame, as indicated at 61. The weight of the bar, 53 is sufficient to maintain it at rest upon the segment 2, and it will maintain this same position irrespective of the vertical position of the platen—that is to say, irrespective of whether the platen-frame be shifted to write upper or lower case printing. Thus the indicating-bar 53 will be maintained adjacent to the printing-line and at the same distance beneath the same at all times, whether the platen be shifted for upper or lower case printing.

From the foregoing description it will be readily seen that it is merely necessary to withdraw the bolts 28 in order to remove the entire carriage and its appurtenances and to replace another coöperating carriage, which may be provided with a cylinder of different dimensions, and that no special provision or change is necessary in the construction of the machine itself to enable the operator to substitute a wide carriage for a narrow carriage.

From an examination of Figs. I and XV of the drawings it will be observed that the bar 33 carries a depending arm 62, which extends to a point where connection may be made with the free end of the band 63, which has its opposite end secured to the spring-drum 64. This spring-drum 64 is pivoted to the framing of the machine and has a spring 65 secured at one end thereto, as indicated at 66 in Fig. IV of the drawings. The opposite end of this spring is secured to a sleeve 67, (see Fig. II,) that is contained within the spring 65 and extends loosely through the plate 68, which is rigid with the spring-drum 64. To the rear end of the sleeve 67 is rigidly secured a gear 69. This gear meshes with

the pinion 70, (see Fig. VI,) that is secured upon a short shaft 71, journaled in a bearing 72 on a bracket 72<sup>a</sup>, depending from the frame. Upon the shaft 71 is rigidly carried a crank-arm 73. This crank-arm 73 is provided at its outer end with a handle 74, that is secured to a spring-plate 75, that coöperates with the said crank-arm. The handle 74 carries an abutment 76, that extends through an aperture 77 in the crank-arm and is adapted to be projected by the spring 75 into the path of a fixed abutment 78. The fixed abutment 78 and the movable abutment 76 are preferably beveled in opposite directions, so that a rotation of the crank-arm 75 in one direction will cause the oppositely-disposed beveled faces of the abutments 76 and 78 to be brought into contact, thus lifting the abutment 76 against the tension of the spring 75 to permit the crank-arm to be moved or rotated freely past the abutment 78. When, however, the crank-arm moves in an opposite direction, the flat faces of the abutments 76 and 78 are brought into contact, and rotation of the arms past the fixed abutment in that direction is prevented unless the handle 74 be pulled out so as to withdraw the abutment 76 from the path of the fixed abutment, when the crank-arm 73 is free to be moved in either direction. The direction in which the crank-arm is automatically prevented from further rotation by the two abutments is that in which the tension of the spring 65 is applied. By this mechanism the tension of the drum can be readily regulated without liability of the controlling mechanism entirely releasing the spring from the control of the operator. Upon the same spindle which supports the spring-drum a loose ratchet-wheel 79 is provided. Coöperating with this ratchet-wheel 79 is a pawl 80, which is normally maintained in engagement with the ratchet-wheel by a suitable spring 81. (See Fig. IV.) This pawl 80 is pivoted to the drum, as indicated at 82, so as to rotate therewith. Connected to the ratchet-wheel 79 is a gear 83, and this gear 83 meshes with a coöperating gear 84. (See Fig. I.) The gear 84 is secured to a shaft 85, the opposite end of which is connected to a bevel-gear 86. The bevel-gear 86 meshes with a coöperating bevel-gear 87, that is loosely supported upon a shaft 88. The bevel-gear 87 carries a sleeve 89, (see Fig. V,) that is grooved, as indicated at 90, to receive the fingers 91, which are secured to a fixed portion of the machine. By these means the gear-wheel 87 will at all times be maintained in mesh with its coöperating bevel-gear 86 notwithstanding any longitudinal movement of the shaft 88. Projecting from the shaft 88 is an arm 92, from which extends a pin 93, that is adapted to project into a slotted arm 94, connected to the sleeve 89. By these means a rotary motion transmitted to the bevel-gear



87 will be imparted to the shaft 88, and yet the shaft 88 will be free to move longitudinally at all times. The shaft 88 is supported in suitable bearings 95 and is adapted to move longitudinally therein. Each end of the shaft 88 is provided with a clutch-section 96 97. These clutch-sections are each adapted to cooperate with a cooperating clutch-section 98 99. The clutch-sections 98 and 99 are each secured to a shaft 100, which extends through suitable bearings in the framing of the machine, and the outer ends 101 thereof form supports for the ribbon-spools 102. An extension 103, which projects at right angles to the length of each shaft, is secured to rotate therewith. Each of these angular projections 103 has pivoted thereto at 104 a latch 105, that is adapted to project through the cooperating ribbon-spool to lock the same in place and to at the same time provide a handle whereby the shaft can be rotated. Each of these latches 105 is spring-pressed and normally maintained in locking engagement with the ribbon-spool, as indicated at the right-hand side of Fig. IV of the drawings. When it is desired to remove a spool from its shaft, it is merely necessary to press the latch 105 toward the shaft, thereby releasing the spool from the locking-shoulder 106 on the latch, and the ribbon-spool is free to be withdrawn from its shaft. The position of the latch 105 to one side of the center of revolution of the cooperating ribbon-spool enables the operator to turn the ribbon-spool and the shaft to which it is locked.

The shaft 88 has two arms 107 straddling the same and adapted to bear against the headed portions which carry or form the clutch-sections 96 97. These arms 107 are each rigidly connected to a longitudinally-movable rod 108, which is under tension of a spring 109, which tends to force it in the direction of the arrow in Fig. V of the drawings. These springs, therefore, tend to force the rods 108 outwardly in opposite directions. The free end of each rod 108 is connected by a pin-and-slot connection 110 to an angular lever 111. (See Fig. II.) This angular lever connected to each of the rods 108 is pivoted to a fixed portion of the machine, as indicated at 112. Each of the arms 107 is provided with an upwardly-extending bifurcated portion 113, which is adapted to receive a latch-lever 114, that is pivoted to a fixed portion of the machine, as indicated at 115. The lower face of each of these latch-levers 114 is provided with a nose 116, which, as indicated at the left-hand side of Fig. III of the drawings, is adapted to engage behind the extension 113 to lock the spring-pressed rod 108 against the tension of its spring. This latch-lever 114 extends into the path of an arm 117, which is carried by a vibratory frame 118, which frame is pivoted at 119 to a fixed portion of the machine. The opposite

end of this vibratory frame 118 is bifurcated, as indicated at 120, for the reception of the ribbon in its movement from one spool to another.

The free end of each of the angular levers 111 extends into the path of a movable dog or pawl 121, which is pivoted to a vertically-movable slide 122. The rear of this pawl 121 is provided with a cam-face 123, which is adapted to contact with a fixed abutment 124 and is maintained in engagement with said abutment by means of a spring 125. By this construction it will be observed that the cam-face 123 on the pawl will permit the pawl to extend outwardly beneath the free end of the angular lever 111 when the vertically-movable bar 122 is in the lowermost position, as indicated at the right-hand side of Fig. II of the drawings, and it will permit the pawl to be withdrawn from a position where it will engage the arm of the lever as the bar 122 is elevated. The arrangement of the parts is such that the free end of either of the angular levers 111 will be engaged by the pawl 121 when the free end of the angular lever is in the lowermost position, as indicated in Fig. XIII of the drawings. When, however, either of the levers is in the position indicated in Fig. II of the drawings, the pawl will be withdrawn without transmitting movement to the angular lever on the vertical movement of the bars 122. The rods or bars 122 are, as before stated, mounted to move vertically in the framing of the machine. The upper end of each of these bars is adapted to support one end of the track 25, which in turn supports the paper-carriage. The lower end of each of the bars or slides 122 is connected to a link 126, which has its opposite end secured to a bar 127, that is spring-pressed and the tension upon which may be adjusted by the clutch-sections 128. (See Fig. III of the drawings.) The levers 129 are connected to suitable shift-keys, and the rear ends of these levers are provided with right-angular projections 130, which, as indicated in Fig. XIV of the drawings, are adapted to bear against the cam-faces 131 of the vibratory levers 132, which are pivoted to a fixed pivot 133. It will be understood that one of these levers 132 and the cooperating shift-key levers 129 are carried at each side of the machine adjacent to the vertically-movable slides 122. The upper end of each of the levers 132 is bifurcated, as indicated at 134, for the reception of a stud 135, carried by the slide 122. When the parts are in the position indicated in Fig. XIV of the drawings, the lever 132 will cooperate with the stud 135, and the slide 122, which carries it, will prevent undue vibration of the parts which support the platen. When either of the shift-keys is depressed, the rear end of the corresponding shift-key lever 129 will be elevated, thereby moving the cooperating



lever 132 around its pivot in the direction of  
 the arrow in Fig. XIV. This movement of  
 the parts will bring the open mouth of the  
 bifurcated portion of the lever 132 to a posi-  
 5 tion where the stud 135 is free to be moved  
 upwardly in a vertical direction. As soon as  
 the lever 122 has reached the limit of its  
 movement in an upward direction the por-  
 10 tion 136 of the lever 132 will be moved be-  
 neath the stud 135 to prevent undue vibra-  
 tion of the lever 122 and the platen supported  
 thereon when the platen is in the raised or  
 elevated position. As soon as the shift-key  
 15 is released to permit the platen to assume the  
 lowermost position the angular portion 130  
 of the lever 129 will by its coöperation with  
 the cam-faces 131 permit the stud 135 to as-  
 sume the position indicated in Fig. XIV of  
 the drawings. From this construction it  
 20 will be seen that undue vibration of the  
 platen is provided against when it is being  
 shifted either to the elevated or to the lower-  
 most position for the purpose of writing up-  
 per or lower case characters and so that a  
 25 blurring of the writing will not take place at  
 these times. During the movement of the  
 levers 129 just described each of them will be  
 brought into contact in its upward move-  
 ment with a pin 137, which is carried by the  
 30 coöperating slide 122. It will be seen that a  
 slight movement of the lever 129 is permitted  
 before it reaches contact with the pin 137.  
 This initial movement of the lever 129 is  
 sufficient to throw the lever 132 around its  
 35 pivot in the manner hereinbefore described  
 in order to permit the stud 135 to pass out of  
 the bifurcated portion of the lever 132. After  
 the lever 129 has reached contact with its co-  
 operating pin 137 it will move the slide to  
 40 elevate the platen. Oppositely-disposed set-  
 screws 138 may be employed to regulate the  
 limit of movement of the rail 25 in both the  
 upward and downward direction. A coiled  
 spring 139 may be adjustably secured to the  
 45 framing of the machine, as indicated at 140,  
 and the opposite end of said spring may be  
 connected to a projection 141, extending  
 from one of the links 126. This spring acts  
 in the nature of a counterbalancing-spring  
 50 for the platen and the supporting mechanism  
 therefor, which coöperates with the shifting  
 mechanism to move the platen for upper and  
 lower case printing.

From the foregoing description it will be  
 55 understood that the shift-keys are effective  
 through the pawls 121 to move the angular  
 levers 111, and thereby compress the coöper-  
 ating springs 109 thereof. During the com-  
 pression of these springs the slides or bifur-  
 60 cated arms 113 will be moved to positions  
 where the coöperating gravity latch-levers  
 114 will drop to the lowermost position, there-  
 by bringing the nose 116 on each of these le-  
 vers to the outside of the slide to lock the  
 65 slides, as indicated in Fig. III of the draw-

ings, and thus maintain the springs 109 un-  
 der tension. When the springs are under  
 tension, the free ends of the angular levers  
 111 are in the position indicated in Fig. II of  
 the drawings. In this position each of the  
 70 angular levers will remain undisturbed and  
 out of the path of the pawl 121 in its move-  
 ment with the slide 122. If, however, either  
 of the angular levers assumes the position in-  
 75 dicated at the left-hand side of Fig. IV of the  
 drawings, (which it assumes when its coöper-  
 ating spring 109 is free from tension,) then  
 the free end of said angular lever will be in a  
 position to be engaged by the pawl 121, as in-  
 80 dicated in Fig. XIII of the drawings. The  
 next upward movement of the slide 122 will  
 elevate the free end of the angular lever,  
 thereby compressing the spring 109 and lock-  
 ing it in the compressed condition in the man-  
 85 ner hereinbefore described.

It has been hereinbefore pointed out that  
 the movement of the slides 113 effects a lon-  
 gitudinal movement of the shaft 88 to bring  
 about an engagement of the coöperating  
 90 clutch members at one side of the machine  
 and a disengagement of said clutch-sections  
 at the other side of the machine. Thus, for  
 instance, a longitudinal movement of the  
 shaft 88 in the direction of the arrow  $x'$  in  
 Fig. V of the drawings will cause the clutch-  
 95 section 96 to be disengaged from the clutch-  
 section 98 and the clutch-section 97 will en-  
 gage the clutch-section 99, so that further  
 rotary motion transmitted to the shaft 88  
 will be communicated to the ribbon-spool 102  
 100 at the left-hand side of the machine. The  
 automatic reversal of the ribbon when an end  
 thereof is approached will be brought about  
 in the following manner: A suitable pin or  
 105 abutment being carried near the end of each  
 ribbon will contact with the bifurcated por-  
 tion 120, through which the ribbon passes  
 when an end of the ribbon is approached.  
 The contact between the abutment on the  
 110 ribbon and the bifurcated portion 120 of the  
 frame 118 will cause said frame to be shifted  
 around its pivot 119, thus elevating the arm  
 117 thereof, which in turn will raise the coö-  
 perating gravity latch-lever 114 to free the  
 115 slide 107, and thus move the clutch-sections  
 to the position shown in Fig. V of the draw-  
 ings. When the other end of the ribbon is ap-  
 proached, a similar action will take place at  
 the other side of the machine, and the shaft  
 88 will be moved in the opposite direction to  
 120 free the clutch-sections 97 and 99 and to en-  
 gage the clutch-sections 96 and 98. Thus  
 the right-hand spool will be placed in opera-  
 tive connection with the ribbon-feed mech-  
 125 anism to rotate the right-hand ribbon-spool.  
 It will be understood that any movement  
 transmitted to either of the shift-keys will op-  
 erate the shift-key levers 129 in the manner  
 described to set the corresponding spring 109  
 130 of the automatic ribbon-reversing mechan-



ism and that after said spring is placed under tension the mechanism is free from further co-operation with the pawl 121, which sets it until it has been again released by the frame 118 in the manner described. It is obvious that a great number of operations of both shift-keys will take place for every movement of the mechanism which brings about the automatic reversal of the ribbon, so that there is no liability of the springs 109 not being set or maintained under tension when it is necessary for them to bring about the longitudinal movement of the shaft 88 in the manner described.

Upon reference to Figs. II and VI of the drawings it will be observed that the rock-shaft 142 is pivoted to oscillate upon cone-bearings 143 144. The cone-bearing 144 is in the form of a pin, which is adjustably secured in a fixed portion of the framing of the machine by the screw 145, whereas the bearing 143 constitutes a portion of a longitudinally-movable rod 146, which is normally maintained in the engaging position represented in Figs. II and VI by a coiled spring 147, that bears at one end upon a sleeve 148, secured to the longitudinally-movable rod 146, and at the other end against the fixed portion of the machine, (indicated at 149.) This longitudinally-movable rod 146 is adapted to pass through and be guided by bearings 150 151 and is provided at its outer end with a finger-piece 152, by means of which it can be withdrawn, so as to release the shaft 142 to permit of its being withdrawn from the machine. The shaft 142 constitutes a carrier for the feed-dogs 50 and 51. These feed-dogs are adapted to vibrate at right angles to the plane of the feed-rack 36, with which they cooperate. The feed-dog 50 is provided with a pin 155, and a lever 156 is pivoted to a fixed portion of the machine, as indicated at 157, and the opposite end of this lever is pivotally connected to a link 158. A downward movement of the free end of the lever 156 will cause both feed-dogs to be depressed out of engagement with the rack, so as to release the carriage. This link 158 and lever 156 constitute a portion of the tabulating mechanism, which is about to be described. This link 158 is bifurcated at its lower end, as indicated at 159 in Fig. XV of the drawings. Within the bifurcated portion 159 of the link 158 is received a screw 160, that is carried by a key-lever 161, that is pivoted, as indicated at 162. The free end of this lever carries the usual finger-key 162<sup>x</sup>. Pivotally connected to the key-lever 161 of the tabulating-key is a crank-arm 163. The connection between this crank-arm and the lever is indicated at 164. The crank-arm 163 referred to is connected to a rock-shaft 165, which extends at right angles to the length of the crank-arm 163, and is connected at its opposite end to a second crank-

arm 166, which projects upwardly from the shaft and is slotted at its upper end, as indicated at 167. Within the slot 167 of the crank-arm 166 is contained a pin 168, which pin is mounted upon an arm 169, that depends from a rack-support 170. One of these rack-supports 170 is provided at each end of the machine, as illustrated in Fig. II of the drawings, and to them is secured a longitudinally-extending rod 171. Suitable cone-bearings 172 are provided at each end of the machine and are carried by ears 173 and are adapted to project into the outer ends of the rod 171, so as to constitute a bearing therefor. The arms 170 are adapted to support a rack 174, provided with teeth 175. The upper edge of this rack 174 is provided with a suitable scale 176, with which the tabulating stop or stops 177 cooperate. In the present instance I have illustrated but one of these tabulating-stops, although it should be understood that any suitable number of such stops may be provided. Referring particularly to Figs. I, II, and VIII of the drawings, it will be observed that the stop 177 comprises a casing to which the various portions of the stop are mounted and that this casing is perforated and adapted to slide upon the longitudinally-extending rod 171. A latch or locking element 178 is adapted to move around the rod 171 as a pivot, and the nose or projection 179 thereon is adapted to be received between the teeth 175 on the rack when the latch is moved to the position indicated in Fig. VIII of the drawings. To facilitate this movement of the latch, a finger-piece 180 is provided, which extends through an opening 181 in the casing. Pivoted to the casing of the stop 171 is an index or pointer 182, the pivot of the said pointer being indicated at 183. The spring 184 enables the pointer 182 to be moved to either of two positions and to be retained in either of such positions therein. When the pointer is in the position indicated in Fig. VIII of the drawings, the pointer-nose 185 thereof will extend over the face of the index plate or scale 176 to cooperate therewith in order to determine the proper positioning of the stop as determined by scale 176. When the latch 178 is locked in the manner indicated in Fig. VIII of the drawings, the stop will be locked to the rack to prevent a movement of the stop in the direction of the length of the rod. A spring 186 cooperates with the locking element 178 and tends to normally force such locking element into the locking position indicated in Fig. VIII of the drawings. In order, however, to maintain the locking element or latch 178 against the tension of this spring and in the unlocked position, a projection 187 (see Fig. I of the drawings) is provided at one side of the casing. This projection is adapted when the latch 178 is in the unlocked position to project into a de-



pression 188 on the latch, and thus maintain the latch against movement by its spring. When, however, the finger-piece 180 is moved by hand, the pressure is sufficient to force the projection 187 out of the depression 188, thus permitting the latch to be moved to the position indicated in Fig. VIII of the drawings. This "latch," so called, 178 performs a two-fold function. When the tabulating-key is depressed, the tabulating-stop as a whole will be moved in the direction of the arrow in Fig. XV, thus conveying the spring-pressed latch 178 into contact with the longitudinally-extending portion 189 on the part 33. This will exert a braking action on the carriage to prevent too rapid a movement of the carriage when it has been released by the tabulator. The pressure of the locking element 178 against the part 189 is not sufficient to release the projection 179 on the locking element from engagement with the teeth 175 on the rack. This disengagement can only be effected by a movement of the hand-operated piece 180. The tabulating-stop, it will be understood, coöperates with a suitable projection or stop on the carriage to arrest the carriage at the position for which the adjustable tabulating-stop 177 has been adjusted.

The detail operation of the tabulating mechanism which has been described is as follows: A depression of the tabulating-key 162<sup>x</sup> will cause an upward movement of the inner end of the tabulating-key, thus rocking the shaft 165 by reason of the connection 164 between said tabulating-key lever and the crank-arm 163 on the rock-shaft. The rocking of the shaft 165 will effect an outward movement of the upper end of the crank-arm 166, thus producing an inward movement of the rack 174 and the tabulating-stop carried thereby—that is, the tabulating-stop will be moved in the direction of the arrow in Fig. XV. This movement of the tabulating-stop will, as hereinbefore described, apply the spring-pressed locking element 178 to the longitudinally-extending portion 189 on the carriage to effect a braking action of the carriage when it is released, at the same time interposing the tabulating-stop in the path of the co-operating stop upon the carriage. This same movement or depression of the tabulating-key 162<sup>x</sup> will cause the inner end of the key-lever to elevate the link 158, thus depressing the free end of the lever 156 (see Fig. II) in order to disengage the feed-dogs from the feed-rack. By reason of the frictional engagement between the inner end of the tabulating-key lever 161 and the link 158 a further upward movement of the inner end of the key-lever may be accomplished after the lever 156 has been moved sufficiently far to depress the feed-dogs out of engagement with the coöperating feed-rack. By this arrangement the different extensive movement for bringing about the

various functions required is accomplished. When the tabulating-key 162<sup>x</sup> is permitted to be restored to the normal position, the tabulating-key lever and the link 158 will attain the same positions with relation to one another which they do before the depression of the key by reason of the frictional connection 159 and 160 between the parts.

From the foregoing description of the construction and operation of the various parts or features of my invention it is thought that a clear understanding of the construction and operation of the machine can be arrived at without further description.

While I have shown and described with considerable detail various features of the device and their coöperation one with another, it should be understood that various of these features may be employed separately in tabulating-machines of different characters and that various changes in construction may be made in order to adapt the features to different type-writing machines.

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

1. In a type-writing machine the combination of a frame, a carriage comprising two sections, viz: a carrying section or base connected with the frame, and a paper-holding section, alining spring-pressed bolts mounted to slide on one of said sections and adapted for detachable engagement with the other section, and handles located at the inner adjacent ends of said bolts.

2. In a type-writing machine, the combination of a frame, a carriage comprising two sections, viz: a carrying section or base connected with the frame, and a paper-holding platen-section, and mechanism for detachably connecting said sections, the said mechanism comprising two connecting members adapted to hold the platen-section and the base together at different points, said members having their inner ends located at the central portion of the carriage and in such proximity to each other as to enable them to be simultaneously actuated by the same hand of the operator.

3. In a type-writing machine the combination of the frame, a carriage comprising two sections, viz: a carrying section or base connected with the frame, and a paper-holding section, one of said sections having a socket or bearing at a distance inward from each of its ends, and the other section having connecting elements located between said sockets and adapted to enter the same, said connecting elements being movable toward and from the sockets to connect or disconnect the two carriage-sections.

4. In a type-writing machine, the combination of the frame of the machine with the traveling carriage, a feed element carried thereby, a second coöperating feed element



carried by the frame of the machine to control the feed of the carriage, one of said feed elements being provided with a socket, while the part which carries said feed element is provided with a guideway or bearing, and a spring-pressed bolt mounted to slide in such bearing and permanently movable therein, said bolt engaging the socket of the feed element to detachably connect the same with its carrier.

5. In a type-writing machine, the combination of a carriage, a feed element carried by the said carriage, a second cooperating feed element carried by the framing of the machine for affording a step-by-step feed of said carriage, and a spring-pressed hand-operated bolt for retaining one of said feed elements in place whereby a feed element of one character can be readily removed and another feed element of a different character be substituted therefor.

6. In a type-writing machine, the combination of a carriage, a feed-rack operatively connected to said carriage, a feed-dog which cooperates with said feed-rack, an oscillating carrier for said feed-dog which carrier is car-

ried by the framing of the machine, and a spring-pressed, longitudinally-slidable bolt for supporting said carrier in the operative position.

7. In a type-writing machine, the combination of a carriage, a spring-drum therefor, a crank for regulating the tension of the spring, an abutment or projection carried by said crank and freely movable therewith for almost a complete revolution of said crank, and a stationary abutment arranged to engage said crank-abutment at one point of its revolution but clear of the path of the crank-abutment at all other points, the two abutments having at one side shoulders arranged to arrest the movement of the crank in one direction, and on the other side, surfaces cooperating with a wedge-like action to allow one abutment to pass over the other, one of the abutments being capable of a yielding movement when engaged by the other.

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