(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
13 October 2005 (13.10.2005)

PCT

(10) International Publication Number
WO 2005/094430 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/US2005/007230

(22) International Filing Date: 3 March 2005 (03.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/555,237 22 March 2004 (22.03.2004) US

(71) Applicant and
(72) Inventor: **ROZUMENKO, Leonid** [—/US]; 5255 N. Kenmore Avenue, Apt. 24-C, Chicago, IL 60640 (US).

(74) Agent: **RAY, James, O., Jr.**; 2640 Pitcairn Road, Monroeville, PA 15146 (US).

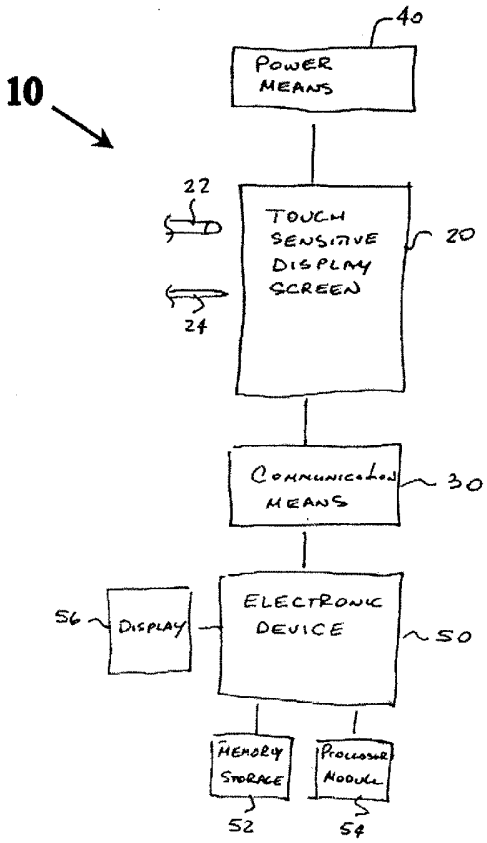
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:
— *of inventorship (Rule 4.17(iv)) for US only*

[Continued on next page]

(54) Title: UNIVERSAL MULTILANGUAGE MULTIFUNCTIONAL KEYBOARD



(57) Abstract: Universal Multilanguage multifunctional keyboard includes a touch-sensitive display screen which is connectable with an electronic device. Operating software enables generation of a custom keyboard layout which is displayed on the touch-sensitive display screen and is utilized by the user for data entry purposes into the electronic device. The user is also able to create new characters or new keyboard layouts. The method for generating and displaying a custom keyboard layout is based on utilization of the coordinate system.

WO 2005/094430 A2

Published:

— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

UNIVERSAL MULTILANGUAGE MULTIFUNCTIONAL KEYBOARD

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 60/555,237 filed March 22, 2004.

FIELD OF THE INVENTION

The present invention relates, in general, to a data entry device and, more particularly, this invention relates to a touch-sensitive keyboard used for data entry and, yet more particularly, the instant invention relates to a touch-sensitive keyboard which is configurable for use with multiple languages and which is configurable to perform multiple functions.

BACKGROUND OF THE INVENTION

As is well known, various electronic technologies, such as computers, personal digital assistants, and multi-functional phone communicators have gained wide acceptance and popularity and are now used throughout the world by population speaking a significant number of different languages and dialects. Additionally, the use of Internet and multinational nature of many major corporations and conglomerates requires verbal and written exchange between individuals speaking different languages, often unrelated in their origin, format and pronunciation.

Yet, a keyboard, the most commonly used input unit for these electronic devices, has not changed significantly since C.

Latham Sholes introduced what is generally known as a standard QWERTY key layout in 1872. Such keyboard layout poses difficulties to a non English speaking population as well as to a population for whom English is not a native language. A keyboard layout designed by August Dvorak in 1930s and, known as a Dvorak keyboard, improves efficiency of entering text in English language but also poses difficulties to a non English speaking population.

Attempts have been made to customize a QWERTY key layout for use with different languages. U.S. Patent 5,387,042 to Brown, U.S. Patent 5,378,068 to Hua and U.S. Patent 5,212,638 to Bernath teach physical assignment or addition of different language characters to each key and use of various means to convert from such QWERTY mode to an alternative mode. The main disadvantage of the above technique is that such customization is generally suitable for only one alternative language.

U.S. Patent 6,851,877 to Liebhold teaches a data entry device with a plurality of user selectable keys arranged about a central point or key such that each key is at a minimum distance from the central point or key relative to another key. The central point key reference forms a base for a coordinate system and is an essential element of the data entry method. The drawback of such data entry system is that the key layout is substantially altered even for English speaking users.

Various software packages employ custom functional character layouts which are displayed on a screen of the electronic device adjacent a display portion thereof and are frequently accessed by the user, in addition to the keyboard keys, during use of such software packages. Such functional character layouts are well known as tool bars and pull-down menus.

The purpose of these additional functional character layouts is to provide the user with expanded command capabilities to effectively and efficiently manipulate contents of the software package and overcome limitations posed by entering the commands via a standard keyboard. However, in some engineering related software packages, such functional character layouts may utilize as much as 30% of the screen thus significantly reducing the usable display portion.

Users dealing with multiple languages and having a need to translate contents from one language to another have been disadvantaged by lack of effective language translation means available in electronic formats and for use with various electronic devices.

As is well known, a plurality of users cooperatively solving a problem or performing a function presently require a corresponding plurality of computers connected in a network to

efficiently access and perform the required task. Such present requirement increases computer hardware and maintenance costs.

SUMMARY OF THE INVENTION

In a first aspect, the present invention provides a universal Multilanguage multifunctional keyboard for data entry purposes into an electronic device. The keyboard includes a touch-sensitive display screen which is connectable with the electronic device through a bus cable, wirelessly or via an infrared port. Operating software displays a predetermined configuration layout upon display activation or presents the user with a selection menu enabling the user to select an alternative keyboard configuration layout which is then displayed on the touch-sensitive display screen and is utilized by the user for at least one of data entry purposes into the electronic device, operating the software to create new characters or new keyboard layouts from the information stored in a library or import information through a download process.

In a second aspect, the present invention provides a method for generating and displaying a custom keyboard layout which is based on employment of the X-Y coordinate system with each character defined by a set of coordinates.

In a third aspect, the present invention provides a method for using a universal Multilanguage multifunctional keyboard in a multi-user environment enabling a plurality of users each

utilizing such keyboard to connect to and operate within the same host environment. Such method is advantageous in reducing costs associated with using and maintaining a plurality of electronic devices such as computers.

In a forth aspect, the present invention provides a method for carrying out language translations particularly utilizing Multilanguage capabilities of the universal keyboard to enable the user to modify the translation in either language.

OBJECTS OF THE INVENTION

It is, therefore, one of the primary objects of the present invention to provide a touch-sensitive keyboard for data entry.

Another object of the present invention is to provide a touch-sensitive keyboard for data entry which can be configured for use with a desired language from multiple choices.

Yet another object of the present invention is to provide a touch-sensitive keyboard for data entry which can be configured to perform multiple functions.

A further object of the present invention is to provide a touch-sensitive keyboard which utilizes an X-Y coordinate system for providing keyboard layout configurations.

Yet a further object of the present invention is to provide a touch-sensitive keyboard which can be utilized in a multi user environment to perform specific tasks or to reduce costs.

Additional object of the present invention is to provide a touch-sensitive keyboard which aids in language translations.

In addition to the several objects and advantages of the present invention which have been described with some degree of specificity above, various other objects and advantages of the invention will become more readily apparent to those persons who are skilled in the relevant art from the following more detailed description of such invention, particularly, when such description is taken in conjunction with the attached drawing Figures and with the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic representation of a universal Multilanguage multifunctional keyboard of the present invention;

FIG. 2 is a pictorial diagram of a coordinate system used for generating a keyboard layout; and

FIG. 3 is a pictorial diagram of a language translation embodiment of the present invention.

BRIEF DESCRIPTION OF THE VARIOUS EMBODIMENTS OF THE PRESENT INVENTION

Prior to proceeding to the more detailed description of the present invention, it should be noted that, for the sake of clarity and understanding, identical components, which have identical functions, have been identified with identical

reference numerals throughout the several views illustrated in the drawing figures.

Reference is now made to FIG. 1. Schematically shown therein is a universal Multilanguage multifunctional keyboard, generally designated 10, of the present invention. Such keyboard 10 includes a display screen 20 of a predetermined shape and size which is sensitive to the touch of a finger 22 or a stylus 24. The display screen 20 can be manufactured by any of the well known technologies including but not limited to resistive and capacitive. As is well known, the stylus 24 used with the display screen 20 manufactured by the capacitive technology must be electrically connected to display screen 20. The display screen 20 is in electrical communication with a communication means 30 and with a power means 40.

The display screen 20 may be further connected to an electronic device 50 through such communication means 30 for utilizing its memory storage module 52 and a processor module 54 which is associated with at least one operating software capable of executing at least one predetermined logic algorithm.

In this embodiment, the communication means 30 will be used for communicating at least one predetermined configuration layout stored in the memory module 52 and which will be displayed on the screen 20 and for returning to the electronic device 50 a response signal based on the action performed by the

user after such at least one predetermined configuration layout has been displayed.

Alternatively, the memory module 52 and processor module 54 may be disposed integral within the keyboard 10 adjacent the display screen 20. It will be appreciated that complexity and functionality of the processor module 54 disposed integral within the keyboard 10 may be determined for each application. At a minimum, such processor module 54 will enable operation of the display screen 20, selection and display of such at least one predetermined configuration layout and communication of such response signal to the electronic device 50.

It will be understood that such communication means 30 may be a well known bus interface via a physical cable connection through well known socket type ports including but not limited to serial, parallel and USB or such communication means 30 may be of a wireless or infrared type.

The power means 40 may be an electrical cable connectable to a source of electrical energy, an electrical battery removably disposed integral with the display screen 20 and a combination thereof.

When the user activates the keyboard 10 aided by the power means 40 the at least one predetermined configuration layout is displayed on the display screen 20 and is available for use. Such at least one predetermined configuration layout may be the

last one used prior to deactivation of the keyboard 10 or may be a most common one selected from a predetermined plurality of most recently used predetermined configuration layouts.

The at least one predetermined configuration layout may be a set of alpha, numeric and functional characters 60 disposed in a first predetermined pattern, preferably correlating to a predetermined language of choice for using such keyboard 10 for word processing data entry.

Alternatively, such at least one predetermined configuration layout may be a set of graphical characters 60 functionally representing the tool bars and pull down menus from a predetermined software means that the user can import for display on the display screen 20. Such configuration will enable the user to manipulate such tool bars and pull down menus with a finger 22 or a stylus 24. Additionally, the user may elect to deactivate the display of tool bars and pull down menus on the computer screen 56 thus increasing the usable portion of such computer screen 56 for graphic and text manipulation.

Yet alternatively, at least a portion of the display screen 20 may be utilized by the user to perform various data entry functions by hand writing in combination with a hand writing recognition software means or such at least one predetermined configuration layout may include a pair of adjacently disposed predetermined configuration layouts. For

example, a first predetermined layout corresponding to a first language keyboard and a second predetermined layout corresponding to a second language keyboard will be adjacently disposed on the display screen 20 for enabling the user to efficiently and effectively switch between such two different languages and perform required language manipulations.

Given the Multilanguage and multifunctional capabilities of the keyboard 10 of the present invention, upon activation of such keyboard 10, the user may be presented with at least one selection table displayed in a predetermined portion of the display screen 20 with such at least one selection table containing at least one recently used predetermined configuration layout preferably saved upon deactivation of the keyboard 10. At least one selection in such at least one selection table will enable the user to select alternative predetermined configurations either through a plurality of selection tables, through a series of scroll-down menus or a combination thereof.

It will be appreciated that, preferably, the at least one predetermined configuration layout will be stored in the storage module 52 and displayed upon user's selection.

Alternatively, the user can select to create a new configuration or customize an existing configuration based on existing configurations stored in a library, preferably disposed

within the storage module 52. Upon such selection, a library of presently stored and available alpha, numeric, functional and graphical characters 60 will be at least partially displayed on the screen 20 and the user can than select at least one character 60 from such library to customize the existing predetermined configuration or create a new configuration which will be then saved and stored in the library upon completion.

In another alternative embodiment, the user may receive and input a new configuration or customize an existing configuration through a download process by connecting to a network computer (not shown) by any well known local or remote connection protocols.

Still further, the user may select to create a new custom character 60 to perform a predetermined function or display a predetermined image by utilizing any available software means. For example, such custom functional character 60 may be programmed to display a mathematical function or a set of mathematical equations capable of accepting data input from the user. Each custom functional character 60 will then be given a unique address reference and a display name and stored in the storage module 52 for further use. In another example, the user may import an image or picture and store it for subsequent display or assign a unique graphical address name that will be

displayed on the display screen 20 and generate a corresponding image on the computer screen 56.

If it is required to prevent inadvertent deactivation or change of the currently used predetermined configuration layout, a hardware means (not shown) disposed within the keyboard 10 or a predetermined selection within the software means may be utilized by the user to selectively lock and unlock such predetermined configuration layout.

It will be appreciated that the user will be able to modify size, shape, font and color of each alpha, numeric, functional or graphical character 60 by employing a predetermined software means disposed within processor module 54.

With reference to FIG. 2, a method for generating and displaying the at least one predetermined configuration layout is based on utilization of at least one coordinate system 100. Preferably, such at least one coordinate system 100 is at least a well known X-Y coordinate system 100. Preferably, the origin of such X-Y coordinate system is disposed on a periphery of the display screen 20.

Accordingly, in such at least one predetermined configuration layout, each unique alpha, numeric, functional or graphical character 60 is formed by at least one coordinate 110 disposed within such at least one coordinate system 100 and such at least one predetermined configuration layout will be formed

by a plurality of such coordinates 110 disposed in a first predetermined pattern.

Preferably, each unique alpha, numeric, functional or graphical character 60 will be formed by a predetermined plurality of coordinates, shown as a predetermined plurality of coordinates 120-156 arranged in a second predetermined pattern. Such second predetermined pattern of such predetermined plurality of coordinates 120-156 defining each unique character will be advantageous in varying the size and shape of each character 60 and in forming a character domain for each character 60 with a first portion of such plurality of coordinates shown by coordinates 132, 134, 142, and 144 forming an active zone of such character domain and with a second portion of such plurality of coordinates 120-156 located at the boundary of the character 60 forming an inactive zone of such character domain thus enabling an operating software means to discriminate between valid and invalid user entries respectively associated with such active and inactive zones. It will be appreciated that even though the character 60 is represented by sixteen coordinates in FIG. 2, the number of optimum coordinates and the shape of such character 60 will be determined based on specific application requirements.

The keyboard 10 of the present invention will be advantageous in a multi-user environment, particularly, wherein

a predetermined plurality of users is cooperatively working on a task or solving a problem. In such environment a predetermined plurality of keyboards 10, each corresponding to each of such predetermined plurality of users, will communicate with one host electronic device 50, preferably a computer 50 operable in a network mode, enabling such predetermined plurality of users to at least access such computer 50 and further manipulate an image displayed on the computer screen 56 while reducing a cost of such effort associated with using a plurality of computers 50. If required, each user may be assigned a predetermined user space domain. Alternatively, such predetermined plurality of keyboards 10 may be directly interconnected into such network mode by any well known connections means.

With reference now to FIG. 3, therein pictorially illustrated is another embodiment of the universal keyboard of the present invention enabling the user to translate content from one language into a second language. Advantageously, the user may select two predetermined configuration layouts with each corresponding to each language generated and adjacently position them on the display screen 20.

By entering a word 210 in a first language 200 trough keyboard 10, a language translation software means will determine at least one translation word 310 in the second language 300 and display it preferably on the display 56.

Preferably, the language translation software means will determine and display a predetermined plurality of translated words 310-330. The user can then select the most suitable and appropriate translation.

The user may also be presented with a plurality of translation meanings, shown by 410-436, which represent reverse translation of second language 300 into the first language 200 and which the user may analyze to improve the accuracy of the translation. Such plurality of translation meaning may be generated and displayed during the translation or selected and accessed by the user as an additional step and may be displayed in a table format shown in FIG.3 or in any other format enabled by the operating and translation software.

It will be appreciated that additional information for the translated words and their translation meanings including but not limited to form, appearance, use in slang language, variations, exceptions, and accuracy may be available to the user during the translation process.

Alternatively, the user may enter a predetermined text portion in the first language 200 and activate the translation process, preferably through a predetermined character 60 triggering such translation or through any other alternative means. The user will then be presented with a translation in the second language 300 based on the grammar and specific features

thereof which the user can accept as is or modify either in the first or second language 200 or 300 respectively by utilizing displayed keyboard configuration layouts and language databases.

According to the embodiments of this invention, the user may create at least one unique character 60 and at least one configuration layout containing such at least one unique character 60 to aid in translation and editing process.

Although the present invention has been described in terms of a physical keyboard configuration, it will be apparent to those skilled in the art, that the present invention may be applied to a virtual environment by employing at least a two-dimensional coordinate system.

Furthermore, it will be understood that the embodiments of the present invention may be integrated into a display screen of an electronic device thus enabling such electronic device to be used in multi-functional and multi-user environment.

Additionally, the user may utilize the electronic device to create, customize or select the predetermined character or the predetermined configuration layout and communicate such information to the keyboard of the present invention.

Advantageously, a handheld pointing device, such as a well known computer mouse, may be used in combination with the keyboard of the present invention or the electronic device.

Thus, the present invention has been described in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains to make and use the same. It will be understood that variations, modifications, equivalents and substitutions for components of the specifically described embodiments of the invention may be made by those skilled in the art without departing from the spirit and scope of the invention as set forth in the appended claims.

I Claim:

1. A method for generating a touch-sensitive keyboard, said method comprising the steps of:

(a) using a touch-sensitive display screen to display at least one selection menu to a user;

(b) enabling said user to select at least one predetermined configuration keyboard layout from said at least one selection menu; and

(c) displaying said at least one predetermined configuration keyboard layout on said touch-sensitive display screen in response to a received user selection.

2. The method, according to claim 1, wherein said at least one predetermined configuration keyboard layout includes at least one predetermined character disposed in a first predetermined pattern on said display screen.

3. The method, according to claim 2, wherein said at least one predetermined character is one of an alpha, numeric, functional and graphical character.

4. The method, according to claim 1, wherein said at least one predetermined configuration keyboard layout is formed using at least one coordinate system.

5. The method, according to claim 4, wherein said at least one coordinate system is at least an X-Y coordinate system including a predetermined plurality of coordinates.

6. The method, according to claim 5, wherein a predetermined character is formed by at least one coordinate and said at least one predetermined configuration keyboard layout is formed by a predetermined plurality of said predetermined characters disposed in a first predetermined pattern.

7. The method, according to claim 5, wherein a predetermined character is formed by a predetermined plurality of coordinates disposed within said at least one X-Y coordinate system, said predetermined plurality of coordinates is disposed in a second predetermined pattern and forms a domain for said predetermined character with a first portion of said predetermined plurality of coordinates forming an active zone of said character domain and a second portion of said predetermined plurality of coordinates forming an inactive zone of said character domain.

8. The method, according to claim 1, wherein said at least one predetermined configuration keyboard layout and at least one

predetermined character are stored in and selectable from a library.

9. The method, according to claim 1, wherein said method includes an additional step of customizing said at least one predetermined configuration keyboard layout.

10. The method, according to claim 1, wherein said method includes an additional step of forming one of a new predetermined character and a new predetermined configuration keyboard layout.

11. The method, according to claim 1, wherein said method includes an additional step of importing one of a new predetermined configuration keyboard layout, a new predetermined character and a combination thereof.

12. The method, according to claim 1, wherein said method includes an additional step of generating at least one data entry signal upon engagement of one of a finger and a stylus with said touch-sensitive display means.

13. The method, according to claim 12, wherein said method includes an additional step of communicating said at least one

data entry signal to an electronic device causing it to perform at least one function.

14. A method for generating a touch-sensitive keyboard, said method comprising the steps of:

(a) energizing a touch-sensitive display screen; and

(b) displaying at least one predetermined configuration keyboard layout stored in a memory means engageable with said touch-sensitive display screen.

15. The method, according to claim 14, wherein said at least one predetermined configuration keyboard layout is one of a last used and a most common layout selected from a predetermined plurality of most recently used predetermined configuration layouts.

16. A method for using a touch-sensitive keyboard in a multi user environment, said method comprising the steps of:

(a) connecting a predetermined plurality of said touch-sensitive keyboards into a network environment; and

(b) generating at least one predetermined configuration layout on each of said predetermined plurality of said touch-sensitive keyboards, whereby said at least one predetermined configuration layout enables a predetermined plurality of users

each having at least one said touch-sensitive keyboard to at least access said network environment.

17. A universal Multilanguage multifunctional keyboard for enabling a user to enter data into an electronic device, said keyboard comprising:

(a) a touch-sensitive display means;

(b) means in electrical communication with said touch-sensitive display means for selectively energizing and deenergizing it;

(c) means engageable with said touch-sensitive display means and said electronic device for communicating data therebetween; and

(d) means engageable with said keyboard for operating said touch-sensitive display means and for displaying at least one predetermined configuration layout thereon capable of generating at least one data entry signal upon engagement of one of a finger and a stylus with said touch-sensitive display means, said at least one data entry signal communicated by said communication means to said electronic device causes it to perform at least one function.

18. The keyboard, according to claim 17, wherein said means for selectively energizing and deenergizing said touch-sensitive

display means is one of an electrical battery removably disposed within said keyboard, an electrical cable connectable to a source of electrical energy and a combination thereof.

19. The keyboard, according to claim 17, wherein said communication means is one of a physical bus interface, wireless means, infrared means and any combination thereof.

20. The keyboard, according to claim 17, wherein said operating means is capable of executing at least one predetermined software logic algorithm.

21. A method for performing a translation between a pair of languages, said method comprising the steps of:

(a) entering at least one word in a first language;

(b) using a predetermined translation software means to generate at least one translation in a second language; and

(c) displaying said at least one translation in said second language.

22. The method, according to claim 21, wherein said method includes a step of generating and displaying at least one reverse translation of said at least one translation in said second language.

23. A method for using a touch-sensitive keyboard for performing a translation between a pair of languages, said method comprising the steps of:

(a) using a touch-sensitive display screen to display at least one selection menu to a user, said at least one selection menu containing a library of predetermined configuration layouts;

(b) enabling said user to select at least one predetermined configuration keyboard layout from said at least one selection menu corresponding to at least one language; and

(c) displaying said at least one predetermined configuration keyboard layout on said touch-sensitive display screen in response to received user selection.

24. The method, according to claim 23, wherein said method includes a pair of predetermined configuration keyboard layouts for entry of a first language and a second predetermined configuration keyboard layout for entry of a second language, said first and said second predetermined configuration keyboard layouts adjacently disposed on said touch-sensitive display screen enabling said user to edit said translation in one of said first language, said second language and a combination thereof.

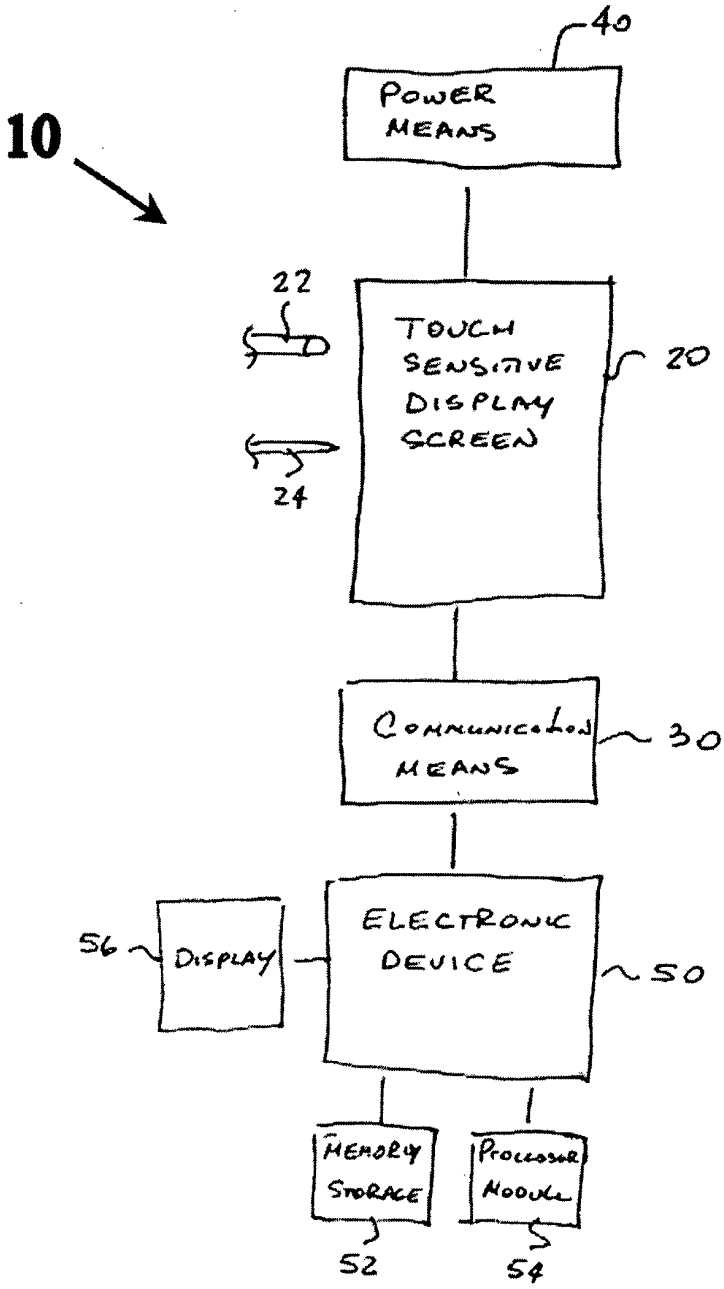

10
40
POWER MEANS
22
TOUCH SENSITIVE DISPLAY SCREEN
20
24
COMMUNICATION MEANS
30
56
DISPLAY
ELECTRONIC DEVICE
50
MEMORY STORAGE
PROCESSOR MODULE
52
54

FIG. 1

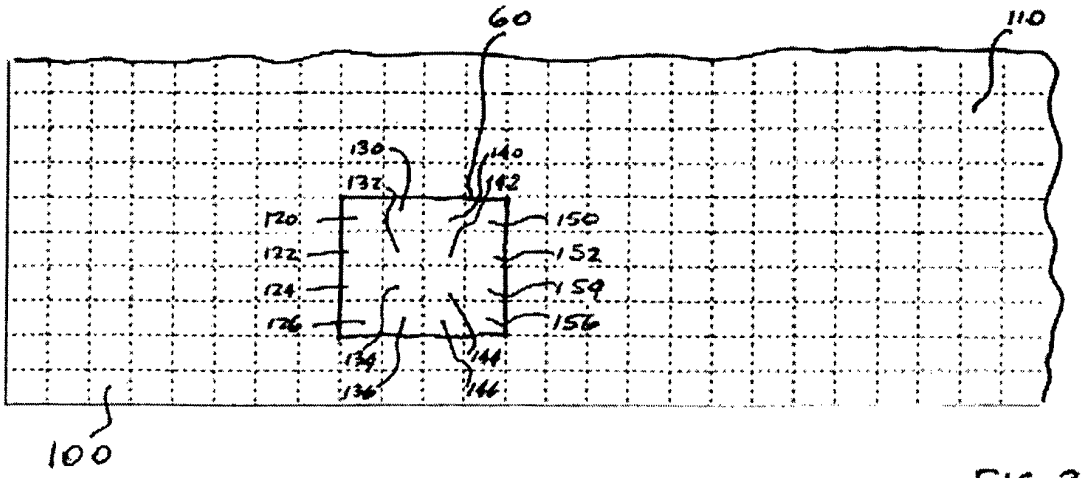


FIG. 2

200 300

First Language	Translation Choices in a Second Language	Meanings in the First Language
210 Complete	Полный 310	410 Full
		412 Full to the brim
		414 Complete
		416 Total
	Законченный 320	420 Finished
		422 Completed
		422 Worked out
	Совершенный 330	430 Complete
		432 Perfect
		434 Whole
		436 Absolute

FIG. 3