

No. 686,043.

Patented Nov. 5, 1901.

J. FELBEL.
TYPE WRITING MACHINE.

(Application filed Dec. 20, 1900.)

(No Model.)

3 Sheets—Sheet 1.

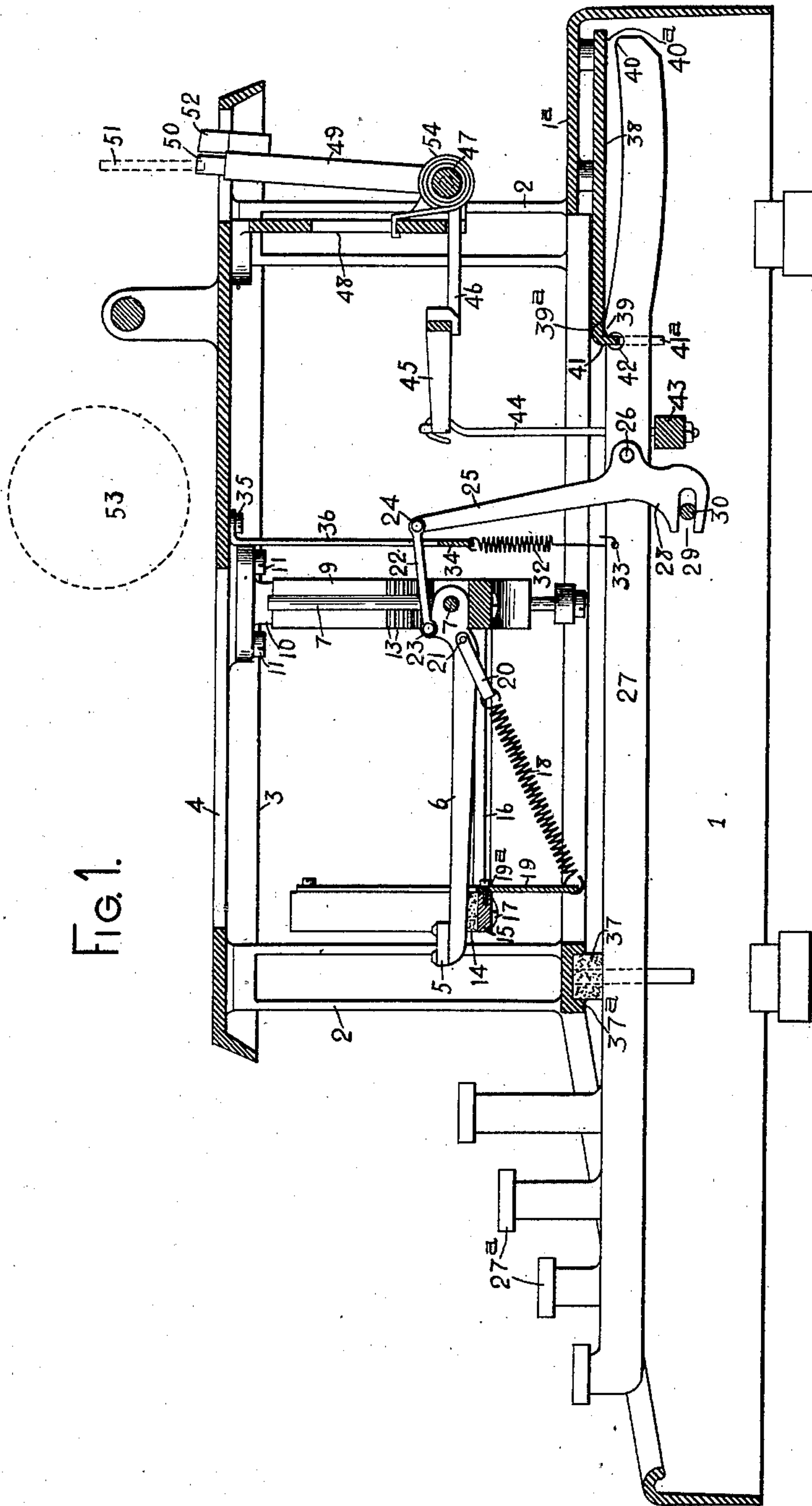


FIG. 1.

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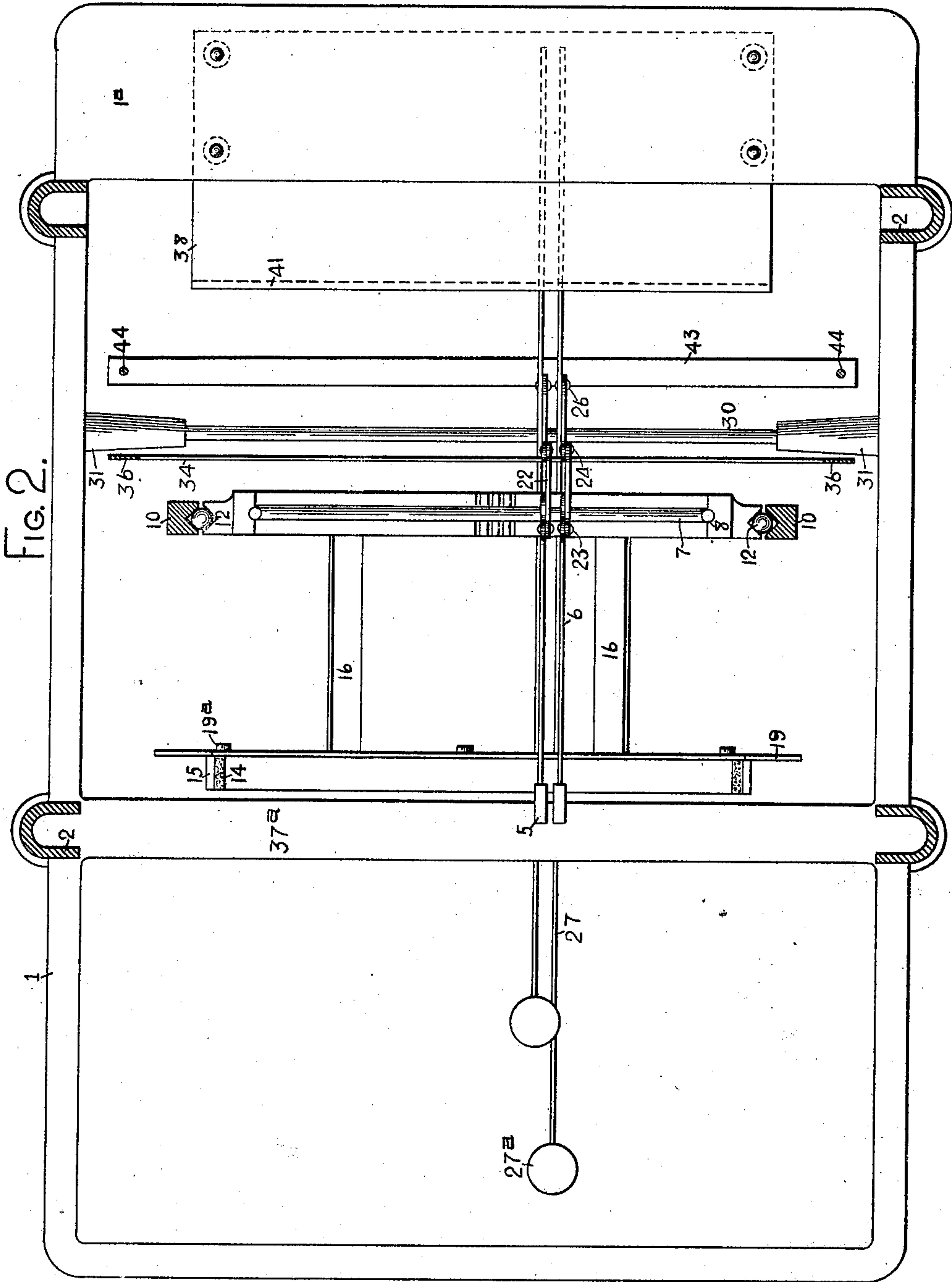
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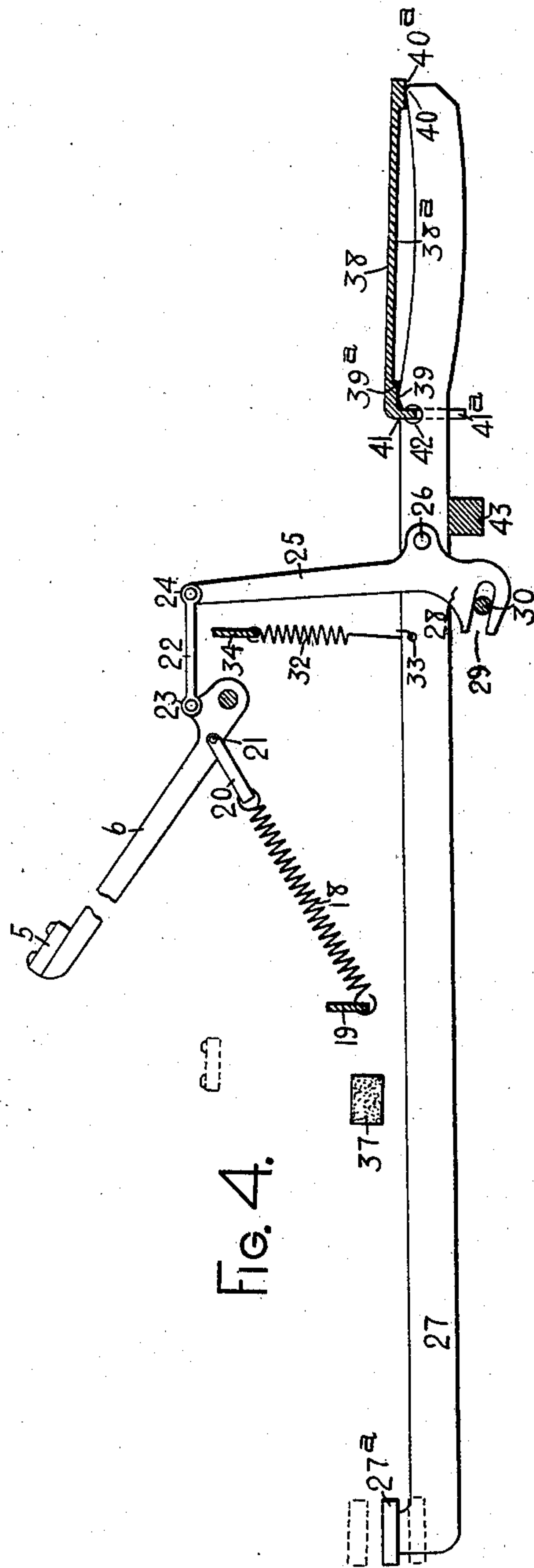
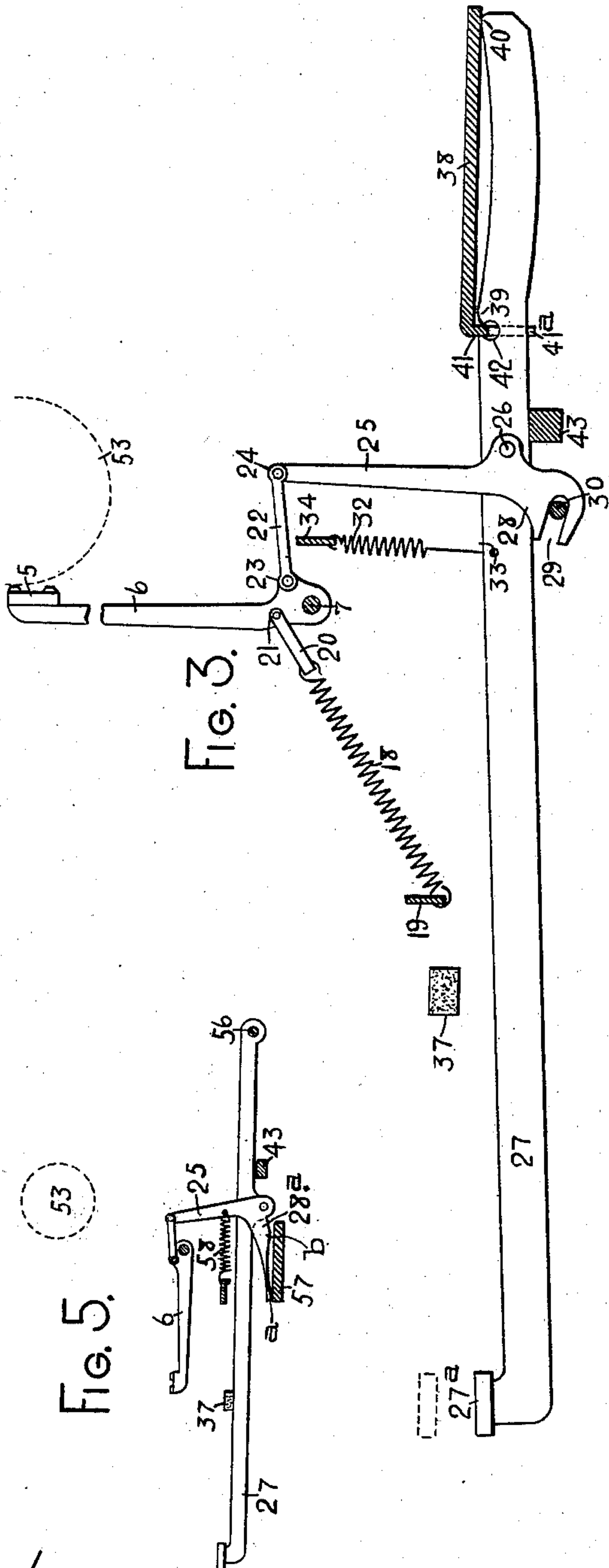
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3. Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

JACOB FELBEL, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 686,043, dated November 5, 1901.

Application filed December 20, 1900. Serial No. 40,537. (No model.)

To all whom it may concern:

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

This application relates to the generic improvements in type-actions of writing-machines made the subject-matter of the Letters Patent No. 660,937, granted October 30, 1900, to Burnham C. Stickney.

The objects of my invention are to avoid jarring the finger when putting the key and the type-bar suddenly in motion and also to secure a sharp blow of the type upon the paper, as well as to increase the speed of operation of the machine.

The invention consists in certain combinations of devices, features of construction, and arrangement of parts, all as will be more fully hereinafter set forth, and particularly pointed out in the concluding claims.

In the accompanying drawings, Figure 1 is a sectional elevation taken longitudinally of a "front-strike" type-writing machine embodying my improvements. Fig. 2 is a sectional plan view of the mechanism shown at Fig. 1. In these and other figures certain parts are omitted for the sake of clearness. Fig. 3 is a skeleton view similar to Fig. 1, but showing the parts at the printing position. Fig. 4 is a view of a type-action similar to that shown at Figs. 1 and 3, but showing the position of the parts when the key is half-way depressed. Fig. 5 shows a modification.

Throughout the several views the same part will be found designated by the same numeral of reference.

The framework consists of a rectangular base 1, corner-posts 2, rising therefrom, and a top plate 3, secured upon the posts and having at its forward portion a large opening 4 for the passage of the types in their movement to the platen. Each type-block 5 is provided with an upper and a lower case type suitably secured upon the free forward end of a type-carrier 6. The type carriers or bars are arranged in front of the platen and are pivoted at their rear ends upon a common

fulcrum-rod 7, which is bowed or arch-shaped and seated in a curved slot 8, formed in a shiftable segment 9, the latter being guided in its up-and-down shift movements between vertical guides 10, depending from the under side of the top plates, to which they are secured by screws 11, bearing-balls 12 being interposed between the segment-casting and the guides 10, and both the guides and the segment being provided with suitable ball-ways. The segment is also provided with radial slots 13, one for each type-bar. The type ends of the bars rest normally upon a segmental pad 14, having a metallic support 15, the latter being secured by screws 17 to the forward ends of arms 16, which are fastened to the segment 9. Each type-bar is returned from working position to normal position and there retained by a draw-spring 18, which hooks at its forward end into a perforation formed near the lower edge of a vertical plate 19 and at its rear end into a sheet-metal yoke or strap 20, which straddles the type-bar and is pivoted thereto at a point near the pivot 7 thereof. The plate 19 is secured to the support 15 by screws 19^a. The segment 9 and its attachments constitute a shiftable supporting-frame for the type-bars.

A short horizontal draw bar or link 22 is pivoted at its forward end 23 to the type-bar and at its rear end 24 to the upper end of a vertical arm 25 of a bell crank or lever. When the segment 9 is shifted, the forward ends of links 22 move up or down with the type-bars, as shown in Letters Patent issued to me September 18, 1900, No. 657,927. The bell-crank is pivoted to a horizontally-extending unpivoted lever 27 of the second order at a point 26 between the ends of the latter. A key 27^a is borne by the forward end of each lever 27, the keys being arranged in straight rows transversely of the machine. The levers extend rearwardly from the keyboard beneath the type-bars and paper-carriage. The other arm 28 of the bell-lever or sublever extends downwardly and forwardly from the pivot 26 and at its lower end is forked at 29, so as to straddle a cylindrical fulcrum rod or bar 30, which extends horizontally across the machine beneath the key-levers and is suitably secured at 31 to the side walls of the base.

The type-bars lie horizontally at different heights, the arms 25 of the bell-crank levers being of corresponding lengths.

At a point just forward of the bell-lever each key-lever is provided with a lifting-spring, as 32, the lower end of which hooks into a hole 33 in the key-lever and the upper end of which hooks into a perforation formed in a horizontal transverse bar 34, having upwardly-extending arms 36, which are secured by means of screws 35 to the under side of the top plate. This spring causes the forward end of the key-lever to bear up normally against a pad 37, arranged upon the under side of a transverse bar 37^a, and its rear portion to bear up against the under side of a fixed transverse horizontal fulcrum-plate 38, arranged over the rear ends of the key-levers and under the horizontal rear plate 1^a of the base.

Each lever 27 is formed or provided upon its upper edge with two working points 39 and 40, of which the former is the foremost, and this normally bears up against the under surface of the fulcrum-plate 38 at 39^a, being held in contact therewith by the spring 32. The other point 40 is arranged at the rear extremity of the lever and normally stands a short distance below the rear portion of the plate 38, so that when the lever is vibrated upon the points 39 39^a said point 40 may move upwardly into contact with said plate at 40^a and work thereon during the terminal portion of the lever-stroke. At its front edge the fulcrum-plate 38 is bent to form a downwardly-directed ledge or rim 41, which engages notches 42, provided in the upper edges of the key-levers just forwardly of the projections 39, thus preventing endwise displacement of the levers, but not interfering with their vibration. Said rim or ledge 41 is also slotted vertically at 41^a to form a guide for each key-lever.

The letter-spacing movements of the spring-propelled carriage may be effected in any suitable way, as by a transverse universal bar 43, depending by means of rods 44 from arms 45, secured to a rocking frame 46, pivoted at 47 to a bracket 48, secured to the under side of the top plate 3. The said rocking frame also includes a vertical arm 49, at the upper end of which is carried both a pivoted feeding or stepping dog 50, which is normally in engagement with a carriage-escapement rack 51 and a fixed detent-dog 52 in line with said dog 50. A cylindrical platen is indicated at 53.

The platen and paper carriage, which are not further illustrated, may be of any usual or suitable construction.

In operation the key-lever is depressed, carrying down the pivot 26 of the bell-crank lever and causing the arm 25 of the latter to swing rearwardly, so that by means of link 22 the type-bar is swung up to strike the platen. During this operation the universal bar 43 is carried down, the rocker-arm 49 is swung for-

wardly, and the dog 50 disengaged from the rack 51, the fixed dog 52 becoming engaged therewith. Upon release of the key from pressure the springs 18 and 32 cause the type-bar, key-lever, and sublever to return to normal position, and the usual dog-rocker spring 54 causes a return of the dog-rocker to normal position, permitting the carriage to advance one step in the usual manner under the tension of a carriage-spring. (Not shown.) Owing to the comparatively short distance between the load-point 26 of the key-lever and the forward fulcrum-point 39, the key is given an extraordinary leverage upon the type-bar, so that even though the key be struck sharply the resistance to the finger-pressure is comparatively slight, and hence the touch is soft and agreeable. By the time the type-bar and connected parts are well under way the rear extremity of the key-lever is so far elevated as to cause the rear fulcrum-point 40 to contact with the fixed fulcrum-point 40^a, as shown at Fig. 4. At this time the key has completed about one-half of its stroke, while the type-bar has made considerably less than one-half of its stroke. When the point 40 contacts with the plate 38 at 40^a, the lever works solely upon said point 40 and the other point 39 moves downwardly out of contact with the plate 38. Because of this decrease in the leverage the key is prevented from descending too far at the last part of the stroke and the speed of the type-bar is much increased relatively to the speed of the key. Owing to its increased speed at the terminal portion of its printing stroke, the impact of the type against the platen or the paper thereon is made more powerful, thus producing a satisfactory impression. It will be seen that the key-stroke may be divided into two periods, during the first of which the lever 27 dwells or works exclusively upon the point 39, and during the second of which said lever works exclusively upon the point 40. More than half of the return stroke of the type-bar—that is, its movement from the platen to the full-line position shown at Fig. 4—occurs while the point 40 is bearing upon the fulcrum-plate and hence while the speed of the type-bar is greatest in proportion to the key speed. Hence the keys may be operated with great rapidity without incurring danger of clashing of the types. It will be understood, further, that the first part of the return stroke of the dog-rocker is also made at a comparatively high rate of speed, since the speed of the universal bar 43 at the time that the lever is working on the point 40 is greater than the speed of said bar when the lever is working upon the point 39, and hence the detent-dog 52 is enabled to escape promptly from the rack or escapement wheel 51, thus enabling the carriage to start earlier and reducing the liability of the type impressions overlapping one another.

Referring now to Fig. 5, it will be seen that the key-lever is pivoted at 56 in the usual

manner, but that the arm 28^a of the bell-crank is extended forward horizontally and provided with a series of points which bear in succession upon the upper surface of a horizontal transverse fulcrum-plate 57 during the vibration of the lever. A spring 58 is provided for returning the bell-crank and key lever to normal position upon the relief of the key from pressure. In operation the forward projection *a* upon the arm 28^a first serves as a fulcrum-point for said lever, then the rear projection *b*. The results obtained by this construction are substantially the same as already set forth in respect to the preferred construction. Other changes may be made within the scope of my invention. The working points 39 and 40 are shown as projections; but this formation is not essential so long as the lever leaps or skips directly from the first to the second working point and dwells for a time upon each of said points. The portion of the fulcrum-plate extending between its working points 39^a and 40^a may be cut away, as at 38^a, Fig. 4. The fulcrum-plates 38 and 57 may be made adjustable to alter the dip and leverage of the keys in substantially the manner shown and described in the application filed by Carl Gabrielson August 16, 1900, Serial No. 27,102.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a type-writing machine, the combination with a type-bar, of a key-operated lever connected thereto, and suitable projections upon which said lever may work in succession, the construction and arrangement being such that during the first part of the key-stroke, said lever works upon one of said projections, and such that at the terminal portion of the key-stroke, said lever works upon another of said projections, at a decreased leverage.

2. In a type-writing machine, the combination of a type-bar, a key-lever having a series of projections, and a fixed means upon which said projections may work in succession.

3. In a type-writing machine, the combination with a type-bar of a key-lever operatively connected thereto, said key-lever having a key at one end and a projection at the other end and also having another projection between its ends, and a fixed means upon which said projections work in succession during the operation of said key-lever.

4. In a type-writing machine, the combination with a series of type-bars, of a series of key-levers connected thereto, and a plate overlying the rear ends of said key-levers, each of said key-levers having a projection at its rear

extremity and also a projection forwardly thereof, the latter projection normally bearing up against the under side of said plate, and the construction and arrangement being such that during the vibration of the key-lever the rear projection thereon swings upwardly into contact with the plate and then serves as a bearing-point for the lever during the final portion of the printing stroke.

5. In a type-writing machine, the combination of a series of type-bars, a series of key-operated levers, each having a series of projections which serve in succession as bearing-points, a fixed means upon which said projections may bear, and springs for holding said levers in contact with said means.

6. In a type-writing machine, the combination of type-bars 6, key-levers 27 having a plurality of separated bearing-points as 39 and 40, and intermediate levers 25 connected to said type-bars and pivoted upon said key-levers, said key-levers first working on one of said points and then leaping or skipping directly to another of said points and working thereon at a decreased leverage.

7. In a type-writing machine, the combination with a type-carrier, of a key-operated lever having two widely-separated bearing-points, upon the first of which it works at the beginning of the printing stroke, and from which it leaps or skips directly to the second point, upon which latter it finishes its stroke at a decreased leverage.

8. In a type-writing machine, the combination with a type-carrier, of a key-lever having a plurality of separated bearing-points, upon one of which it works during the initial portion of its movement, and from which it leaps or skips directly to another working point, whereon it works at a decreased leverage.

9. In a type-writing machine, the combination with a type-carrier, of a key-operated lever having a plurality of separated bearing-points, and correspondingly-separated coacting fulcrum-points arranged upon the framework of the machine, said lever working upon one of said fulcrum-points during the initial portion of its movement, and leaping or skipping from thence directly to another of said fulcrum-points upon which it works at a decreased leverage.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York, this 17th day of December, A. D. 1900.

JACOB FELBEL.

Witnesses:

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E. M. WELLS.