

[54] ENGLISH KEYBOARD SCHEME

3,712,444 1/1973 Frost 197/100

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## [57] ABSTRACT

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The letter keys on the keyboards of typewriters and other typographical equipment are arranged in positions to accommodate either dextral or sinistral typists with greater speed and accuracy. By balancing the typing loads of hands and fingers, concentrating work on the home row, reducing the frequency of disabling and awkward typing patterns, and keeping either hand from typing too long by itself; most of the difficulty in typing English can be eliminated, and typing in other languages improved.

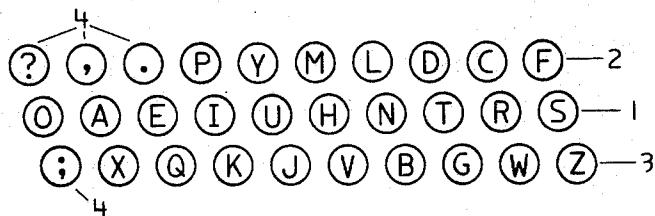
[52] U.S. Cl. 197/100  
 [51] Int. Cl. B41j 5/10  
 [58] Field of Search 197/100, 98, 102, 103

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2 Claims, 2 Drawing Figures



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FIGURE 1

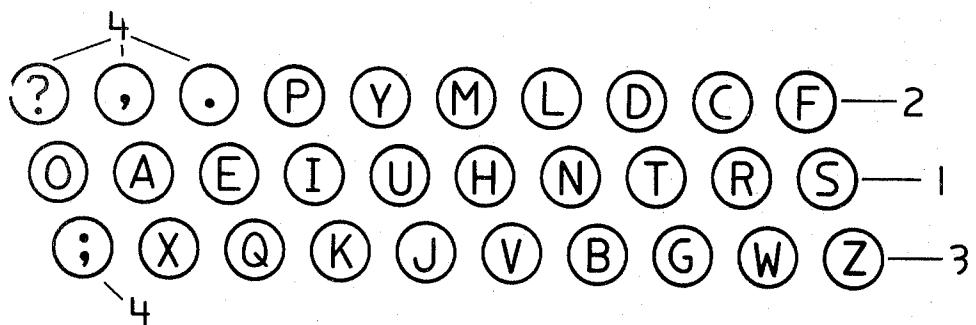
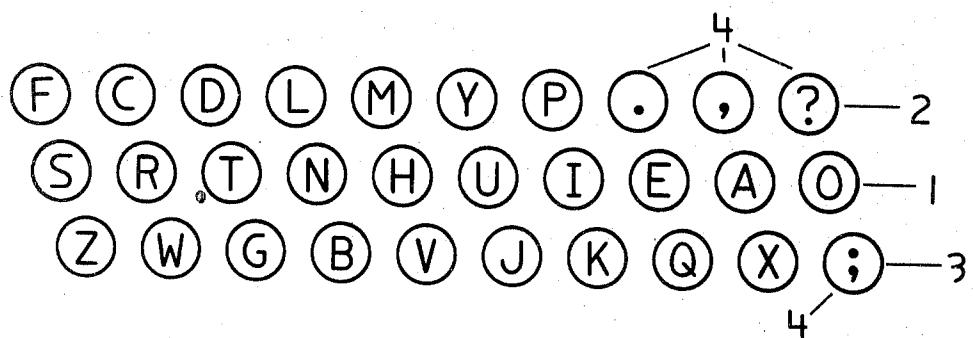


FIGURE 2



## ENGLISH KEYBOARD SCHEME

This invention relates to the spatial arrangement of certain character keys on the keyboards of typewriters and other typographical equipment.

The standard arrangement of character keys on the typewriter, known as the universal keyboard, has remained almost unchanged since its introduction on some of the first practical typewriters in 1874. At that time, the spatial arrangement of the character keys was not thought to be crucial in the efficiency of typewriting; instead, the universal keyboard was purposely made disabling and awkward for the typist. Since the type-striking mechanism depended on gravity to return the type-bar after it had struck the paper, the typing speed had to be slow, or the type-bars would pile up on the returning type-bars and jam the machine. Also, to assure the typists that they would not have to learn to type on a new keyboard with each typewriter they might encounter, all typewriters were arranged according to the universal keyboard; and even though some other early models provided alternative keyboards, the universal keyboard was the only one that has remained in regular use to date.

Since 1874, certain improvements have been made in the operating mechanisms of the typewriter that no longer require a keyboard that is disabling and awkward to the typist. What had once been an asset to the typist in the past has become a costly and unnecessarily complicated problem in the present. The universal keyboard slows the speed of typing, increases the frequency of error, loads the hands and fingers with disproportionate amounts of work, frequently breaks the rhythm of typing, and rapidly produces fatigue in the hands and fingers of the typist.

Several attempts have been made to remedy the faults of the universal keyboard, but none has yet replaced the universal keyboard in regular use. Some of the keyboards designed to improve the typewriter keyboard are those by W. H. Robertson, J. H. Hotson, S. W. Rowell, M. Trejos, F. M. Banaji C. Wolcott, R. E. Hoke, A. Dvorak and W. L. Dealey, R. G. Bower, F. L. Paul, W. W. Nelson, J. M. Ostrey, W. A. Gilbert, and E. Riemer. Unfortunately, most of them did not improve the situation of the keyboard, for they often concentrated on one aspect of the keyboard and would fail to recognize the creation of a greater problem in another aspect. The only comprehensive solution proposed for the typewriter keyboard was that made by A. Dvorak and W. L. Dealey, but their study was based primarily on the most frequently used words in English and dealt only with the English language.

I have found that most of the disadvantages found in the use of the universal keyboard can be eliminated by arranging the letter keys of the keyboard for typewriters and other typographical equipment to that set forth in this specification. Not only are the improvements made by this invention more substantial than any found in the keyboards by the previous list of inventors for English, but this invention provides an improved keyboard for many other languages in addition.

The general objects of this invention are: providing a spatial arrangement of the letter keys on the keyboard which can be balanced for either the dextral or sinistral typist's hands and fingers, placing the greater portion of typing on the home row and distributing the remainder to the upper and lower rows to the best ad-

vantage of the typist, reducing the total amount of movement needed in typing and reducing the greater portion of awkward and disabling movements for the typist's hands and fingers, facilitating increases in the speed and accuracy by the reduction of slow key-stroking sequences that account for the frequent breaks in typing rhythm and the majority of errors, lessening the rate of fatigue in the hands and fingers by the reductions in movement and providing an arrangement that assures the frequent use of both hands, and arranging the keys to best accommodate typing in English, or where no advantage can be found in English in a number of other major languages.

In addition to the general objects, the invention will not require any change in the operating mechanism of the typewriter or typographical equipment and can readily be effected on such equipment by interchanging the type, key labels, and any repeat mechanisms.

The basic handicap found on the universal keyboard is the imbalance of the amount of typing done by each hand and finger. For the dextral typist, the universal keyboard places a typing load on the left hand that is about 45 percent more than it should handle and does not fully utilize the stronger right hand. The typing loads for the hands on this invention are properly balanced and can be adapted for use by either dextral or sinistral typists. Also, the typing loads for the fingers on this invention are properly balanced for the corresponding hands so that no finger is forced to do more or less work than it can manage.

Aside from the imbalance of hand and finger typing loads, the universal keyboard places the greater portion of letters typed not on the home row where it should be but on the upper row. The distribution of letters typed on the universal keyboard is as follows: 32 percent are on the home row, 52 percent are on the upper row, 16 percent are on the lower row, and 25 percent are on the eight keys over which the fingers normally rest on the home row; but, the distribution of letters typed on this invention is as follows: 74 percent are on the home row, 19 percent are on the upper row, 7 percent are on the lower row, and 66 percent are on the eight keys over which the fingers rest on the home row and account for the eight most frequently used letters in English.

While the balancing of hand, finger, and row loads is important to the typist; the patterns of key-stroking are most important for providing an efficient keyboard in typing. The individual stroking of separate keys does not account for the speeds found in normal typing. It is the quick succession of stroking several keys, or basically the stroking of two successive keys, that accounts for these speeds. Instead of waiting for the finger stroking the first key to return to its resting position before the next finger begins its stroke, the next finger is ready to strike its key and has already moved to a position to do so. The two-letter stroking patterns, known as digraph sequences, vary greatly in their speed and complexity of movement. By eliminating as many of the slower and more complicated sequences as possible, a substantial increase in the speed and accuracy of typing can be realized; and by ridding the keyboard of the most awkward sequences, the rate at which fatigue develops can be effectively reduced. The classifications of the digraph sequences, listed in order of their speed from fastest to slowest, are as follows: opposite hand sequences involving the use of fingers from each hand, rock sequences involving the use of remote (non-

adjacent) fingers on the same hand, trill sequences involving the use of adjacent fingers on the same hand, tapping sequences involving the use of the same finger twice on the same key, and reach sequences involving the use of the same finger on different keys. The most awkward sequences are those which hurdle over the home row going from the upper row to the lower row or vice versa. By arranging the letter keys as set forth in this specification, the reach sequences found on the keyboard and the frequency with which hurdles occur are reduced 95 percent when compared to the universal keyboard. And, by arranging the keys in this manner, the sequences which are fastest in speed and less complicated are increased in frequency. The frequency of opposite hand sequences is increased 35 percent over that found on the universal keyboard, and the speed of typing will increase by 4.5 to 9.5 percent not taking into consideration any other factor, such as the decrease in the frequency of errors.

When the center row of letter keys on the universal keyboard is called the home row, it should be recognized as being a misnomer. While the center row is that over which the fingers are positioned when at rest, the row on which the fingers spend most of their time in typing is the upper row. The arrangement of the letter keys given in this specification corrects this error; for, it places 74 percent of the letters typed and 55 percent of the digraph sequences solely on the home row, as compared to 32 percent of the letters typed and 8 percent of the digraph sequences on the universal keyboard. Also, the eight keys lying below the fingers when at rest are considerably improved by this invention; for, the eight letters most frequently used that make up 66 percent of the letters typed and 40 percent of the digraph sequences are found on those keys, as compared to only 25 percent of the letters typed and 6 percent of the digraph sequences found on the universal keyboard. This invention places the most typing on the home row and reduces the movement away from the home row to the permissible minimum.

Even if the keyboard is balanced and the stroking patterns turned to the best advantage of the typist, the problem of a lengthy use of a single hand still exists. On the universal keyboard, more than 2600 common words can be spelled by the keys typed by the left hand, and more than 600 common words can be spelled by the keys typed by the right hand. On the corresponding dextral keyboard set forth in this specification only 69 words can be spelled by the keys typed by the left hand, and only one, rarely used word could be spelled by the keys typed by the right hand. The means by which the stroking monopolization of one hand can be reduced to this number is by placing the five major vowels and the semi-vowel Y on one side of the keyboard and placing the semi-vowel W and 14 letters which account for more than 95 percent of the consonants on the other side. The arrangement of keys also helps in locating 39 percent of the digraph sequences that are opposite hand sequences on the home row. On the whole keyboard, the arrangement of the letter keys makes 70 percent of the typing sequences opposite hand sequences, as compared with 51 percent on the universal keyboard. Thus, the typist is assured that neither hand will carry the burden of typing for any great length of time and eliminates the majority of words that quickly fatigue the typist and break the typing rhythm.

While it may seem that certain letter keys could be readily interchanged with others without disturbing the factors put forth in this specification, there should not be any alterations made, otherwise the value of this arrangement of letter keys would impair its improvements in languages other than English. The positions given to the punctuation marks in the drawings are those found to be most advantageous for English and corresponds to the balance given to the letter keys.

10 Those keys not given in the drawings and specification may be varied according to the specific needs of the typist that would have other letters, numerals, symbols, and accents.

15 In the drawings, which illustrate the embodiments of this invention,

FIG. 1 is a top plan view of the keyboard which is oriented for the dextral typist, and

FIG. 2 is a top plan view of the keyboard which is oriented for the sinistral typist.

The keyboard scheme illustrated is made up of three rows of keys. These rows are known as the home row 1, the upper row 2, and the lower row 3. Punctuation keys 4 are located in positions most advantageous for English. The character keys for letters are labelled with the letter each should operate.

Referring to FIG. 1, the dextral orientation of the keyboard scheme, the home row 1 is comprised of the following character keys, from left to right: O, A, E, I, U, H, N, T, R, and S; the upper row 2 is comprised of the following character keys, from left to right: question mark 4, comma 4, period 4, P, Y, M, L, D, C, and F; and, the lower row 3 is comprised of the following character keys, from left to right: colon or semi-colon 4, X, Q, K, J, V, B, G, W, and Z.

Referring to FIG. 2, the sinistral orientation of the keyboard scheme, the home row 1 is comprised of the following character keys, from left to right: S, R, T, N, H, U, I, E, A, and O; the upper row 2 is comprised of the following character keys, from left to right: F, C, D, L, M, Y, P, period 4, comma 4, and question mark 4; and, the lower row is comprised of the following character keys, from left to right: Z, W, G, B, V, J, K, Q, X, and colon or semi-colon 4.

45 The embodiments of the invention in which I claim exclusive property or privilege are defined as follows:

50 1. A keyboard scheme for use on typewriters or other typographical equipment which has the character keys for letters arranged in a home row, an upper row and a lower row such that the letter keys are adjacent to each other in the following successive and fixed order whether it is from left to right or from right to left: on the home row as follows, O, A, E, I, U, H, N, T, R, and S; on the upper row as follows, P, Y, M, L, D, C, and F such that P is located over the corresponding position of I on the home row and that F is located over the corresponding position of S on the home row; and, on the lower row as follows, X, Q, K, J, V, B, G, W, and Z such that X is located below the corresponding position of A on the home row and that Z is located below the corresponding position of S on the home row.

55 2. A keyboard scheme as defined in claim 1 in which any letter may be replaced by its equivalent in a language other than common English.

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