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(54) **LANGUAGE INPUT INTERFACE ON A DEVICE**

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(57) **ABSTRACT**

Methods, systems, and apparatus, including computer program products, for inputting text. A virtual keyboard is presented in a first region of a touch sensitive display of a device. An input representing a phonetic string is received on the virtual keyboard. The entered phonetic string is presented in a second region of the touch sensitive display. One or more candidates are identified based on the phonetic string. At least a subset of the candidates is presented. An input selecting one of the candidates is received. The entered phonetic string is replaced with the selected candidate.

(58) **Field of Classification Search**

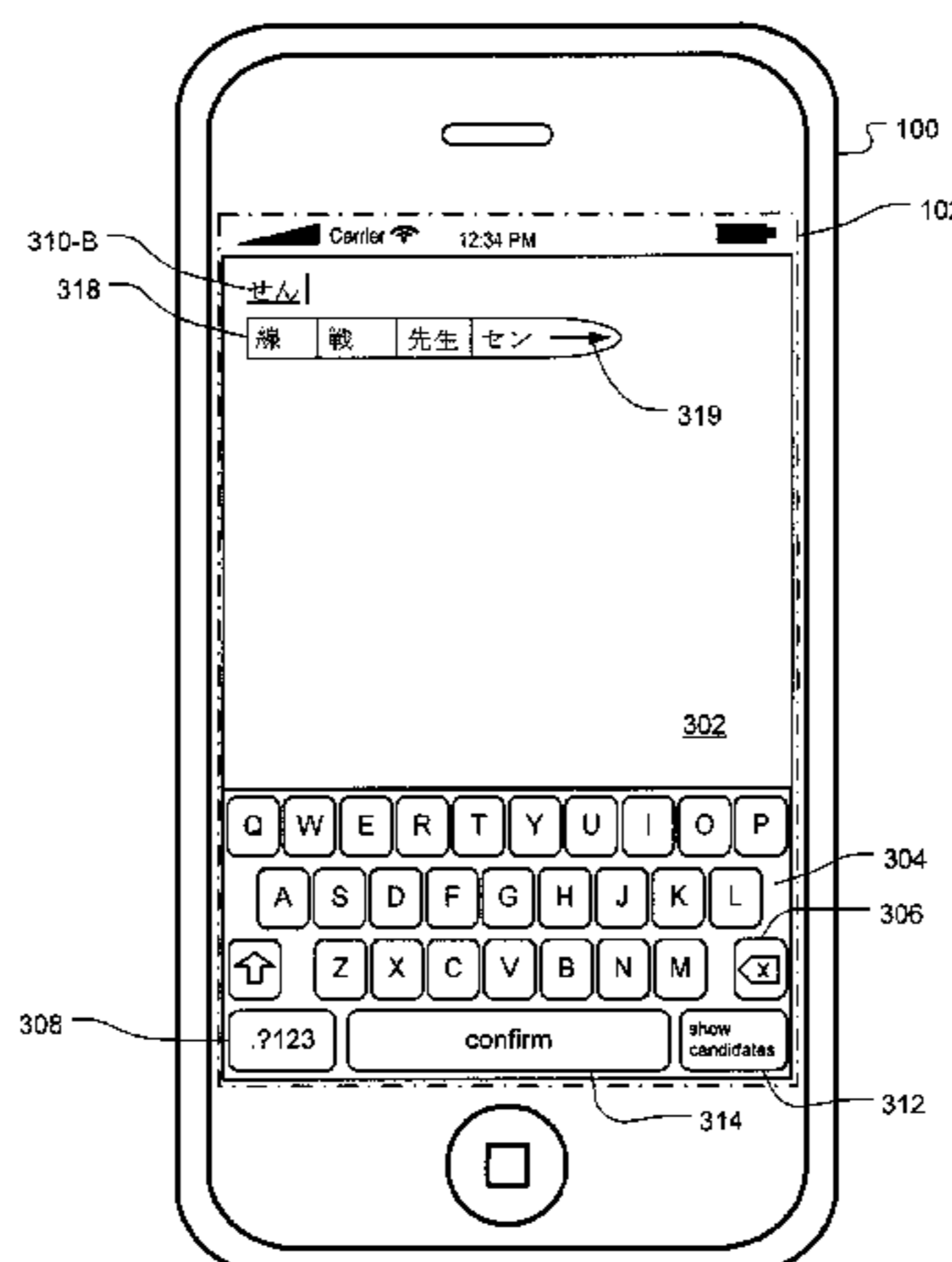
CPC .. G06F 17/2863; G06F 3/018; G06F 3/0237; G06F 3/04886  
USPC ..... 704/2, 3; 345/168, 173-182; 178/18.01; 200/512; 340/407.1  
See application file for complete search history.

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**107 Claims, 9 Drawing Sheets**



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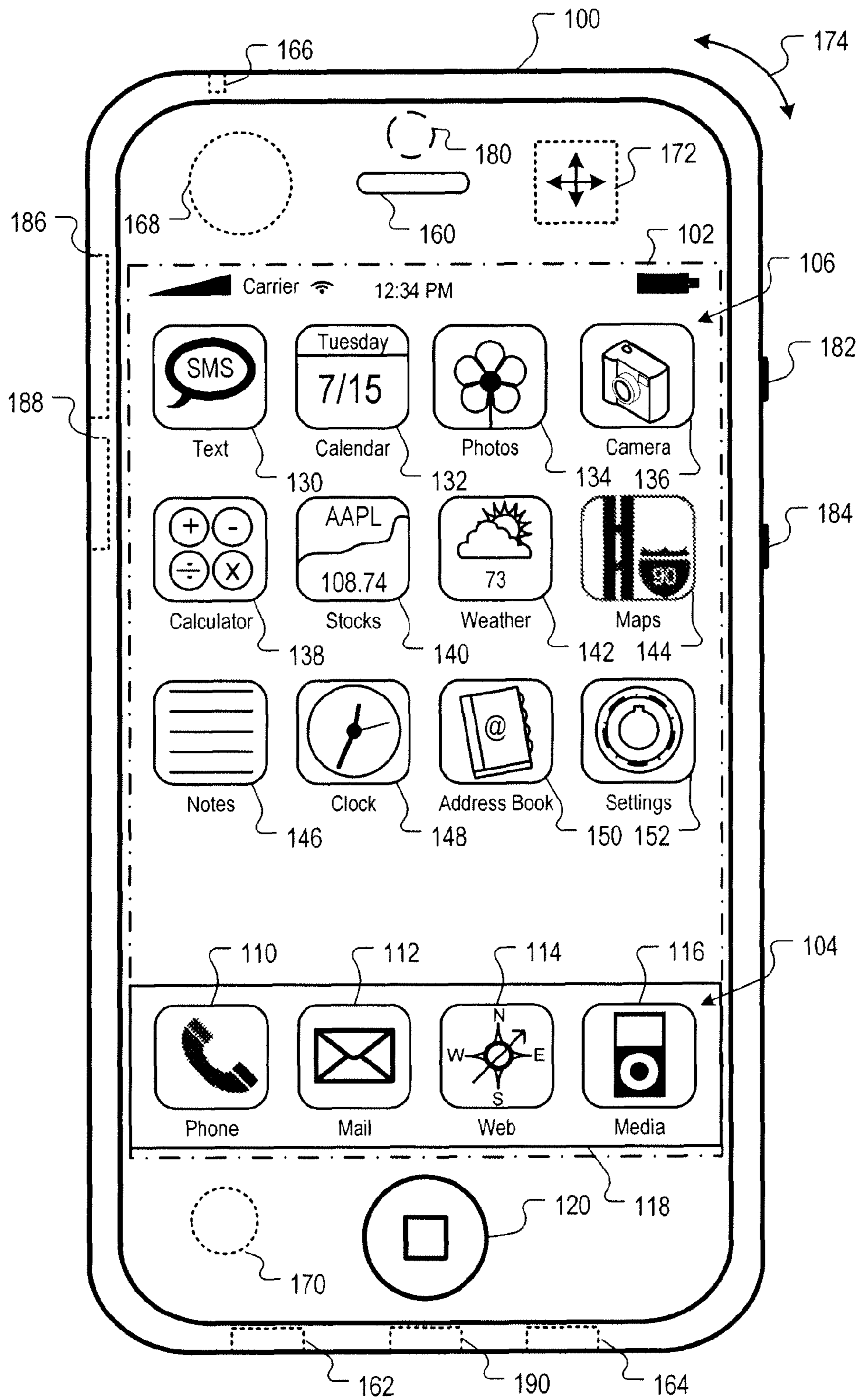
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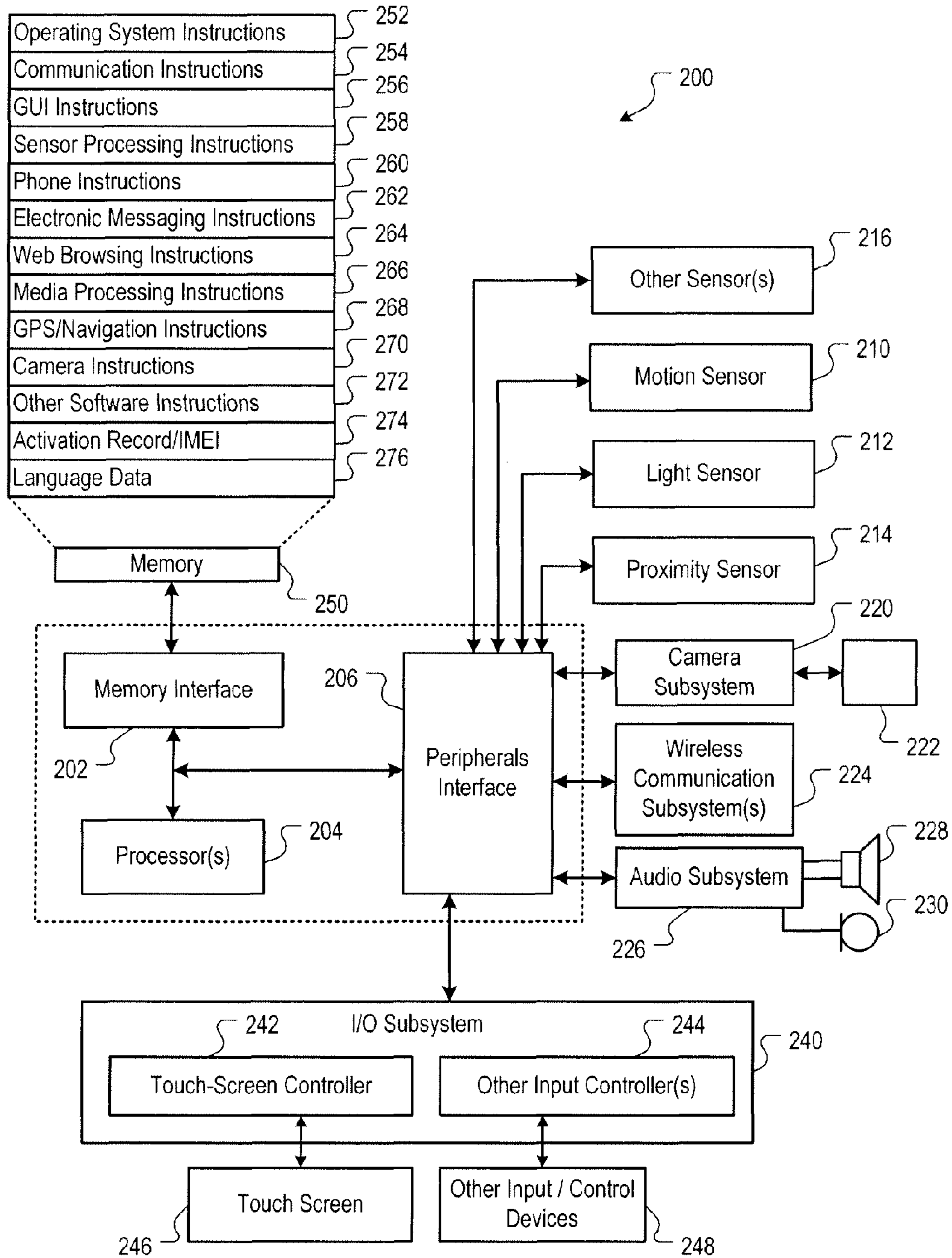


FIG. 2



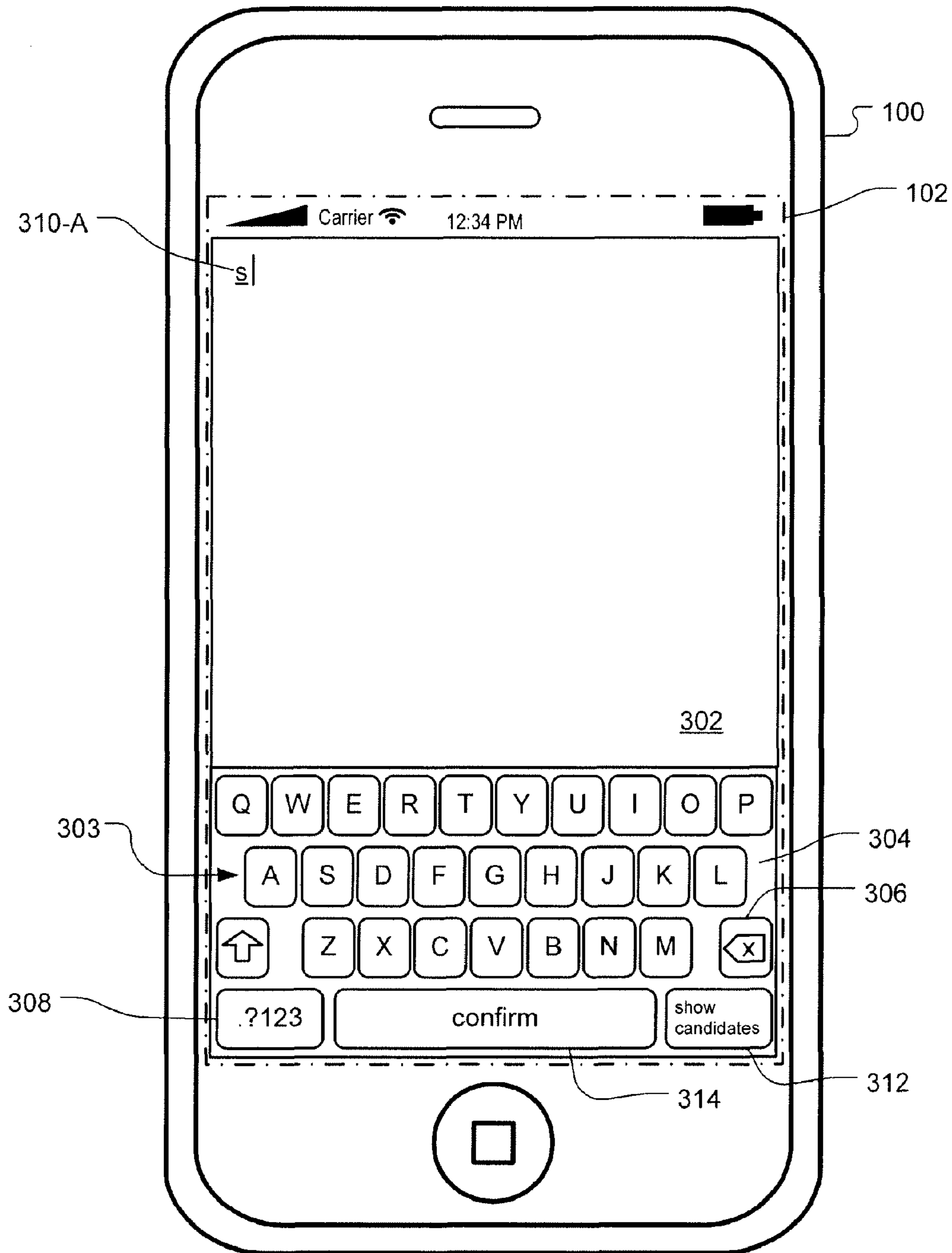


FIG. 3A



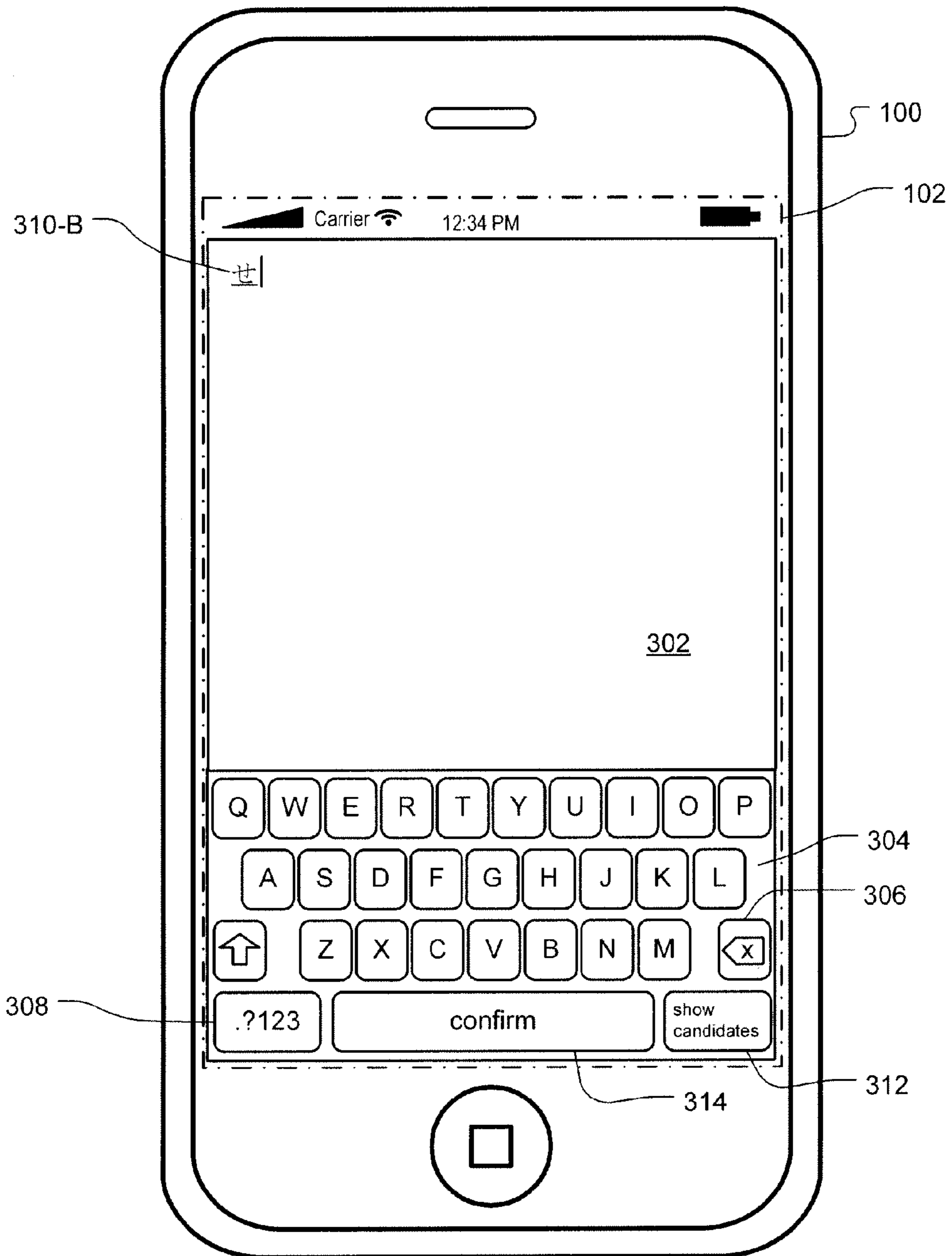


FIG. 3B



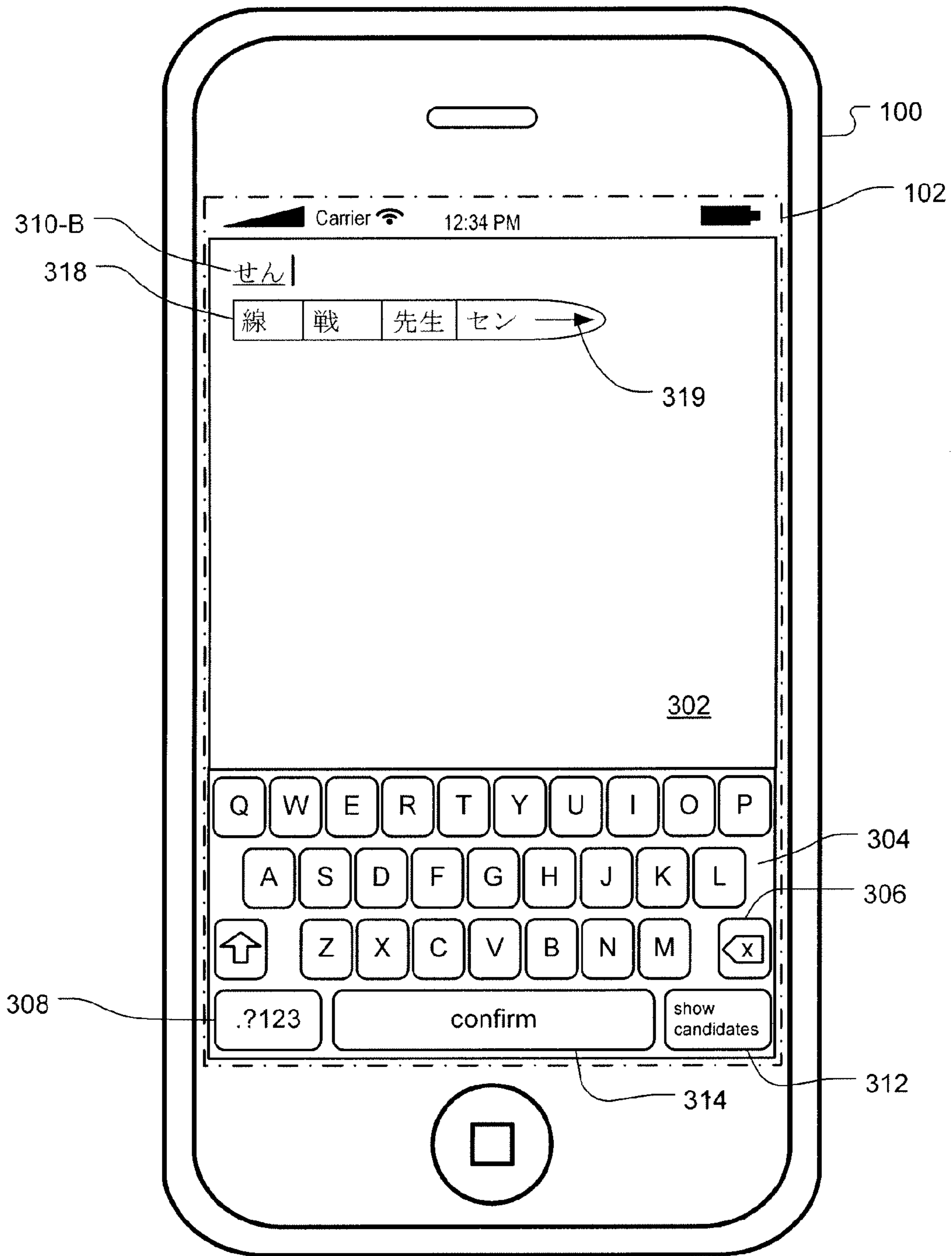


FIG. 3C



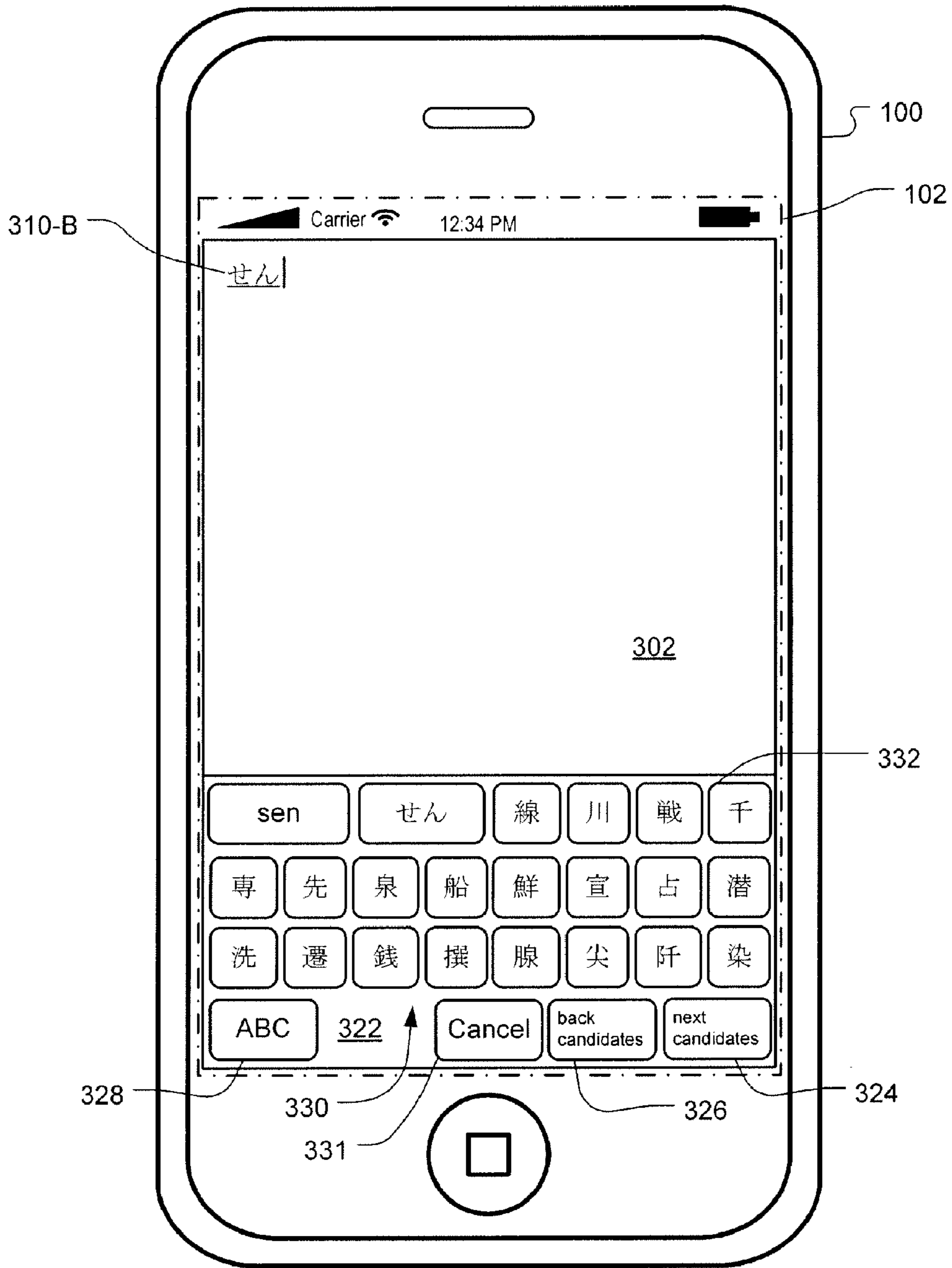


FIG. 3D

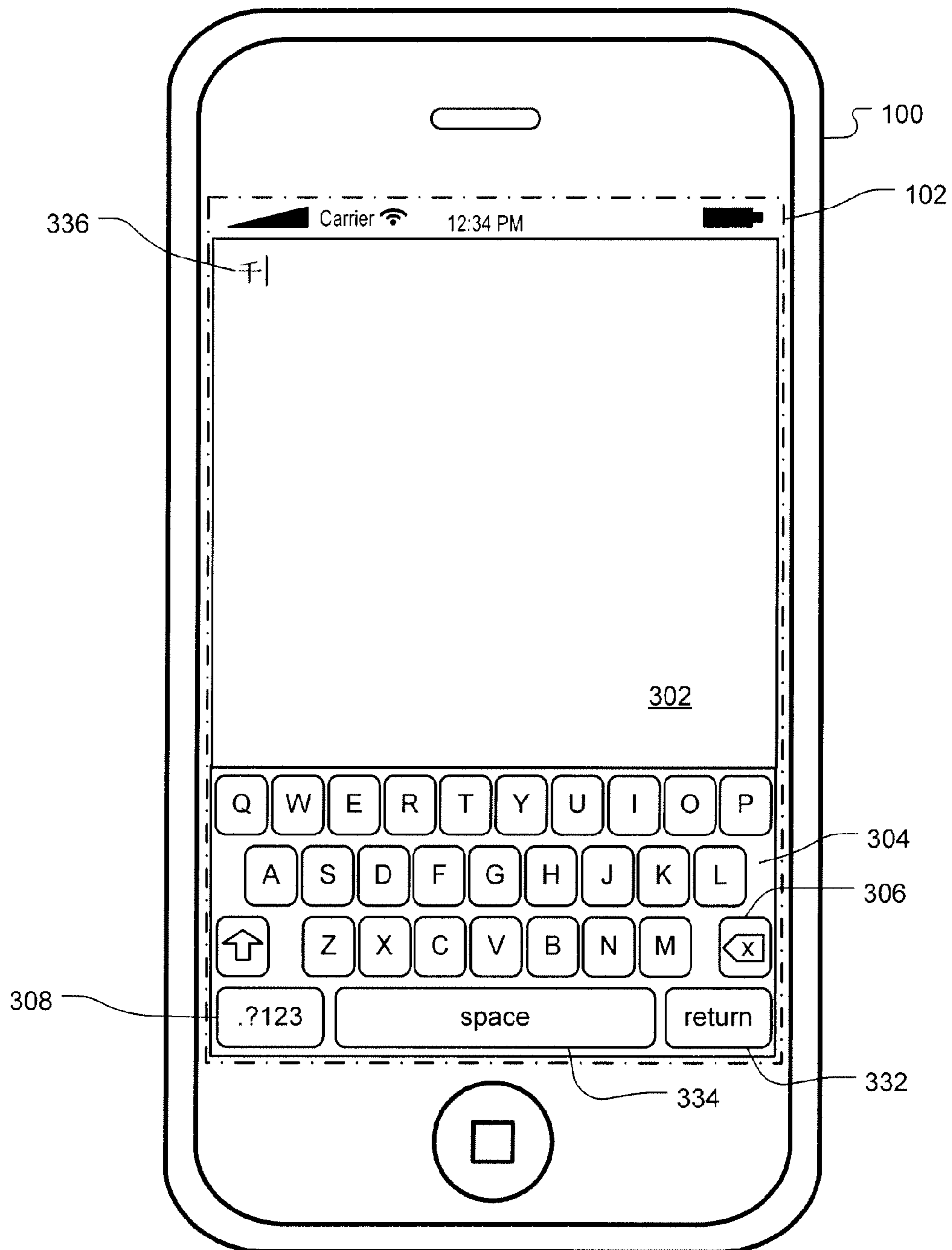


FIG. 3E



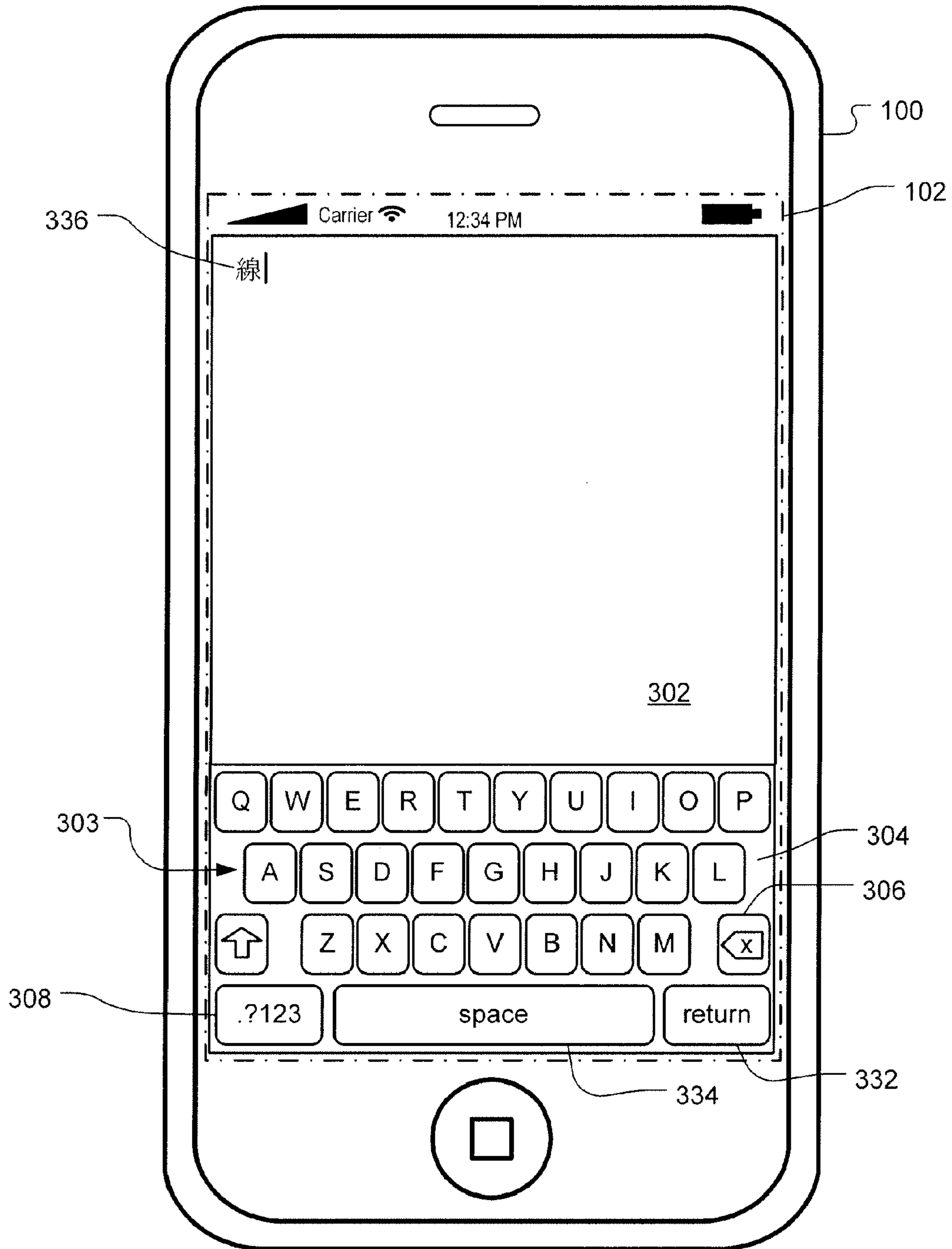


FIG. 3F

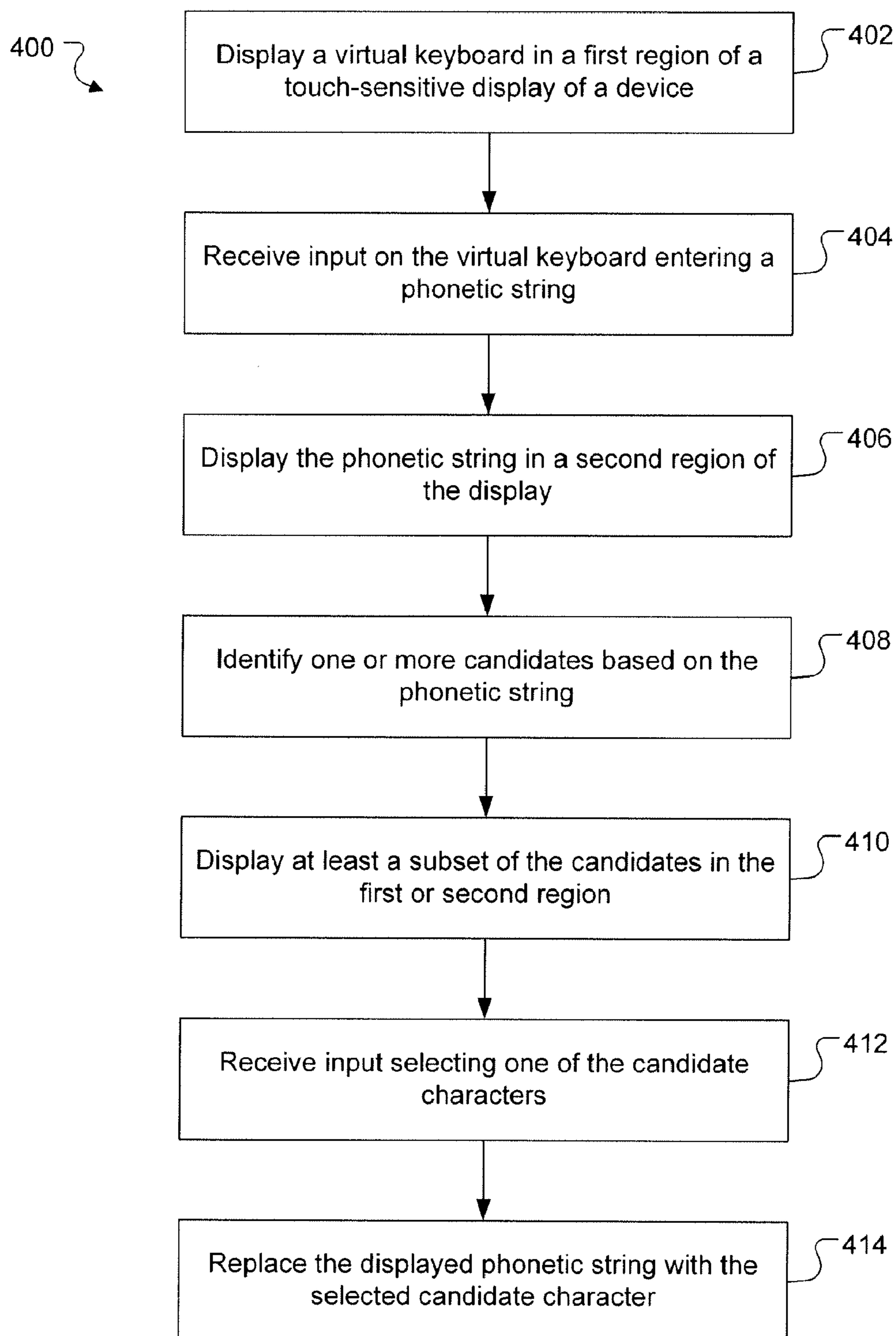


FIG. 4



## LANGUAGE INPUT INTERFACE ON A DEVICE

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

### BACKGROUND

The subject matter of this specification is related generally to text input interfaces.

Traditional computer keyboards may be too large for portable devices, such as mobile phones, multimedia players, or personal digital assistants (PDAs). Some portable devices include a smaller version of the traditional computer keyboard or use a virtual keyboard to receive user input. A virtual keyboard can be of the form of a software application or a feature of a software application to simulate a computer keyboard. For example, in a portable device with a touch-sensitive display, a virtual keyboard can be used by a user to input text by selecting or tabbing areas of the touch-sensitive display corresponding to keys of the virtual keyboard.

These smaller keyboards and virtual keyboards may have keys that correspond to more than one character. For example, some of the keys can, by default, correspond to a character in the English language, for example, the letter "a," and may also correspond to other additional characters, such as another letter or the letter with an accent option, e.g., the character "ä," or other characters with accent options. Because of the physical limitations (e.g., size) of the virtual keyboard, a user may find it difficult to type characters not readily available on the virtual keyboard.

Input methods for devices having multi-language environments can present unique challenges with respect to input and spelling correction which may need to be tailored to the selected language to ensure accuracy and an efficient workflow.

### SUMMARY

In general, one aspect of the subject matter described in this specification can be embodied in methods that include the actions of presenting a virtual keyboard in a first region of a touch sensitive display of a device, receiving an input representing a phonetic string on the virtual keyboard, presenting the entered phonetic string in a second region of the touch sensitive display, identifying one or more candidates based on the phonetic string, presenting at least a subset of the candidates in the first region or the second region, receiving an input selecting one of the candidates, and replacing the entered phonetic string with the selected candidate. Other embodiments of this aspect include corresponding systems, apparatus, computer program products, and computer readable media.

Particular embodiments of the subject matter described in this specification can be implemented to realize one or more of the following advantages. Text in languages that require phonetic string-to-character conversion can be input more efficiently on a portable device. Error correction and word prediction techniques can be applied to entry of East Asian languages.

The details of one or more embodiments of the subject matter described in this specification are set forth in the

accompanying drawings and the description below. Other features, aspects, and advantages of the subject matter will become apparent from the description, the drawings, and the claims.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of an example mobile device.

FIG. 2 is a block diagram of an example implementation of the mobile device of FIG. 1.

FIGS. 3A-3F illustrate an example user interface for entering text.

FIG. 4 illustrates an example text input process.

Like reference numbers and designations in the various drawings indicate like elements.

### DETAILED DESCRIPTION

#### Example Mobile Device

FIG. 1 is a block diagram of an example mobile device **100**. The mobile device **100** can be, for example, a handheld computer, a personal digital assistant, a cellular telephone, a network appliance, a camera, a smart phone, an enhanced general packet radio service (EGPRS) mobile phone, a network base station, a media player, a navigation device, an email device, a game console, or a combination of any two or more of these data processing devices or other data processing devices.

#### Mobile Device Overview

In some implementations, the mobile device **100** includes a touch-sensitive display **102**. The touch-sensitive display **102** can implement liquid crystal display (LCD) technology, light emitting polymer display (LPD) technology, or some other display technology. The touch sensitive display **102** can be sensitive to haptic and/or tactile contact with a user.

In some implementations, the touch-sensitive display **102** can comprise a multi-touch-sensitive display **102**. A multi-touch-sensitive display **102** can, for example, process multiple simultaneous touch points, including processing data related to the pressure, degree, and/or position of each touch point. Such processing facilitates gestures and interactions with multiple fingers, chording, and other interactions. Other touch-sensitive display technologies can also be used, e.g., a display in which contact is made using a stylus or other pointing device. Some examples of multi-touch-sensitive display technology are described in U.S. Pat. Nos. 6,323, 846, 6,570,557, 6,677,932, and 6,888,536, each of which is incorporated by reference herein in its entirety.

In some implementations, the mobile device **100** can display one or more graphical user interfaces on the touch-sensitive display **102** for providing the user access to various system objects and for conveying information to the user. In some implementations, the graphical user interface can include one or more display objects **104**, **106**. In the example shown, the display objects **104**, **106**, are graphic representations of system objects. Some examples of system objects include device functions, applications, windows, files, alerts, events, or other identifiable system objects.

#### Example Mobile Device Functionality

In some implementations, the mobile device **100** can implement multiple device functionalities, such as a telephony device, as indicated by a phone object **110**; an e-mail



device, as indicated by the e-mail object **112**; a network data communication device, as indicated by the Web object **114**; a Wi-Fi base station device (not shown); and a media processing device, as indicated by the media player object **116**. In some implementations, particular display objects **104**, e.g., the phone object **110**, the e-mail object **112**, the Web object **114**, and the media player object **116**, can be displayed in a menu bar **118**. In some implementations, device functionalities can be accessed from a top-level graphical user interface, such as the graphical user interface illustrated in FIG. 1. Touching one of the objects **110**, **112**, **114**, or **116** can, for example, invoke corresponding functionality.

In some implementations, the mobile device **100** can implement network distribution functionality. For example, the functionality can enable the user to take the mobile device **100** and provide access to its associated network while traveling. In particular, the mobile device **100** can extend Internet access (e.g., Wi-Fi) to other wireless devices in the vicinity. For example, mobile device **100** can be configured as a base station for one or more devices. As such, mobile device **100** can grant or deny network access to other wireless devices.

In some implementations, upon invocation of device functionality, the graphical user interface of the mobile device **100** changes, or is augmented or replaced with another user interface or user interface elements, to facilitate user access to particular functions associated with the corresponding device functionality. For example, in response to a user touching the phone object **110**, the graphical user interface of the touch-sensitive display **102** may present display objects related to various phone functions; likewise, touching of the email object **112** may cause the graphical user interface to present display objects related to various e-mail functions; touching the Web object **114** may cause the graphical user interface to present display objects related to various Web-surfing functions; and touching the media player object **116** may cause the graphical user interface to present display objects related to various media processing functions.

In some implementations, the top-level graphical user interface environment or state of FIG. 1 can be restored by pressing a button **120** located near the bottom of the mobile device **100**. In some implementations, each corresponding device functionality may have corresponding “home” display objects displayed on the touch-sensitive display **102**, and the graphical user interface environment of FIG. 1 can be restored by pressing the “home” display object.

In some implementations, the top-level graphical user interface can include additional display objects **106**, such as a short messaging service (SMS) object **130**, a calendar object **132**, a photos object **134**, a camera object **136**, a calculator object **138**, a stocks object **140**, a weather object **142**, a maps object **144**, a notes object **146**, a clock object **148**, an address book object **150**, and a settings object **152**. Touching the SMS display object **130** can, for example, invoke an SMS messaging environment and supporting functionality; likewise, each selection of a display object **132**, **134**, **136**, **138**, **140**, **142**, **144**, **146**, **148**, **150**, and **152** can invoke a corresponding object environment and functionality.

Additional and/or different display objects can also be displayed in the graphical user interface of FIG. 1. For example, if the device **100** is functioning as a base station for other devices, one or more “connection” objects may appear in the graphical user interface to indicate the connection. In some implementations, the display objects **106** can be con-

figured by a user, e.g., a user may specify which display objects **106** are displayed, and/or may download additional applications or other software that provides other functionalities and corresponding display objects.

In some implementations, the mobile device **100** can include one or more input/output (I/O) devices and/or sensor devices. For example, a speaker **160** and a microphone **162** can be included to facilitate voice-enabled functionalities, such as phone and voice mail functions. In some implementations, an up/down button **184** for volume control of the speaker **160** and the microphone **162** can be included. The mobile device **100** can also include an on/off button **182** for a ring indicator of incoming phone calls. In some implementations, a loud speaker **164** can be included to facilitate hands-free voice functionalities, such as speaker phone functions. An audio jack **166** can also be included for use of headphones and/or a microphone.

In some implementations, a proximity sensor **168** can be included to facilitate the detection of the user positioning the mobile device **100** proximate to the user’s ear and, in response, to disengage the touch-sensitive display **102** to prevent accidental function invocations. In some implementations, the touch-sensitive display **102** can be turned off to conserve additional power when the mobile device **100** is proximate to the user’s ear.

Other sensors can also be used. For example, in some implementations, an ambient light sensor **170** can be utilized to facilitate adjusting the brightness of the touch-sensitive display **102**. In some implementations, an accelerometer **172** can be utilized to detect movement of the mobile device **100**, as indicated by the directional arrow **174**. Accordingly, display objects and/or media can be presented according to a detected orientation, e.g., portrait or landscape. In some implementations, the mobile device **100** may include circuitry and sensors for supporting a location determining capability, such as that provided by the global positioning system (GPS) or other positioning systems (e.g., systems using Wi-Fi access points, television signals, cellular grids, Uniform Resource Locators (URLs)). In some implementations, a positioning system (e.g., a GPS receiver) can be integrated into the mobile device **100** or provided as a separate device that can be coupled to the mobile device **100** through an interface (e.g., port device **190**) to provide access to location-based services.

In some implementations, a port device **190**, e.g., a Universal Serial Bus (USB) port, or a docking port, or some other wired port connection, can be included. The port device **190** can, for example, be utilized to establish a wired connection to other computing devices, such as other communication devices **100**, network access devices, a personal computer, a printer, a display screen, or other processing devices capable of receiving and/or transmitting data. In some implementations, the port device **190** allows the mobile device **100** to synchronize with a host device using one or more protocols, such as, for example, the TCP/IP, HTTP, UDP and any other known protocol.

The mobile device **100** can also include a camera lens and sensor **180**. In some implementations, the camera lens and sensor **180** can be located on the back surface of the mobile device **100**. The camera can capture still images and/or video.

The mobile device **100** can also include one or more wireless communication subsystems, such as an 802.11b/g communication device **186**, and/or a Bluetooth™ communication device **188**. Other communication protocols can also be supported, including other 802.x communication protocols (e.g., WiMax, Wi-Fi, 3 G), code division multiple



access (CDMA), global system for mobile communications (GSM), Enhanced Data GSM Environment (EDGE), etc.

#### Example Mobile Device Architecture

FIG. 2 is a block diagram 200 of an example implementation of the mobile device 100 of FIG. 1. The mobile device 100 can include a memory interface 202, one or more data processors, image processors and/or central processing units 204, and a peripherals interface 206. The memory interface 202, the one or more processors 204 and/or the peripherals interface 206 can be separate components or can be integrated in one or more integrated circuits. The various components in the mobile device 100 can be coupled by one or more communication buses or signal lines.

Sensors, devices, and subsystems can be coupled to the peripherals interface 206 to facilitate multiple functionalities. For example, a motion sensor 210, a light sensor 212, and a proximity sensor 214 can be coupled to the peripherals interface 206 to facilitate the orientation, lighting, and proximity functions described with respect to FIG. 1. Other sensors 216 can also be connected to the peripherals interface 206, such as a positioning system (e.g., GPS receiver), a temperature sensor, a biometric sensor, or other sensing device, to facilitate related functionalities.

A camera subsystem 220 and an optical sensor 222, e.g., a charged coupled device (CCD) or a complementary metal-oxide semiconductor (CMOS) optical sensor, can be utilized to facilitate camera functions, such as recording photographs and video clips.

Communication functions can be facilitated through one or more wireless communication subsystems 224, which can include radio frequency receivers and transmitters and/or optical (e.g., infrared) receivers and transmitters. The specific design and implementation of the communication subsystem 224 can depend on the communication network(s) over which the mobile device 100 is intended to operate. For example, a mobile device 100 may include communication subsystems 224 designed to operate over a GSM network, a GPRS network, an EDGE network, a Wi-Fi or WiMax network, and a Bluetooth™ network. In particular, the wireless communication subsystems 224 may include hosting protocols such that the device 100 may be configured as a base station for other wireless devices.

An audio subsystem 226 can be coupled to a speaker 228 and a microphone 230 to facilitate voice-enabled functions, such as voice recognition, voice replication, digital recording, and telephony functions.

The I/O subsystem 240 can include a touch screen controller 242 and/or other input controller(s) 244. The touch screen controller 242 can be coupled to a touch screen 246. The touch screen 246 and touch screen controller 242 can, for example, detect contact and movement or break thereof using any of a plurality of touch sensitivity technologies, including but not limited to capacitive, resistive, infrared, and surface acoustic wave technologies, as well as other proximity sensor arrays or other elements for determining one or more points of contact with the touch screen 246.

The other input controller(s) 244 can be coupled to other input/control devices 248, such as one or more buttons, rocker switches, thumb-wheel, infrared port, USB port, and/or a pointer device such as a stylus. The one or more buttons (not shown) can include an up/down button for volume control of the speaker 228 and/or the microphone 230.

In one implementation, a pressing of the button for a first duration may disengage a lock of the touch screen 246; and

a pressing of the button for a second duration that is longer than the first duration may turn power to the mobile device 100 on or off. The user may be able to customize a functionality of one or more of the buttons. The touch screen 246 can, for example, also be used to implement virtual or soft buttons and/or a keyboard.

In some implementations, the mobile device 100 can present recorded audio and/or video files, such as MP3, AAC, and MPEG files. In some implementations, the mobile device 100 can include the functionality of an MP3 player, such as an iPod™. The mobile device 100 may, therefore, include a 30-pin connector that is compatible with the iPod™. Other input/output and control devices can also be used.

The memory interface 202 can be coupled to memory 250. The memory 250 can include high-speed random access memory and/or non-volatile memory, such as one or more magnetic disk storage devices, one or more optical storage devices, and/or flash memory (e.g., NAND, NOR). The memory 250 can store an operating system 252, such as Darwin, RTXC, LINUX, UNIX, OS X, WINDOWS, or an embedded operating system such as VxWorks. The operating system 252 may include instructions for handling basic system services and for performing hardware dependent tasks. In some implementations, the operating system 252 can be a kernel (e.g., UNIX kernel).

The memory 250 may also store communication instructions 254 to facilitate communicating with one or more additional devices, one or more computers and/or one or more servers. The memory 250 may include graphical user interface instructions 256 to facilitate graphic user interface processing; sensor processing instructions 258 to facilitate sensor-related processing and functions; phone instructions 260 to facilitate phone-related processes and functions; electronic messaging instructions 262 to facilitate electronic-messaging related processes and functions; web browsing instructions 264 to facilitate web browsing-related processes and functions; media processing instructions 266 to facilitate media processing-related processes and functions; GPS/Navigation instructions 268 to facilitate GPS and navigation-related processes and instructions; camera instructions 270 to facilitate camera-related processes and functions; and/or other software instructions 272 to facilitate other processes and functions, e.g., security processes and functions. The memory 250 may also store other software instructions (not shown), such as web video instructions to facilitate web video-related processes and functions; and/or web shopping instructions to facilitate web shopping-related processes and functions. In some implementations, the media processing instructions 266 are divided into audio processing instructions and video processing instructions to facilitate audio processing-related processes and functions and video processing-related processes and functions, respectively. An activation record and International Mobile Equipment Identity (IMEI) 274 or similar hardware identifier can also be stored in memory 250.

Language data 276 can also be stored in memory 250. Language data 276 can include, for example, word dictionaries (i.e., list of possible words in a language) for one or more languages, dictionaries of characters and corresponding phonetics, one or more corpuses of characters and character compounds, and so on.

Each of the above identified instructions and applications can correspond to a set of instructions for performing one or more functions described above. These instructions need not be implemented as separate software programs, procedures, or modules. The memory 250 can include additional instruc-



tions or fewer instructions. Furthermore, various functions of the mobile device **100** may be implemented in hardware and/or in software, including in one or more signal processing and/or application specific integrated circuits.

#### Language Input Interface

FIGS. 3A-3F illustrate an example user interface for entering multi-lingual text on mobile device **100**. Mobile device **100** can display a text input area **302** and a virtual keyboard **304** on the touch-sensitive display **102**. The text input area **302** can be any area where input text can be displayed, e.g., a note-taking application, an email application, and so on. In some implementations, the text input area **302** can be one or more text fields located in a document (e.g., a web page rendered in a web browser application). The virtual keyboard **304** includes one or more virtual keys **303** that each correspond to a letter in an alphabet (e.g., Latin alphabet). The virtual keyboard **304** can include a keyboard toggle key **308** for toggling between letter keys and keys for numbers, punctuation, etc. (i.e., either letter keys or numbers/punctuation keys can be displayed in the virtual keyboard **304**). A user can enter text by touching the touch-sensitive display **102** on the areas of the desired keys of the virtual keyboard **304**; the user selects or hits the desired keys of the virtual keyboard **304**. Letters, numbers, etc. corresponding to the touched keys are displayed in the text input area **302** as unconverted current input **310-A**. The user can hit the backspace key **306** to delete the last input character.

In some implementations, the mobile device **100** includes capability to input text in a non-English language using Latin alphabet virtual keyboard. For example, the mobile device **100** can include capability for inputting Chinese and/or Japanese text, including Chinese or Japanese characters and symbols, using a Latin alphabet virtual keyboard (e.g., virtual keyboard with letters arranged in a QWERTY layout). For example, the device **100** can include a Chinese or Japanese text entry mode that utilizes a Latin alphabet keyboard. A user can use the virtual keyboard to enter a phonetic string of letters representing sounds or syllables in the non-English language. For example, a user can use the virtual keyboard to type in a romanization of one or more characters or symbols in Chinese or Japanese.

For convenience, the implementations in this specification will be described in reference to entry of Japanese language text. It should be appreciated, however, that the described implementations can be applied to other non-English languages (e.g., Chinese). More generally, the described implementations can be applied to any text input interface that involves identification, presentation, and selection of candidates for inputs, regardless of language (e.g., Latin alphabet romanization to non-Latin-alphabet text, spelling and grammar correction, thesaurus features, etc.).

When a user inputs in a first letter of a phonetic string, the letter is displayed in the text input area **302** as an unconverted current input **310-A**, as shown in FIG. 3A. In some implementations, the input **310-A** is displayed with underlining or some other formatting (e.g., bold text, italics, highlighting). The underlining/formatting indicates that the input is a provisional input subject to conversion pending additional input from the user, whether that additional input is additional letters or a selection of a candidate by the user. For example, in FIG. 3A, the user hits the “s” key, and the letter “s” is displayed in the text input area **302** as current input **310-A** with underlining.

The virtual keyboard **304** can include a “confirm” key **314** that, when hit by the user, accepts the displayed input **310-A**

as is. The accepted input is displayed without the underlining. For example, in FIG. 3A, the user can hit the “confirm” key **314** to accept the input string “s” as is; “s” is displayed without underlining. In some implementations, hitting of the “confirm” key **214** also adds a space after the accepted input. In some other implementations, the addition of the space after the accepted input depends on whether the accepted input is in a language where spaces separate words and/or whether the accepted input is the end of a sentence, to name a few example criteria. In some implementations, key **314** is a “space” key that, when pressed, accepts the current input as is, effectively serving as a “confirm” key.

The virtual keyboard **304** can also include a “show candidates” key **312**. By hitting the “show candidates” key **312**, the user can bring up a tray of candidate characters, symbols, and combinations thereof (e.g., kanji, kana combinations) with which to replace the input **310-A**. The tray of candidates is further described below.

Continuing from the example input **310-A** shown in FIG. 3A, the user next hits the letter “e” on the keyboard, resulting in the string “se.” The string “se” can be converted by the device **100** to the hiragana symbol “せ”, of which the string “se” is the romanization, and the hiragana symbol “せ”, is displayed as converted current input **310-B** with underlining, as shown in FIG. 3B. The user can hit the “confirm” key **314** to accept the hiragana symbol “せ”, as is; “せ”, is then displayed without underlining. Alternatively, the user can hit the “show candidates” key **312** to bring up the tray of candidates related to the string “se” (e.g., characters whose phonetic readings begin with “se”).

Continuing from the example input **310-B** as shown in FIG. 3B, the user next hits the “n” key, resulting in the string “sen.” The terminal “n” letter is converted to the hiragana symbol “ん”, of which the terminal “n” is the romanization, and appended to the already-converted hiragana symbol “せ”. The hiragana symbol “せん” is displayed as converted current input **310-B** with underlining, as shown in FIG. 3C.

In some implementations, the device **102** can display one or more suggested candidates **318** inline for the input **310-B**. The suggested candidates can include single characters, phonetic symbols (e.g., Japanese kana), and combinations of multiple characters and/or phonetic symbols. For example, in FIG. 3C, the kanji character “線” is displayed as a suggested candidate for “せん せん” (“sen”) is the onyomi reading for the kanji character “線”. In some implementations, the user can hit a suggested candidate (i.e., touch the touch-sensitive display **102** over the area of the desired suggested candidate) to select a suggested candidate, continue typing letter keys on the virtual keyboard **304** to add to the input **310-B**, or hit the “show candidates” key **312** to bring up the candidates tray, among other actions. If the user selects a suggested candidate, the selected suggested candidate is displayed as accepted input **336**, as shown in FIG. 3F. If the user continues typing on the letter keys on the virtual keyboard **304**, the current input **310-B** is extended and possible candidates for the current input **310-B** are narrowed down.

In some implementations, the one or more suggested candidates **318** that are presented to the user are determined by the device **100** to be the best match for the input **310-B** based on one or more criteria (e.g., frequency in the language, exact match, etc.).

In some implementations, more candidates can be displayed by the device **100** when the user hits an arrow graphical object **319** or the like on the touch-sensitive display **102**. For example, when the user hits the arrow **319**,



a candidates tray 322 can be displayed. Alternatively, the inline suggested candidates list 318 can expand to show more candidates. The arrow 319 gives the user a hint that there are additional candidates available.

In some implementations, the user can hit the confirm key 314 once to select the first candidate of the suggested candidates 318, hit the confirm key 314 twice in quick succession to select the second candidate of the suggested candidates 318, and so on.

If the user hits the “show candidates” key 312 or the arrow 319, a candidates tray 322 can be displayed, as shown in FIG. 3D. In some implementations, the candidates tray 322 is displayed in place of the virtual keyboard 304. In some other implementations, the candidates tray 322 is displayed over all or part of the text input area 302. In some implementations, the candidates tray 322 slides over the virtual keyboard 304 or the text input area 302, and the sliding is displayed as an animated effect. When the candidates tray 322 is removed from view, the candidates tray 322 can slide off the touch-sensitive display 102.

The candidates tray 322 can include one or more candidate keys 330, each of the candidate keys 330 corresponding to a candidate for conversion of the input 310-B. A candidate (whether for the candidate keys 330 or suggested candidates 318) can be a character, a phonetic or syllabic symbol (e.g., a kana symbol), romanization, multi-character combinations forming words or phrases, multi-symbol combinations forming words or phrases, a combination of characters and symbols forming words or phrases, and so on. The candidates can include characters whose phonetic reading is or begins with the input 310-B as a reading, words that begin with the input 310-B, and so on. For example, in FIG. 3D, the candidates tray 322 includes some candidate keys 330 that correspond to kanji characters that has “せん” as a reading. In some implementations, the candidates in the candidates tray are ordered based on various criteria as to which candidate is the best candidate.

In some implementations, the candidates for the suggested candidates 318 and the candidates tray 322 are identified and ordered using predictive text and/or error correction techniques, examples of which include fuzzy matching, techniques for determining cursor position based on a finger contact, and so on. An example of a predictive text technique is disclosed in Masui, “An Efficient Text Input Method for Pen-based Computers,” in Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '98), Addison-Wesley, April 1998, pp. 328-335, the disclosure of which is incorporated by reference herein in its entirety. An example of a techniques for determining cursor position based on a finger contact is disclosed in U.S. patent application Ser. No. 11/850,015, titled “Methods for Determining a Cursor Position from a Finger Contact with a Touch Screen Display,” filed Sep. 4, 2007, the disclosure of which is incorporated by reference herein in its entirety.

In some implementations, if the candidates tray 322 is displayed over the virtual keyboard 304, the candidates tray 322 can also include a keyboard switch key 328 for switching back to the virtual keyboard 304. The candidates tray 322 can also include back candidates key 326 and/or next candidates key 324 for moving back and forth between sets of candidate keys 330 within the candidates tray 322. In some implementations, the candidates tray 322 also includes the confirm key 314.

The user can hit a candidate key 330 to replace the input 310-B with the candidate corresponding to the hit candidate key 330. For example, from FIG. 3D, if the user hits the key that corresponds to the candidate character “千” (key 332),

the input 310-B is replaced with the character “せん” The character “せん” is displayed as accepted input 336, as shown in FIG. 3E. In FIG. 3E, the candidates tray 322 reverts back to virtual keyboard 304. The virtual keyboard 304 can include a “space” key 334 and a “return” key 332 in place of “confirm” key 314 and show candidate key 312, respectively. From FIG. 3F, the user can enter a new phonetic string input.

In some implementations, the virtual keyboard 304 can include a key for switching between multiple input keyboards for various languages.

In some implementations, the candidates tray 322 includes a cancel key 331 for reverting back to the virtual keyboard 304 from the candidates tray 322 without selecting a candidate.

In some implementations, a candidate in the suggested candidates 318 or candidates tray 322 is highlighted as the “currently selected” candidate. When the suggested candidates 318 or candidates tray 322 is first displayed after an input of a phonetic string, the initial highlighted candidate can be the phonetic string itself in the suggested candidates 318 or candidates tray 322 or the “best” candidate. Key 312 can be a “next candidate” key, where a press of the key moves the highlighting to the next candidate. In some implementations, there can be a “previous candidate” key to move the highlighting backward to a previous candidate. The confirm key 314 can be used to accept the highlighted candidate.

In some other implementations, when the user inputs a phonetic sting, no candidate is automatically selected or highlighted by default; the user can hit the confirm key 314 to accept the phonetic string as is. The user can hit the next candidate key (and optionally a previous candidate key) to move through the candidates and highlight one of them. As different candidates are highlighted, the current input 310-B changes to show the currently highlighted candidate, while still displayed with underlining or other formatting to indicate that the current input 310-B is still provisional. Hitting a return key (e.g., return key 332) confirms the currently selected candidate or the phonetic string (i.e., whatever phonetic string or candidate is shown in the current input 310-B). Adding more phonetic symbols by typing on the virtual keyboard 304 also automatically accepts the currently selected candidate or the phonetic string (i.e., whatever phonetic string or candidate is shown in the current input 310-B).

FIG. 4 illustrates an example text input process 400. For convenience, the process 400 will be described in reference to a device (e.g., device 100) that performs the process 400.

A virtual keyboard is displayed in a first region of a touch-sensitive display of a device (402). For example, the device displays virtual keyboard 304 on a portion of the touch-sensitive display 102.

An input is received entering a phonetic string on the virtual keyboard (404). A user can enter one or more letters using the virtual keyboard. The entered letters can constitute a phonetic string. The phonetic string can be a romanization of characters, words, and the like in a language that does not use the Latin alphabet, for example.

The input phonetic string is displayed in a second region of the display (406). The device 100 can display the phonetic string in a text input area on the touch-sensitive Display 102. In some implementations, the device 100 converts the phonetic string to, for example, symbols corresponding to the phonetic string (e.g., Japanese kana, Chinese zhuyin, etc.).

One or more candidates matching the phonetic string are identified (408). For example, the device 100 can look up the



phonetic string in a dictionary, character database, or the like, and finds matching characters for the phonetic string. In some implementations, the device **100** can segment the phonetic string based on syllables or another criteria and find candidates for each of the segments.

At least a subset of the identified candidates is displayed in the first region of the touch sensitive display (**410**). For example, the candidates can be displayed in a candidates tray **322** that is displayed in place of the virtual keyboard **304**. In some implementations, if there are more candidates than can fit in the tray **322**, the user can navigate to the overflow candidates by hitting the back candidates **326** or next candidates key **324**.

Input is received selecting one of the candidates (**412**). For example, a user can hit one of the candidate keys **330** in a candidates tray **322** to select the corresponding candidate.

The displayed phonetic string is replaced with the selected candidate (**414**). In some implementations, the selected candidate is displayed on the touch-sensitive display in place of the input phonetic string.

In some implementations, the virtual keyboard **304** and the candidates tray **322** can be dynamically resized based on the orientation of the touch-sensitive display **102**. For example, FIGS. **3A-3F** show the virtual keyboard **304** or the candidates tray **322** in portrait orientation. If the device **100**, and thus the touch-sensitive display **102**, is rotated to landscape orientation, the device **100** can detect the rotation and resize the keyboard **304** and the candidates tray **322** to fit the landscape width of the touch-sensitive display **102**.

In some implementations, the suggested candidates **318** are displayed in the same orientation as the text input, whose orientation can vary by language. For example, if the text is displayed from left-to-right, the suggested candidates **318** are displayed from left to right. If the text is displayed from right to left, the suggested candidates **318** are displayed from right to left. If the text displayed from top to bottom, the suggested candidates **318** are displayed from top to bottom.

In some implementations, the phonetic string can be input by voice rather than typing on the virtual keyboard **304**. For example, the device **100** can include a voice recognition module that receives and processes a user's voice input and generates a phonetic string based on the voice input. The device **100** can identify candidates for the phonetic string generated by the voice recognition module for selection by the user.

The disclosed and other embodiments and the functional operations described in this specification can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware, including the structures disclosed in this specification and their structural equivalents, or in combinations of one or more of them. The disclosed and other embodiments can be implemented as one or more computer program products, i.e., one or more modules of computer program instructions encoded on a computer-readable medium for execution by, or to control the operation of, data processing apparatus. The computer-readable medium can be a machine-readable storage device, a machine-readable storage substrate, a memory device, a composition of matter effecting a machine-readable propagated signal, or a combination of one or more them. The term "data processing apparatus" encompasses all apparatus, devices, and machines for processing data, including by way of example a programmable processor, a computer, or multiple processors or computers. The apparatus can include, in addition to hardware, code that creates an execution environment for the computer program in question, e.g., code that constitutes processor firmware, a protocol stack, a

database management system, an operating system, or a combination of one or more of them. A propagated signal is an artificially generated signal, e.g., a machine-generated electrical, optical, or electromagnetic signal, that is generated to encode information for transmission to suitable receiver apparatus.

A computer program (also known as a program, software, software application, script, or code) can be written in any form of programming language, including compiled or interpreted languages, and it can be deployed in any form, including as a stand-alone program or as a module, component, subroutine, or other unit suitable for use in a computing environment. A computer program does not necessarily correspond to a file in a file system. A program can be stored in a portion of a file that holds other programs or data (e.g., one or more scripts stored in a markup language document), in a single file dedicated to the program in question, or in multiple coordinated files (e.g., files that store one or more modules, sub-programs, or portions of code). A computer program can be deployed to be executed on one computer or on multiple computers that are located at one site or distributed across multiple sites and interconnected by a communication network.

The processes and logic flows described in this specification can be performed by one or more programmable processors executing one or more computer programs to perform functions by operating on input data and generating output. The processes and logic flows can also be performed by, and apparatus can also be implemented as, special purpose logic circuitry, e.g., an FPGA (field programmable gate array) or an ASIC (application-specific integrated circuit).

Processors suitable for the execution of a computer program include, by way of example, both general and special purpose microprocessors, and any one or more processors of any kind of digital computer. Generally, a processor will receive instructions and data from a read-only memory or a random access memory or both. The essential elements of a computer are a processor for performing instructions and one or more memory devices for storing instructions and data. Generally, a computer will also include, or be operatively coupled to receive data from or transfer data to, or both, one or more mass storage devices for storing data, e.g., magnetic, magneto-optical disks, or optical disks. However, a computer need not have such devices. Computer-readable media suitable for storing computer program instructions and data include all forms of non-volatile memory, media and memory devices, including by way of example semiconductor memory devices, e.g., EPROM, EEPROM, and flash memory devices; magnetic disks, e.g., internal hard disks or removable disks; magneto-optical disks; and CD-ROM and DVD-ROM disks. The processor and the memory can be supplemented by, or incorporated in, special purpose logic circuitry.

To provide for interaction with a user, the disclosed embodiments can be implemented on a computer having a display device, e.g., a CRT (cathode ray tube) or LCD (liquid crystal display) monitor, for displaying information to the user and a keyboard and a pointing device, e.g., a mouse or a trackball, by which the user can provide input to the computer. Other kinds of devices can be used to provide for interaction with a user as well; for example, feedback provided to the user can be any form of sensory feedback, e.g., visual feedback, auditory feedback, or tactile feedback; and input from the user can be received in any form, including acoustic, speech, or tactile input.



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The disclosed embodiments can be implemented in a computing system that includes a back-end component, e.g., as a data server, or that includes a middleware component, e.g., an application server, or that includes a front-end component, e.g., a client computer having a graphical user interface or a Web browser through which a user can interact with an implementation of what is disclosed here, or any combination of one or more such back-end, middleware, or front-end components. The components of the system can be interconnected by any form or medium of digital data communication, e.g., a communication network. Examples of communication networks include a local area network (“LAN”) and a wide area network (“WAN”), e.g., the Internet.

While this specification contains many specifics, these should not be construed as limitations on the scope of what being claims or of what may be claimed, but rather as descriptions of features specific to particular embodiments. Certain features that are described in this specification in the context of separate embodiments can also be implemented in combination in a single embodiment. Conversely, various features that are described in the context of a single embodiment can also be implemented in multiple embodiments separately or in any suitable subcombination. Moreover, although features may be described above as acting in certain combinations and even initially claimed as such, one or more features from a claimed combination can in some cases be excised from the combination, and the claimed combination may be directed to a subcombination or variation of a subcombination.

Similarly, while operations are depicted in the drawings in a particular order, this should not be understood as requiring that such operations be performed in the particular order shown or in sequential order, or that all illustrated operations be performed, to achieve desirable results. In certain circumstances, multitasking and parallel processing may be advantageous. Moreover, the separation of various system components in the embodiments described above should not be understood as requiring such separation in all embodiments, and it should be understood that the described program components and systems can generally be integrated together in a single software product or packaged into multiple software products.

Particular embodiments of the subject matter described in this specification have been described. Other embodiments are within the scope of the following claims. For example, the actions recited in the claims can be performed in a different order and still achieve desirable results. As one example, the processes depicted in the accompanying figures do not necessarily require the particular order shown, or sequential order, to achieve desirable results. In certain implementations, multitasking and parallel processing may be advantageous.

What is claimed is:

1. A method comprising:

presenting a virtual keyboard corresponding to a first alphabet in a first region of a touch-sensitive display of a device;

receiving an input on the virtual keyboard representing a phonetic string;

presenting the phonetic string in a second region of the touch-sensitive display;

identifying one or more candidate representations based on the phonetic string, wherein the candidate representations correspond to a second alphabet different from the first alphabet;

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*identifying one or more additional candidate representations based on the phonetic string in a third alphabet different from the first and second alphabets;*

presenting a candidate tray including at least a subset of the candidate representations *and a subset of the additional candidate representations;*

receiving an input of a selected candidate representation of the candidate representations *and the additional candidate representations;* and

replacing the entered phonetic string with the selected candidate representation.

2. The method of claim 1, wherein:

the phonetic string comprises Chinese romanization; and the candidates comprise Chinese characters.

3. The method of claim 1, wherein:

the phonetic string comprises Japanese romanization; and the candidates comprise one or more of the group consisting of Japanese kanji characters and Japanese kana symbols.

4. The method of claim 1, wherein the virtual keyboard comprises keys corresponding to letters of the Latin alphabet.

5. The method of claim 1, wherein the candidates comprise multi-character words.

6. The method of claim 1, wherein identifying one or more candidates based on the phonetic string comprises identifying one or more candidates using text prediction from the phonetic string.

7. The method of claim 6, wherein presenting at least a subset of the candidates comprises presenting the subset of the candidates in an order determined based on the text prediction.

8. A portable device comprising:

a touch-sensitive display;

memory;

one or more processors; and

instructions stored in the memory and configured for execution by the one or more processors, the instructions comprising instructions to:

present a virtual keyboard corresponding to a first alphabet in a first region of the touch-sensitive display of a device;

receive an input on the virtual keyboard representing a phonetic string;

present the phonetic string in a second region of the touch-sensitive display;

identify one or more candidate representations based on the phonetic string, wherein the candidate representations correspond to a second alphabet different from the first alphabet;

*identify one or more additional candidate representations based on the phonetic string in a third alphabet different from the first and second alphabets;*

present a candidate tray including at least a subset of the candidate representations *and a subset of the additional candidate representations;*

receive an input of a selected candidate representation of the candidate representations *and the additional candidate representations;* and

replace the entered phonetic string with the selected candidate representation.

9. The device of claim 8, wherein:

the phonetic string comprises Chinese romanization; and the candidates comprise Chinese characters.



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10. The device of claim 8, wherein:  
the phonetic string comprises Japanese romanization; and  
the candidates comprise one or more of the group con-  
sisting of Japanese kanji characters and Japanese kana  
symbols.

11. The device of claim 8, wherein the virtual keyboard  
comprises keys corresponding to letters of the Latin alpha-  
bet.

12. The device of claim 8, wherein the candidates com-  
prise multi-character words.

13. The device of claim 8, further comprising instructions  
to identify one or more candidates using text prediction from  
the phonetic string.

14. The device of claim 13, further comprising instruc-  
tions to present the subset of the candidates in an order  
determined based on the text prediction.

15. A computer program product, encoded on a tangible  
program carrier, operable to cause a portable device to  
perform operations comprising:

presenting a virtual keyboard corresponding to a first  
alphabet in a first region of a touch-sensitive display of  
a device;

receiving an input on the virtual keyboard representing a  
phonetic string;

presenting the phonetic string in a second region of the  
touch-sensitive display;

identifying one or more candidate representations based  
on the phonetic strings wherein the candidate repre-  
sentations correspond to a second alphabet different  
from the first alphabet;

*identifying one or more additional candidate representa-  
tions based on the phonetic string in a third alphabet  
different from the first and second alphabets;*

presenting a candidate tray including at least a subset of  
the candidate representations *and a subset of the addi-  
tional candidate representations;*

receiving an input of a selected candidate representation  
of the candidate representations *and the additional  
candidate representations;* and

replacing the entered phonetic string with the selected  
candidate representation.

16. The program product of claim 15, wherein:  
the phonetic string comprises Chinese romanization; and  
the candidates comprise Chinese characters.

17. The program product of claim 15, wherein:  
the phonetic string comprises Japanese romanization; and  
the candidates comprise one or more of the group con-  
sisting of Japanese kanji characters and Japanese kana  
symbols.

18. The program product of claim 15, wherein the virtual  
keyboard comprises keys corresponding to letters of the  
Latin alphabet.

19. The program product of claim 15, wherein the can-  
didates comprise multi-character words.

20. The program product of claim 15, wherein identifying  
one or more candidates based on the phonetic string com-  
prises identifying one or more candidates using text predic-  
tion from the phonetic string.

21. The program product of claim 20, wherein presenting  
at least a subset of the candidates comprises presenting the  
subset of the candidates in an order determined based on the  
text prediction.

22. A method comprising:

presenting a virtual keyboard corresponding to a first  
alphabet in a first region of a touch-sensitive display of  
a device;

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receiving an input on the virtual keyboard representing a  
phonetic string;

presenting the phonetic string in a second region of the  
touch-sensitive display;

identifying one or more candidate representations based  
on the phonetic string, wherein the candidate represen-  
tations correspond to a second alphabet different from  
the first alphabet;

*identifying one or more additional candidate representa-  
tions based on the phonetic string in a third alphabet  
different from the first and second alphabets;*

presenting at least a subset of the candidate representa-  
tions *and a subset of the additional candidate repre-  
sentations* inline with the phonetic string in the second  
region, where the candidate representations are dis-  
played according to an orientation of text in the second  
region;

receiving an input selecting one of the candidate repre-  
sentations *and the additional candidate representa-  
tions;* and

replacing the entered phonetic string with the selected  
candidate representation.

[23. The method of claim 1, further comprising identify-  
ing one or more additional candidate representations based  
on the phonetic string in a third alphabet different from the  
first and second alphabets, wherein the candidate tray  
includes at least a subset of the additional candidate repre-  
sentations.]

24. The method of claim 1, wherein the candidate tray  
further includes the phonetic string.

25. The method of claim 1, wherein the second alphabet  
comprises logographic characters.

26. The method of claim 1, wherein the candidate tray is  
presented in place of the virtual keyboard.

27. The method of claim 8, wherein the candidate tray is  
presented in place of the virtual keyboard.

28. The method of claim 15, wherein the candidate tray is  
presented in place of the virtual keyboard.

29. *The method of claim 1, wherein presenting the can-  
didate tray comprises presenting the candidate tray in the  
second region of the touch-sensitive display.*

30. *The method of claim 1, wherein replacing the entered  
phonetic string comprises replacing the entered phonetic  
string in the second region of the touch-sensitive display.*

31. *The method of claim 1, wherein presenting the can-  
didate tray comprises presenting the candidate tray adjacent  
to the phonetic string.*

32. *The method of claim 1, wherein presenting the can-  
didate tray comprises presenting the candidate tray adjacent  
to the phonetic string in the second region.*

33. *The method of claim 1, further comprising:  
receiving an input on the virtual keyboard representing a  
second phonetic string;*

*presenting the second phonetic string in the second region  
of the touch-sensitive display; and*

*receiving an input confirming the second phonetic string.*

34. *The method of claim 1, further comprising:  
presenting an option to expand the candidate tray to  
include a larger subset of the candidate representa-  
tions.*

35. *The method of claim 1, further comprising:  
providing a confirm key.*

36. *The method of claim 35, wherein the received input of  
a selected candidate representation comprises a number of  
hits to the confirm key in succession.*



37. The method of claim 36, wherein each of the candidate representations presented in the candidate tray corresponds to a different number of hits of the confirm key.

38. The method of claim 1, further comprising: providing an option of replacing the virtual keyboard in the first region with at least a subset of the candidate representations.

39. The method of claim 1, further comprising: providing an option of presenting a different subset of the candidate representations in the candidate tray.

40. The method of claim 1, wherein presenting the phonetic string in the second region comprises:

displaying the phonetic string using a phonetic representation different from the first alphabet.

41. The method of claim 1, further comprising: displaying a visual indicator that identifies the presented phonetic string as a provisional input.

42. The method of claim 1, wherein presenting the candidate tray comprises:

presenting the subset of candidate representations according to a text orientation associated with the second alphabet.

43. The method of claim 42, wherein the text orientation comprises a left to right orientation.

44. The method of claim 42, wherein the text orientation comprises a right to left orientation.

45. The method of claim 42, wherein the text orientation comprises a top to bottom orientation.

46. The method of claim 1, further comprising: presenting a next candidate key configured to allow a user to select a next candidate of the one or more candidate representations.

47. The method of claim 1, further comprising: presenting a previous candidate key configured to allow a user to select a previous candidate of the one or more candidate representations.

48. The device of claim 8, wherein the instructions to present the candidate tray include instructions to present the candidate tray in the second region of the touch-sensitive display.

49. The device of claim 8, wherein the instructions to replace the entered phonetic string include instructions to replace the entered phonetic string in the second region of the touch-sensitive display.

50. The device of claim 8, wherein the instructions to present the candidate tray include instructions to present the candidate tray adjacent to the phonetic string.

51. The device of claim 8, wherein the instructions to present the candidate tray comprise instructions to present the candidate tray adjacent to the phonetic string in the second region.

52. The device of claim 8, further comprising instructions to:

receive an input on the virtual keyboard representing a second phonetic string;

present the second phonetic string in the second region of the touch-sensitive display; and

receive an input confirming the second phonetic string.

53. The device of claim 8, further comprising instructions to:

present an option to expand the candidate tray to include a larger subset of the candidate representations.

54. The device of claim 8, further comprising instructions to:

provide a confirm key.

55. The device of claim 54, wherein the instructions to receive an input of a selected candidate representation include instructions to recognize a number of hits to the confirm key in succession.

56. The device of claim 55, further comprising instructions to:

associate each of the candidate representations presented in the candidate tray with a different number of hits of the confirm key.

57. The device of claim 8, further comprising instructions to:

provide an option of replacing the virtual keyboard in the first region with at least a subset of the candidate representations.

58. The device of claim 8, further comprising instructions to:

provide an option of presenting a different subset of the candidate representations in the candidate tray.

59. The device of claim 8 wherein the instructions to present the phonetic string in the second region comprise instructions to display the phonetic string using a phonetic representation different from the first alphabet.

60. The device of claim 8, further comprising instructions to:

display a visual indicator that identifies the presented phonetic string as a provisional input.

61. The device of claim 8, wherein the instructions to present the candidate tray comprise instructions to present the subset of candidate representations according to a text orientation associated with the second alphabet.

62. The device of claim 61, wherein the text orientation comprises a left to right orientation.

63. The device of claim 61, wherein the text orientation comprises a right to left orientation.

64. The device of claim 61, wherein the F comprises a top to bottom orientation.

65. The device of claim 8, further comprising instructions to present a next candidate key configured to allow a user to select a next candidate of the one or more candidate representations.

66. The device of claim 8, further comprising instructions to present a previous candidate key configured to allow a user to select a previous candidate of the one or more candidate representations.

67. The program product of claim 15, wherein presenting the candidate tray comprises presenting the candidate tray in the second region of the touch-sensitive display.

68. The program product of claim 15, wherein replacing the entered phonetic string comprises replacing the entered phonetic string in the second region of the touch-sensitive display.

69. The program product of claim 15, wherein presenting the candidate tray comprises presenting the candidate tray adjacent to the phonetic string.

70. The program product of claim 15, wherein presenting the candidate tray comprises presenting the candidate tray adjacent to the phonetic string in the second region.

71. The program product of claim 15, wherein the operations further comprise:

receiving an input on the virtual keyboard representing a second phonetic string;

presenting the second phonetic string in the second region of the touch-sensitive display; and

receiving an input confirming the second phonetic string.



72. The program product of claim 15, wherein the operations further comprise:

presenting an option to expand the candidate tray to include a larger subset of the candidate representations.

73. The program product of claim 15, wherein the operations further comprise:

providing a confirm key.

74. The program product of claim 73, wherein the received input of a selected candidate representation comprises a number of hits to the confirm key in succession.

75. The program product of claim 74, wherein each of the candidate representations presented in the candidate tray corresponds to a different number of hits of the confirm key.

76. The program product of claim 15, wherein the operations further comprise:

providing an option of replacing the virtual keyboard in the first region with at least a subset of the candidate representations.

77. The program product of claim 15, wherein the operations further comprise:

providing an option of presenting a different subset of the candidate representations in the candidate tray.

78. The program product of claim 15, wherein presenting the phonetic string in the second region comprises:

displaying the phonetic string using a phonetic representation different from the first alphabet.

79. The program product of claim 15, further comprising: displaying a visual indicator that identifies the presented phonetic string as a provisional input.

80. The program product of claim 15, wherein presenting the candidate tray comprises presenting the subset of candidate representations according to a text orientation associated with the second alphabet.

81. The program product of claim 80, wherein the text orientation comprises a left to right orientation.

82. The program product of claim 80, wherein the text orientation comprises a right to left orientation.

83. The program product of claim 80, wherein the text orientation comprises a top to bottom orientation.

84. The program product of claim 15, wherein the operations further comprise:

presenting a next candidate key configured to allow a user to select a next candidate of the one or more candidate representations.

85. The program product of claim 15, wherein the operations further comprise:

presenting a previous candidate key configured to allow a user to select a previous candidate of the one or more candidate representations.

86. The method of claim 22, wherein presenting the subset of candidate representations comprises presenting a candidate tray in the second region of the touch-sensitive display.

87. The method of claim 22, wherein replacing the entered phonetic string comprises replacing the entered phonetic string in the second region of the touch-sensitive display.

88. The method of claim 22, wherein presenting the subset of the candidate representations comprises presenting the candidate representations adjacent to the phonetic string.

89. The method of claim 22, wherein presenting the subset of candidate representations comprises presenting the candidate representations adjacent to the phonetic string in the second region.

90. The method of claim 22, further comprising: receiving an input on the virtual keyboard representing second phonetic string;

presenting the second phonetic string in the second region of the touch-sensitive display; and

receiving an input confirming the second phonetic string.

91. The method of claim 22, further comprising: presenting an option to expand the subset of the candidate representations.

92. The method of claim 22, further comprising: providing a confirm key.

93. The method of claim 92, wherein the received input of a selected candidate representation comprises a number of hits to the confirm key in succession.

94. The method of claim 93, wherein each of the candidate representations corresponds to a different number of hits of the confirm key.

95. The method of claim 22, further comprising: providing an option of replacing the virtual keyboard in the first region with at least a subset of the candidate representations.

96. The method of claim 22, further comprising: providing an option of presenting a different subset of the candidate representations.

97. The method of claim 22, wherein presenting the phonetic string in the second region comprises: displaying the phonetic string using a phonetic representation different from the first alphabet.

98. The method of claim 22, further comprising: displaying a visual indicator that identifies the presented phonetic string as a provisional input.

99. The method of claim 22, wherein the orientation of text comprises a left to right orientation.

100. The method of claim 22, wherein the orientation of text comprises a right to left orientation.

101. The method of claim 22, wherein the orientation of text comprises a top to bottom orientation.

102. The method of claim 22, further comprising: presenting a next candidate key configured to allow a user to select a next candidate of the one or more candidate representations.

103. The method of claim 22, further comprising: presenting a previous candidate key configured to allow a user to select a previous candidate of the one or more candidate representations.

104. A method comprising: presenting a virtual keyboard corresponding to a first alphabet in a first region of a touch-sensitive display of a device;

receiving an input on the virtual keyboard representing a phonetic string;

presenting the phonetic string in a second region of the touch-sensitive display;

identifying one or more candidate representations based on the phonetic string, wherein the candidate representations correspond to a second alphabet different from the first alphabet;

identifying one or more additional candidate representations based on the phonetic string in a third alphabet different from the first and second alphabets;

presenting a candidate tray including at least a subset of the candidate representations and a subset of the additional candidate representations;

receiving an input of a selected candidate representation of the candidate representations and the additional candidate representations; and

removing the presented phonetic string and presenting the selected candidate representation.

105. A non-transitory computer-readable storage medium storing one or more programs, the one or more programs



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comprising instructions, which when executed by an electronic device with a touch-sensitive display, cause the device to:

present a virtual keyboard corresponding to a first alphabet in a first region of the touch-sensitive display of the device; 5

receive an input on the virtual keyboard representing a phonetic string;

present the phonetic string in a second region of the touch-sensitive display; 10

identify one or more candidate representations based on the phonetic string, wherein the candidate representations correspond to a second alphabet different from the first alphabet;

identify one or more additional candidate representations based on the phonetic string in a third alphabet different from the first and second alphabets; 15

present a candidate tray including at least a subset of the candidate representations and a subset of the additional candidate representations; 20

receive an input of a selected candidate representation of the candidate representations and the additional candidate representations; and

remove the presented phonetic string and present the selected candidate representation. 25

106. A method comprising:

presenting a virtual keyboard corresponding to a first alphabet in a first region of a touch-sensitive display of a device;

receiving input representing a phonetic string corresponding to the first alphabet; 30

presenting the phonetic string in a second region of the touch-sensitive display;

identifying one or more candidate representations based on the phonetic string, wherein the candidate representations correspond to a second alphabet different from the first alphabet; 35

identifying one or more additional candidate representations based on the phonetic string in a third alphabet different from the first and second alphabets; 40

presenting a candidate tray including at least a subset of the candidate representations and a subset of the additional candidate representations;

receiving an input of a selected candidate representation of the candidate representations and the additional candidate representations; and 45

removing the presented phonetic string and presenting the selected candidate representation.

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107. A method comprising:

presenting a virtual keyboard in a first region of a touch-sensitive display of a device;

receiving an input on the virtual keyboard representing a phonetic string;

presenting the phonetic string using a first alphabet in a second region of the touch-sensitive display;

identifying one or more candidate representations based on the phonetic string, wherein the one or more candidate representations correspond to a second alphabet different from the first alphabet;

identifying one or more additional candidate representations based on the phonetic string in a third alphabet different from the first and second alphabets;

presenting a candidate tray including at least a subset of the candidate representations and a subset of the additional candidate representations;

receiving an input of a selected candidate representation of the candidate representations and the additional candidate representations; and

removing the presented phonetic string and presenting the selected candidate representation.

108. A method comprising:

presenting one or more virtual keys corresponding to a first alphabet in a first region of a touch-sensitive display of a device;

receiving an input on the one or more virtual keys, wherein the input represents a phonetic string;

presenting the phonetic string in a second region of the touch-sensitive display;

identifying one or more candidate representations based on the phonetic string, wherein the one or more candidate representations correspond to a second alphabet different from the first alphabet;

identifying one or more additional candidate representations based on the phonetic string in a third alphabet different from the first and second alphabets;

presenting a candidate tray including at least a subset of the candidate representations and a subset of the additional candidate representations;

receiving an input of a selected candidate representation of the candidate representations and the additional candidate representations; and

removing the presented phonetic string and presenting the selected candidate representation.

\* \* \* \* \*



UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : RE46,139 E  
APPLICATION NO. : 14/516533  
DATED : September 6, 2016  
INVENTOR(S) : Yasuo Kida et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

At Column 16, Claim number 27, Line number 37, DELETE “method” and ADD -- device --, therefor.

At Column 16, Claim number 28, Line number 39, DELETE “method” and ADD -- program product --, therefor.

Signed and Sealed this  
Thirtieth Day of May, 2017



Michelle K. Lee  
*Director of the United States Patent and Trademark Office*