

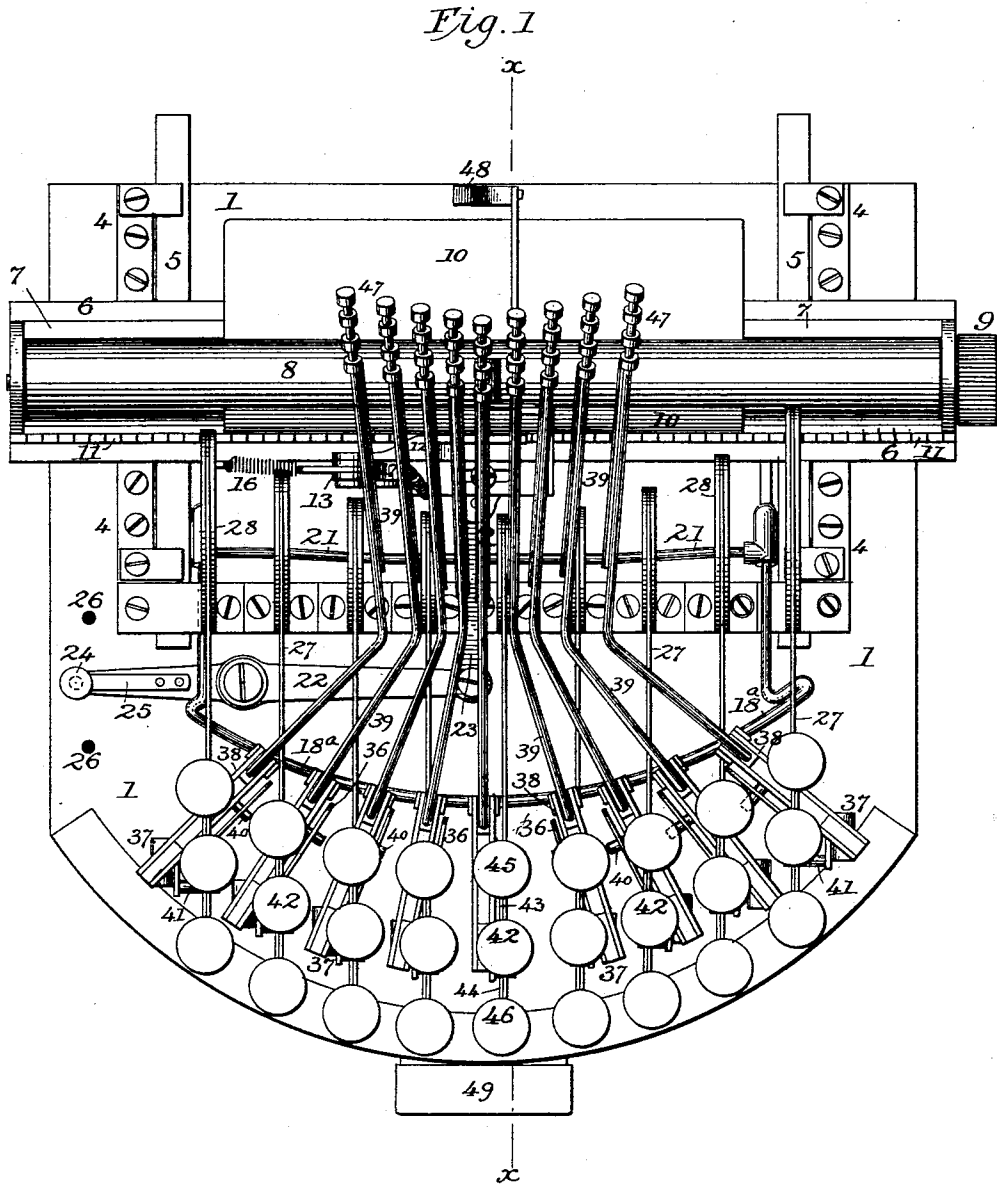
(No Model.)

3 Sheets—Sheet 1.

L. S. BURRIDGE.
TYPE WRITING MACHINE.

No. 593,563.

Patented Nov. 16, 1897.



Witnesses;
W. B. Burdine
D. E. Burdine

Inventor;
Leo S. Burridge,
by Rodger Leno,
Att'y.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 2.

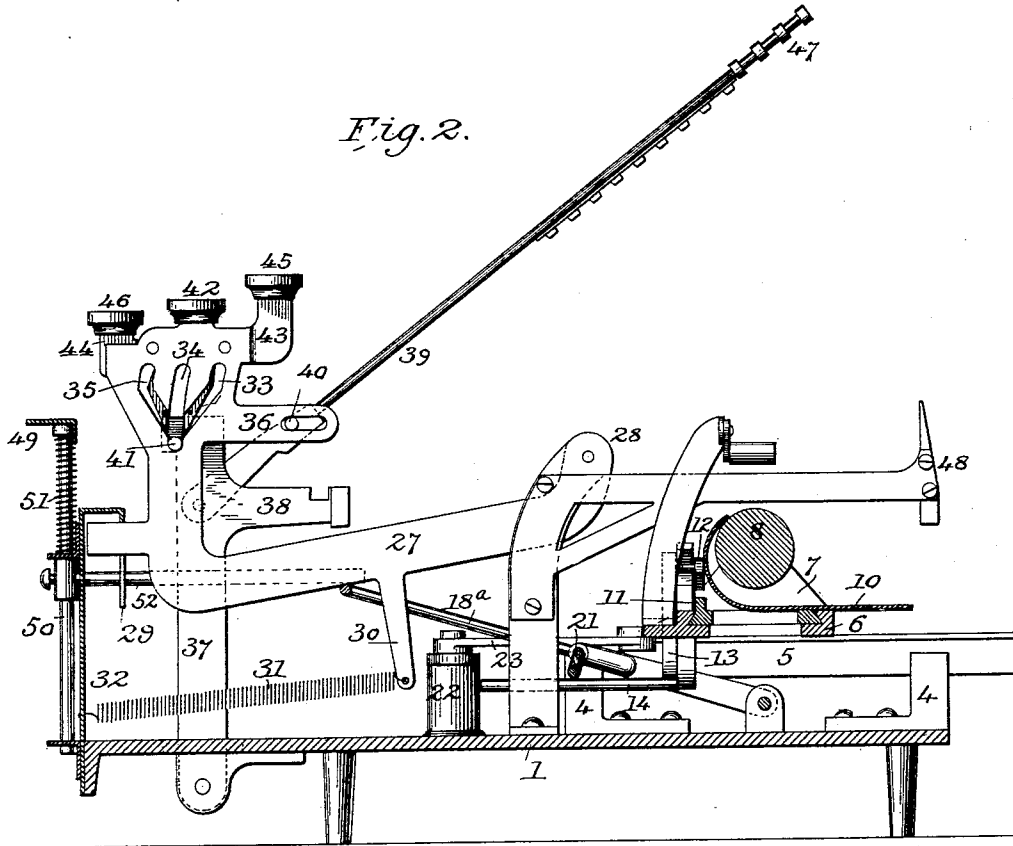
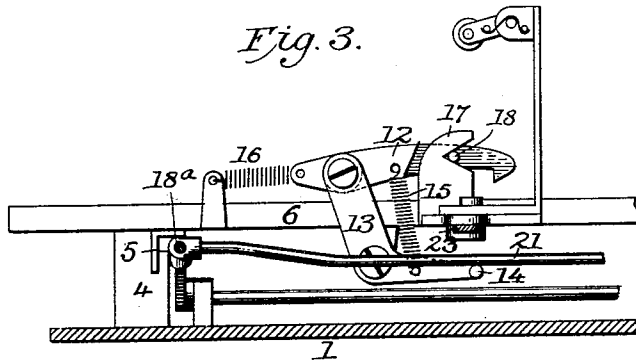


Fig. 3.



Witnesses;
C. B. Burdine
D. E. Burdine

Inventor;
Lee S. Burridge,
by Dodge & Luns,
Attys.

(No Model.)

3 Sheets—Sheet 3.

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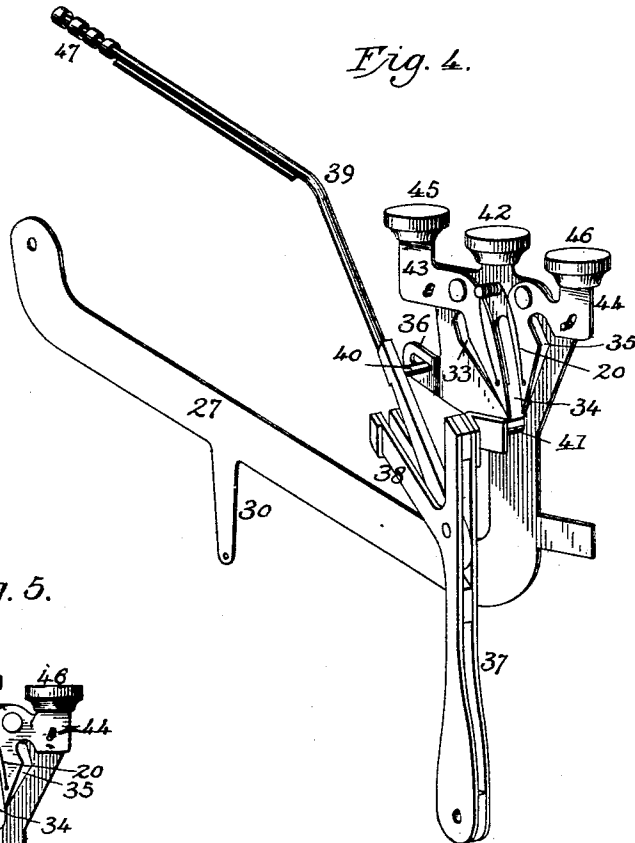


Fig. 4.

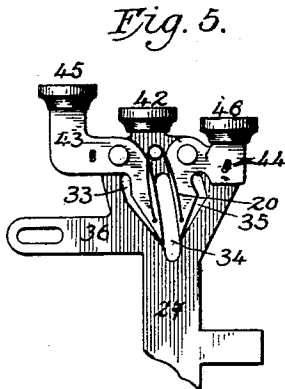


Fig. 5.

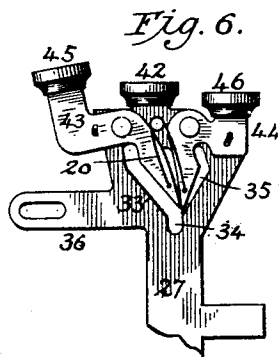


Fig. 6.

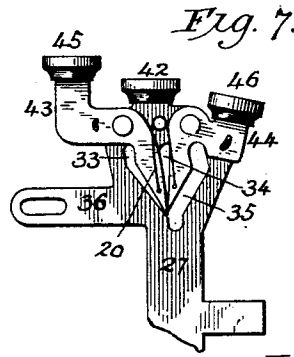


Fig. 7.

Witnesses:

C. C. Burdine

D. C. Burdine

Inventor;
L. S. Burrige,
by Rodger Lins,
Attys.

UNITED STATES PATENT OFFICE.

LEE S. BURRIDGE, OF NEW YORK, N. Y., ASSIGNOR TO THE CENTURY MACHINE COMPANY, OF SAME PLACE.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 593,563, dated November 16, 1897.

Application filed March 10, 1897. Serial No. 626,873. (No model.)

To all whom it may concern:

Be it known that I, LEE S. BURRIDGE, a citizen of the United States, residing at 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 invention has reference to type-writing machines, and is in the nature of an improvement upon or modification of that set forth in an application filed in my name on the 31st day of October, 1896, and designated by Serial No. 610,715, patented July 6, 1897, No. 585,838.

The present improvement is designed to introduce a lever movement for the finger-keys analogous to that of the more generally used commercial machines in lieu of the vertically-movable key-plates of said application. Except, therefore, as hereinafter particularly pointed out, the construction may be the same as therein set forth and shown.

Figure 1 is a top plan view of my improved machine; Fig. 2, a vertical section on the line *xx* of Fig. 1; Fig. 3, a view illustrating the mechanism for advancing the carriage for letter and word spacing; Fig. 4, a perspective view of the type-bar and actuating-key mechanism; Figs. 5, 6, and 7, views illustrating the action of the switches or gates by which are determined the movements of the type-bar and consequently the character printed.

In the drawings I have illustrated a machine with twenty-seven finger keys or buttons which are designed to control three type each, in most instances a capital and small letter of the same name and a numeral or a punctuation-mark. The characters adopted may, however, vary according to the requirements of different cases, the finger keys or buttons being marked to correspond with the several characters which they control. It will of course be understood, however, that a smaller or larger number of characters may be used, as found expedient, and this variation may be effected through varying the number of characters carried by each type-bar or by increasing or diminishing the number of such bars. In the present instance I have represented nine type-bars, each bear-

ing nine type or printing-characters, or eighty-one in all. This allows a full set of upper and lower case letters, eight numerals, the lower-case "1" and capital "O" being used for "one" and "naught," as usual, and twenty-one punctuation-marks, commercial signs, &c., of which latter group a portion may be omitted, if deemed expedient.

I will now describe the construction of the machine, referring but briefly to those parts common to this and to the prior application, yet describing them sufficiently to give a proper understanding of the machine as a whole.

All the mechanism is carried by a base-plate 1, the front of which is preferably curved on the arc of a circle struck from a central point 2 within the base-plate, which is also the center about which are grouped the finger keys or buttons of the keyboard.

The base-plate 1 may conveniently be of cast-iron or other cast metal, and should be formed or furnished with feet or with a depending skirt to raise the plate somewhat above the table or support upon which it is placed in order that certain parts may extend beneath the same. This is not essential, but is deemed expedient.

At the rear part of the base-plate 1 are arranged two sets of posts 4 4, slotted or grooved at their upper ends to receive the vertical webs of angle-bars 5 5, of which there is one to each pair of posts, the bars extending parallel with the sides of the base-plate or in a direction from front to rear of the machine, as in Figs. 1 and 2. Upon these bars 5 5 there is rigidly secured a carriage bed or base 6, which extends transversely across the base-plate, parallel with the rear side thereof, and is formed with longitudinal guides or ways to receive and guide a carriage 7. The carriage-bed is preferably of cast metal and may have the bars 5 5 formed integral therewith, though this is not important, being, like the form of the bars, wholly optional and subject to variation at will. I have shown the carriage-base as provided with a dovetail guide and the carriage as having a correspondingly-shaped rib to enter and traverse said guide-way, this being at once a simple and good

construction, admitting of ready compensation for wear by the use of gibs, as is common in machine construction.

The carriage 7 bears a platen roll or cylinder 8, journaled in suitable uprights and furnished with a hand wheel or knob 9, or with other common device by which to turn it. It also carries a curved paper-guide 10, which serves both to direct the paper to and about the platen and to clamp or bind it thereto, so that it shall move forward or backward with the platen as the latter is turned in one or the other direction. At its forward side the carriage 7 is furnished with a toothed rack-bar 11, the teeth of which have abrupt vertical faces and long inclined tops or backs, so that a feed-dog 12, used in connection therewith, may freely ride over the teeth in one direction, but shall engage with them when moving in the opposite direction. Feed-dog 12 is carried by an elbow-lever 13, fulcrumed on the carriage-base 6 and provided with a horizontal rod or stem 14, projecting forward from its lower arm, as seen in Figs. 2 and 3. A light spring 15 connects dog 12 with the lower arm of elbow-lever 13 and tends to draw the free end of the dog down into engagement with the toothed rack-bar 11, and another spring 16, attached either to the upper arm of the elbow-lever or to the dog, tends to draw the dog to the left or in a direction to advance the carriage 7. Rising from the carriage-base 6, close beside the dog 12, is a plate 17, provided with a V-notch in its right-hand upright face or edge to receive a pin or stud 18, projecting from the side of the dog, the plate thus serving both as a stop to limit the longitudinal movement of the dog and consequent advance of the carriage and also as a means of lifting the dog out of engagement with the toothed rack when the requisite movement is completed.

For the purpose of actuating the dog at and by each depression of a finger key or button there is provided a bail 18^a, the ends of which are pivoted to studs beneath the carriage-base 6 and the body of which bows out in semicircular form to pass beneath each and all of the key-levers 27, hereinafter more fully described. A cross bar or rod 21 extends from one arm of the bail to the other at a suitable distance from its pivot-axis and bears upon rod or stem 14 of elbow-lever 13, as shown in Fig. 2. The rod or stem 14 is made of such length as to permit the carriage and its base to be shifted forward or backward from its normal position to bring the platen under one or another group of type at will. For the purpose of thus shifting the platen-carriage and its base there is provided a hand-lever 22, one arm of which is connected with the carriage-base 6 by a link 23 and the other end of which is furnished with a knob or finger-piece 24, by which to move it. Any convenient friction or locking device may be provided to retain the lever at its different adjustments, the knob 24 being

represented in Fig. 2 as pressed downward by a spring 25 to cause a stem or point to enter one or another of three conical sockets 26 in the base-plate 1. Obviously any common form of key-shift may be substituted for the lever, if desired.

Coming now to the finger-key and type-bar mechanism, to which the present invention particularly relates, 27 indicates a lever, of which nine are indicated in Fig. 1, each fulcrumed at its inner end in a post or standard 28. In order to give each lever the same length and thus to secure the same or substantially the same action for each, it is necessary in a machine of the proportions here represented and with a curved keyboard to carry the upper ends of the posts or standards back to correspond with the curved arrangement of the keyboard. To prevent the posts or standards from interfering with the forward movement of the platen-carriage and its base, their lower ends are preferably arranged in a straight line or series, as in Fig. 2, while their upper ends curve over and extend rearward such distances as are necessary to preserve the proper relation to the keyboard, as will be understood upon reference to Figs. 1 and 2.

The levers 27 will by preference be stamped from sheet-steel or other metal and formed each with a tongue or end piece to enter a vertical slot or guideway 29, formed in separate posts or in a continuous plate at the front of the machine, as may be most convenient in practice. Depending from the body of each lever is an arm 30, to which is attached one end of a coiled spring 31, the other end of which is made fast to the guide plate or post 32 or to other fixed part of the machine, said spring exerting a constant lifting force upon the lever 27. Each lever has an upturned forward end which is widened, as shown in Figs. 2, 4, 5, 6, and 7, and is provided with three converging slots 33, 34, and 35, which merge into one at a point slightly above the lower end of the middle slot. The middle slot and the upper end of each branch or side slot is curved on an arc of a circle concentric with the pivot-axis of the lever. Projecting from each lever is a slotted arm 36, the purpose of which will presently appear. By the side of each lever 27 there is arranged an oscillating upright or standard 37, the lower end of which is pivotally supported upon the base-plate 1. The standard may be stamped from sheet-steel either in one piece, in which case it will be subsequently bent to form, or in two pieces provided with suitable spacing-blocks and united by brazing, riveting, or in any other convenient way, or they may be cast or forged and afterward machined to give the necessary form. In whatever manner produced each standard has its upper end bent or set at an angle to its pivot-axis, so that its horizontal arm 38 shall stand substantially radial to the center 2, about which the finger-buttons are arranged. Pivoted in

the upper part of each oscillating standard is a type-bar 39, all of which except the one at the middle of the series are bent at a point somewhere about their mid-length, so that when carried to the printing-level the forward end of each bar shall occupy a horizontal position perpendicular to the axis of the platen. The angle at which the bars are bent of course varies, increasing from the central bar toward the outer bars of the series. Each bar under the construction here illustrated bears nine type or printing-characters arranged in three groups of three type each, the middle group being brought into action when the platen is in its medial position and the others when the platen is moved forward or backward. Each type-bar has a flat and comparatively broad or deep pivotal end which is guided between the two plates or walls of the horizontal arm 38 of the oscillating standard 37, whereby the type-bar is prevented from playing laterally. Projecting from the side of this heavier portion of the type-bar is a pin or stud 40, preferably provided with a loose sleeve or roller, which pin or stud projects into and through the slot of arm 36 of the finger-key lever 27, as best seen in Fig. 4. It will readily be seen that under this construction and arrangement depression of the key-lever 27 will carry the type-bar down with it, the pin 40 moving along the slot of arm 36 to compensate for the curved path of the arm 36, due to its movement about the fixed fulcrum of lever 27.

Mention has already been made of the slots 33, 34, and 35, with which each lever 27 is provided. The purpose of these slots is to receive a pin or stud 41, projecting horizontally from the upper end of the proximate standard 37, as best shown in Fig. 4, the pin or stud resting normally in the lower end of the middle slot 34 and serving to limit the rise of lever 27. Rigidly secured to the up-turned end of each lever 27 is a finger key or button 42, pressure upon which causes the lever to descend and the pin or stud 41 to pass into the middle slot 34, which being curved concentrically with the pivot-axis of the lever holds the standard 37 against oscillation about its pivot. From this it follows that whenever the finger-button 42 of any lever 27 is depressed that particular type or printing-character which occupies the medial position in the middle group will print. Pivoted to each lever 27 are two gates or switches 43 and 44, provided with finger-buttons 45 and 46. Each gate or lever has a pointed lower end which is normally held across the mouth or opening of one of the slots 33 or 35 by a light spring 20, but which may be thrown to position to open such slot and to close the middle slot 34. This action will be readily understood upon referring to Figs. 5, 6, and 7, Fig. 5 showing the parts in their normal positions, Fig. 6 showing the inner button depressed and slot 33 uncovered, and Fig. 7 showing the outer button 46 depressed

and slot 35 opened or uncovered. Slot 33 inclining inward, as it does, toward the fulcrum or pivot of lever 27, it follows that pin or stud 41 when directed into said slot by depression of button 45 and consequent opening of the slot and closing of the middle slot 34 will be carried toward the fulcrum or pivot of lever 27 by the descent of said lever, thus swinging the upper end of standard 37 inward and moving the type-bar 39 longitudinally inward while said bar is being depressed by pressure upon pin 40. If the platen be at the time in its normal or medial position, so that the middle group of type or characters is brought into play, the forward type of said group or the one therein nearest the keyboard will be caused to strike and make its impression at the printing-point. By depressing the outer button 46 the middle slot is closed and the pin or stud 41 is directed into the outer slot 35, which, inclining outward or away from the fulcrum or pivot of lever 27, will cause the standard 37 and the type-bar 39 to be drawn forward or outward while being depressed by the pressure of slotted arm 36 on pin or stud 40. Still assuming the platen to be at its medial or normal adjustment, the innermost type of the middle group will now be caused to print. It is of course important that the type-bar be moved longitudinally the precise distance required and that such movement cease before the type reaches the paper or impression surface, and it is to insure this result that the upper ends of the slots 33 and 35 are curved concentrically with the pivot or fulcrum of lever 27. To further insure this precise positioning of the type at the printing-point and to guard against variation due to play or lost motion in the parts, the end of each type-bar 39 is furnished with four collars 47, uniformly spaced to form three grooves or spaces corresponding with the spacing of the type or printing-characters in each of the several groups. Located in the path of the type-bars is a slotted or bifurcated upright or post 48, the slot of which is widened at the top and narrowed at the bottom to produce a free yet close fit of the body of the bar within it. The post or upright 48 is also tapered or made thinner toward its top, so that its arms may readily enter the grooves or spaces between the collars, but is made of a thickness at the printing-level of the type-bars to fit the grooves or spaces nicely yet freely. In this way the type-carrying ends of the several bars are accurately guided and held against play either laterally or longitudinally. By shifting the platen forward or backward the forward or rearward groups of type of the several bars may be brought into action, as will be readily understood, the middle, forward, or rearward letter of each group being selected by pressure upon the finger-buttons 42, 46, or 45, as in the case of the middle group, already explained.

For spacing between words, indenting, or

the like a space bar or key 49 is provided. This may be of any convenient construction, the drawings showing said key or plate sustained by vertically-movable rods 50 and elevated by a spring or springs 51. A horizontal rod 52 extends inward from one of the upright rods 50 and bears upon bail 18^a, so that depression of the key or plate 49 shall cause the bail to be depressed and the space-dog to be actuated. The finger keys or buttons are preferably arranged in three tiers or levels, as indicated, though this is not essential.

The levers 27 and standards 37 may vary in form, provided only the general plan of construction and operation be retained, and the details of the machine may be modified as desired. The type-bar movement may be employed in machines of varying design in other respects, and the platen may be arranged to shift or not, or the number of shifts may vary. So, too, the number of slots in the finger-key levers may be diminished or increased.

The key-lever construction is advantageous over the vertically-movable slide in that it is less liable to cramp or bind, offers less friction, is cheaper, and gives the motion to which operators are more generally accustomed. It is further advantageous in that it permits the leverage and stroke to be varied as desired.

Having thus described my invention, what I claim is—

1. In a type-writing machine, the combination of a pivoted type-bar capable of longitudinal movement and of oscillation about its pivot-axis, and bearing a plurality of printing-characters; and an actuating-lever arranged to act directly upon and to swing said type-bar, said lever being provided with a plurality of finger-keys, each arranged to control the movements of the type-bar and to bring one or another of its printing-characters to the printing-point.

2. In a type-writing machine, the combination of a type-bar bearing a plurality of type; a movable support in which said bar is pivoted; and a lever provided with a plurality of finger-keys and connected with the type-bar and with its movable support, said finger-keys serving to determine the movements of the type-bar and thus to determine which of its several characters shall print.

3. In combination with standard or support 37 provided with a projection 41; type-bar 39 pivotally supported in said standard, and provided with a plurality of printing-characters, and with a projecting pin 40; lever 27 provided with slotted arm 36 and with slots 33, 34, 35; gates or switches 43, 44, carried by the lever 27 and provided with buttons 45 and 46; and button 42 applied to lever 27, all substantially as described and shown.

4. In combination with a longitudinally-movable type-bar bearing a plurality of printing-characters and having a pivotal axis at

or near one end; a key-lever adapted and arranged both to move said bar longitudinally and to swing it about its pivotal axis; and a plurality of finger-keys carried by said lever and adapted to control the movements of the bar.

5. In a type-writing machine, the combination of a longitudinally-movable type-bar provided with a plurality of printing-characters and having a pivotal axis at or near one end; a key-lever connected with said type-bar and serving to swing it about its pivotal axis; a series of divergent guides in one of said parts adapted to receive a projection from the other of said parts; and a switch carried by the key-lever and serving to determine into which of the guides the projection shall enter; whereby the position of the pivotal axis of the type-bar at the moment of printing is determined.

6. In combination with a longitudinally-movable type-bar provided with a plurality of printing-characters and with a pivot pin or axle at or near one end; a key-lever adapted to press against the type-bar and to swing it about its pivot pin or axle; a plurality of divergent slots in said key-lever each adapted to receive the pivot pin or axle of the type-bar; a finger-key applied directly to the key-lever and serving to move the same in line with one of its slots; and a separate finger-key movably supported upon said key-lever and carrying a switch or gate to direct the pivot pin or axle into a different slot of the key-lever.

7. In combination with the main frame of a type-writing machine, a platen or paper-support; a standard pivotally supported in the main frame and adapted to swing toward and from the platen; a type-bar pivotally supported upon said standard and provided with a plurality of type; a key-lever movable in a plane parallel with that in which the type-bar swings and having a loose connection with said type-bar; a plurality of divergent slots or ways in said key-lever; a projection extending from the swinging standard into or through the key-lever at the point of convergence of the slots; and a plurality of finger-keys carried by said lever and serving to direct said projection into one or another of the slots according as one or another key is pressed, substantially as and for the purpose set forth.

8. In combination with a swinging type-bar bearing a plurality of printing-characters; a movable support to which said bar is pivoted, provided with a lateral projection; a key-lever having a slot in alinement with said projection and other slots divergent therefrom; a finger-key carried by said lever and serving to move the same in alinement with the first-mentioned slot; and separate finger-keys bearing gates or switches each adapted to close the first-mentioned slot and to direct the projection of the standard into one or another of the divergent slots.

9. In a type-writing machine, the combination of a paper-support; a movable type-bar

support; a type-bar pivotally connected with said support and provided with a plurality of type; a key-lever having a loose connection with and serving to swing said type-bar, and
 5 serving also to lock the movable support or to move the same toward or from the platen; and a plurality of finger-keys carried by said lever and arranged to determine the locking or the movement of the type bar or support
 10 according as one or another is pressed, substantially as set forth.

10. In a type-writing machine, the combination of a type-bar having a pivot pin or axle at or near one end; a type-bar support; a key-
 15 lever provided with a plurality of divergent slots each adapted to receive a pin or projection of the type-bar support, and to hold the same against movement or to move it forward or backward; and a loose connection between
 20 said key-lever and type-bar at a point at one side of its pivot-axis, whereby said key-lever is adapted to both swing the type-bar about its pivot and move the same longitudinally, or to hold the same against longitudinal movement but swing it about its axis, substantially
 25 as set forth.

11. In a type-writing machine, a type-bar capable of longitudinal and of swinging movement; a key-lever loosely connected with said
 30 type-bar and adapted to effect both the longitudinal and the swinging movement or to produce the swinging movement alone; a plurality of finger keys or buttons carried by said key-lever; and intermediate devices between the finger-keys and the type-bar, where-
 35 by the movements of said bar are determined and are made either simple or compound as one or another finger-key is pressed.

12. In a type-writing machine, the combination of a longitudinally-movable type-bar provided with a pivot or axle at or near one end, and with a plurality of types at its other end; a type-bar support; a key-lever having a loose connection with the type-bar and
 40 capable of movement in a plane substantially parallel with that in which the type-bar moves; a key-plate carried by said lever and serving to move the same; guides carried by

the key-plate and adapted to receive a pin or projection of the type-bar support; switches
 50 carried by said key-plate and serving to direct the pin or projection into one or another of said guides; and finger-keys also carried by said key-plate and adapted, when pressed, to actuate said switches and also to move the
 55 key-lever and type-bar, substantially as set forth.

13. In a type-writing machine, the combination of a type-bar provided with a plurality of type and adapted both to move longitudi-
 60 nally and to swing about an axis; a key-lever adapted both to move the type-bar longitudinally and to swing it about its axis or merely to swing it; and a plurality of keys each serving to move the key-lever and to cause or
 65 prevent a longitudinal movement of the type-bar.

14. In a type-writer, the combination of a pivoted arm or standard provided with a lateral projection; a type-bar having its fulcrum in the free or swinging end of said
 70 standard; a key-lever having a plurality of finger-keys; and switches controlled by said finger-keys and adapted to be thrown to one or the other side of the projection of the standard to cause said standard to be moved
 75 forward or backward.

15. In combination with the bail or universal bar of a type-writing machine; a series of swinging type-bars each provided with a plurality of printing-characters; movable sup-
 80 ports to which said type-bars are pivoted; a series of key-levers each provided with an arm to bear upon the universal bar or bail and with a plurality of slots to receive a projection upon the type-bar support; and a plu-
 85 rality of finger-keys carried by each of said levers and serving both to depress the same and to determine into which of the several slots the projection shall pass.

In witness whereof I hereunto set my hand 90 in the presence of two witnesses.

LEE S. BURRIDGE.

Witnesses:

EDWARD B. HESS,
 JOSEPH M. STOUGHTON.