Dec. 14, 1937. F. M. GUILFOYLE 2,102,526

TYPEWRITING MACHINE

Filed Jan. 18, 1934 2 Sheets-Sheet 1

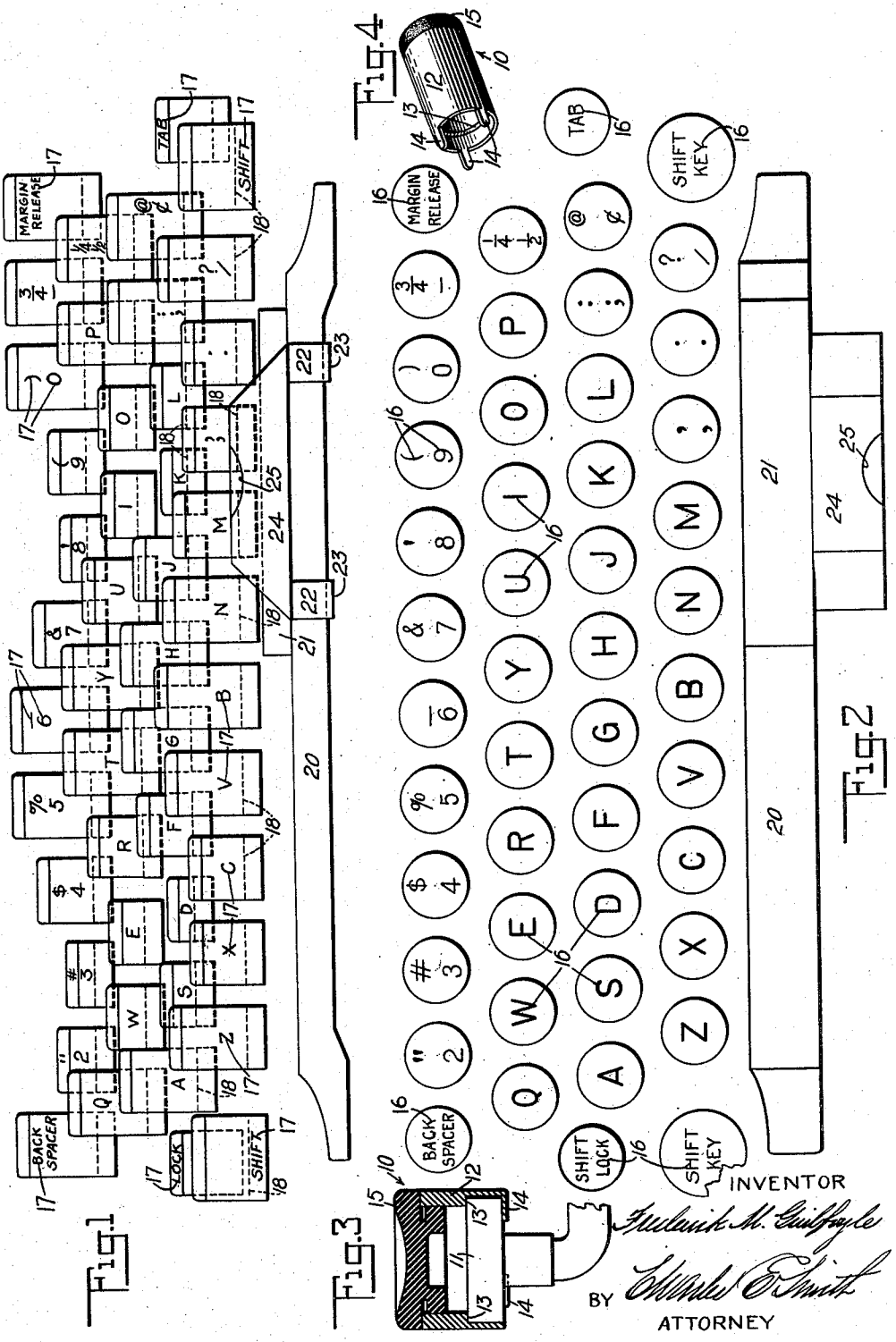


Fig. 1

Fig. 2

Fig. 3

Fig. 4

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TYPEWRITING MACHINE

Filed Jan. 18, 1934 2 Sheets-Sheet 2

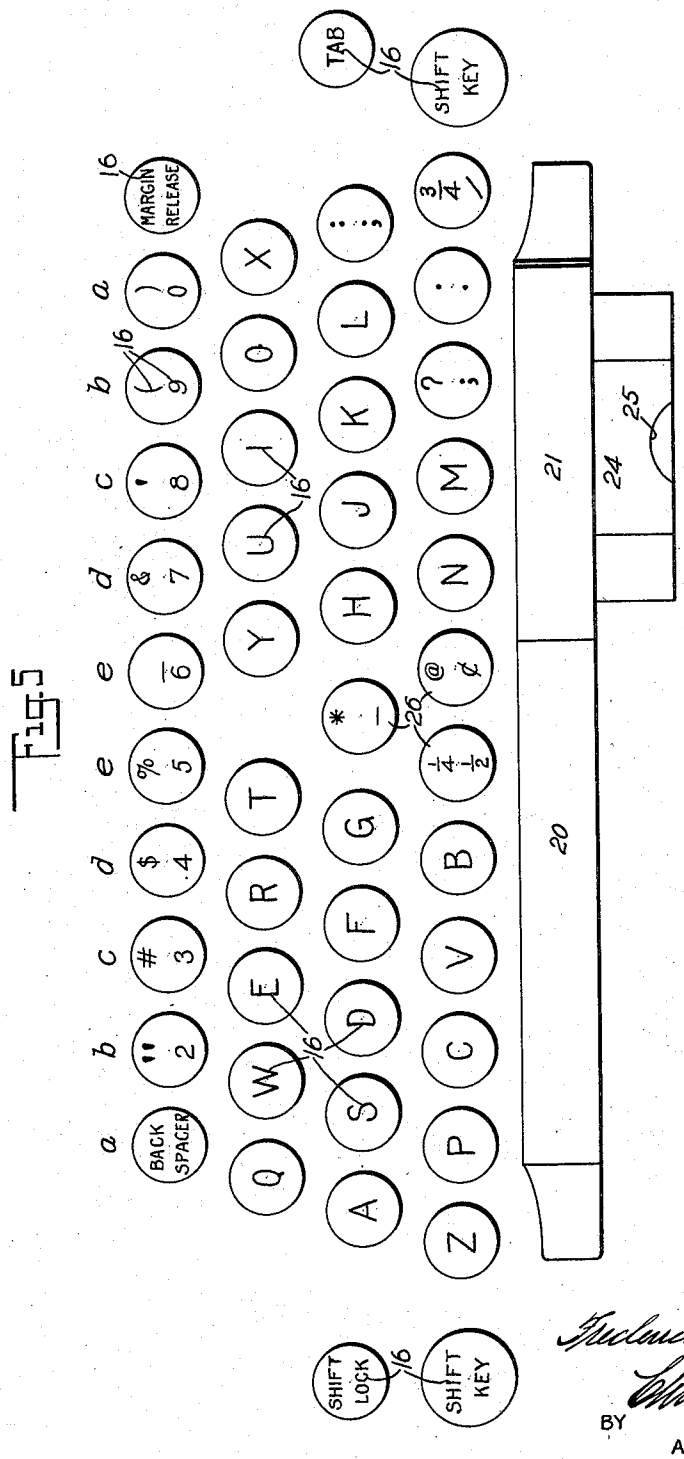


Fig. 5

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TYPEWRITING MACHINE

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Application January 18, 1934, Serial No. 707,176

5 Claims. (Cl. 197—100)

My invention relates to typewriting and like machines, and more particularly to key boards therefor.

The main object of my invention, generally stated, is to provide a key board which may be actuated with greater speed, accuracy and ease than the key boards ordinarily employed.

A further object of my invention is to embody such construction in a "standard" or "universal" key board.

In order to attain these ends I provide a key board in which keys arranged in each transverse row have their contact surfaces located at different heights depending in the main on the differences in the length of the fingers of the operator employed to actuate said keys, the nature of the stroke on different keys due to their location in the key board and the characteristics of the stroke of the operator due to the particular fingers employed to effect the actuation of given keys etc.

A still further object of my invention is to provide key caps of different heights for the attainment of the above mentioned ends and which are detachably mounted on the keys of the ordinary standard key board, whereby such ordinary key board may be readily converted into one embodying the advantages of my present invention.

To the above and other ends which will hereinafter appear, my invention consists in the features of construction, arrangements of parts and combinations of devices set forth in the following specification and particularly pointed out in the appended claims.

In the drawings, wherein like reference characters designate corresponding parts in the different views—

Fig. 1 is a diagrammatic front view of a key board constructed in accordance with my present invention.

Fig. 2 is a diagrammatic top plan view of the same.

Fig. 3 is an enlarged, detail, vertical sectional view through one of the key caps and its supporting key lever.

Fig. 4 is a detail perspective view of one of the key caps and

Fig. 5 is a diagrammatic top plan view of a modified form of key board embodying my invention.

I have shown my invention, as it is disclosed in Figs. 1 to 4 inclusive, embodied in a type of "standard" or "universal" key board, known as "Remington 360 Double Punctuation Key Board", and while I prefer to embody my invention in a "universal" key board for reasons which will hereinafter appear, it should be understood that the invention from certain aspects thereof is not restricted to inclusion in such a key board.

It will be understood that the different fingers of an operator act differently on the keys. Some fingers of the operator depending on the length thereof and other physical characteristics cannot actuate the keys with the same facility as others. This is true of the little finger of each hand, the one next thereto and the thumb. Nor do these fingers naturally have the natural length of stroke as the first and second fingers.

Moreover, in the natural position of the operator's hands over the key board, with the second or so-called "guide" fingers over the "guide" keys, some keys are actuated by a more or less direct downward movement whereas others are not and are more difficult to actuate.

In accordance with the present invention I compensate in part, at least, for these deficiencies and have regulated the height of each key in the key board with regard to the length of the finger of the operator, by which such key is actuated, by the nature of the stroke of the particular finger and by the necessary clearance for the operator's fingers in moving from that particular key to another in every direction, and so that each key meets the operator's finger at such an elevation that the said key may be completely depressed at the natural completion of the stroke of the particular finger of the operator by which the actuation of the key in question is effected.

With these objects in view I arrange the top surfaces of the different keys with which the fingers of the operator contact at different elevations as shown in Fig. 1, the height of each key above the normal being hereinafter specifically pointed out.

I prefer to attain this result by providing key caps 10 of different heights which are detachably mounted on the usual keys 11, preferably of a "standard" key board, and which may be readily applied thereto. Any suitable detachable key caps of different heights may be employed for this purpose. As shown in the present instance each of these key caps is constructed as follows.

A cylindrical metallic shell 12 is provided with an internal circular shoulder 13 that is adapted to rest on the upper surface of the usual key 11 near the edge thereof. Each shell 12 is preferably provided with integral bendable prongs 14 at the lower edge thereof. When a key cap is in place on its key 11 these prongs may be bent inwardly beneath the associated key, as shown in Fig. 3,

and thus secure the key cap in place. Seated and held in the upper end of each shell 12 is a soft rubber key 15 which provides a cushion key construction and bears on the top thereof the appropriate marking for such key, as indicated at 16 in Fig. 2.

The distinct advantage of making the different height key caps of my invention readily attachable, is that the key board of the present invention may be readily applied to and embodied in existing machines having "standard" key boards. If desired, the key caps may be readily removed thus converting the regular key board to original condition and enabling a comparison of the results of both forms of key board to be readily attained.

In first describing the construction disclosed in Figs. 1 to 4, it will be understood that the height of each key cap is hereinafter designated by the distance that it extends above the associated key 11. In order that this height of each key cap may be more readily arrived at I have indicated at 17 on each key cap shown in Fig. 1 an appropriate character corresponding to the character 16 that the key cap bears on the top thereof. The dotted lines 18 in Fig. 1 represent the tops of the keys 11 on which the key caps are mounted, and with reference to which the heights of the key caps enumerated below are considered.

Each of the following mentioned keys has an approximate height of .7 of an inch—

N	0)
Y	¾ -
Z	: ;
V	@ ¢
A	P
Back spacer	¼ ½
Margin release	Q
5	T
6—	? /

Each of the following mentioned keys has an approximate height of .5 of an inch.

4	Shift key
7	Tab
C	F
X	J
U	:
R	;
Shift lock	

Each of the following mentioned keys has an approximate height of .32 of an inch—

S	O
L	9
2	I
W	E

Each of the following mentioned keys has an approximate height of .25 of an inch—

K
D
8
3

Each of the following mentioned keys has an approximate height of .6 of an inch—

H
M
G

Key "B" has an approximate height of .75 of an inch.

From the foregoing description it will be seen that keys in each of the four transverse rows are at different heights and each is arranged to accord with the conditions hereinbefore pointed out.

While I prefer to arrange the various keys at substantially the heights pointed out above it will be understood that the relative heights between the different keys is the controlling factor and from certain aspects of my invention even these may be modified to meet specific conditions and yet carry out the main purposes of the present invention.

The "D" and "K" keys are ordinarily known as the "guide keys" and are actuated by the second finger of each hand which fingers are termed the "guide" fingers of the operator. It will be seen that these keys are lower than other keys in the same transverse row and are controlled by the longest fingers of the operator. The remaining keys in this row are arranged at different heights to afford a natural clearance and greater facility in the operation of adjacent keys by the remaining fingers of the two hands of the operator. The relative heights of the remaining keys are determined by this same basic idea and to accord with the height of the "guide keys".

It will be seen, moreover, that in accordance with my invention there is a difference in the height of the keys in each of the four transverse rows and that the height of the alphabet keys in the first or front row is generally less relative to that of the keys in the second row than the difference in height that exists between the alphabet keys in the second and third transverse rows. This arrangement facilitates carrying out the purposes of my invention, since due to the natural positions of the hands of the operator over the key board and the positions of the keys controlled by the "guide" fingers, the first three rows of keys may be controlled with greater ease and comfort and by the natural movements of the respective fingers of the operator on such keys.

It will be seen, moreover, the contact surface of the "S" key is only slightly elevated above the contact surface of the "Z" key and that the difference in height between these two keys is much less than that between the "A" key (which also is a so-called "guide" key) and the "S" or "Z" key. This arrangement also contributes to the attainment of the purposes of the present invention, as indicated above.

The arrangement of the entire key board is such that the appropriate keys may be more readily actuated by the natural strokes of the respective fingers of the operator intended to actuate such keys. This may be done with less exertion and at a higher rate of speed than may be attained with the usual standard key board. This is of course due to the fact that the relative height of the keys compensates not alone for the differences in the length of the fingers of the operator but takes into account the characteristic distinctions in the nature and efficiency of the strokes of the different fingers of the operator and the relative positions of the keys in the key board that are actuated by the fingers of the operator. In some instances the stroke on the key is naturally a straight down stroke, whereas in other instances it is not and is less efficient. The relative heights of the keys has been determined with a consideration to all of these different conditions and with a view to compensating in a measure therefor and thus

rendering the operation more speedy and with the exertion of less effort.

I prefer to employ on the usual space key **20** a rubber key **21** which may be held in place on the space key by depending metal arms **22** that embrace the space key on opposite sides thereof and have inturned terminal portions **23** that engage the lower side of the space key. This enables the rubber key **21** to be adjusted to any desired position along the space key, preferably to the position near the right-hand end thereof for convenient operation by the right-hand thumb of the operator. The rubber key **21** preferably has an upwardly and forwardly extending, integral, rubber projection **24** that is recessed at **25** in the upper front edge thereof to receive the right-hand thumb of the operator. The upper surface of the key **21** proper, preferably is about one quarter of an inch above the upper surface of the space key **20**, whereas the upper surface of the extension **24** is about one half inch higher than the space key. This construction, in view of the elevation of the remaining keys, offers greater facility for operating the space key.

The relative heights of the keys disclosed in Fig. 5 are approximately the same as those hereinbefore described, but a special form of key board is shown in Fig. 5. In this figure the keys are arranged in five rearwardly and inwardly inclined rows *a b c d e* on each side of the key board, whereas three seldom used keys **26**, are arranged between the two above mentioned groups of keys and in the inverted V-shaped space between them. This arrangement of the keys facilitates the operation thereof since it accords more nearly with the natural and unstrained position of the hands of the operator over the key board and with the movements of the hands and fingers.

I am aware of the fact that it has been proposed heretofore to arrange keys in the key board so as to compensate in a measure for the differences in the length of the operator's fingers, and do not claim this feature broadly. However, such prior constructions involved special and freakish arrangements of the keys in the key board and the prior constructions could not be embodied in a "standard" or "universal" key board, such as is almost universally employed in typewriting machines at the present time. One of the distinct advantages of the present invention is that it may attain all of the advantages hereinbefore pointed out, and may, nevertheless, be embodied in a "standard" or "universal" key board.

Various changes may be made in the construction, and certain features thereof may be employed without others, without departing from my invention as it is defined in the accompanying claims.

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

1. A key board for typewriting and like machines provided with four transverse rows of keys in which there is a difference in the height of the keys in each transverse row, the height of the alphabet keys in the first or front row being generally less relative to those in the second row than the difference in height between the alphabet keys in the second and third transverse rows of keys.

2. A key board for typewriting and like machines provided with four transverse rows of keys in which there is a variation in the height of the keys in each transverse row, the height of the alphabet keys in the first or front row being generally less relative to those in the second row than the difference in height between the alphabet keys in the second and third transverse rows of keys, the contact surfaces of the remaining keys of the second row being at such elevations as to accord with lengths of the remaining fingers of the operator when the hands are held in the natural position with the second fingers of both hands on the "D" and "K" respectively.

3. A key board for typewriting and like machines having keys provided with detachable key caps the contact surfaces of which are located at substantially the following elevations with reference to the keys on which they are mounted, the contact surfaces of the key caps for the "N", "Y", "Z", "V", "A", "5", "6", ")0", "P", "Q", and "T" keys having an elevation of substantially .7 of an inch from their respective keys; the contact surfaces of the key caps for the "4", "7", "C", "X", "U", "R", "F", "J", "," and ":" keys having an elevation of substantially .5 of an inch from their respective keys; the contact surfaces of the "S", "L", "2", "W", "O", "9", "I" and "E" having an elevation of substantially .32 of an inch from their respective keys; the contact surfaces of the key caps for the "K", "D", "8" and "3" keys having an elevation of substantially .25 of an inch above their respective keys; the contact surfaces of the key caps of the "H", "M" and "G" keys having an elevation of substantially .65 of an inch above their respective keys and the contact surface of the key cap for the "B" key having an elevation of substantially .75 of an inch above its key.

4. In a keyboard for typewriting and like machines an auxiliary rubber key adapted to be mounted on the usual space key of the machine and having a part that extends above the top of the space key and forward thereof, and means for affording an adjustment of said auxiliary key along the space key to different positions thereon.

5. A key board for a typewriting machine, in which the keys are arranged in four transverse rows, keys in each such row being of different heights, the height of the alphabet keys in the first or front row being generally less relative to that of the keys in the second row than the general difference in height between the alphabet keys in the second and third rows.

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