

[54] **KEYBOARD ARRANGEMENT**  
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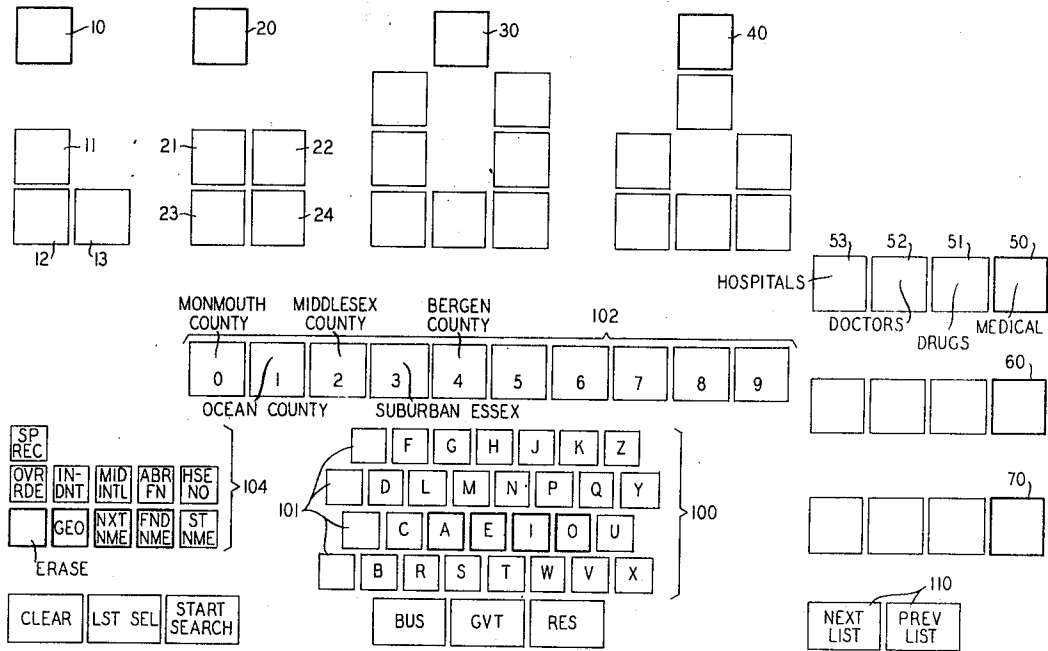
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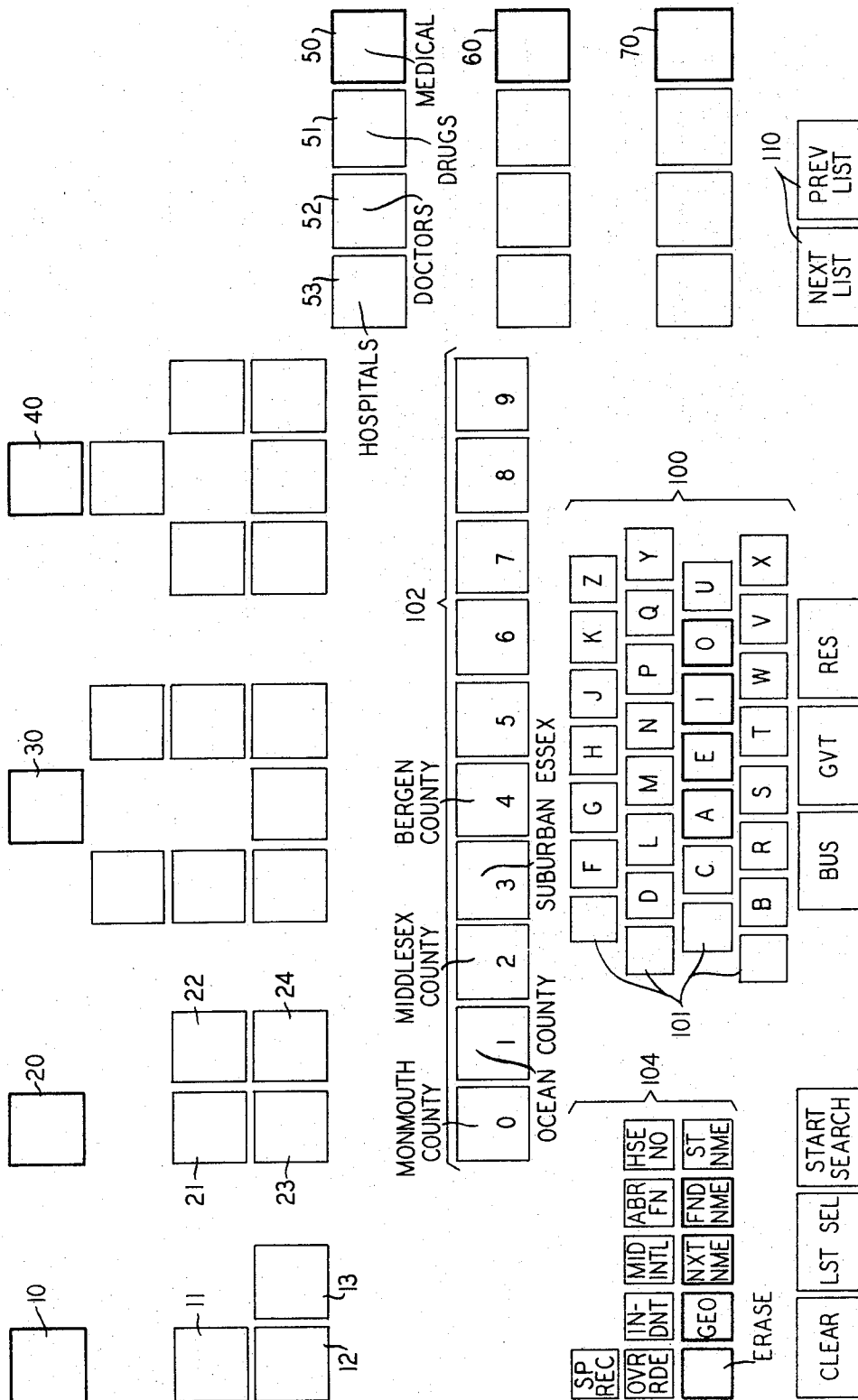
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[57] **ABSTRACT**

The alphabetic keys of a keyboard adapted for coded alphanumeric input are arranged in four staggered rows so as to be operated by the right hand, with the home row including the vowel letter keys A, E, I, O and U, and with the remaining letter keys arranged relative to the home row according to their frequency of use. The numerical keys 0 through 9 are arranged in a single row approximately centered above the alphabetic keys. Various directional and functional keys are arranged so as to be operated by the left hand to indicate the direction or field of the alphanumeric keys operated by the right hand.

**4 Claims, 1 Drawing Figure**





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## KEYBOARD ARRANGEMENT

### BACKGROUND OF THE INVENTION

This relates to keyboards and more particularly to key arrangements for information input and retrieval keyboards.

The standard typewriter keyboard arrangement has persisted in basically unchanged form for many years and has proven generally satisfactory for most textual information applications. However, in certain applications such as for coded alphanumeric information input, it has been recognized that the standard typewriter keyboard arrangement is rather inefficient. Keyboard inefficiency tends to result in slower keying rates and in greater error rates, both very costly and undesirable in large volume information retrieval applications. Another important aspect in such applications is the ease with which the keyboard arrangement can be learned by untrained personnel.

### SUMMARY OF THE INVENTION

It is accordingly an object of this invention to provide a new and improved keyboard arrangement.

More particularly, it is an object of this invention to provide a new and improved keyboard arrangement for coded alphanumeric information input, which is easy to learn and which is more efficient than heretofore arrangements.

According to one aspect of our invention, the above and other objects are attained in an illustrative embodiment of a keyboard arrangement in which the keys are arranged such that the alphanumeric keys are operated principally by one hand, e.g., the right hand. The alphabetic keys are arranged in four banks or rows, preferably staggered, with the home row including the vowel letter keys, A, E, I, O and U. The remaining alphabetic keys are arranged generally in accordance with the frequency of their use for coded alphanumeric input, with the more frequently used keys, such as B, C, D, L, M and N, disposed so as to be operated by the stronger fingers with minimum reach. Infrequently used keys, such as Q, Z, Y, X and V, are located in the more difficult to reach locations on the keyboard.

The keyboard arrangement according to our invention contemplates the operation of directional keys with the left hand to indicate the direction or field of the alphanumeric input keyed with the right hand. Functional keys employed in substantially every information input operation are arranged so as to be operated using the thumbs. In the illustrative information retrieval keyboard arrangement herein, for example, keys operated by the right thumb determine portions of the information file to be searched, and one of the keys operated by the left thumb starts the search operation.

The two-handed directional keyboard arrangement of the present invention thus minimizes the hand movement and finger reach required, in turn helping to minimize keying errors and increase keying speed. In addition, we have found that operation of the present keyboard arrangement is generally learned more easily by untrained personnel than standard typewriter keyboard arrangements.

In certain information retrieval keyboard applications, it is often desirable to be able to quickly search and retrieve information from various predetermined

blocks and sub-blocks of information in the file. Of course, retrieval can be effected on the basis of unique alphanumeric input codes, requiring generally the operation of a plurality of keys and the learning of the particular codes involved. However, according to another aspect of the present keyboard arrangement, individual class keys are provided for effecting search or retrieval of such blocks and sub-blocks of information, the class keys being arranged advantageously in hierarchal clusters each comprising a general class key and two or more specific class keys.

### DETAILED DESCRIPTION

These and other objects and features of the invention may be fully apprehended from the following detailed description and the accompanying drawing in which an illustrative embodiment of an information retrieval keyboard is shown arranged in accordance with the principles of the invention.

The specific embodiment shown in the drawing is illustratively depicted for use in a telephone company directory assistance position. In such use, the keyboard is operatively associated, usually on a shared basis, with a file of telephone listing information. Specific listings are retrieved in response to coded alphanumeric information keyed in by the operator. For example, the keyed input information in a directory assistance application would typically include coded manifestations of an individual or business name and of the street address therefor, e.g., the first three letters of the name and the first three letters of the street. It will be appreciated, of course, that the present keyboard arrangement may be employed advantageously in a variety of alphanumeric information input applications, for example, coding mail for electronic sorting.

Information retrieval keyboards typically comprise a number of different types of keys, including alphabetic, numeric, and function keys. According to one aspect of the present keyboard arrangement, the alphabetic or letter keys are arranged in four rows, designated 100 in the illustrative embodiment of the drawing, and are arranged so as to be operated by one hand, illustratively the right hand. The rows of alphabetic keys are preferably staggered, such as in typical typewriter keyboard fashion. The third row of alphabetic keys down from the top comprises the home row for the right hand and includes the vowel letter keys A, E, I, O and U. The keys A, E, I and O, shown in relatively heavier outline in the drawing, are the home keys for the fingers of the right hand. Advantageously, the vowel letter keys are arranged in the order shown in the drawing inasmuch as that is the order in which they are usually learned. The frequency with which the vowel letter keys are used and the fact that they are generally already known to the operator makes them advantageously suited to the home row position, particularly from the standpoint of training the operator.

The remaining alphabetic keys are arranged generally in accordance with the relative frequency of their use for coded alphanumeric input. The more frequently used keys, such as B, C, D, L, M and N, are disposed so as to be operated by the stronger fingers with minimum reach. Relatively infrequently used keys, such as Q, Z, Y, X and V, are located in the more difficult to reach locations on the keyboard. In the illus-

trative keyboard embodiment of the drawing, the keys B, C, D and F are arranged as the first alphabetic keys respectively of the four rows 100, ordered from the bottom to the top row. The remaining keys are arranged in alphabetical order in each row. Thus the first or top row comprises the keys F, G, H, J, K and Z; the second row comprises D, L, M, N, P, Q and Y; the third or home row comprises the keys C, A, E, I, O and U; and the bottom row comprises B, R, S, T, W, V and X.

While certain of these keys are best located in the positions shown in the illustrative embodiment of the drawing, other of the alphabetic keys can be interchanged without departing from the spirit and scope of the invention. For example, the home row of alphabetic keys should not be changed, as should not the general locations of the keys B, C, D, L, M and N, although the locations of the latter keys relative to one another can be interchanged if desired for a particular application. Similarly, the general locations of the keys Q, Z, Y, X and V should not be changed but their relative locations can be interchanged if desired.

The keys 101, shown blank at the left of the alphabetic key rows, may be employed for special marks or for special combinations of letters. In the directory assistance application mentioned above, for example, the keys 101 may be employed for frequently used trigrams or combinations of three letters, such as "WIL" used in retrieving telephone listings for Wilson and Williams. Further breakdown of the retrieved listings can be effected advantageously by operation of one of the alphabetic keys corresponding to the fourth letter of the name sought, such as by operation of one of keys 101 for "WIL" followed by operation of key S for Wilson. Keys 101 may be employed also for hard-to-spell names to minimize keying errors and/or multiple retrievals associated therewith.

The numeric keys 0 through 9 are arranged in that order in a single row 102 approximately centered above the alphabetic keys. Advantageously, row 102 is spaced apart from the alphabetic keys a distance greater than the spacing between rows 100 and, as depicted in the drawing, the numeric keys may be somewhat larger than the alphabetic keys. Further, as shown in the illustrative embodiment of the drawing, the numeric keys may be employed also for other purposes such as special records or geographic identification.

As mentioned above, the keyboard arrangement according to our invention contemplates the operation of directional keys with the left hand to indicate the direction or field of the alphanumeric input keyed with the right hand. The directional keys are arranged in one or more rows 104 and depend generally as to number and use upon the particular application of the keyboard. In the illustrative information retrieval keyboard arrangement shown in the drawing, which is particularly adapted for use in a directory assistance position, the directional keys include the following:

INDNT - Indent  
MID INTL - Middle Initial  
ABR FN - Abbreviated Finding Name  
HSE NO - House Number  
GEO - Geographic  
NXT NME - Next Name (First Name)  
FND NME - Finding Name (Last Name)  
ST NME - Street Name

The home row is the bottom row of the directional keys, with the home positions for the fingers of the left hand shown in relatively heavier outline.

The Indent key identifies the listing wanted as being an indent within an organization, such as a branch office of a large bank. The fields identified by the keys designated Middle Initial, Next Name, Finding Name, Street Name and House Number are self-evident. The Geographic key, used immediately preceding the operation of one of the numeric keys, identifies a particular geographical field of search such as "Monmouth County." The Abbreviated Finding Name key permits the complete input of a last name with only two keystrokes. For example, the operation of this key followed by the operation of the alphabetic key S illustratively inputs the complete name "Smith."

Special function keys may also be included in rows 104, as shown in the drawing, such as keys SP REC (Special Record, such as emergency numbers), OVR RDE (Override) and ERASE. General function keys, one or more of which may be used in substantially every information retrieval operation, are arranged so they may be operated by the thumbs. For example, the keys BUS (Business), GVT (Government) and RES (Residence) may be operated by the right thumb to determine major portions of the information file to be searched on the basis of the alphanumeric input. The keys CLEAR, LST SEL (Listing Select) and START SEARCH may be operated by the left thumb to respectively permit the operator to clear the keyed input and start over, to mark a selected listing, and to start the retrieval search after the necessary alphanumeric information has been keyed in.

Two additional function keys 110 are shown at the lower right of the illustrative keyboard arrangement in the drawing. Keys 110 are used to advance and reverse associated visual displays of retrieved information.

In certain information retrieval keyboard applications, it is often desirable to be able to quickly search and retrieve information from various predetermined blocks and sub-blocks of information in the file. According to another aspect of the present keyboard arrangement, individual class keys are provided for this purpose and are arranged advantageously in hierarchal clusters. Each cluster comprises a general class key, such as keys 10, 20, 30, 40, 50, 60 and 70 (shown in relatively heavier outline), and two or more specific class keys such as keys 11 through 13 under general class key 10 and 21 through 24 under general class key 20. The designations of the general and specific class keys depend, of course, upon the particular application. For example, for use in a directory assistance position, keys 50 through 53 may be designated as indicated illustratively in the drawing, referring to further file subdivisions of the business listings.

What has been described hereinabove, therefore, is a new and improved keyboard arrangement which is easy to learn and which is susceptible of faster and more accurate operation than existing keyboard arrangements. It is to be understood, however, that the above-described arrangements are but illustrative of the application of the principles of our invention. Numerous other arrangements may be devised by those skilled in the art without departing from the spirit and scope of the invention.

What is claimed is:

1. A keyboard arrangement adapted for coded alphanumeric information input comprising, alphabetic letter keys A through Z arranged in a plurality of rows positioned so as to facilitate operation of all of said alphabetic keys by one hand, numeric keys 0 through 9 arranged in a single row positioned above said alphabetic keys, said alphabetic and numeric keys being operative for generating manifestations of coded alphanumeric information, a plurality of directional keys arranged in one or more rows positioned alongside said rows of alphabetic keys so as to facilitate operation of all of said directional keys by the other hand, operation of said directional keys generating manifestations identifying predetermined fields associated with said alphanumeric information, and a plurality of function keys peripherally arranged adjacent said alphabetic and directional keys.

2. A keyboard arrangement in accordance with claim 1 adapted for operative association with a file of data based on the name and location of individual parties and for operative association with means for retrieving selected data from said file, wherein said directional keys include keys for generating manifestations identifying name and location fields associated with respective portions of said coded alphanumeric information;

and wherein said function keys include a first key for initiating operation of said retrieving means, a second key for erasing at least part of said alphanumeric information input, and one or more additional keys for controlling data retrieved from said file.

3. A keyboard arrangement in accordance with claim 1 wherein said function keys include keys operative for categorizing and for controlling the input of said generated manifestations of alphanumeric information.

4. A keyboard arrangement in accordance with claim 3 adapted for use with a file of data, said arrangement further comprising a plurality of class keys arranged in clusters disposed adjacent the periphery of said alphabetic, numeric and directional keys, each of said clusters including a general class key and two or more specific class keys, said general class key and said specific class keys in each cluster being hierarchically arranged such that said general class key is operative for generating manifestations defining a predetermined block of data in said file and said specific class keys are operative for generating manifestations defining predetermined subdivisions of said predetermined block of data.

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