

No. 667,929.

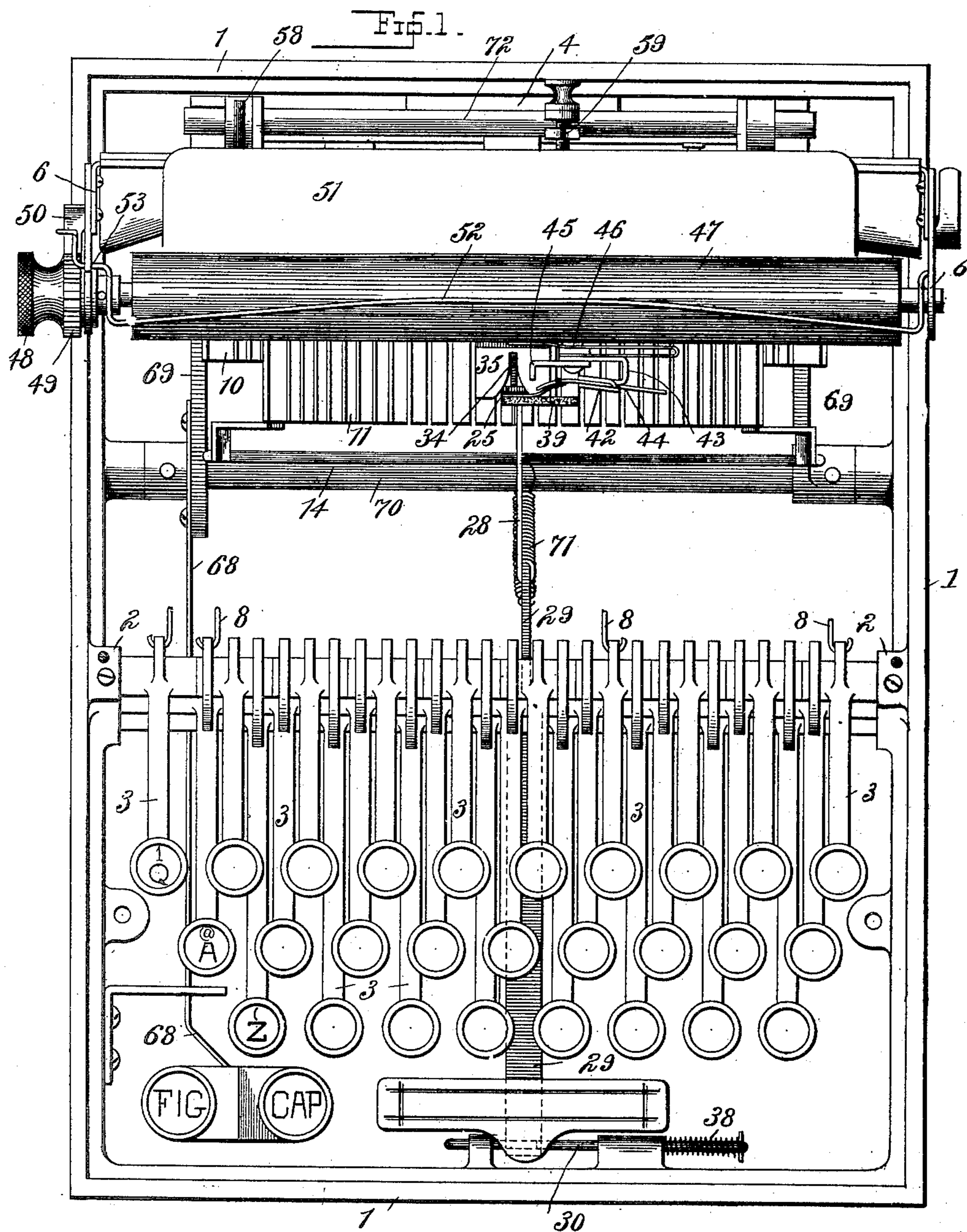
Patented Feb. 12, 1901.

L. S. BURRIDGE.
TYPE WRITING MACHINE.

(Application filed Apr. 18, 1900.)

(No Model.)

5 Sheets—Sheet 1.



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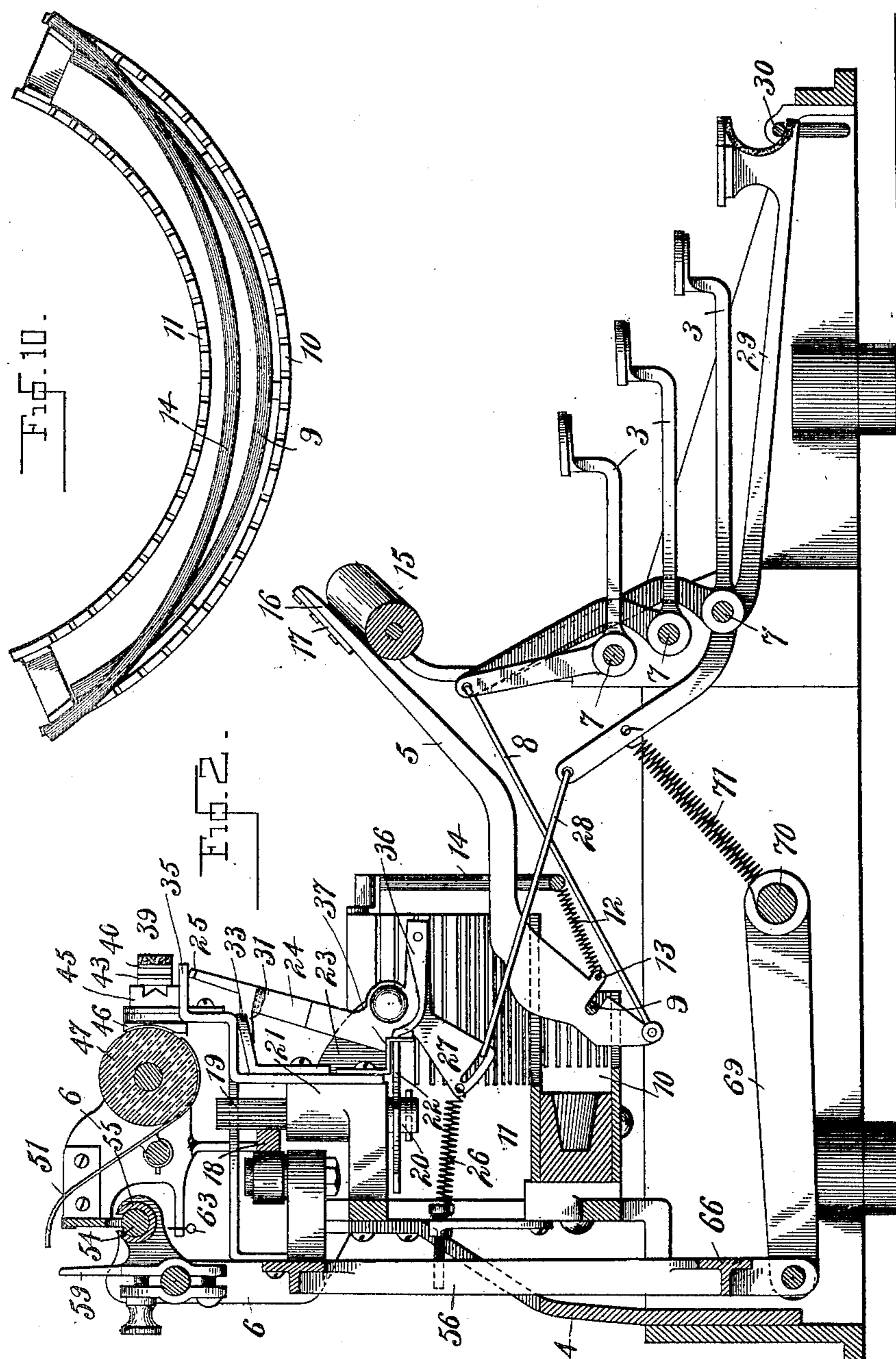
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(No Model.)

5 Sheets—Sheet 2.



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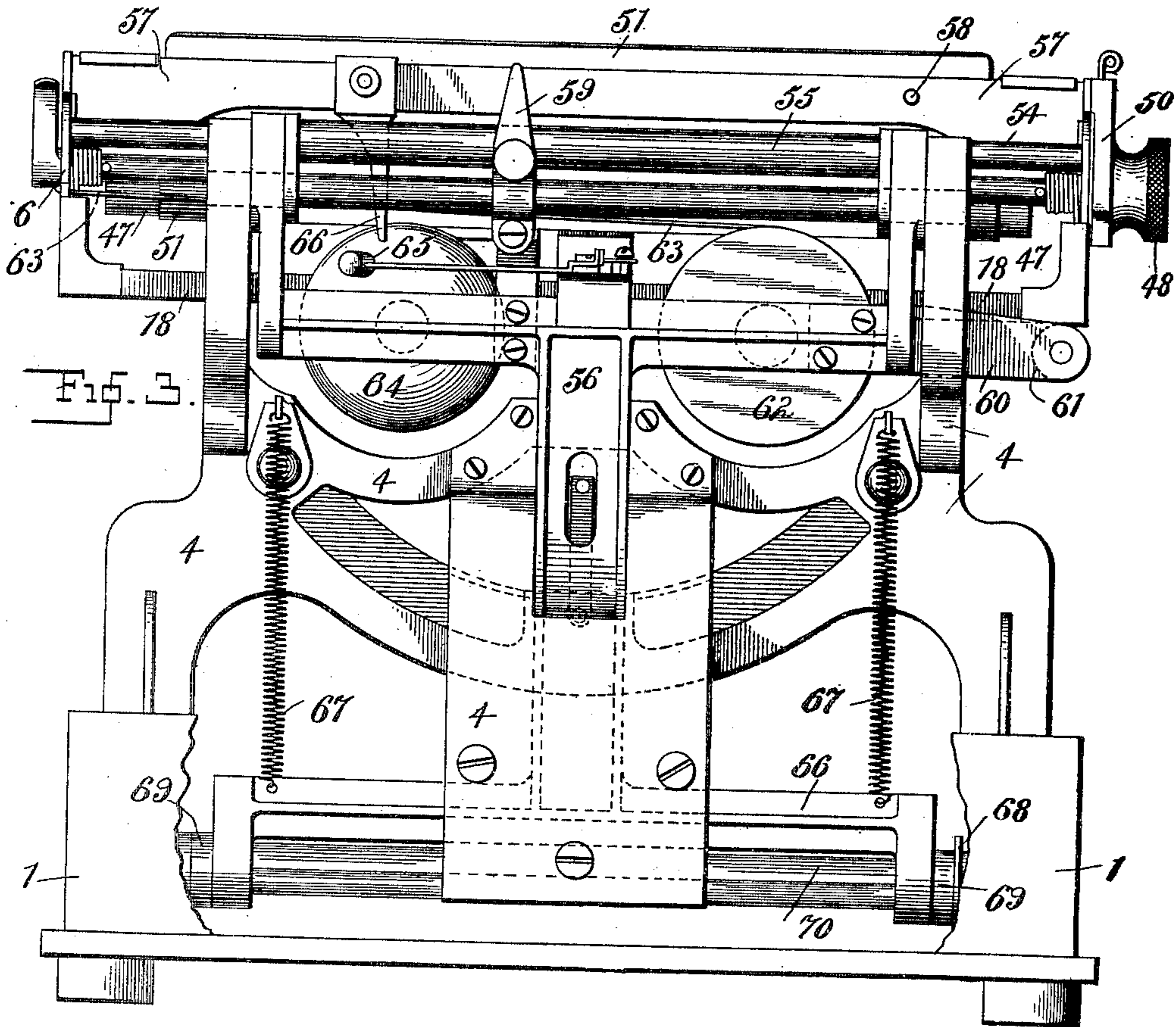
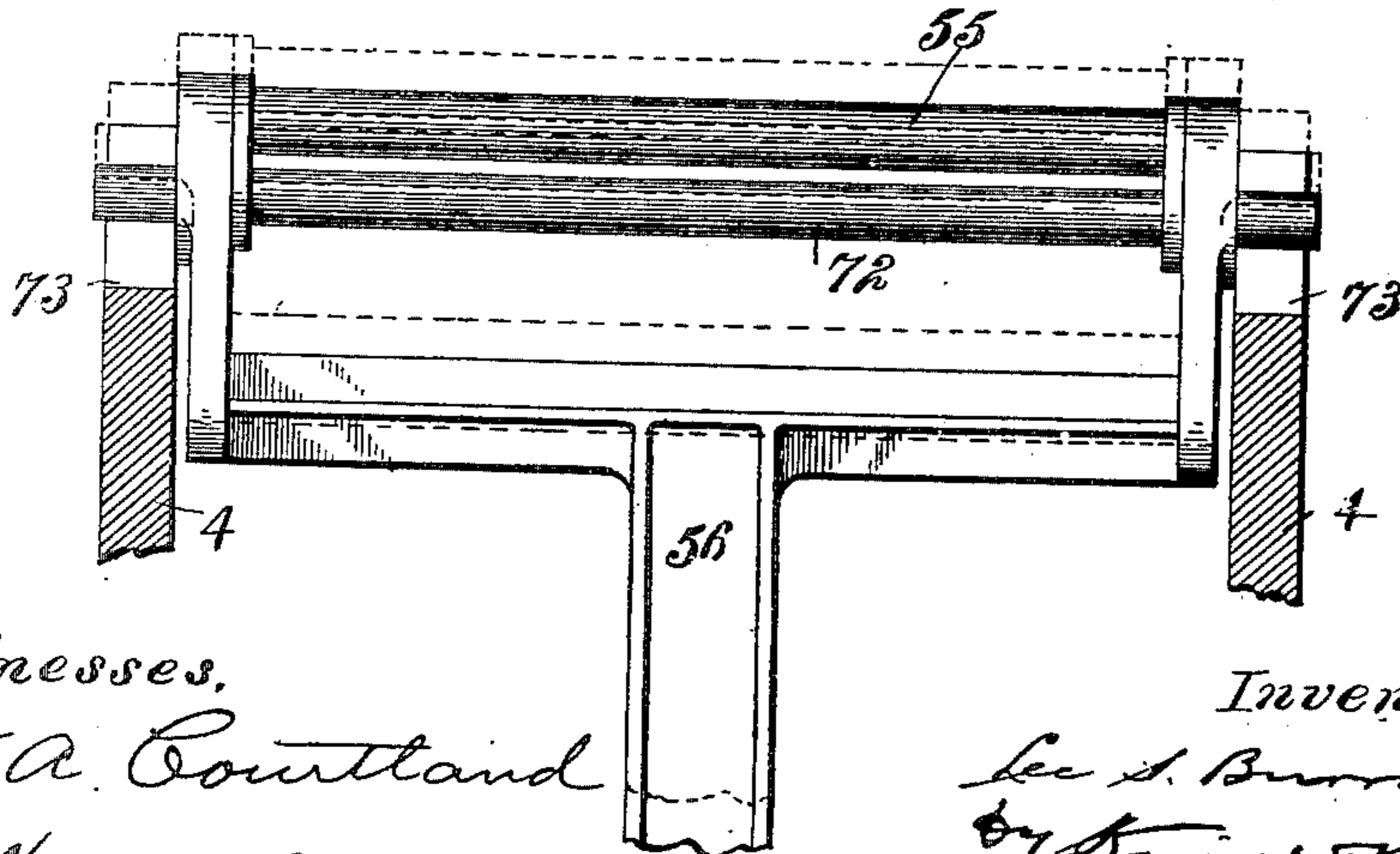


Fig. 3.



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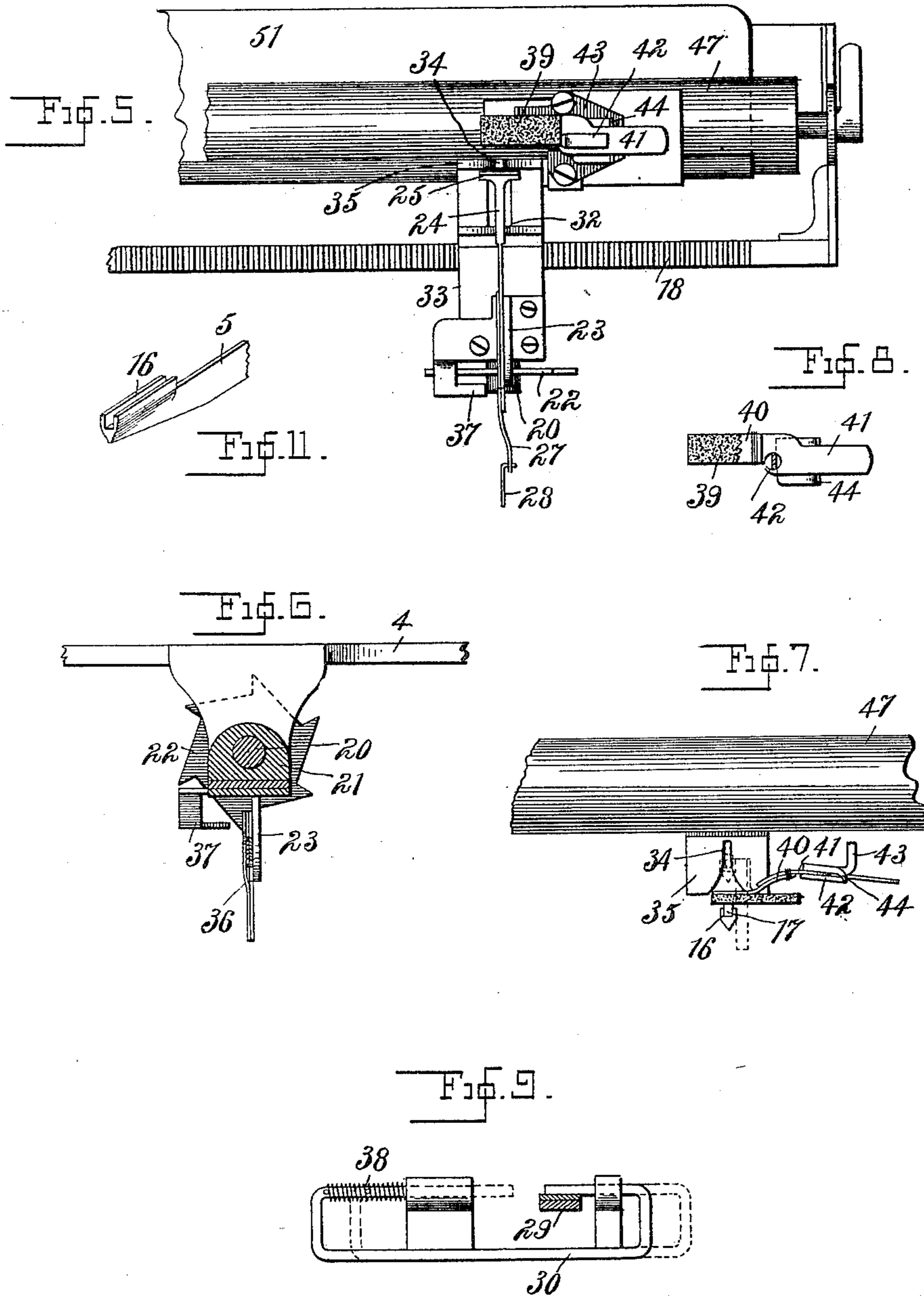
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(Application filed Apr. 18, 1900.)

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5 Sheets—Sheet 4.



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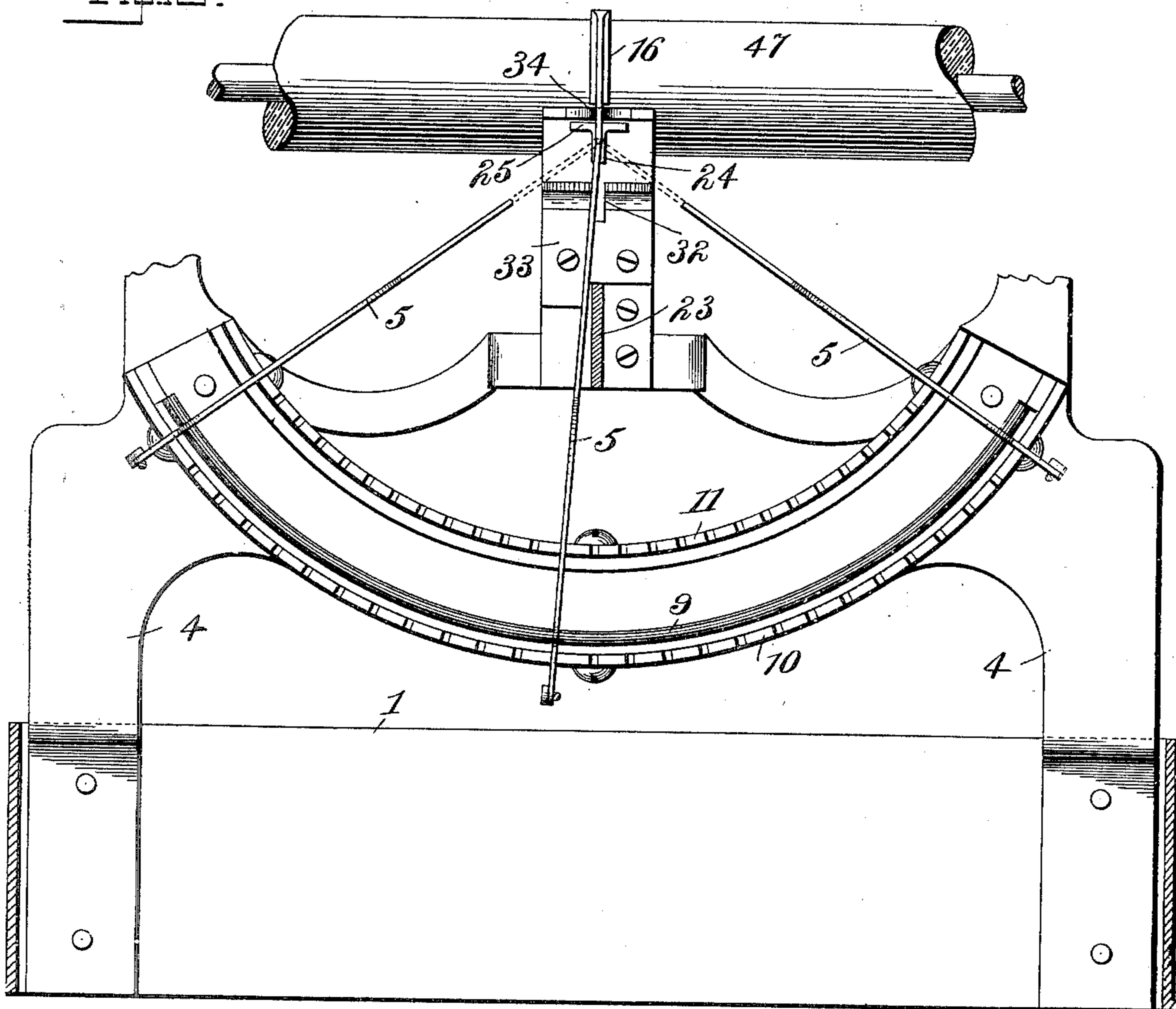
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5 Sheets—Sheet 5.

Fig. 12.



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UNITED STATES PATENT OFFICE.

LEE S. BURRIDGE, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 667,929, dated February 12, 1901.

Application filed April 18, 1900. Serial No. 13,313. (No model.)

To all whom it may concern:

Be it known that I, LEE S. BURRIDGE, a citizen of the United States, residing in the borough of Manhattan, in the city 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, as to its main elements, to that class of type-writing machines known as "type-bar" machines, and has for its object the production of a machine of that class of such compactness and simplicity as to be of exceedingly cheap construction, yet of sufficiently perfect operation for commercial purposes.

Certain of the features relating to the paper-carriage shown and described herein are reserved for claims in a division of this case filed June 5, 1900, Serial No. 19,112.

The nature of the invention will fully appear from the following specification and appended claims.

In the accompanying drawings, Figure 1 is a plan view of my machine with portions of the type-lever mechanism removed. Fig. 2 is a vertical section thereof, the plane of section being from front to rear of the machine, all type-levers but the middle one being removed for the sake of clearness of illustration. Fig. 3 is a rear elevation, part of the main frame being broken away to show the interior more clearly. Fig. 4 is a detail view, partly in section, of a part of the carriage-supporting frame to illustrate the shifting motion. Fig. 5 is a front view of the universal bar, inking mechanism, and adjacent mechanism. Fig. 6 is a partly-sectional plan view of part of the paper-carriage-feeding mechanism. Fig. 7 is a plan view of the inking device. Fig. 8 is a detail view of a part thereof. Fig. 9 is an elevation of the spacing-key-unlocking device. Fig. 10 is a sectional front elevation of the spring counterbalancing devices for the type-levers, the springs being omitted. Fig. 11 is a detail view of the type end of a type-lever. Fig. 12 is a front elevation of parts of the mechanism to illustrate the type-lever support and action.

The main frame 1 is preferably of rectangular shape and has at 2 an inclined series of bearings for the pivot-rods of key-levers 3 and at 4 an approximately vertical standard

which supports the type-levers 5 and paper-carriage 6. Mounted in bearings 2 are rods 7, on which are pivoted the three banks of key-levers 3. The key-levers are, as shown, of bell-crank shape. Their upright arms terminate in substantially the same horizontal plane, while their horizontal arms are arranged, as shown, in three banks to form the keyboard. By superimposing their pivot-rods 7, as shown, and arranging the several banks so that the medium-length horizontal arms are supported on the central bearing-rod 7, the short ones on the uppermost and the longest on the lowermost of said rods, I obtain a proportioning of the bell-cranks, so that the pressures of all the keys of the keyboard for operating them are substantially the same. A series of pull-rods 8 connect the upper ends of the vertical arms of bell-crank key-levers 3 to the lower shorter arms of the series of type-levers 5, which are pivoted to a curved pivot-rod 9, substantially concentric with the printing-point. Said pivot-rod is carried by a lower guide-comb 10, in which the lower short arms of the type-levers travel, while the long arms of the type-levers are guided by an upper guide-comb 11. Both guide-combs are rigidly supported upon the standard 4, and their guide-slots are arranged in planes radial to the printing-point.

Attached to each type-lever is a counterbalancing-spring arranged substantially as shown in my copending application, filed August 1, 1899, serially numbered 725,776. I have found it advisable to vary the direction of strain of these springs, as shown in the present application.

It will be seen that the several type-levers 5 need counterbalancing in inverse ratio to their distance from the center—that is to say, the central type-levers are mounted on substantially horizontal pivots and move in substantially vertical planes, while from there outward toward the outermost type-levers the type-levers move in planes more and more approaching the horizontal, and consequently requiring less counterbalancing. I have accordingly arranged a series of counterbalancing springs 12, connected to the type-levers by lugs 13, so that those at the center will when the type-levers are in the normal position of rest have passed considerably below a straight line

connecting the attaching-point of the spring and the pivot of the type-lever, and thus the spring will exert a strong lifting or counterbalancing effect upon such type-levers; but the springs toward the outside of the series are arranged more and more in a line between the point of attachment of the springs and the type-lever pivots, so as to exert a counterbalancing effect in inverse ratio to their distance from the central type-lever. This proportioning of the strain of the springs I conveniently attain by forming the rod or support 14, to which the fixed ends of the springs are attached, in a curve struck on a greater radius than the curve of the type-lever pivot-rod 9. Thus, as shown in Fig. 10, the springs as the outer type-levers are approached will lie more and more in an imaginary line, joining the support or rod 14 with the type-lever pivot 9. It will be noticed that as arranged not only the counterbalancing but the returning effect of the several springs 12 upon the type-levers is varied, and in the following claims I have intended to cover such springs of varying effect for either of these purposes. When in their normal position at rest, the front or outer ends of the type-levers are supported in substantially horizontal position by bar 15, preferably covered with some cushioning material, such as felt. The outer ends of the type-levers are formed on their upper surface with troughs 16, in which the type-blocks 17, preferably of rubber or similar material, are placed and attached by applying shellac or similar adhesive material. This matter is not claimed herein, but forms part of the subject of an application for United States Letters Patent filed by me October 16, 1900, Serial No. 33,290.

The paper-carriage 6 has a long feed-rack 18, which is engaged by pinion 19, made of sufficient length vertically to allow the shifting motion of the carriage hereinafter described. Said pinion is carried by a vertical shaft 20, mounted in lug 21 of standard 4 and bearing at its lower end a star-wheel 22.

By using the term "star-wheel" here I intend merely to indicate the form of mechanism here shown, and it is to be understood that any equivalent form of wheel adapted to give a step-by-step motion may be used and is intended to be covered by that term.

Pivoted to a rigid arm 23 of lug 21, so as to vibrate in the vertical plane of the printing-point of the machine, is a universal bar 24. The bar has a laterally-extended head 25, which is engaged by any type-lever operated so as to vibrate the universal bar. It is normally held in the position shown in Fig. 2 by a spring 26, attached to its lower short arm 27, and when struck by a type-lever is vibrated toward the paper-carriage. The pull of the spring 26 is normally resisted by a rod 28, engaging a slot in the arm 27 and connected to the substantially vertical arm of bell-crank spacing-lever 29. The upward motion of the key end of spacing-lever 29 is

arrested by a pin or bolt 30. The result of this train of mechanism is the holding of the universal bar normally in the position shown in Fig. 2. A tongue or arm 31 on the universal bar 24 guides it by engagement with a slot 32 in a guide-bracket 33. The upper end or head of the universal bar lies adjacent to the flaring slot 34 in a guide 35, which directs all of the type-levers to the printing-point and which as they enter said slot are necessarily brought in contact with the head of said universal bar. It will be seen in Fig. 12 that, while at the striking-point the type ends of the type-levers all lie vertically, the main body of the several type-levers lie, as above stated, in planes which approach the horizontal in proportion to their distance from the center of the machine, the outermost type-levers being most nearly horizontal. The type-lever is accordingly either straight or bent at a point adjacent to the head 25 of the universal bar, the angle of the bend depending on the distance of the type-lever from the center of the machine. The true center of the type-levers—that is to say, the point toward which their inner ends all approach when thrown to the striking position and to which all of their guide-slots are radial—is a point just below the central guide-slot 32, and at this point I arrange the head of the universal bar, as shown. By locating the head of the universal bar adjacent to the printing-point in position to be struck by all the type-levers and remote from the pivot-point of said bar I obtain a lightness of parts and delicacy of operation not, I believe, hitherto attained in devices of this character. The universal bar has a spring portion 36, which, as shown, normally engages one of the teeth of a star-wheel 22. When the upper end of the universal bar is forced to the rear—that is to say, toward the printing-point—either on being struck by a type-lever or by the depression of the spacing-key, the spring portion 36 falls below the teeth of the star-wheel and springs to the left, where it is arrested by the stop 37 as the rigid part or heel of the universal bar comes in contact with the teeth of the star-wheel just left by said spring portion. When now the universal bar is again vibrated forward by the pull of the spring 26, the star-wheel being rotated by the pull of the carriage-spring in well-known manner will have its next succeeding tooth engaged by the spring portion 36 and will force said spring portion to the right until it is arrested by contact with the rigid part of the universal bar. A step-by-step motion of the paper-carriage is thus obtained by vibrating the universal bar.

It will be seen that the slotted connection of the rod 28 with the short arm 27 of the universal bar will permit the vibration of the universal bar when it is struck by the type-levers without moving the space-key. The bolt 30, which arrests the upward motion of the space-key lever 29, is normally held in the

position shown in Fig. 1 by the spring 38. Fig. 9 shows the bolt from the rear. It will be seen that by pressing it toward the left of the machine (toward the right of Fig. 9) the bolt will be disengaged from the space-lever, allowing the latter to rise under the pull of springs 26 and 71 and thus allowing said spring 26 to pull the short arm 27 of the universal bar beyond its normal position, lifting the spring portion of the universal bar above the star-wheel 22 and leaving the carriage entirely free to be forced by hand in either direction.

The inking mechanism consists of a pad 39, of felt or similar porous material, supported immediately above the guide-slot 34 by a flexible arm 40, preferably of sheet-rubber, attached to a metal arm 41. It will be seen that the flexible arm 40 is supported near its extreme end, but that the heel of the ink-pad projects somewhat beyond the point of attachment of the flexible arm to the metal arm, thus giving greater ink capacity and also making the ink-pad more sensitive and certain to return to the normal position at right angles to the line of motion to the type. When struck by the type, the pad is revolved from the position shown in full lines to that shown in dotted lines in Fig. 7, the motion of a part of the flexible arm 40 being arrested by its coming in contact with the metal arm 41 and the pad and outer end of the flexible arm then turning upon the end of said metal arm to a position at right angles to normal position. The metal arm 41 has a hole by which it is supported on a tongue 42 of bracket 43. The arm 41 is held horizontally by engaging between teeth 44 of said bracket, and, being of spring material, may be pressed forward to disengage it from said teeth and rotated about the tongue 42 to a vertical position, in which position it may be withdrawn from said tongue.

45 is a stop to limit the rearward motion of the pad when struck by the type.

46 is a guard-plate adjacent to the platen 47 to protect the paper from accidental striking by a type other than the one intended. The platen 47 is mounted so as to rotate upon the paper-carriage 6 and has the usual thumb-piece 48 for rotating it to feed in or eject the paper or to give line-spacing thereto. The platen is held from accidental rotation by toothed wheel 49 and dog 50.

51 is the paper-guide plate, and 52 a guide-rod arranged over the top of the platen. It is preferably of spring-wire fastened rigidly at one end and engaging in an open slot 53 at the other end of the paper-carriage.

The paper-carriage has at rear a long guide-rod 54, engaging a long sleeve 55, carried by the upper end of a supporting shifting frame 56. The guide-rod 54 is connected to the carriage by a plate or web 57, and the guide-sleeve 55 is open at top to allow the said web or plate to enter said opening, and thus allow free play of the rod in the sleeve. I am thus enabled to give full lateral motion to the

paper-carriage without extending its support unduly, as is customary in such machines. The play of the carriage in one direction is limited by the engagement of a pin 58 thereon with an adjustable stop 59 on the shifting frame 56. Said shifting frame is of the shape shown in Figs. 3 and 4. It carries, besides the paper-carriage, an arm 60, having an antifriction-roller 61 for supporting the paper-carriage when in position of projection at the left of the machine, the spring-drum 62, connected to said carriage by chain or ligament 63, the bell 64, its hammer 65, actuated by adjustable trip 66 on the paper-carriage, and the inking mechanism already described. The paper-carriage is guided and its rack 18 held in proper position against the pinion 19 by the antifriction-roller 76, carried by arm 77 of the shifting frame 56. Its weight is counterbalanced by springs 67, and it is shifted in a manner which will be readily understood by those skilled in the art by the shift-lever 68. The shifting of the frame 56 enables the platen to be placed in any one of three positions, so as to bring any one of three series of types on the type-levers to operative relation thereto. At its lower end the supporting or shifting frame 56 is guided by connection to arms 69, attached to a shaft 70, to which the shifting-lever 68 is also connected and which serves as a point of attachment for the return-spring 71 of space-lever 29, while at its upper end the said frame is guided by pins or projections 72, which engage vertical slots 73 in the top of standard 4.

It will be understood that the above-described preferred form of my machine is capable of considerable variations without departing from my invention.

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

1. In a substantially front-strike type-writing machine, the combination of type-levers pivoted in a segment of a circle and operatively connected to finger-keys, and springs acting to return them so arranged as to exert an effect varying with their distance from the center of the segment.

2. In a type-writing machine, the combination of a series of type-levers fulcrumed so as to lie substantially horizontally in planes radial to the printing-point, and a series of counterbalance-springs one for each type-lever, the several springs on each side of the center being arranged to exert the counterbalancing effect in inverse ratio to their distance from the center.

3. In a type-writing machine, the combination of a series of type-levers, fulcrumed so as to lie substantially horizontally in planes radial to the printing-point, and a series of springs one for each type-lever, the several springs on each side of the center being arranged to exert an effect varying with their distance from the center.

4. In a type-writing machine, the combina-

tion of a series of substantially horizontal type-levers, fulcrumed in planes radial to the printing-point, a series of springs attached thereto, one for each lever, and a member at-
5 tached to the machine-frame for receiving the ends of said springs; the connection of each spring to the lever, and the member being so arranged that the action of said springs varies from the center levers to the outer ones.

10 5. In a type-writing machine, the combination of a series of substantially horizontal type-levers fulcrumed in planes radial to the printing-point, a series of springs attached thereto, and a rod or member attached to the
15 machine-frame for receiving the ends of said springs and bent in a curve of greater radius than that of the type-lever fulcrums.

6. In a type-writing machine, the combina-

tion of a series of substantially horizontal type-levers fulcrumed in planes radial to the 20 printing-point, a series of counterbalance-springs attached thereto, and a rod or member attached to the machine-frame for receiving the ends of said springs and bent in a curve of greater radius than that of the type- 25 lever fulcrums.

7. In a substantially front-strike type-writing machine, the combination of type-levers operatively connected to finger-keys, and springs acting to return them so arranged as 30 to exert a different effect on the side type-levers and keys from the center ones.

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