

## [54] COMPUTER DATA ENTRY METHOD AND APPARATUS

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379/96; 340/365 R[58] Field of Search ..... 179/2 A, 2 DP, 90 AN,  
179/81 C, 84 L; 340/365 R, 756; 379/97, 93,  
94, 95, 96, 98

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Becker & Shur

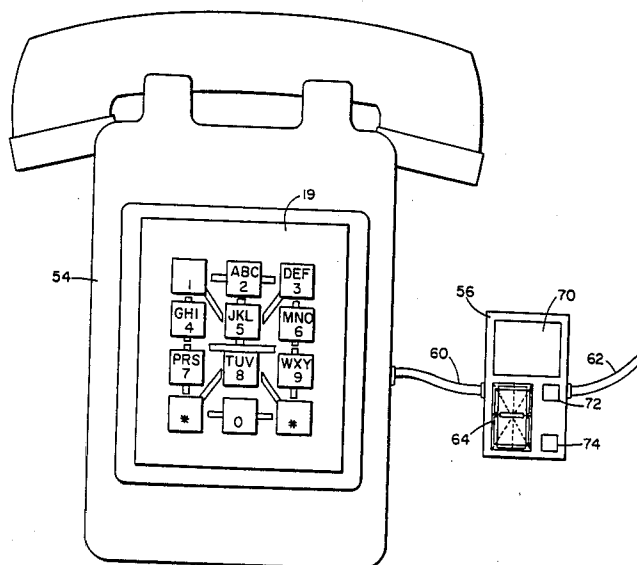
## [57] ABSTRACT

A method and apparatus for entering data into a computer including an abbreviated keyboard wherein each key represents a plurality of characters. Depression of a key of the keyboard causes the generation and transmission of a first electronic signal to a computer. The computer receives the signal and according to a predetermined algorithm, generates a best guess of which one of the plurality of alphanumeric characters represented by the key and signal sent to the computer is desired to be ultimately entered into the computer. A second electronic signal is generated by the computer and transmitted to a display to cause the display to indicate the guess. By subsequent stroke or strokes of the keyboard, the guess is either selected if correct, or if incorrect changed until the correct alphanumeric character is guessed.

The computer programmed with the algorithm for making the guesses may be remote to the keyboard or contain within the keyboard such as by the incorporation of an appropriate microchip. If remote, the computer may be the same computer to which data will be transferred or may be an associated apparatus. Such associated apparatus may include display means for displaying the guess.

In one embodiment the keyboard and display means are integral with a telephone. A secondary display means is provided to show an accumulation of characters previously transmitted, or accumulated in buffer for subsequent transmission.

20 Claims, 2 Drawing Sheets



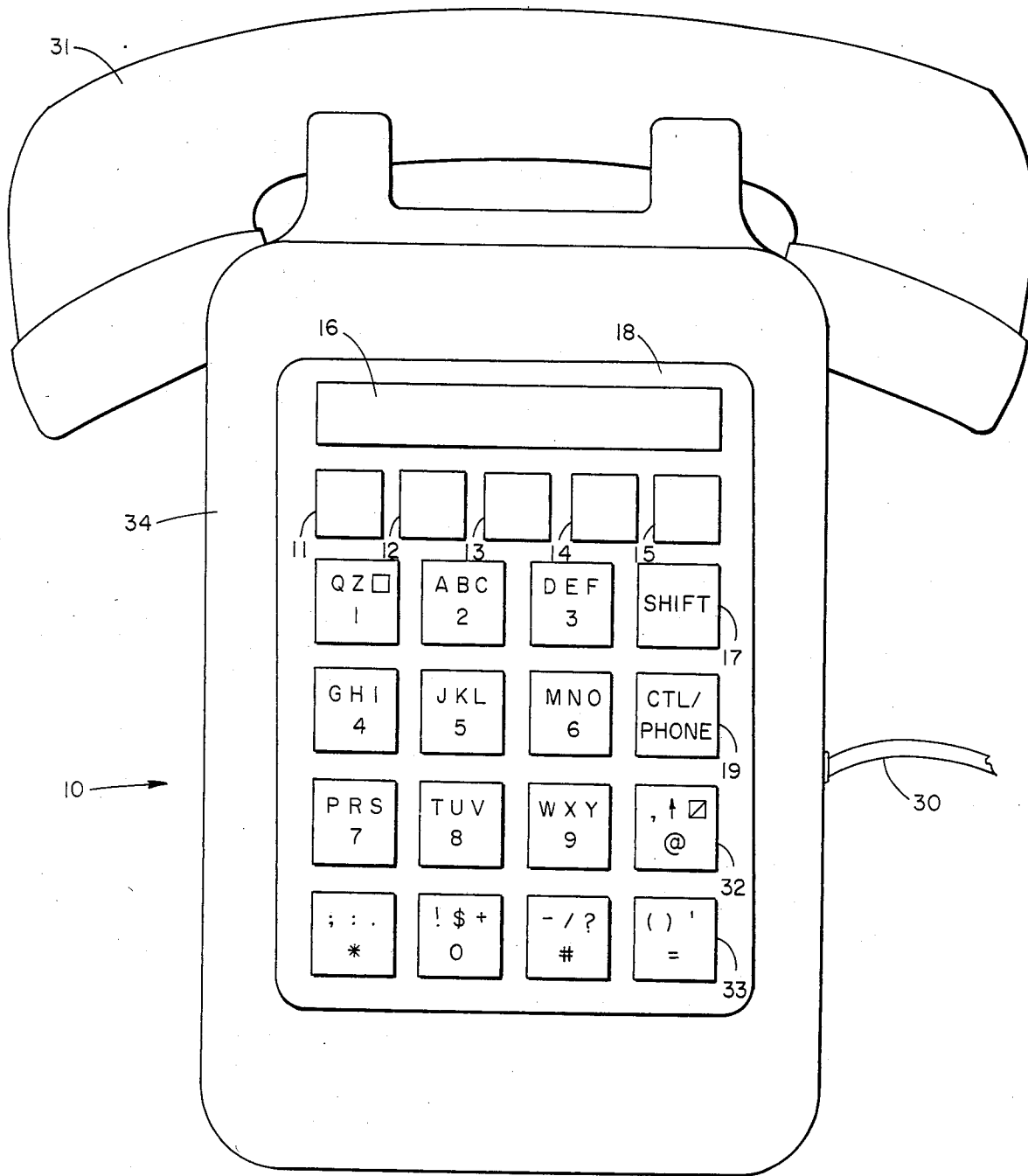


FIG. 1

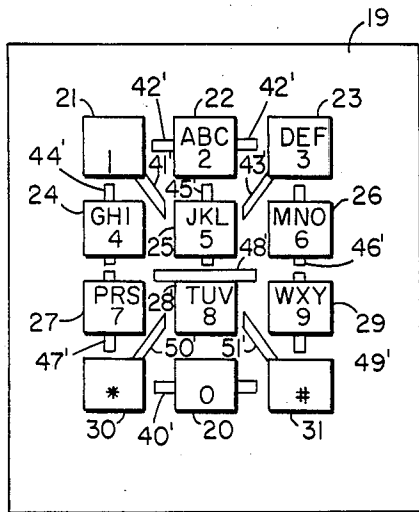


FIG. 3

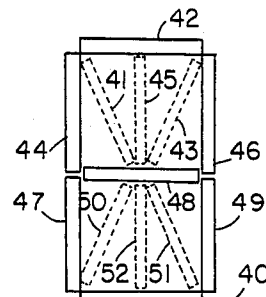


FIG. 4

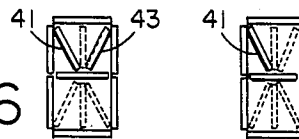


FIG. 6

FIG. 5

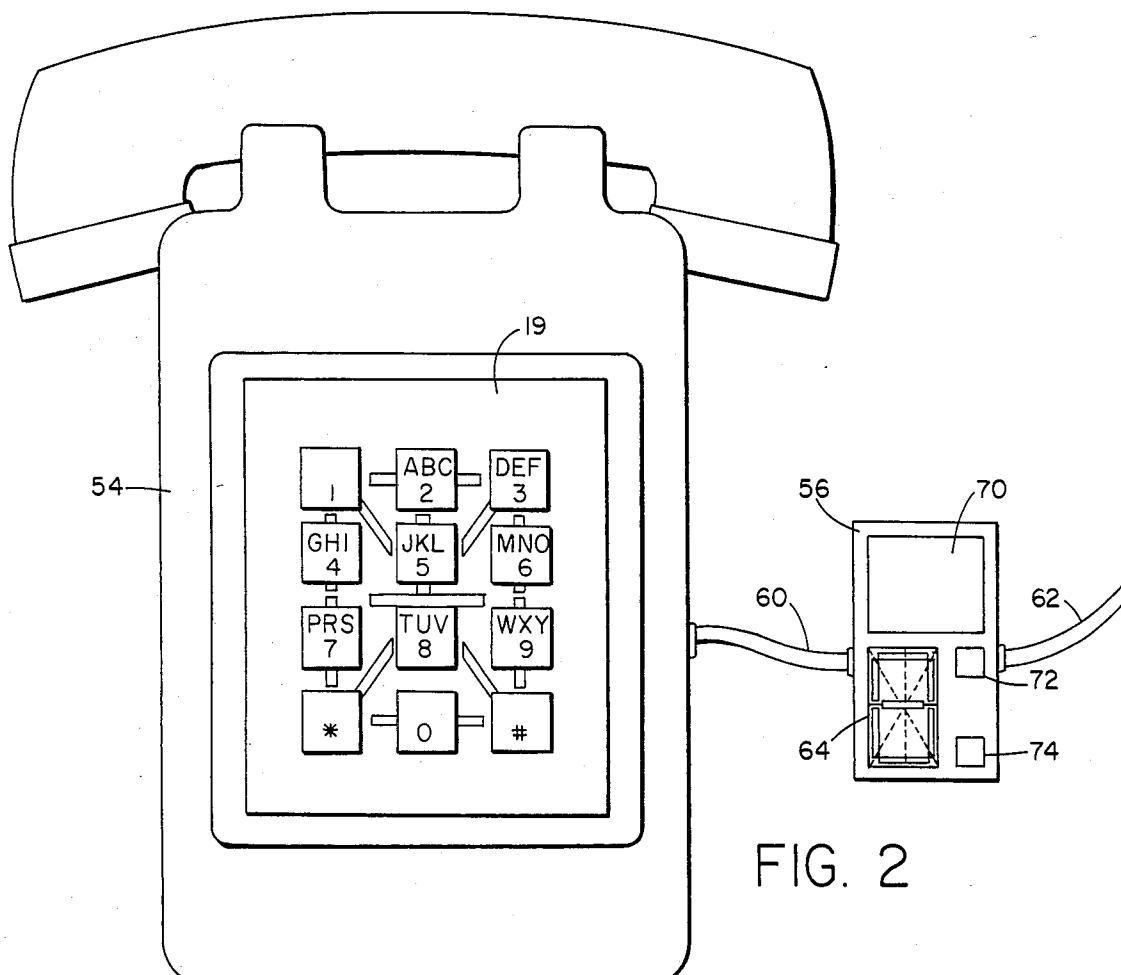


FIG. 2

# COMPUTER DATA ENTRY METHOD AND APPARATUS

## BACKGROUND

The present invention relates generally to a method and apparatus for entry of data into a computer. More particularly, the present invention relates to the entry of data into a computer with an abbreviated keyboard using two or more strokes to enter a single character into the computer.

A number of apparatus are known for the entry of data into a computer with an abbreviated keyboard. Morely, et al., U.S. Pat. No. 4,005,388 disclosed a hand-held system having a keyboard, a portion of which is similar to a telephone dialing system. Each of the keys in the keyboard have several alphanumeric characters. By actuating one of the keys on the keyboard and then actuating a set of keys on the side of the keyboard, one of the characters of each key can be selected for input into the computer.

U.S. Pat. No. 3,772,597 to Stover discloses a nine-key keyboard in which each key can be used for entering any one of four different letters. Each of the keys is set up as a rocker key so that when pushing the key to any one if its sides a different letter will be activated.

U.S. Pat. No. 3,967,273 to Knowlton discloses a keyboard on a telephone in which each key has a plurality of letters, numbers or other symbols. By first pressing one of the keys on the keyboard and then pressing a second key which indicates a particular location of the particular character on the first key pressed, a particular character can be entered into the computer.

U.S. Pat. No. 4,029,915 to Ogima and U.S. Pat. No. 4,449,839 to Bleuer disclose keyboards having a set of rocker keys in which each rocker key can be used for entering any one of several different characters into a computer.

U.S. Pat. No. 4,385,291 to Piguet discloses a system for entering information into a small computer within a watch. In this system a range of digits are displayed in display window 2. Key 7 can select a particular range to be displayed and a larger segment of the range is selected by a key 5 and the particular letter within the range is selected by key 6. In this manner, various characters can be entered into the computer utilizing a minimum number of keys.

U.S. Pat. Nos. 4,486,741 to Nozawa, et al., 4,481,508 to Kamei, et al., 4,340,887 to Dias II, 4,202,038 to Petersson, 4,201,489 to Zapp, and 4,124,843 to Bramson, et al. that illustrate additional keyboard art.

## SUMMARY OF THE INVENTION

The present invention involves an abbreviated keyboard wherein each key represents a plurality of characters. Depression of a key of the keyboard causes the generation and transmission of a first electronic signal to a computer. The computer receives the signal and, according to a predetermined algorithm, generates a best guess of which one of the plurality of alphanumeric characters represented by the key and the signal sent to the computer is desired to be ultimately entered into the keyboard. A second electronic signal is generated by the computer and transmitted to a display to cause the display to indicate the best guess. By subsequent stroke or strokes of the keyboard, the guess is either selected if

correct, or, if incorrect, changed until the correct alphanumeric character is guessed.

The computer programmed with the algorithm for making the guesses may be remote to the keyboard or contained within the keyboard such as by the incorporation of an appropriate microchip. If remote, the computer may be the same computer to which data will be transferred or may be an associated apparatus. Such associated apparatus may include display means for displaying the guess. In one embodiment the keyboard and display means are integral with a telephone. A secondary display means is provided to show a string of characters previously transmitted, or accumulated in buffer for subsequent transmission.

In another embodiment, a monogram pattern is utilized wherein each key of the keyboard corresponds to one portion of the monogram pattern. The mosaic pattern is displayed on the keyboard or associated apparatus. Depression of the key will change the state of the corresponding portion of the displayed monogram pattern between illuminated and not illuminated. The computer or microchip in communication with the keyboard receives the signal and determines one or more best guesses of the desired character according to a predetermined algorithm. These best guesses are displayed on a display provided on the keyboard, or alternatively, on associated apparatus. Subsequent strokes of the keyboard select one of the best guesses or change the mosaic pattern to initiate the generation of a second round of best guesses.

The present invention allows communication with and entry of data into a computer from a standard telephone utilizing a standard telephone keyboard. The computer is connected to a phone line and processes the signals generated by the standard twelve telephone keys. Return signals from the computer are received by auxiliary apparatus provided in line to accept and process the signals between the keyboard and the computer. Alternatively, the computer may generate second electronic signals which cause audible enunciations through the phone handset which are simulative of human speech, prerecorded human speech, or at least human understandable code such as Morse code.

An object of the present invention is a method of entering data into a computer.

Another object of the present invention is a method of entering data into a computer wherein an operator causes a first signal which corresponds to a plurality of characters to be transmitted to the computer, the computer generates a second signal corresponding to a best guess of which of the plurality of characters is intended and the operator causes a third signal to be transmitted to the computer to initiate the transmission of the guessed character or the generation of a second guess.

A further object of the present invention is an apparatus for entering data into a computer.

A still further object of the present invention is an apparatus for entering data into a computer wherein an abbreviated keyboard is used.

Yet another object of the present invention is an apparatus having the foregoing advantage and which uses a standard telephone keyboard.

Other objects and advantages of the present invention will be readily apparent from the following description and drawings which illustrate the preferred embodiments of the present invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view of a first embodiment of a telephone having a keyboard according to the present invention.

FIG. 2 is a schematic view of a second embodiment of a telephone having a keyboard according to the present invention.

FIG. 3 is a closeup view of the keyboard of FIG. 2.

FIG. 4 is a schematic view of a monogram pattern displayed according to the keyboard of FIG. 2.

FIG. 5 is a view like FIG. 4.

FIG. 6 is a view like FIG. 5.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Refer now to FIG. 1, there being shown a preferred embodiment of a telephone incorporating a keyboard according to the present invention and generally designated by reference numeral 10. Telephone 10 includes a standard size housing 34 and keyboard 18. Standard telephone line 30 provides a communication access line to a computer to which data is to be transferred. Keyboard 18 includes the standard twelve telephone buttons with character designations added where space permits such that each key carries four alphanumeric characters. Keyboard 18 includes, in addition, control buttons 17 and 19 and character buttons 32 and 33. Displays 11, 12, 13, and 14 are one character alphanumeric displays for displaying the best guess generated by the programmed algorithm. Display 15 is provided to display a symbol or a letter to indicate status such as whether the keyboard is in upper case, upper caselock, or control mode. Display 16 is a running input/output display for displaying an accumulation of characters that have been previously transmitted across line 30, or stored in a provided buffer for later transmission.

The operation of the keyboard is a multistroke process. The person operating the keyboard first presses one of the keys, each representing four alphanumeric characters. These characters are displayed in displays 11, 12, 13 and 14. The computer receives the first signal generated by the depression of the key, recognizes the first signal and according to a predetermined algorithm, generates a best guess of which which one of the four alphanumeric characters represented by the key and the first signal is desired to be ultimately entered into the computer. A second electric signal is generated by the computer and transmitted to display 11 to cause display of the best guess. The remaining characters are displayed in displays 12, 13 and 14 in order of their likelihood of being chosen, according to the algorithm, as the character desired to be ultimately entered into the computer.

If the guess displayed by display 11 is correct, control key 19 is pressed and the character is stored in buffer and displayed at the end of a series of previous choices by display 16. Pressing the control key a second time at this point, causes the string of alphanumeric characters displayed by display 16 to be transmitted over line 30 to the computer being in phone-line communication with keyboard/telephone 10. Pressing the control key a third time will cause the keyboard to shift into regular telephone mode.

If, on the other hand, the guess displayed by display 11 is incorrect, the original alphanumeric key is pushed again and a new guess is generated. In this embodiment, pressing the alphanumeric character key a second time

causes the guesses to shift to the left such that, for example, the alphanumeric character displayed in display 12 will be shifted to display 11. If the new guess is correct, the control key 19 is pressed as indicated above.

The shift key 17 functions to shift between upper and lower case.

One algorithm suitable for use with the present invention is as follows:

If the keystroke generating a first electric signal represents the beginning of a word, the first consonant represented on the key is chosen as the best guess. Appropriate second electronic signals are generated and transmitted to the displays. If this guess is correct, a designated key, such as the control key is pressed generating an electric signal recognized by the computer to indicate that the data should be transmitted to the computer or buffer storage. However, if this guess is not correct, the originally pressed alphanumeric character key is pressed again and the algorithm selects the next consonant. Again, if this is not correct the key is pressed again and the computer goes through the consonants in this manner and then the vowels and then the numerals or other characters displayed on the particular key. As each key only represents a small number of characters, four to six characters generally at the most, this process would be quick.

The algorithm could be expanded such that if the previous character entered into the computer was a consonant the first guess would be a vowel represented on the key and, vice-versa, if the previous character was a vowel the next letter would be a consonant. A further amplification of this algorithm could be that if the previous character was not a letter but, rather, a number, then the first guess would also be a number. Many other algorithms and expansions of the foregoing algorithm are possible. For example, the probability of a letter appearing after another in the English language could be programmed into the microchip to fine tune the best guess.

The algorithm could also be expanded such that not only the previous letter but the previous string of letters or previous word or words would be used to improve the guess by the computer.

Moreover, the algorithm could guess not only a single character but one or more characters or one or more words, as well as punctuation, based on previous entries.

Refer now to FIG. 2 illustrating an alternate embodiment of the present invention, wherein a standard telephone 54 is shown having overlay 19 laid over the telephone keyboard. Controller 58 is connected in the telephone line 60, 62 to provide display and control capability to the user. Controller 58 includes two displays, display 64 which illustrates a monogram pattern and display 70 which illustrates the best guesses generated by the computer. The computer may be integral to controller 58, in the form of a microchip, or may be in communication with the keyboard through controller 58 through phoneline 62. Controller 58 also includes a control button 72 and a shift button 74.

Refer now to FIG. 3 which illustrates a more detailed view of the abbreviated keyboard of FIG. 2 incorporating a monogram display pattern. An overlay 19 may be placed over a standard keyboard as represented in FIG. 3. Each key of the keyboard corresponds to one of the bars of the monogram pattern as shown.

FIG. 4 illustrates the mosaic pattern showing selected bars lit to form the character 8. The keyboard controls



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