

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

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 March 2008 (13.03.2008)

PCT

(10) International Publication Number
WO 2008/030779 A3

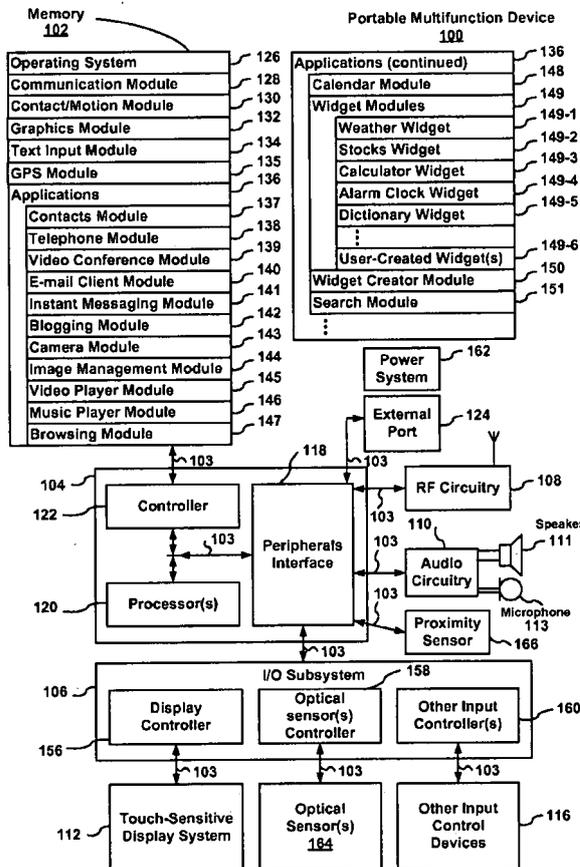
- (51) International Patent Classification:
G06F 3/048 (2006.01)
- (21) International Application Number:
PCT/US2007/077441
- (22) International Filing Date: 31 August 2007 (31.08.2007)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:

60/824,769	6 September 2006 (06.09.2006)	US
60/883,785	6 January 2007 (06.01.2007)	US
60/879,253	7 January 2007 (07.01.2007)	US
60/879,469	8 January 2007 (08.01.2007)	US
60/937,993	29 June 2007 (29.06.2007)	US
60/947,118	29 June 2007 (29.06.2007)	US
11/848,210	30 August 2007 (30.08.2007)	US
- (71) Applicant (for all designated States except US): APPLE INC. [US/US]; 1 Infinite Loop, Cupertino, CA 95014 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): MATAS, Michael

- [US/US]; 1065 Middlefield Road, Palo Alto, CA 94301 (US). **CHRISTIE, Greg** [US/US]; 1112 Kelly Drive, San Jose, CA 95129 (US). **MARCOS, Paul, D.** [US/US]; 1108 Covington Road, Los Altos, CA 95014 (US). **FORSTALL, Scott** [US/US]; 329 Martens Way, Mountain View, CA 94040 (US). **VAN OS, Marcel** [NL/US]; 116 Lundy's Lane Unit A, San Francisco, CA 94110 (US). **ORDING, Bas** [NL/US]; 44 Newburg Street, San Francisco, CA 94131 (US). **CHAUDHRI, Imran** [US/US]; 300 Linden Street, #7, San Francisco, CA 94102 (US).
- (74) Agents: **WILLIAMS, Gary, S.** et al.; Morgan Lewis & Bockius LLP, 2 Palo Alto Square, 3000 Ei Camino Real, Suite 700, Palo Alto, CA 94306 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW,

[Continued on next page]

(54) Title: PORTABLE ELECTRONIC DEVICE FOR PHOTO MANAGEMENT



(57) Abstract: A portable electronic device with a touch screen display for photo management is disclosed. One aspect of the invention involves a computer-implemented method in which the portable electronic device displays an array of thumbnail images corresponding to a set of photographic images. The device replaces the displayed array of thumbnail images with a user-selected photographic image upon detecting a user contact with a corresponding thumbnail image in the array. The user-selected photographic image is displayed at a larger scale than the corresponding thumbnail image. The portable device displays a different photographic image in replacement of the user-selected photographic image in accordance with a scrolling gesture. The scrolling gesture comprises a substantially horizontal movement of user contact with the touch screen display.

WO 2008/030779 A3



MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(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, LV, MC, MT, NL, PL,

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) **Date of publication of the international search report:**

26 June 2008

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

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 March 2008 (13.03.2008)

PCT

(10) International Publication Number
WO 2008/030779 A2

- (51) International Patent Classification:
G06F 3/048 (2006.01)
- (21) International Application Number:
PCT/US2007/077441
- (22) International Filing Date: 31 August 2007 (31.08.2007)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:

60/824,769	6 September 2006 (06.09.2006)	US
60/883,785	6 January 2007 (06.01.2007)	US
60/879,253	7 January 2007 (07.01.2007)	US
60/879,469	8 January 2007 (08.01.2007)	US
60/937,993	29 June 2007 (29.06.2007)	US
60/947,118	29 June 2007 (29.06.2007)	US
11/848,210	30 August 2007 (30.08.2007)	US
- (71) Applicant (for all designated States except US): **APPLE INC.** [US/US]; 1 Infinite Loop, Cupertino, CA 95014 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **MATAS, Michael**

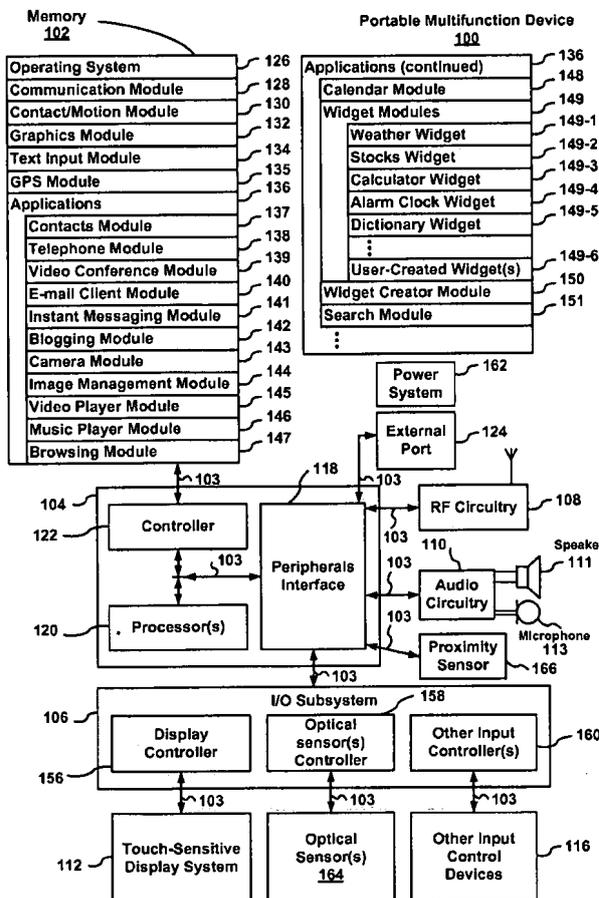
[US/US]; 1065 Middlefield Road, Palo Alto, CA 94301 (US). **CHRISTIE, Greg** [US/US]; 1112 Kelly Drive, San Jose, CA 95129 (US). **MARCOS, Paul, D.** [US/US]; 1108 Covington Road, Los Altos, CA 95014 (US). **FORSTALL, Scott** [US/US]; 329 Martens Way, Mountain View, CA 94040 (US). **VAN OS, Marcel** [NL/US]; 116 Lundy's Lane Unit A, San Francisco, CA 94110 (US). **ORDING, Bas** [NL/US]; 44 Newburg Street, San Francisco, CA 94131 (US). **CHAUDHRI, Imran** [US/US]; 300 Linden Street, #7, San Francisco, CA 94102 (US).

(74) Agents: **WILLIAMS, Gary, S.** et al.; Morgan Lewis & Bockius LLP, 2 Palo Alto Square, 3000 Ei Camino Real, Suite 700, Palo Alto, CA 94306 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW,

[Continued on next page]

(54) Title: PORTABLE ELECTRONIC DEVICE FOR PHOTO MANAGEMENT



(57) Abstract: A portable electronic device with a touch screen display for photo management is disclosed. One aspect of the invention involves a computer-implemented method in which the portable electronic device displays an array of thumbnail images corresponding to a set of photographic images. The device replaces the displayed array of thumbnail images with a user-selected photographic image upon detecting a user contact with a corresponding thumbnail image in the array. The user-selected photographic image is displayed at a larger scale than the corresponding thumbnail image. The portable device displays a different photographic image in replacement of the user-selected photographic image in accordance with a scrolling gesture. The scrolling gesture comprises a substantially horizontal movement of user contact with the touch screen display.

WO 2008/030779 A2



MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, 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).

(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),

Published:

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

Portable Electronic Device for Photo Management

TECHNICAL FIELD

[0001] The disclosed embodiments relate generally to portable electronic devices, and more particularly, to portable devices for photo management, such as digital photographing, photo editing, and emailing photos.

BACKGROUND

[0002] As portable electronic devices become more compact and capable of performing functions, it has become a significant challenge to design a user interface that allows users to easily interact with such a multifunction device. This challenge is more significant for handheld portable electronic devices, which have much smaller screens than desktop or laptop computers. This situation is unfortunate because a user interface is the gateway through which a user receives information and a device receives user actions or behaviors, including user attempts to access the portable electronic device's features, tools, and functions.

[0003] Some portable devices (e.g., mobile telephones, sometimes called mobile phones, cell phones, cellular telephones, and the like) have resorted to adding more push buttons, increasing the density of push buttons, overloading the functions of push buttons, or using complex menu systems to allow a user to access, store, and manipulate data. These approaches often result in complicated key sequences and menu hierarchies that must be memorized by the user.

[0004] Many conventional user interfaces, such as those that include physical push buttons, are also inflexible because a physical push button may prevent a user interface from being configured and/or adapted by either an application running on the portable electronic device or by users. When coupled with the time consuming requirement to memorize multiple key sequences and menu hierarchies, and the difficulty in activating a desired push button, such inflexibility is frustrating to most users.

[0005] For example, cell phones with a built-in digital camera have been on the market for some time. But existing cell phones are difficult to use for even basic photo-

related operations such as displaying, deleting and sending a photo because of limitations with the cell phones' user interface.

[0006] Accordingly, there is a need for portable multifunction devices with more transparent and intuitive user interfaces for photo management.

5

SUMMARY

[0007] The above deficiencies and other problems associated with user interfaces for portable devices are reduced or eliminated by the disclosed portable multifunction device. In some embodiments, the portable electronic device has a touch-sensitive display (also known as a "touch screen" or "touch screen display") with a graphical user interface (GUI), one or more processors, memory and one or more modules, programs or sets of instructions stored in the memory for performing multiple functions. In some embodiments, the user interacts with the GUI primarily through finger contacts and gestures on the touch-sensitive display. Instructions for performing photo management may be included in a computer program product configured for execution by one or more processors.

[0008] One aspect of the invention involves a computer-implemented method in which a portable electronic device with a touch screen: displays an array of thumbnail images corresponding to a set of photographic images; replaces the displayed array of thumbnail images with a user-selected photographic image upon detecting a user contact with a corresponding thumbnail image in the array, wherein the user-selected photographic image is displayed at a larger scale than the corresponding thumbnail image; and displays a different photographic image in replacement of the user-selected photographic image, wherein the different photographic image is selected in accordance with a scrolling gesture comprising a substantially horizontal movement of user contact with the touch screen display.

[0009] Another aspect of the invention involves a computer-implemented method in which a portable electronic device with a touch screen: displays an array of thumbnail images corresponding to a set of photographic images; detects a scrolling gesture comprising a substantially vertical movement of user contact with the touch screen display; and responds to the scrolling gesture by scrolling the display of thumbnail images in accordance with a direction of the scrolling gesture; wherein the scrolling gesture is substantially independent of a horizontal position of the user contact with the touch screen display.

[0010] Another aspect of the invention involves a portable electronic device. The device includes a touch screen display, one or more processors, memory, and one or more programs. The one or more program are stored in the memory and configured to be executed by the one or more processors. The one or more programs include: instructions for displaying an array of thumbnail images corresponding to a set of photographic images; instructions for replacing the displayed array of thumbnail images with a user-selected photographic image upon detecting a user contact with a corresponding thumbnail image in the array, wherein the user-selected photographic image is displayed at a larger scale than the corresponding thumbnail image; and instructions for displaying a different photographic image in replacement of the user-selected photographic image, wherein the different photographic image is selected in accordance with a scrolling gesture comprising a substantially horizontal movement of user contact with the touch screen display.

[0011] Another aspect of the invention involves a portable electronic device. The device includes a touch screen display, one or more processors, memory, and one or more programs. The one or more program are stored in the memory and configured to be executed by the one or more processors. The one or more programs include: instructions for displaying an array of thumbnail images corresponding to a set of photographic images; instructions for detecting a scrolling gesture comprising a substantially vertical movement of user contact with the touch screen display; and instructions for responding to the scrolling gesture by scrolling the display of thumbnail images in accordance with a direction of the scrolling gesture; wherein the scrolling gesture is substantially independent of a horizontal position of the user contact with the touch screen display.

[0012] Another aspect of the invention involves a computer-program product that includes a computer readable storage medium and a computer program mechanism embedded therein. The computer program mechanism includes instructions, which when executed by a portable electronic device with a touch screen display, cause the device to: display an array of thumbnail images corresponding to a set of photographic images; replace the displayed array of thumbnail images with a user-selected photographic image upon detecting a user contact with a corresponding thumbnail image in the array, wherein the user-selected photographic image is displayed at a larger scale than the corresponding thumbnail image; and display a different photographic image in replacement of the user-selected photographic image,

wherein the different photographic image is selected in accordance with a scrolling gesture comprising a substantially horizontal movement of user contact with the touch screen display.

[0013] Another aspect of the invention involves a computer-program product that includes a computer readable storage medium and a computer program mechanism embedded therein. The computer program mechanism includes instructions, which when executed by a portable electronic device with a touch screen display, cause the device to: display an array of thumbnail images corresponding to a set of photographic images; detect a scrolling gesture comprising a substantially vertical movement of user contact with the touch screen display; and respond to the scrolling gesture by scrolling the display of thumbnail images in accordance with a direction of the scrolling gesture; wherein the scrolling gesture is substantially independent of a horizontal position of the user contact with the touch screen display.

[0014] Another aspect of the invention involves a portable electronic device with a touch screen display, comprising: means for displaying an array of thumbnail images corresponding to a set of photographic images; means for replacing the displayed array of thumbnail images with a user-selected photographic image upon detecting a user contact with a corresponding thumbnail image in the array, wherein the user-selected photographic image is displayed at a larger scale than the corresponding thumbnail image; and means for displaying a different photographic image in replacement of the user-selected photographic image, wherein the different photographic image is selected in accordance with a scrolling gesture comprising a substantially horizontal movement of user contact with the touch screen display.

[0015] Another aspect of the invention involves a portable electronic device with a touch screen display, comprising: means for displaying an array of thumbnail images corresponding to a set of photographic images; means for detecting a scrolling gesture comprising a substantially vertical movement of user contact with the touch screen display; and means for responding to the scrolling gesture by scrolling the display of thumbnail images in accordance with a direction of the scrolling gesture; wherein the scrolling gesture is substantially independent of a horizontal position of the user contact with the touch screen display.

[0016] Another aspect of the invention involves a computer-implemented method in which an electronic device with a touch screen: detects a first movement of a physical object

on or near the touch screen display; while detecting the first movement, translates a first digital object displayed on the touch screen display in a first direction, wherein the first digital object is associated with a set of digital objects; in response to display of a previously hidden edge of the first digital object and continued detection of the first movement, displays
5 an area beyond the edge of the first digital object; after the first movement is no longer detected, translates the first digital object in a second direction until the area beyond the edge of the first digital object is no longer displayed; detects a second movement of the physical object on or near the touch screen display; and, in response to detecting the second movement while the previously hidden edge of the first digital object is displayed, translates the first
10 digital object in the first direction and displays a second digital object in the set of digital objects.

[0017] Another aspect of the invention involves an electronic device. The device includes a touch screen display, one or more processors, memory, and one or more programs. The one or more program are stored in the memory and configured to be executed by the one
5 or more processors. The one or more programs include: instructions for detecting a first movement of a physical object on or near the touch screen display; instructions for, while detecting the first movement, translating a first digital object displayed on the touch screen display in a first direction, wherein the first digital object is associated with a set of digital objects; instructions for, in response to display of a previously hidden edge of the first digital
10 object and continued detection of the first movement, displaying an area beyond the edge of the first digital object; instructions for, after the first movement is no longer detected, translating the first digital object in a second direction until the area beyond the edge of the first digital object is no longer displayed; instructions for detecting a second movement of the physical object on or near the touch screen display; and instructions for, in response to
15 detecting the second movement while the previously hidden edge of the first digital object is displayed, translating the first digital object in the first direction and displaying a second digital object in the set of digital objects.

[0018] Another aspect of the invention involves a computer-program product that includes a computer readable storage medium and a computer program mechanism embedded
10 therein. The computer program mechanism includes instructions, which when executed by an electronic device with a touch screen display, cause the device to: detect a first movement of a physical object on or near the touch screen display; while detecting the first movement,

translate a first digital object displayed on the touch screen display in a first direction, wherein the first digital object is associated with a set of digital objects; in response to display of a previously hidden edge of the first digital object and continued detection of the first movement, display an area beyond the edge of the first digital object; after the first movement is no longer detected, translate the first digital object in a second direction until the area beyond the edge of the first digital object is no longer displayed; detect a second movement of the physical object on or near the touch screen display; and, in response to detecting the second movement while the previously hidden edge of the first digital object is displayed, translate the first digital object in the first direction and display a second digital object in the set of digital objects.

[0019] Another aspect of the invention involves an electronic device with a touch screen display, comprising: means for detecting a first movement of a physical object on or near the touch screen display; means for, while detecting the first movement, translating a first digital object displayed on the touch screen display in a first direction, wherein the first digital object is associated with a set of digital objects; means for, in response to display of a previously hidden edge of the first digital object and continued detection of the first movement, displaying an area beyond the edge of the first digital object; means for, after the first movement is no longer detected, translating the first digital object in a second direction until the area beyond the edge of the first digital object is no longer displayed; means for detecting a second movement of the physical object on or near the touch screen display; and means for, in response to detecting the second movement while the previously hidden edge of the first digital object is displayed, translating the first digital object in the first direction and displaying a second digital object in the set of digital objects.

[0020] Thus, the invention provides a transparent and intuitive user interface for managing photos on a portable electronic device with a touch screen display

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] For a better understanding of the aforementioned embodiments of the invention as well as additional embodiments thereof, reference should be made to the Description of Embodiments below, in conjunction with the following drawings in which like reference numerals refer to corresponding parts throughout the figures.

[0022] Figure 1 is a block diagram illustrating a portable electronic device with a touch-sensitive display in accordance with some embodiments.

[0023] Figure 2 illustrates a portable electronic device having a touch screen in accordance with some embodiments.

5 [0024] Figure 3 illustrates an exemplary user interface for unlocking a portable electronic device in accordance with some embodiments.

[0025] Figure 4 illustrates an exemplary user interface for a menu of applications on a portable electronic device in accordance with some embodiments.

.0 [0026] Figure 5 illustrates an exemplary user interface for a camera in accordance with some embodiments.

[0027] Figure 6 illustrates an exemplary user interface for a camera roll in accordance with some embodiments.

[0028] Figures 7A through 7C illustrate an exemplary user interface for viewing and manipulating images in accordance with some embodiments.

5 [0029] Figure 8 illustrates an exemplary user interface for viewing photo albums in accordance with some embodiments.

[0030] Figure 9 illustrates an exemplary user interface for setting user preferences in accordance with some embodiments.

10 [0031] Figure 10 illustrates an exemplary user interface for viewing an album in accordance with some embodiments.

[0032] Figure 11 illustrates an exemplary user interface for viewing images in an album in accordance with some embodiments.

[0033] Figure 12 illustrates an exemplary user interface for selecting a use for an image in an album in accordance with some embodiments.

15 [0034] Figures 13A through 13G illustrate an exemplary user interface for incorporating an image in an email message template in accordance with some embodiments.

[0035] Figures 14A and 14B illustrate an exemplary user interface for assigning an image to a contact in the user's contact list in accordance with some embodiments.

[0036] Figure 15 illustrates an exemplary user interface for incorporating an image in the user's wallpaper in accordance with some embodiments.

[0037] Figure 16 is a flowchart illustrating a process for displaying thumbnail images on a touch screen in accordance with some embodiments.

5 [0038] Figure 17 is a flowchart illustrating a process for performing operations in response to user contact with the touch screen in accordance with some embodiments.

[0039] Figure 18 is a flowchart illustrating a process for deleting an image in response to a user contact with the touch screen in accordance with some embodiments.

[0040] Figure 19 is a flowchart illustrating a process for displaying multiple photo
.0 albums on the touch screen in accordance with some embodiments.

[0041] Figure 20 is a flowchart illustrating a process for performing additional operations upon a user selection of an additional options icon in accordance with some embodiments.

[0042] Figure 21 is a flowchart illustrating an animated process for rendering an
5 email service interface that includes a user selected image in accordance with some embodiments.

[0043] Figure 22 is a flowchart illustrating a process for assigning an image to a user selected contact in the user's contact list in accordance with some embodiments.

[0044] Figures 23A-23H illustrate an exemplary user interface for viewing digital
10 objects in a set of digital objects in accordance with some embodiments.

[0045] Figure 24 is a flowchart illustrating a process for viewing digital objects in a set of digital objects in accordance with some embodiments.

DESCRIPTION OF EMBODIMENTS

[0046] Reference will now be made in detail to embodiments, examples of which are
15 illustrated in the accompanying drawings. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the invention. However, it will be apparent to one skilled in the art that the invention may be practiced without these specific details. In other instances, well-known methods, procedures,

components, circuits, and networks have not been described in detail so as not to unnecessarily obscure aspects of the embodiments.

[0047] Embodiments of a portable electronic device, user interfaces for such devices, and associated processes for using such devices are described. In some embodiments, the portable electronic device is a portable communications device such as a mobile telephone that also contains other functions, such as PDA and/or music player functions.

[0048] The user interface may include a physical click wheel in addition to a touch screen or a virtual click wheel displayed on the touch screen. A click wheel is a physical user-interface device that may provide navigation commands based on an angular displacement of the wheel or a point of contact with the wheel by a user of the portable electronic device. A click wheel may also be used to provide a user command corresponding to selection of one or more items, for example, when the user of the portable electronic device presses down on at least a portion of the wheel or the center of the wheel. Alternatively, breaking contact with a click wheel image on a touch screen surface may indicate a user command corresponding to selection. For simplicity, in the discussion that follows, a portable electronic device that includes a touch screen is used as an exemplary embodiment. It should be understood, however, that some of the user interfaces and associated processes may be applied to other devices, such as personal computers and laptop computers, which may include one or more other physical user-interface devices, such as a physical click wheel, a physical keyboard, a mouse and/or a joystick.

[0049] In addition to photo management, the device may support a variety of other applications, such as a telephone application, a video conferencing application, an e-mail application, an instant messaging application, a blogging application, a web browsing application, a digital music player application, and/or a digital video player application.

[0050] The various applications that may be executed on the portable electronic device may use at least one common physical user-interface device, such as the touch screen. One or more functions of the touch screen as well as corresponding information displayed on the portable electronic device may be adjusted and/or varied from one application to the next and/or within a respective application. In this way, a common physical architecture (such as the touch screen) of the portable electronic device may support the variety of applications with user interfaces that are intuitive and transparent.

[0051] The user interfaces may include one or more soft keyboard embodiments. The soft keyboard embodiments may include standard (QWERTY) and/or non-standard configurations of symbols on the displayed icons of the keyboard, such as those described in U.S. Patent Application No. 11/459,606, "Keyboards For Portable Electronic Devices," filed July 24, 2006, and U.S. Patent Application No. 11/459,615, "Touch Screen Keyboards For Portable Electronic Devices," filed July 24, 2006, the contents of which are hereby incorporated by reference. The keyboard embodiments may include a reduced number of icons (or soft keys) relative to the number of keys in existing physical keyboards, such as that for a typewriter. This may make it easier for users to select one or more icons in the keyboard, and thus, one or more corresponding symbols. The keyboard embodiments may be adaptive. For example, displayed icons may be modified in accordance with user actions, such as selecting one or more icons and/or one or more corresponding symbols. One or more applications on the portable electronic device may utilize common and/or different keyboard embodiments. Thus, the keyboard embodiment used may be tailored to at least some of the applications. In some embodiments, one or more keyboard embodiments may be tailored to a respective user. For example, based on a word usage history (lexicography, slang, individual usage) of the respective user. Some of the keyboard embodiments may be adjusted to reduce a probability of a user error when selecting one or more icons, and thus one or more symbols, when using the soft keyboard embodiments.

[0052] Attention is now directed towards embodiments of the portable electronic device. Figure 1 is a block diagram illustrating a portable electronic device 100 with a touch-sensitive display 112 in accordance with some embodiments. The touch-sensitive display 112 is sometimes called a "touch screen" for convenience. The device 100 may include a memory 102 (which may include one or more computer readable storage mediums), a memory controller 122, one or more processing units (CPU's) 120, a peripherals interface 118, RF circuitry 108, audio circuitry 110, a speaker 111, a microphone 113, an input/output (I/O) subsystem 106, other input or control devices 116, and an external port 124. The device 100 may include one or more optical sensors 164. These components may communicate over one or more communication buses or signal lines 103.

[0053] It should be appreciated that the portable electronic device 100 is only one example of a portable electronic device 100, and that the portable electronic device 100 may have more or fewer components than shown, may combine two or more components, or a

may have a different configuration or arrangement of the components. The various components shown in Figure 1 may be implemented in hardware, software or a combination of hardware and software, including one or more signal processing and/or application specific integrated circuits.

5 [0054] Memory 102 may include high-speed random access memory and may also include non-volatile memory, such as one or more magnetic disk storage devices, flash memory devices, or other non-volatile solid-state memory devices. Access to memory 102 by other components of the portable electronic device 100, such as the CPU 120 and the peripherals interface 118, may be controlled by the memory controller 122.

10 [0055] The peripherals interface 118 couples the input and output peripherals of the portable electronic device to the CPU 120 and memory 102. The one or more processors 120 run or execute various software programs and/or sets of instructions stored in memory 102 to perform various functions for the portable electronic device 100 and to process data.

15 [0056] In some embodiments, the peripherals interface 118, the CPU 120, and the memory controller 122 may be implemented on a single chip, such as a chip 104. In some other embodiments, they may be implemented on separate chips.

20 [0057] The RF (radio frequency) circuitry 108 receives and sends RF signals, also called electromagnetic signals. The RF circuitry 108 converts electrical signals to/from electromagnetic signals and communicates with communications networks and other communications devices via the electromagnetic signals. The RF circuitry 108 may include well-known circuitry for performing these functions, including but not limited to an antenna system, an RF transceiver, one or more amplifiers, a tuner, one or more oscillators, a digital signal processor, a CODEC chipset, a subscriber identity module (SIM) card, memory, and so forth. The RF circuitry 108 may communicate with networks, such as the Internet, also
25 referred to as the World Wide Web (WWW), an intranet and/or a wireless network, such as a cellular telephone network, a wireless local area network (LAN) and/or a metropolitan area network (MAN), and other devices by wireless communication. The wireless communication may use any of a plurality of communications standards, protocols and technologies, including but not limited to Global System for Mobile Communications (GSM), Enhanced
30 Data GSM Environment (EDGE), high-speed downlink packet access (HSDPA), wideband code division multiple access (W-CDMA), code division multiple access (CDMA), time division multiple access (TDMA), Bluetooth, Wireless Fidelity (Wi-Fi) (e.g., IEEE 802.11a,

IEEE 802.11b, IEEE 802.11g and/or IEEE 802.11n), voice over Internet Protocol (VoIP), Wi-MAX, a protocol for email, instant messaging (IM), and/or Short Message Service (SMS)), or any other suitable communication protocol, including communication protocols not yet developed as of the filing date of this document.

5 [0058] The audio circuitry 110, the speaker 111, and the microphone 113 provide an audio interface between a user and the portable electronic device 100. The audio circuitry 110 receives audio data from the peripherals interface 118, converts the audio data to an electrical signal, and transmits the electrical signal to the speaker 111. The speaker 111 converts the electrical signal to human-audible sound waves. The audio circuitry 110 also receives electrical signals converted by the microphone 113 from sound waves. The audio circuitry 110 converts the electrical signal to audio data and transmits the audio data to the peripherals interface 118 for processing. Audio data may be retrieved from and/or transmitted to memory 102 and/or the RF circuitry 108 by the peripherals interface 118. In some embodiments, the audio circuitry 110 also includes a headset jack (not shown). The headset jack provides an interface between the audio circuitry 110 and removable audio input/output peripherals, such as output-only headphones or a headset with both output (e.g., a headphone for one or both ears) and input (e.g., a microphone).

[0059] The I/O subsystem 106 couples input/output peripherals on the portable electronic device 100, such as the display system 112 and other input/control devices 116, to the peripherals interface 118. The I/O subsystem 106 may include a display controller 156 and one or more input controllers 160 for other input or control devices. The one or more input controllers 160 receive/send electrical signals from/to other input or control devices 116. The other input/control devices 116 may include physical buttons (e.g., push buttons, rocker buttons, etc.), dials, slider switches, joysticks, click wheels, and so forth. In some alternate embodiments, input controller(s) 160 may be coupled to any (or none) of the following: a keyboard, infrared port, USB port, and a pointer device such as a mouse. The one or more buttons (e.g., 208, Figure 2) may include an up/down button for volume control of the speaker 111 and/or the microphone 113. The one or more buttons may include a push button (e.g., 206, Figure 2). A quick press of the push button may disengage a lock of the touch screen 112 or begin a process that uses gestures on the touch screen to unlock the portable electronic device, as described in U.S. Patent Application No. 11/322,549, "Unlocking a Device by Performing Gestures on an Unlock Image," filed December 23,

2005, which is hereby incorporated by reference. A longer press of the push button (e.g., 206) may turn power to the portable electronic device 100 on or off. The user may be able to customize a functionality of one or more of the buttons. The touch screen 112 is used to implement virtual or soft buttons and one or more soft keyboards.

5 [0060] The touch-sensitive display system 112 provides an input interface and an output interface between the portable electronic device and a user. The display controller 156 receives and/or sends electrical signals from/to the display system 112. The display system 112 displays visual output to the user. The visual output may include graphics, text, icons, video, and any combination thereof (collectively termed "graphics"). In some embodiments, some or all of the visual output may correspond to user-interface objects, further details of which are described below.

[0061] A touch screen in display system 112 is a touch-sensitive surface that accepts input from the user based on haptic and/or tactile contact. The display system 112 and the display controller 156 (along with any associated modules and/or sets of instructions in memory 102) detect contact (and any movement or breaking of the contact) on the display system 112 and converts the detected contact into interaction with user-interface objects (e.g., one or more soft keys, icons, web pages or images) that are displayed on the touch screen. In an exemplary embodiment, a point of contact between a touch screen in the display system 112 and the user corresponds to a finger of the user.

10 [0062] The touch screen in the display system 112 may use LCD (liquid crystal display) technology, or LPD (light emitting polymer display) technology, although other display technologies may be used in other embodiments. The touch screen in the display system 112 and the display controller 156 may detect contact and any movement or breaking thereof using any of a plurality of touch sensing technologies now known or later developed, 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 a touch screen in the display system 112. A touch-sensitive display in some embodiments of the display system 112 may be analogous to the multi-touch sensitive tablets described in the following U.S. Patents: 6,323,846 (Westerman et al.), 15 6,570,557 (Westerman et al.), and/or 6,677,932 (Westerman), and/or U.S. Patent Publication 2002/0015024A1, each of which is hereby incorporated by reference. However, a touch screen in the display system 112 displays visual output from the portable electronic device

100, whereas touch sensitive tablets do not provide visual output. The touch screen in the display system 112 may have a resolution in excess of 100 dpi. In an exemplary embodiment, the touch screen in the display system has a resolution of approximately 168 dpi. The user may make contact with the touch screen in the display system 112 using any suitable object or appendage, such as a stylus, a finger, and so forth. In some embodiments, the user interface is designed to work primarily with finger-based contacts and gestures, which are much less precise than stylus-based input due to the larger area of contact of a finger on the touch screen. In some embodiments, the portable electronic device translates the rough finger-based input into a precise pointer/cursor position or command for performing the actions desired by the user.

[0063] A touch-sensitive display in some embodiments of the display system 112 may be as described in the following applications: (1) U.S. Patent Application No. 11/381,313, "Multipoint Touch Surface Controller," filed on May 2, 2006; (2) U.S. Patent Application No. 10/840,862, "Multipoint Touchscreen," filed on May 6, 2004; (3) U.S. Patent Application No. 10/903,964, "Gestures For Touch Sensitive Input Devices," filed on July 30, 2004; (4) U.S. Patent Application No. 11/048,264, "Gestures For Touch Sensitive Input Devices," filed on January 31, 2005; (5) U.S. Patent Application No. 11/038,590, "Mode-Based Graphical User Interfaces For Touch Sensitive Input Devices," filed on January 18, 2005; (6) U.S. Patent Application No. 11/228,758, "Virtual Input Device Placement On A Touch Screen User Interface," filed on September 16, 2005; (7) U.S. Patent Application No. 11/228,700, "Operation Of A Computer With A Touch Screen Interface," filed on September 16, 2005; (8) U.S. Patent Application No. 11/228,737, "Activating Virtual Keys Of A Touch-Screen Virtual Keyboard," filed on September 16, 2005; and (9) U.S. Patent Application No. 11/367,749, "Multi-Functional Hand-Held Device," filed on March 3, 2006. All of these applications are incorporated by reference herein.

[0064] In some embodiments, in addition to the touch screen, the portable electronic device 100 may include a touchpad (not shown) for activating or deactivating particular functions. In some embodiments, the touchpad is a touch-sensitive area of the portable electronic device that, unlike the touch screen, does not display visual output. The touchpad may be a touch-sensitive surface that is separate from the touch screen in the display system 112 or an extension of the touch-sensitive surface formed by the touch screen.

[0065] In some embodiments, the portable electronic device 100 may include a physical or virtual click wheel as an input control device 116. A user may navigate among and interact with one or more graphical objects (henceforth referred to as icons) displayed in the display system 112 by rotating the click wheel or by moving a point of contact with the click wheel (e.g., where the amount of movement of the point of contact is measured by its angular displacement with respect to a center point of the click wheel). The click wheel may also be used to select one or more of the displayed icons. For example, the user may press down on at least a portion of the click wheel or an associated button. User commands and navigation commands provided by the user via the click wheel may be processed by an input controller 160 as well as one or more of the modules and/or sets of instructions in memory 102. For a virtual click wheel, the click wheel and click wheel controller may be part of the display system 112 and the display controller 156, respectively. For a virtual click wheel, the click wheel may be either an opaque or semitransparent object that appears and disappears on the touch screen display in response to user interaction with the device. In some embodiments, a virtual click wheel is displayed on the touch screen of a portable multifunction device and operated by user contact with the touch screen.

[0066] The device 100 also includes a power system 162 for powering the various components. The power system 162 may include a power management system, one or more power sources (e.g., battery, alternating current (AC)), a recharging system, a power failure detection circuit, a power converter or inverter, a power status indicator (e.g., a light-emitting diode (LED)) and any other components associated with the generation, management and distribution of power in portable electronic devices.

[0067] The device 100 may also include one or more optical sensors 164. Figure 1 shows an optical sensor coupled to an optical sensor controller 158 in I/O subsystem 106. The optical sensor 164 may include charge-coupled device (CCD) or complementary metal-oxide semiconductor (CMOS) phototransistors. The optical sensor 164 receives light from the environment, projected through one or more lens, and converts the light to data representing an image. In conjunction with an imaging module 143, the optical sensor 164 may capture still images or video. In some embodiments, an optical sensor is located on the back of the portable electronic device 100, opposite the touch screen display 112 on the front of the portable electronic device, so that the touch screen display may be used as a viewfinder for either still and/or video image acquisition. In some embodiments, an optical sensor is located

on the front of the portable electronic device so that the user's image may be obtained for videoconferencing while the user views the other video conference participants on the touch screen display. In some embodiments, the position of the optical sensor 164 can be changed by the user (e.g., by rotating the lens and the sensor in the portable electronic device housing) so that a single optical sensor 164 may be used along with the touch screen display for both video conferencing and still and/or video image acquisition.

[0068] The device 100 may also include one or more proximity sensors 166. Figure 1 shows a proximity sensor 166 coupled to the peripherals interface 118. Alternately, the proximity sensor 166 may be coupled to an input controller 160 in the I/O subsystem 106. The proximity sensor 166 may perform as described in U.S. Patent Application Nos. 11/241,839, "Proximity Detector In Handheld Device," filed September 30, 2005, and 11/240,788, "Proximity Detector In Handheld Device," filed September 30, 2005, which are hereby incorporated by reference. In some embodiments, the proximity sensor turns off and disables the touch screen 112 when the multifunction device is placed near the user's ear (e.g., when the user is making a phone call). In some embodiments, the proximity sensor keeps the screen off when the portable electronic device is in the user's pocket, purse, or other dark area to prevent unnecessary battery drainage when the portable electronic device is a locked state.

[0069] In some embodiments, the software components stored in memory 102 may include an operating system 126, a communication module (or set of instructions) 128, a contact/motion module (or set of instructions) 130, a graphics module (or set of instructions) 132, a text input module (or set of instructions) 134, a Global Positioning System (GPS) module (or set of instructions) 135, and applications (or set of instructions) 136.

[0070] The operating system 126 (e.g., Darwin, RTXC, LINUX, UNIX, OS X, WINDOWS, or an embedded operating system such as VxWorks) includes various software components and/or drivers for controlling and managing general system tasks (e.g., memory management, storage device control, power management, etc.) and facilitates communication between various hardware and software components.

[0071] The communication module 128 facilitates communication with other devices over one or more external ports 124 and also includes various software components for handling data received by the RF circuitry 108 and/or the external port 124. The external port 124 (e.g., Universal Serial Bus (USB), FIREWIRE, etc.) is adapted for coupling directly to other devices or indirectly over a network (e.g., the Internet, wireless LAN, etc.). In some

embodiments, the external port is a multi-pin (e.g., 30-pin) connector that is the same as, or similar to and/or compatible with the 30-pin connector used on iPod (trademark of Apple Computer, Inc.) devices.

[0072] The contact/motion module 130 may detect contact with the touch screen in the display system 112 (in conjunction with the display controller 156) and other touch sensitive devices (e.g., a touchpad or physical click wheel). The contact/motion module 130 includes various software components for performing various operations related to detection of contact, such as determining if contact has occurred, determining if there is movement of the contact and tracking the movement across the touch screen in the display system 112, and determining if the contact has been broken (i.e., if the contact has ceased). Determining movement of the point of contact may include determining speed (magnitude), velocity (magnitude and direction), and/or an acceleration (a change in magnitude and/or direction) of the point of contact. These operations may be applied to single contacts (e.g., one finger contacts) or to multiple simultaneous contacts (e.g., "multitouch"/multiple finger contacts). In some embodiments, the contact/motion module 130 and the display controller 156 also detects contact on a touchpad. In some embodiments, the contact/motion module 130 and the controller 160 detects contact on a click wheel.

[0073] The graphics module 132 includes various known software components for rendering and displaying graphics on the display system 112, including components for changing the intensity of graphics that are displayed. As used herein, the term "graphics" includes any object that can be displayed to a user, including without limitation text, web pages, icons (such as user-interface objects including soft keys), digital images, videos, animations and the like.

[0074] The text input module 134, which may be a component of graphics module 132, provides soft keyboards for entering text in various applications (e.g., contacts 137, email 140, IM 141, blogging 142, browser 147, and any other application that needs text input).

[0075] The GPS module 135 determines the location of the portable electronic device and provides this information for use in various applications (e.g., to telephone 138 for use in location-based dialing, to camera 143 and/or blogger 142 as picture/video metadata, and to applications that provide location-based services such as weather widgets, local yellow page widgets, and map/navigation widgets).

[0076] The applications 136 may include the following modules (or sets of instructions), or a subset or superset thereof:

- a contacts module 137 (sometimes called an address book or contact list);
- a telephone module 138;
- 5 • a video conferencing module 139;
- an e-mail client module 140;
- an instant messaging (IM) module 141;
- a blogging module 142;
- a camera module 143 for still and/or video images;
- 10 • an image management module 144;
- a video player module 145;
- a music player module 146;
- a browser module 147;
- a calendar module 148;
- 5 • widget modules 149, which may include weather widget 149-1, stocks widget 149-2, calculator widget 149-3, alarm clock widget 149-4, dictionary widget 149-5, and other widgets obtained by the user, as well as user-created widgets 149-6;
- widget creator module 150 for making user-created widgets 149-6; and/or
- search module 151.

20 [0077] Examples of other applications 136 that may be stored in memory 102 include memo pad and other word processing applications, JAVA-enabled applications, encryption, digital rights management, voice recognition, and voice replication.

[0078] In conjunction with display system 112, display controller 156, optical sensor(s) 164, optical sensor controller 158, contact module 130, graphics module 132, and
 25 image management module 144, the camera module 143 may be used to capture still images or video (including a video stream) and store them into memory 102, browse the still images or videos, modify characteristics of a still image or video, or delete a still image or video

from memory 102. Embodiments of user interfaces and associated processes using camera module 143 are described further below.

[0079] In conjunction with display system 112, display controller 156, contact module 130, graphics module 132, text input module 134, and camera module 143, the image management module 144 may be used to arrange, modify or otherwise manipulate, label, delete, present (e.g., in a digital slide show or album), and store still and/or video images. Embodiments of user interfaces and associated processes using image management module 144 are described further below.

[0080] Note that the above identified modules and applications (including the camera module 143 and the image management module 144) correspond to a set of instructions for performing one or more functions described above. These modules (i.e., sets of instructions) need not be implemented as separate software programs, procedures or modules, and thus various subsets of these modules may be combined or otherwise re-arranged in various embodiments. In some embodiments, memory 102 may store a subset of the modules and data structures identified above. Furthermore, memory 102 may store additional modules and data structures not described above.

[0081] In some embodiments, the portable electronic device 100 is a device where operation of a predefined set of functions on the portable electronic device is performed exclusively through a touch screen in the display system 112 and/or a touchpad. By using a touch screen and/or a touchpad as the primary input/control device for operation of the portable electronic device 100, the number of physical input/control devices (such as push buttons, dials, and the like) on the portable electronic device 100 may be reduced.

[0082] The predefined set of functions that may be performed exclusively through a touch screen and/or a touchpad include navigation between user interfaces. In some embodiments, the touchpad, when touched by the user, navigates the portable electronic device 100 to a main, home, or root menu from any user interface that may be displayed on the portable electronic device 100. In such embodiments, the touchpad may be referred to as a "menu button." In some other embodiments, the menu button may be a physical push button or other physical input/control device instead of a touchpad.

[0083] Figure 2 illustrates a portable electronic device 100 having a touch screen 112 in accordance with some embodiments. The touch screen may display one or more graphics.

In this embodiment, as well as others described below, a user may select one or more of the graphics by making contact or touching the graphics, for example, with one or more fingers 202 (not drawn to scale in the figure) or a stylus (not shown in the figure). In some embodiments, selection of one or more graphics occurs when the user breaks contact with the one or more graphics. In some embodiments, the contact may include a gesture, such as one or more taps, one or more swipes (from left to right, right to left, upward and/or downward and/or a rolling of a finger (from right to left, left to right, upward and/or downward) that has made contact with the portable electronic device 100. In some embodiments, inadvertent contact with a graphic may not select the graphic. For example, a swipe gesture with that sweeps over an application icon may not select the corresponding application when the gesture corresponding to selection is a tap. In other words, the portable electronic device 100 interprets the meaning of a gesture and acts accordingly after considering which application or module is in use at the moment.

[0084] The device 100 may also include one or more physical buttons, such as "home" or menu button 204. As described previously, the menu button 204 may be used to navigate to any application 136 in a set of applications that may be executed on the portable electronic device 100. Alternatively, in some embodiments, the menu button is implemented as a soft key in a GUI in touch screen 112.

[0085] In one embodiment, the portable electronic device 100 includes a touch screen 112, a menu button 204, a push button 206 for powering the portable electronic device on/off and locking the portable electronic device, and volume adjustment button(s) 208. The push button 206 may be used to turn the power on/off on the portable electronic device by depressing the button and holding the button in the depressed state for a predefined time interval; to lock the portable electronic device by depressing the button and releasing the button before the predefined time interval has elapsed; and/or to unlock the portable electronic device or initiate an unlock process. In an alternative embodiment, the portable electronic device 100 also may accept verbal input for activation or deactivation of some functions through the microphone 113.

[0086] Attention is now directed towards embodiments of user interfaces ("UI") and associated processes that may be implemented on a portable electronic device 100.

[0087] Figure 3 illustrates an exemplary user interface for unlocking a portable electronic device in accordance with some embodiments. In some embodiments, user interface 300 includes the following elements, or a subset or superset thereof:

- Unlock image 302 that is moved with a finger gesture to unlock the portable electronic device;
- Arrow 304 that provides a visual cue to the unlock gesture;
- Channel 306 that provides additional cues to the unlock gesture;
- Time 308;
- Day 310;
- Date 312; and
- Wallpaper image 314.

[0088] In some embodiments, the portable electronic device detects contact with the touch-sensitive display (e.g., a user's finger making contact on or near the unlock image 302) while the portable electronic device is in a user-interface lock state. The device moves the unlock image 302 in accordance with the contact. The device transitions to a user-interface unlock state if the detected contact corresponds to a predefined gesture, such as moving the unlock image across channel 306. Conversely, the portable electronic device maintains the user-interface lock state if the detected contact does not correspond to the predefined gesture. As noted above, processes that use gestures on the touch screen to unlock the portable electronic device are described in U.S. Patent Application 11/322,549, "Unlocking a Device by Performing Gestures on an Unlock Image," filed December 23, 2005, which is hereby incorporated by reference.

[0089] Figure 4 illustrates an exemplary user interface for a menu of applications on a portable electronic device in accordance with some embodiments. In some embodiments, user interface 400 includes the following elements, or a subset or superset thereof:

- Signal strength indicator 402 for wireless communication;
- Time 404;
- Battery status indicator 406;

- Tray 408 with icons for frequently used applications, such as one or more of the following:
 - Phone 138;
 - E-mail client 140, which may include an indicator 410 of the number of unread e-mails;
 - Browser 147; and
 - Music player 146; and
- Icons for other applications, such as one or more of the following:
 - IM 141;
 - Image management 144;
 - Camera 143;
 - Video player 145;
 - Weather 149-1;
 - Stocks 149-2;
 - Blog 142;
 - Calendar 148;
 - Calculator 149-3;
 - Alarm clock 149-4;
 - Dictionary 149-5; and
 - User-created widget 149-6.

[0090] In some embodiments, UI 400 displays all of the available applications 136 on one screen so that there is no need to scroll through a list of applications (e.g., via a scroll bar). In some embodiments, as the number of applications increase, the icons corresponding to the applications may decrease in size so that all applications may be displayed on a single screen without scrolling. In some embodiments, having all applications on one screen and a menu button enables a user to access any desired application with at most two inputs, such as activating the menu button 204 and then activating the desired application (e.g., by a tap or other finger gesture on the icon corresponding to the application).

[0091] In some embodiments, UI 400 provides integrated access to both widget-based applications and non-widget-based applications. In some embodiments, all of the widgets, whether user-created or not, are displayed in UI 400. In other embodiments, activating the icon for user-created widget 149-6 may lead to another UI (not shown) that contains the user-created widgets or icons corresponding to the user-created widgets.

[0092] In some embodiments, a user may rearrange the icons in UI 400, e.g., using processes described in U.S. Patent Application No. 11/459,602, "Portable Electronic Device With Interface Reconfiguration Mode," filed July 24, 2006, which is hereby incorporated by reference. For example, a user may move application icons in and out of tray 408 using finger gestures on or near corresponding icons displayed on the touch screen 112.

[0093] Figure 5 illustrates an exemplary user interface for a camera in accordance with some embodiments. In some embodiments, user interface 500 includes the following elements, or a subset or superset thereof:

- Viewfinder 502;
- Camera roll 504 that manages images and/or videos taken with the camera;
- Shutter 506 for taking still images;
- Record button 508 for starting and stopping video recording;
- Timer 510 for taking an image or recording a video after a predefined time delay; and
- Image 512 that appears (e.g., via the animation illustrated schematically in Figure 5) to be added to camera roll 504 when it is obtained.

[0094] Figure 6 illustrates an exemplary user interface for a virtual camera roll in accordance with some embodiments. The portable electronic device displays the user interface after a user finger gesture 514 on the camera roll icon 504 in Figure 5. In some embodiments, the finger gesture is a momentary, substantially single-position contact with the touch screen, while in other embodiments other finger gestures may be used. In some embodiments, user interface 600 includes the following elements, or a subset or superset thereof:

- 402, 404, and 406, as described above;
- Thumbnail images 602 of images and/or videos obtained by camera 143;

- Camera icon 604 that when activated (e.g., by a finger gesture on the icon) initiates transfer to the camera UI (e.g., UI 500);

[0095] Figure 16 is a flowchart illustrating a process for displaying thumbnail images on a touch screen in accordance with some embodiments. Upon detecting the finger gesture 514 (1602), the portable electronic device identifies a set of thumbnail images in the virtual camera roll (1604) and displays the thumbnail images on the touch screen (1606). In some embodiments, the thumbnail images are displayed in a 2-D array (Figure 6). In some other embodiments, the thumbnail images are displayed in a vertical column or a horizontal row. In some embodiments, a thumbnail image may have a description including a name, a file size, and a timestamp indicating when the image was created. In some embodiments, the thumbnail images of videos have a unique appearance that is visually distinguishable from the other still images. The portable electronic device displays the camera icon 604 at the bottom of the touch screen (1608) and starts monitoring next user contact with the touch screen (1610).

[0096] In some embodiments, the user may scroll through the thumbnail images 602 using vertically upward/downward finger gestures 606 on the touch screen (1612). Upon detecting such a finger gesture (e.g., a vertical finger swipe), the portable electronic device scrolls the set of thumbnail images accordingly (1618). In some embodiments, the scrolling gesture is independent of a horizontal position of the user contact with the touch screen display. In some embodiments, the scrolling gesture is substantially independent of a horizontal position of the user contact with the touch screen display (e.g., one or more side regions of the touch screen display may be reserved for other functions, such as functions corresponding to icons, soft keys or application navigation functions, and not available for the scroll gesture). In some embodiments, in response to a stationary gesture on a particular thumbnail image (1614), e.g., a finger tap 608 on the thumbnail image 602-11, the portable electronic device initiates a process of generating an enlarged display of the corresponding image (e.g., UI 700A) on the touch screen. A more detailed description of this process is provided below in connection with Figures 7 and 17. In some embodiments, upon detecting a user's finger gesture on the camera icon 604 (1616), the portable electronic device brings back the camera UI 500 as shown in Figure 5.

[0097] Figures 7A through 7C illustrate an exemplary user interface for viewing and manipulating images in accordance with some embodiments. Note that one skilled in the art

would understand that the term “image” in the present application covers both still images and video streams.

[0098] In some embodiments, user interface 700A includes the following elements, or a subset or superset thereof:

- 5 • 402, 404, 406, and 604, as described above;
- Camera roll icon 702 that when activated (e.g., by a finger gesture on the icon) initiates transfer to the camera roll UI (e.g., UI 600);
- Image 704;
- Additional options icon 706 that when activated (e.g., by a finger gesture on the icon)
10 initiates transfer to a UI with additional options for use of image 704 (e.g., UI 1200, Figure 12));
- Previous image icon 708 that when activated (e.g., by a finger gesture on the icon) initiates display of the previous image in the virtual camera roll (e.g., 602-10);
- Play icon 710 that when activated (e.g., by a finger gesture on the icon) initiates a
15 slide show of the images in the virtual camera roll;
- Next image icon 712 that when activated (e.g., by a finger gesture on the icon) initiates display of the next image in the virtual camera roll (e.g., 602-12); and
- Delete symbol icon 714 that when activated (e.g., by a finger gesture on the icon) initiates display of a UI to confirm that the user wants to delete image 704 (e.g. UI
20 700B, Figure 7B).

[0099] Figure 17 is a flowchart illustrating a process for performing operations in response to user contact with the touch screen in accordance with some embodiments. After detecting a user selection of a thumbnail image (1702), the portable electronic device identifies an image associated with the thumbnail image (1704). Generally, this identified
25 image is larger than the thumbnail image. In some embodiments, the thumbnail image is a sub-sampled version of the larger image. As shown in Figure 7A, the large image is displayed on the touch screen in replacement of all the thumbnail images (1706). The portable electronic device displays various icons at predefined locations on the touch screen (1708) and waits for next user contact with the touch screen (1710).

[00100] In some embodiments, as shown in Figure 7A, the portable electronic device performs the same operation(s) in response to different user contacts. In some embodiments, a user can browse images in the virtual camera roll through three different gestures: (i) a finger gesture on the previous/next image icon 708/712 (1716), (ii) a user image navigation gesture by a finger tap 715/718 adjacent to the left/right edge of the touch screen (1714), or
5 (iii) a leftward/rightward horizontal finger swipe gesture 720 on the touch screen (1712). Upon detecting any of these user gestures, the portable electronic device replaces the image on the touch screen with the previous/next one in the virtual camera roll (1724). In some
0 embodiments, this replacement is an animated process of moving the current image out of the touch screen to the right/left side and moving the previous/next image into the touch screen from the left/right side. With multiple means to perform the same task, the portable electronic device allows a user to choose whichever the user prefers, thereby making the photo management simpler and more intuitive. In some embodiments, the tap gestures 715 and 718 are used to magnify (e.g., by zooming in) an image by a predetermined amount,
5 rather than to view a previous or next image. For this case, the user is still provided with two different types of gestures for browsing images: (i) a finger gesture on the previous/next image icon 708/712 (1716) and (ii) a leftward/rightward horizontal finger swipe gesture 720 on the touch screen (1712).

[00101] In some embodiments, the portable electronic device rotates the image 704 by
10 an angle in response to a user image rotation gesture. For example, the user image rotation gesture may include three simultaneous finger contacts 722, 724 and 726 with the image 704. When the three finger contacts move in the directions indicated by the respective arrows for at least a predefined distance, the portable electronic device rotates the image 704 from a portrait orientation to a landscape orientation or from a landscape orientation to a portrait
15 orientation. In some embodiments, the rotation gesture is a two-finger multitouch gesture (e.g., simultaneous finger contacts 722 and 726). In some embodiments, the image rotates in response to detection of a change in the orientation of the device (e.g., using accelerometers to detect the orientation of the device). For example, the image may rotate to maintain proper viewing orientation as the touch screen 112 is physically rotated from a portrait orientation to
20 a landscape orientation.

[00102] In some embodiments, a user finger gesture on the additional options icon 706 (1718) triggers the portable electronic device to render additional operations on the image

704. A more detailed description of some exemplary operations associated with the icon 706 is provided below in connection with Figures 12 and 20.

[00103] In some embodiments, a user finger gesture on the delete symbol icon 714 (1717) causes the portable electronic device to provide a user interface 700B as shown in Figure 7B. Through the user interface 700B, the user can delete the current image 704 from the camera roll. The user interface 700B includes the following elements, or a subset or superset thereof:

- 402, 404, 406, 604, 702, and 704, as described above;
- Delete icon 716 that when activated (e.g., by a finger gesture on the icon) deletes the image 704; and
- Cancel icon 718 that when activated (e.g., by a finger gesture on the icon) returns the portable electronic device to the previous user interface (e.g. UI 700A)

[00104] Figure 18 is a flowchart illustrating a process for deleting an image in response to a user contact with the touch screen in accordance with some embodiments. Upon detecting a user contact with the delete symbol icon 714 (1802), the portable electronic device displays the delete icon 716, the cancel icon 718, and the camera icon 604 on top of the image 704 (1804) and then monitors next user contact with the touch screen (1806).

[00105] In some embodiments, in response to a finger gesture on the delete icon 716 (1810), the portable electronic device eliminates the icons 716, 718 from the touch screen (1816) and initiates an animated process of “shredding” the image 704 (1818). In some embodiments, the shredding process includes breaking the image 704 into vertical stripes and dropping the vertical stripes from the touch screen at different paces. Other shredding animations, such as placing the image in a trash icon, may be used in other embodiments.

[00106] In some embodiments, the portable electronic device brings back the camera roll user interface 600 as shown in Figure 6 after deleting the image 704. The user can then repeat any aforementioned processes shown in Figure 16. In some other embodiments, the portable electronic device displays the next image in the virtual camera roll on the touch screen. The user may repeat any aforementioned processes shown in Figure 17.

[00107] If the portable electronic device detects a finger gesture on the cancel icon 718 (1812), it the device brings back the user interface 700A as shown in Figure 7A. If the next user action is a finger gesture on the camera icon 604 (1814), the portable electronic device

switches back to the camera mode user interface 500, which allows the user to take new photos.

[00108] This deletion process, which requires user finger gestures on two different user interfaces (e.g., 700A and 700B), reduces the chance of a user accidentally deleting an image or other similar item.

[00109] In some embodiments, the portable electronic device stores images within different photo albums. The images may come from different sources. They may be downloaded from locations such as the user's desktop or laptop computer and a website on the Internet, etc. For example, one album may include images downloaded from a website through the web browser 147, images attached to email messages received by the user of the portable electronic device, and photos taken by the portable electronic device using the camera module 143.

[00110] Figure 8 illustrates an exemplary user interface for viewing photo albums in accordance with some embodiments. In some embodiments, user interface 800 includes the following elements, or a subset or superset thereof:

- 402, 404, and 406, as described above;
- Graphics 804, e.g., thumbnail images of the first picture or a user-selected picture in the corresponding albums;
- Album names 806;
- Selection icons 808 that when activated (e.g., by a finger gesture on the icon) initiates display of the corresponding album (e.g., UI 1000, Figure 10); and
- Settings icon 810, that brings up a settings menu (e.g., Figure 9) when activated by a user gesture (e.g., a tap gesture).

[00111] Figure 19 is a flowchart illustrating a process for displaying multiple photo albums on the touch screen in accordance with some embodiments. After detecting a finger gesture 412 (Figure 4) on the icon for the image management module 144 (1902), the portable electronic device identifies a set of photo albums (1904) and displays them on the touch screen (1906). Figure 8 depicts a vertically list of photo albums 804 list, each album having a thumbnail image 804, a name 806, and a selection icon 808. In some embodiments, the photo albums are ordered alphabetically by their names. In some other embodiments, the

photo albums are ordered by their creation timestamps, e.g., with the most recent one at the top of the list.

[00112] The portable electronic device displays a setting icon 810 at the bottom of the touch screen (1908) and monitors user contact with the touch screen (1910). As will be described below in connection with Figure 9, a user can configure the image management module 144 to operate in a user-chosen manner through the setting icon 810.

[00113] If there is a long photo album list, the user may scroll through the list using vertically upward/downward finger gestures 812 such as a vertical finger swipe on the touch screen (1912, 1920). When the user selects a particular album by a finger gesture (1914), the portable electronic device opens the album by executing the process described above in connection with Figure 16. The virtual camera roll shown in Figure 6 is one of many photo albums. User operations associated with the virtual camera roll also applies to images in a user-chosen album. A more detailed description of exemplary user operations is provided below in connection with Figures 10-12. In some embodiments, a user may initiate display of an album by contacting any region on the touch screen corresponding to the album (e.g., a finger tap on the graphic 804, album name 806, or selection icon 808).

[00114] Upon detecting a finger gesture on the setting icon 810 (1916), the portable electronic device renders a Settings user interface that enables the user to configure the image management service (1918). Figure 9 illustrates an exemplary Settings user interface 900 for setting user preferences in accordance with some embodiments. In some embodiments, user interface 900 includes the following elements, or a subset or superset thereof:

- 402, 404, and 406, as described above;
- Music setting 902 for selecting the music during a slide show (e.g., Now Playing, 90s Music, Recently Added, or Off);
- Repeat setting 904 for selecting whether the slide show repeats (e.g., On or Off);
- Shuffle setting 906 for selecting whether the images in the slide show are displayed in a random or pseudo-random order (e.g., On or Off);
- Time per slide setting 908 (e.g., 2, 3, 5, 10, 20 seconds or manual);
- Transition setting 910 (e.g., random, wipe across, wipe down, or off);
- TV out setting 912 for external display (e.g., on, off, or ask user);

- TV signal setting 914 (e.g., NTSC or PAL);
- Auto Rotate setting 916 (e.g. on or off);
- Done icon 918 that when activated (e.g., by a finger gesture on the icon) returns the portable electronic device to the previous UI (e.g., UI 800); and
- 5 • Selection icons 920 that when activated (e.g., by a finger gesture on the icon) show choices for the corresponding settings.

[00115] In some embodiments, a user may touch anywhere in a row for a particular setting to initiate display of the corresponding setting choices. For example, upon detecting a finger tap on TV Signal setting 914, the portable electronic device brings up a dropdown
.0 menu adjacent to the corresponding row. The dropdown menu lists configuration options associated with the setting. The user can select one option over another by applying a finger gesture on the selected option.

[00116] Figure 10 illustrates an exemplary user interface for viewing an album in accordance with some embodiments. In some embodiments, user interface 1000 includes the
.5 following elements, or a subset or superset thereof:

- 402, 404, and 406, as described above;
- Photo albums icon 1002 that when activated (e.g., by a finger gesture on the icon) initiates transfer to the photo albums UI (e.g., UI 800);
- Thumbnail images 1006 of images in the corresponding album;
- 2.0 • Play icon 1008 that when activated (e.g., by a finger gesture on the icon) initiates a slide show of the images in the album;

[00117] The user interface 1000 is similar to the user interface 600 associated with the camera roll icon 504. Both user interfaces perform similar operations upon detecting a user contact with the thumbnail images. For example, the user may scroll through the thumbnails
2.5 1006 using vertically upward/downward gestures 1010 on the touch screen. In some embodiments, a stationary gesture on a particular thumbnail (e.g., a finger tap 1012 on thumbnail 1006-11) initiates transfer to an enlarged display of the corresponding image (e.g., UI 1100).

[00118] In some embodiments, there are differences between the two user interfaces.
3.0 For example, the user interface 1000 has a play icon 1008 while the user interface 600 has a

camera icon 604. A user selection of the play icon 1008 triggers the portable electronic device to begin a slide show of the images in the user-selected album. In contrast, the portable electronic device returns to the camera mode (e.g., for taking pictures) when there is a user finger gesture on the camera icon 604.

5 [00119] Upon user selection of a particular image, the portable electronic device renders a new user interface displaying the user-selected image. Figure 11 illustrates such an exemplary user interface for viewing images in an album in accordance with some embodiments. In some embodiments, user interface 1100 includes the following elements, or a subset or superset thereof:

- 0 • 402, 404, and 406, as described above;
- Album name icon 1102 that when activated (e.g., by a finger gesture on the icon) initiates transfer to the corresponding album UI (e.g., UI 1000);
- Image 1106;
- Additional options icon 1108 that when activated (e.g., by a finger gesture on the
5 icon) initiates transfer to a UI with additional options for use of image 1106 (e.g., UI 1200, Figure 12));
- Previous image icon 1110 that when activated (e.g., by a finger gesture on the icon) initiates display of the previous image in the album (e.g., 1006-10);
- Play icon 1112 that when activated (e.g., by a finger gesture on the icon) initiates a
10 slide show of the images in the album; and
- Next image icon 1114 that when activated (e.g., by a finger gesture on the icon) initiates display of the next image in the album.

[00120] Clearly, the user interface 1100 is very similar to the user interface 700A. Various image browsing functions described above with respect to Figure 7A are also
15 available at the user interface 1100. For example, the user can initiate viewing of the previous image by making a tap gesture 1118 on the left side of the image or making a swipe gesture 1116 from left to right on the image. Similarly, the user can initiate viewing of the next image by making a tap gesture 1120 on the right side of the image or making a swipe gesture 1116 from right to left on the image.

[00121] In some embodiments, image 1106 moves off screen to the left as the next image moves on screen from the right. In some embodiments, image 1106 moves off screen to the right as the previous image moves on screen from the left.

[00122] With multiple ways to perform the same task, the portable electronic device enables a user to choose whichever methodology or gesture the user prefers, thereby making the photo management simpler and more intuitive.

[00123] A detailed description of the portable electronic device's operations in response to user selections of the previous image icon 1110, the play icon 1112, and the next image icon 1114 have been provided above in connection with Figures 7A and 17. In response to a user contact with the additional options icon 706 (Figure 7A) or 1108 (Figure 11), the portable electronic device renders a new interface with additional options for the user to choose in connection with the image being displayed.

[00124] Figure 12 illustrates such an exemplary user interface for selecting a use for an image in an album in accordance with some embodiments. In some embodiments, user interface 1200 includes the following elements, or a subset or superset thereof:

- 402, 404, 406, 1602, and 1106 as described above;
- Email photo icon 1208 that when activated (e.g., by a finger gesture on the icon) initiates a process for incorporating the image 1106 in an email (e.g., as illustrated in Figures 13A-13G);
- Assign to contact icon 1210 that when activated (e.g., by a finger gesture on the icon) initiates a process for associating the image 1106 with a contact in the user's contact list (e.g., as illustrated in Figures 14A-14B);
- Use as wallpaper icon 1212 that when activated (e.g., by a finger gesture on the icon) initiates a process for incorporating the image 1106 in the user's wallpaper (e.g., as illustrated in Figure 15); and
- Cancel icon 1214 that when activated (e.g., by a finger gesture on the icon) initiates transfer back to the previous UI (e.g., UI 1100).

[00125] In some embodiments, as shown in Figure 12, the image 1106 is displayed in the background and one or more the function icons 1208, 1210, 1212, 1214, are superimposed over the displayed image 1106.

[00126] Figure 20 is a flowchart illustrating a process for performing additional operations upon a user selection of an additional options icon (e.g., icon 1108 in UI 1100, Figure 11) in accordance with some embodiments. Upon detecting a finger gesture 1122 on the additional options icon (2002), the portable electronic device displays a list of option icons on the touch screen (2004). Each option icon corresponds to a specific operation on the image being displayed. As shown in Figure 12, the list includes Email photo icon 1208, Assign to contact icon 1210, Use as wallpaper icon 1212, and Cancel icon 1214. In some other embodiments, the user interface 1200 may include a subset of these icons, and may also include additional image usage icons for invoking other image usage functions.

[00127] If the user selects the email photo icon 1208 by a finger gesture (2008), the portable electronic device renders an email service interface that allows the user to send the image 1106 to somebody through email. If the user selects the assign to contact icon 1210 (2010), the portable electronic device displays a user interface (having a list of contacts) for the user to select a contact to be associated with the image 1106. Similarly, if the user selects the use as wallpaper icon 1212 (2012), the portable electronic device displays a user interface for the user to edit the image 1106 and set it as the portable electronic device's wallpaper.

[00128] Figure 21 is a flowchart illustrating an animated process for rendering an email service interface that includes a user selected image in accordance with some embodiments. After detecting the user selection of Email photo icon 1208 (2102), the portable electronic device animates a process of introducing an email message template onto the touch screen and placing the image into a predefined region of the email message template. In some embodiments, the animation includes initially reducing the image's size (Figure 13A) (2104); sliding or otherwise rendering an email message template behind the image 1106 (Figure 13B) (2106); and fitting the image into the message body field (Figure 13C) of an email composition user interface 1300C (2108).

[00129] In some embodiments, following the animation, the device monitors the touch screen for user contact (2110). When the user taps on or makes other predefined gestures 1302 (Figure 13D) on the To: field of the email recipient field to enter an email address (2112). The portable electronic device then displays the user's contact list (2122) (Figure 13E). After detecting a user finger gesture or other predefined gesture on a recipient/contact (2124) (e.g., a finger tap 1316 on Bob Adams in Figure 13E), the portable electronic device

associates the recipient's email address with the email message and displays the contact's name in the To: field (2126) (e.g., "Bob Adams" in Figure 13F).

[00130] In some embodiments, in response to a user finger tap or other predefined gestures on predefined fields within the email message template (2114, 2116) (e.g., finger taps 1304, 1306 in Figure 13D, or "Other Email" in Figure 13E), the portable electronic device displays a letter keyboard 616 (2128) on the touch screen. The user may enter text into the respective fields through the letter keyboard 616 (Figure 13F). In some embodiments, the user may also enter an email address by tapping on character icons in the letter keyboard or other character keyboards.

[00131] As shown in Figure 13G, after detecting a finger gesture on the send icon 1314 (2120), the portable electronic device sends the email message to its recipient(s) (2132) and returns to the user interface 1000 or 1100. But if the user selects the cancel icon 1308 (2118), the portable electronic device may display the save draft icon 1310 and the don't save icon 1312 (2130). The device saves the draft in a draft folder associated with the e-mail client module 140 if the user chooses the save draft icon 1310 or deletes the draft if the user chooses the don't save icon 1312.

[00132] Assuming that the user taps or makes other predefined gestures on the assign to contact icon 1210 shown in Figure 12, Figure 22 is a flowchart illustrating a process for assigning an image to a user selected contact in the user's contact list in accordance with some embodiments.

[00133] Upon a user selection of the assign to contact icon 1210, the portable electronic device displays the user's contact list (Figure 14A). After the user selects a contact in the contact list (e.g., a finger tap 1401 on Bob Adams in Figure 14A), the portable electronic device produces a new user interface 1400B as shown in Figure 14B and monitors next user contact with the touch screen (2208). In some embodiments, the user interface 1400B includes the user instructions 1402 (2202), the user-selected image 1106 (2204), the cancel icon 1404 and the set photo icon 1406 (2206).

[00134] The portable electronic device modifies the image (2214) in response to a user finger gesture on the image 1106 (2212). For example, the user may crop, scale, and otherwise adjust the image 1106 using different types of finger gestures. In some embodiments, the portable electronic device moves the image on the touch screen in response

to a movement of one-finger contact gesture 1408; enlarges the image in response to a de-pinching gesture including at least two simultaneous and continuous contacts 1410 and 1412; reduces the image in response to a pinching gesture including at least two simultaneous and continuous contacts 1410 and 1412; and/or rotates the image in response to a twisting gesture including two or more simultaneous and continuous contacts 1410 and 1412.

[00135] In some embodiments, the user assigns the modified image to the user-selected contact by tapping on the set photo icon 1406 (2216). This triggers the portable electronic device to associate the modified image with the contact. If the user selects the cancel icon 1404 (2218), the portable electronic device terminates the image assignment and brings back the user interface 1100.

[00136] If the user taps or makes other predefined gestures on the use as wallpaper icon 1212 in Figure 12, the portable electronic device displays a user interface for incorporating an image in the user's wallpaper. Figure 15 illustrates such an exemplary user interface 1500 in accordance with some embodiments.

[00137] In some embodiments, this wallpaper setting process is similar to the assign to contact process. For example, the user may move the image with a one-finger gesture 1508; enlarge the image with a de-pinching gesture using multiple contacts 1510 and 1512; reduce the image with a pinching gesture using multiple contacts 1510 and 1512; and/or rotate the image with a twisting gesture using multiple contacts 1510 and 1512.

[00138] The wallpaper setting process is completed after the user selects the set photo icon 1506. If the user selects the cancel icon 1504, the portable electronic device stops the assignment process and brings back the UI 1100 in Figure 11. In some embodiments, the interface 1500 also includes user instruction information 1502.

[00139] Figures 23A-23H illustrate an exemplary user interface for viewing digital objects in a set of digital objects in accordance with some embodiments.

[00140] In Figure 23A, the displayed digital object is a digital image 2300-1. In this example, the entire image 2300-1 is displayed in Figure 23A. This exemplary image includes a first person 2302-1 and a second person 2302-2. In response to detecting a de-pinching gesture 2304 and 2306 on or about the second person 2302-2, a command to zoom in on a portion of the image 2300-1 that includes the second person 2302-2 is executed. Upon execution of the command to zoom in, a reduced portion of the image 2300-1 is displayed at

a higher magnification than in Figure 23A. For example, in Figure 23B the second person 2302-2 is shown at a higher magnification than in Figure 23A and the first person 2302-1 is no longer shown.

[00141] In Figure 23C, a swipe gesture 2310 is detected on or near the touch screen display. In response, the displayed portion of the image 2300-1, including the second person 2302-2, is translated in a direction corresponding to the direction of the swipe gesture 2310, as shown in Figures 23C-23D, where the image is translated horizontally from right to left. An edge 2312 of the (enlarged) image 2300-1 is displayed in Figure 23D. In response to continued detection of the swipe gesture 2310 (Figure 23D), an area 2314 beyond the edge 2312 is displayed (e.g., a black area or other area visually distinct from the digital object). After the swipe gesture 2310 is no longer detected, as shown in Figure 23E, the image 2300-1, including the image of the second person 2302-2, is translated in a second direction 2316 until the area 2314 is no longer displayed (e.g., horizontally from left to right).

[00142] In response to detection of a second swipe gesture 2318, the displayed portion of the image 2300-1 is translated in a direction corresponding to the direction of the second swipe gesture 2318, as shown in Figure 23G, and a second digital image 2300-2 is displayed. In some embodiments, as shown in Figures 23G and 23H, the second digital image 2300-2 (or, more generally, digital object) slides on to the touch screen as the first digital image 2300-1 slides off of the touch screen.

[00143] In this example, the display of area 2314 lets the user know that the edge of the (enlarged) digital object has been reached during the first gesture 2310. Upon detecting the second gesture 2318 in the same or substantially the same direction as the first gesture, the device transitions to the display of another image in a set of images, rather than just repeating the visual indication that the edge of the digital object has been reached.

[00144] Figure 24 is a flowchart illustrating a process 2400 for viewing digital objects in a set of digital objects in accordance with some embodiments.

[00145] In some embodiments, a device with a touch screen display (e.g., device 100, a tablet computer, or a desktop computer with a touch screen display) detects (2402) a first movement of a physical object on or near the touch screen display. In some embodiments, the device is a portable electronic device. In some embodiments, the physical object is a finger.

In some embodiments, the physical object is a stylus. In some embodiments, the first movement is a horizontal swipe gesture (e.g., 2310, Figure 23C).

[00146] While detecting the first movement, the device translates (2404) a first digital object (e.g., a digital image 2300-1) displayed on the touch screen display in a first direction.

5 In some embodiments, prior to the translating, at least one edge of the first digital object extends beyond the touch screen display in the first direction.

[00147] The first digital object is associated with a set of digital objects. In some embodiments, the set of digital objects is a set of digital images (e.g., 2300-1, 2300-2, etc., which may be part of an album or part of a set of images taken with a camera in the device).

10 In some embodiments, the set of digital objects is a set of web pages (e.g., a set of web pages selected by a user for display in a browser). In some embodiments, the set of digital objects is a set of electronic documents.

[00148] In response to display of a previously hidden edge (e.g., edge 2312, Figure 23D) of the first digital object and continued detection of the first movement (e.g., swipe gesture 2310, Figure 23D), the device displays (2406) an area beyond the edge of the first digital object (e.g., area 2314).

15 [00149] After the first movement is no longer detected, the device translates (2408) the first digital object in a second direction until the area beyond the edge of the first digital object is no longer displayed. For example, in Figure 23E the digital image 2300-1 is translated in a direction 2316 (e.g., horizontally from left to right) until the area 2314 is no longer displayed. In some embodiments, the second direction is opposite the first direction. In some embodiments, the first digital object is translated in the second direction using a damped motion. In some embodiments, the change from translating the first digital object in the first direction to translating the first digital object in the second direction until the area
20 beyond the edge of the first digital object is no longer displayed makes the edge of the first digital object appear to be elastically attached to an edge of the touch screen display or to an edge displayed on the touch screen display.

[00150] The device detects (2410) a second movement (e.g., a second swipe gesture 2318 from right to left, Figure 23F) of the physical object on or near the touch screen display.

25 [00151] In response to detecting the second movement while the previously hidden edge of the first digital object is displayed (e.g., edge 2312, Figure 23F), the device translates

(2412) the first digital object in the first direction and displays a second digital object (e.g., a digital image 2300-2, Figures 23G and 23H) in the set of digital objects.

[00152] Thus, depending on the context, similar movements (e.g., 2310 and 2318 are both right to left swipe gestures) allow a user to either (1) translate a displayed first digital object or (2) transition from displaying the first digital object to displaying a second digital object in a set of digital objects.

[00153] In some embodiments, the time between the first and second movements must be less than a predetermined value (e.g., 0.5 seconds). Otherwise, the device will not transition to displaying the second digital object. Rather, the device may just translate the first digital object and show the area beyond the edge of the object (to show the user again that the edge of the first digital object has been reached).

[00154] In some embodiments, if the entire first digital object is displayed (e.g., Figure 23A), then the first movement (e.g., a horizontal swipe gesture) will transition the device to display another digital object in the set of digital objects.

[00155] Process 2400 permits a touch screen user to easily navigate within a displayed digital object and between digital objects in a set of digital objects.

[00156] The foregoing description, for purpose of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated.

Claims for 2nd Short Term Patent in Hong Kong

Portable Electronic Device for Photo Management

What is claimed is:

1. An electronic device, comprising:
 - a display;
 - one or more processors;
 - memory; and
 - a program, wherein the program is stored in the memory and configured to be executed by the one or more processors, the program including:
 - instructions for detecting a first movement of a physical object on or near the touch screen display;
 - instructions for, while detecting the first movement, translating a first digital object displayed on the touch screen display in a first direction, wherein the first digital object is associated with a set of digital objects;
 - instructions for, in response to display of a previously hidden edge of the first digital object and continued detection of the first movement, displaying an area beyond the edge of the first digital object;
 - instructions for, after the first movement is no longer detected, translating the first digital object in a second direction until the area beyond the edge of the first digital object is no longer displayed;
 - instructions for detecting a second movement of the physical object on or near the touch screen display; and
 - instructions for, in response to detecting the second movement while the previously hidden edge of the first digital object is displayed, translating the first digital object in the first direction and displaying a second digital object in the set of digital objects.
2. The electronic device of claim 1, wherein, prior to the translating while detecting the first movement, at least one edge of the first digital object extends beyond the touch screen display in the first direction.
3. The electronic device of claim 1, wherein the physical object is a finger.

4. The electronic device of claim 1, wherein the physical object is a stylus.
5. The electronic device of claim 1, wherein the first movement is a horizontal swipe gesture.
6. The electronic device of claim 1, wherein the set of digital objects is a set of digital images.
7. The electronic device of claim 1, wherein the set of digital objects is a set of web pages.
8. The electronic device of claim 1, wherein the set of digital objects is a set of electronic documents.
9. The electronic device of claim 1, wherein the device is a portable electronic device.
10. The electronic device of claim 1, wherein the second direction is opposite the first direction.
11. The electronic device of claim 1, wherein the first digital object is translated in the second direction using a damped motion.
12. The electronic device of claim 1, wherein the time between the first and second movements must be less than a predetermined value for the device to display the second digital object.
13. The electronic device of claim 1, wherein if the entire first digital object is displayed, then the device displays another digital object in the set of digital objects in response to detecting the first movement.

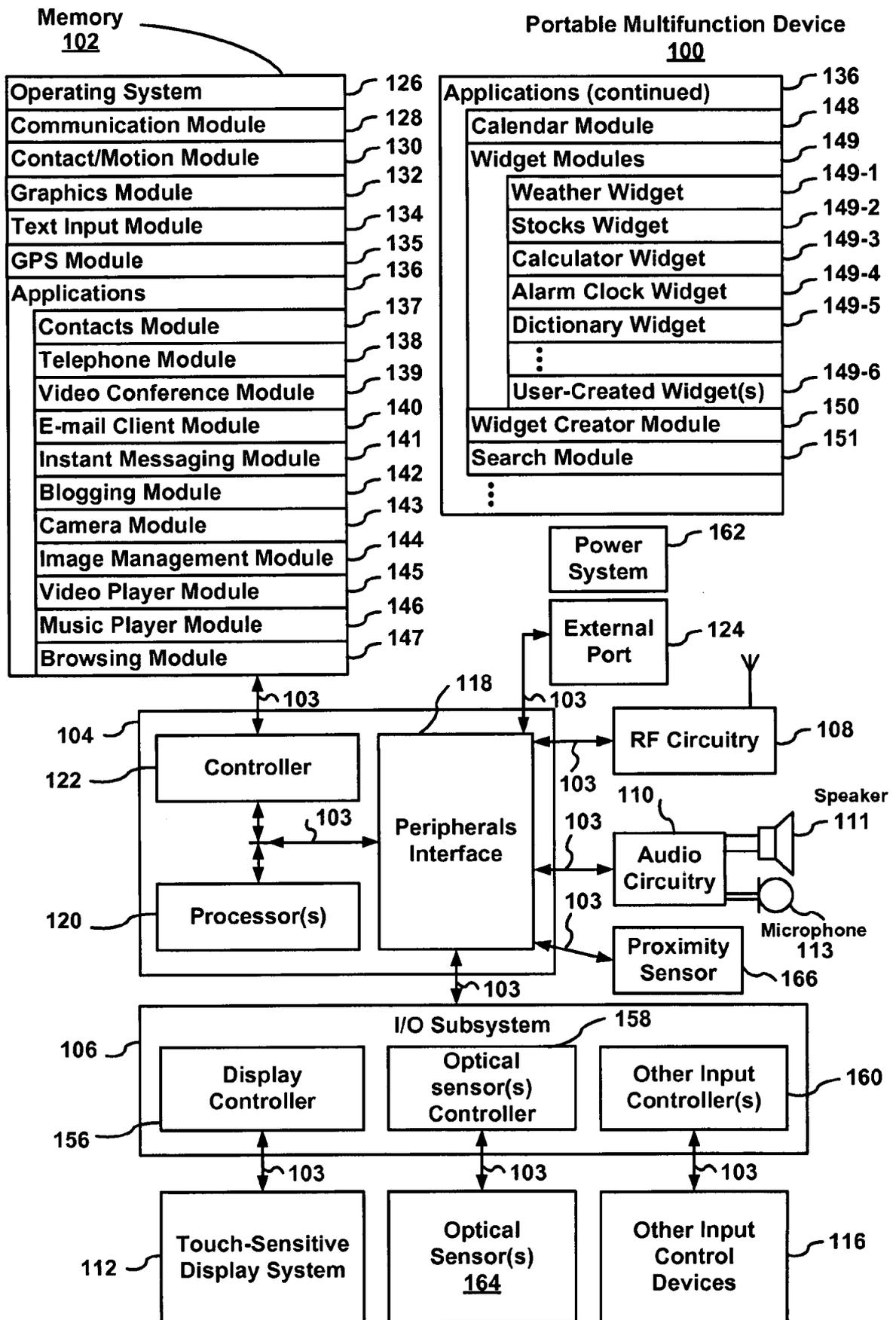


Figure 1
1/36

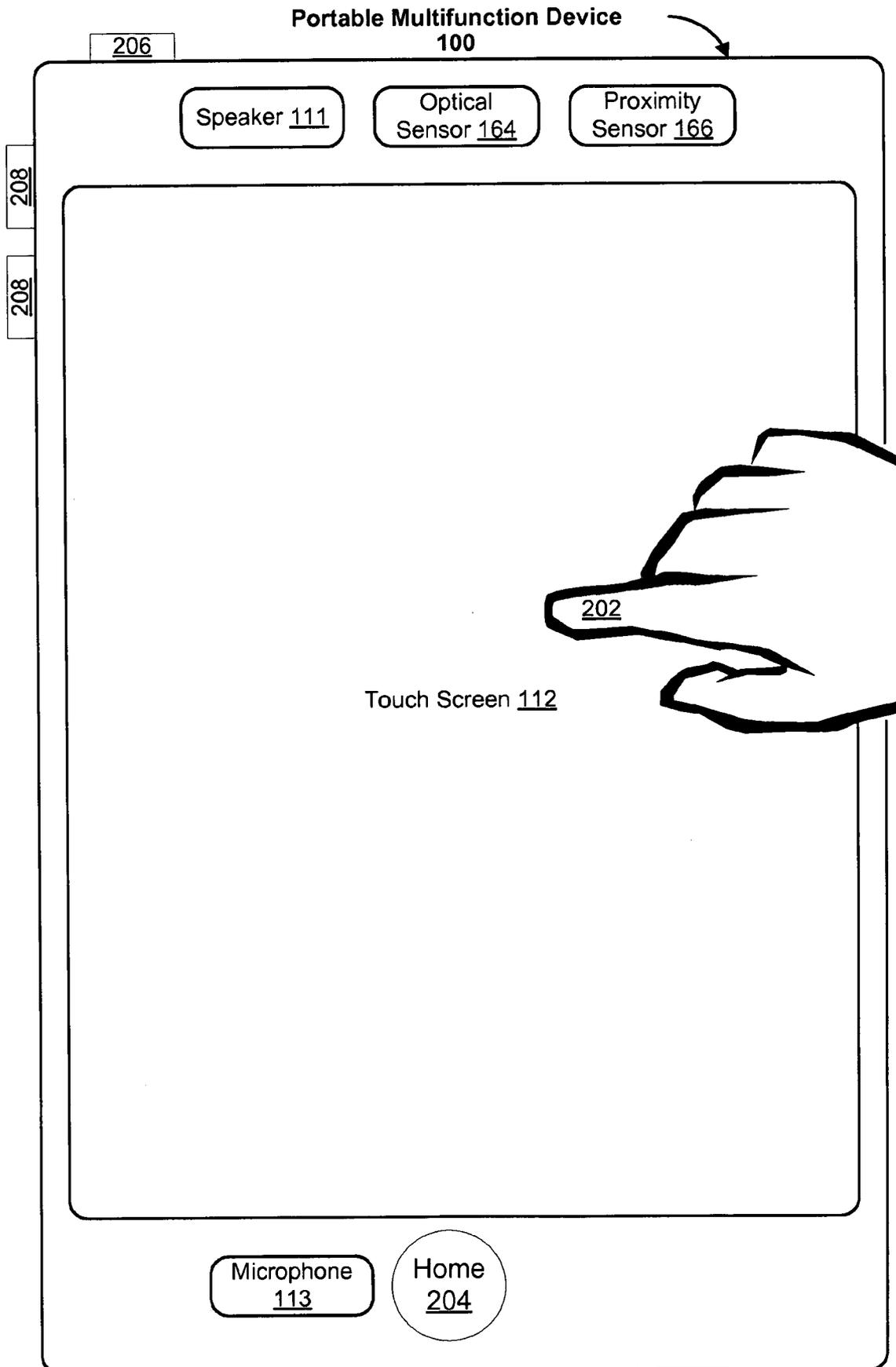


Figure 2
2/36

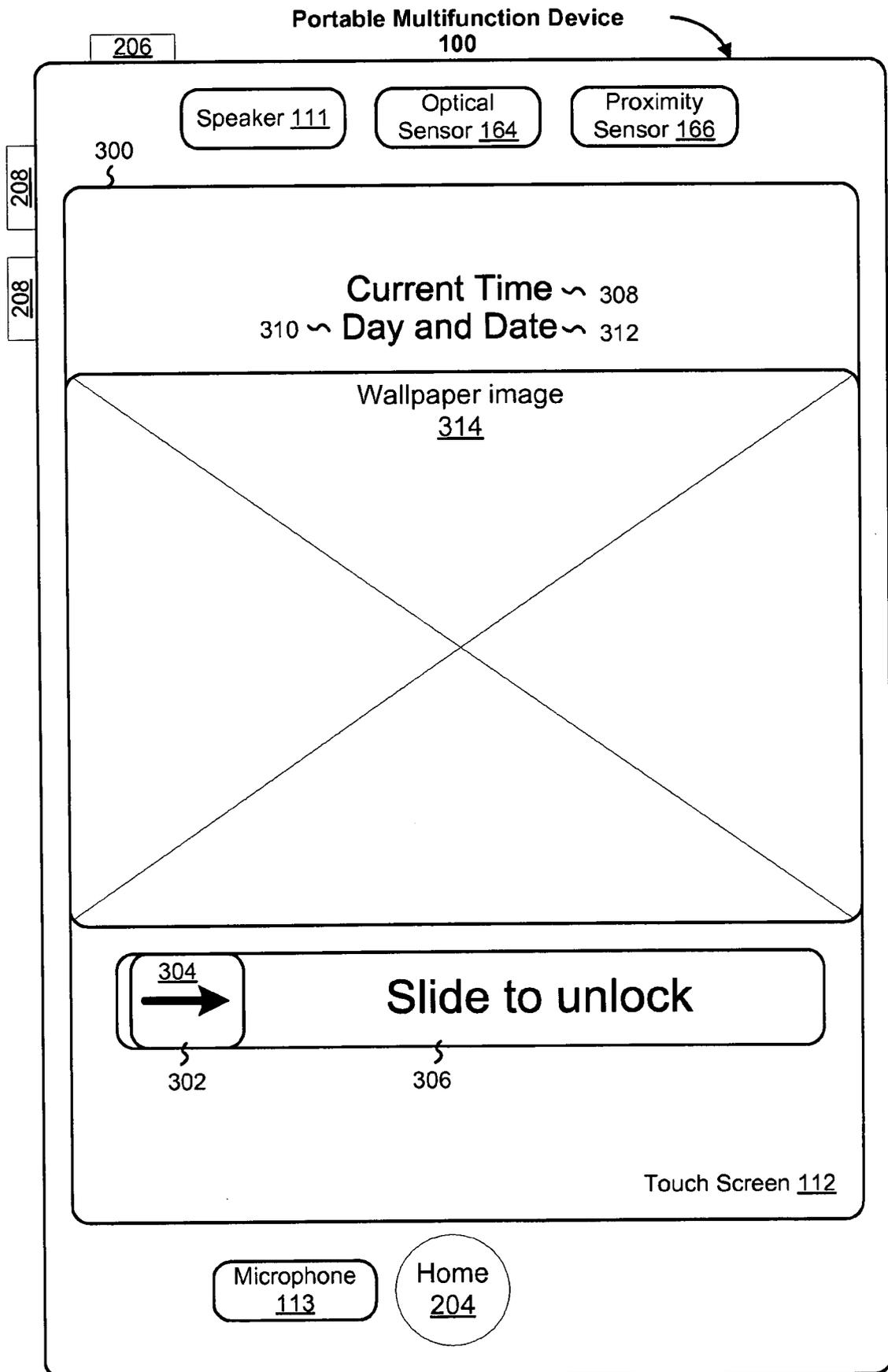


Figure 3
3/36

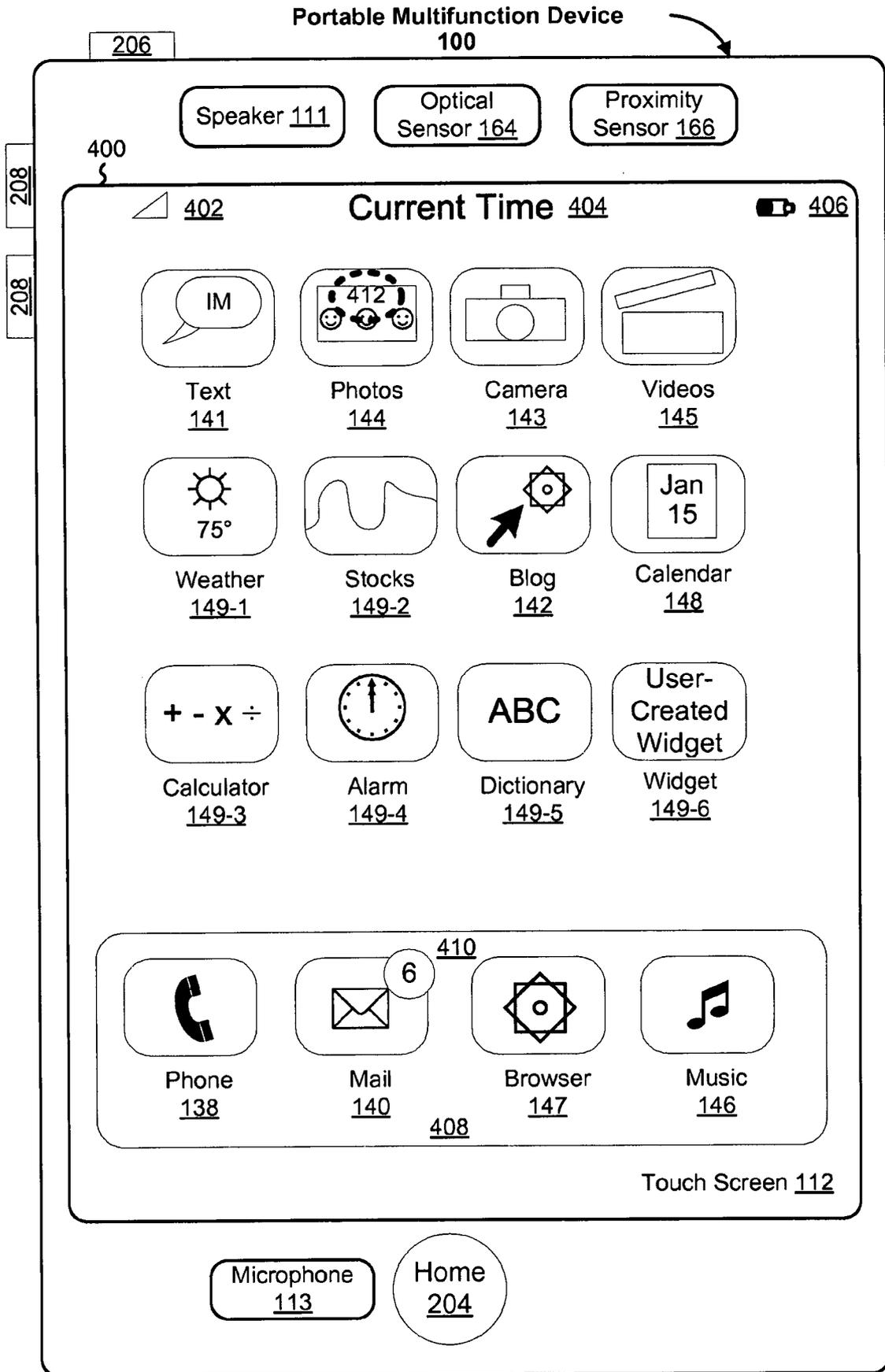


Figure 4
4/36

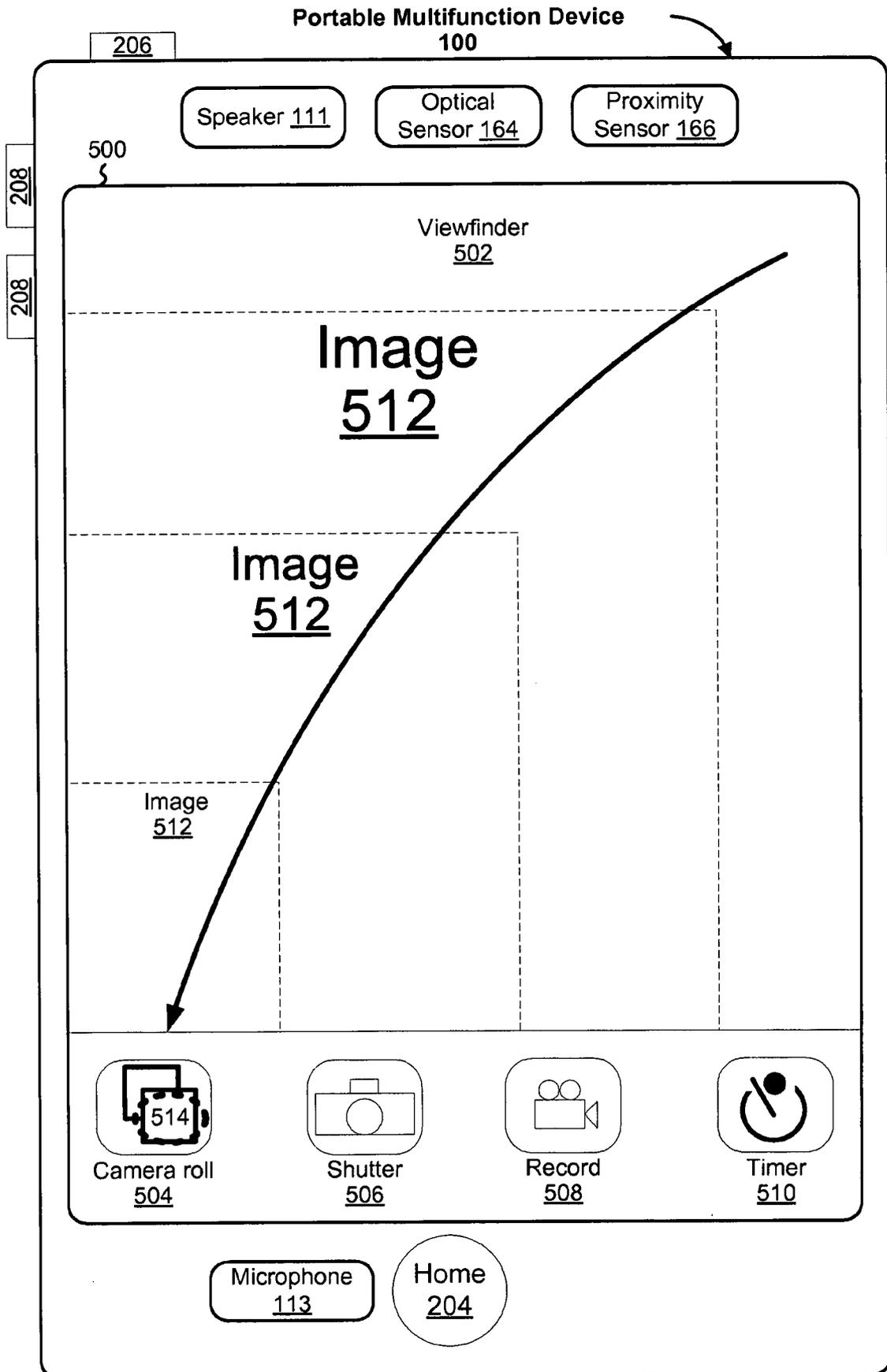


Figure 5
5/36

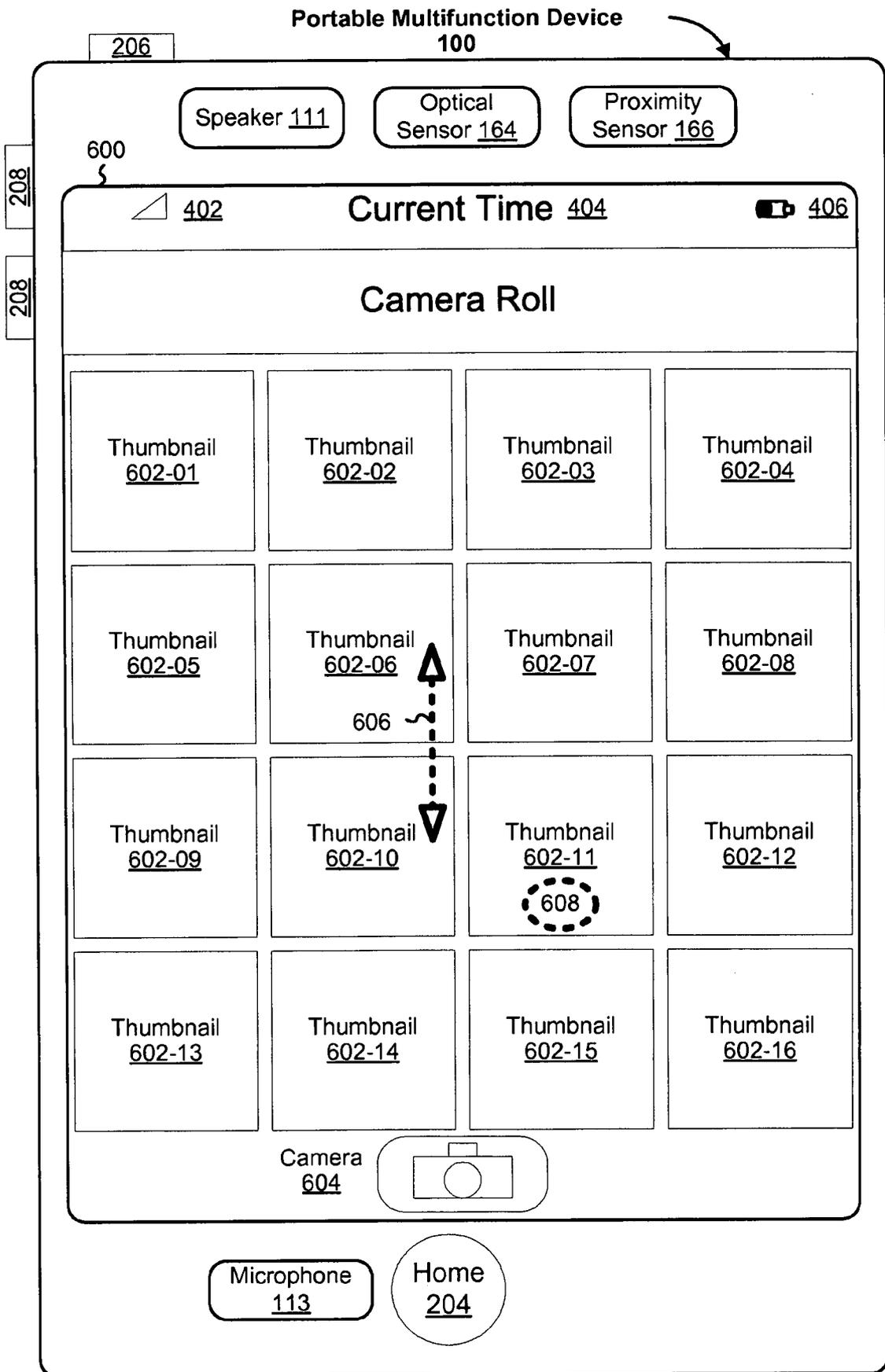


Figure 6

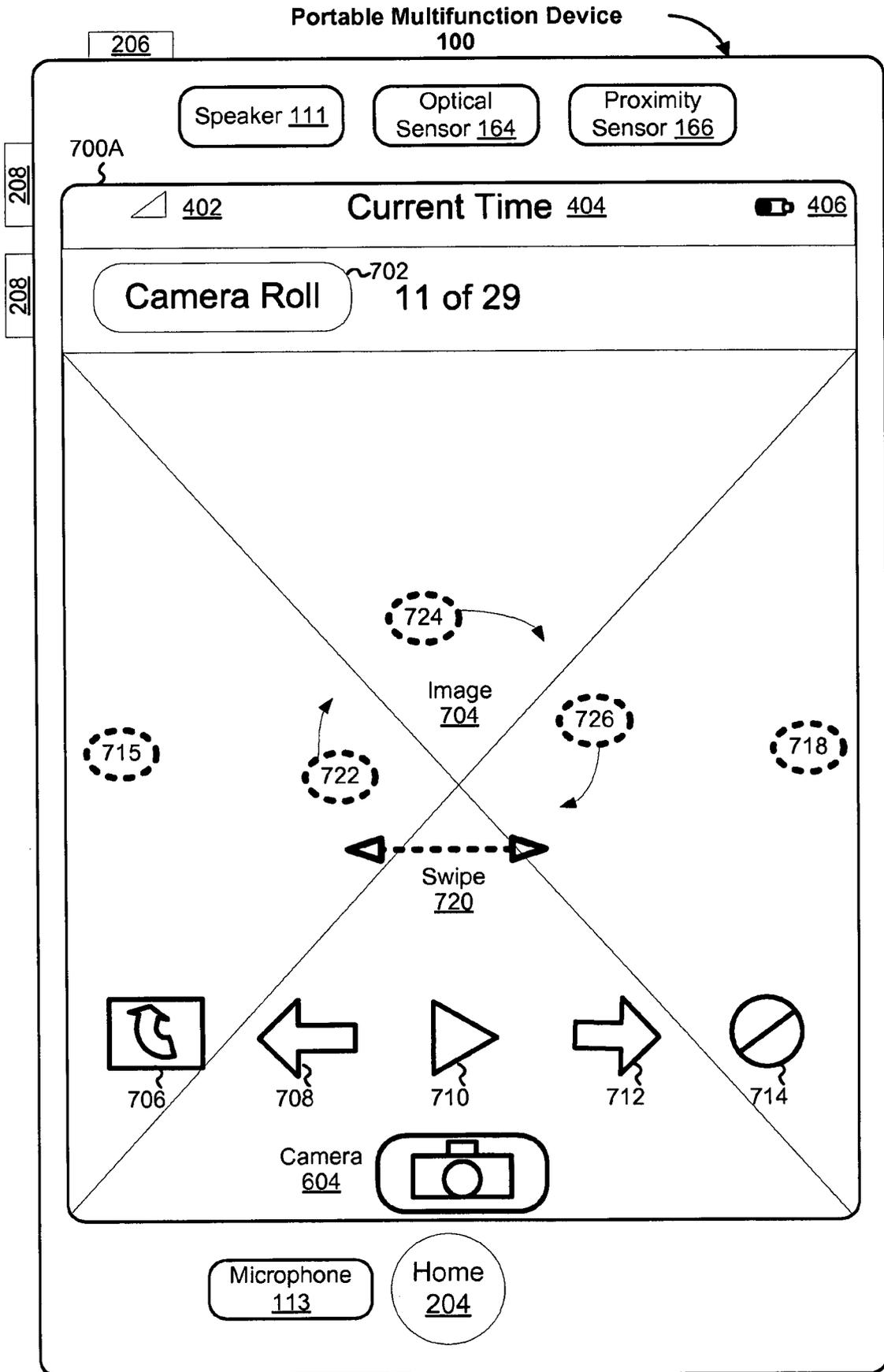


Figure 7A
7/36

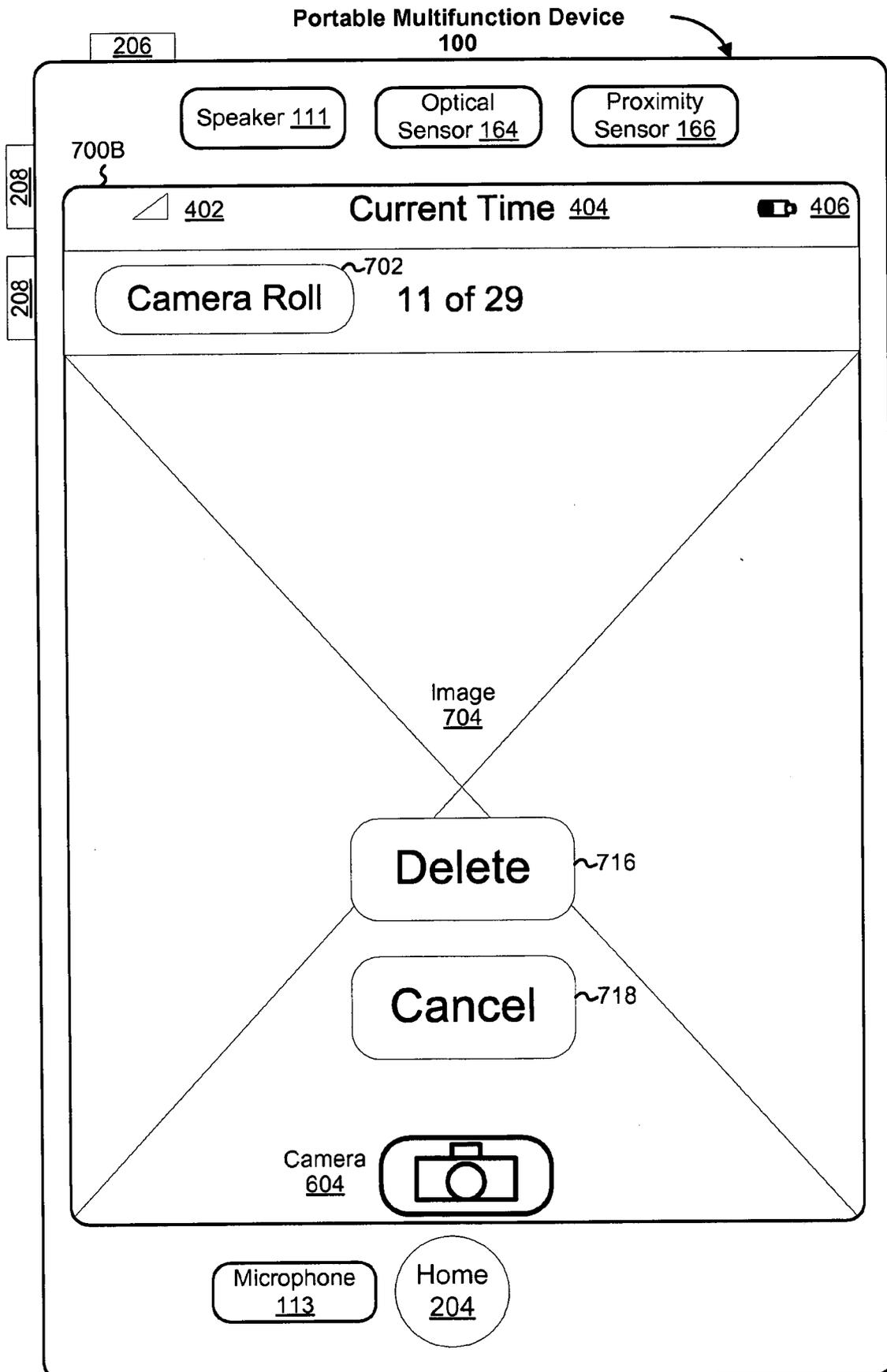


Figure 7B
8/36

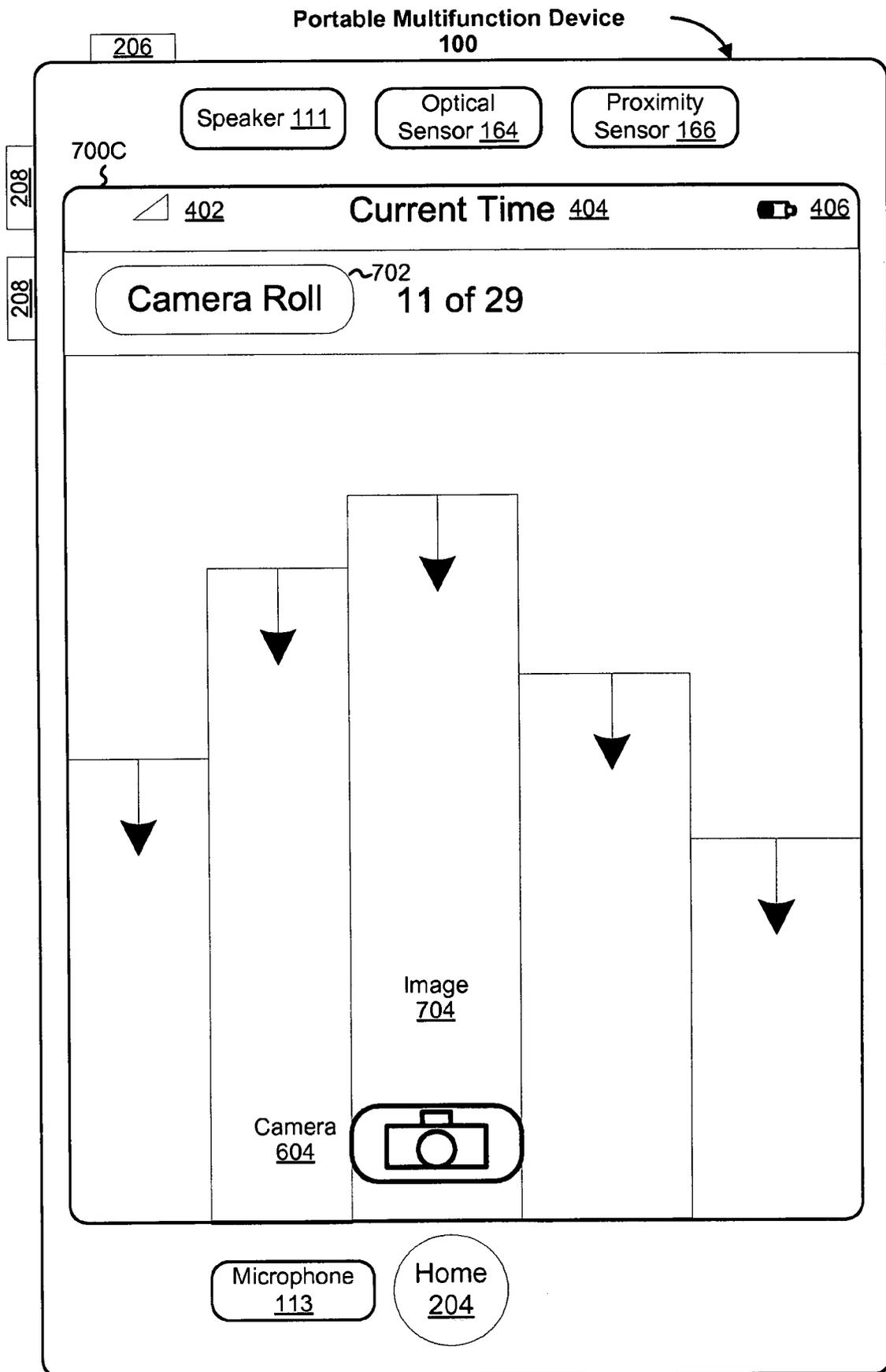


Figure 7C
9/36

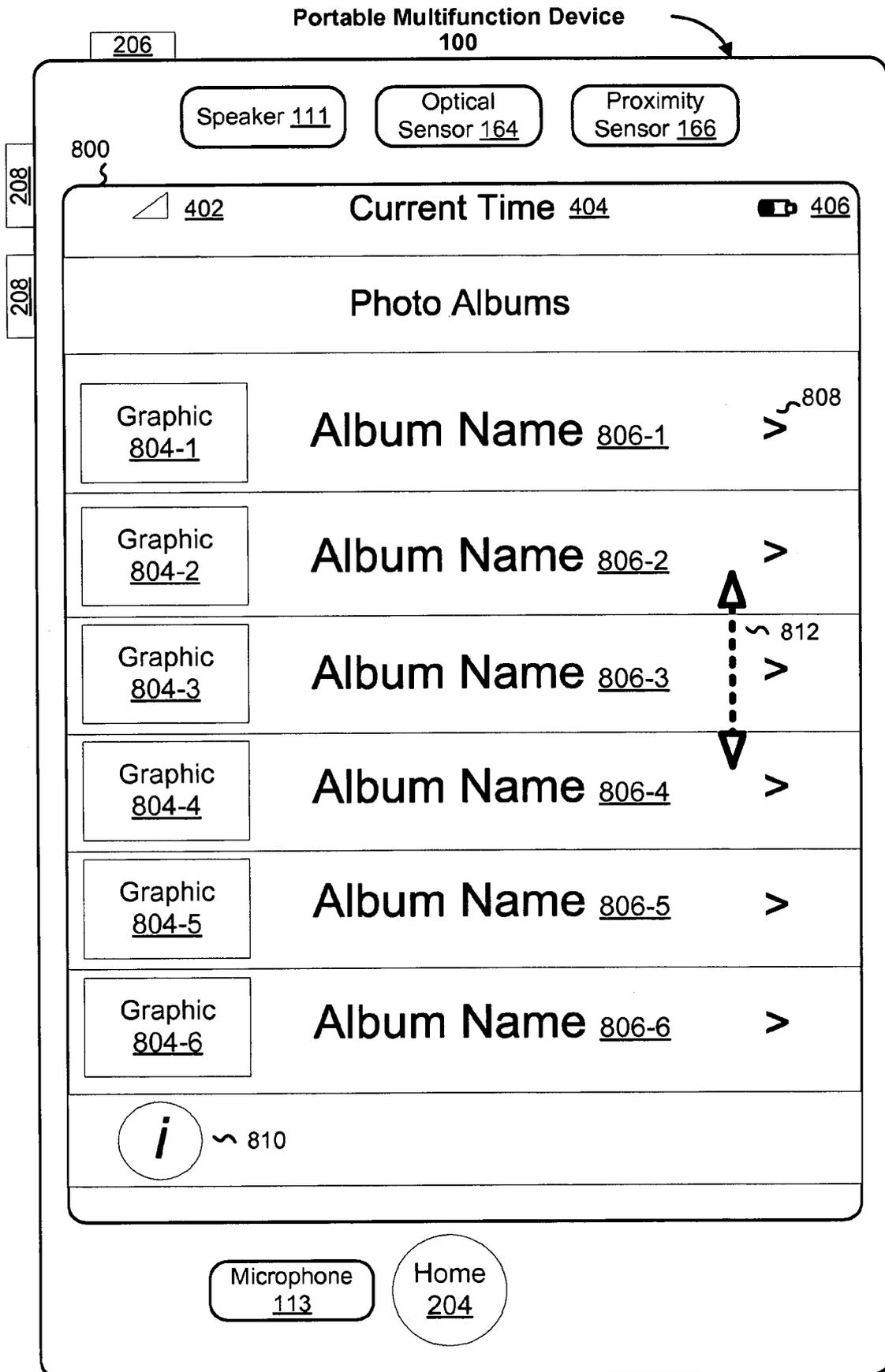


Figure 8
10/36

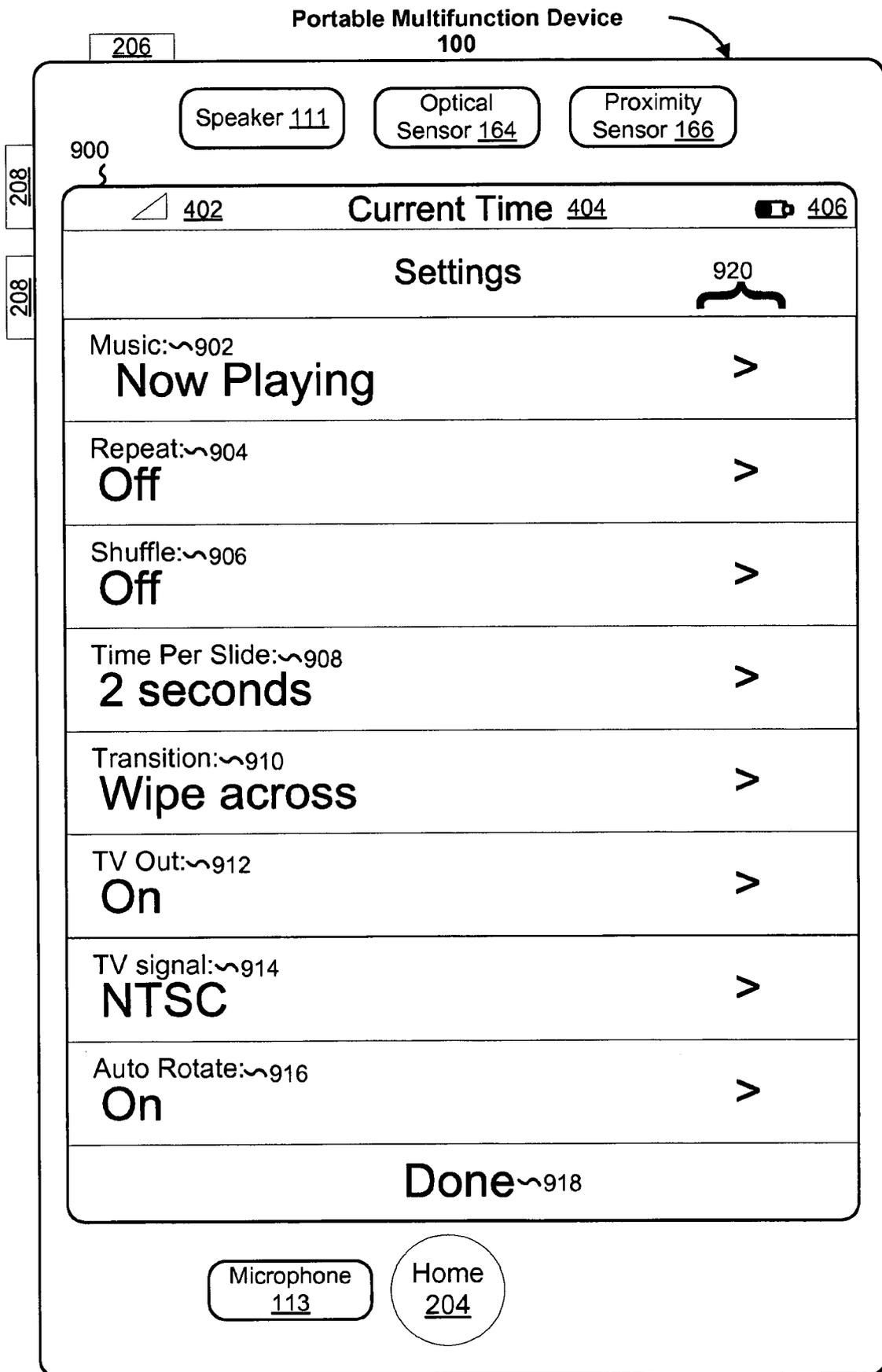


Figure 9
11/36

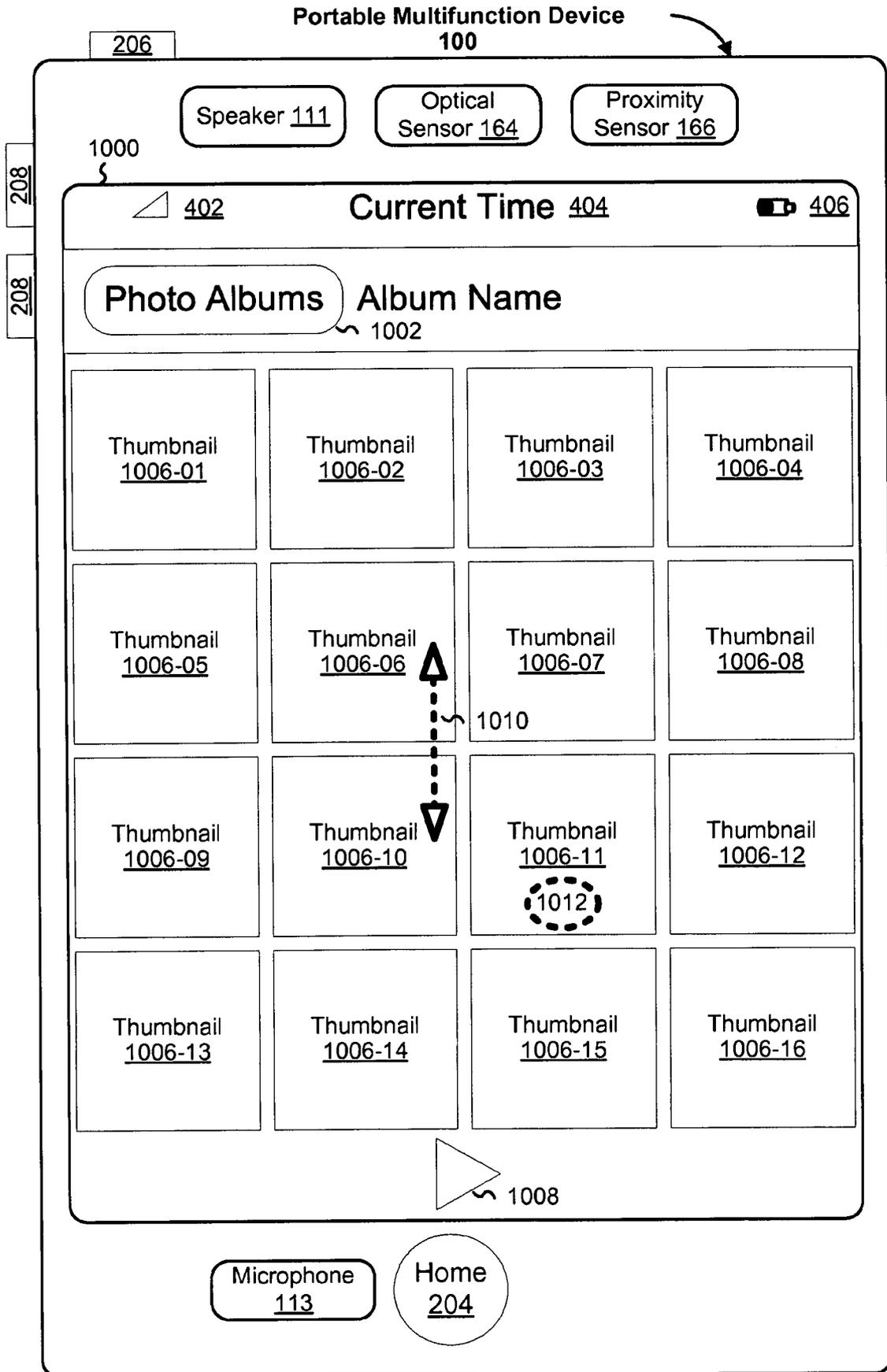


Figure 10
12/36

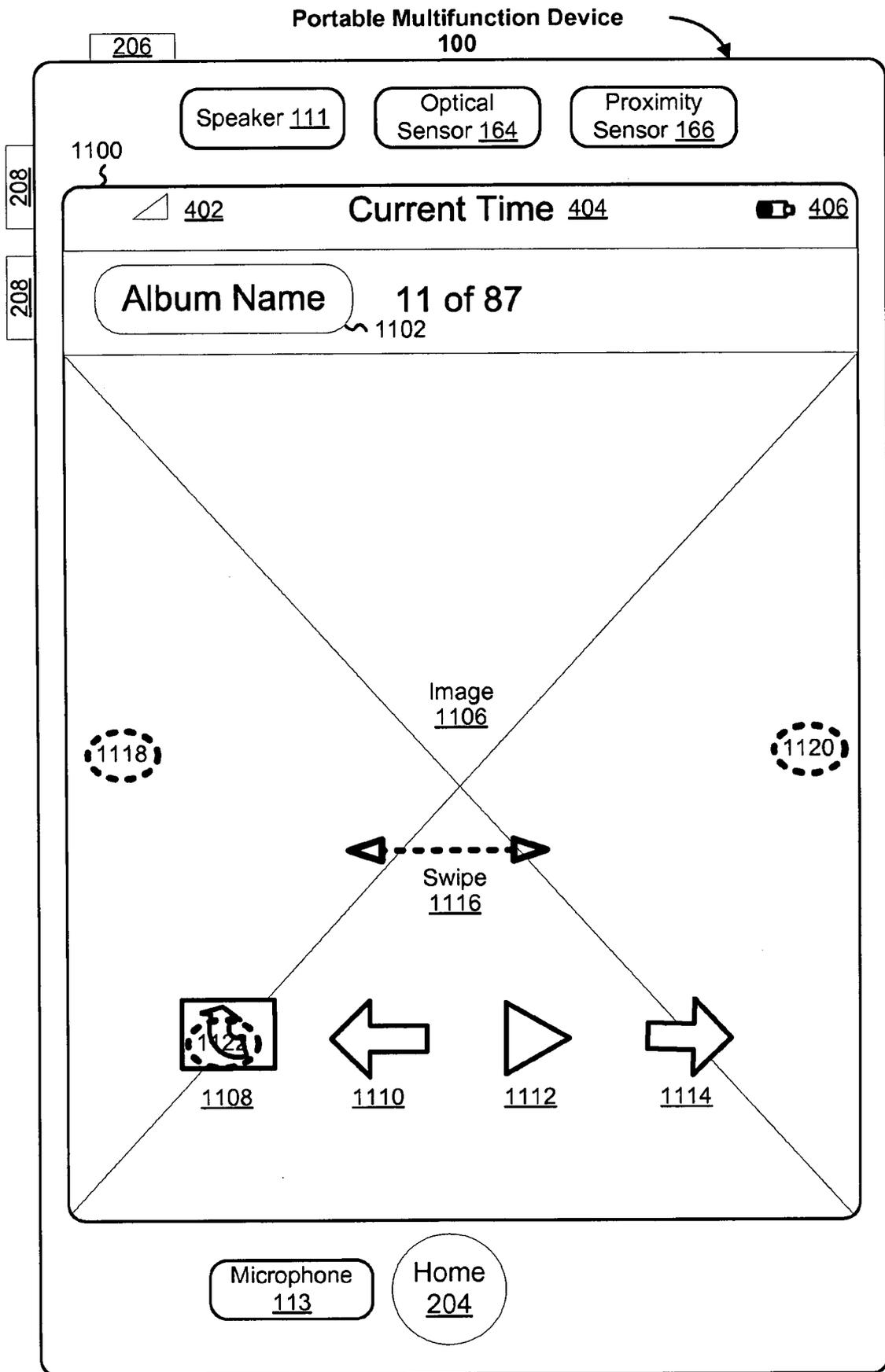


Figure 11
13/36

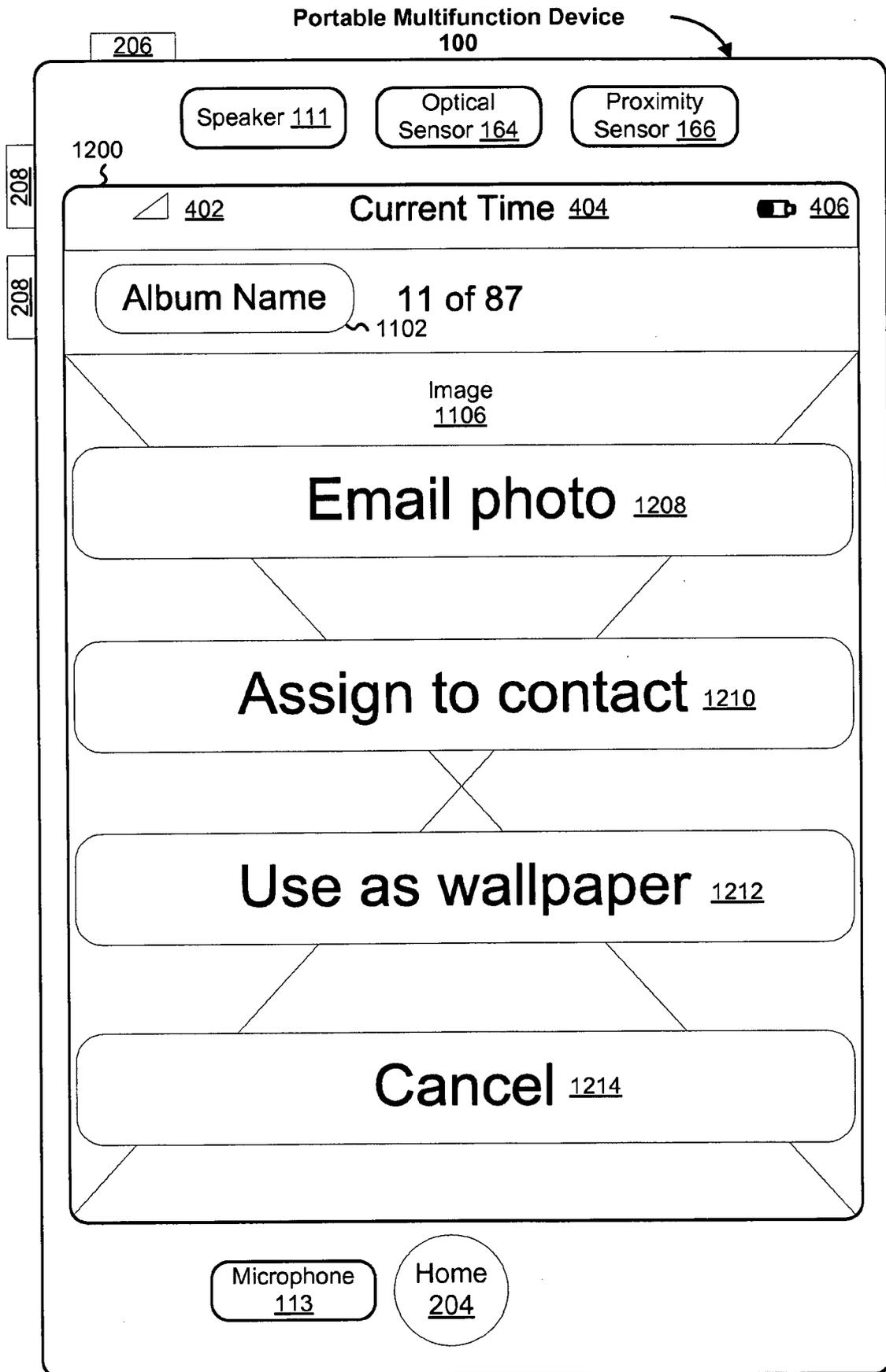


Figure 12
14/36

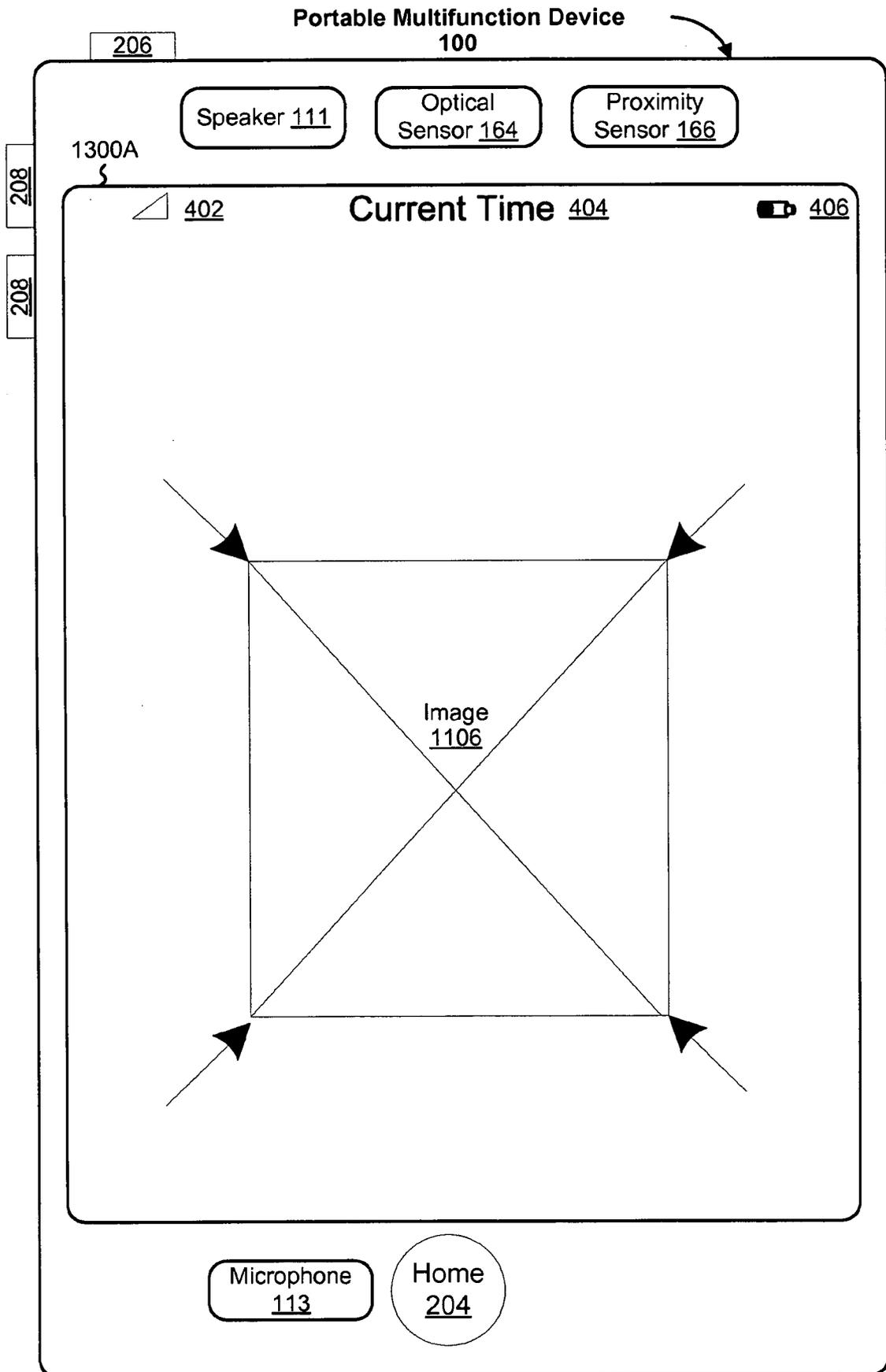


Figure 13A
15/36

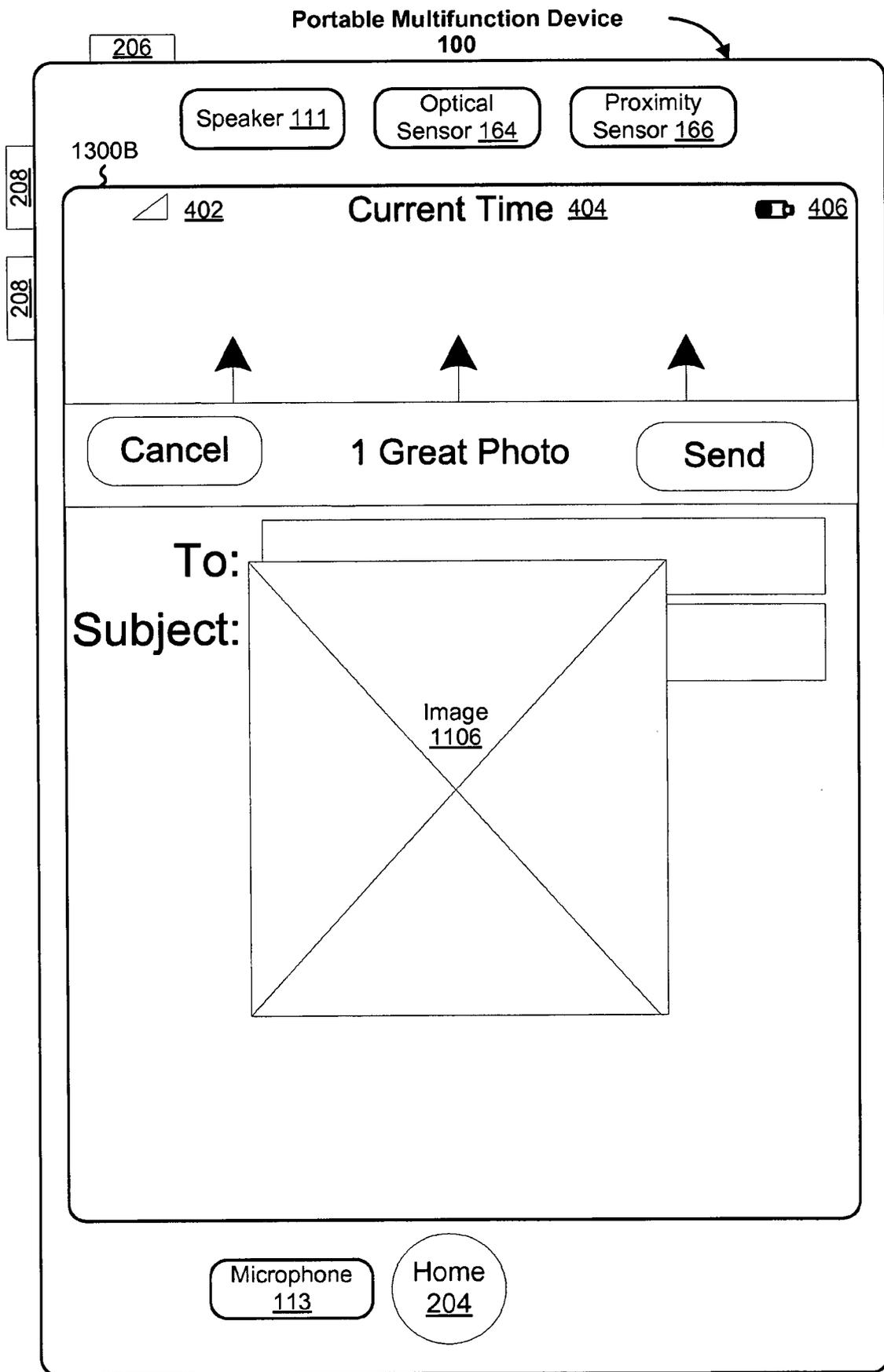


Figure 13B
16/36

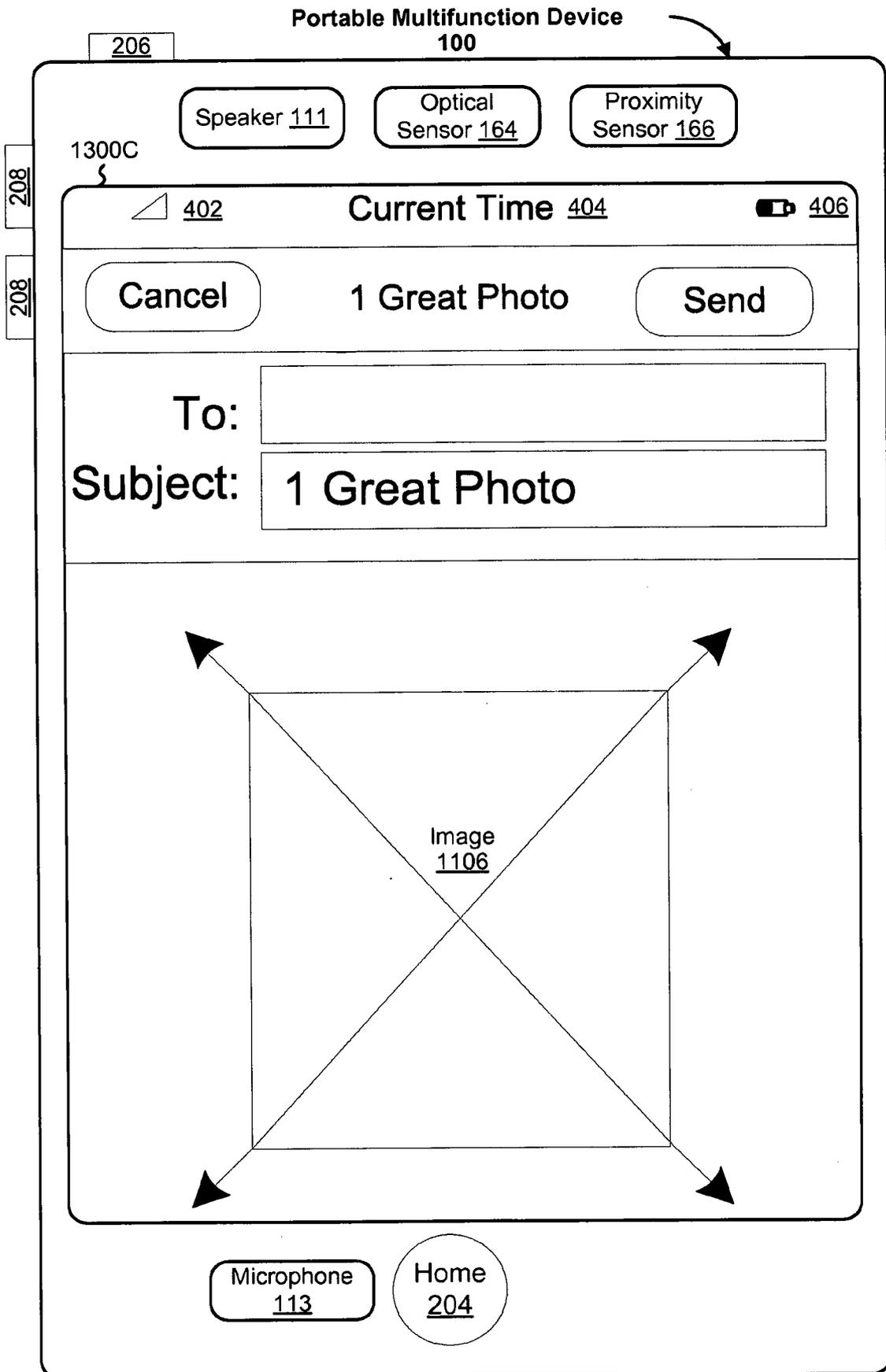


Figure 13C
17/36

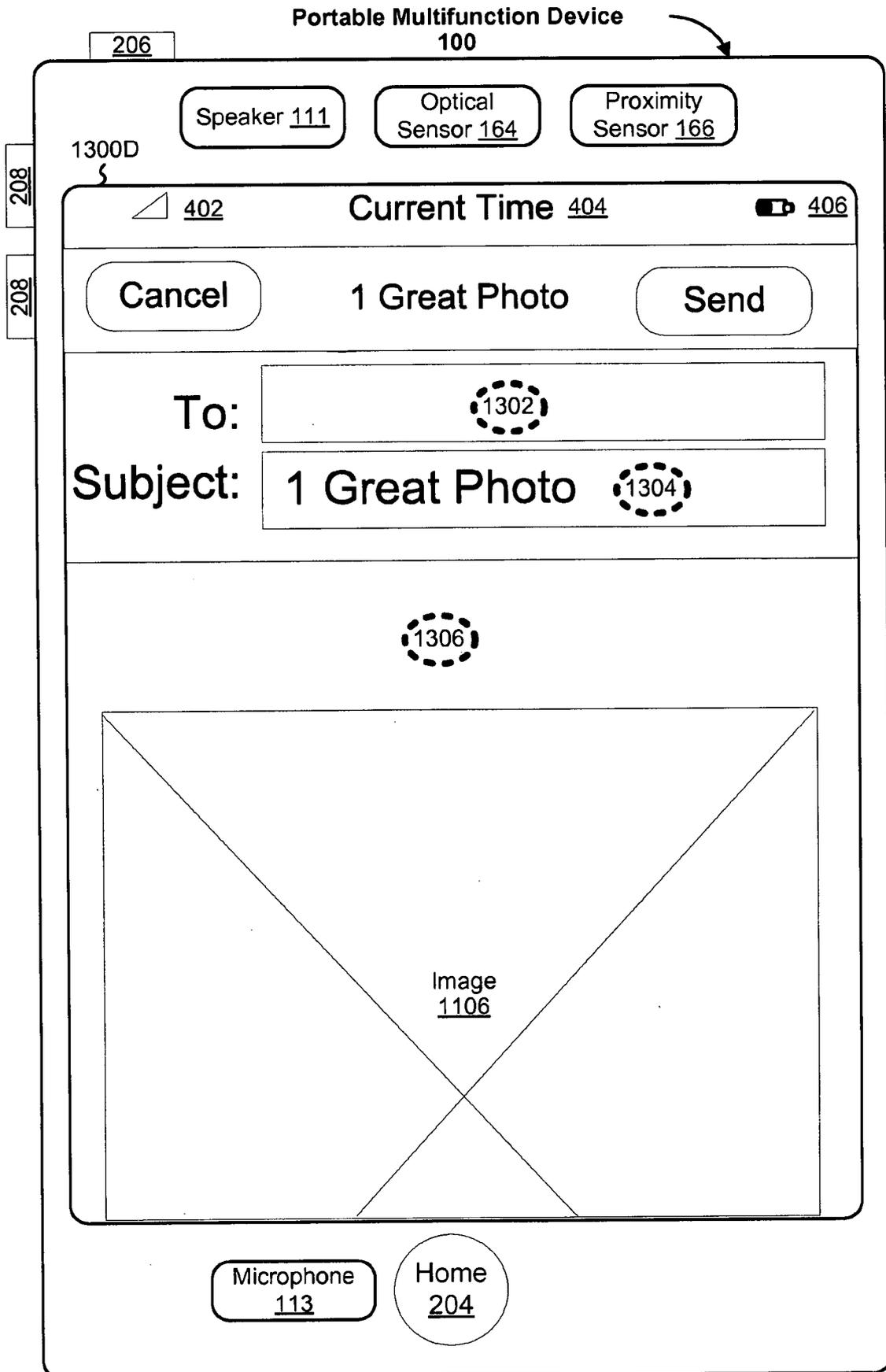


Figure 13D
18/36

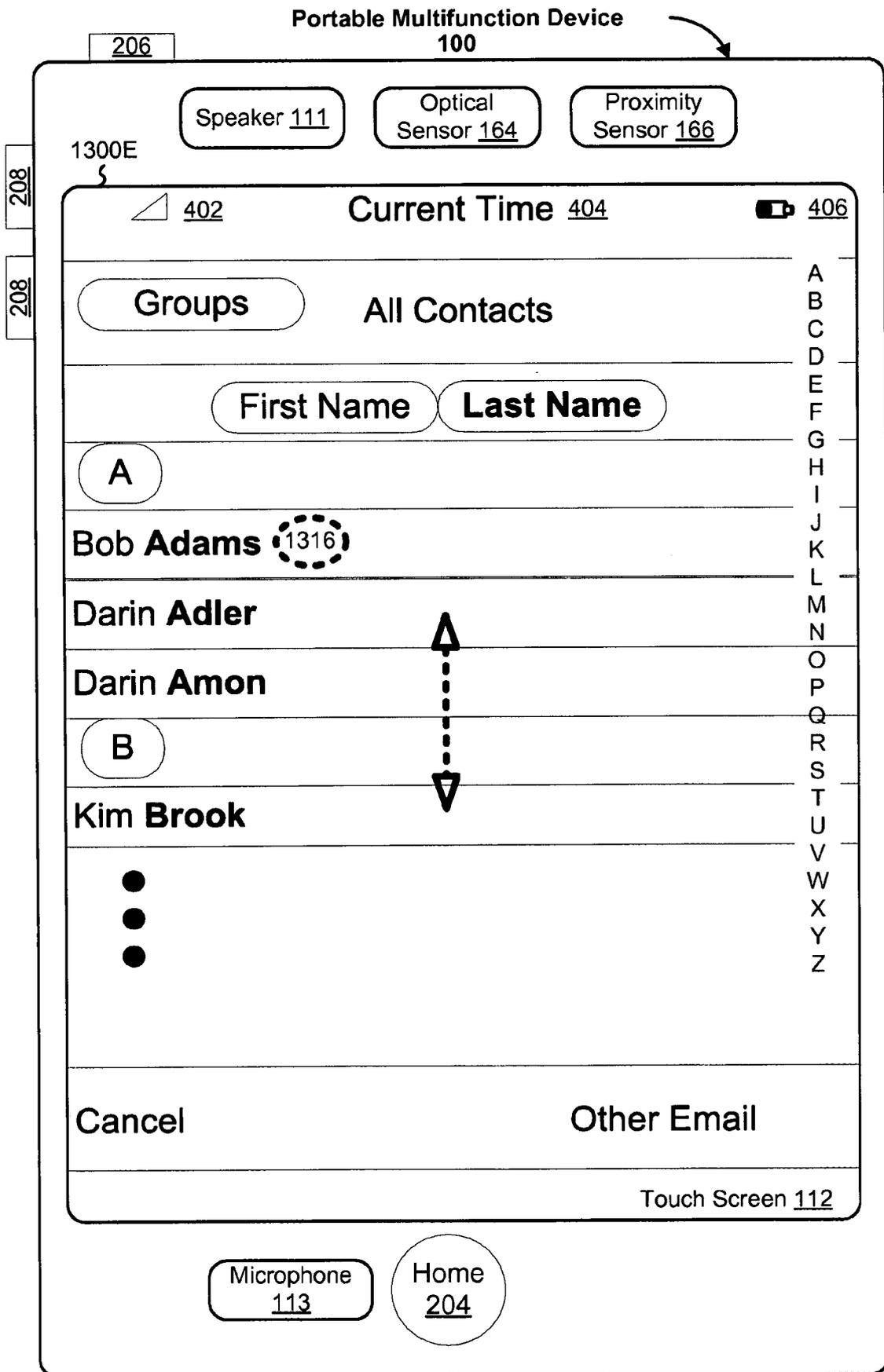


Figure 13E
19/36

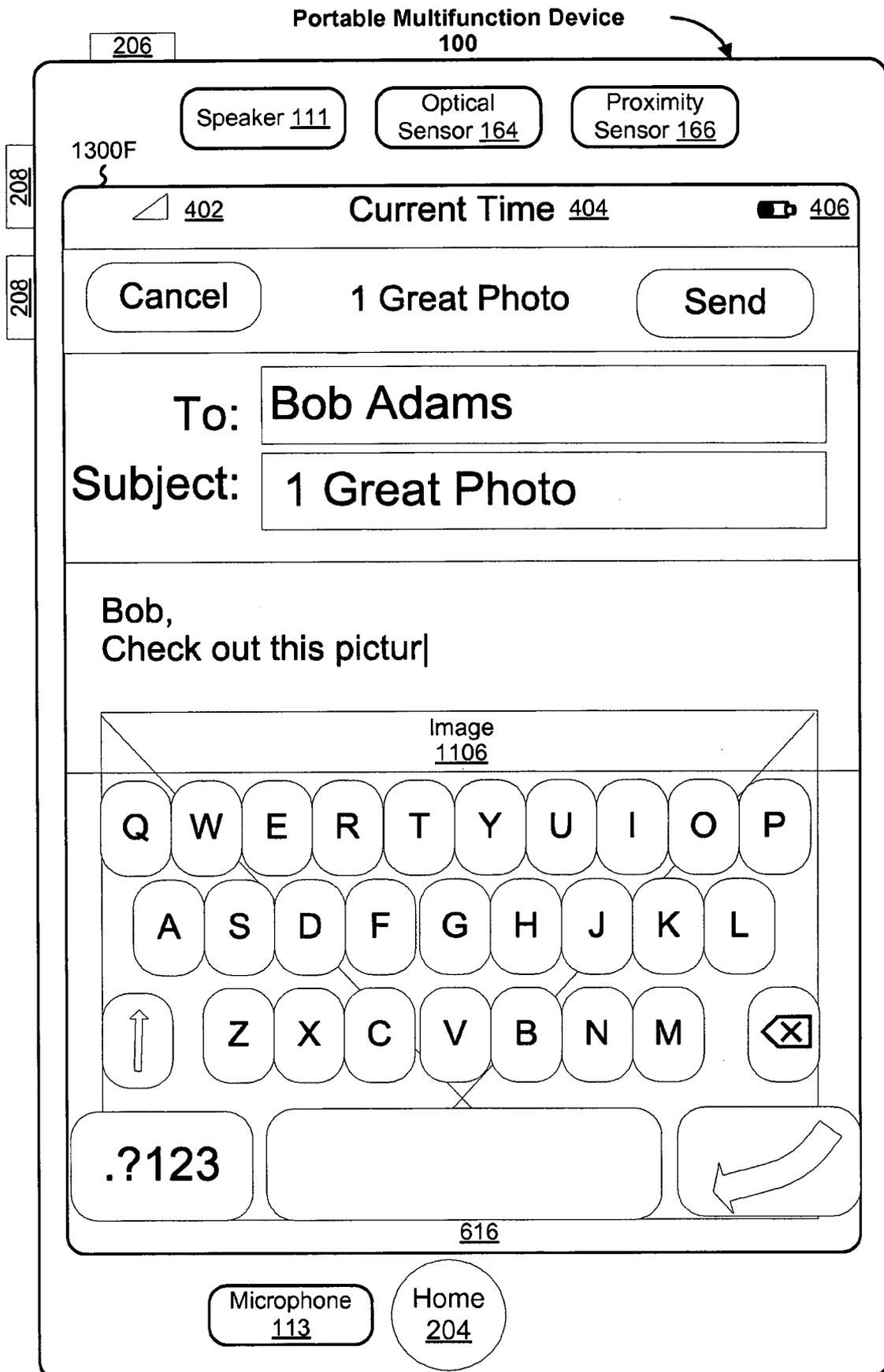


Figure 13F
20/36

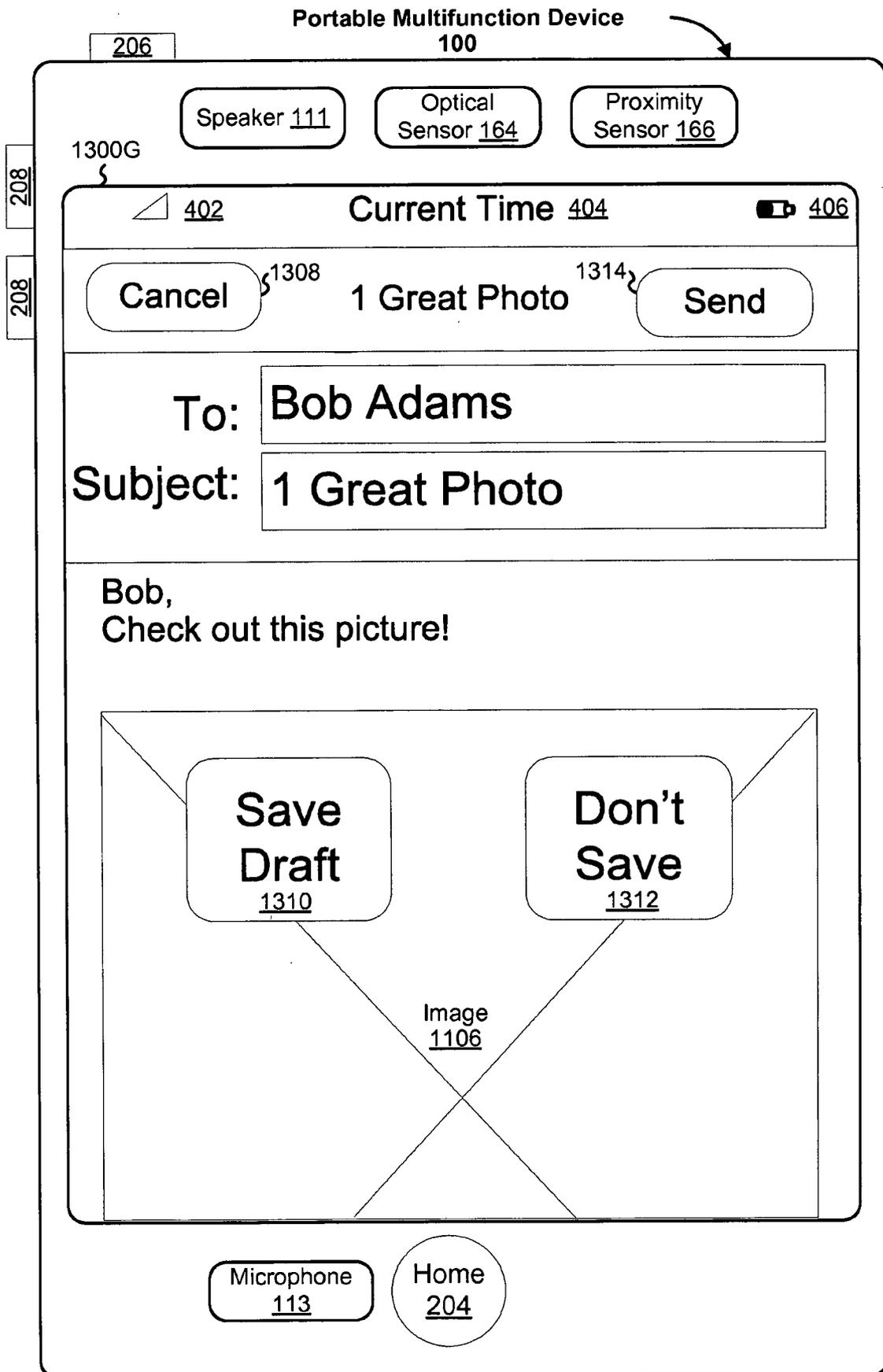


Figure 13G
21/36

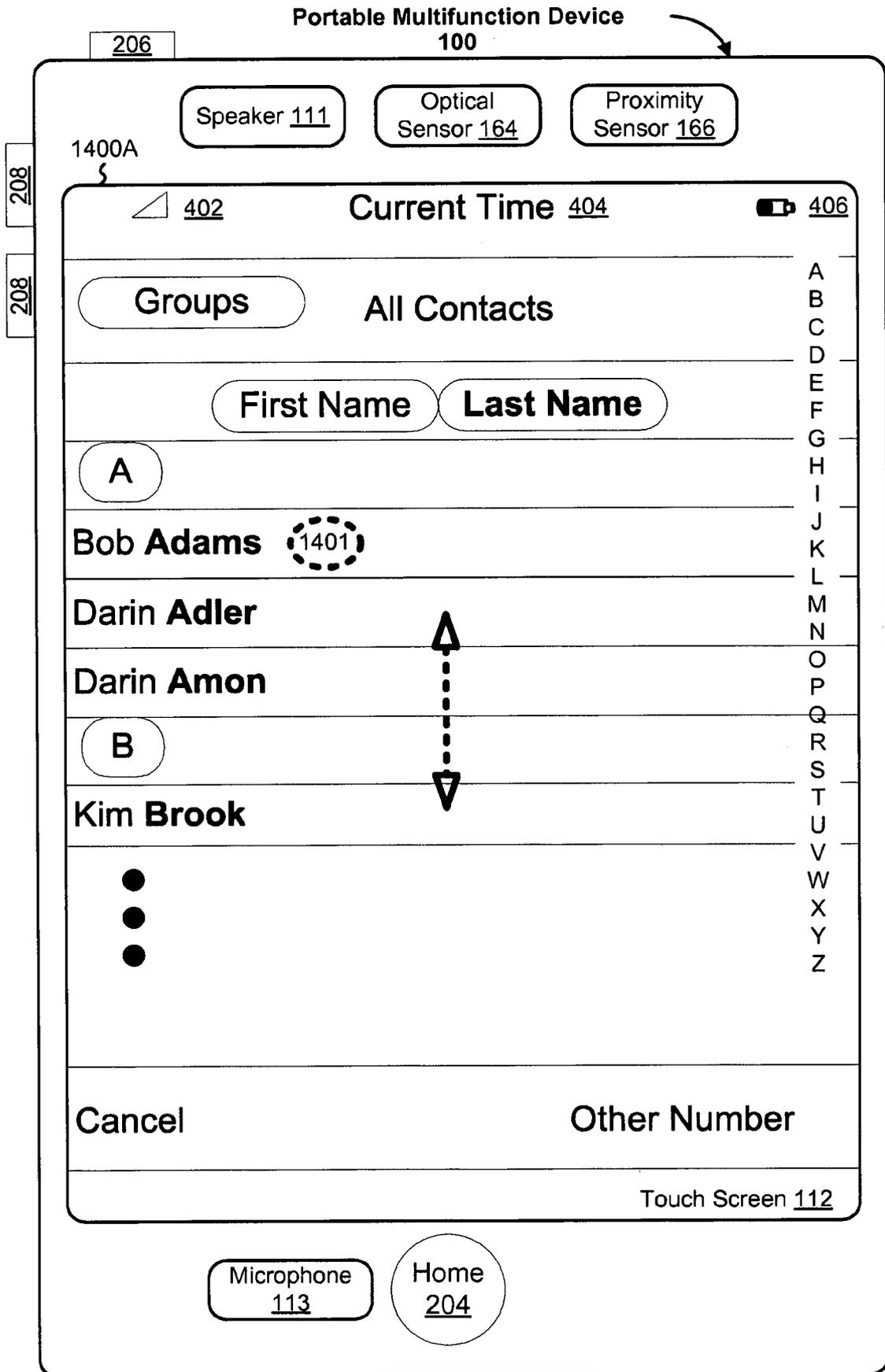


Figure 14A
22/36

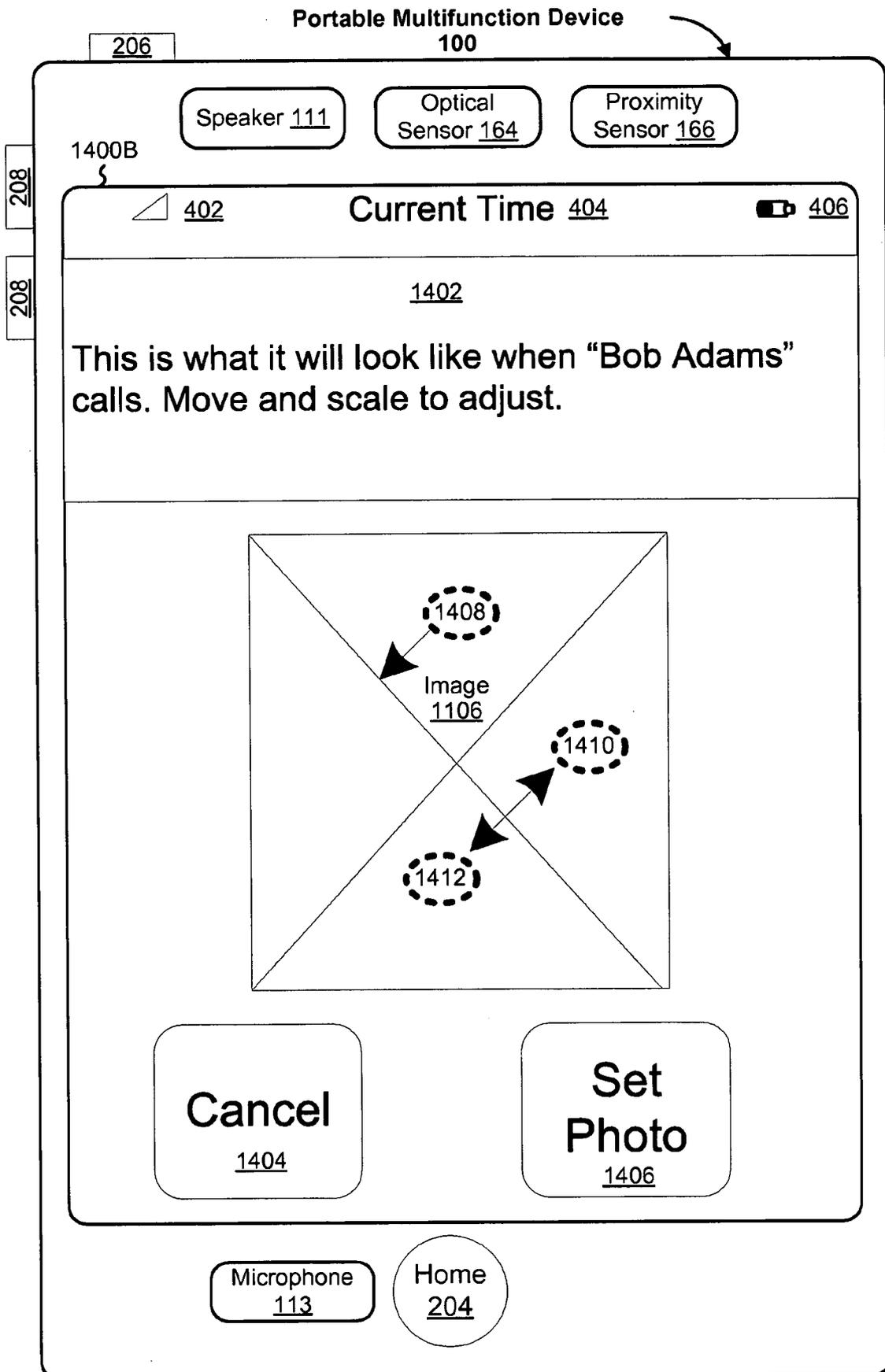


Figure 14B
23/36

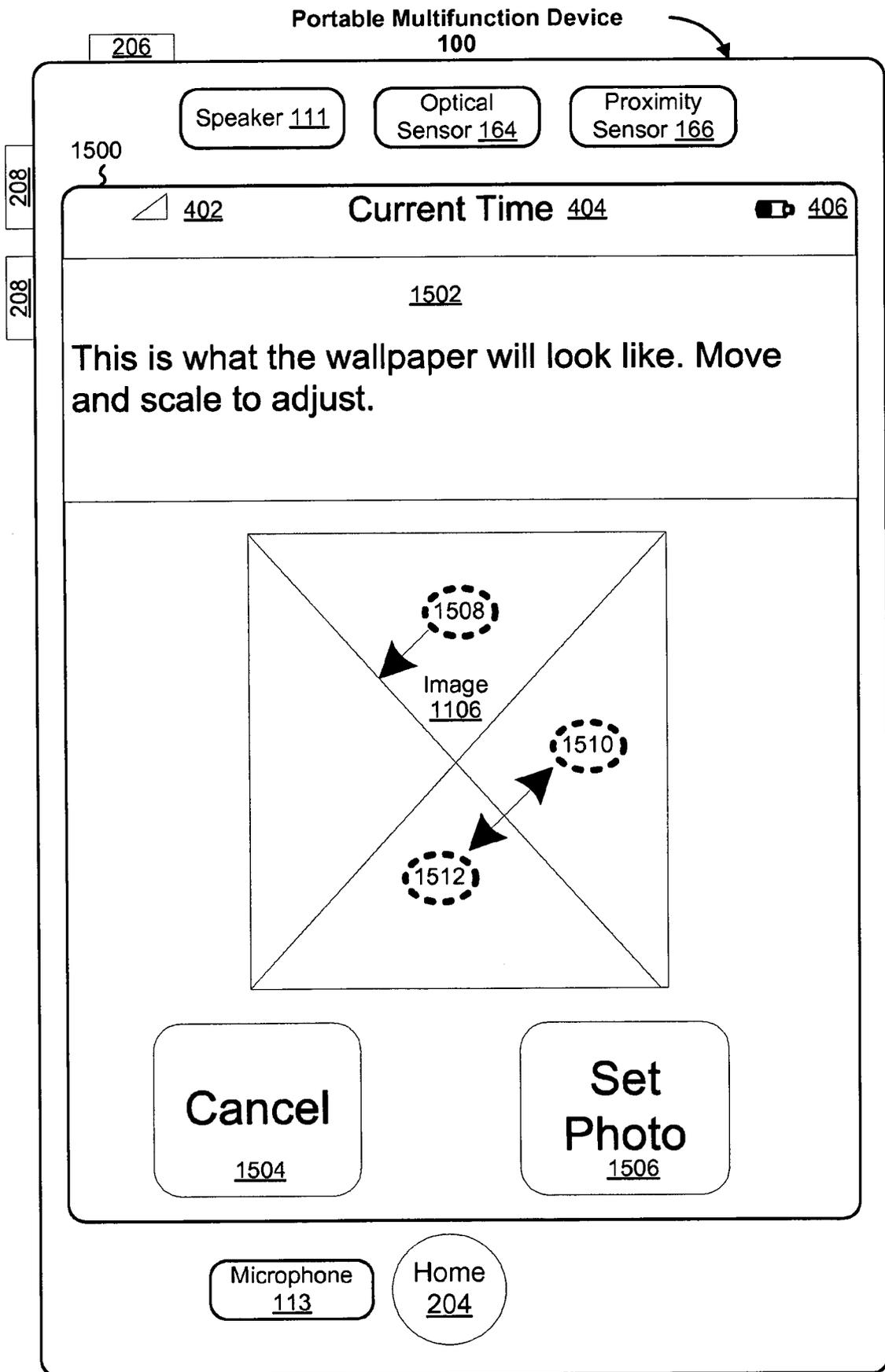


Figure 15
24/36

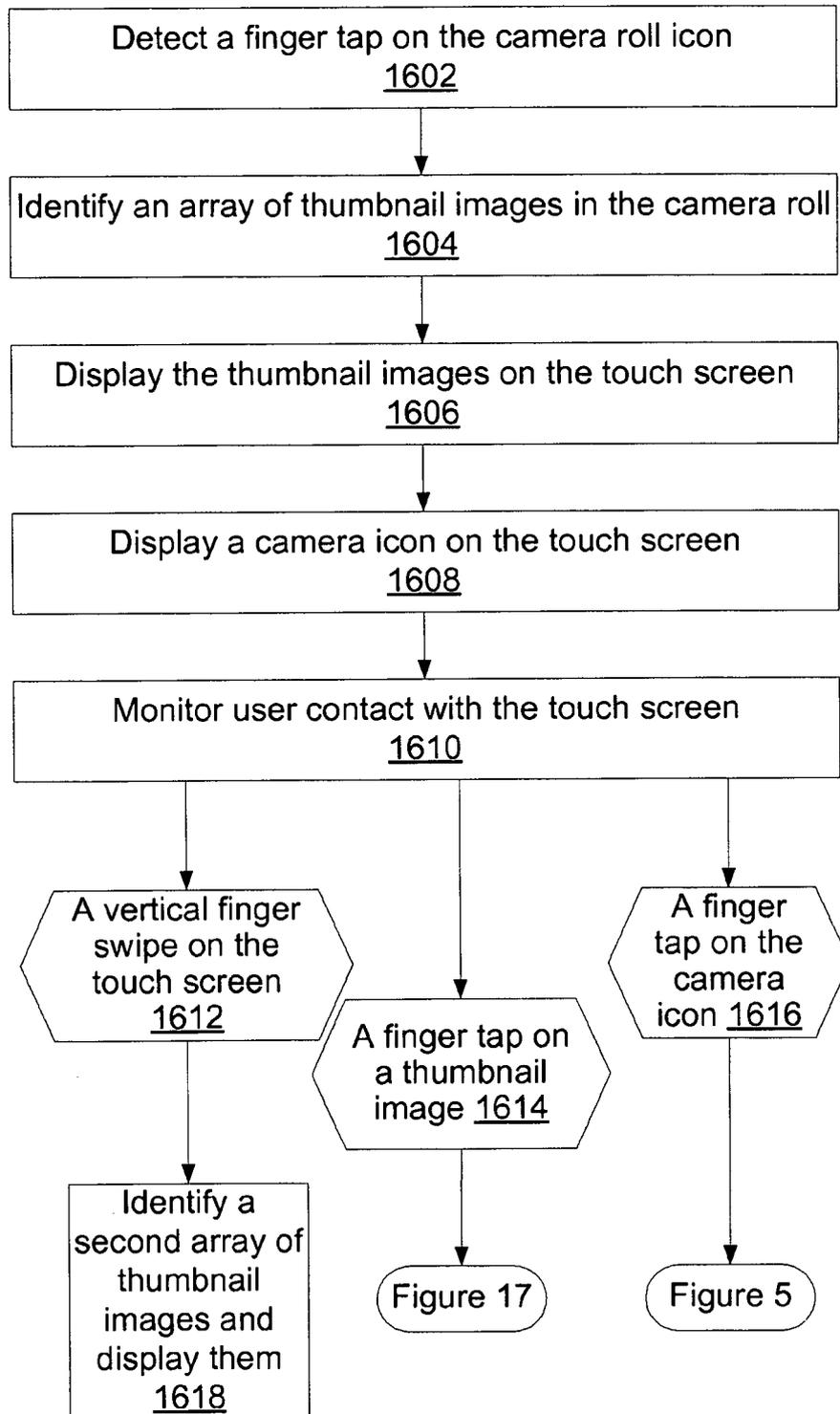


Figure 16

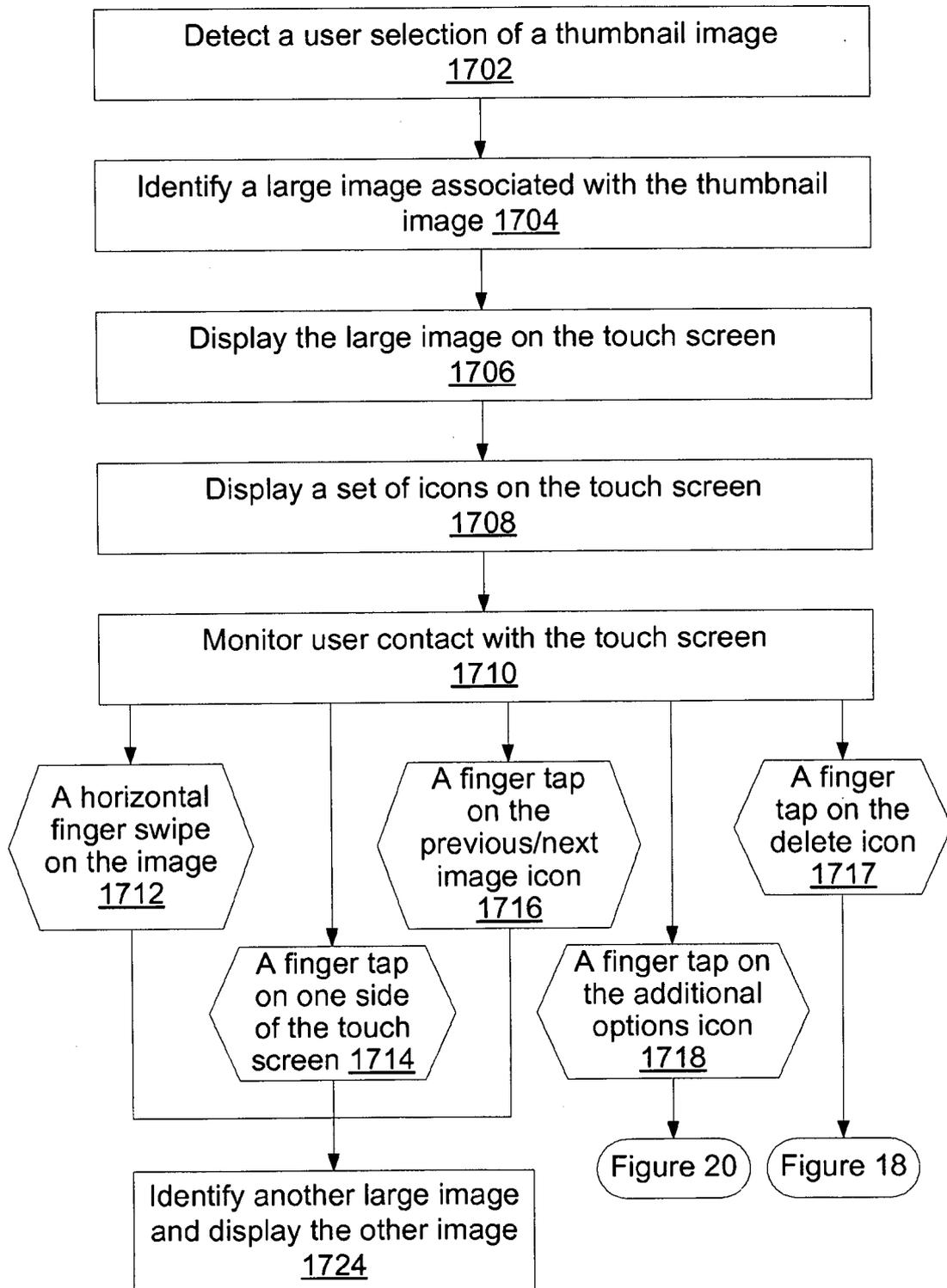


Figure 17

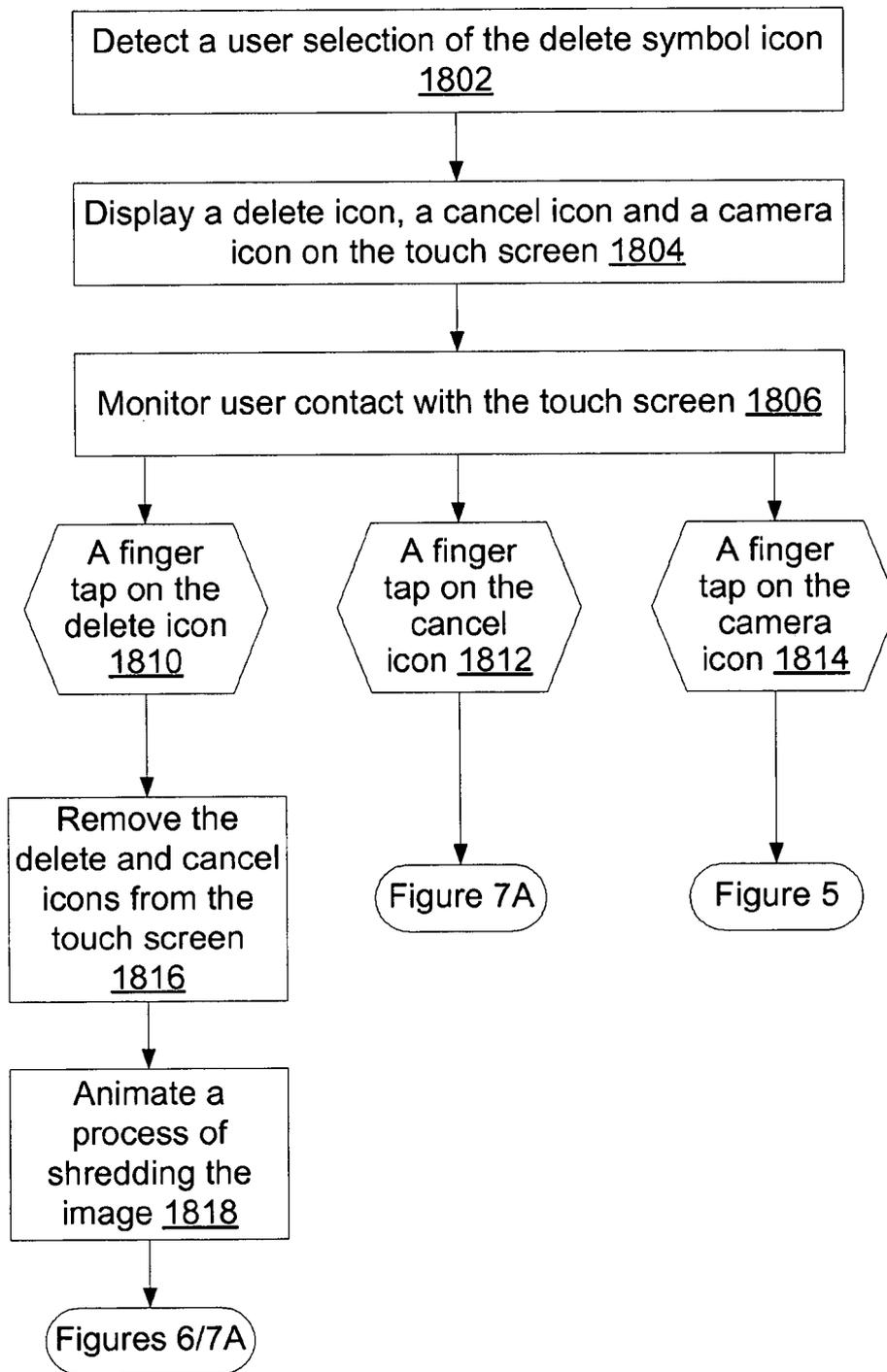


Figure 18

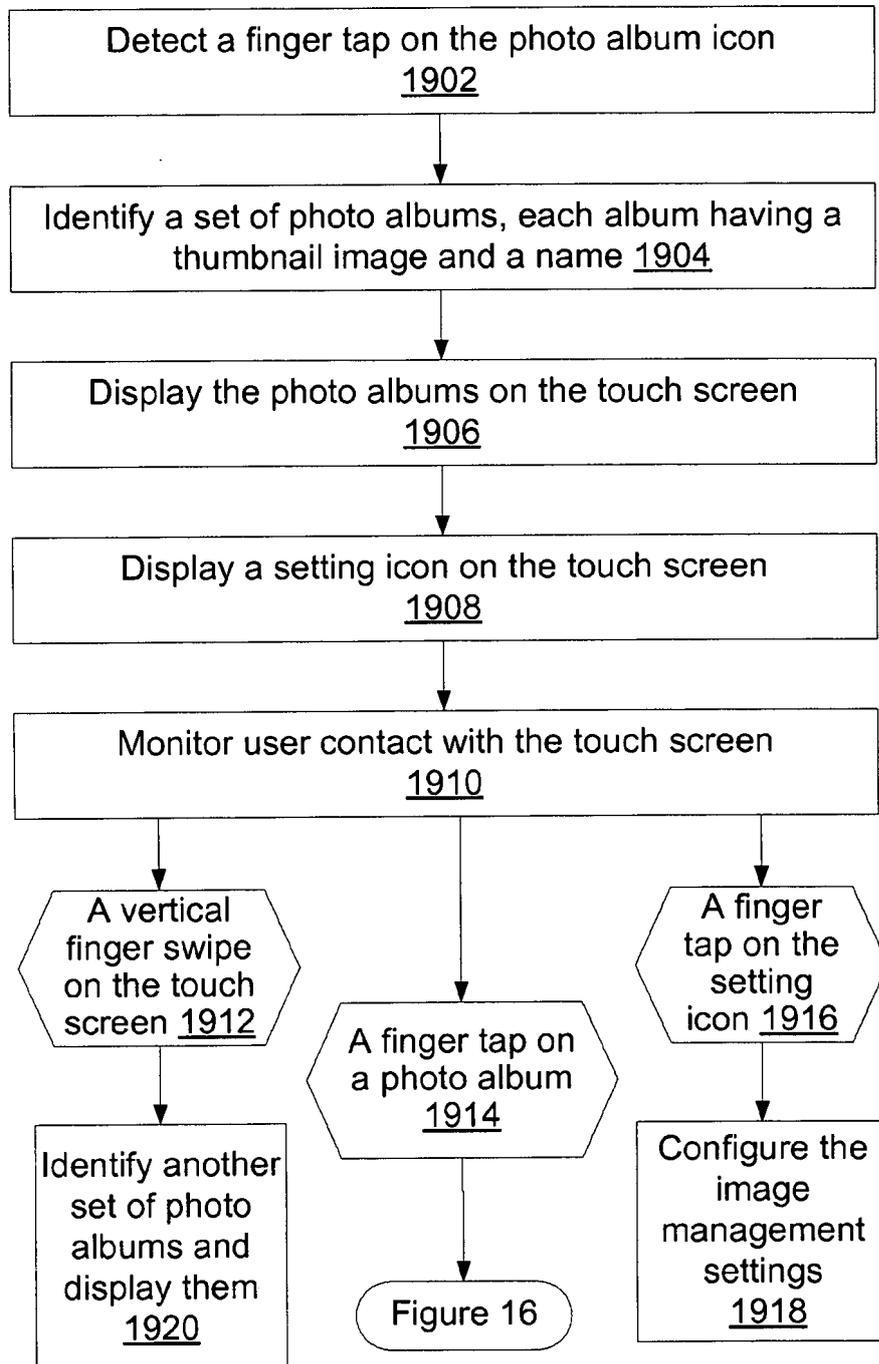


Figure 19

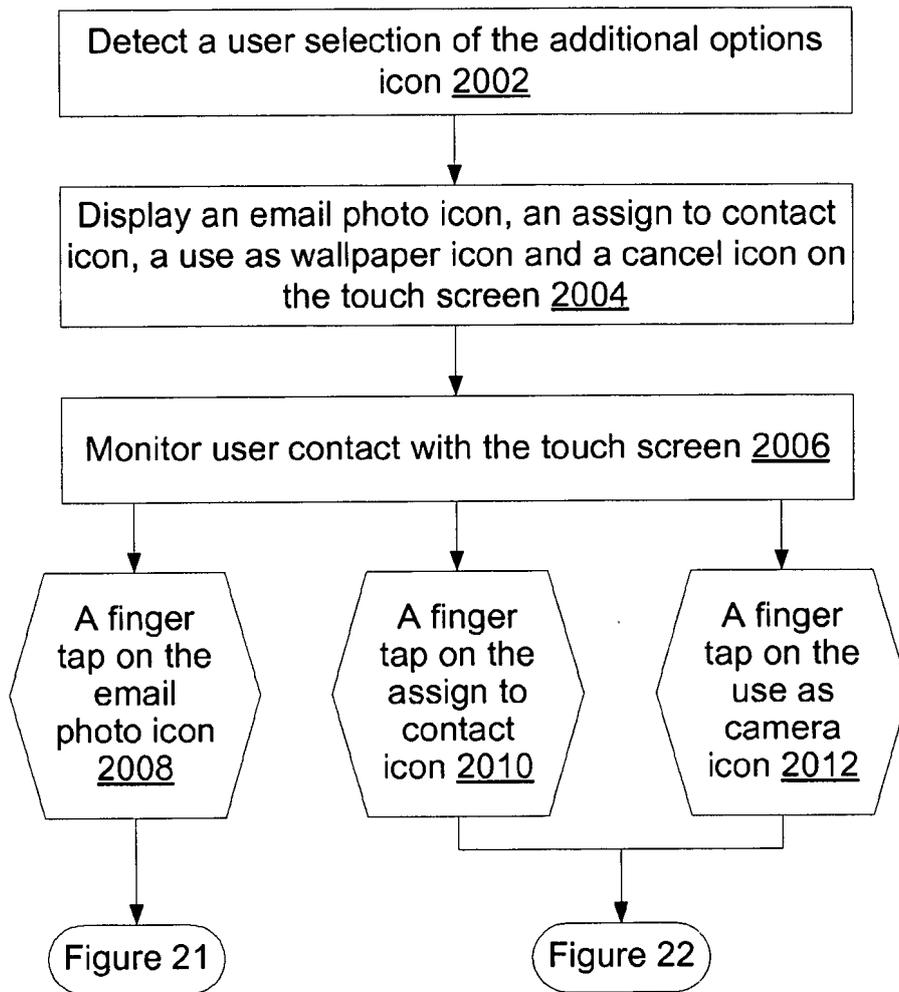


Figure 20

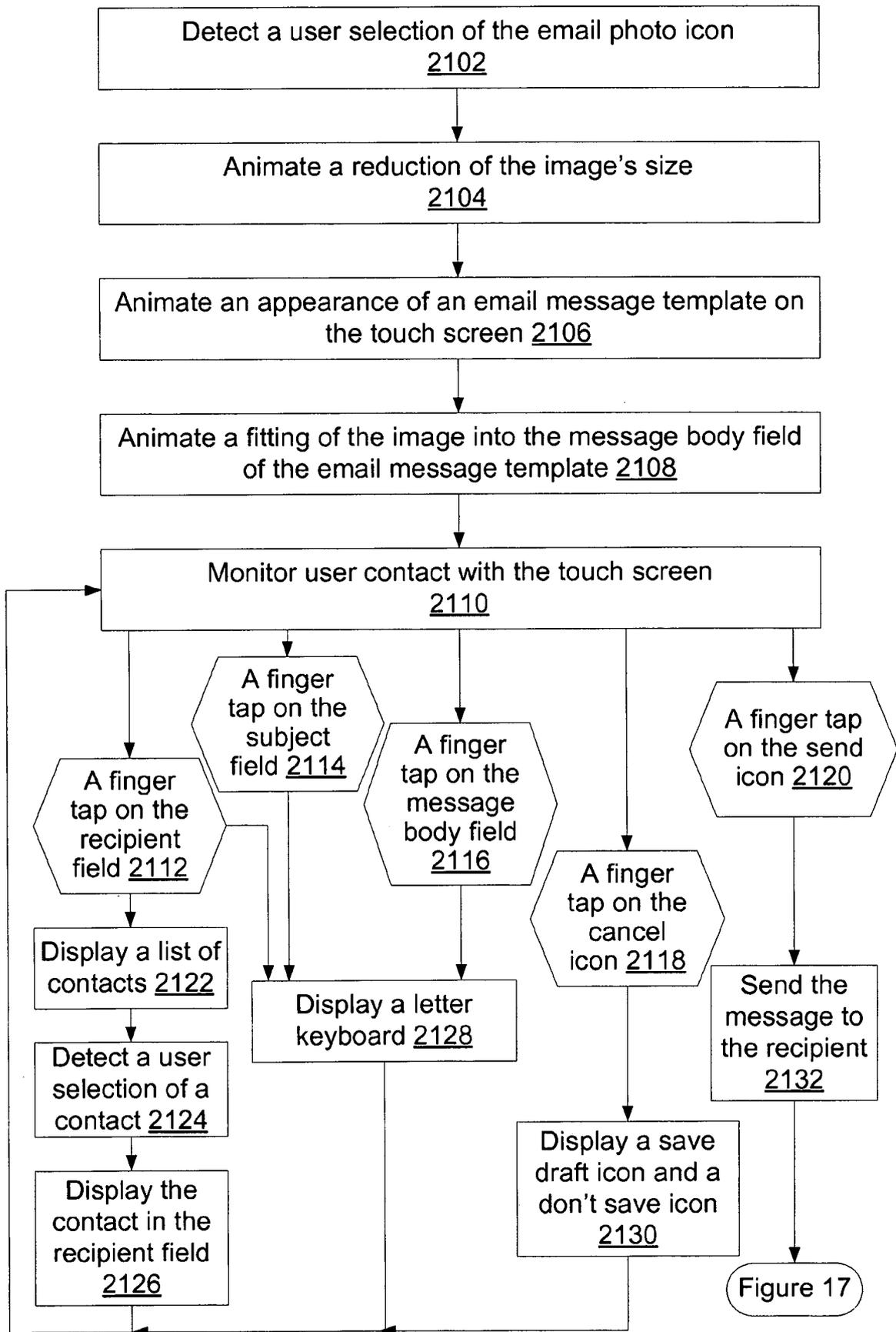


Figure 21
30/36

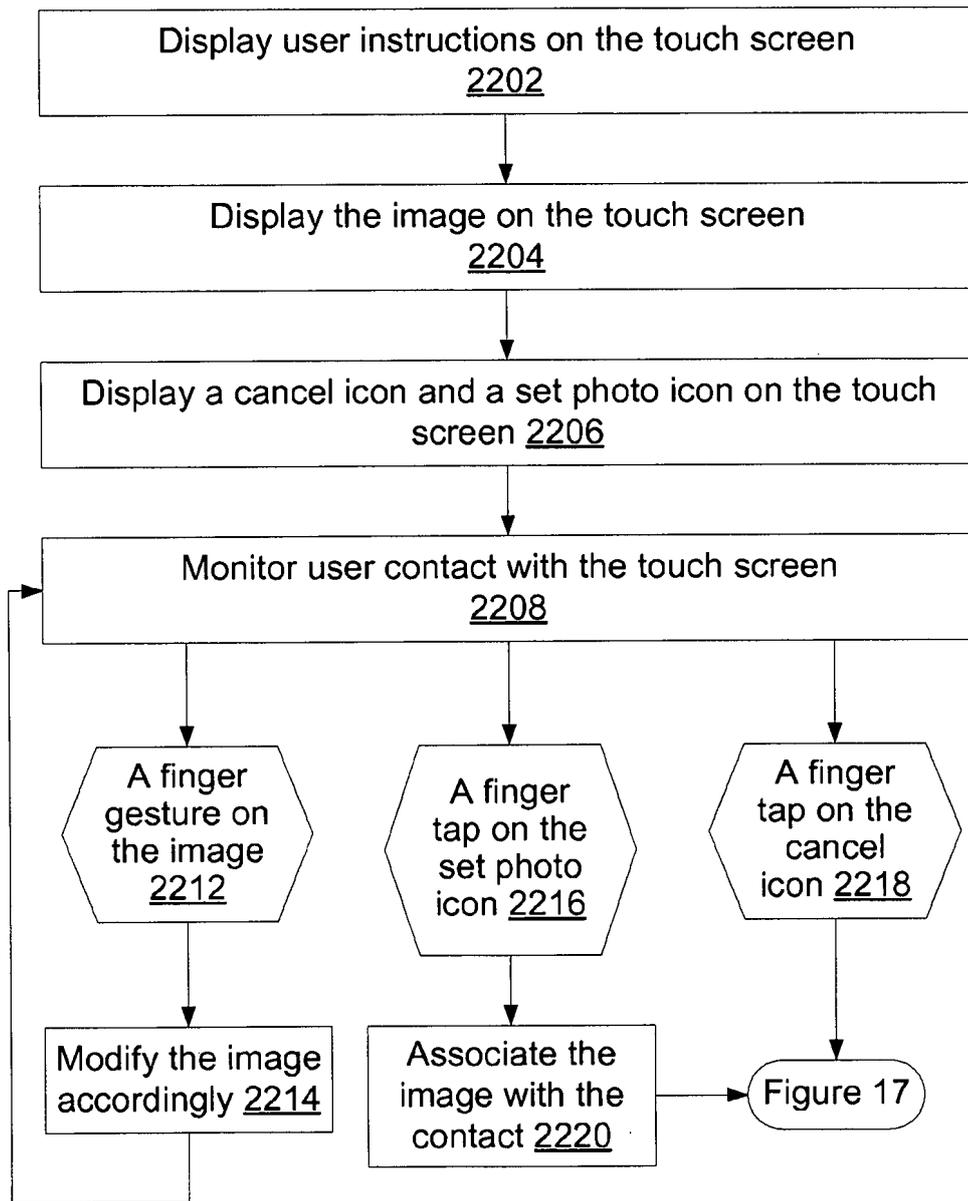


Figure 22

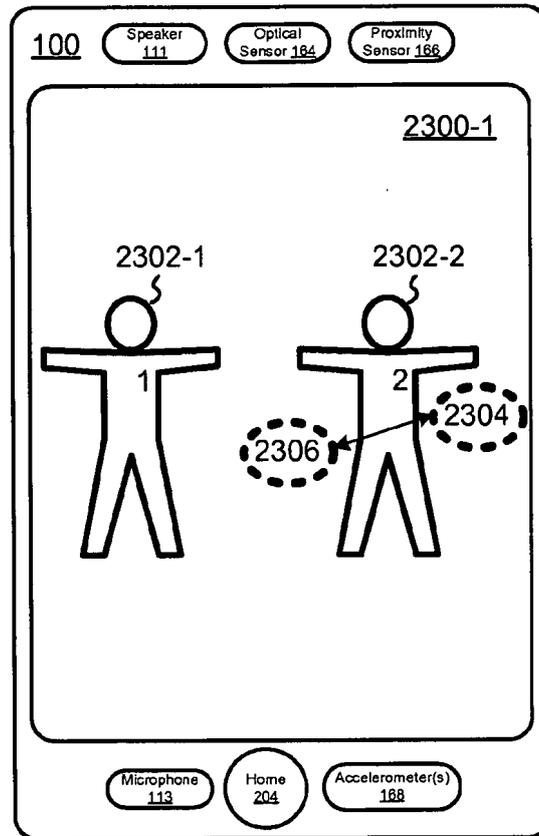


Figure 23A

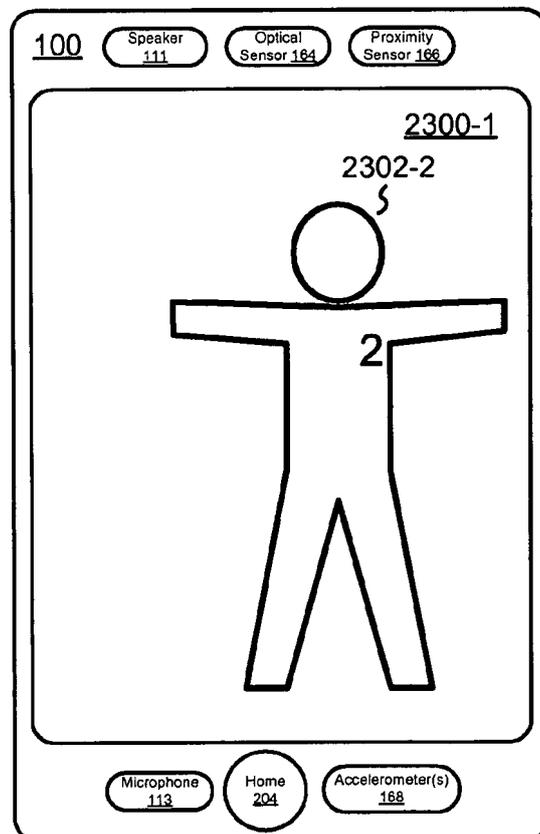


Figure 23B

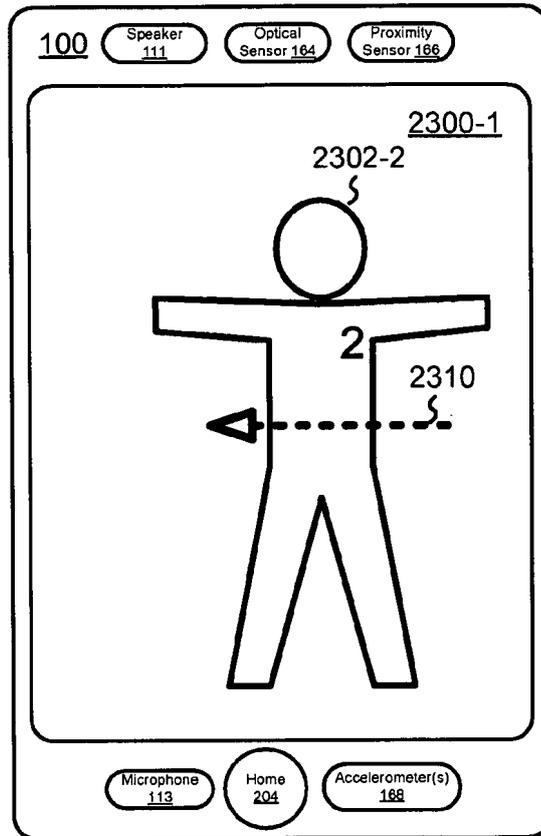


Figure 23C

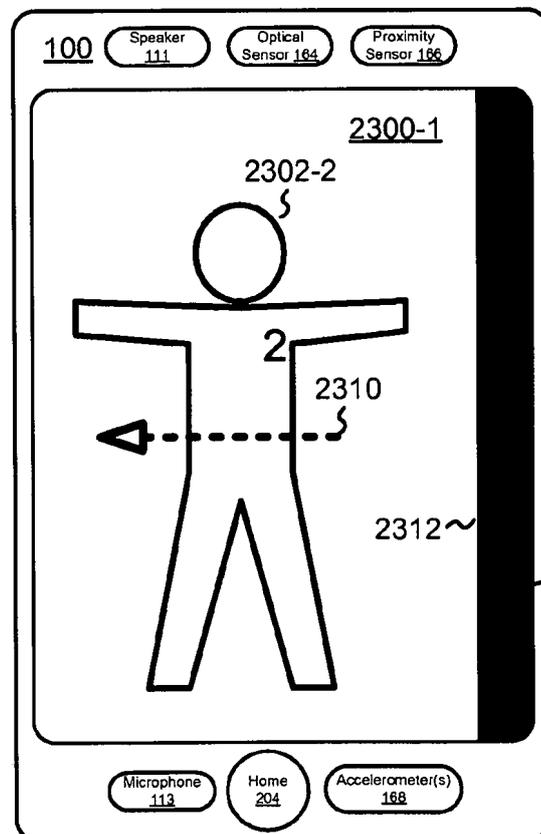


Figure 23D

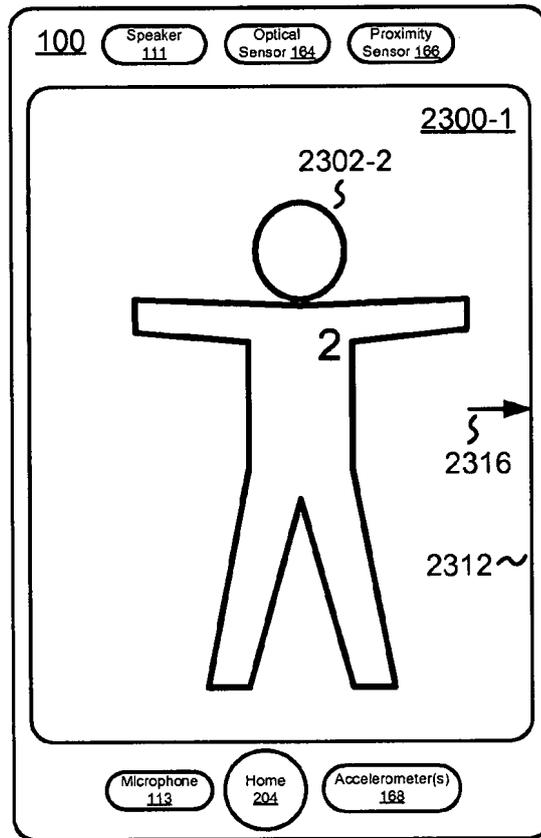


Figure 23E

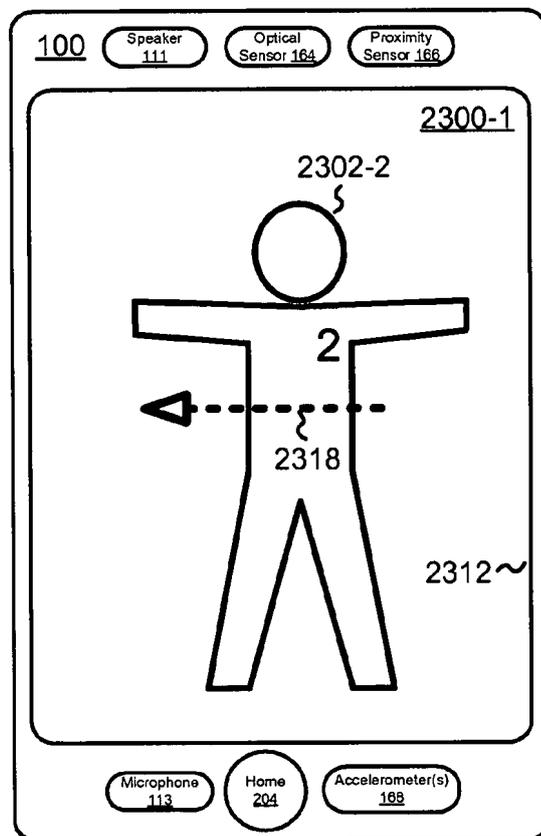


Figure 23F

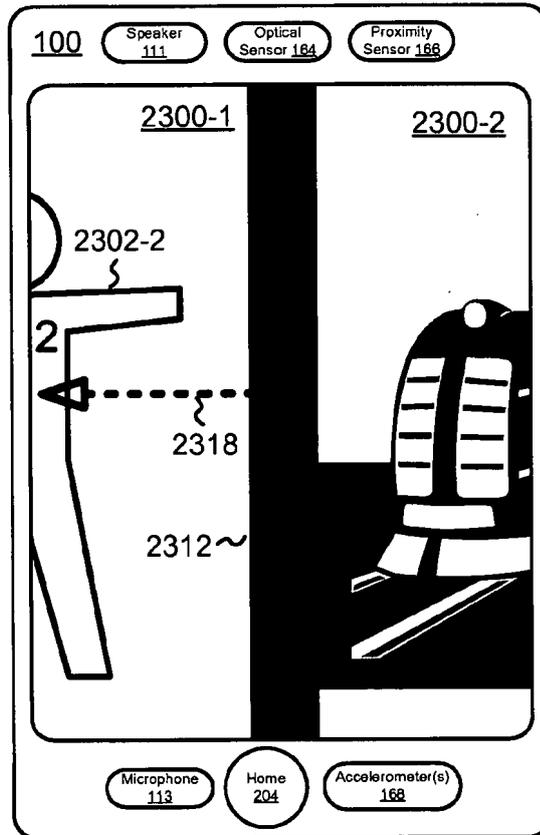


Figure 23G

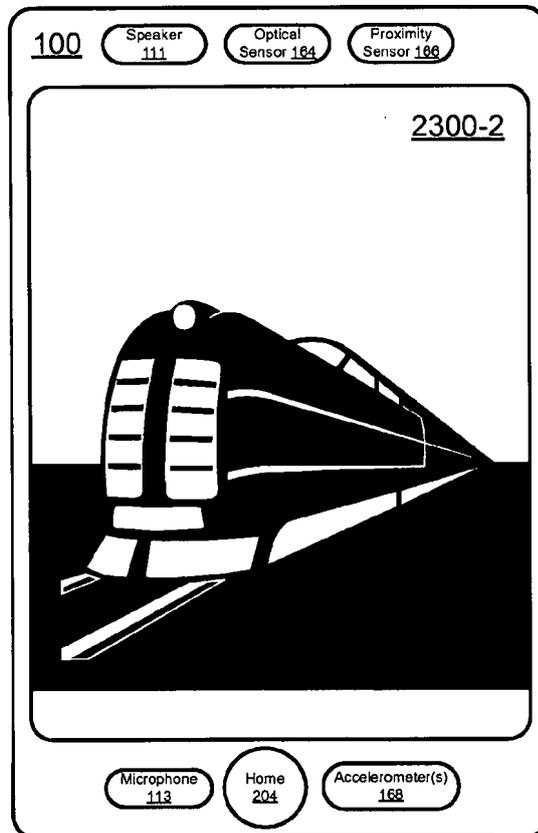
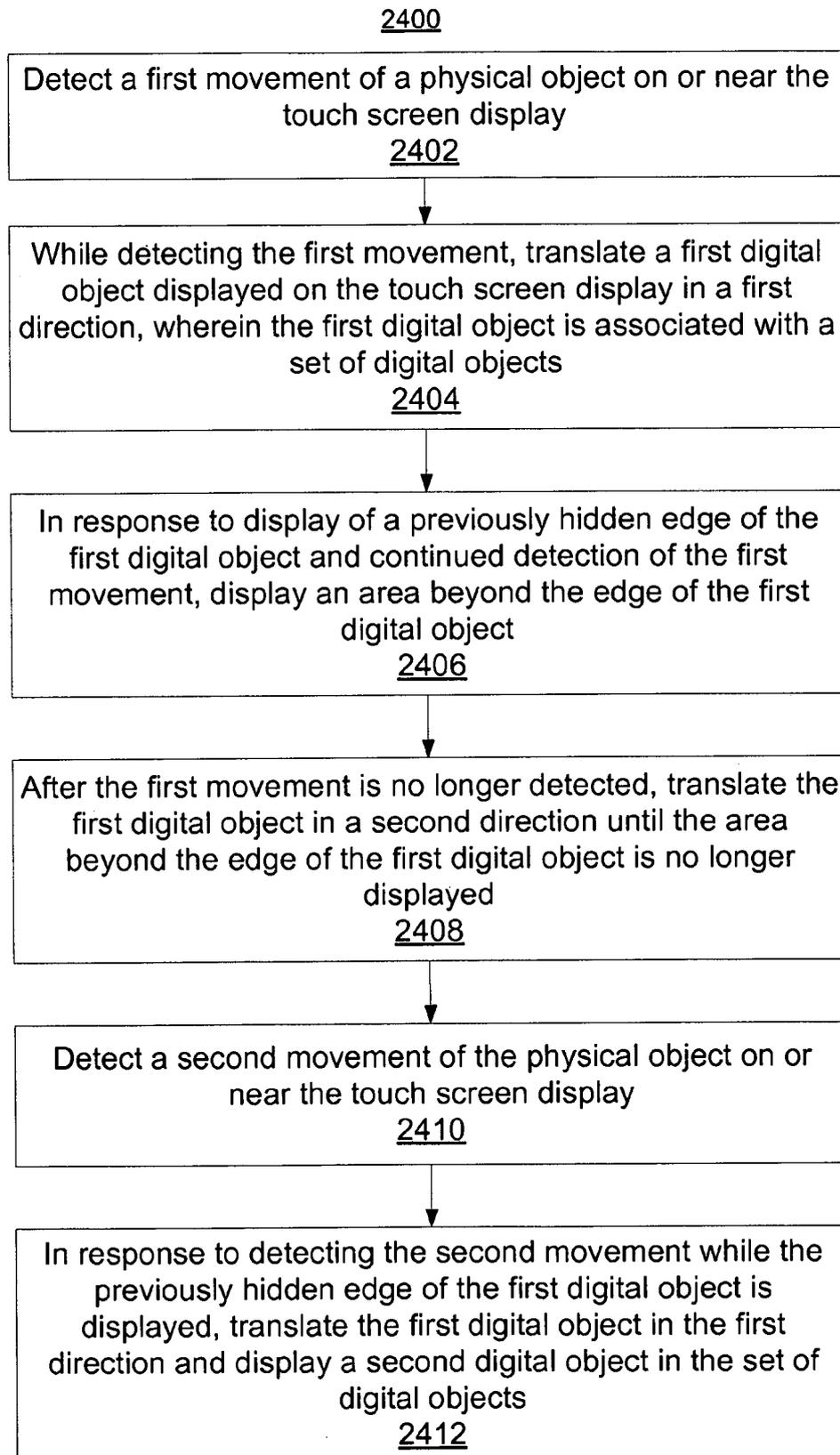


Figure 23H

**Figure 24**

[19] 中华人民共和国国家知识产权局

[51] Int. Cl.
G06F 3/048 (2006.01)



[12] 发明专利申请公布说明书

[21] 申请号 200780001142.8

[43] 公开日 2009年1月28日

[11] 公开号 CN 101356493A

[22] 申请日 2007.8.31

[21] 申请号 200780001142.8

[30] 优先权

- [32] 2006. 9. 6 [33] US [31] 60/824,769
- [32] 2007. 1. 6 [33] US [31] 60/883,785
- [32] 2007. 1. 7 [33] US [31] 60/879,253
- [32] 2007. 1. 8 [33] US [31] 60/879,469
- [32] 2007. 6. 29 [33] US [31] 60/937,993
- [32] 2007. 6. 29 [33] US [31] 60/947,118
- [32] 2007. 8. 30 [33] US [31] 11/848,210

[86] 国际申请 PCT/US2007/077441 2007.8.31

[87] 国际公布 WO2008/030779 英 2008.3.13

[85] 进入国家阶段日期 2008.4.10

[71] 申请人 苹果公司

地址 美国加利福尼亚

[72] 发明人 M·马塔斯 G·克里斯蒂
P·D·马科斯 S·福斯塔
M·瓦诺斯 B·奥丁 I·乔德里

[74] 专利代理机构 中国国际贸易促进委员会专利
商标事务所
代理人 李玲

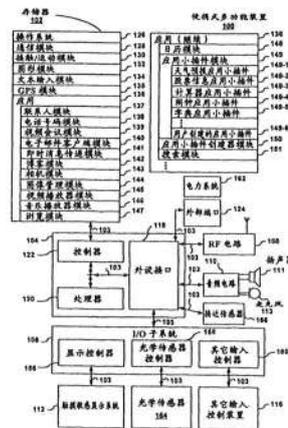
权利要求书9页 说明书36页 附图36页

[54] 发明名称

用于照片管理的便携式电子装置

[57] 摘要

公开了用于照片管理的具有触摸屏显示器的便携式电子装置。本发明的一个方面包含便携式电子装置显示与一组照片图像对应的缩略图像的阵列的计算机实现的方法。在检测到用户接触阵列中的相应缩略图像时，装置用用户选择的照片图像代替缩略图像的显示的阵列。用户选择的照片图像以比相应的缩略图像大的比例被显示。便携式装置根据滚动手势代替用户选择的照片图像显示不同的照片图像。滚动手势包含用户接触触摸屏显示器的基本上水平移动。



权利要求书

1. 一种电子装置，包括：

显示器；

一个或多个处理器；

存储器；和

程序，其中，该程序被存储在存储器中并被配置为所述一个或多个处理器被执行，该程序包括：

用于检测触摸屏显示器上或附近的物理对象的第一移动的指令；

用于在检测第一移动的同时沿第一方向平移在触摸屏显示器上显示的第一数字对象的指令，其中，第一数字对象与一组数字对象相关；

用于响应第一数字对象的以前隐藏的边缘的显示和连续检测到第一移动，显示超出第一数字对象的边缘的区域的指令；

用于在不再检测到第一移动之后沿第二方向平移第一数字对象直到不再显示超出第一数字对象的边缘的区域的指令；

用于检测触摸屏显示器上或附近的物理对象的第二移动的指令；和

用于在显示第一数字对象的以前隐藏的边缘的同时响应检测到第二移动，沿第一方向平移第一数字对象并显示所述一组数字对象中的第二数字对象的指令。

2. 根据权利要求一所述的电子装置，其中在平移之前，第一数字对象的至少一个边缘沿第一方向伸出触摸屏显示器。

3. 根据权利要求一所述的电子装置，其中物理对象是手指。

4. 根据权利要求一所述的电子装置，其中物理对象是铁笔。

5. 根据权利要求一所述的电子装置，其中第一移动是水平掠过手势。

6. 根据权利要求一所述的电子装置，其中，所述一组数字对象是一组数字图像。

7. 根据权利要求一所述的电子装置，其中，所述一组数字对象是一组网页。

8. 根据权利要求一所述的电子装置, 其中, 所述一组数字对象是一组电子文文件。
9. 根据权利要求一所述的电子装置, 其中, 所述装置是便携式电子装置。
10. 根据权利要求一所述的电子装置, 其中, 所述第二方向与第一方向相反。
11. 根据权利要求 1 所述的电子装置, 其中利用阻尼运动使第一数字对象在第二方向平移
12. 根据权利要求 1 所述的电子装置, 其中第一移动与第二移动之间的时间必须比显示第二数字对象的装置的默认值少。
13. 根据权利要求 1 所述的电子装置, 其中如果显示整个第一数字对象, 于是装置因应检测方向来显示整组数字对像中的另一数字对象。

用于照片管理的便携式电子装置

技术领域

公开的实施例一般涉及便携式电子装置、特别是涉及用于诸如数字拍摄、照片编辑和电子邮件传送照片的照片管理的便携式装置。

背景技术

由于便携式电子装置变得更为紧凑并能够执行多种功能，因此设计允许用户很容易地与这种多功能装置交互作用的用户界面成为重大的挑战。对于具有比桌上型或膝上型计算机小的屏幕的手持便携式电子装置，这种挑战更加明显。由于用户界面是用户接收信息以及装置接收包含用户尝试访问便携式电子装置的特征、工具和功能的用户动作或行为的途径，因此这种情形是很不幸的。

一些便携式装置（例如，移动电话，手机和蜂窝电话等）借助于添加更多的按钮、增加按钮的密度、过度加载（overload）有时被称为移动电话、按钮的功能或使用复杂的菜单系统以允许用户访问、存储和操纵数据。这些方法常导致用户必须记住的复杂的按键次序和菜单层次。

由于物理按钮会防止在便携式电子装置上运行的应用或用户配置和/或调整用户界面，因此诸如包含物理按钮的用户界面的许多常规的用户界面还是不灵活的。当与记住多个按键次序和菜单层次的耗时需求和激活希望的按钮的困难结合时，这种不灵活对大多数的用户造成阻碍。

例如，具有内置数码相机的手机已被投放到市场上一段时间。但是，由于手机的用户界面的限制，因此现有的手机即使对于诸如显示、删除和发送照片的基本的与照片有关的操作也是难以使用的。

因此，需要具有用于照片管理的更明了直观的用户界面的便携式

多功能装置。

发明内容

通过公开的便携式多功能装置减少或消除与用于便携式装置的用户界面相关的以上缺点和其它问题。在一些实施例中，便携式电子装置包括具有图形用户界面（GUI）的触摸敏感显示器（也被称为“触摸屏”或“触摸屏显示器”）、一个或多个处理器、存储器和一个或多个模块、存储在存储器内的用于执行多种功能的程序或多组指令。在一些实施例中，用户主要通过触摸敏感显示器上的手指接触和手势与 GUI 交互作用。用于执行照片管理的指令可被包含于被配置为由一个或多个处理器执行的计算机程序产品中。

本发明的一个方面包含一种计算机实现的方法，在该方法中，具有触摸屏的便携式电子装置执行以下步骤：显示与一组照片图像对应的缩略图像阵列；在检测到用户接触阵列中的相应缩略图像时，用用户选择的照片图像代替显示的缩略图像阵列，其中，以比相应的缩略图像大的比例显示用户选择的照片图像；和代替用户选择的照片图像显示不同的照片图像，其中，根据包含用户接触触摸屏显示器的基本上水平移动的滚动手势选择不同的照片图像。

本发明的另一方面包含一种计算机实现的方法，在该方法中，具有触摸屏的便携式电子装置执行以下步骤：显示与一组照片图像对应的缩略图像阵列；检测包含用户接触触摸屏显示器的基本上垂直移动的滚动手势；和通过根据滚动手势的方向滚动缩略图像的显示响应滚动手势，其中，滚动手势基本上与用户接触触摸屏显示器的水平位置无关。

本发明的另一方面包含一种便携式电子装置。该装置包括触摸屏显示器、一个或多个处理器、存储器和一个或多个程序。一个或多个程序被存储在存储器中并被配置为通过所述一个或多个处理器被执行。一个或多个程序包括：用于显示与一组照片图像对应的缩略图像阵列的指令；用于在检测到用户接触阵列中的相应缩略图像时，用用

户选择的照片图像代替显示的缩略图像阵列的指令，其中，以比相应的缩略图像大的比例显示用户选择的照片图像；和用于代替用户选择的照片图像显示不同的照片图像的指令，其中，根据包含用户接触触摸屏显示器的基本上水平移动的滚动手势选择不同的照片图像。

本发明的另一方面包含一种便携式电子装置。该装置包括触摸屏显示器、一个或多个处理器、存储器和一个或多个程序。一个或多个程序被存储在存储器中并被配置为通过所述一个或多个处理器被执行。一个或多个程序包括：用于显示与一组照片图像对应的缩略图像阵列的指令；用于检测包含用户接触触摸屏显示器的基本上垂直移动的滚动手势的指令；和用于通过根据滚动手势的方向滚动缩略图像的显示来响应滚动手势的指令，其中，滚动手势基本上与用户接触触摸屏显示器的水平位置无关。

本发明的另一方面包括一种包括计算机可读存储介质和嵌入其中的计算机程序机构的计算机程序产品。该计算机程序机构包含当通过具有触摸屏显示器的便携式电子装置被执行时使该装置执行以下步骤的指令：显示与一组照片图像对应的缩略图像阵列；在检测到用户接触阵列中的相应缩略图像时，用用户选择的照片图像代替显示的缩略图像阵列，其中，以比相应的缩略图像大的比例显示用户选择的照片图像；和代替用户选择的照片图像显示不同的照片图像，其中，根据包含用户接触触摸屏显示器的基本上水平移动的滚动手势选择不同的照片图像。

本发明的另一方面包括一种包括计算机可读存储介质和嵌入其中的计算机程序机构的计算机程序产品。该计算机程序机构包含当通过具有触摸屏显示器的便携式电子装置被执行时使该装置执行以下步骤的指令：显示与一组照片图像对应的缩略图像阵列；检测包含用户接触触摸屏显示器的基本上垂直移动的滚动手势；和通过根据滚动手势的方向滚动缩略图像的显示来响应滚动手势，其中，滚动手势基本上与用户接触触摸屏显示器的水平位置无关。

本发明的另一方面包含一种具有触摸屏显示器的便携式电子装

置，该便携式电子装置包括：用于显示与一组照片图像对应的缩略图像阵列的器件；用于在检测到用户接触阵列中的相应缩略图像时，用用户选择的照片图像代替显示的缩略图像阵列的器件，其中，以比相应的缩略图像大的比例显示用户选择的照片图像；和用于代替用户选择的照片图像显示不同的照片图像的器件，其中，根据包含用户接触触摸屏显示器的基本上水平移动的滚动手势选择不同的照片图像。

本发明的另一方面包含一种具有触摸屏显示器的便携式电子装置，该便携式电子装置包括：用于显示与一组照片图像对应的缩略图像阵列的器件；用于检测包含用户接触触摸屏显示器的基本上垂直移动的滚动手势的器件；和用于通过根据滚动手势的方向滚动缩略图像的显示来响应滚动手势的器件，其中，滚动手势基本上与用户接触触摸屏显示器的水平位置无关。

本发明的一个方面包含一种计算机实现的方法，在该方法中，具有触摸屏的便携式电子装置执行以下步骤：检测触摸屏显示器上或附近的物理对象的第一移动；在检测第一移动的同时，沿第一方向平移在触摸屏显示器上显示的第一数字对象，其中，第一数字对象与一组数字对象相关；响应第一数字对象的以前隐藏的边缘的显示和连续检测到第一移动，显示超出第一数字对象的边缘的区域；在不再检测到第一移动之后，沿第二方向平移第一数字对象，直到不再显示超出第一数字对象的边缘的区域；检测触摸屏显示器上或附近的物理对象的第二移动；和在显示第一数字对象的以前隐藏的边缘的同时，响应检测到第二移动，沿第一方向平移第一数字对象并显示所述一组数字对象中的第二数字对象。

本发明的另一方面包含一种便携式电子装置。该装置包括触摸屏显示器、一个或多个处理器、存储器和一个或多个程序。一个或多个程序被存储在存储器中并被配置为通过所述一个或多个处理器被执行。一个或多个程序包括：用于检测触摸屏显示器上或附近的物理对象的第一移动的指令；用于在检测第一移动的同时沿第一方向平移在触摸屏显示器上显示的第一数字对象的指令，其中，第一数字对象与

一组数字对象相关；用于响应第一数字对象的以前隐藏的边缘的显示和连续检测到第一移动，显示超出第一数字对象的边缘的区域的指令；用于在不再检测到第一移动之后沿第二方向平移第一数字对象直到不再显示超出第一数字对象的边缘的区域的指令；用于检测触摸屏显示器上或附近的物理对象的第二移动的指令；和用于在显示第一数字对象的以前隐藏的边缘的同时响应检测到第二移动，沿第一方向平移第一数字对象并显示所述一组数字对象中的第二数字对象的指令。

本发明的另一方面包括一种包括计算机可读存储介质和嵌入其中的计算机程序机构的计算机程序产品。该计算机程序机构包含当通过具有触摸屏显示器的便携式电子装置被执行时使该装置执行以下步骤的指令：检测触摸屏显示器上或附近的物理对象的第一移动；在检测第一移动的同时，沿第一方向平移在触摸屏显示器上显示的第一数字对象，其中，第一数字对象与一组数字对象相关；响应第一数字对象的以前隐藏的边缘的显示和连续检测到第一移动，显示超出第一数字对象的边缘的区域；在不再检测到第一移动之后，沿第二方向平移第一数字对象，直到不再显示超出第一数字对象的边缘的区域；检测触摸屏显示器上或附近的物理对象的第二移动；和在显示第一数字对象的以前隐藏的边缘的同时，响应检测到第二移动，沿第一方向平移第一数字对象并显示所述一组数字对象中的第二数字对象。

本发明的另一方面包含一种具有触摸屏显示器的便携式电子装置，该便携式电子装置包括：用于检测触摸屏显示器上或附近的物理对象的第一移动的器件；用于在检测第一移动的同时沿第一方向平移在触摸屏显示器上显示的第一数字对象的器件，其中，第一数字对象与一组数字对象相关；用于响应第一数字对象的以前隐藏的边缘的显示和连续检测到第一移动，显示超出第一数字对象的边缘的区域的器件；用于在不再检测到第一移动之后沿第二方向平移第一数字对象直到不再显示超出第一数字对象的边缘的区域的器件；用于检测触摸屏显示器上或附近的物理对象的第二移动的器件；和用于在显示第一数字对象的以前隐藏的边缘的同时响应检测到第二移动，沿第一方向平

移第一数字对象并显示所述一组数字对象中的第二数字对象的器件。

因此，本发明提供用于在具有触摸屏显示器的便携式电子装置上管理照片的明了直观的用户界面。

附图说明

为了更好地理解本发明的上述实施例及其附加的实施例，应结合以下的附图参照以下的具体实施方式，在这些附图中，类似的附图标记始终指的是相应的部分。

图 1 是解释根据一些实施例的具有触摸敏感显示器的便携式电子装置的框图。

图 2 解释根据一些实施例的具有触摸屏的便携式电子装置。

图 3 解释根据一些实施例的用于解锁便携式电子装置的示例性用户界面。

图 4 解释根据一些实施例的用于便携式电子装置上的应用的菜单的示例性用户界面。

图 5 解释根据一些实施例的用于相机的示例性用户界面。

图 6 解释根据一些实施例的用于相机相册 (camera roll) 的示例性用户界面。

图 7A~7C 解释根据一些实施例的用于查看和操纵图像的示例性用户界面。

图 8 解释根据一些实施例的用于查看相册的示例性用户界面。

图 9 解释根据一些实施例的用于设置用户偏好的示例性用户界面。

图 10 解释根据一些实施例的用于查看相册的示例性用户界面。

图 11 解释根据一些实施例的用于查看相册中的图像的示例性用户界面。

图 12 解释根据一些实施例的用于选择相册中的图像的使用的示例性用户界面。

图 13A~13G 解释根据一些实施例的用于在电子邮件消息模板中

加入图像的示例性用户界面。

图 14A 和图 14B 解释根据一些实施例的用于向用户的联系人 (contact) 列表中的联系人分配图像的示例性用户界面。

图 15 解释根据一些实施例的用于在用户的壁纸中加入图像的示例性用户界面。

图 16 是解释根据一些实施例的用于在触摸屏上显示缩略图像的过程的流程图。

图 17 是解释根据一些实施例的用于响应用户接触触摸屏执行操作的过程的流程图。

图 18 是解释根据一些实施例的用于响应用户接触触摸屏删除图像的过程的流程图。

图 19 是解释根据一些实施例的用于在触摸屏上显示多个相册的过程的流程图。

图 20 是解释根据一些实施例的用于在用户选择附加选项图标时执行附加操作的过程的流程图。

图 21 是解释根据一些实施例的用于呈现包含用户选择的图像的电子邮件服务界面的动画过程的流程图。

图 22 是解释根据一些实施例的用于向用户的联系人列表中的用户选择的联系人分配图像的过程的流程图。

图 23A~23H 解释根据一些实施例的用于查看一组数字对象中的数字对象的示例性用户界面。

图 24 是解释根据一些实施例的用于查看一组数字对象中的数字对象的过程的流程图。

具体实施方式

现在详细参照在附图中示出其例子的实施例。在以下的详细说明中，为了使得能够彻底理解本发明，阐述大量的特定细节。但是，对于本领域技术人员来说很显然可以在没有这些特定的细节的情况下实施本发明。在其它的情况下，公知的方法、过程、部件、电路和网络

没有被详细说明，以不至于不必要地混淆实施例的各个方面。

便携式电子装置、用于这些装置的用户界面和用于使用这些装置的相关处理的实施例被说明。在一些实施例中，便携式电子装置是还包含诸如 PDA 和/或音乐播放器功能的其它功能的诸如移动电话的便携式通信装置。

除了触摸屏或在触摸屏上显示的虚拟点击式转盘 (click wheel) 以外，用户界面可包含物理点击式转盘。点击式转盘是可基于转盘的角位移或便携式电子装置的用户与转盘接触的点而提供导航命令的物理用户界面装置。例如，当便携式电子装置的用户在转盘的至少一部分或转盘的中心上按下时，点击式转盘还可被用于提供与一个或多个项目的选择对应的用户命令。作为替代方案，停止与触摸屏表面上的点击式转盘图像的接触可指示与选择对应的用户命令。为了简化，在以下的讨论中，使用包含触摸屏的便携式电子装置作为示例性实施例。但是，应当理解，可以将用户界面和相关的处理中的一些应用于其它的装置，诸如可包含诸如物理点击式转盘、物理键盘、鼠标和/或操纵杆的一个或多个其它物理用户界面装置的个人计算机和膝上型计算机。

除了照片管理以外，装置可支持各种其它的应用，诸如电话应用、视频会议应用、电子邮件应用、即时消息应用、博客应用、网页浏览应用、数字音乐播放器应用和/或数字视频播放器应用。

可在便携式电子装置上执行的各种应用可使用至少一个共用的物理用户界面装置，诸如触摸屏。可从一个应用到下一个应用并且/或者在各个应用内调整和/或改变触摸屏的一个或多个功能以及在便携式电子装置上显示的相应的信息。这样，便携式电子装置的共用的物理结构（诸如触摸屏）可以用直观明了的用户界面支持各种应用。

用户界面可包含一个或多个软键盘实施例。软键盘实施例可包含键盘的显示的图标上的符号的标准 (QWERTY) 和/或非标准配置，诸如在 2006 年 7 月 24 日提交的美国专利申请 No. 11/459606, “Keyboards For Portable Electronic Devices” 和在 2006 年 7 月 24

日提交的美国专利申请 No. 11/459615, “Touch Screen Keyboards For Portable Electronic Devices” 说明的那些, 在此加入这些专利申请的内容作为参考。与诸如用于打字机的物理键盘的现有物理键盘中的键的数量相比, 键盘实施例可包含数量减少的图标 (或软键)。这使得用户更容易选择键盘中的一个或多个图标并由此选择一个或多个相应的符号。键盘实施例可以是自适应的。例如, 可根据诸如选择一个或多个图标和/或一个或多个相应的符号的用户动作修改显示的图标。便携式电子装置上的一个或多个应用可利用共用和/或不同的键盘实施例。因此, 可以为应用中的至少一些定制使用的键盘实施例。在一些实施例中, 可以为各个用户定制一个或多个键盘实施例。例如, 基于各用户的单词使用历史 (字典编辑法、俚语、个体使用)。在使用软键盘实施例时, 可以调整键盘实施例中的一些以在选择一个或多个图标并由此选择一个或多个符号时减小用户出错的概率。

现在把注意指向便携式电子装置的实施例。图 1 是解释根据一些实施例的具有触摸敏感显示器 112 的便携式电子装置 100 的框图。为了方便, 将触摸敏感显示器 112 称为“触摸屏”。装置 100 可包含存储器 102 (可包含一个或多个计算机可读存储介质)、存储器控制器 122、一个或多个处理单元 (CPU) 120、外设接口 118、RF 电路 108、音频电路 110、扬声器 111、麦克风 113、输入/输出 (I/O) 子系统 106、其它的输入或控制装置 116 和外部端口 124。装置 100 可包含一个或多个光学传感器 164。这些部件可在一个或多个通信总线或信号线 103 之上通信。

应当理解, 便携式电子装置 100 仅是便携式电子装置 100 的一个例子, 并且, 便携式电子装置 100 可具有比图示多或少的部件、可组合两个或多个部件, 或者可具有部件的不同结构或配置。可以以包含一个或多个信号处理和/或专用集成电路的硬件、软件或硬件和软件的组合实现图 1 所示的各种部件。

存储器 102 可包含高速随机存取存储器, 并且还可包含非易失性存储器, 诸如一个或多个磁盘存储设备、闪存设备或其它的非易失性

固态存储设备。可以通过存储器控制器 122 控制便携式电子装置 100 的诸如 CPU 120 和外设接口 118 的其它部件对存储器 102 的访问。

外设接口 118 将便携式电子装置的输入和输出外设与 CPU 120 和存储器 102 耦合。一个或多个处理器 120 运行或执行存储在存储器 102 中的各种软件程序和/或多组指令，以执行用于便携式电子装置 100 的各种功能并处理数据。

在一些实施例中，可以在诸如芯片 104 的单一芯片上实现外设接口 118、CPU 120 和存储器控制器 122。在一些其它的实施例中，可以在各分开的芯片上实现它们。

RF (射频) 电路 108 接收和发送也被称为电磁信号的 RF 信号。RF 电路 108 将电信号转换成电磁信号/从电磁信号转换电信号，并通过电磁信号与通信网络和其它通信装置通信。RF 电路 108 可包含用于执行这些功能的公知的电路，包括但不限于天线系统、RF 收发器、一个或多个放大器、调谐器、一个或多个振荡器、数字信号处理器、CODEC 芯片组、用户身份模块 (SIM) 卡和存储器等。RF 电路 108 可通过无线通信与诸如也被称为万维网 (WWW) 的因特网、诸如蜂窝式电话网络的内部网和/或无线网络、无线局域网 (LAN) 和/或都市区域网 (MAN) 的网络以及其它装置通信。无线通信可使用包括但不限于全球移动通信系统 (GSM)、增强型数据 GSM 环境 (EDGE)、高速下行链路分组访问 (HSDPA)、宽带码分多址 (W-CDMA)、码分多址 (CDMA)、时分多址 (TDMA)、蓝牙、无线保真 (Wi-Fi) (例如, IEEE 802.11a、IEEE 802.11b、IEEE 802.11g 和/或 IEEE 802.11n)、语音 IP (voice over Internet Protocol) (VoIP)、Wi-MAX、电子邮件用协议、即时消息传递 (IM) 和/或短信服务 (SMS) 的多种通信标准、协议和技术中的任一种或包含到本文件的提交日期为止还没有开发的通信协议的任何其它适当的通信协议。

音频电路 110、扬声器 111 和麦克风 113 在用户和便携式电子装置 100 之间提供音频界面。音频电路 110 从外设接口 118 接收音频数据、将音频数据转换成电信号，并将电信号传送给扬声器 111。扬声

器 111 将电信号转换成可听的声波。音频电路 110 还从声波接收通过麦克风 113 转换的电信号。音频电路 110 将电信号转换成音频数据并将音频数据传送给外设接口 118 用于处理。可以通过外设接口 118 从存储器 102 和/或 RF 电路 108 检索音频数据并且/或者将音频数据传送给存储器 102 和/或 RF 电路 108。在一些实施例中，音频电路 110 还包含耳机插孔（未示出）。耳机插孔在音频电路 110 和诸如只输出型耳机或具有输出（例如，用于一只或两只耳朵的耳机）和输入（例如，麦克风）的头戴式送受话器的可去除音频输入/输出外设之间提供接口。

I/O 子系统 106 将便携式电子装置 100 上的诸如显示系统 112 和其它输入/控制装置 116 的输入/输出外设与外设接口 118 耦合。I/O 子系统 106 可包含显示控制器 156 和用于其它输入或控制装置的一个或多个输入控制器 160。一个或多个输入控制器 160 从/向其它输入或控制装置 116 接收/发送电信号。其它输入/控制装置 116 可包含物理按钮（例如，按钮、摇杆按钮（rocker button）等）、拨盘、滑动开关、操纵杆和点击式转盘等。在一些替代性实施例中，输入控制器 160 可以与（或不与）键盘、红外端口、USB 端口和诸如鼠标的指示器装置中的任一种耦合。一个或多个按钮（例如，208，图 2）可包含用于扬声器 111 和/或麦克风 113 的音量控制的增大/减小按钮。一个或多个按钮可包含按钮（例如，206，图 2）。如在在 2005 年 12 月 23 日提交的美国专利申请 No. 11/322549，“Unlocking a Device by Performing Gestures on a Unlock Image”中说明的那样，按钮的迅速按下可解除触摸屏 112 的锁定或开始在触摸屏上使用手势以解锁便携式电子装置的过程，在此加入该美国专利申请作为参考。按钮（例如，206）的长时按下可接通或断开便携式电子装置 100 的电源。用户能够定制按钮中的一个或多个的功能。触摸屏 112 被用于实现虚拟或软按钮和一个或多个软键盘。

触摸敏感显示系统 112 在便携式电子装置和用户之间提供输入接口和输出接口。显示控制器 156 从/向显示系统 112 接收和/或发送电

信号。显示系统 112 向用户显示视觉输出。视觉输出可包含图形、文本、图标、视频和它们的任意组合（统称为“图形”）。在一些实施例中，视觉输出中的一些或全部可与后面详述的用户界面对象对应。

显示系统 112 中的触摸屏是基于有触觉的和/或能触知的接触从用户接收输入的触摸敏感表面。显示系统 112 和显示控制器 156（与相关的模块和/或存储器 102 中的多组指令一起）检测显示系统 112 上的接触（和接触的任何移动或停止）并将检测的接触转换成与在触摸屏上显示的用户界面对象（例如，一个或多个软键、图标、网页或图像）的交互作用。在示例性实施例中，显示系统 112 中的触摸屏和用户之间的接触点与用户的手指对应。

显示系统 112 中的触摸屏可使用 LCD（液晶显示器）技术或 LPD（发光聚合物显示器）技术，但在其它的实施例中也可使用其它的显示技术。显示系统 112 中的触摸屏和显示控制器 156 可通过使用现在已知或以后开发的多种接触感测技术中的任一种检测接触及其任何移动或停止，这些技术包括但不限于电容、电阻、红外和表面声波技术以及其它接近传感器阵列或用于确定与显示系统 112 中的触摸屏的一个或多个接触点的其它元件。显示系统 112 的一些实施例中的触摸敏感显示器可以与美国专利 6323846（Westerman 等）、6570557（Westerman 等）和/或 6677932（Westerman）和/或美国专利公开 2002/0015024A1 中说明的多重触摸敏感板类似，在此加入这些专利和专利申请中的每一个作为参考。但是，显示系统 112 中的触摸屏显示来自便携式电子装置 100 的视觉输出，而触摸敏感板不提供视觉输出。显示系统 112 中的触摸屏可具有超过 100dpi 的分辨率。在示例性实施例中，显示系统中的触摸屏具有约 168dpi 的分辨率。用户可通过使用诸如铁笔和手指等的任何适当的物体或附属物与显示系统 112 中的触摸屏进行接触。在一些实施例中，用户界面被设置为主要用基于手指的接触和手势来进行工作，由于手指在触摸屏上的接触面积较大，因此其精度比基于铁笔的输入低得多。在一些实施例中，便携式电子装置将粗略的基于手指的输入转换成用于执行用户希望的动作的精确的

指示器/光标位置或命令。

显示系统 112 的一些实施例中的触摸敏感显示器可以为在以下的申请中说明的那些：(1) 在 2006 年 5 月 2 日提交的美国专利申请 No. 11/381313, “Multipoint Touch Surface Controller”；(2) 在 2004 年 5 月 6 日提交的美国专利申请 No. 10/840862, “Multipoint Touchscreen”；(3) 在 2004 年 7 月 30 日提交的美国专利申请 No. 10/903964, “Gestures For Touch Sensitive Input Devices”；(4) 在 2005 年 1 月 31 日提交的美国专利申请 No. 11/048264, “Gestures For Touch Sensitive Input Devices”；(5) 在 2005 年 1 月 18 日提交的美国专利申请 No. 11/038590, “Mode-based Graphical User Interfaces For Touch Sensitive Input Devices”；(6) 在 2005 年 9 月 16 日提交的美国专利申请 No. 11/258758, “Virtual Input Device Placement On A Touch Screen User Interface”；(7) 在 2005 年 9 月 16 日提交的美国专利申请 No. 11/228700, “Operation Of A Computer With A Touch Screen Interface”；(8) 在 2005 年 9 月 16 日提交的美国专利申请 No. 11/228737, “Activating Virtual Keys Of A Touch-Screen Virtual Keyboard”；和 (9) 在 2006 年 3 月 3 日提交的美国专利申请 No. 11/367749, “multi-Functional Hand-Held Device”, 在此加入所有这些申请作为参考。

在一些实施例中，除了触摸屏以外，便携式电子装置 100 可包含用于激活或减活特定的功能的触摸板（未示出）。在一些实施例中，触摸板是便携式电子装置的触摸敏感区域，与触摸屏不同，该触摸敏感区域不显示视觉输出。触摸板可以是与显示系统 112 中的触摸屏分开的触摸敏感表面或通过触摸屏形成的触摸敏感表面的延伸。

在一些实施例中，便携式电子装置 100 可包含物理或虚拟点击式转盘作为输入控制装置 116。用户可通过旋转点击式转盘或通过移动与点击式转盘的接触点（例如，通过其相对于点击式转盘的中心点的角位移测量接触点的移动量）在显示系统 112 中显示的一个或多个图形对象（以下称为图标）之间导航或与它们交互作用。点击式转盘还

被用于选择显示的图标中的一个或多个。例如，用户可在与点击式转盘的至少一部分或相关的按钮上按下。可以通过输入控制器 160 以及一个或多个模块和/或存储器 102 中的多组指令处理用户通过点击式转盘提供的用户命令和导航命令。对于虚拟点击式转盘，点击式转盘和点击式转盘控制器可分别是显示系统 112 和显示控制器 156 的一部分。对于虚拟点击式转盘，点击式转盘可以是响应用户与装置的交互作用出现和消失的不透明或半透明物体。在一些实施例中，在便携式多功能装置的触摸屏上显示并通过用户与触摸屏的接触操作虚拟点击式转盘。

装置 100 还包含用于对各个部件供电的电力系统 162。电力系统 162 可包含电力管理系统、一个或多个电源(例如, 电池、交流电(AC))、再充电系统、电源故障检测电路、电力转换器或逆变器、电力状态指示器(例如, 发光二极管(LED))和与便携式电子装置中的电力的产生、管理和分布相关的任何其它部件。

装置 100 还可包含一个或多个光学传感器 164。图 1 显示与 I/O 子系统 106 中的光学传感器控制器 158 耦合的光学传感器。光学传感器 164 可包含电荷耦合器件(CCD)或互补金属氧化物半导体(CMOS)光电晶体管。光学传感器 164 接收通过一个或多个透镜投射的来自环境的光, 并将该光转换成代表图像的数据。光学传感器 164 可与成像模块 142 一起捕获静态图像或视频。在一些实施例中, 光学传感器与便携式电子装置前面的触摸屏显示器 112 相对, 位于便携式电子装置 100 的后面, 使得触摸屏显示器可被用作用于静态和/或视频图像获取的取景器。在一些实施例中, 光学传感器位于便携式电子装置的前面, 使得可在用户在触摸屏显示器上查看其它视频会议参与者的同时对于视频会议获得用户的图像。在一些实施例中, 光学传感器 164 的位置可被用户改变(例如, 通过旋转便携式电子装置外壳中的透镜和传感器), 使得可以与触摸屏显示器一起使用单一的光学传感器 164 用于同时进行视频会议和静态和/或视频图像获取。

装置 100 还可包含一个或多个接近传感器 166。图 1 显示与外设

接口 118 耦合的接近传感器 166。作为替代方案，接近传感器 166 可与 I/O 子系统 106 中的输入控制器 160 耦合。接近传感器 166 可如在 2005 年 9 月 30 日提交的美国专利申请 No. 11/241839, “Proximity Detector In Handheld Device” 和在 2005 年 9 月 30 日提交的美国专利申请 No. 11/240788, “Proximity Detector In Handheld Device” 中说明的那样执行，在此加入这些专利申请作为参考。在一些实施例中，当多功能装置位于用户的耳朵附近时（例如，当用户正在打电话时），接近传感器关闭并禁用触摸屏 112。在一些实施例中，当便携式电子装置处于用户的口袋、钱包或其它的黑暗区域中时，接近传感器使屏幕保持为关，以在便携式电子装置处于锁定状态时防止不必要的电池泄漏。

在一些实施例中，存储在存储器 102 中的软件成分可包含操作系统 126、通信模块（或一组指令）128、接触/运动模块（或一组指令）130、图形模块（或一组指令）132、文本输入模块（或一组指令）134、全球定位系统（GPS）模块（或一组指令）135 和应用（或一组指令）136。

操作系统 126（例如，Darwin、RTXC、LINUX、UNIX、OS X、WINDOWS 或诸如 V_xWorks 的嵌入式操作系统）包含用于控制和管理一般的系统任务（例如，存储器管理、存储设备控制、电源管理等）的各种软件成分和/或驱动器并有利于各种硬件和软件成分之间的通信。

通信模块 128 有利于在一个或多个外部端口 124 上与其它装置通信，并且还包含用于处理通过 RF 电路 108 和/或外部端口 124 接收的数据的各种软件成分。外部端口 124（例如，通用串行总线（USB）、FIREWIRE 等）适于直接地或在网络（例如，因特网、无线 LAN 等）上间接地与其它装置耦合。在一些实施例中，外部端口是与在 iPOD（Apple Computer, Inc. 的商标）装置上使用的 30 针连接器相同或类似和/或兼容的多针（例如，30 针）连接器。

接触/运动模块 130 可检测与显示系统 112 中的触摸屏（协同显示

控制器 156) 和其它接触敏感装置 (例如, 触摸板或物理点击式转盘) 的接触。接触/运动模块 130 包含用于执行与接触的检测有关的各种操作的各种软件成分, 这些操作诸如确定是否发生了接触、确定是否存在接触的移动并跨过显示系统 112 中的触摸屏跟踪移动以及确定接触是否已停止 (即, 接触是否已中止)。确定接触点的移动可包含确定接触点的速度 (大小)、速率 (大小和方向) 和/或加速度 (大小和/或方向的变化)。这些操作可被应用于各单一的接触 (例如, 一个手指接触) 或多个同时的接触 (例如, “多重触摸”/多手指接触)。在一些实施例中, 接触/运动模块 130 和显示控制器 156 还检测触摸板上的接触。在一些实施例中, 接触/运动模块 130 和控制器 160 检测点击式转盘上的接触。

图形模块 132 包括用于在显示系统 112 上呈现和显示图形的各种已知的软件成分, 包含用于改变显示的图像的亮度的成分。如这里使用的那样, 术语“图形”包含可向用户显示的任意对象, 包括但不限于文本、网页、图标 (诸如包含软键的用户界面对象)、数字图像、视频和动画片等。

可以是图形模块 132 的成分的文本输入模块 134 提供用于在各种应用 (例如, 联系人 137、电子邮件 140、IM 141、博客 142、浏览器 147 和需要文本输入的任何其它应用) 中键入文本的软键盘。

GPS 模块 135 确定便携式电子装置的位置并提供该信息以用于各种应用中 (例如, 提供给电话 138 用于基于位置的拨号、作为图片/视频元数据提供给相机 143 和/或博客 142 并提供给提供诸如天气预报应用小插件 (weather widget)、本地黄页应用小插件 (yellow page widget) 和地图/导航服务的基于位置的服务的应用)。

应用 136 可包含以下的模块 (或多组指令) 或它们的子集或超集:

- 联系人模块 137 (有时称为地址簿或联系人列表);
- 电话号码模块 138;
- 视频会议模块 139;
- 电子邮件客户端模块 140;

- 即时消息传递 (IM) 模块 141;
- 博客模块 142;
- 用于静态和/或视频图像的相机模块 143;
- 图像管理模块 144;
- 视频播放器模块 145;
- 音乐播放器模块 146;
- 浏览器模块 147;
- 日历模块 148;
- 应用小插件(widget 模块 149, 可包含天气预报应用小插件 149-1、股票应用小插件 149-2、计算器应用小插件 149-3、闹钟应用小插件 149-4、字典应用小插件 149-5 和用户获得的其它应用小插件以及用户创建的应用小插件 149-6);
- 用于制作用户创建的应用小插件 149-6 的应用小插件创建器模块 150; 和/或
- 搜索模块 151.

可被存储在存储器 102 中的其它应用 136 的例子包含记事簿和其它字处理应用、启用 JAVA 的应用、加密、数字权利 (right) 管理、语音识别和语音复制。

可以连同显示系统 112、显示控制器 156、光学传感器 164、光学传感器控制器 158、接触模块 130、图形模块 132 和图像管理模块 144 一起使用相机模块 143, 以捕获静态图像或视频 (包含视频流) 并将它们存储在存储器 102 中、浏览静态图像或视频、修改静态图像或视频的特性或从存储器 102 中删除静态图像或视频。下面进一步说明使用相机模块 143 的用户界面和相关的处理的实施例。

可以连同显示系统 112、显示控制器 156、接触模块 130、图形模块 132、文本输入模块 134、相机模块 143 一起使用图像管理模块 144, 以配置、修改或另外操纵、标注、删除、(例如, 在数字幻灯片放映或相册中) 给出和存储静态和/或视频图像。下面进一步说明使用图像管理模块 144 的用户界面和相关的处理的实施例。

注意，以上识别的模块和应用（包含相机模块 143 和图像管理模块 144）与用于执行上述的一种或多种功能的一组指令对应。这些模块（即，多组指令）不需要作为单独的软件程序、过程或模块被实现，因此，可以在各种实施例组合或另外重新配置这些模块的各种子集。在一些实施例中，存储器 102 可存储以上识别的模块的子集和数据结构。并且，存储器 102 可存储上面没有说明的附加模块和数据结构。

在一些实施例中，便携式电子装置 100 是专有地通过显示系统 112 中的触摸屏和/或触摸板执行便携式电子装置上的预定的一组功能的操作的装置。通过使用触摸屏和/或触摸板作为用于操作便携式电子装置 100 的主要输入/控制装置，可以减少便携式电子装置 100 上的物理输入/控制装置（诸如按钮和拨盘等）的数量。

可以专有地通过触摸屏和/或触摸板执行的预定的一组功能包含用户界面之间的导航。在一些实施例中，触摸板在被用户触摸时将便携式电子装置 100 从可在便携式电子装置 100 上显示的任意用户界面导航到主要菜单、主按键菜单（home menu）或根菜单。在这些实施例中，触摸板可被称为“菜单按钮”。在一些其它的实施例中，菜单按钮可以是物理按钮或其它物理输入/控制装置而不是触摸板。

图 2 示出根据一些实施例的具有触摸屏 112 的便携式电子装置 100。触摸屏可显示一个或多个图形。在本实施例以及下述的其它实施例中，用户可通过例如用一个或多个手指 202（图中未按比例绘制）或铁笔（图中未示出）接触或触摸图形来选择一个或多个图形。在一些实施例中，当用户停止接触一个或多个图形时选择一个或多个图形。在一些实施例中，接触可包含诸如一次或多次轻敲（tap）、一次或多次掠过（swipe）（从左到右、从右到左、向上和/或向下）和/或与便携式电子装置 100 接触的手指的滚动（从右到左、从左到右、向上和/或向下）的手势。在一些实施例中，与图形的无意接触不会选择该图形。例如，当与选择对应的手势是轻敲时，在应用图标上扫过的掠过手势不会选择相应的应用，换句话说，便携式电子装置 100 在考虑此时哪一个应用或模块处于使用中之后解释手势和动作的含义。

装置 100 还可包含诸如“主菜单 (home) 按钮”或菜单按钮 204 的一个或多个物理按钮。如上所述, 菜单按钮 204 可被用于导航到可在便携式电子装置 100 上执行的一组应用中的任意应用 136。作为替代方案, 在一些实施例中, 作为触摸屏 112 中的 GUI 中的软键实现菜单按钮。

在一个实施例中, 便携式电子装置 100 包含触摸屏 112、菜单按钮 204、用于接通/断开便携式电子装置的电源并锁定便携式电子装置的按钮 206 和音量调节按钮 208。按钮 206 可被用于通过压下按钮并将按钮在压下的状态中保持预定的时间间隔, 接通/断开便携式电子装置的电源、通过压下按钮并在经过预定的时间间隔之前释放按钮, 来锁定便携式电子装置, 和/或解锁便携式电子装置或启动解锁过程。在替代性实施例中, 便携式电子装置 100 还可通过麦克风 113 接收用于激活或减活一些功能的口头输入。

现在关注可以在便携式电子装置 100 上实现的用户界面 (“UI”) 和相关的过程的实施例。

图 3 示出根据一些实施例的用于解锁便携式电子装置的示例性用户界面。在一些实施例中, 用户界面 300 包含以下的要素或它们的子集或超集:

- 随手指手势移动以解锁便携式电子装置的解锁图像 302;
- 向解锁手势提供视觉信号的箭头 304;
- 向解锁手势提供附加信号的通道 306;
- 时间 308;
- 日子 310;
- 日期 312; 和
- 壁纸图像 314。

在一些实施例中, 便携式电子装置在便携式电子装置处于用户界面锁定状态中时检测与触摸敏感显示器的接触 (例如, 用户的手指在解锁图像 302 上或附近的接触)。装置根据接触移动解锁图像 302。如果检测到的接触与诸如跨过通道 306 移动解锁图像的预定手势对

应，那么装置转变成用户界面解锁状态。相反，如果检测到的接触不与预定的手势对应，那么便携式电子装置保持用户界面锁定状态。如上所述，在2005年12月23日提交的美国专利申请 No. 11/322549，“Unlocking a Device by Performing Gestures on a Unlock Image”中说明了在触摸屏上使用手势以解锁便携式电子装置的过程，在此加入该专利申请作为参考。

图4示出根据一些实施例的用于便携式电子装置上的应用的菜单的示例性用户界面。在一些实施例中，用户界面400包含以下的要素或它们的子集或超集：

- 用于无线通信的信号强度指示器 402；
- 时间 404；
- 电池状态指示器 406；
- 具有用于频繁使用的应用的图标托盘 (tray) 408，这些图标诸如为以下的图标中的一个或多个：
 - 电话 138；
 - 电子邮件客户端 140，可包含未读电子邮件的数量的指示器 410；
 - 浏览器 147； 和
 - 音乐播放器 146； 和
- 用于其它应用的图标，这些图标诸如为以下的图标中的一个或多个：
 - IM 141；
 - 图像管理 144；
 - 相机 143；
 - 视频播放器 145；
 - 天气预报 149-1；
 - 股票 149-2；
 - 博客 142；
 - 日历 148；

- 计算器 149-3
- 闹钟 149-4;
- 字典 149-5; 和
- 用户创建的应用小插件 149-6.

在一些实施例中，UI 400 在一个屏幕上显示所有可用的应用 136，使得不需要滚动应用的列表（例如，通过滚动条）。在一些实施例中，随着应用的数量增加，与应用对应的图标会减小尺寸，使得可以在不滚动的条件下在单一屏幕上显示所有的应用。在一些实施例中，具有处于一个屏幕上的所有应用和菜单按钮使得用户能够用诸如激活菜单按钮 204 并然后激活希望的应用（例如，通过在与应用对应的图标上的轻敲或其它手指手势）的最多两次输入来访问任意希望的应用。

在一些实施例中，UI 400 对基于应用小插件的应用和不基于应用小插件的应用提供一体化的访问。在一些实施例中，所有的应用小插件，不管是不是用户创建的，都在 UI 400 中被显示。在其它的实施例中，激活用于用户创建的应用小插件 149-6 的图标可导致包含用户创建的应用小插件的另一 UI（未示出）或与用户创建的应用小插件对应的图标。

在一些实施例中，用户可例如通过使用在 2006 年 7 月 24 日提交的美国专利申请 No. 11/459602，“Portable Electronic Device With Interface Reconfiguration Mode”中说明的过程重新配置 UI 400 中的图标，在此加入该专利申请作为参考。例如，用户可通过在触摸屏 112 上显示的相应图标上或附近使用手指手势将应用图标移入和移出托盘 408。

图 5 示出根据一些实施例的用于相机的示例性用户界面。在一些实施例中，用户界面 500 包含以下的要素或它们的子集或超集：

- 取景器 502;
- 管理用相机拍摄的图像和/或视频的相机相册（camera roll）504;
- 用于拍摄静态图像的快门 506;

- 用于开始和停止视频记录的记录按钮 508;
- 用于在预定的时间延迟之后拍摄图像或记录视频的定时器 510; 和
- 当被获得时看起来被添加到相机相册 504 中 (例如, 通过图 5 示意地示出的动画) 的图像 512。

图 6 示出根据一些实施例的用于虚拟相机相册的示例性用户界面。便携式电子装置显示图 5 中的相机相册图标 504 上的用户手指手势 514 之后的用户界面。在一些实施例中, 手指手势是瞬时的、与触摸屏的基本上单一位置的接触, 而在其它的实施例中可以使用其它的手指手势。在一些实施例中, 用户界面 600 包含以下的要素或它们的子集或超集:

- 上述的 402、404 和 406;
- 通过相机 143 获得的图像和/或视频的缩略图像 602;
- 当被激活 (例如, 通过图标上的手指手势) 时开始转移到相机 UI (例如, UI 500) 的相机图标 604;

图 16 是示出根据一些实施例的用于在触摸屏上显示缩略图像的过程的流程图。在检测到手指手势 514 (1602) 时, 便携式电子装置识别虚拟相机相册中的一组缩略图像 (1604) 并在触摸屏上显示缩略图像 (1606)。在一些实施例中, 在 2-D 阵列中显示缩略图像 (图 6)。在一些其它的实施例中, 在垂直的列或水平的行中显示缩略图像。在创建实施例中, 缩略图像可具有包含名称、文件大小和指示什么时间产生图像的时间戳的说明。在一些实施例中, 视频的缩略图像具有在视觉上可与其它的静态图像区分开的独特的外观。便携式电子装置在触摸屏的底端显示相机图标 604 (1608) 并开始监视用户下一次接触触摸屏 (1610)。

在一些实施例中, 用户可通过在触摸屏上使用垂直向上/向下的手指手势 606 滚动缩略图像 602。在检测到这种手指手势 (例如, 垂直手指掠过) 时, 便携式电子装置因此滚动该组缩略图像 (1618)。在一些实施例中, 滚动手势与用户接触触摸屏显示器的水平位置无关。

在一些实施例中，滚动手势基本上与用户接触触摸屏显示器的水平位置无关（例如，触摸屏显示器的一个或多个侧面区域可被保留用于诸如与图标对应的功能、软键或应用导航功能的其它功能，并且对于滚动手势是不可用的）。在一些实施例中，响应特定的缩略图像上的静止手势（1614），例如，缩略图像 602-11 上的手指轻敲 608，便携式电子装置开始在触摸屏上产生相应的图像的放大的显示（例如，UI 700A）的过程。下面关于图 7 和图 17 提供该过程的更详细的说明。在一些实施例中，一旦检测到相机图标 604 上的用户手指手势（1616），便携式电子装置就带回图 5 所示的相机 UI 500。

图 7A~图 7C 示出根据一些实施例的用于查看和操纵图像的示例性用户界面。注意，本领域技术人员可以理解本申请中的术语“图像”包含静态图像和视频流。

在一些实施例中，用户界面 700A 包含以下的要素或它们的子集或超集：

- 上述的 402、404、406 和 604；
- 当被激活（例如，通过图标上的手指手势）时开始转移到相机相册 UI（例如，UI 600）的相机相册图标 702；
- 图像 704；
- 当被激活（例如，通过图标上的手指手势）时开始转移到具有用于图像 704 的附加选项的 UI（例如，UI 1200，图 12）的附加选项图标 706；
- 当被激活（例如，通过图标上的手指手势）时开始显示虚拟相机相册中的前一图像（例如，602-10）的前一图像图标 708；
- 当被激活（例如，通过图标上的手指手势）时开始幻灯片放映虚拟相机相册中的图像的播放图标 710；
- 当被激活（例如，通过图标上的手指手势）时开始显示虚拟相机相册中的下一图像（例如，602-12）的下一图像图标 712；
- 和
- 当被激活（例如，通过图标上的手指手势）时开始显示确认用

户希望删除图像 704 的 UI (例如, UI 700B, 图 7B) 的删除符号图标 714。

图 17 是解释根据一些实施例的响应用户接触触摸屏而执行操作的过程的流程图。在检测到用户选择缩略图像 (1702) 之后, 便携式电子装置识别与缩略图像有关的图像 (1704)。一般地, 该识别的图像比缩略图像大。在一些实施例中, 缩略图像是较大的图像的子样板。如图 7A 所示, 代替所有的缩略图像在触摸屏上显示大图像 (1706)。便携式电子装置在触摸屏上的预定位置上显示各种图标 (1708) 并等待用户下一次接触触摸屏 (1710)。

在一些实施例中, 如图 7A 所示, 便携式电子装置响应不同的用户接触执行相同的操作。在一些实施例中, 用户可通过以下三种不同的手势浏览虚拟相机相册中的图像: (i) 前一/下一图像图标 708/712 上的手指手势 (1716)、(ii) 通过与触摸屏的左/右边缘邻近的手指轻敲 715/718 的用户图像导航手势 (1714)、或 (iii) 触摸屏上的向左/向右的水平手指掠过手势 720 (1712)。在检测到这些用户手势中的任一个时, 便携式电子装置用虚拟相机相册中的前一/下一个代替触摸屏上的图像 (1724)。在一些实施例中, 该代替是将当前的图像从右/左侧移出触摸屏并将前一/下一图像从左/右侧移入触摸屏的动画过程。通过执行同一任务的多种手段, 便携式电子装置允许用户选择用户偏爱的任一个, 由此使得照片管理更简单直观。在一些实施例中, 使用轻敲手势 715 和 718 以将图像放大 (例如, 通过放大 (zoom in)) 预定的量而不是查看前一或下一图像。对于这种情况, 用户仍具有两种不同类型的用于浏览图像的手势: (i) 前一/下一图像图标 708/712 上的手指手势 (1716) 和 (ii) 触摸屏上的向左/向右的水平手指掠过手势 720 (1712)。

在一些实施例中, 便携式电子装置响应用户图像旋转手势将图像 704 旋转某一角度。例如, 用户图像旋转手势可包含与图像 704 的三个同时的手指接触 722、724 和 726。当三个手指接触沿由各箭头指示的方向移动至少预定的距离时, 便携式电子装置将图像 704 从纵向旋

转到横向或从横向旋转到纵向。在一些实施例中，旋转手势是二手指多触摸手指（例如，同时的手指接触 722 和 726）。在一些实施例中，响应检测到装置的取向的变化（例如，通过使用检测装置的取向的加速度计）图像旋转。例如，当触摸屏 112 在物理上从横向旋转到纵向时，图像可旋转以维持适当的查看取向。

在一些实施例中，附加选项图标 706 上的用户手指手势（1718）触发便携式电子装置以在图像 704 上实施附加的操作。下面关于图 12 和图 20 提供与图标 706 相关的一些示例性操作的更详细的说明。

在一些实施例中，删除符号图标 714 上的用户手指手势（1717）导致便携式电子装置提供图 7B 所示的用户界面 700B。通过用户界面 700B，用户可从相机相册中删除当前的图像 704。用户界面 700B 包含以下的要素或它们的子集或超集：

- 上述的 402、404、406、604、702 和 704；
- 当被激活（例如，通过图标上的手指手势）时删除图像 704 的删除图标 716；和
- 当被激活（例如，通过图标上的手指手势）时使便携式电子装置返回前一用户界面（例如，UI 700A）的取消图标 718。

图 18 是解释根据一些实施例的用于响应用户接触触摸屏删除图像的过程的流程图。在检测到用户接触删除符号图标 714（1802）时，便携式电子装置在图像 704 的顶部显示删除图标 716、取消图标 718 和相机图标 604（1804）并然后监视用户下一次接触触摸屏（1806）。

在一些实施例中，响应删除图标 716 上的手指手势（1810），便携式电子装置从触摸屏消除图标 716、718（1816）并开始“粉碎”图像 704 的动画过程（1818）。在一些实施例中，粉碎过程包含将图像 704 撕成垂直条带并以不同的步调使垂直条带从触摸屏降落。可以在其它的实施例中使用诸如将图像放在垃圾图标中的其它的粉碎动画。

在一些实施例中，便携式电子装置在删除图像 704 之后恢复图 6 所示的相机相册用户界面 600。用户然后可重复图 16 所示的任何上述的过程。在一些其它的实施例中，便携式电子装置在触摸屏上显示虚

拟相机相册中的下一图像。用户可重复图 17 所示的任意上述过程。

如果便携式电子装置检测到取消图标 718 上的手指手势 (1812)，那么装置恢复图 7A 所示的用户界面 700A。如果下一用户动作是相机图标 604 上的手指手势 (1814)，那么便携式电子装置切换回允许用户拍摄新的照片的相机模式用户界面 500。

需要两个不同用户界面 (例如, 700A 和 700B) 上的用户手指手势的该删除过程减少用户意外删除图像或其它类似的项目的机会。

在一些实施例中, 便携式电子装置在不同的相册内存储图像。该图像可来自不同的来源。可以从诸如用户的桌面或膝上型计算机的位置和因特网等上的网站下载它们。例如, 一个相册可包含通过网络浏览器 147 从网站下载的图像、被附加到通过便携式电子装置的用户接收的电子邮件消息上的图像和通过使用相机模块 143 通过便携式电子装置拍摄的照片。

图 8 示出根据一些实施例的用于查看相册的示例性用户界面。在一些实施例中, 用户界面 800 包含以下的要素或它们的子集或超集:

- 上述的 402、404 和 406;
- 图形 804, 例如, 相应的相册中的第一图片或用户选择的图片的缩略图像;
- 相册名称 806;
- 当被激活 (例如, 通过图标上的手指手势) 时开始显示相应的相册 (例如, UI 1000, 图 10) 的选择图标 808; 和
- 当被用户手势 (例如, 轻敲手势) 激活时引出设置菜单 (例如, 图 9) 的设置图标 810。

图 19 是解释根据一些实施例的用于在触摸屏上显示多个相册的过程的流程图。在检测到用于图像管理模块 144 的图标上的手指手势 412 (图 4) (1902) 之后, 便携式电子装置识别一组相册 (1904) 并在触摸屏上显示它们 (1906)。图 8 垂直地示出相册 804 列表的列表, 各个相册具有缩略图像 804、名称 806 和选择图标 808。在一些实施例中, 根据它们的名称按字母排序所述相册。在一些其它的实施例中,

通过它们的创建时间戳排序所述相册，例如，使得最近的一个排在列表的顶端。

便携式电子装置在触摸屏的底端显示设置图标 810 (1908) 并监视用户接触触摸屏 (1910)。如下面结合图 9 说明的那样，用户可配置图像管理模块 144 以通过设置图标 810 以用户选择的方式操作。

如果存在较长的相册列表，那么用户可通过使用诸如触摸屏上的垂直手指掠过的垂直向上/向下手指手势 812 滚动列表 (1912、1920)。当用户通过手指手势选择特定的相册 (1914) 时，便携式电子装置通过执行上面结合图 16 说明的处理打开相册。图 6 所示的虚拟相机相册是许多相册中的一个。与虚拟相机相册相关的用户操作还适用于用户选择的相册中的图像。下面结合图 10~12 提供示例性用户操作的更详细的说明。在一些实施例中，用户可通过接触与相册对应的触摸屏上的任意区域 (例如，图形 804、相册名称 806 或选择图标 808 上的手指轻敲) 开始相册的显示。

在检测到设置图标 810 上的手指手势 (1916) 时，便携式电子装置呈现使得用户能够配置图像管理服务的设置用户界面 (1918)。图 9 解释根据一些实施例的用于设置用户偏好的示例性设置用户界面 900。在一些实施例中，用户界面 900 包含以下的要素或它们的子集或超集：

- 上述的 402、404 和 406；
- 用于选择幻灯片放映中的音乐的音乐设置 902 (例如，现在播放、90 秒音乐、最近添加或关闭)；
- 用于选择是否重复幻灯片放映的重复设置 904 (例如，开或关)；
- 用于选择是否以随机或伪随机的次序显示幻灯片放映中的图像的无序播放 (shuffle) 设置 906 (例如，开或关)；
- 每张幻灯片时间设置 908 (例如，2、3、5、10、20 秒或手动)；
- 转变设置 910 (例如，随机、左右划变 (wipe across)、向下划变 (wipe down) 或关)；
- 用于外部显示的 TV 输出设置 912 (例如，开、关或询问用户)；

- TV 信号设置 914 (例如, NTSC 或 PAL);
- 自动旋转设置 (例如, 开或关);
- 当被激活时 (通过图标上的手指手势) 使便携式电子装置返回前一 UI (例如, UI 800) 的完成图标 918; 和
- 当被激活时 (通过图标上的手指手势) 显示对于相应的设置的选择的选择图标 920。

在一些实施例中, 用户可为了特定的设置接触行中的任一处以开始相应的设置选择的显示。例如, 在检测到 TV 信号设置 914 上的手指轻敲时, 便携式电子装置引出邻近相应的行的下拉菜单。下拉菜单列出与设置有关的配置选项。用户可通过在选择的选项上施加手指手势在一个选项上选择另一个。

图 10 示出根据一些实施例的用于查看相册的示例性用户界面。在一些实施例中, 用户界面 1000 包含以下的要素或它们的子集或超集:

- 上述 402、404 和 406;
- 当被激活 (例如, 通过图标上的手指手势) 时开始转移到相册 UI (例如, UI 800) 的相册图标 1002;
- 相应相册中的图像的缩略图像 1006;
- 当被激活 (例如, 通过图标上的手指手势) 时开始相册中的图像的幻灯片放映的播放图标 1008;

用户界面 1000 与和相机相册图标 504 相关的用户界面 600 类似。两种用户界面均在检测到用户接触缩略图像时执行类似的操作。例如, 用户可通过在触摸屏上使用垂直向上/向上手势 1010 滚动缩略图 1006。在一些实施例中, 特定的缩略图上的静态手势 (例如, 缩略图 1006-11 上的手指轻敲 1012) 开始转移到相应的图像的放大显示 (例如, UI 1100)。

在一些实施例中, 在两种用户界面之间存在差异。例如, 用户界面 1000 具有播放图标 1008, 而用户界面 600 具有相机图标 604。用户选择播放图标 1008 触发便携式电子装置开始用户选择的相册中的图像的幻灯片放映。相反, 当存在相机图标 604 上的用户手指手势时,

便携式电子装置返回相机模式（例如，用于拍照）。

在用户选择特定的图像时，便携式电子装置呈现显示用户选择的图像的新的用户界面。图 11 示出根据一些实施例的用于查看相册中的图像的这种示例性用户界面。在一些实施例中，用户界面 1100 包含以下的要素或它们的子集或超集：

- 上述的 402、404 和 406；
- 当被激活（例如，通过图标上的手指手势）时开始转移到相应的相册 UI（例如，UI 1000）的相册名称图标 1102；
- 图像 1106；
- 当被激活（例如，通过图标上的手指手势）时开始转移到具有用于使用图像 1106 的附加选项的 UI（例如，UI 1200，图 12）的附加选项图标 1108；
- 当被激活（例如，通过图标上的手指手势）时开始显示相册中的前一图像（例如，1006-10）的前一图像图标 1110；
- 当被激活（例如，通过图标上的手指手势）时开始相册中的图像的幻灯片放映的播放图标 1112；和
- 当被激活（例如，通过图标上的手指手势）时开始显示相册中的下一图像的下一图像图标 1114。

很显然，用户界面 1100 与用户界面 700A 非常类似。上面参照图 7A 说明的各种图像浏览功能在用户界面 1100 中也是可用的。例如，用户可通过在图像的左侧完成轻敲手势 1118 或在图像上从左到右完成掠过手势 1116 开始查看前一图像。类似地，用户可通过在图像的右侧完成轻敲手势 1120 或在图像上从右到左完成掠过手势 1116 开始查看下一图像。

在一些实施例中，随着下一图像从右边移动到屏幕上，图像 1106 从左边移出屏幕。在一些实施例中，随着前一图像从左边移动到屏幕上，图像 1106 从右边移出屏幕。

通过执行相同任务的多种方式，便携式电子装置使得用户能够选择用户偏好的任一种方法或手势，由此使得照相管理更加简单直观。

上面结合图 7A 和图 17 提供了响应前一图像图标 1110、播放图标 1112 和下一图像图标 1114 的用户选择的便携式电子装置的操作的详细说明。响应用户接触附加选项图标 706 (图 7A) 或 1108 (图 11), 便携式电子装置呈现具有用户与正在显示的图像相关联地选择的附加选项的新的界面。

图 12 示出根据一些实施例的用于选择相册中的图像的使用的示例性用户界面。在一些实施例中, 用户界面 1200 包含以下的要素或它们的子集或超集:

- 上述的 402、404、406、1602 和 1106;
- 当被激活时 (例如, 通过图标上的手指手势) 开始用于在电子邮件中加入图像 1106 的处理 (例如, 如图 13A~13G 所示) 的电子邮件照片图标 1208;
- 当被激活时 (例如, 通过图标上的手指手势) 开始用于将图像 1106 与用户的联系人列表中的联系人相关联的处理 (例如, 如图 14A~14B 所示) 的分配给联系人图标 1210;
- 当被激活时 (例如, 通过图标上的手指手势) 开始用于在用户的壁纸中加入图像 1106 的处理 (例如, 如图 15 所示) 的用作壁纸图标 1212; 和
- 当被激活时 (例如, 通过图标上的手指手势) 开始转移回到前一 UI (例如, UI 1100) 的取消图标 1214。

在一些实施例中, 如图 12 所示, 在背景中显示图像 1106, 并且, 在显示的图像 1106 之上叠加一个或多个功能图标 1208、1210、1212、1214。

图 20 是解释根据一些实施例的用于在用户选择附加选项图标 (例如, UI 1100 中的图标 1108, 图 11) 时执行附加操作的处理的流程图。在检测到附加选项图标上的手指手势 1122 (2002) 时, 便携式电子装置在触摸屏上显示选项图标的列表 (2004)。各个选项图标与对于正在显示的图像的特定的操作对应。如图 12 所示, 列表包含电子邮件照片图标 1208、分配给联系人图标 1210、用作壁纸图标 1212 和取消图

标 1214。在一些其它的实施例中，用户界面 1200 可包含这些图标的子集，并且还可包含用于调用其它图像使用功能的附加图像使用图标。

如果用户通过手指手势选择电子邮件照片图标 1208 (2008)，那么便携式电子装置呈现允许用户通过电子邮件向某人发送图像 1106 的电子邮件服务界面。如果用户选择分配给联系人图标 1210 (2010)，那么便携式电子装置显示用户选择要与图像 1106 相关联的联系人用户界面 (具有联系人的列表)。类似地，如果用户选择用作壁纸图标 1212 (2012)，那么便携式电子装置显示用户编辑图像 1106 并将其设为便携式电子装置的壁纸的用户界面。

图 21 是解释根据一些实施例的用于呈现包含用户选择的图像的电子邮件服务界面的动画过程的流程图。在检测到用户选择电子邮件照片图标 1208 (2102) 之后，便携式电子装置动画演示将电子邮件消息模板引入到触摸屏上并将图像放入电子邮件消息模板的预定区域中的过程。在一些实施例中，动画包含：首先减小图像的尺寸 (图 13A) (2104)；在图像 1106 后面滑动或另外呈现电子邮件消息模板 (图 13B) (2106)；和将图像装入电子邮件写作用户界面 1300C 的消息体栏内 (图 13C) (2108)。

在一些实施例中，在动画之后，装置监视用户接触触摸屏 (2110)。当用户在电子邮件收件人栏的“发往：”栏上轻敲或完成其它预定的手势 1302 (图 13D) 以键入电子邮件地址 (2112) 时。便携式电子装置然后显示用户的联系人列表 (2122) (图 13E)。在检测到收件人/联系人上的用户手指手势或其它预定手势 (2124) (例如，图 13E 中的 Bob Adams 上的手指轻敲 1316) 之后，便携式电子装置将收件人的电子邮件地址与电子邮件消息相关联并在“发往：”栏中显示联系人的名字 (2126) (例如，图 13F 中的“Bob Adams”)。

在一些实施例中，响应电子邮件消息模板内的预定栏上的用户手指轻敲或其它预定手势 (2114、2116) (例如，图 13D 中的手指轻敲 1304、1306 或图 13E 中的“其它电子邮件”)，便携式电子装置在触摸屏上显示字母键盘 616 (2128)。用户可通过字母键盘 616 (图 13F)

在各栏中键入文本。在一些实施例中，用户还可通过轻敲字母键盘或其它字符键盘中的字符图标键入电子邮件地址。

如图 13G 所示，在检测到发送图标 1314 上的手指手势（2120）之后，便携式电子装置将电子邮件消息发送给其收件人（2132）并返回用户界面 1000 或 1100。但是如果用户选择取消图标 1308（2118），那么便携式电子装置可显示保存草稿图标 1310 并且不保存图标 1312（2130）。如果用户选择保存草稿图标 1310，那么装置在与电子邮件客户端模块 140 相关的草稿文件夹中保存草稿，或者，如果用户选择不保存图标 1312，那么装置删除草稿。

假定用户在图 12 所示的分配给联系人图标 1210 上轻敲或完成其它预定手势，图 12 是解释根据一些实施例的用于将图像分配给用户的联系人列表中的用户选择的联系人的过程的流程图。

在用户选择分配给联系人图标 1210 时，便携式电子装置显示用户的联系人列表（图 14A）。在用户选择联系人列表中的联系人（例如，图 14A 中的 Bob Adams 上的手指轻敲 1401）之后，便携式电子装置产生图 14B 所示的新的用户界面 1400B，并监视用户下一次接触触摸屏（2208）。在一些实施例中，用户界面 1400B 包含用户指令 1402（2202）、用户选择的图像 1106（2204）、取消图标 1404 和设定照片图标 1406（2206）。

便携式电子装置响应图像 1106 上的用户手指手势（2212）修改图像（2214）。例如，用户可通过使用不同类型的手指手势修剪、缩放并另外调整图像 1106。在一些实施例中，便携式电子装置响应一手指接触手势 1408 的移动在触摸屏上移动图像、响应包含至少两次同时和连续的接触 1410 和 1412 的去收缩（de-pinching）手势放大图像、响应包含至少两次同时和连续的接触 1410 和 1412 的收缩（pinching）手势缩小图像、和/或响应包含至少两次同时和连续的接触 1410 和 1412 的扭转手势旋转图像。

在一些实施例中，用户通过在设定照片图标 1406 上轻敲将修改的图像分配给用户选择的联系人（2216）。这触发便携式电子装置将修

改的图像与联系人相关联。如果用户选择取消图标 1404 (2218), 那么便携式电子装置终止图像分配并恢复用户界面 1100。

如果用户在图 12 中的用作壁纸图标 1212 上轻敲或完成其它预定手势, 那么便携式电子装置显示用于在用户的壁纸中加入图像的用户界面。图 15 示出根据一些实施例的这种示例性用户界面 1500。

在一些实施例中, 该壁纸设定过程与分配给联系人过程类似。例如, 用户可用一手指手势 1508 移动图像、用使用多次接触 1510 和 1512 的去收缩手势放大图像、用使用多次接触 1510 和 1512 的收缩手势缩小图像和/或用使用多次接触 1510 和 1512 的扭转手势旋转图像。

在用户选择设定照片图标 1506 之后完成壁纸设定过程。如果用户选择取消图标 1504, 那么便携式电子装置停止分配过程并恢复图 11 中的 UI 1100。在一些实施例中, 界面 1500 还包含用户指令信息 1502。

图 23A~23H 示出根据一些实施例的用于查看一组数字对象中的数字对象的示例性用户界面。

在图 23A 中, 显示的数字对象是数字图像 2300-1。在本例子中, 在图 23A 中显示整个图像 2300-1。该示例性图像包含第一人 2302-1 和第二人 2302-2。响应检测到第二人 2302-2 上或附近的去收缩手势 2304 和 2306, 执行在包含第二人 2302-2 的图像 2300-1 的一部分上放大的命令。在执行放大命令时, 以比图 23A 高的放大倍数显示图像 2300-1 的更小的部分。例如, 在图 23B 中, 以比图 23A 高的放大倍数显示第二人 2302-2, 并且不再显示第一人 2302-1。

在图 23C 中, 在触摸屏显示器上或附近检测掠过手势 2310。作为响应, 如图 23C~23D 所示, 包含第二人 2302-2 的图像 2300-1 的显示部分沿与掠过手势 2310 的方向对应的方向平移, 这里, 图像沿水平方向从右向左平移。在图 23D 中显示(放大的)图像 2300-1 的边缘 2312。响应连续检测到掠过手势 2310 (图 23D), 显示超出边缘 2312 的区域 2314 (例如, 在视觉上与数字对象明显不同的黑色区域或其它区域)。在不再检测到掠过手势 2310 之后, 如图 23E 所示, 包含第二人 2302-2 的图像的图像 2300-1 沿第二方向 2316 平移直到不再显示区

域 2314 (例如, 沿水平方向从左向右)。

响应检测到第二掠过手势 2318, 如图 23G 所示, 图像 2300-1 的显示部分沿与第二掠过手势 2318 的方向对应的方向平移, 并且, 第二数字图像 2300-2 被显示。在一些实施例中, 如图 23G 和图 23H 所示, 随着第一数字图像 2300-1 滑出触摸屏, 第二数字图像 2300-2 (或者, 更一般地, 为数字对象) 滑动到触摸屏上。

在本例子中, 区域 2314 的显示使用户在第一手势 2310 的过程中知道已到达 (放大的) 的数字对象的边缘。在检测到沿与第一手势相同或基本上相同的方向的第二手势 2318 时, 装置转变到一组图像中的另一图像的显示, 而不仅仅重复已到达数字对象的边缘的视觉指示。

图 24 是解释根据一些实施例的用于查看一组数字对象中的数字对象的过程 2400 的流程图。

在一些实施例中, 具有触摸屏显示器的装置 (例如, 具有触摸屏显示器的装置 100、平板计算机 (tablet computer) 或桌上型计算机) 检测 (2402) 触摸屏显示器上或附近的物理对象的第一移动。在一些实施例中, 装置是便携式电子装置。在一些实施例中, 物理对象是手指。在一些实施例中, 物理对象是铁笔。在一些实施例中, 第一移动是水平掠过手势 (例如, 2310, 图 23C)。

当检测到第一移动时, 装置沿第一方向平移 (2404) 在触摸屏显示器上显示的第一数字对象 (例如, 数字图像 2300-1)。在一些实施例中, 在平移之前, 第一数字对象的至少一个边缘沿第一方向伸出触摸屏显示器。

第一数字对象与一组数字对象相关。在一些实施例中, 该组数字对象是一组数字图像 (例如, 可以为相册的一部分或用装置内的相机拍摄的一组图像的一部分的 2300-1、2300-2 等)。在一些实施例中, 该组数字对象是一组网页 (例如, 用户选择的在浏览器中显示的一组网页)。在一些实施例中, 该组数字对象是一组电子文档。

响应第一数字对象的以前隐藏的边缘 (例如, 边缘 2312, 图 23D) 的显示和第一移动 (例如, 掠过手势 2310, 图 23D) 的连续检测, 装

置显示 (2406) 超出第一数字对象的边缘的区域 (例如, 区域 2314)。

在不再检测到第一移动之后, 装置沿第二方向平移 (2408) 第一数字对象, 直到不再显示超出第一数字对象的边缘的区域。例如, 在图 23E 中, 数字图像 2300-1 沿方向 2316 平移 (例如, 沿水平方向从左向右), 直到不再显示区域 2314。在一些实施例中, 第二方向与第一方向相反。在一些实施例中, 第一数字对象通过使用阻尼运动沿第二方向平移。在一些实施例中, 从沿第一方向平移第一数字对象到沿第二方向平移第一数字对象直到不再显示超出第一数字对象的边缘的区域的变化使得第一数字对象的边缘看起来是以弹性的方式附加到触摸屏显示器的边缘上或附加到在触摸屏显示器上显示的边缘上。

装置检测 (2410) 触摸屏显示器上或附近的物理对象的第二移动 (例如, 从右向左的第二掠过手势 2318, 图 23F)。

在显示第一数字对象的以前隐藏的边缘 (例如, 边缘 2312, 图 23F) 的同时响应检测到第二移动, 装置沿第一方向平移 (2412) 第一数字对象, 并显示该组数字对象中的第二数字对象 (例如, 数字图像 2300-2, 图 23G 和图 23H)。

因此, 根据实际情况, 类似的移动 (例如, 2310 和 2318 均是从右向左的掠过手势) 允许用户 (1) 平移显示的第一数字对象或 (2) 从显示第一数字对象转变到显示一组数字对象中的第二数字对象。

在一些实施例中, 第一和第二移动之间的时间必须比预定的值 (例如, 0.5 秒) 小。否则, 装置将不转变到显示第二数字对象。相反地, 装置可仅平移第一数字对象并显示超出对象的边缘的区域 (以重新向用户表示已到达第一数字对象的边缘)。

在一些实施例中, 如果显示整个第一数字对象 (例如, 图 23A), 那么第一移动 (例如, 水平掠过手势) 将装置转变到显示该组数字对象中的另一数字对象。

过程 2400 容许触摸屏用户很容易地在显示的数字对象内以及在一组数字对象的数字对象之间导航。

已出于解释的目的参照特定的实施例给出以上的说明。但是, 以

上的解释性的讨论意图不在于是详尽无遗的或将本发明限于公开的精
确形式。鉴于以上的教导，许多变更方式和变化是可能的。为了最好
地解释本发明的原理及其实际应用选择和说明实施例，以由此使得本
领域技术人员能够通过适于设想的特定用途的各种变更方式最好地利
用本发明和各种实施例。

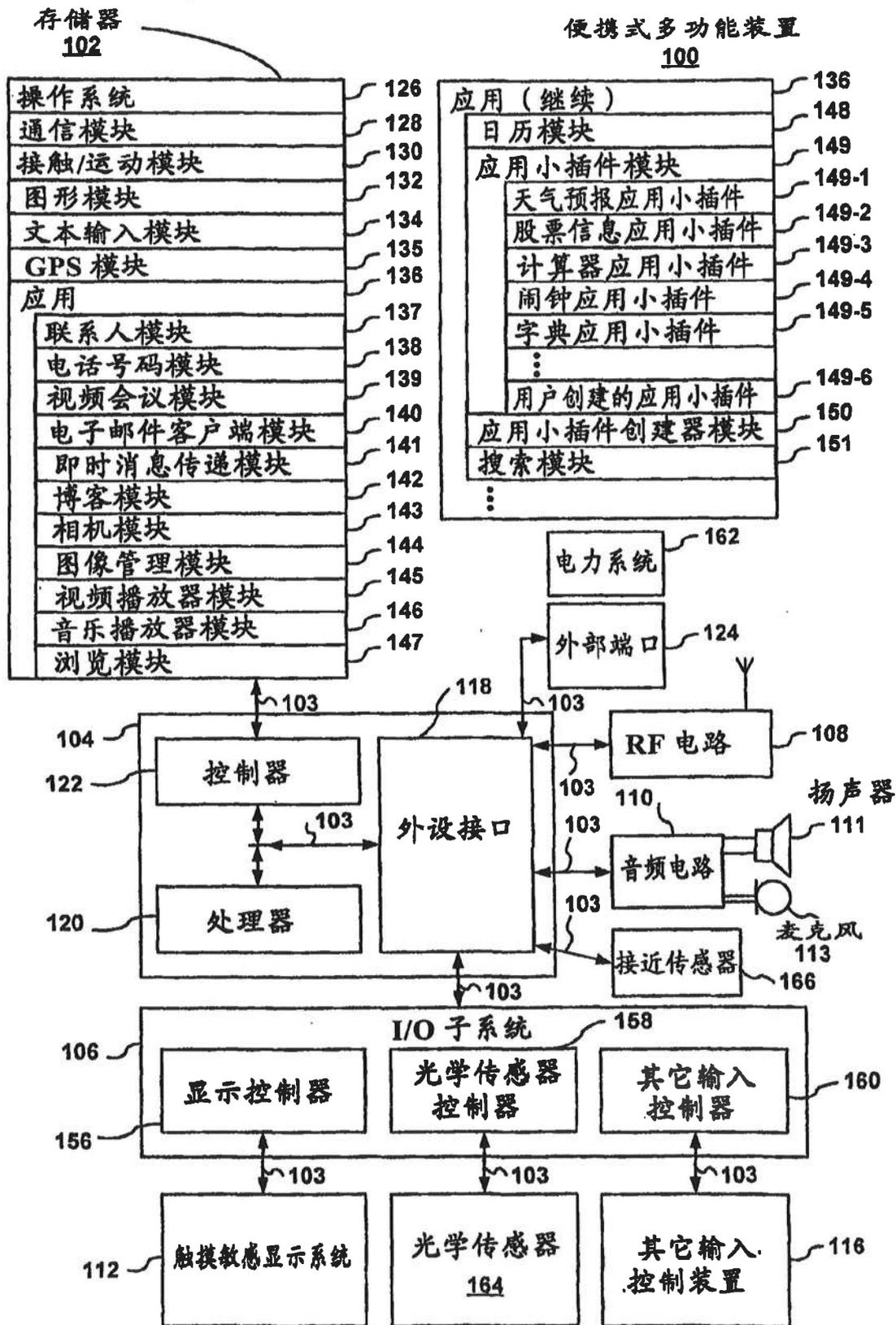


图 1

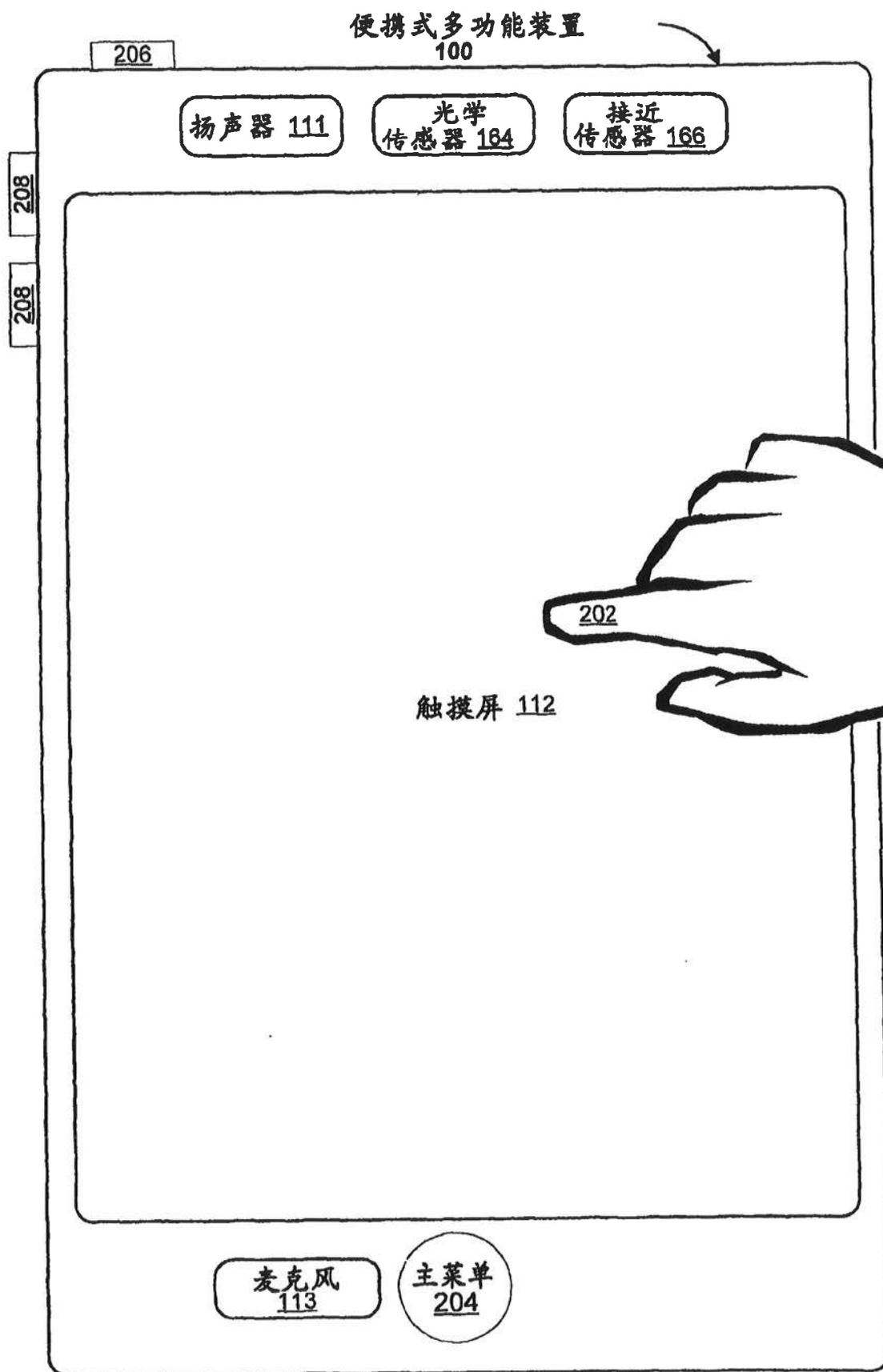


图 2

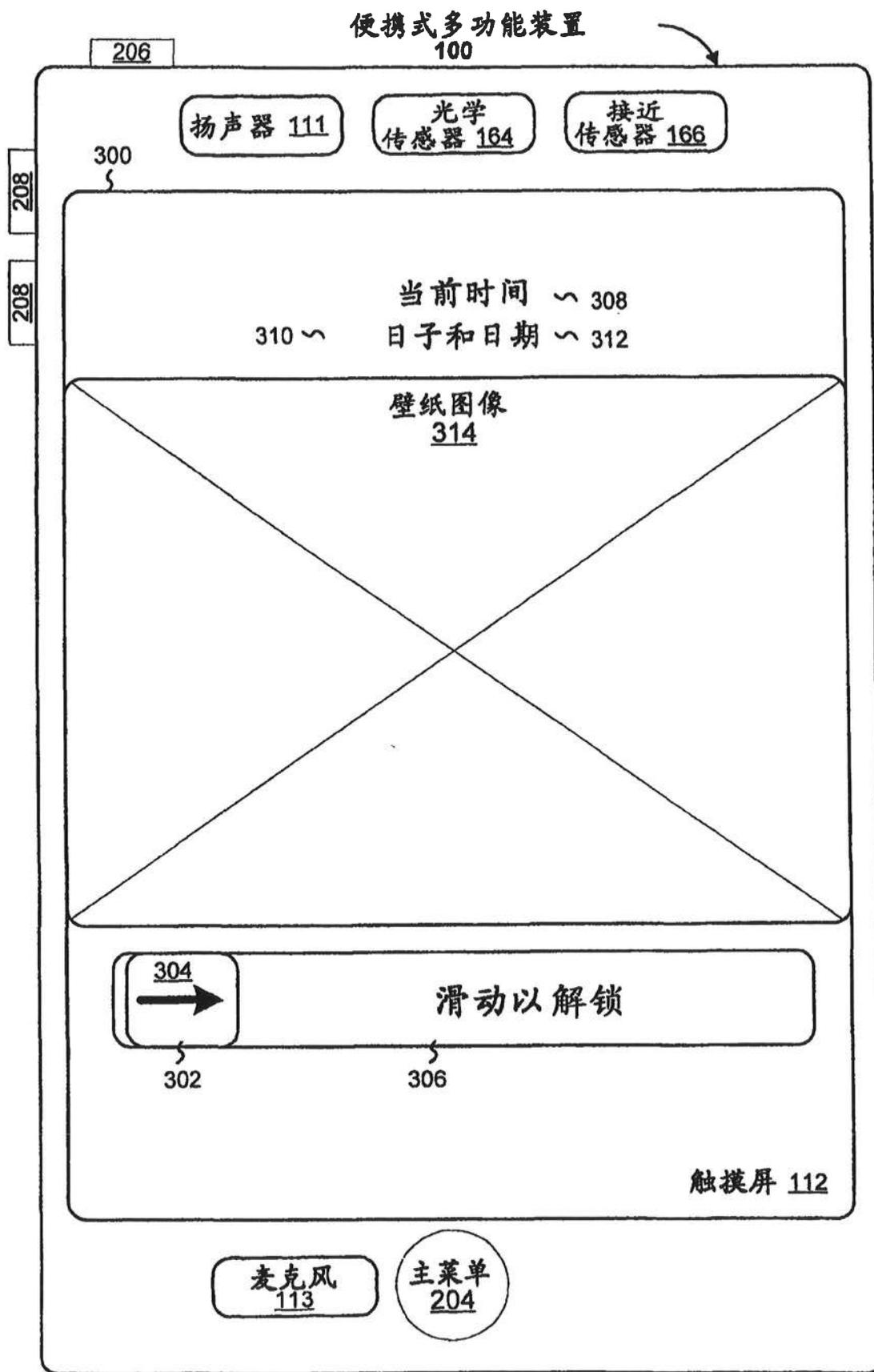


图3

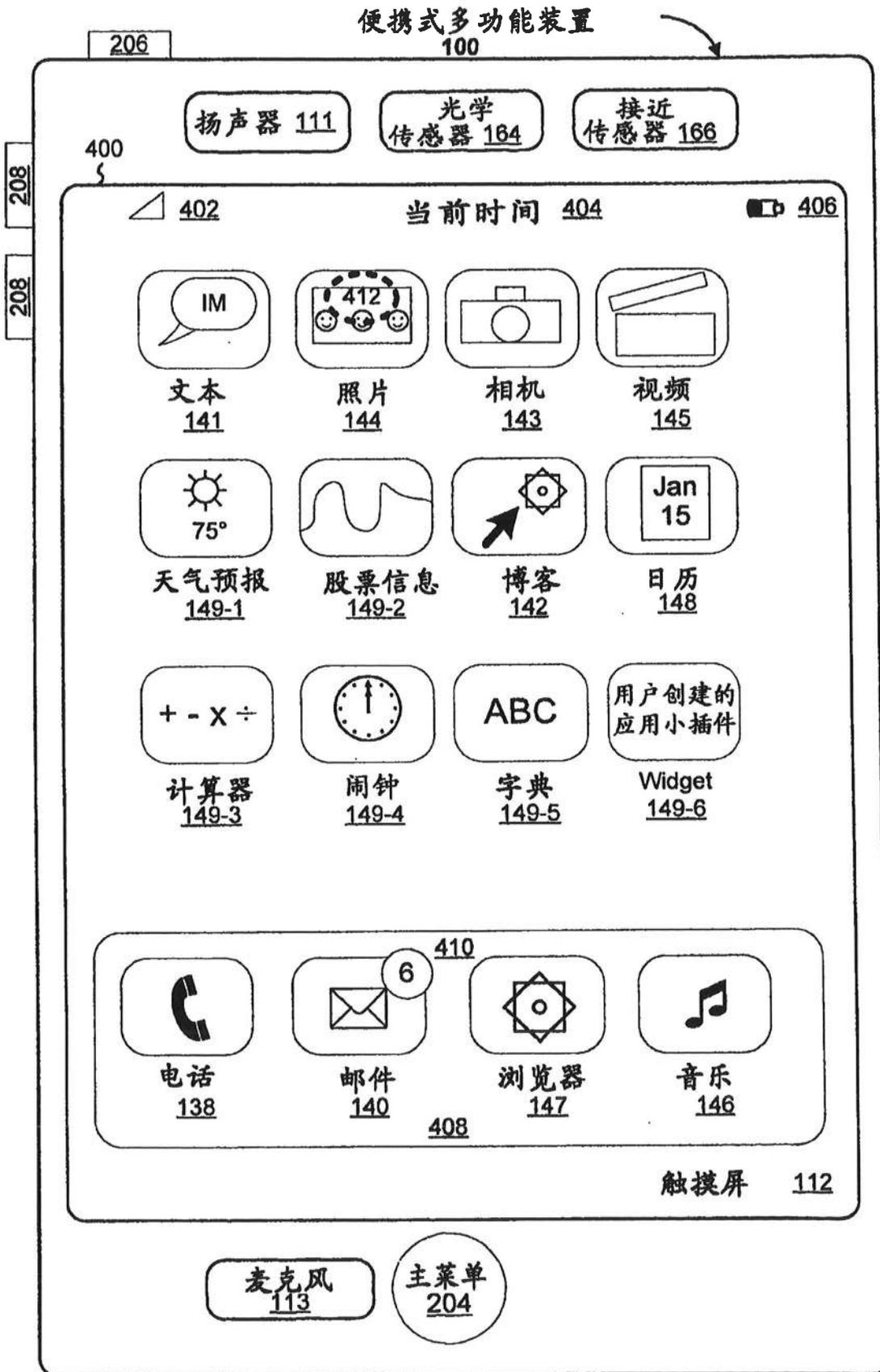


图 4

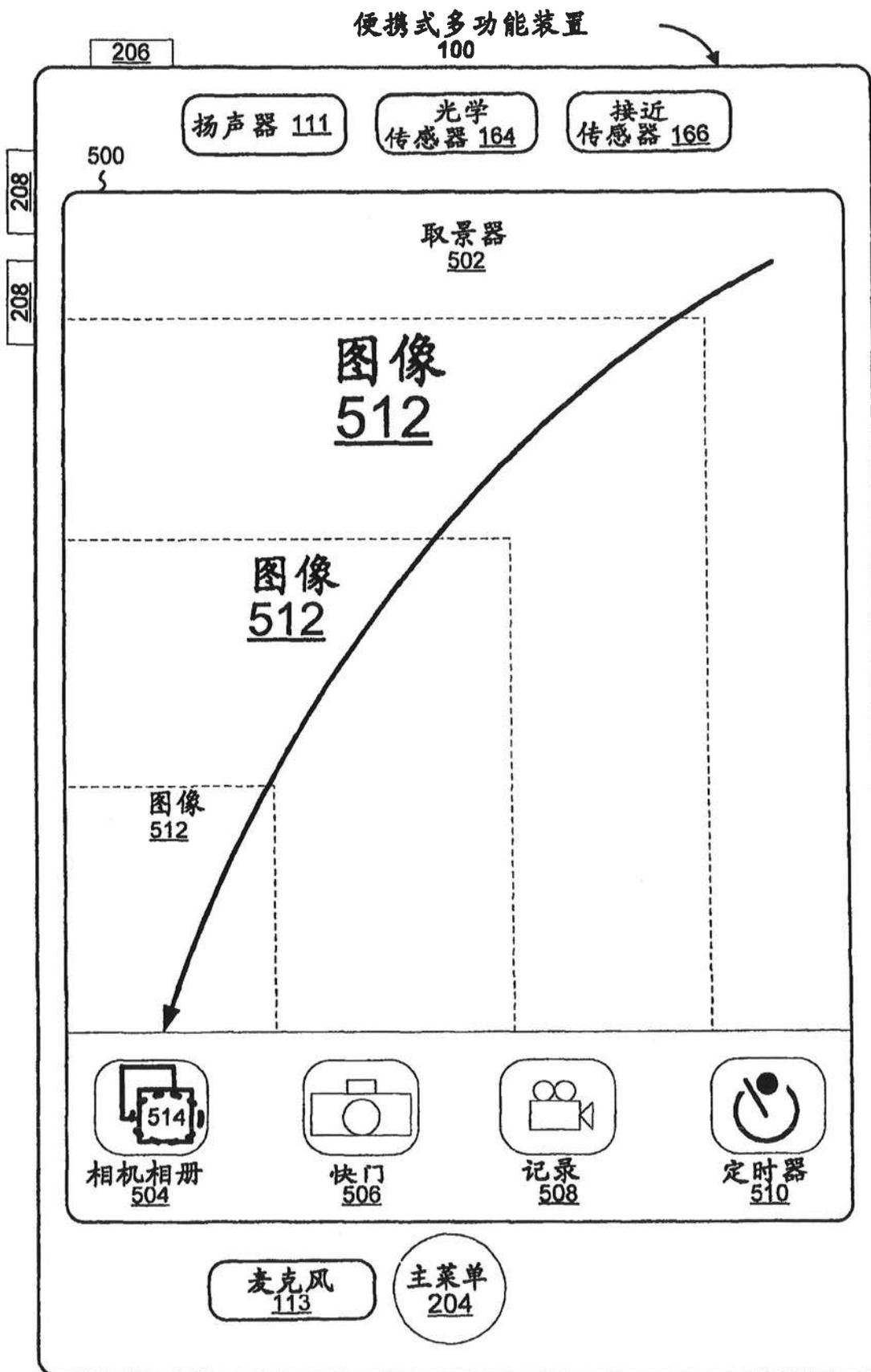


图 5

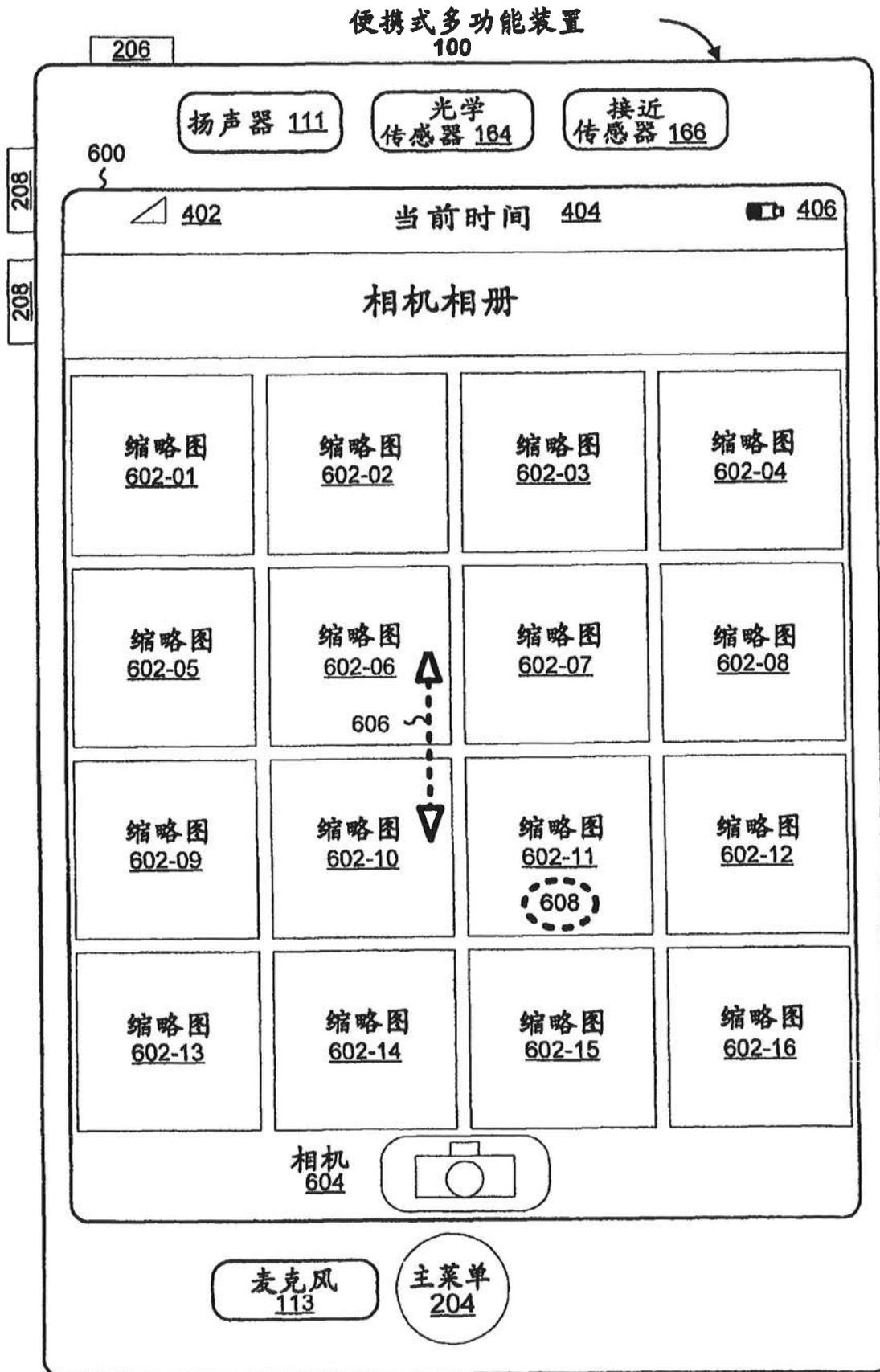


图 6

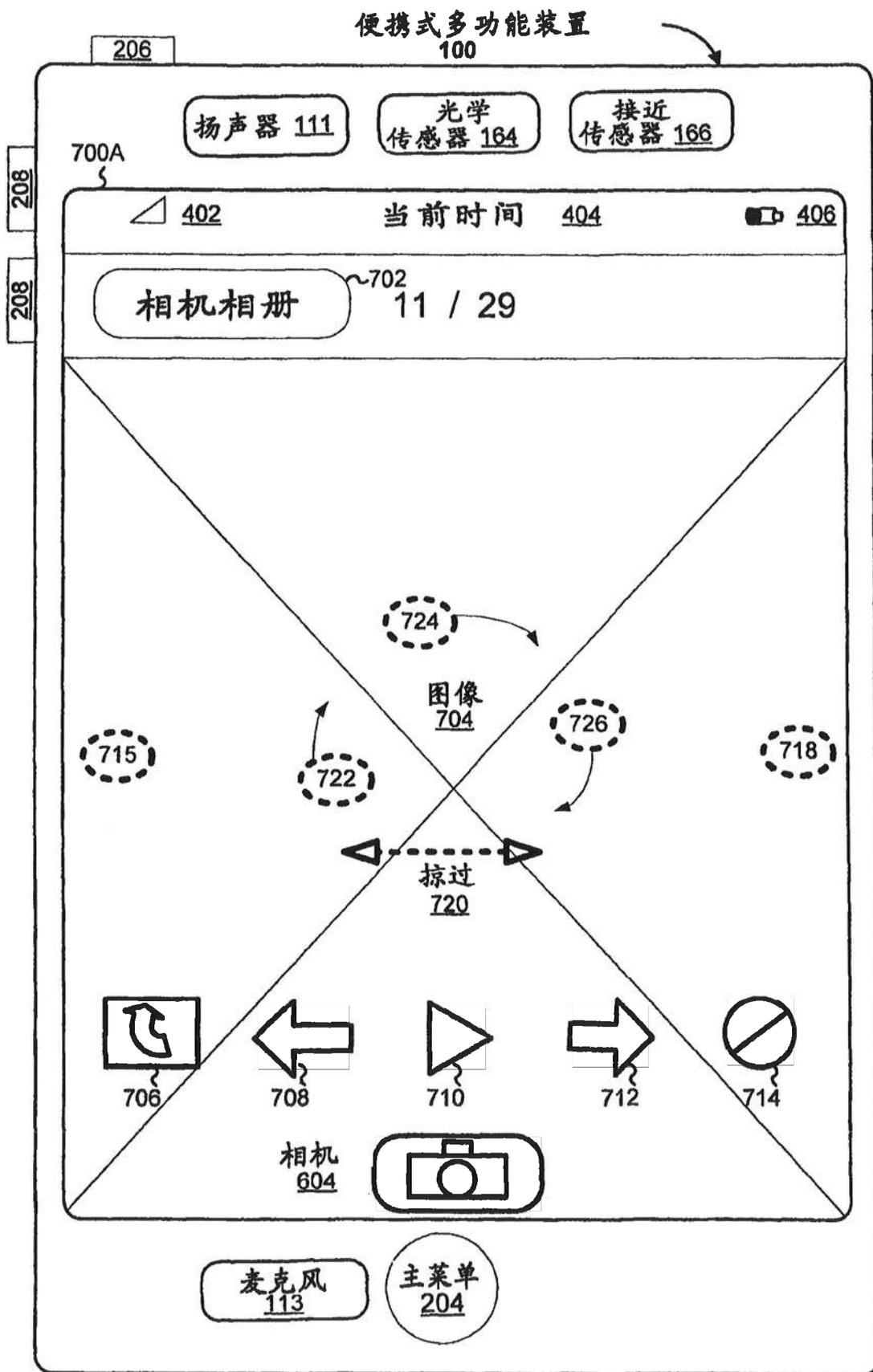


图7A

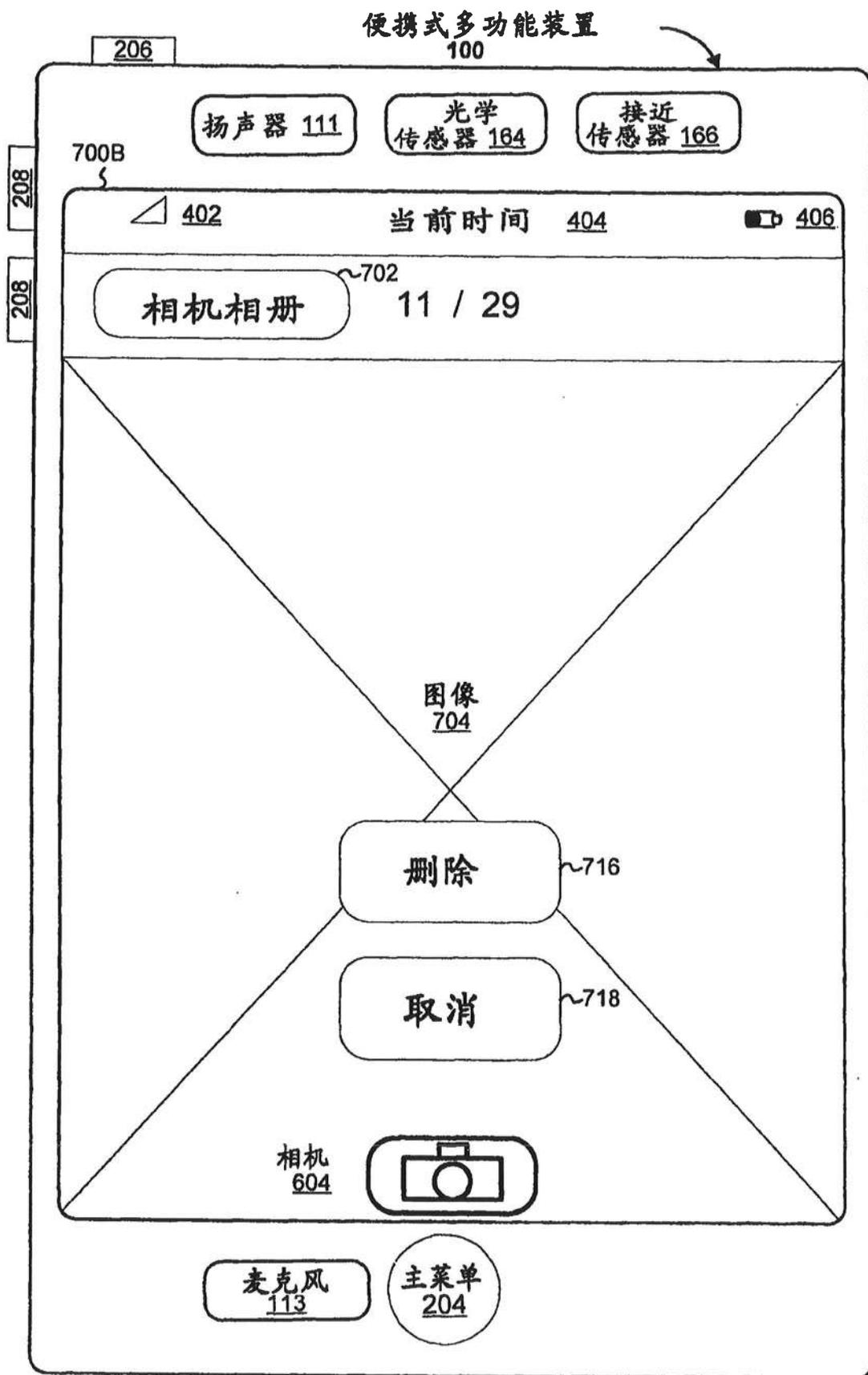


图 7B

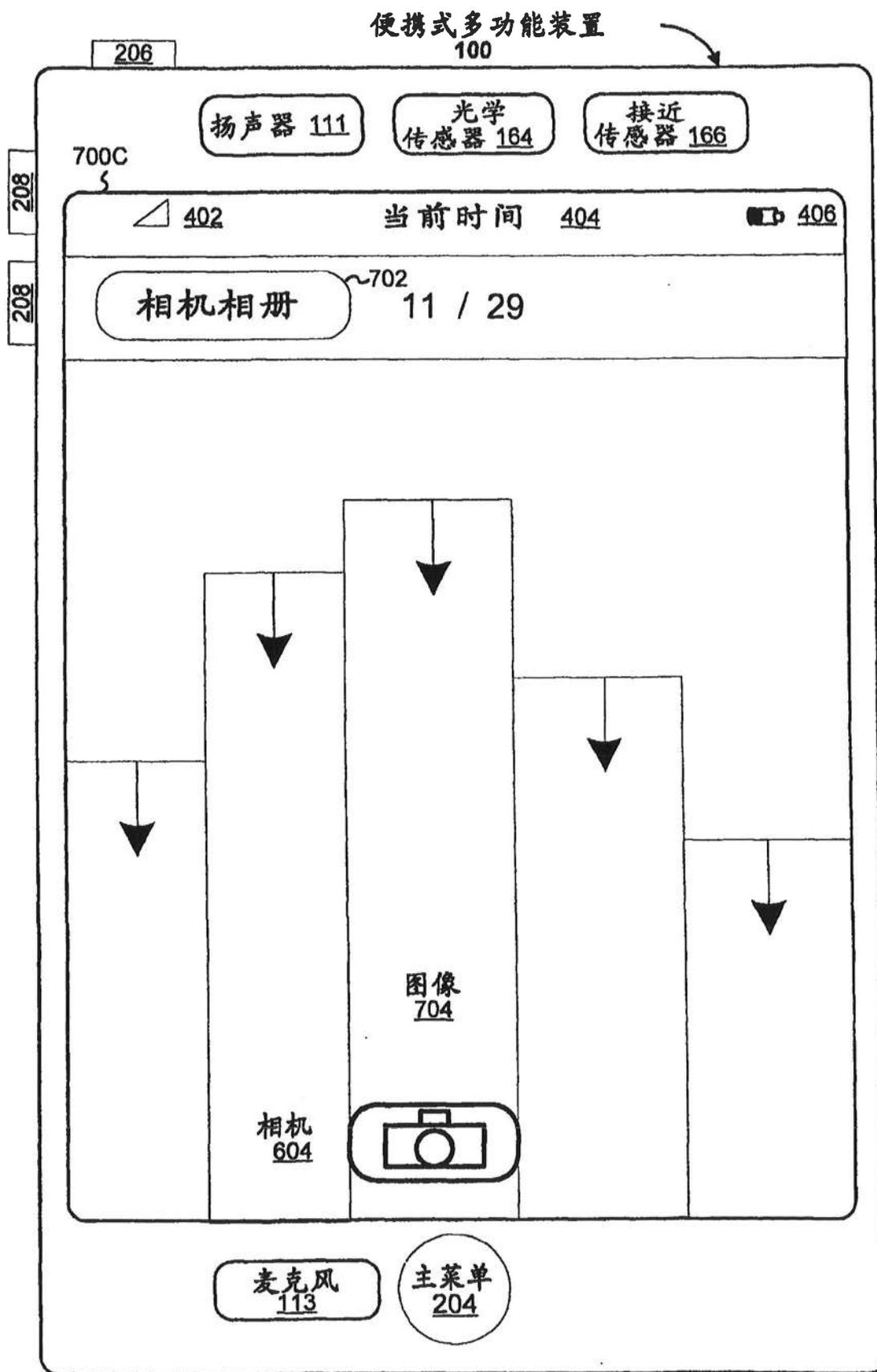


图7C

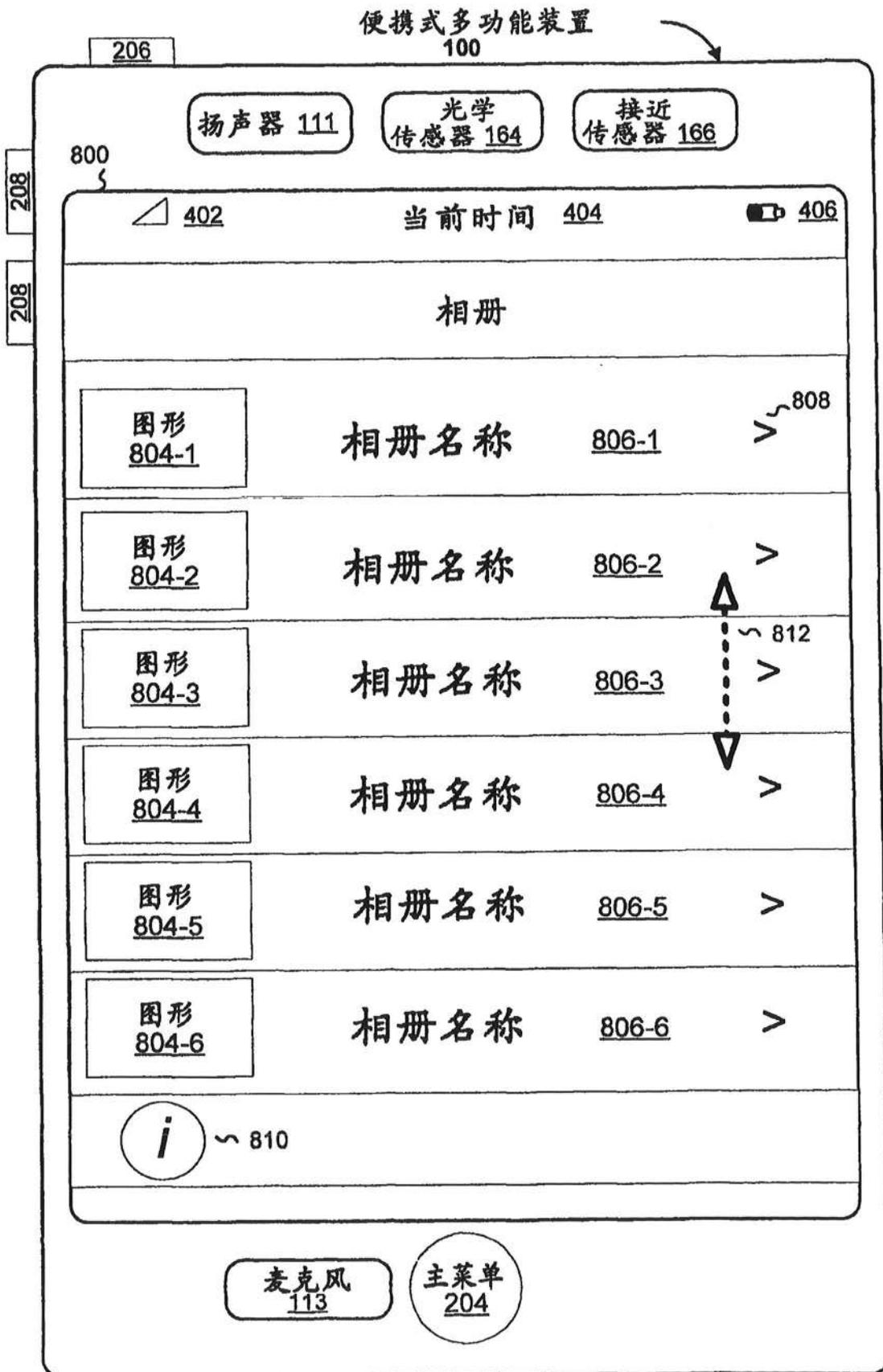


图 8

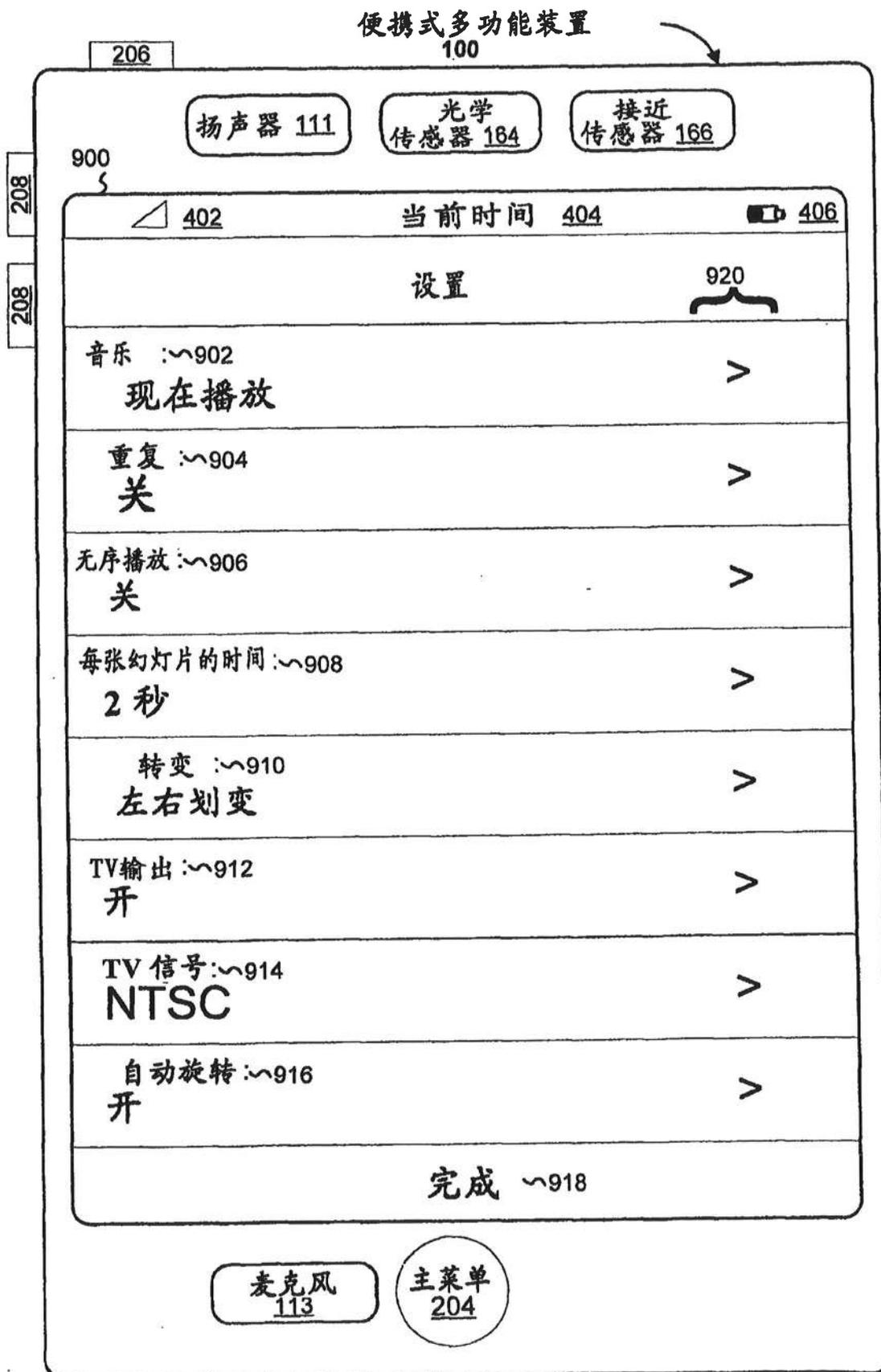


图9

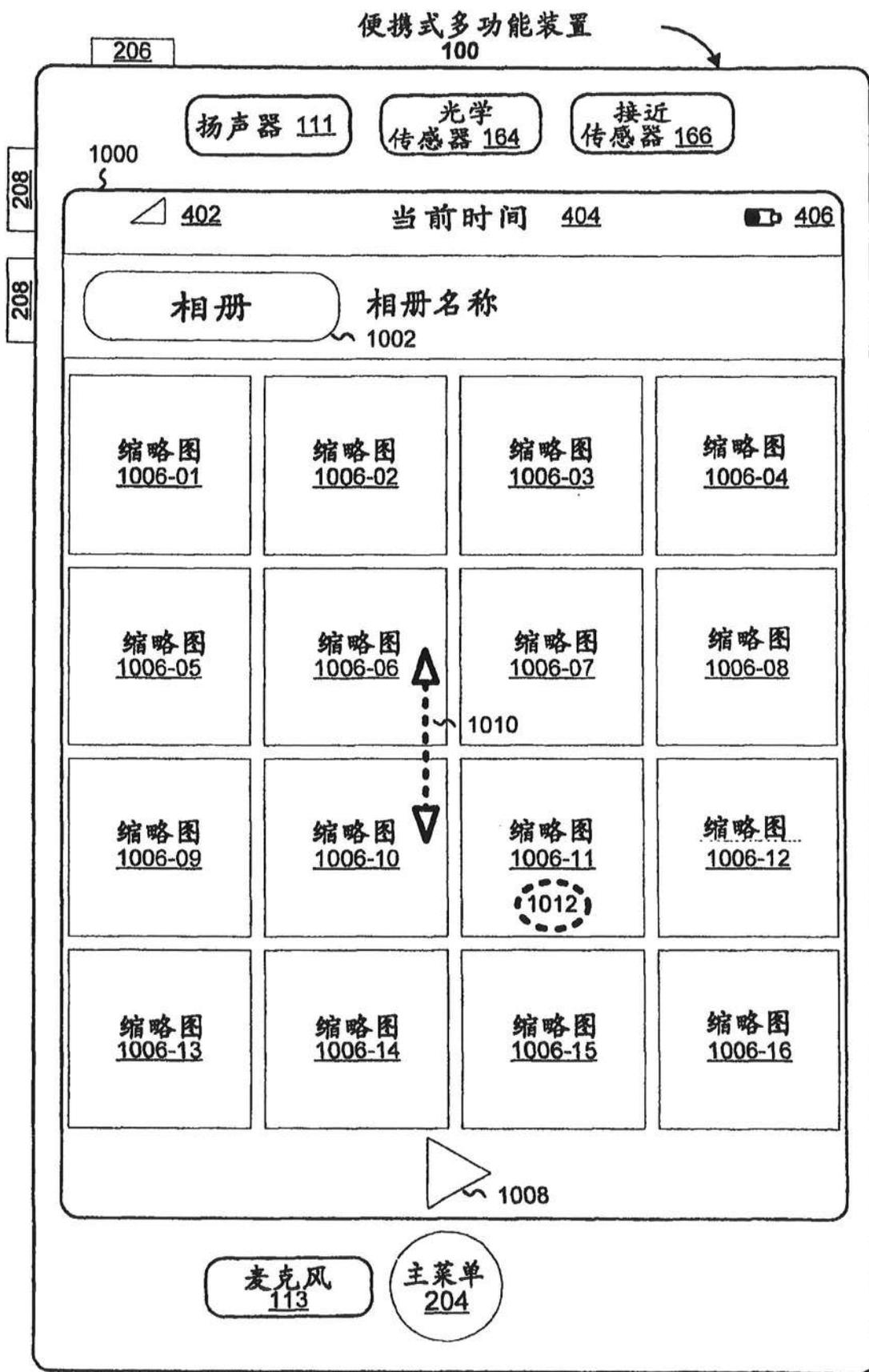


图10

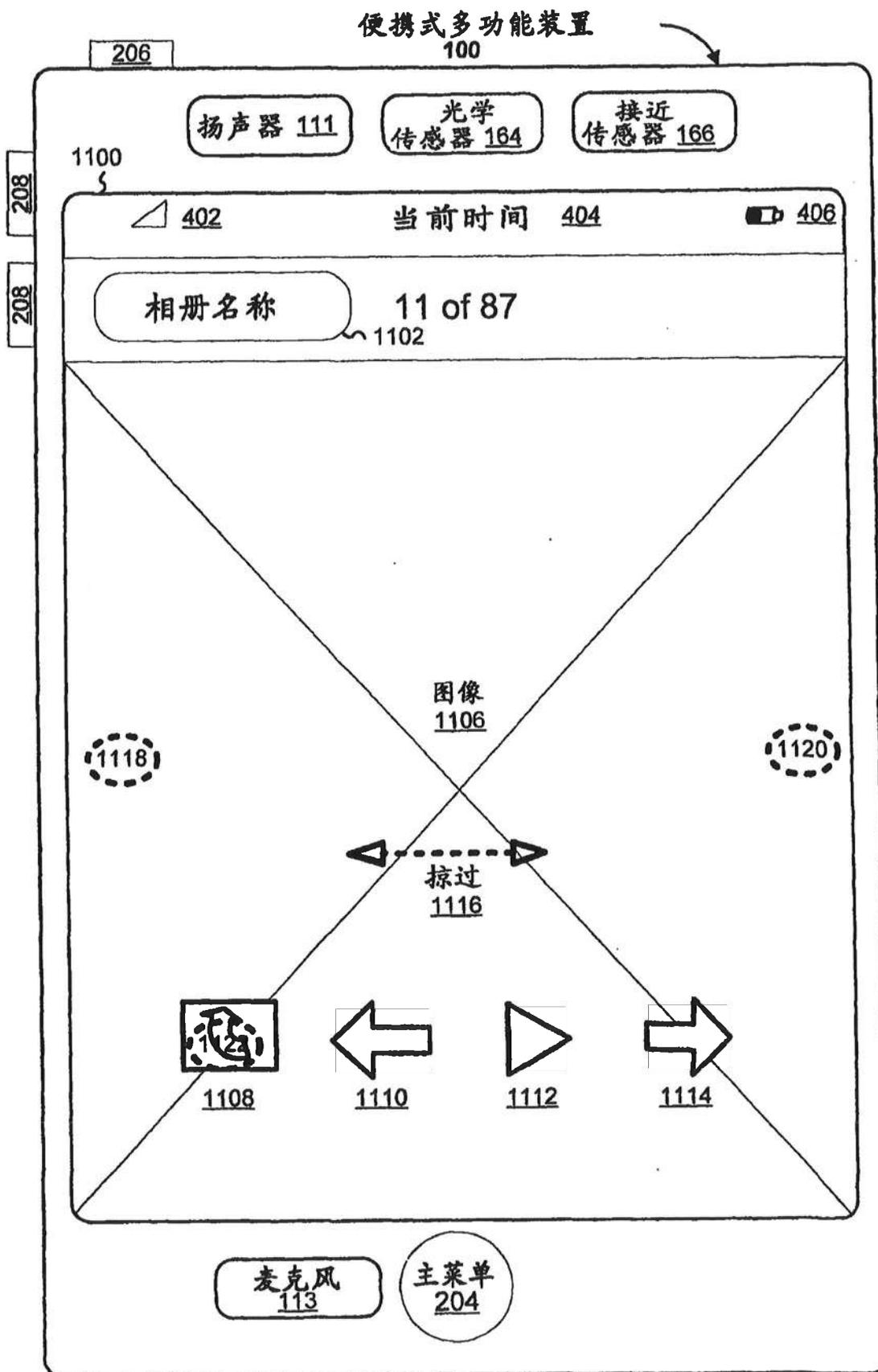


图 11

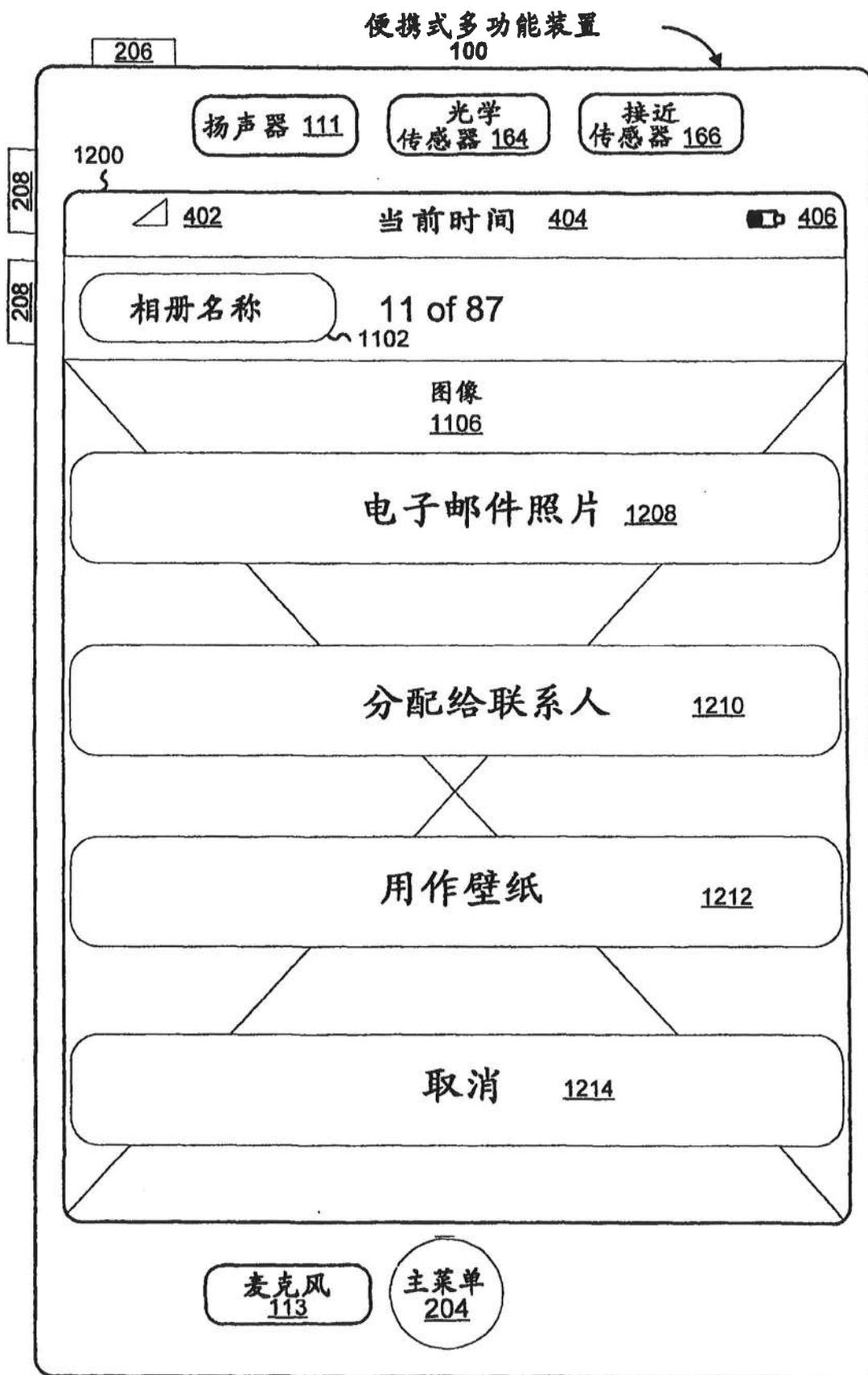


图12

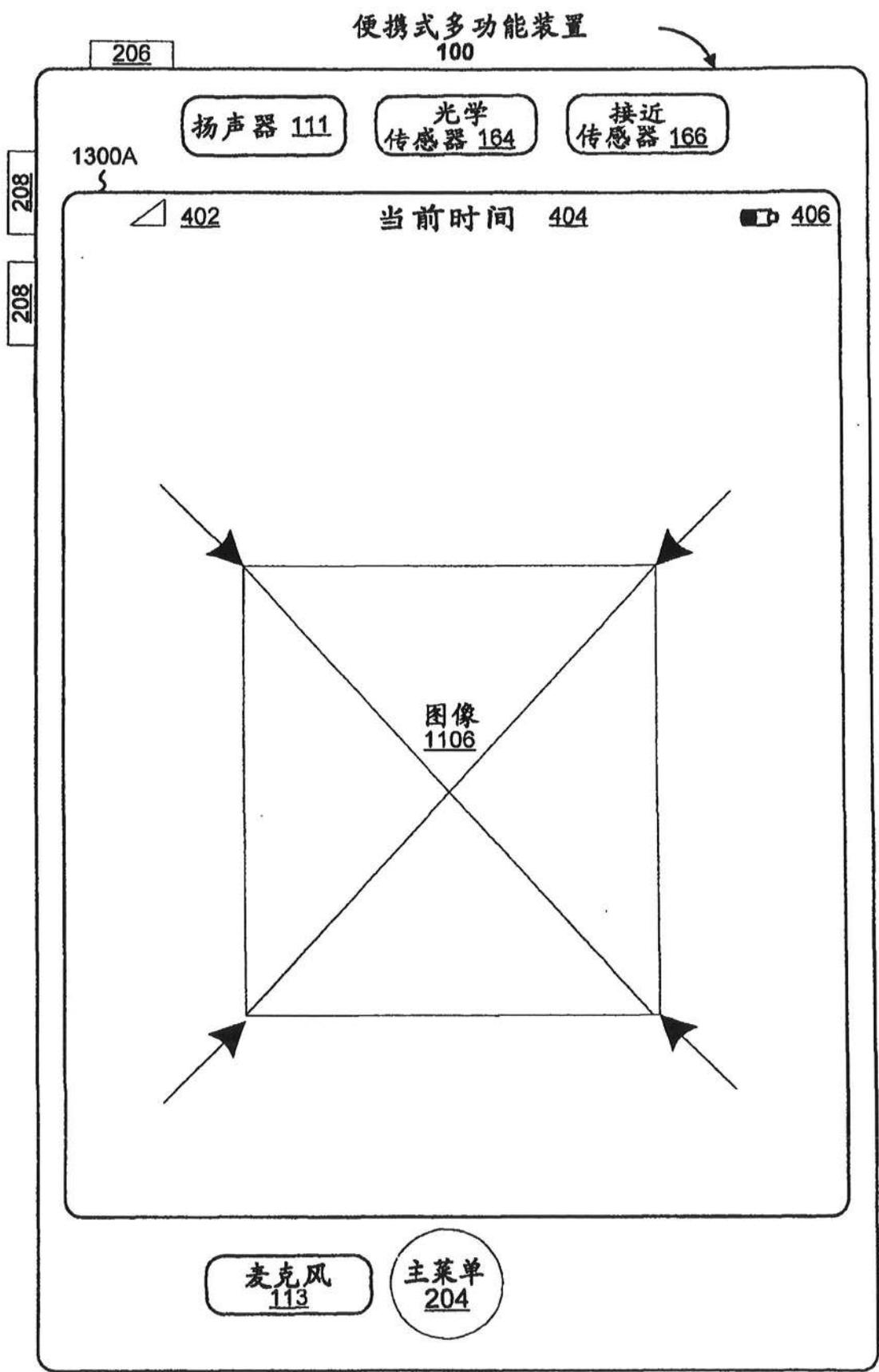


图 13A

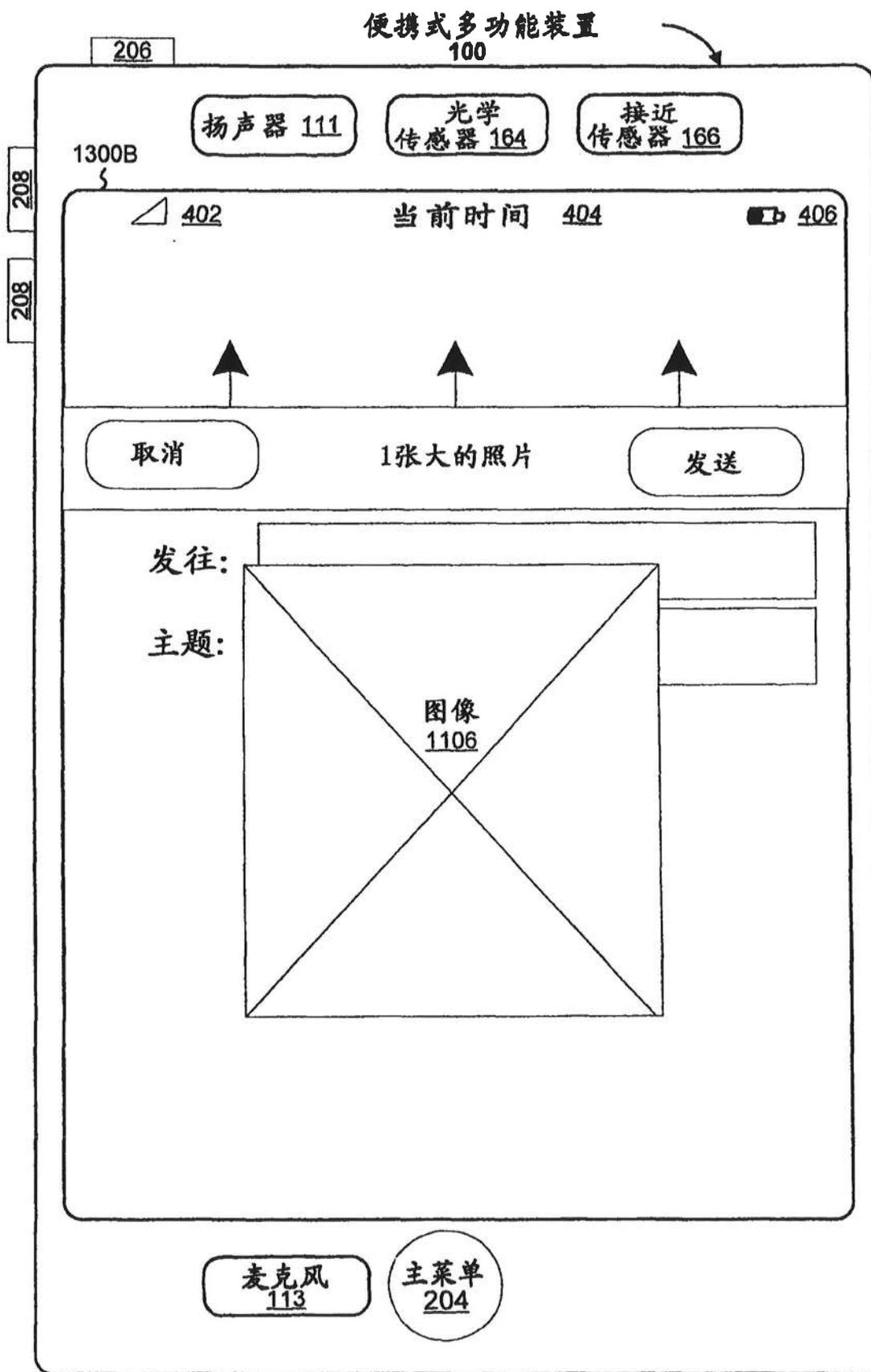


图13B

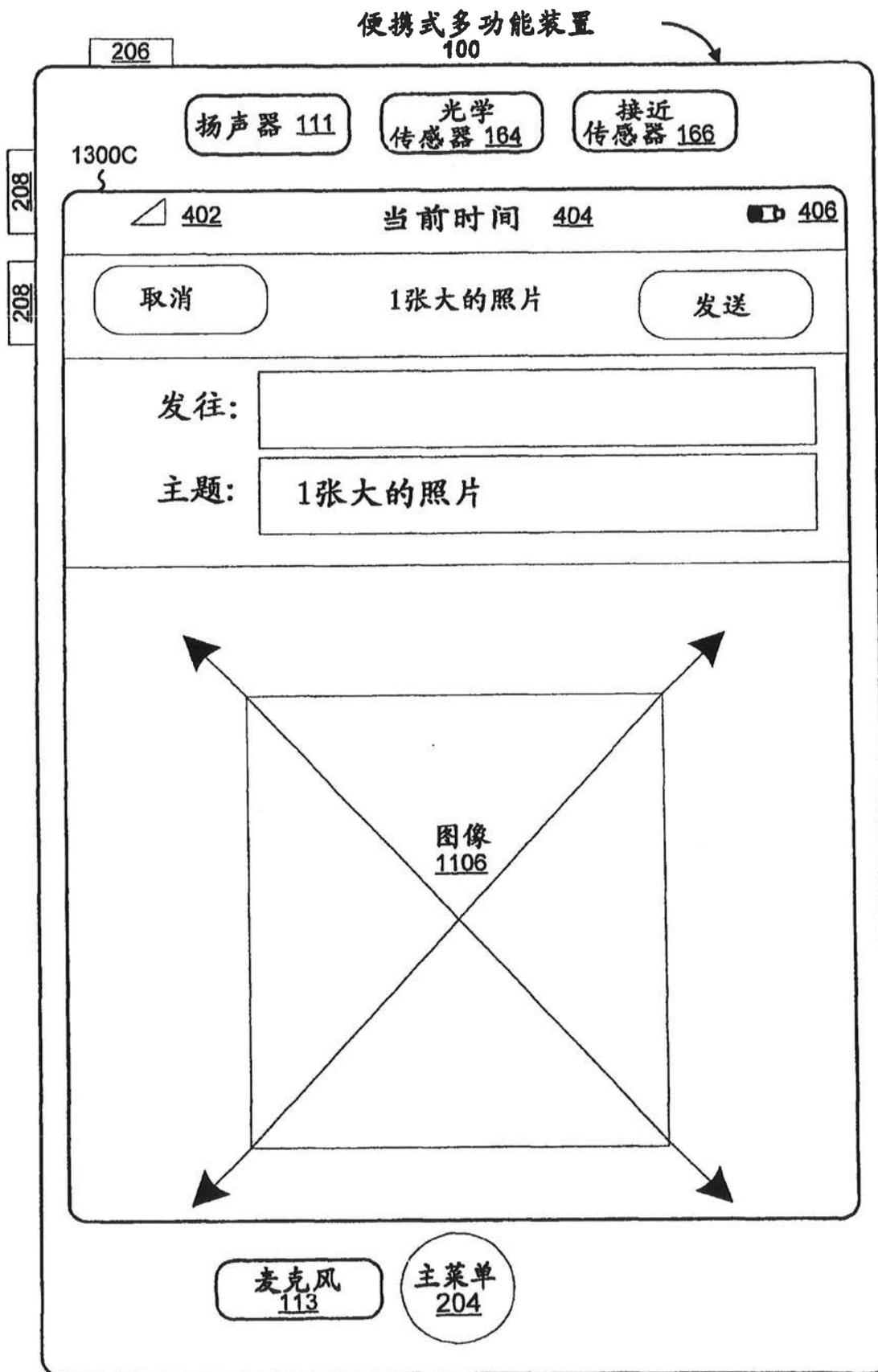


图13C

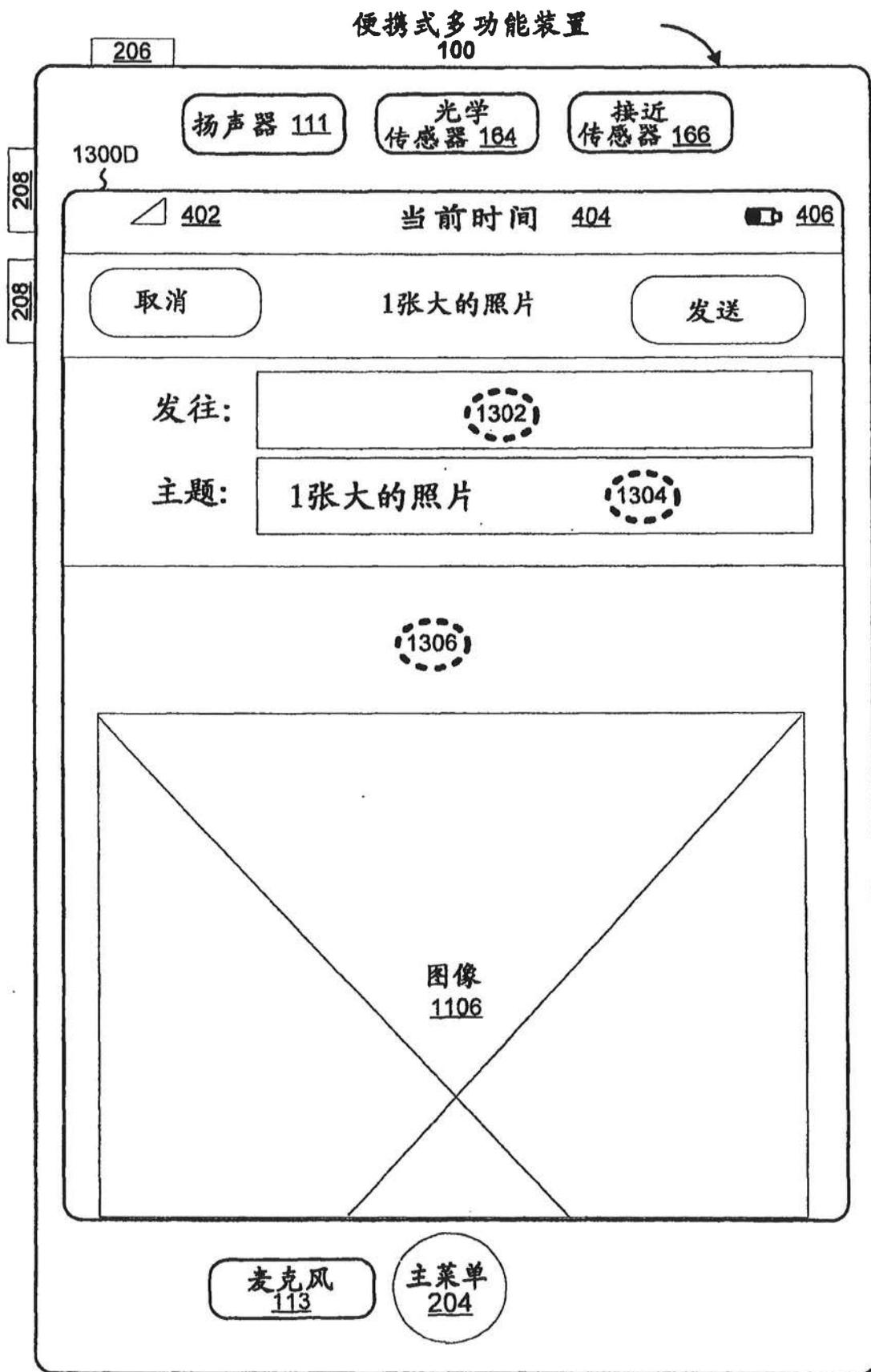


图 13D

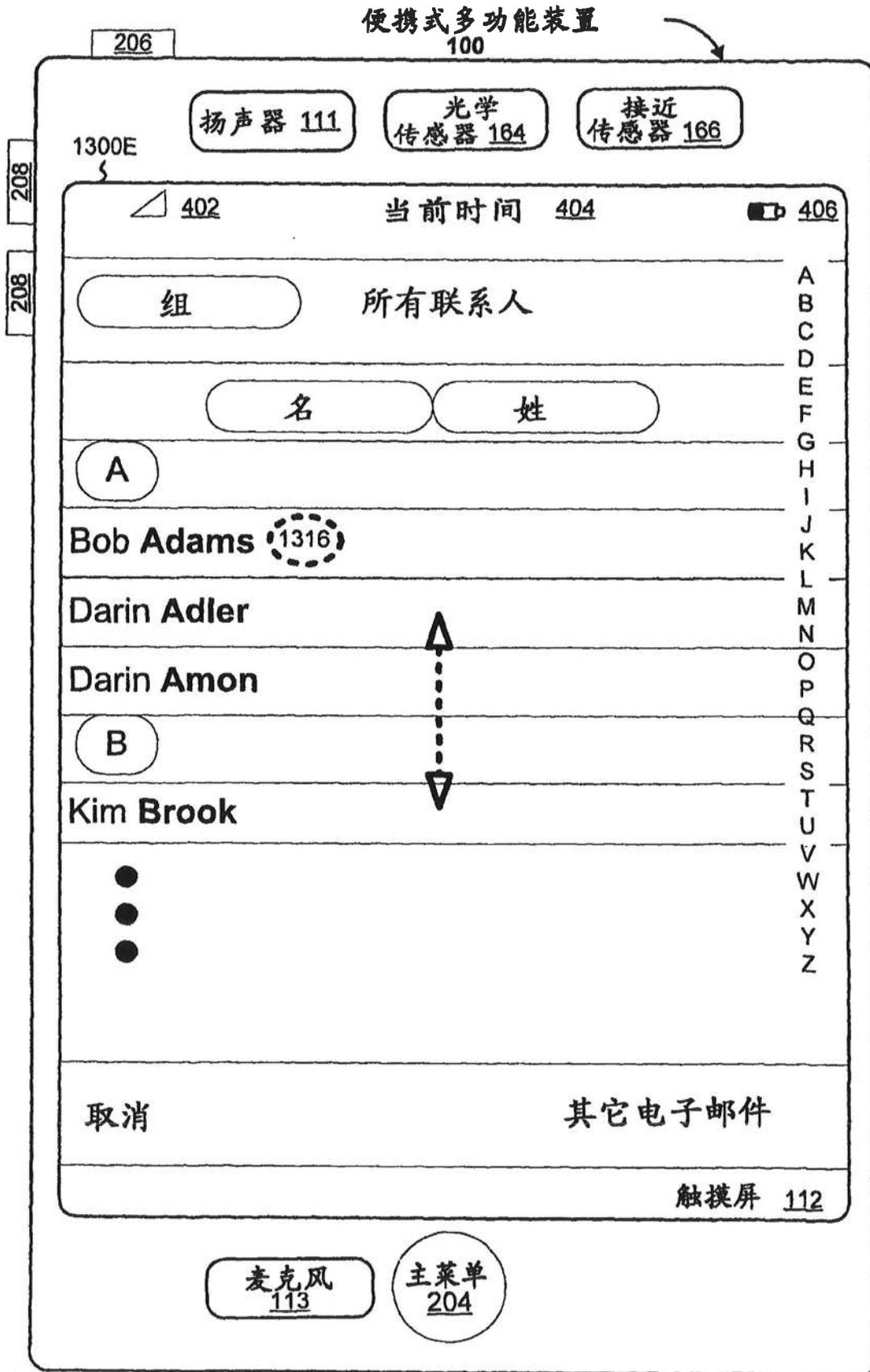


图 13E

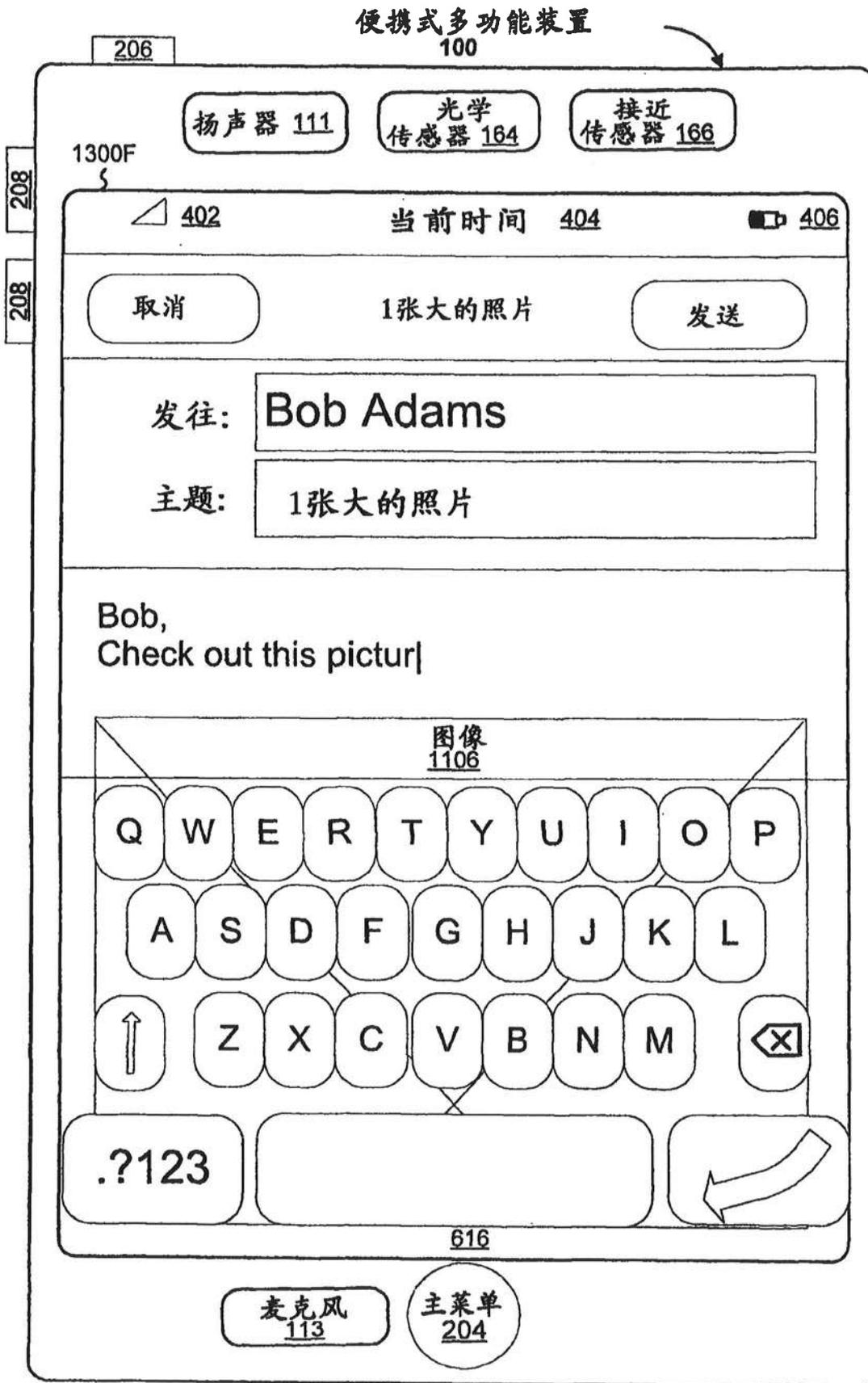


图13F

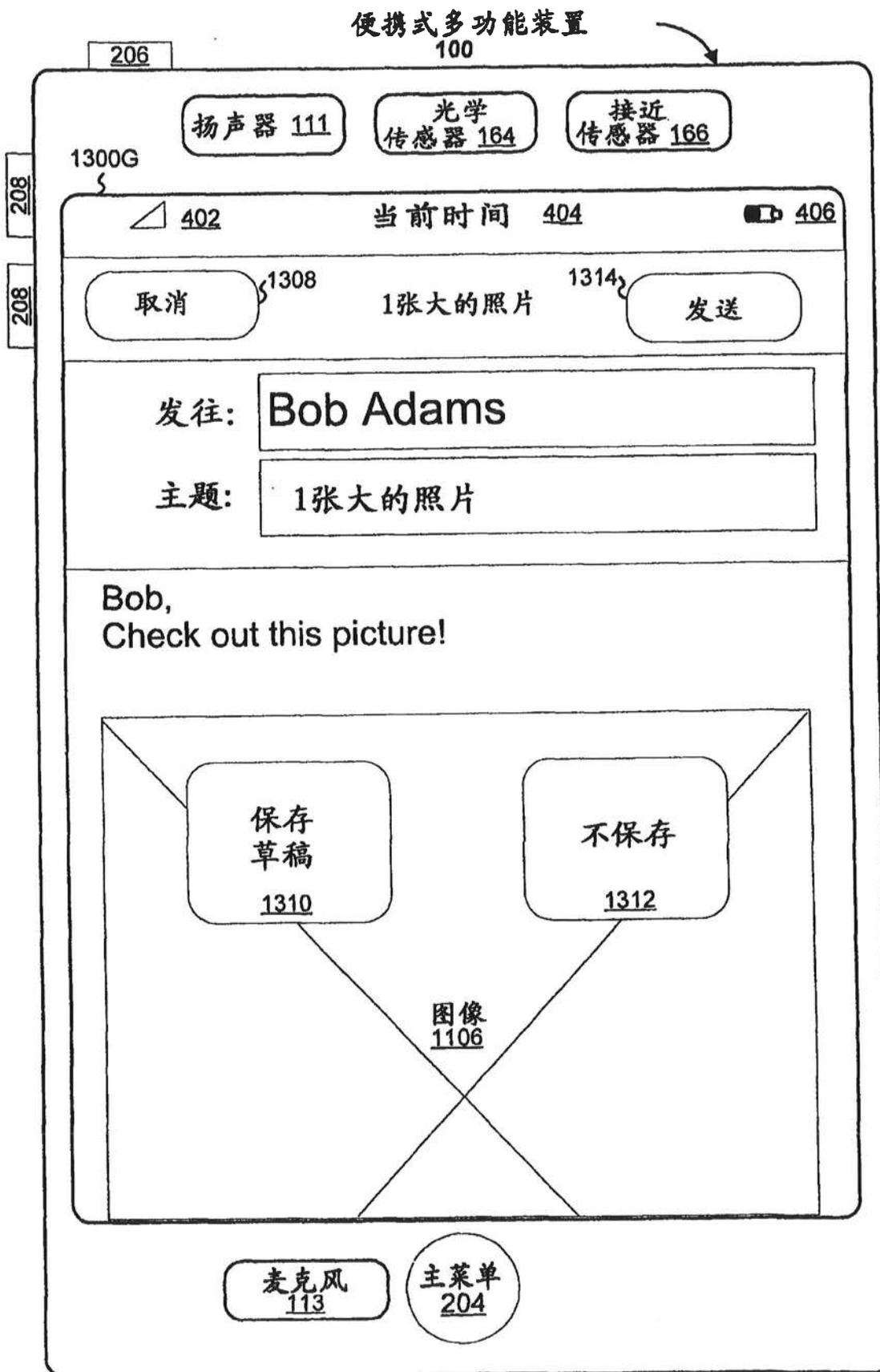


图13G

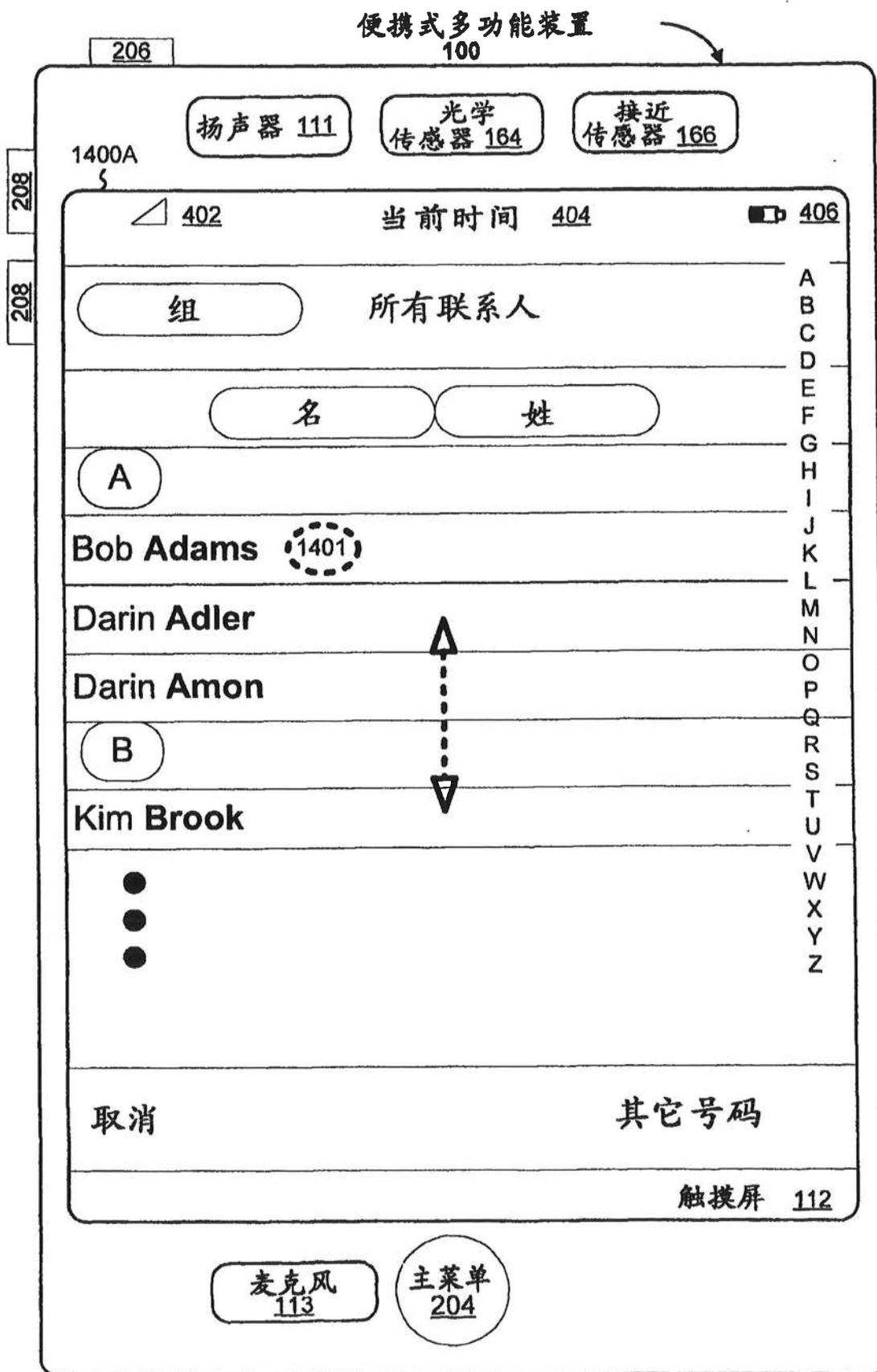


图14A

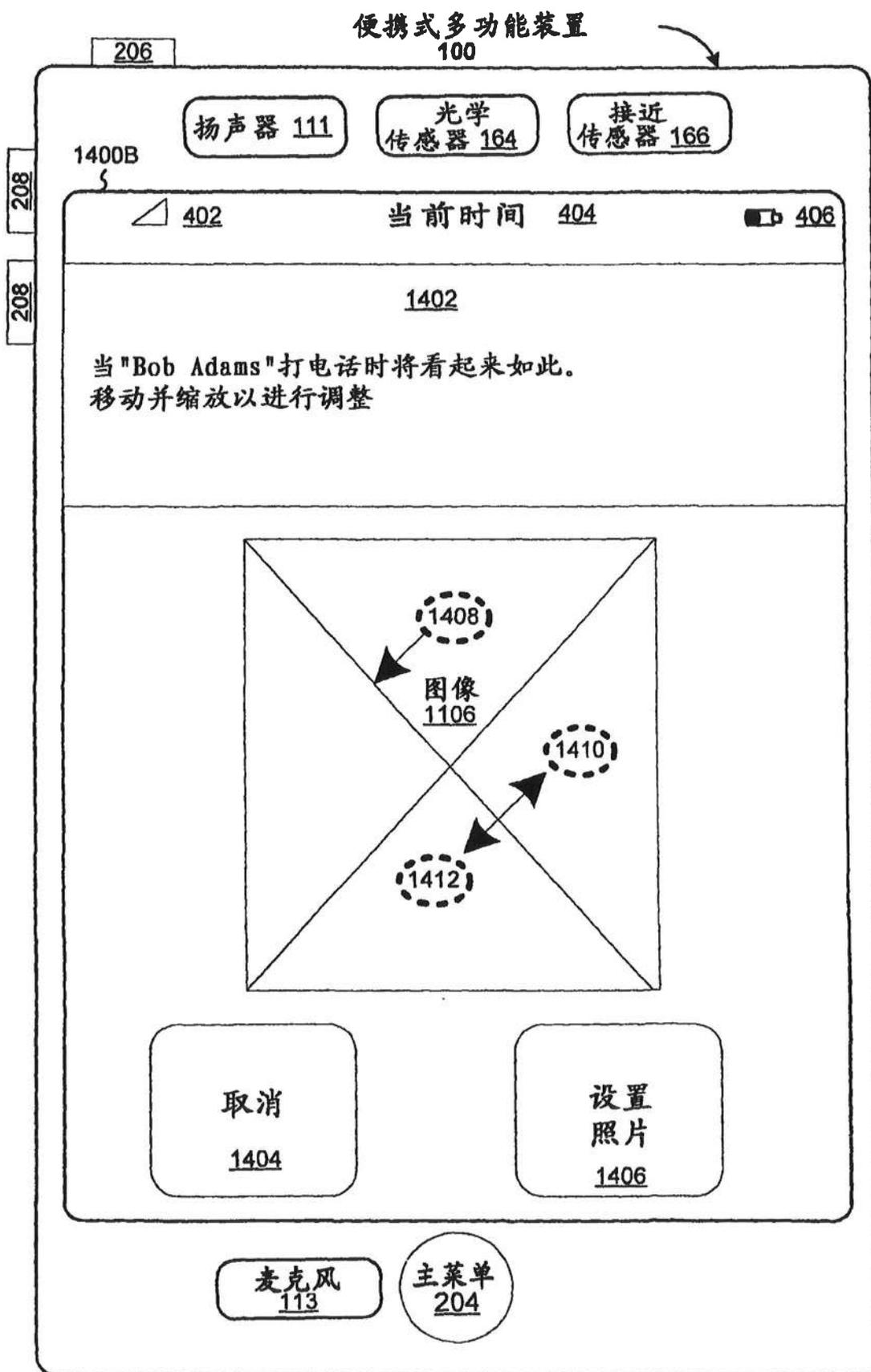


图 14B

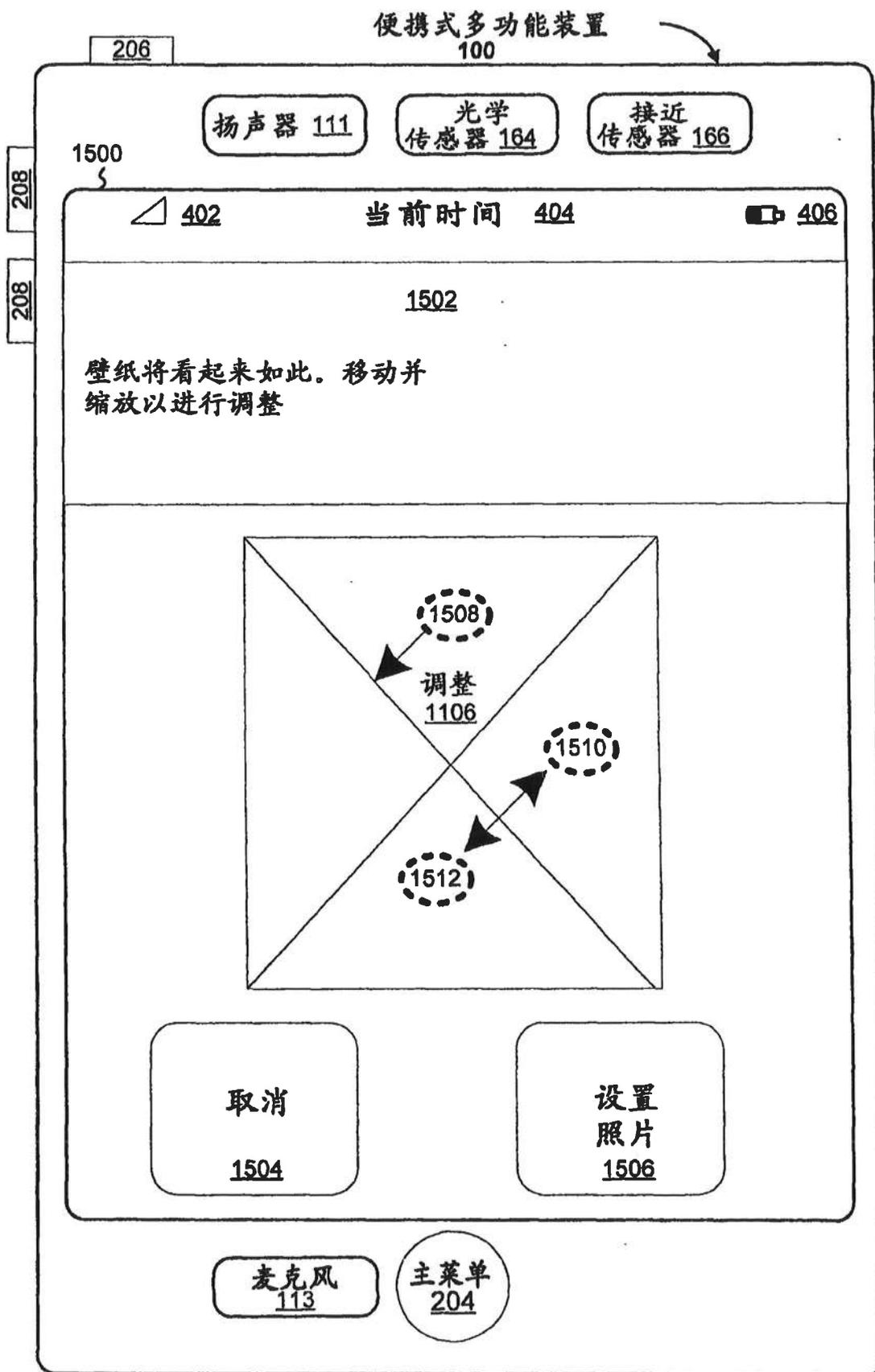


图 15

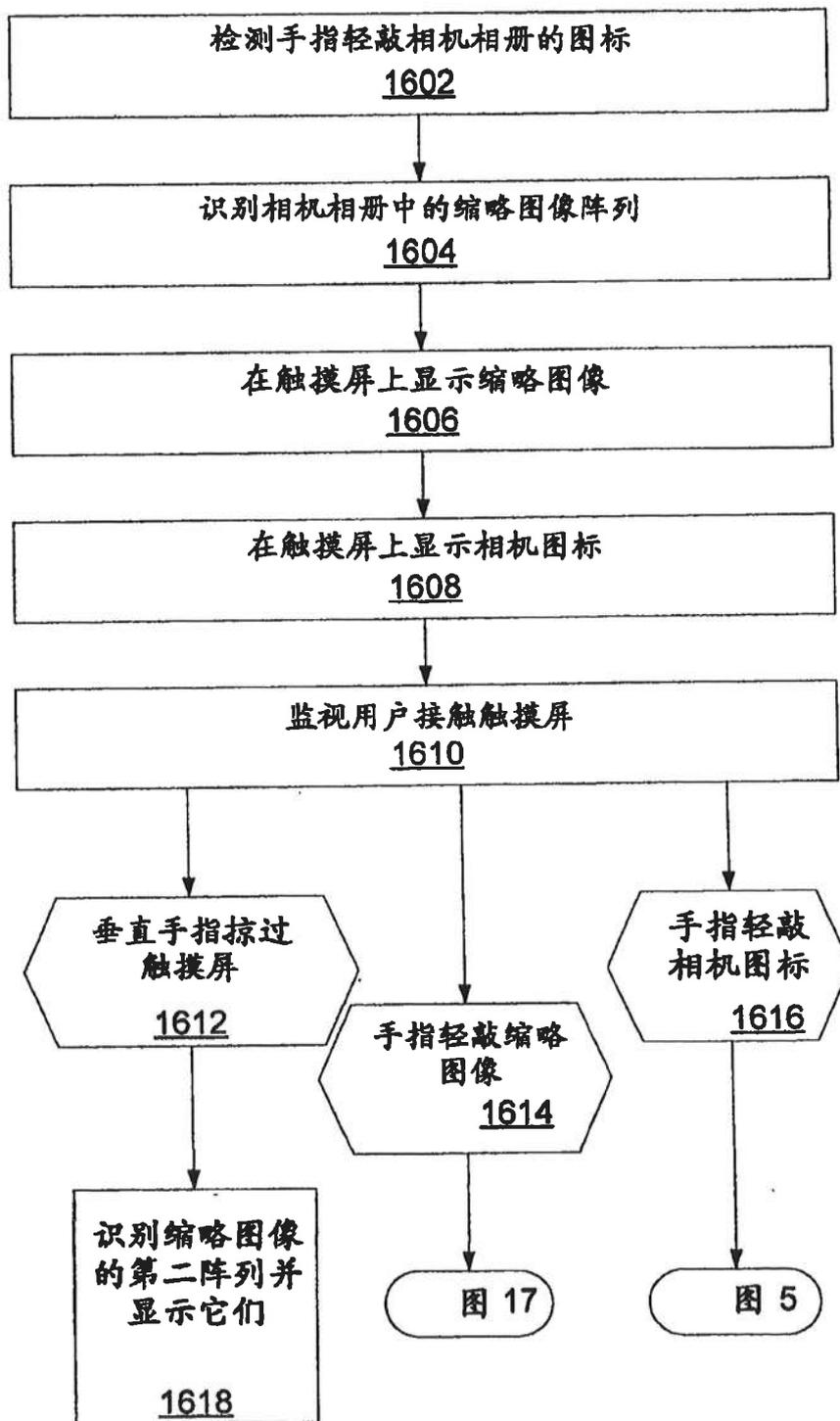


图 16

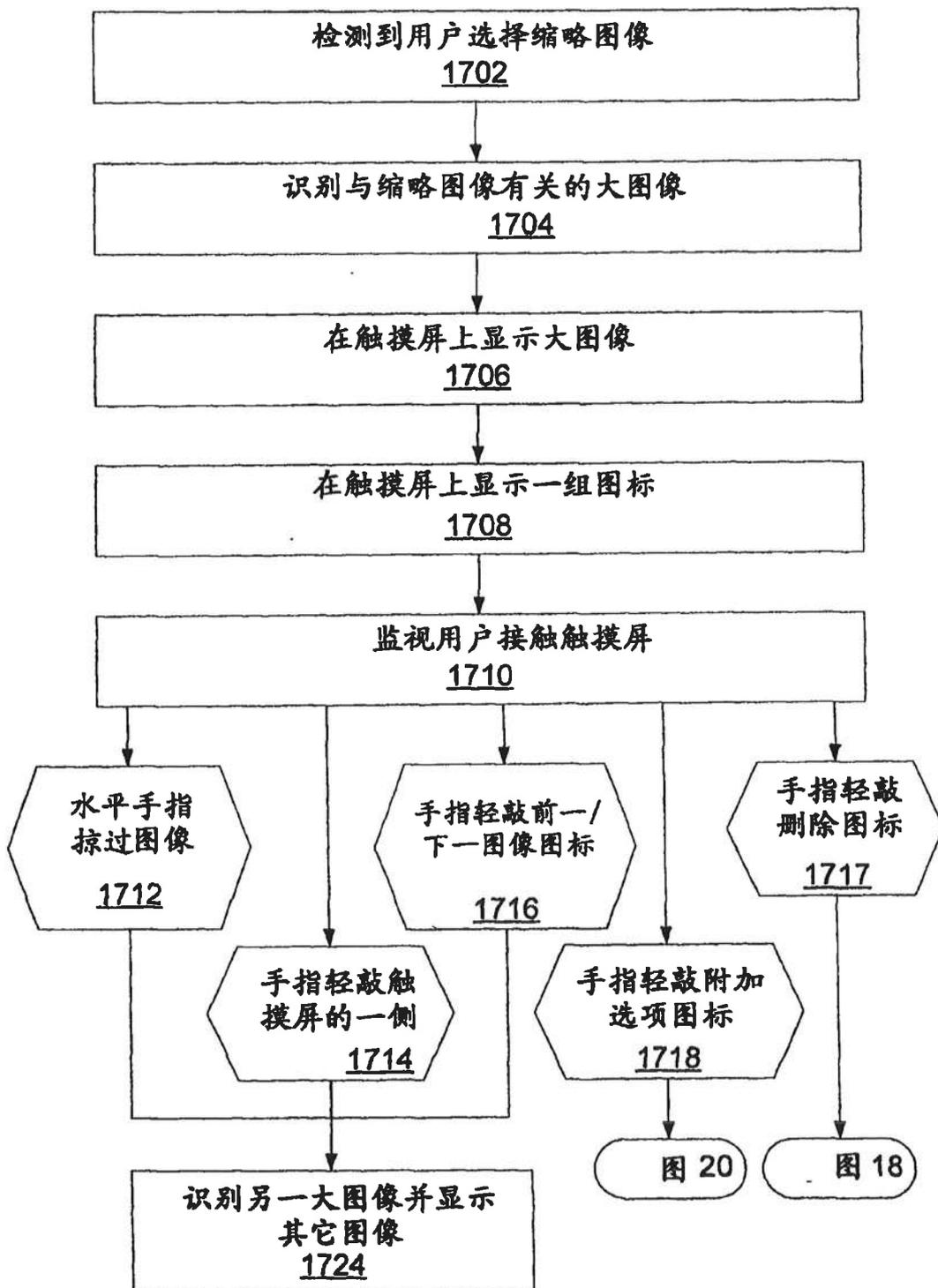


图 17

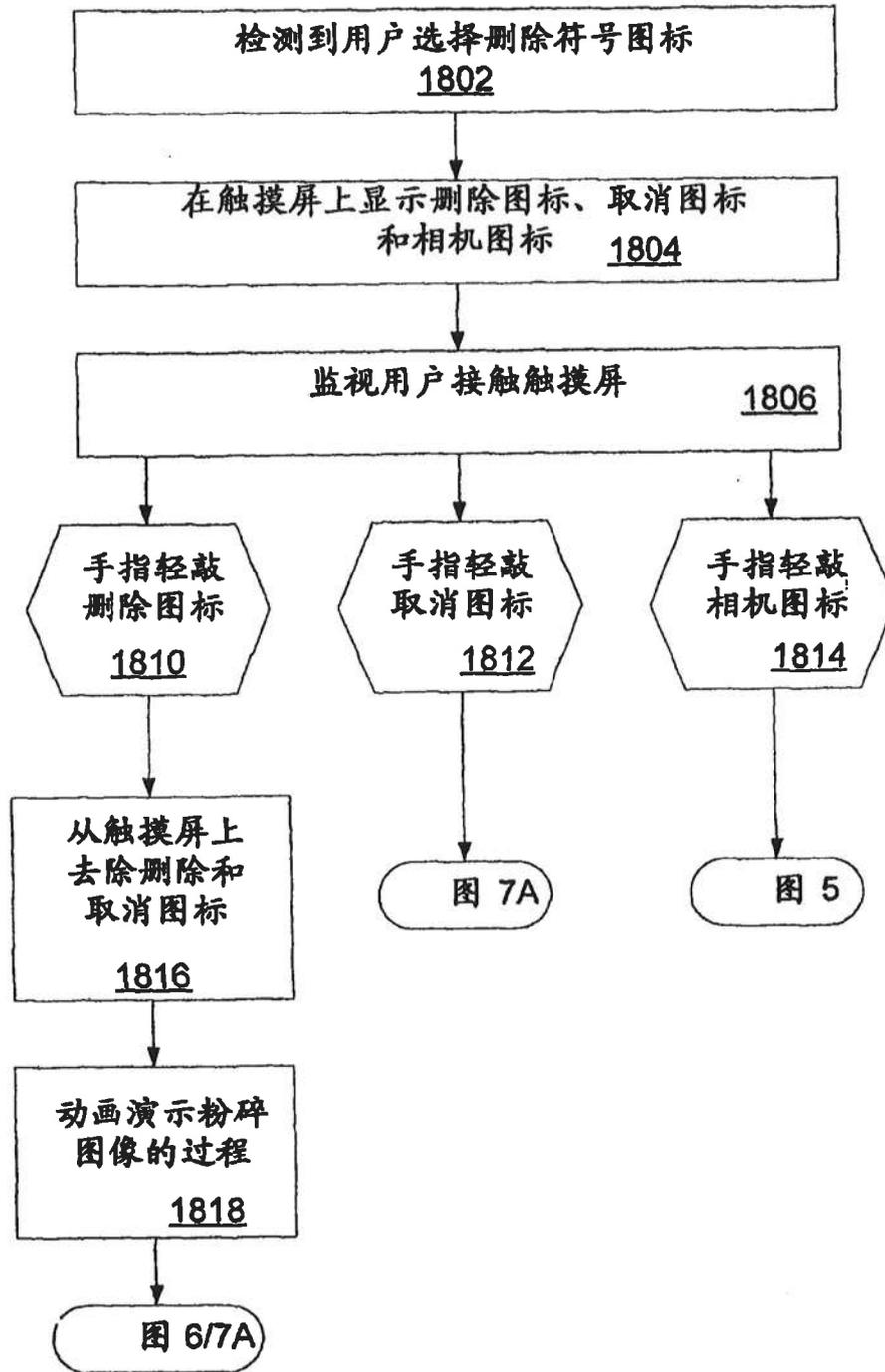


图 18

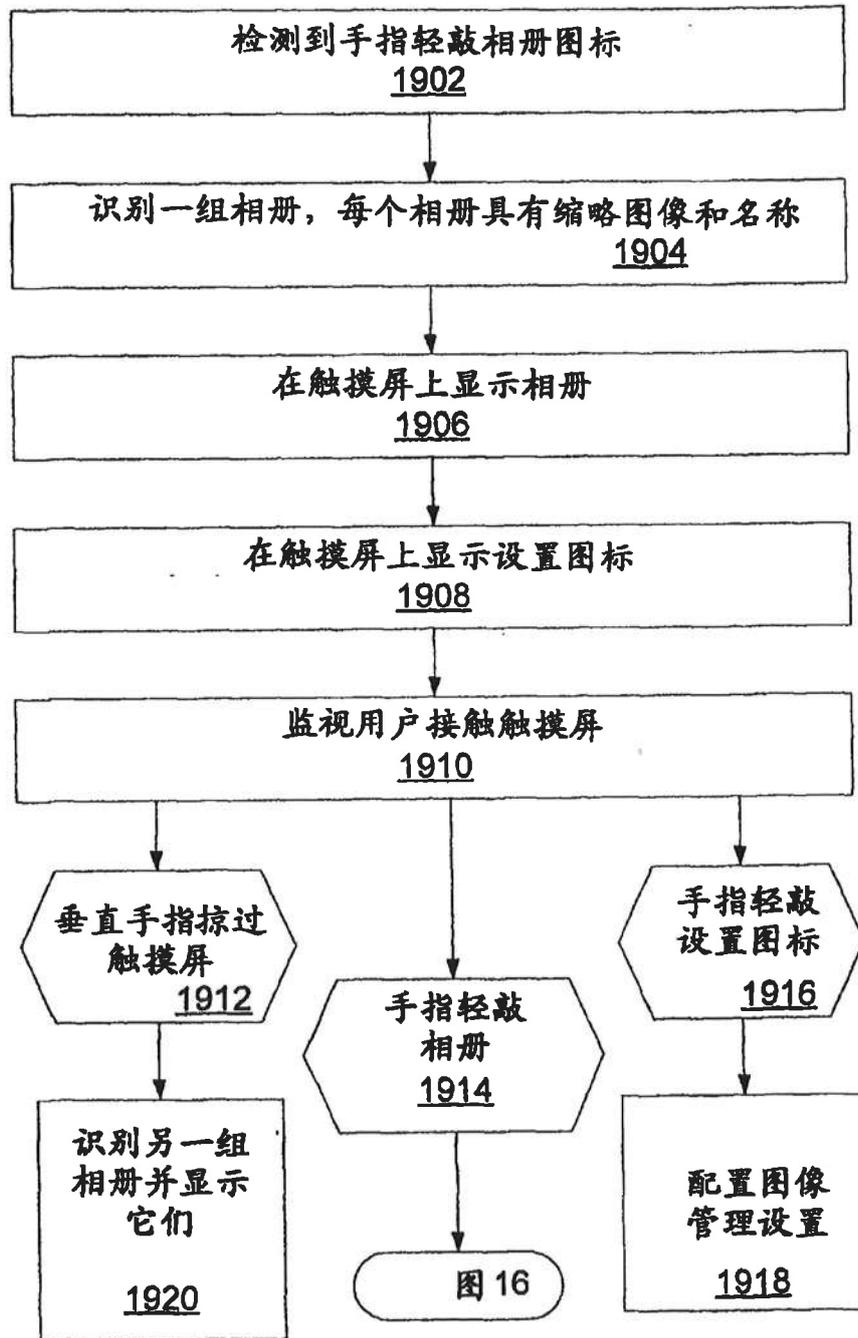


图 19

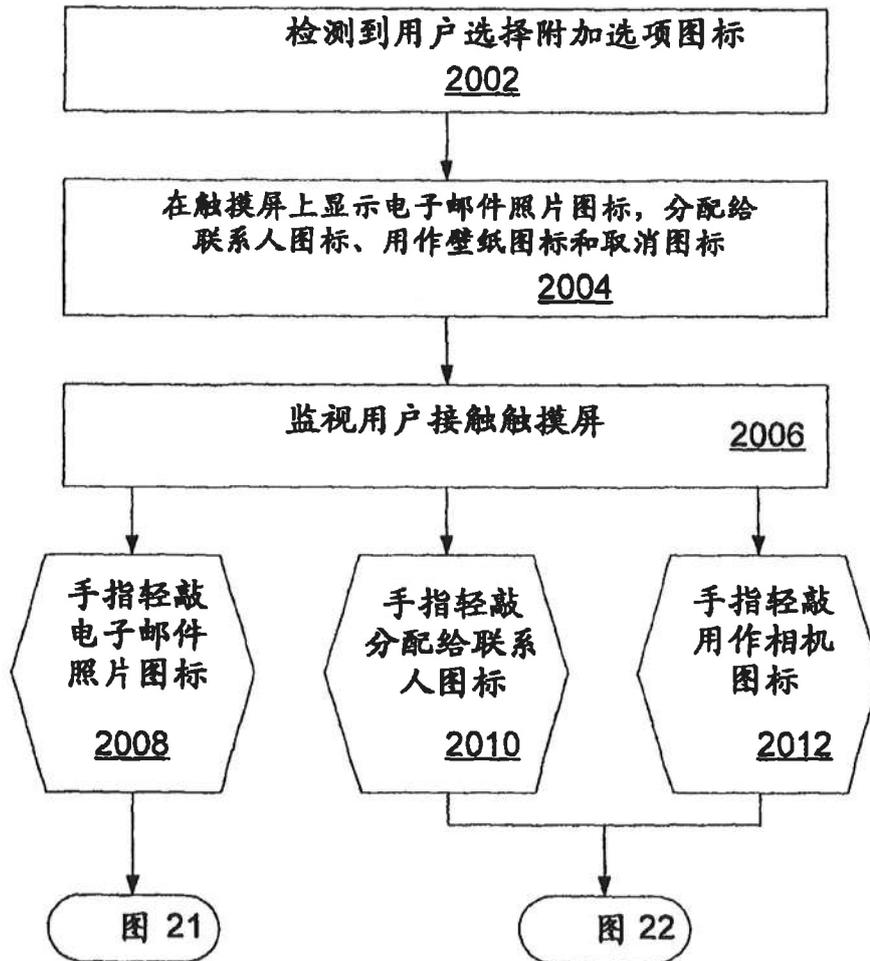


图20

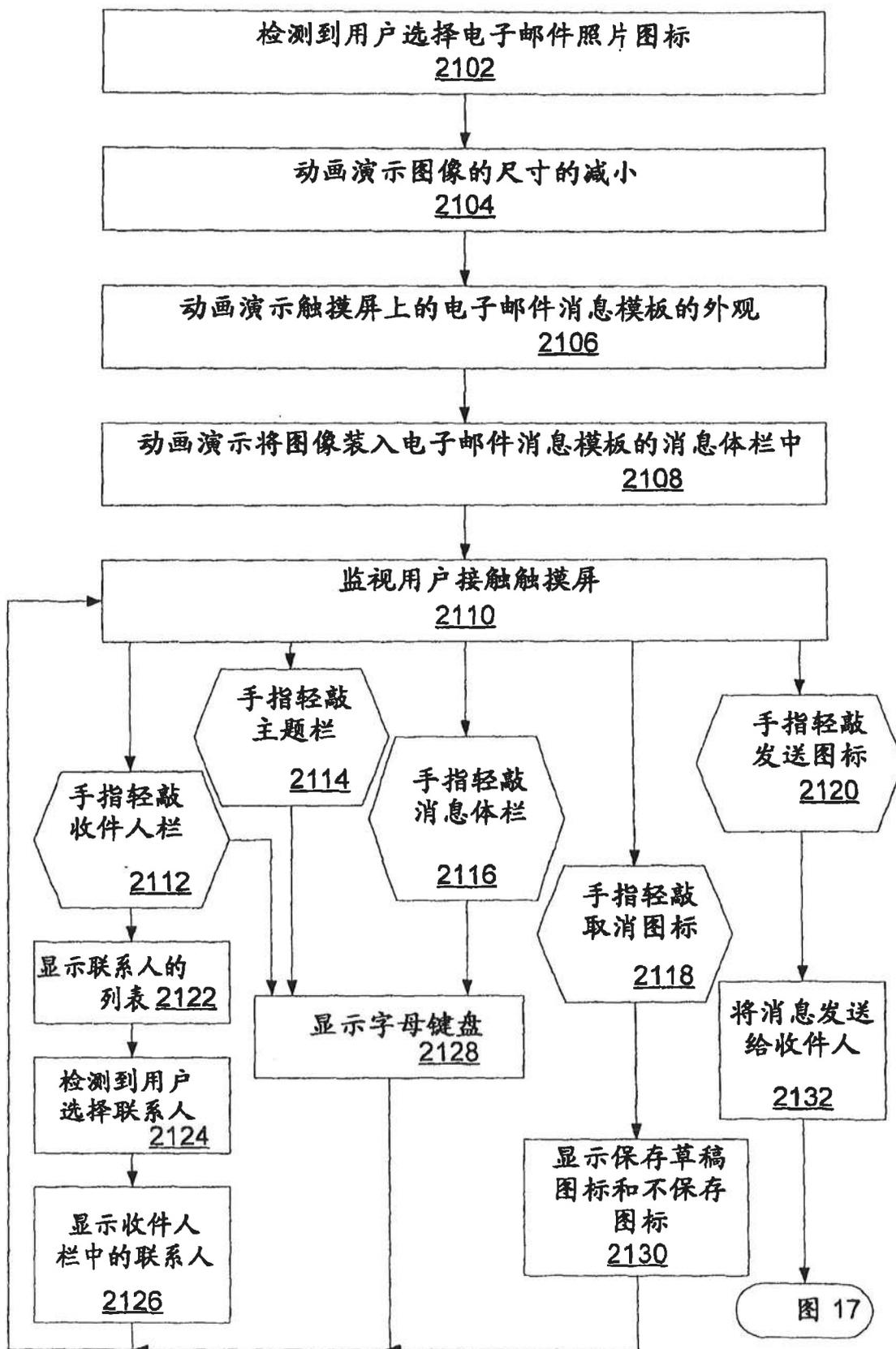


图21

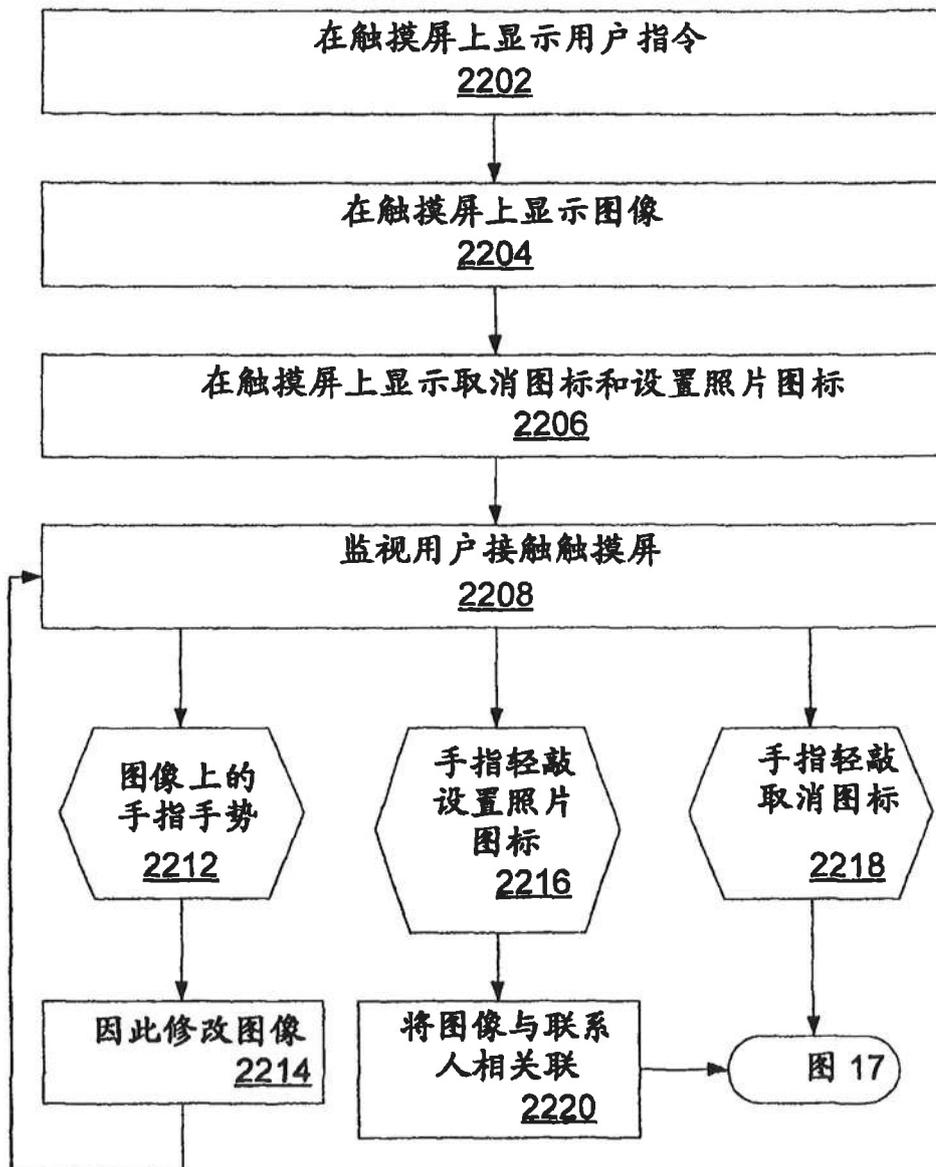


图 22

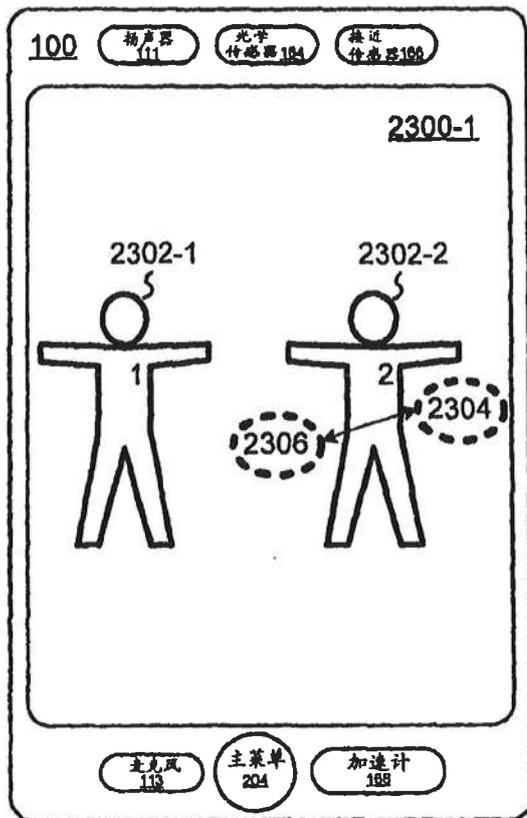


图 23A

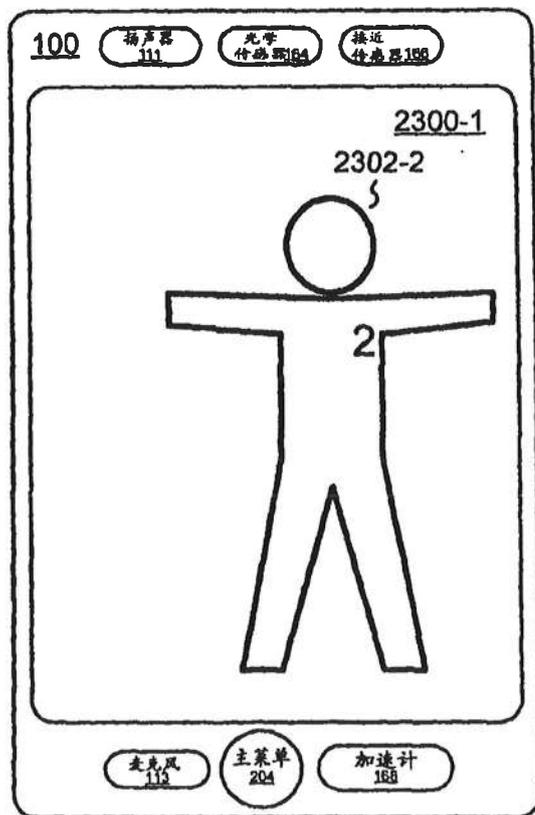


图 23B

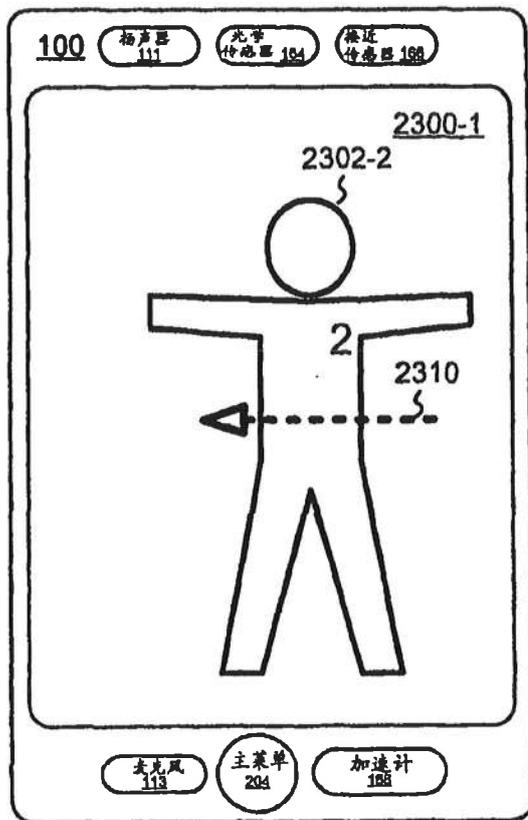


图 23C

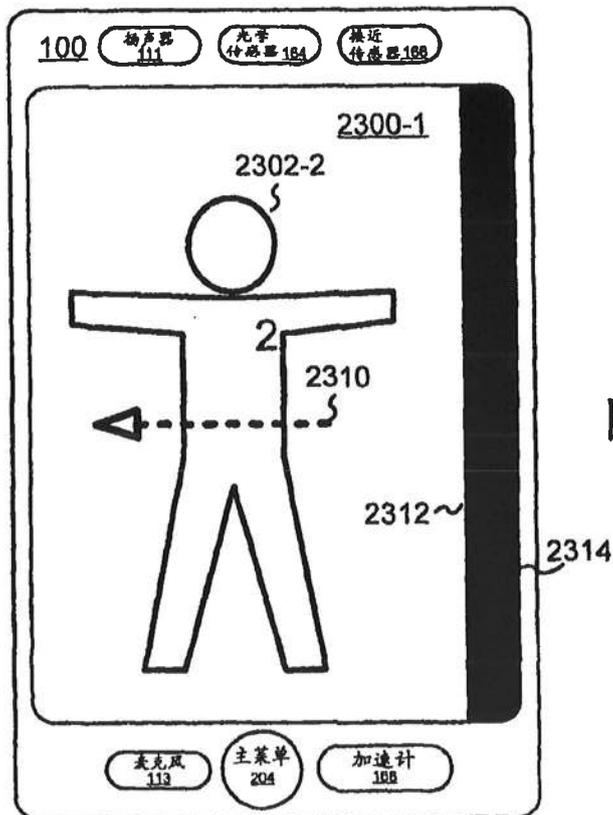


图 23D

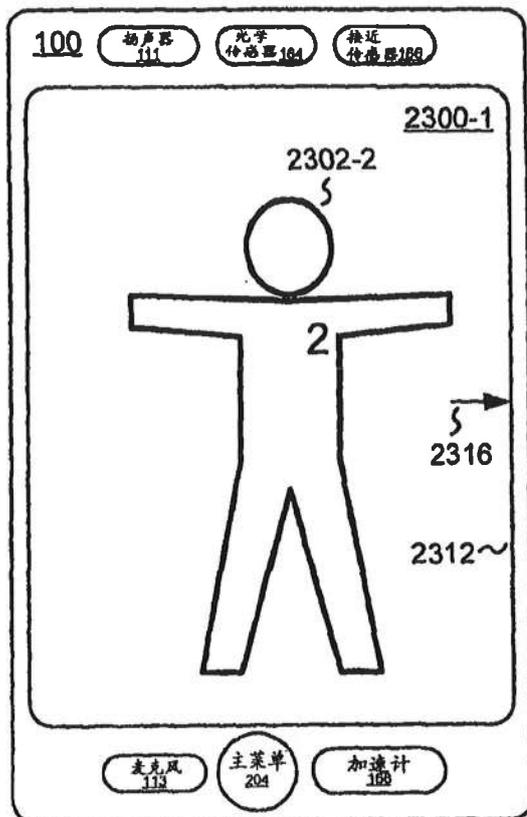


图 23E

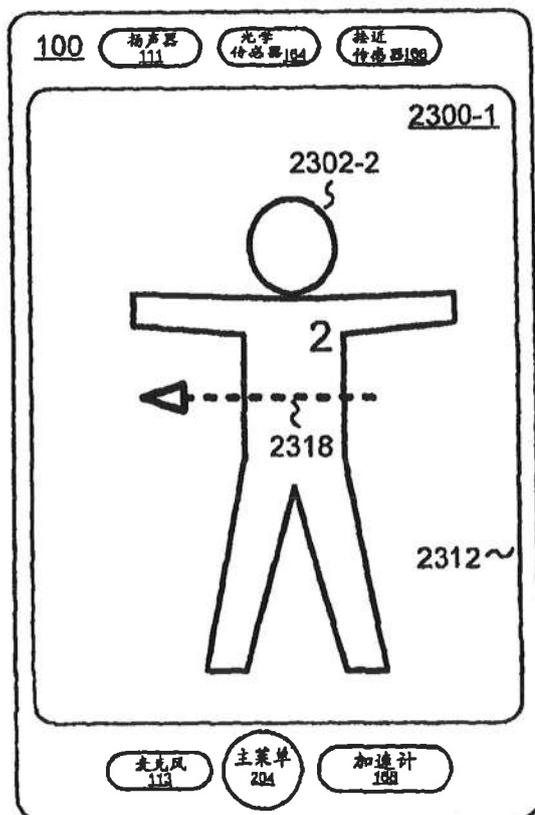


图 23F

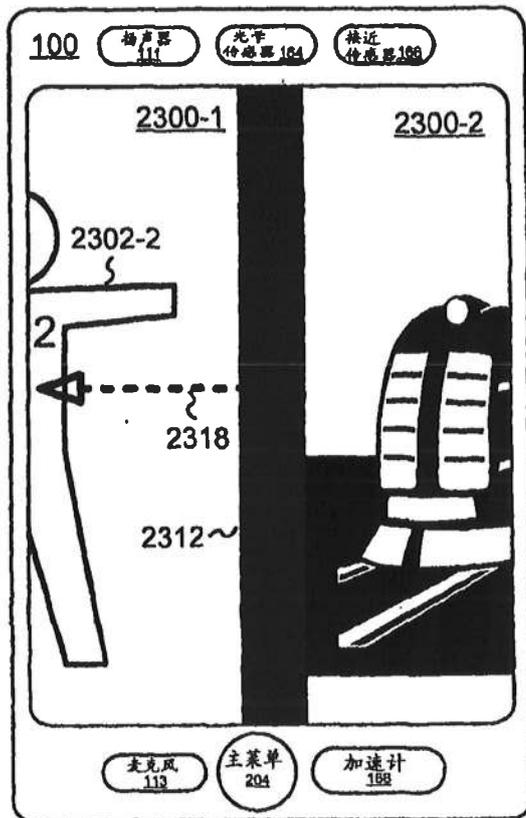


图 23G

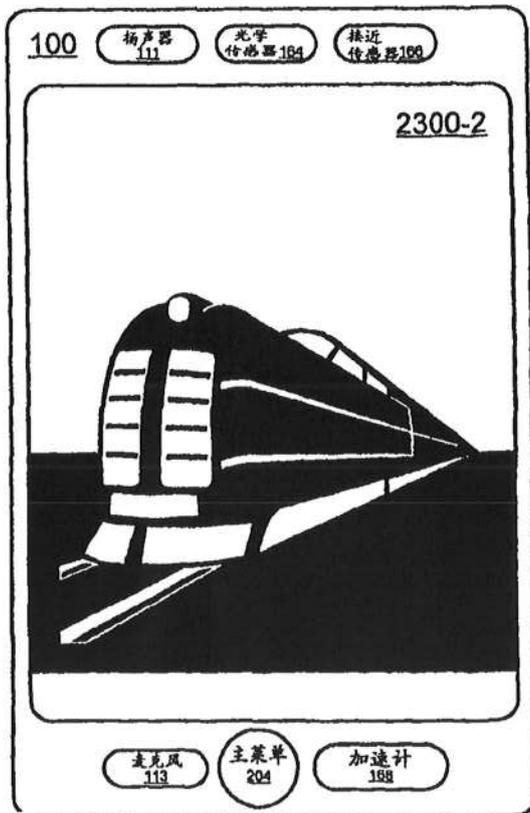


图 23H

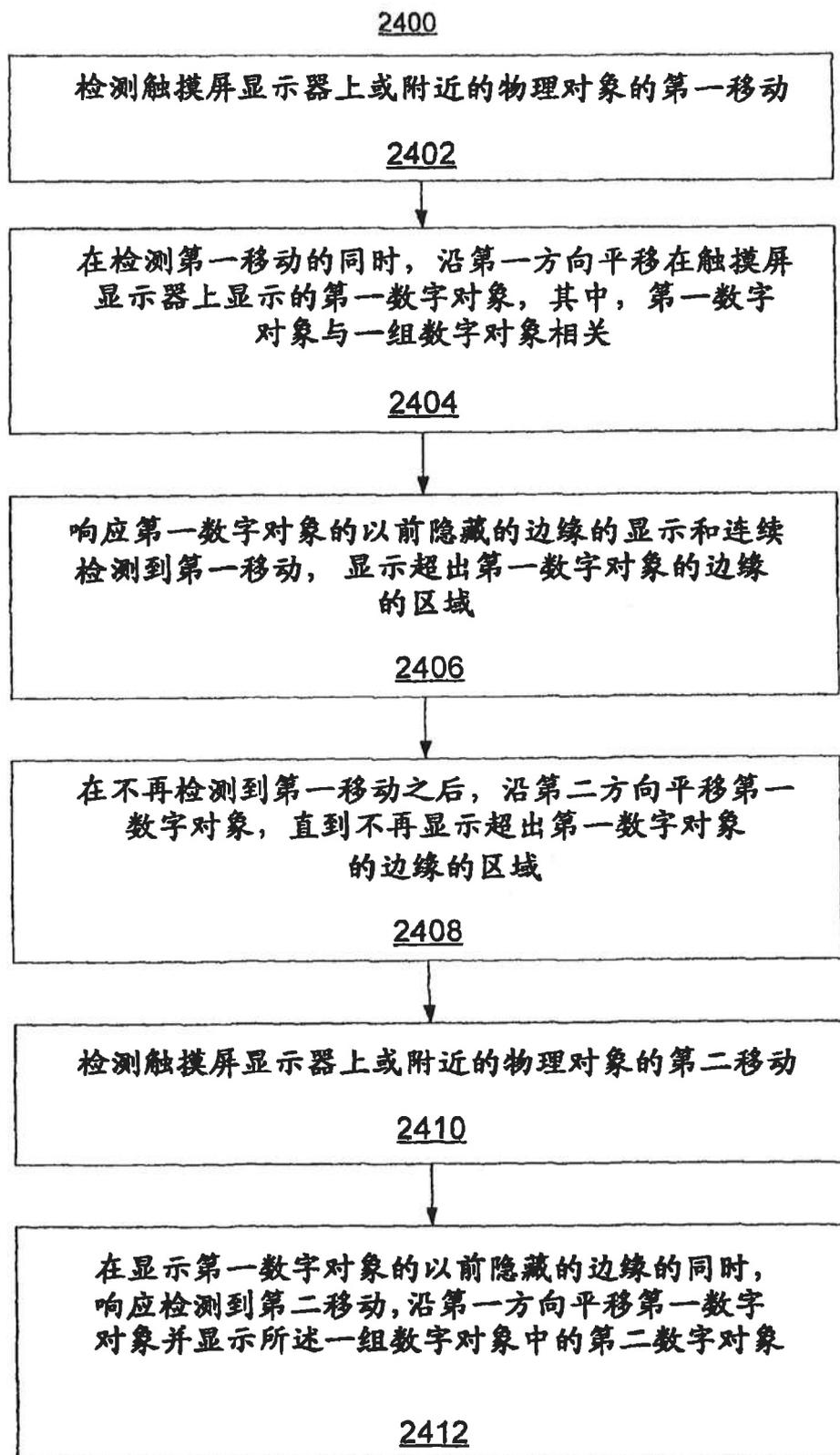


图 24