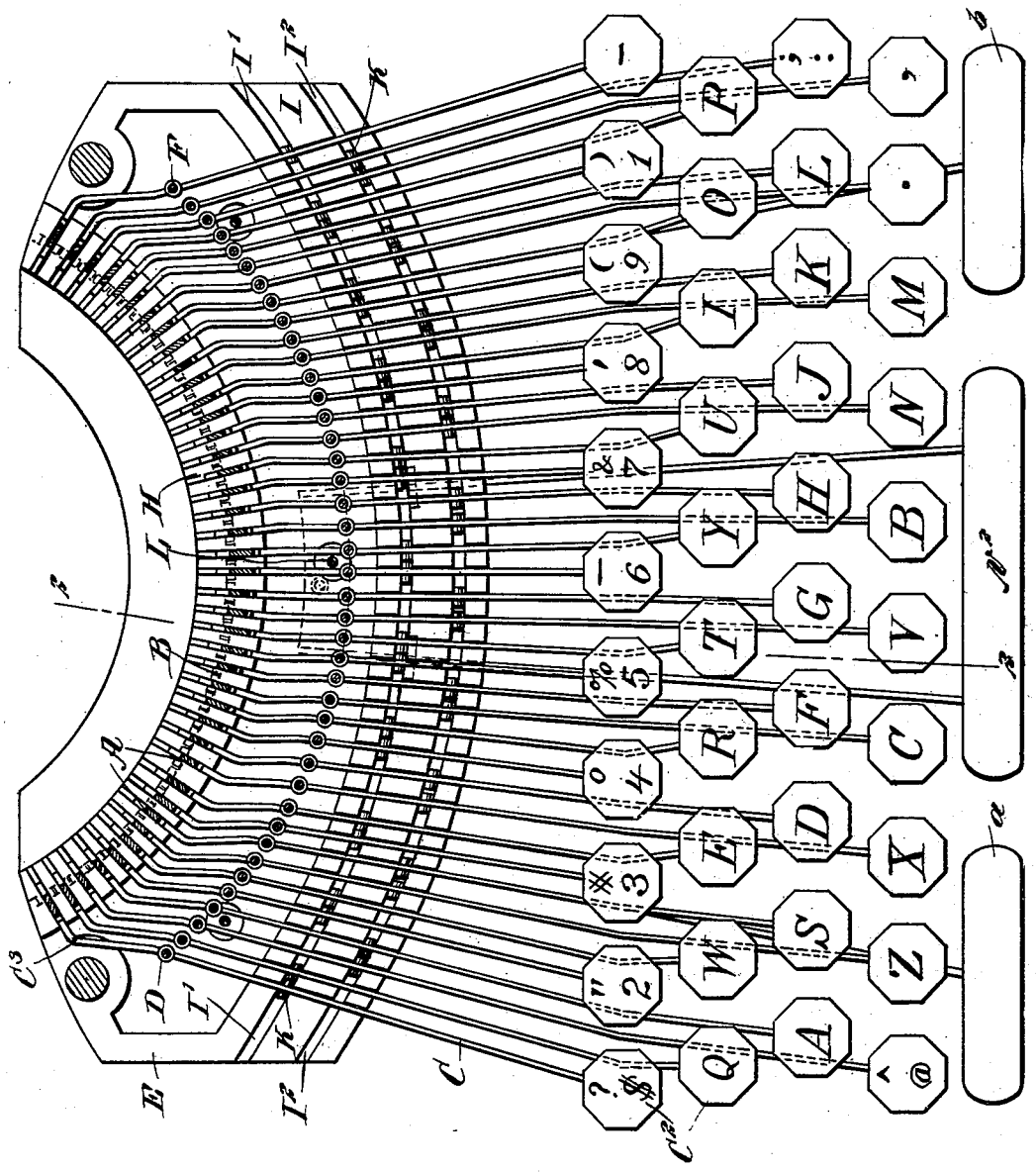
No. 626,915. Patented June 13, 1899.

R. C. LITTLE.

TYPE WRITER.

(Application filed Oct. 11, 1898.)

(No Model.) 2 Sheets—Sheet 1.



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FIG. 2.

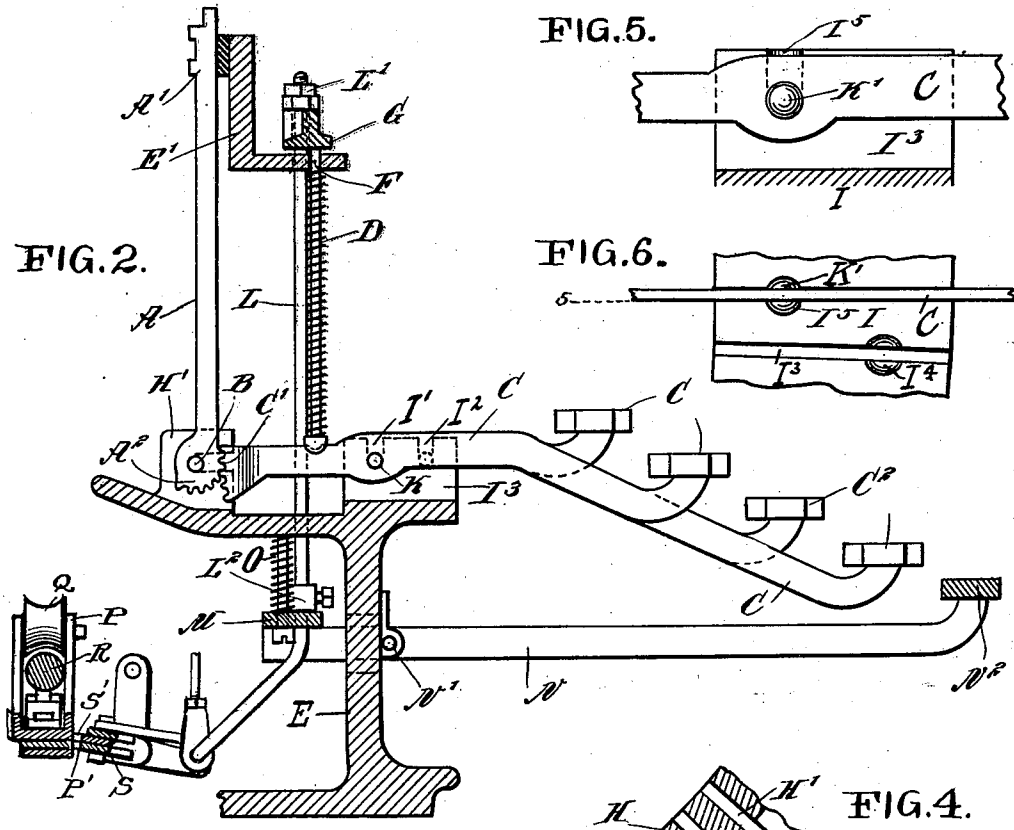


FIG. 5.

FIG. 6.

FIG. 4.

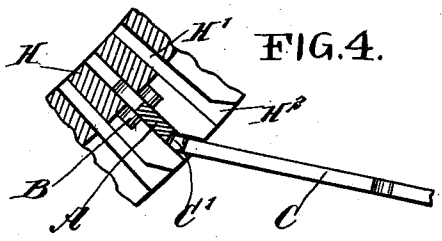
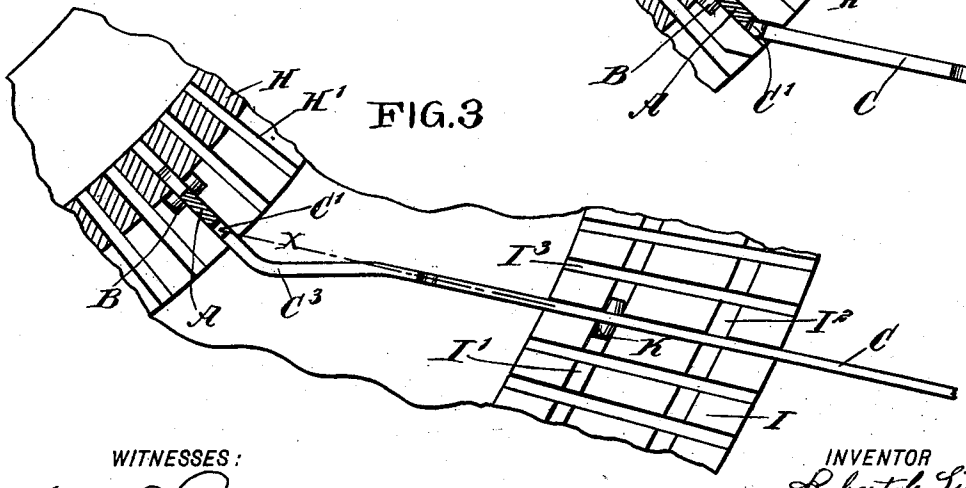


FIG. 3



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UNITED STATES PATENT OFFICE.

ROBERT C. LITTLE, OF PITTSBURG, PENNSYLVANIA.

TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 626,915, dated June 13, 1899.

Application filed October 11, 1898. Serial No. 693,208. (No model.)

To all whom it may concern:

Be it known that I, ROBERT C. LITTLE, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Type-Writers, of which the following is a full, clear, and exact description.

My invention relates to type-writers, particularly those of the class known as the "Franklin" type-writer, in which the type-levers are disposed in the arc or segment of a cylinder, the impression-point being at the axis of said cylinder. With this construction as it now exists the type-keys are spread over a comparatively extended surface, as they are arranged to radiate from the axis of said cylinder.

The object of my present invention is primarily to provide an arrangement by which the keys may be located close together, occupying the same relative positions as in the square keyboard of the Remington and other type-writers.

Another object of my invention is to provide a simplified spacing mechanism, and a third feature of the improved type-writer consists in an improved bearing for the keys, whereby a very easy movement is obtained.

The invention will be fully described hereinafter and the features of novelty pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan of the improved type-writer with the carriage omitted. Fig. 2 is a sectional elevation on the line 2 2 of Fig. 1. Fig. 3 is a broken sectional plan on an enlarged scale. Fig. 4 shows a different way of connecting the type-levers and key-levers. Fig. 5 is a broken sectional elevation on the line 5 5 of Fig. 6, showing the preferred form of key-lever and bearing therefor; and Fig. 6 is a plan of such bearing and key-lever.

A designates the type-levers, carrying types A′ at their upper ends and mounted upon a series of supports or pivots B, arranged in the arc of a circle, as shown in Fig. 1. The type-levers are thus adapted to move in radial planes toward the impression-point located at the axis of the cylinder formed by said levers when in their normal position. Each type-lever has a segmental gear A^2 at its lower end, and said gears are engaged by similar gears C′ upon the rear ends of the key-levers C, which are returned to their normal position by means of springs D, engaging a stationary bar E′ of the frame E and the upper surfaces of the key-levers. Said springs are coiled about rods F, extending up through said bar E′ and connected with a vertically-movable segmental bar G, which feeds the carriage after each impression.

So far as above described the parts are not materially different from those now in use upon the Franklin type-writer.

The construction of the key-levers and the arrangement of their pivots differ as follows from those now in use: In the present construction of the Franklin type-writer each type-lever and the key-lever operating it are arranged to swing in the same plane—that is, the axes about which such meshing levers turn are parallel. According to my invention the axes of each key-lever and of the type-lever belonging thereto are arranged at an angle to each other except at the center of the keyboard, and the farther the levers are removed from the center the greater the said angle becomes. This construction enables me to bring the keys C^2 located at the front ends of the key-levers C much closer together, thus reducing the extent of the keyboard and bringing the keys into the same arrangement as on type-writers such as the Remington.

To secure a proper meshing of the segmental gears A^2 and C′, notwithstanding the fact that their axes of rotation are at an angle to each other, I have found it best to so construct the levers that the pitch line of the said gears A^2 and C′ will be at the line of intersection of the two planes in which the levers swing—that is, in plan view, as in Figs. 1, 3, and 4, the lines perpendicular to the pivots of meshing levers A C will intersect at the meshing-point of the corresponding gears A^2 C′. Apparently the simplest way of accomplishing this is by the employment of bevel-gears, as shown in Fig. 4. This requires the channels or grooves H′ of the segmental bearing H to be cut away on one side at their in-

ner ends, as at H^2. When it is desired to avoid this, I employ the construction shown in Figs. 1 and 3, according to which the key-lever has a bend C^3 on the outer side of its longitudinal axis X, the rear end portion of the key-lever being in alinement with the gear portion A^2 of the type-lever. This is the construction I prefer for the reason that it affords a better guidance for the gear-segments C′ in the grooves H′ and that it enables me to use gears A^2 of the style employed heretofore instead of cutting bevel-gears of varying angles.

The bearing I for the key-lever pivots is of a particular novel construction. Instead of having said bearing concentric with the bearing H of the type-lever pivots, as heretofore, I give it a curvature from a different center, as clearly shown in Fig. 1. Furthermore, instead of having the key-lever pivots K arranged in a single arc of a circle I dispose them in two concentric arcs, so as to secure a different leverage for the key-levers. The reason for this will be obvious when considering that each of the keys C^2 is intended to be depressed the same distance when operated and should of course produce the same extent of movement for each type-lever A. Now it will be obvious that keys (for instance, the "Q" key) which are farther away from the pivot K than the other (for instance, the "?" key) will produce a smaller angular movement of the key-lever C when depressed than said keys nearer to the bearing I. To compensate for this, I make use partly of the same expedient as in the present form of the Franklin type-writer—that is, for instance, the gear A^2 belonging to the "Q" key-lever will have less teeth than the gear A^2 belonging the "?" key-lever. In addition thereto, however, I also make use of the novel expedient above referred to—viz., the arrangement of the pivots K in a plurality of rows (two rows, as shown) one in front of the other. Obviously the angular movement obtained by the same amount of depression would be smaller for a key-lever of the front rows (such as the "A" and "Z" key-levers) than for those (like the "?" and "Q" levers) of the rear rows if all of such levers were pivoted at the same distance from the type-lever pivots; but by arranging the pivots K in two rows the proportion between the lengths of key-lever portions in front and in the rear of the pivots K becomes approximately the same for all the key-levers. In my improved arrangement therefore the levers C leading to the two rear rows of keys C^2 have their pivots arranged in the rear row in the rear segmental groove I′ of the bearing I, while the levers C leading to the two front rows of keys C^2 have their pivots arranged in the front row in the front segmental groove I^2 of the bearing I. As above explained, the gear A^2 C′ is slightly different for the rearmost row of keys from the next adjoining row, and the same expedient is used to secure the required compensation of movement for the two front rows.

In detail the bearing I may be constructed as shown in Figs. 1 and 3, where the pivot-pins K of the key-levers C are received in the concentric segmental grooves I′ I^2, while the key-levers themselves work in cross-grooves I^3, extending from front to rear. Under this construction the key-levers have no unnecessary forward, rearward, or side play. I prefer, however, to construct the bearing I as shown in Figs. 5 and 6. According to this construction the segmental grooves I′ I^2 are dispensed with, and instead of the pivot-pins K, I employ balls K′, held in place by simply pressing them tightly into apertures of the key-levers. These balls are received in spherically-rounded sockets I^4, formed at the bottom of cylindrically-curved vertical grooves I^5 at each side of the key-lever grooves I^3. By this construction I provide a ball-bearing for each key-lever and a very easy motion of said levers.

The keys lettered *a* and *b* in Fig. 1 are the usual keys known, respectively, as the "shift-key" and the "lock shift-key," the one being used when it is desired to write a single capital when the machine is set for small letters, or vice versa, and the lock shift-key being used to change the entire machine from small letters to capitals.

The segmental spacing-bar G, hereinbefore referred to, is raised at each depression of a key and through the medium of a rod L actuates the carriage-feed mechanism, this construction being the one now employed. As indicated in Fig. 2, the carriage P, which by means of rollers Q rolls on a track R and has a rack P′ at the bottom, is normally held stationary by a pawl S engaging said rack. When the rod L is raised, the pawl S is lowered to release the carriage, which is pulled toward one end by a spring. At the same time another pawl S′, located above the pawl S, moves into the path of the rack to limit the movement of the carriage. This carriage-feed mechanism is well known and no novelty is claimed for it. The rod L, however, is in my improved construction mounted to slide in the bar G and has a nut L′ abutting against the upper surface of said bar, and the nut and bar are normally kept in engagement by the action of the carriage-feed mechanism, which exerts a downward pull on the rod L. The said rod slides through a bar M, secured to the spacing-lever N, pivoted at N′ and carrying the spacing-key N^2. An adjustable collar L^2 is rigid with the rod L, and said collar and bar M are normally in contact. A spring O serves to return the spacing-lever N to its normal position. The advantage of the construction described is that in operating the spacing-lever N the rod L is moved without carrying the segmental bar G with it, as in the construction now in use.

By the arrangements hereinbefore de-

scribed I secure an easy working of the key-levers C and spacing-lever N, and, further, I obtain the important advantage of reducing the keyboard to the dimensions and shape employed with the majority of type-writers now in use.

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

1. In a type-writer, a pivoted type-lever, and a key-lever meshing with said type-lever and pivoted about an axis arranged at an angle to that of the type-lever, the key-lever extending first in a straight direction rearward from its pivot toward the type-lever, then laterally outward, and then back toward the plane in which the main portion of the key-lever swings, the longitudinal axis of the key-lever intersecting the meshing portions of the key-lever and type-lever at the pitch lines.

2. In a type-writer, type-levers mounted upon pivots arranged in the arc of a circle, and key-levers meshing with said type-levers and mounted upon pivots arranged in the arc of a circle eccentric to the first-named circle, the key-levers having end portions in line with the meshing portions of the type-levers, and laterally-bent portions connecting said end portions with the pivot portions of the key-levers, the angle of said bent portions increasing progressively from the central keys toward the end keys.

3. In a type-writer, a lever having a transverse through-aperture a ball located therein centrally and projecting at each side of said lever, and a bearing having a groove for the reception of the lever, and a spherically-rounded socket for said ball.

4. In a type-writer, a lever having a transverse through-aperture a ball located therein centrally and projecting at each side of said lever, and a bearing having a groove for the reception of the lever, cylindrically-rounded recesses in the sides of the groove, and spherically-rounded sockets at the bottom of said recesses.

5. The combination of the key-levers, the spacing-bar operated thereby, the carriage-feed rod arranged to be actuated by the movement of the spacing-bar, and the spacing-lever connected with the said feed-rod, the said carriage-feed rod passing loosely through the spacing-bar and having a stop adapted to engage the top of said bar, whereby the operation of the spacing-key will move the feed-rod independently of the spacing-bar.

6. The combination of the key-levers, the spacing-bar operated thereby, the spacing-lever, and the carriage-feed rod passing loosely through the spacing-lever and through the spacing-bar, and having stops engaging the top surfaces of said lever and bar, whereby the carriage-feed rod, when actuated by the spacing-lever or by one of the key-levers, will move independently of the spacing-bar or of the spacing-lever respectively.

ROBERT C. LITTLE.

Witnesses:
JOHN LOTKA,
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