US 20110083100A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2011/0083100 A1

(43) Pub. Date: Apr. 7, 2011

FYKE et al.

(54) APPARATUS AND METHOD FOR INVOKING A FUNCTION BASED ON A GESTURE INPUT

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(21) Appl. No.: **12/571,612**

(22) Filed: **Oct. 1, 2009**

Publication Classification

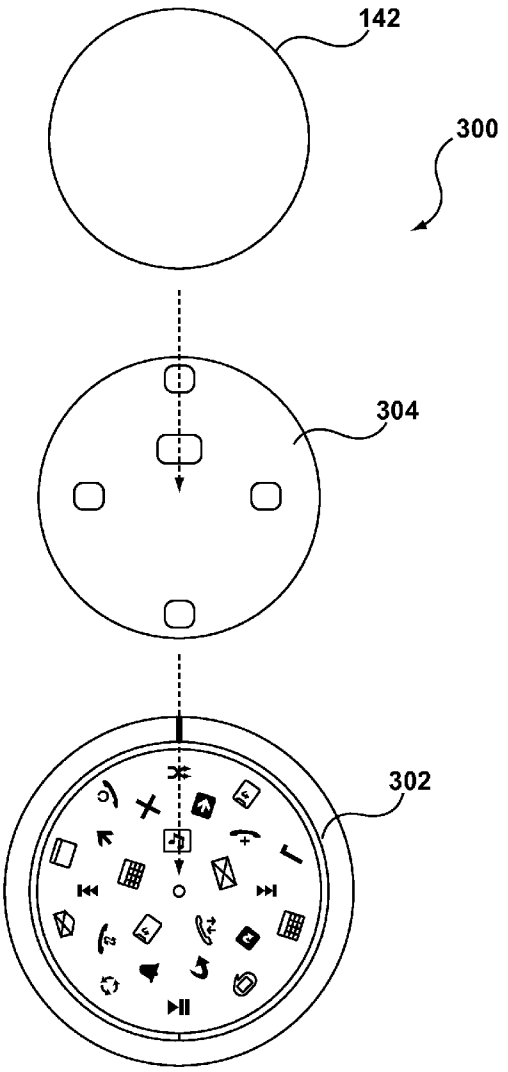
(51) **Int. Cl.**

G06F 3/048	(2006.01)
G06F 3/041	(2006.01)
G06F 3/033	(2006.01)

(52) **U.S. Cl.** **715/790**; 345/173; 715/835; 715/863

(57) **ABSTRACT**

An electronic apparatus is provided including an input assembly. The input assembly includes a graphic display layer, a masking layer, and an input device. The graphic display layer includes a plurality of function icons. The masking layer includes a plurality of function icon windows for displaying functions icons associated with a particular application. Each of the displayed function icons corresponds to a function of the particular application. The input device includes a plurality of input device sections for receiving a gesture input. The graphic display layer is moveable relative to the masking layer such that, based on the relative positioning between the graphic display layer and the masking layer, function icons associated with a particular application are displayed through the function icon windows and the other function icons are at least obscured by the masking layer. The receiving of the gesture input by a one of the plurality of input device sections corresponding to a one of the displayed function icons invokes the function corresponding to the one of the displayed function icons.



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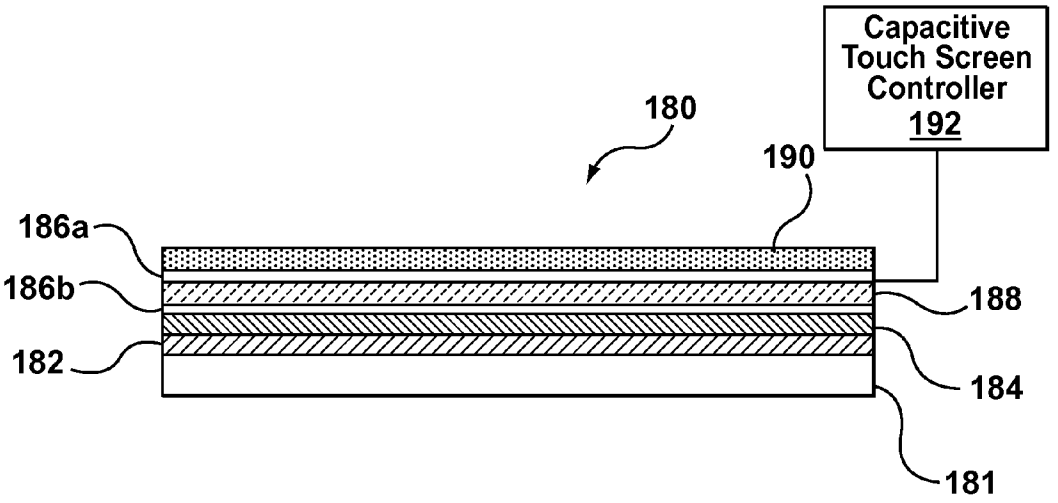

Capacitive
Touch Screen
Controller
192
180
190
186a
186b
188
182
184
181

FIG. 1

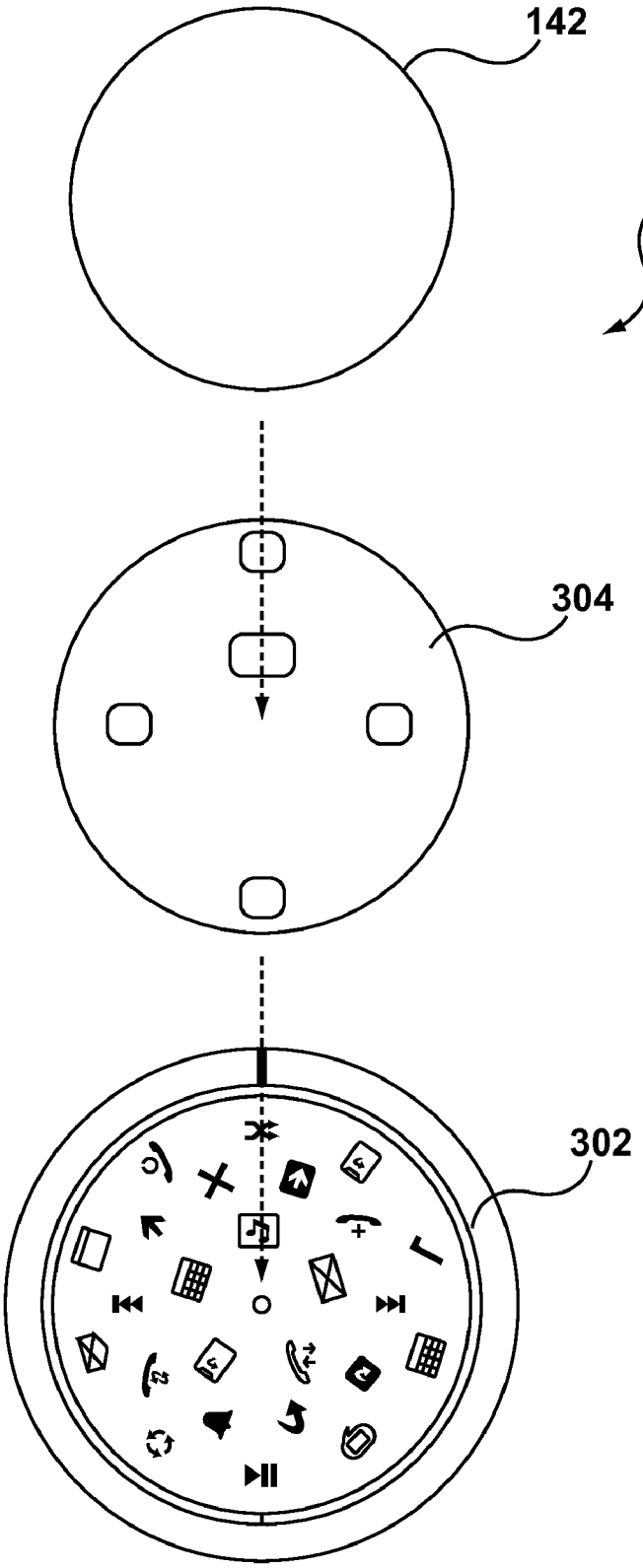


FIG. 2

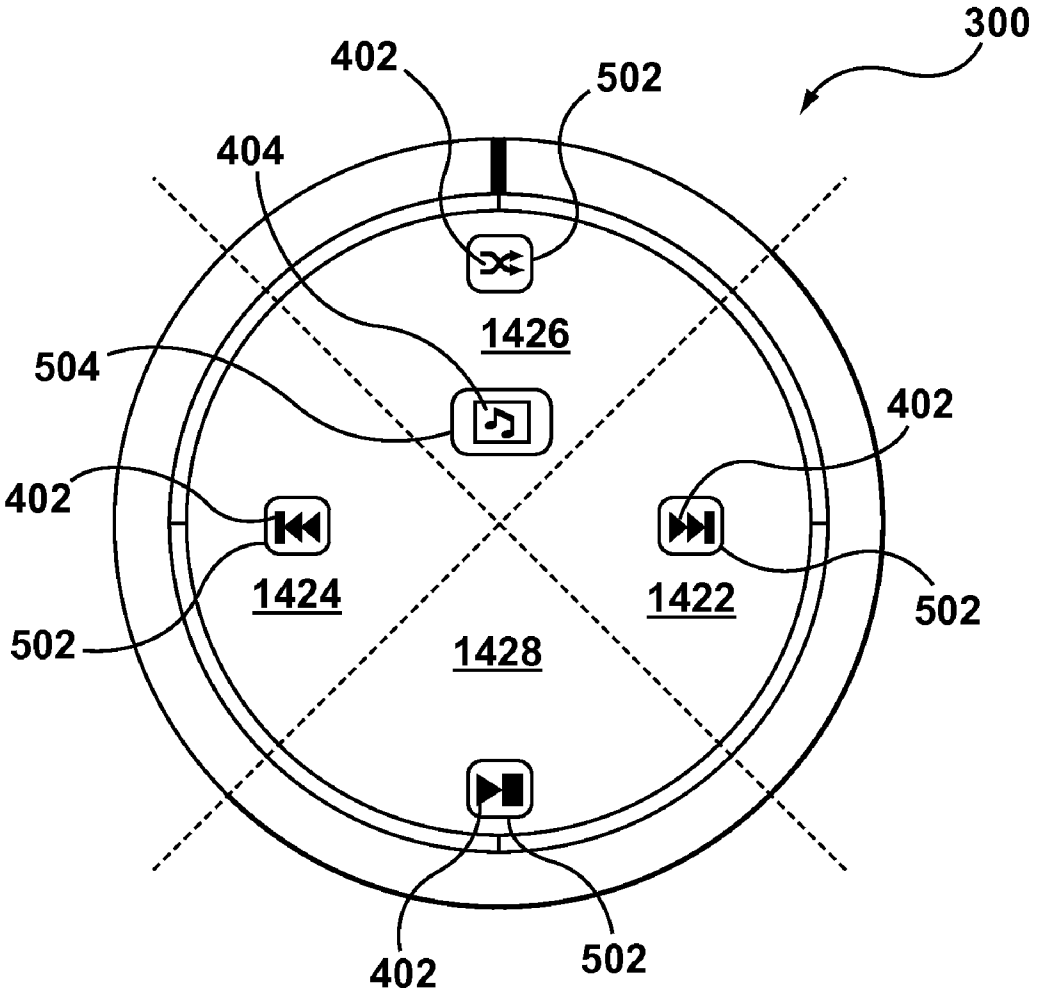

300
402
502
404
1426
504
402
402
1424
1422
502
502
1428
402
502

FIG. 3A

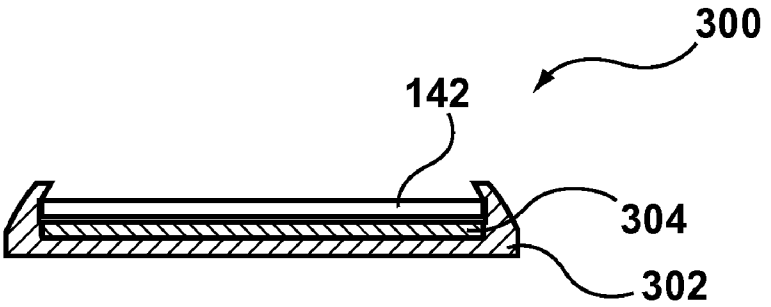

300
142
304
302

FIG. 3B

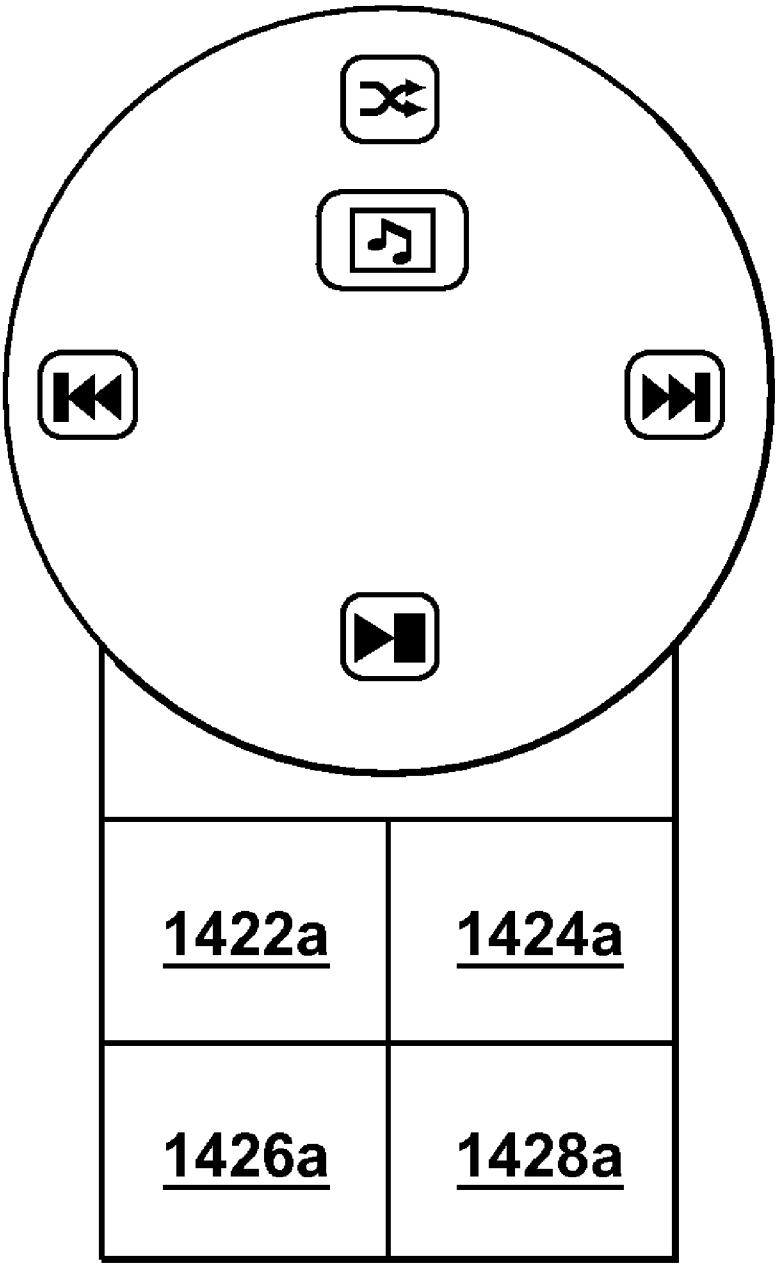


FIG. 3C

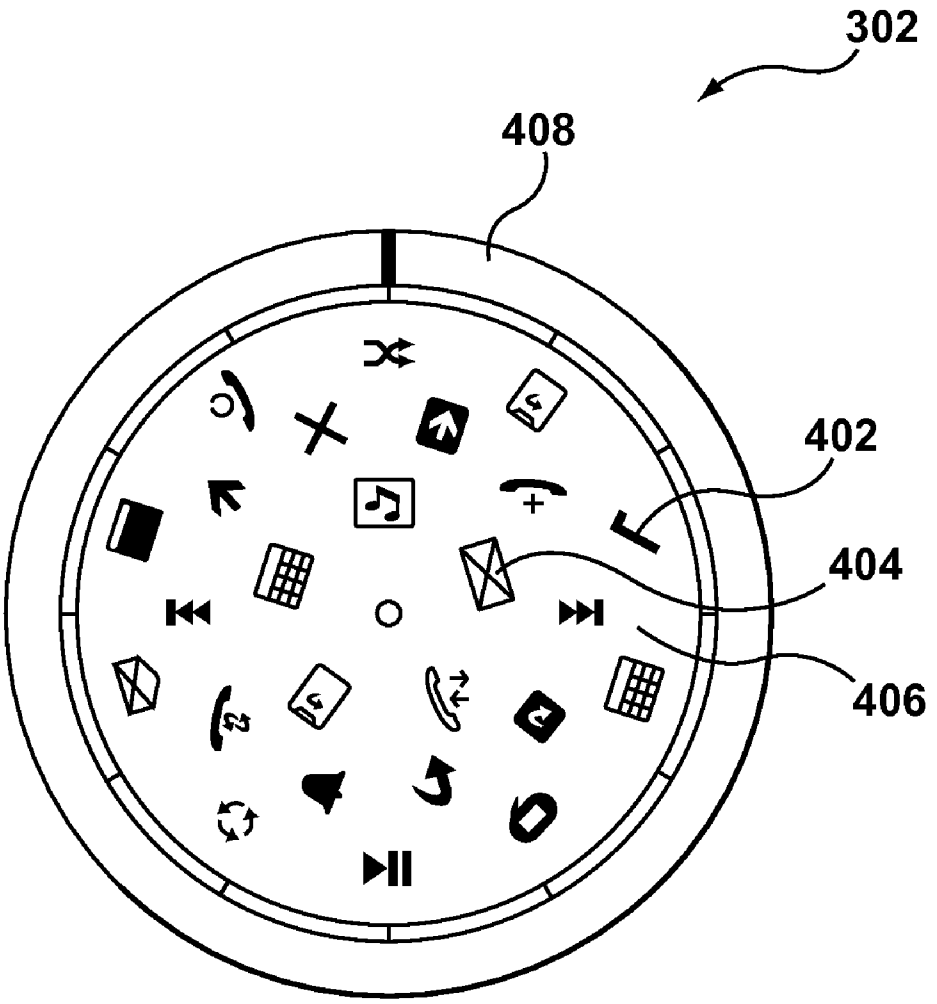
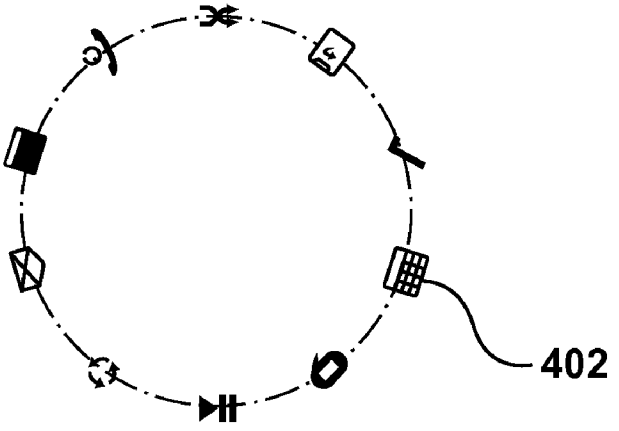
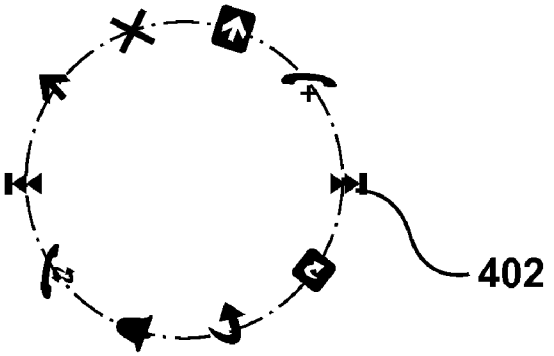


FIG. 4A





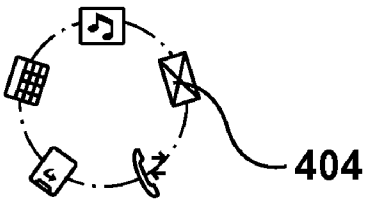


FIG. 4B

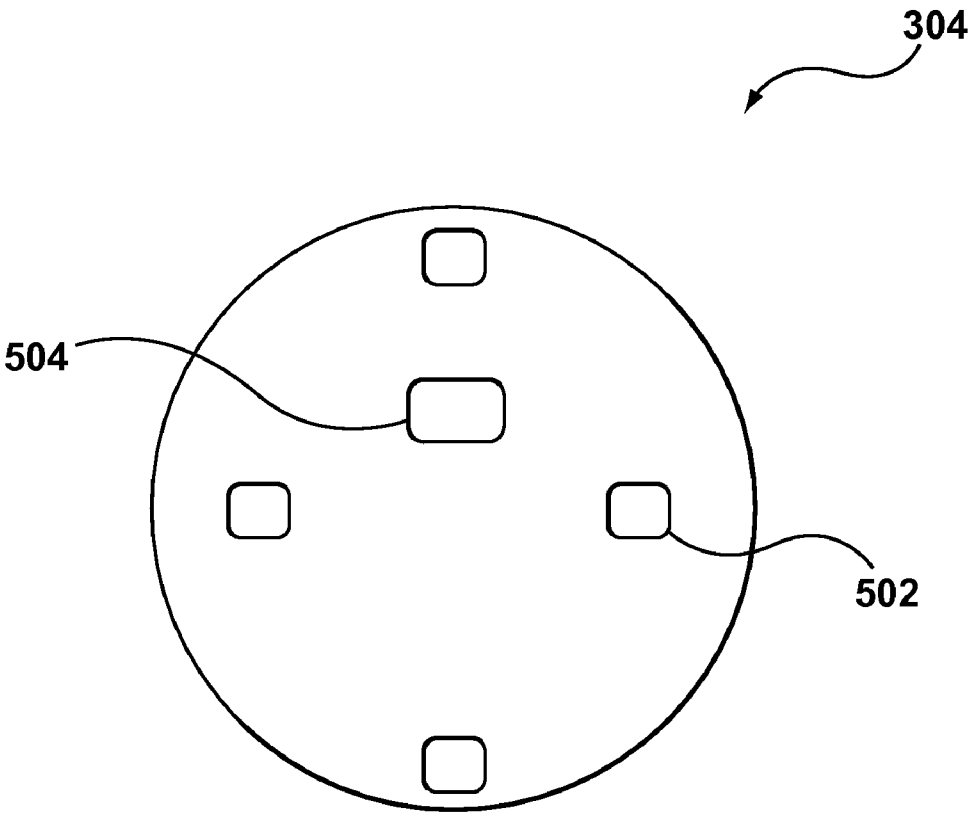


FIG. 5

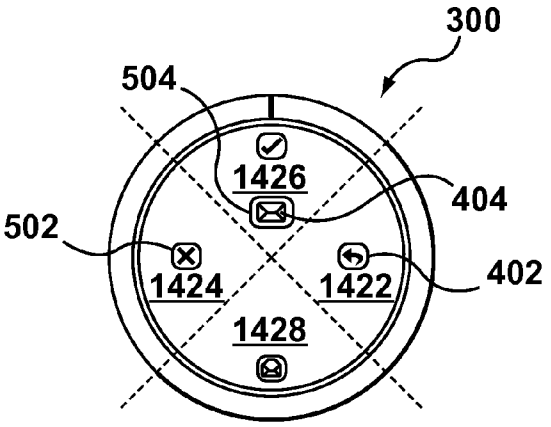


FIG. 6A

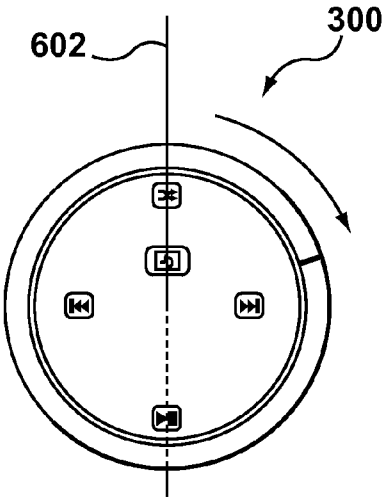


FIG. 6B

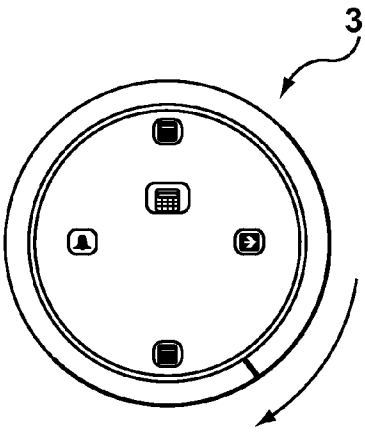


FIG. 6C

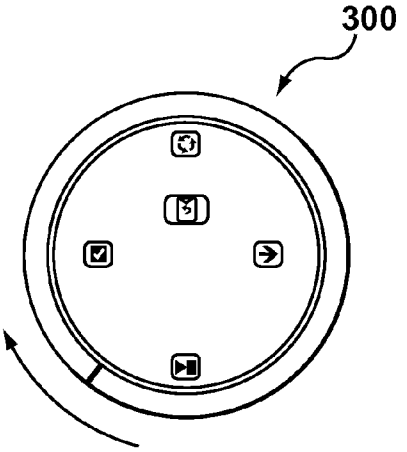


FIG. 6D

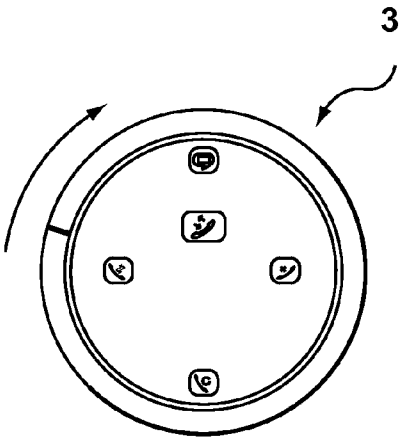


FIG. 6E

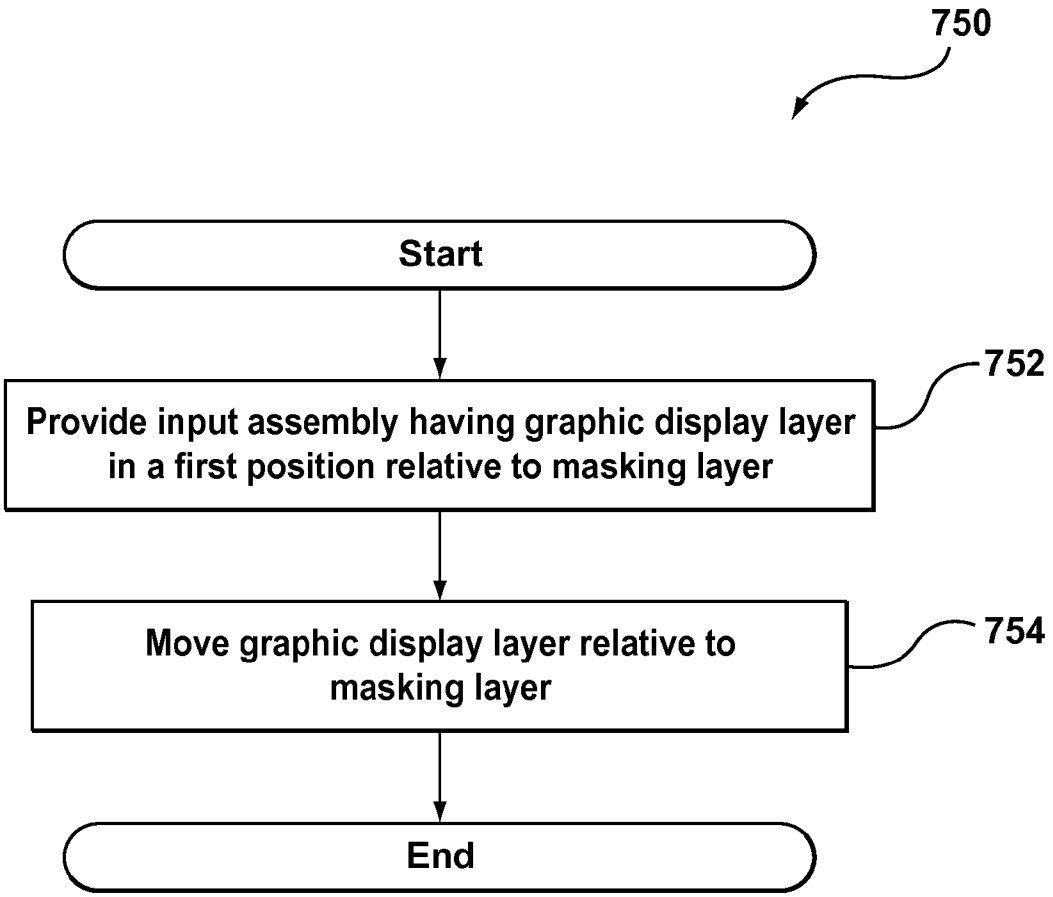

750
Start
752
Provide input assembly having graphic display layer in a first position relative to masking layer
754
Move graphic display layer relative to masking layer
End

FIG. 7

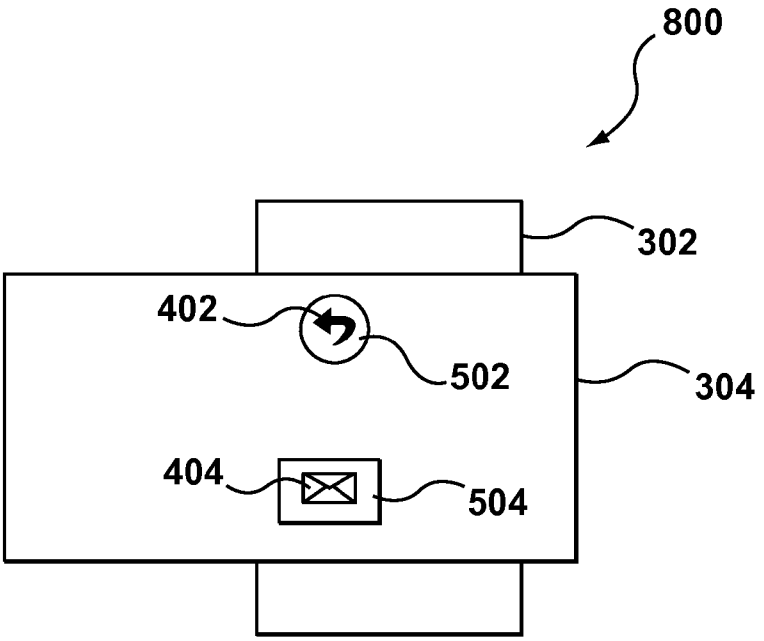


FIG. 8A

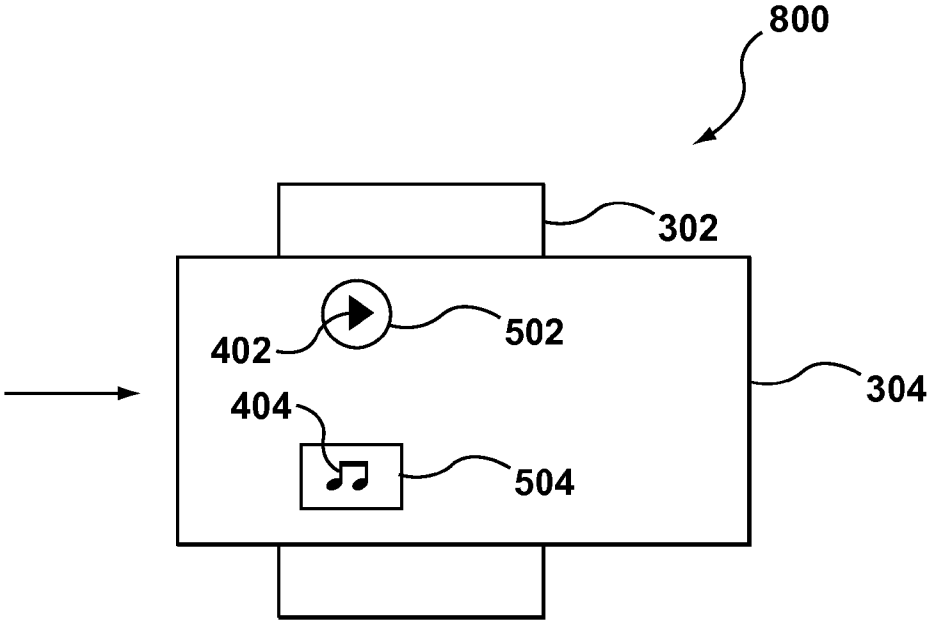


FIG. 8B

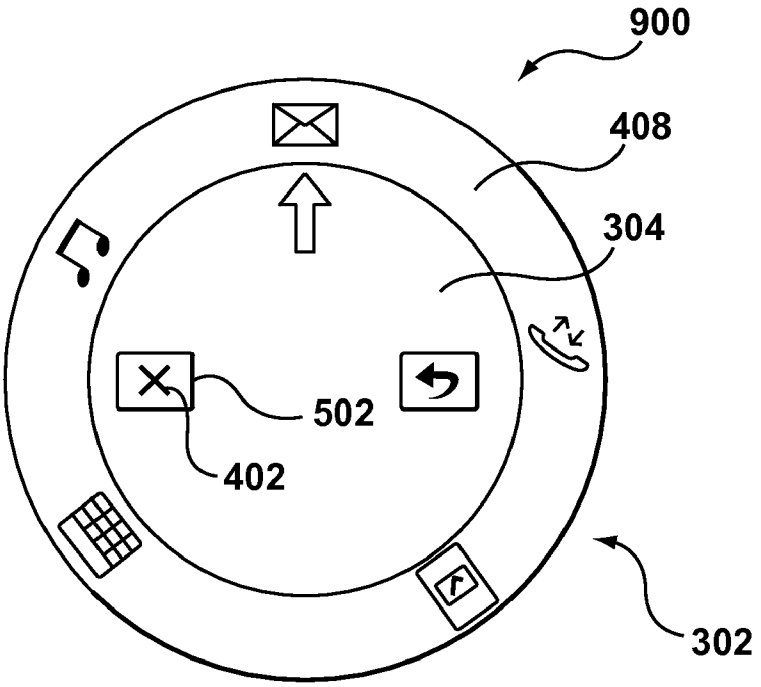


FIG. 9A

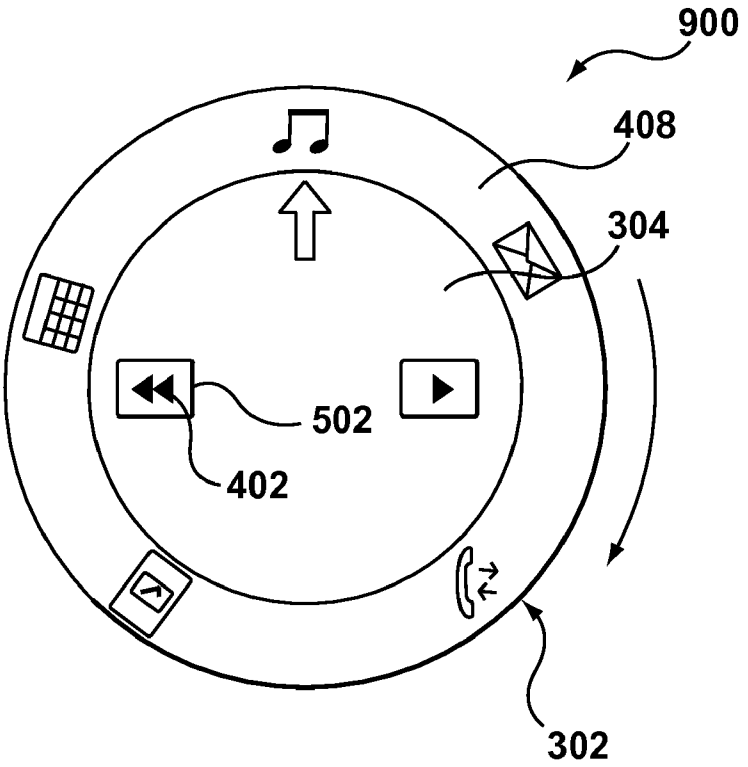


FIG. 9B

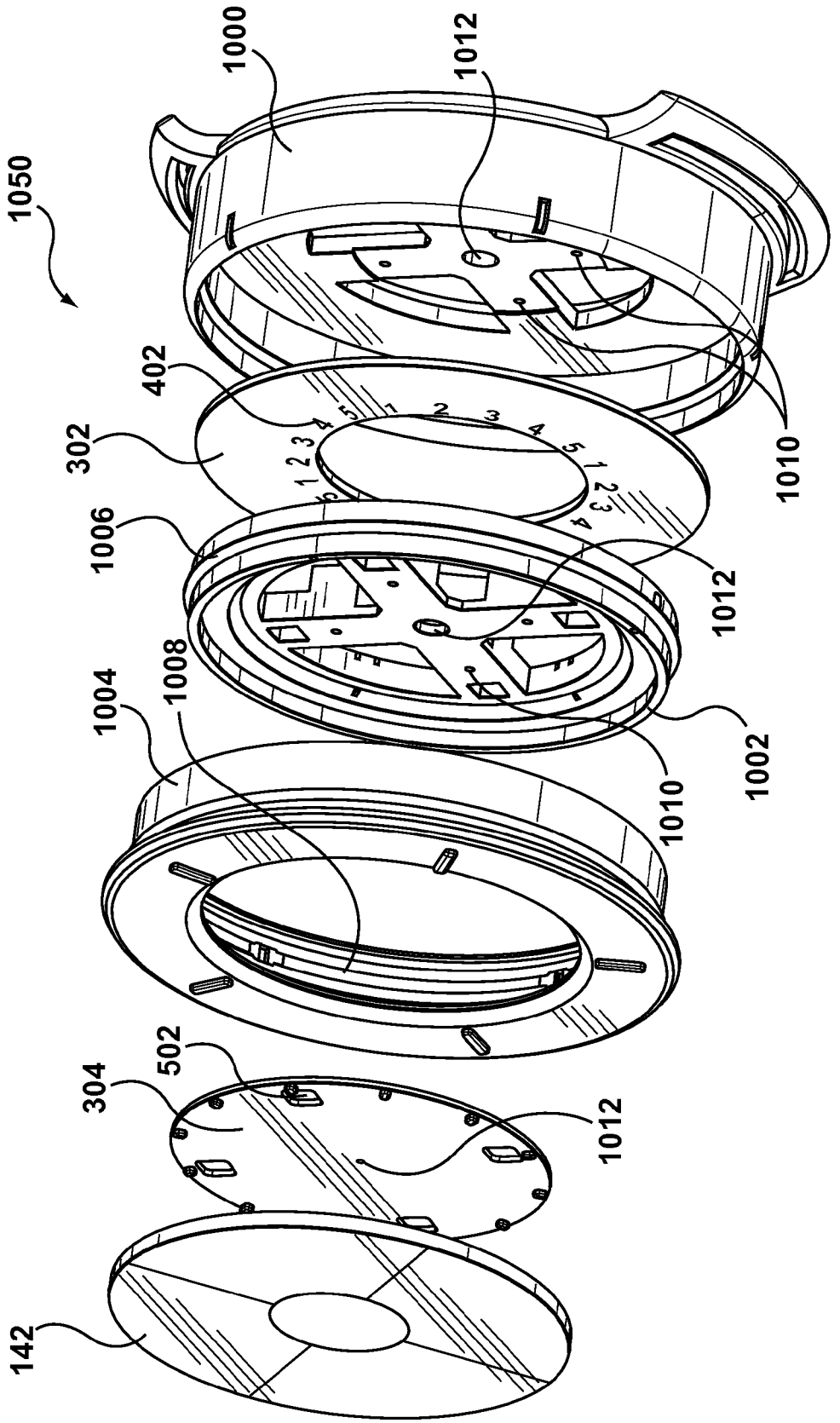

1050
1000
1012
402
302
1010
1006
1012
1008
1004
1002
1010
502
304
1012
142

FIG. 10

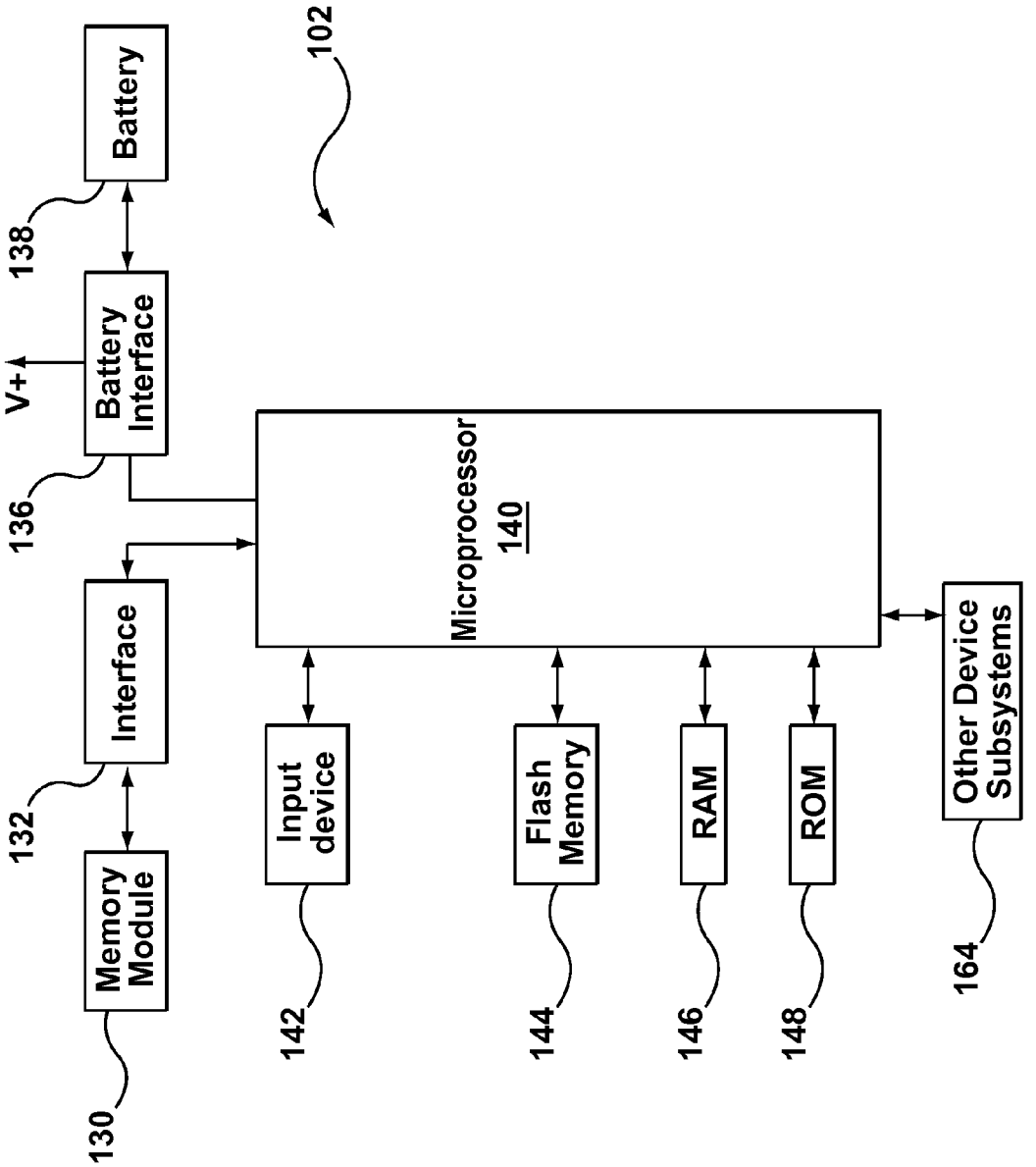

102
Battery
138
Battery Interface
V+
136
Microprocessor
140
Interface
132
Memory Module
130
Input device
142
Flash Memory
144
RAM
146
ROM
148
Other Device Subsystems
164

FIG. 11

APPARATUS AND METHOD FOR INVOKING A FUNCTION BASED ON A GESTURE INPUT

TECHNICAL FIELD

[0001] The present disclosure relates generally to an electronic apparatus and method for invoking a function based on a gesture input.

BACKGROUND

[0002] Some electronic apparatuses, such as mobile devices or mobile communication devices, include a touch sensing component for accepting or sensing touch input. Such inputs are also referred to as gesture inputs, which can be a point gesture input, or a vector or directional gesture input.

[0003] Although the touch sensing component is often a touchscreen display, in some cases, the touch sensing component does not include a display, or the display aspect of the touch sensing component is selectively disabled. For example, where the display aspect of a touch sensing component, such as a touchscreen display, consumes significant battery power, in the interest of decreasing power consumption, especially for mobile devices, the display aspect is disabled for all or a portion of the component at certain times or in certain modes of operation. In such cases, it would be desirable to provide the user with information about the functions that are invokable based on a gesture input.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] Reference will now be made to the drawings, which show by way of example embodiments of the present disclosure, and in which:

[0005] FIG. **1** shows a cutaway view of an example input device, in accordance with an example embodiment of the present disclosure;

[0006] FIG. **2** shows an exploded front view of an input assembly, in accordance with an example embodiment of the present disclosure;

[0007] FIG. **3**A shows an assembled front view of the assembly of FIG. **2**;

[0008] FIG. **3**B shows an assembled side cutaway view of the assembly of FIG. **2**;

[0009] FIG. **3**C is a front view of an input assembly, in accordance with another example embodiment of the present disclosure;

[0010] FIG. **4**A is a front view of an example icon device suitable for use in the input assembly of FIG. **2**;

[0011] FIG. **4**B illustrates example icons suitable for use in the icon device of FIG. **4**A;

[0012] FIG. **5** is a front view of an example masking layer suitable for use in the input assembly of FIG. **2**;

[0013] FIGS. **6**A-**6**E illustrates an example operation of the input assembly of FIG. **2**;

[0014] FIG. **7** is a flowchart illustrating an example method in accordance with an example embodiment;

[0015] FIGS. **8**A and **8**B are front views of an input assembly in accordance with another embodiment;

[0016] FIGS. **9**A and **9**B are front views of an input assembly in accordance with another embodiment;

[0017] FIG. **10** is an isometric exploded view of an input assembly in accordance with another embodiment; and

[0018] FIG. **11** shows in block diagram form an electronic apparatus in accordance with an example embodiment.

[0019] It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION

[0020] As is used herein, the term "icon" is intended to include any one of graphic, text, or visual link.

[0021] In one aspect, for example as shown in FIGS. **1-6**, there is provided an electronic apparatus **102**. The electronic apparatus **102** includes an input assembly **300**. The input assembly **300** includes a graphic display layer **302**, a masking layer **304**, and an input device **142**. The graphic display layer **302** includes a plurality of function icons **402**. The masking layer **304** includes a plurality of function icon windows **502** for displaying functions icons **402** associated with a particular application. Each of the displayed function icons **402** corresponding to a function of the particular application. The input device **142** further includes a plurality of input device sections **1422**, **1424**, **1426**, **1428** for receiving a gesture input.

[0022] The graphic display layer **302** is moveable relative to the masking layer **304** such that, based on the relative positioning between the masking layer **304** and the graphic display layer **302**, function icons **402** associated with a particular application are displayed through the function icon windows **502** and the other function icons **402** are at least obscured by the masking layer **304**. The receiving of a gesture input by an input device section **1422**, **1424**, **1426**, **1428** corresponding to a one of the displayed function icons **402** invokes the function corresponding to the one of the displayed function icons **402**.

[0023] In some embodiments, the input device **142** includes a touch sensing component. In some examples, the input device **142** includes a display component, such as an LCD display. In other examples, the input device **142** has no display component. For example, the touch sensing component is a touch-sensitive overlay, such as in the form of a capacitive touch-sensitive overlay **180**, as shown in FIG. **1**. In some example embodiments, the capacitive touch-sensitive overlay **180** includes a number of layers in a stack and is fixed to the input device **142** via a suitable optically clear adhesive. The layers include, for example, a substrate **181** fixed to the LCD display by a suitable adhesive (not shown), a ground shield layer **182**, a barrier layer **184**, a pair of capacitive touch sensor layers **186**, including an outer touch sensor layer **186***a* and an inner touch sensor layer **186***b* separated by a substrate or other barrier layer **188**, and a cover layer **190** fixed to the outer capacitive touch sensor layer **186***a* by a suitable adhesive (not shown). The capacitive touch sensor layers are made of any suitable material such as patterned indium tin oxide (ITO).

[0024] A touch event is detected upon user touching of the touch sensing component. Typically, such a touch event is determined upon a user touch at the touch sensing component for selection of, for example, a feature in a list, such as a message or other feature for scrolling in the list or selecting a virtual input key. Signals are sent from the capacitive touch-sensitive overlay **180** to the microprocessor **140** when a suitable object such as a finger or other conductive object held in the bare hand of a user, is detected. Thus, the touch event is detected and an X and a Y location of the touch is determined. Typically, the X and Y location of the touch is determined to fall within the touch-sensitive area defined by the boundary on the touch sensing component.

[0025] Reference is again made to FIG. **1**. In the present example, the X and Y locations of a touch event are both determined, with the X location being determined by a signal

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generated as a result of capacitive coupling with one of the touch sensor layers **186***a*, **186***b* and the Y location being determined by the signal generated as a result of capacitive coupling with the other of the touch sensor layers **186***a*, **186***b*. In this example, each of the touch-sensor layers **186***a*, **186***b* provides a signal to the microprocessor **140** as a result of capacitive coupling with a suitable object such as a finger of a user or a conductive object held in a bare hand of a user resulting in a change in the electric field of each of the touch sensor layers.

[0026] In some examples, the outer touch sensor layer **186***a* is connected to a capacitive touch screen controller **192** in the electronic apparatus **102** for conducting a continuous electrical current across the inner touch sensor layer **186***b* and detecting a change in the capacitance as a result of capacitive coupling between, for example, the finger of a user or a conductive stylus held by a user, and the outer touch sensor layer **186***a*. Thus, the change in capacitance acts as a signal to the capacitive touch screen controller **192**, which senses the touch or near touch, on the capacitive touch-sensitive overlay **180**.

[0027] When a user places a finger, or other conductive object (e.g., a conductive stylus) on the capacitive touch-sensitive overlay **180** without applying force to cause the outer and inner touch sensor layers **186***a*, **186***b* to contact each other, capacitive coupling of the finger or conductive object with the outer touch sensor layer **186***a* occurs, resulting in a signal at the capacitive touch screen controller **192**. Capacitive coupling also occurs through the cover layer **190** and through a small air gap (not shown). Thus, capacitive coupling occurs, resulting in a signal being sent to the capacitive touch screen controller **192**, when the finger or other conductive object (e.g., held in the bare hand of a user) approaches the surface of the cover layer **190** and when contacting the cover layer **190**, prior to force being applied to the cover layer **190** to force the outer and inner touch sensor layers **186***a*, **186***b* into contact with each other. The sensitivity of the capacitive touch screen controller **192** can therefore be set to detect an approaching finger (or other conductive object) at a small distance away from the cover layer **190** of, for example, 9 mm or less. In some examples, the location of approach is not determined, however the approach of a finger or other conductive object that is proximal the outer touch sensor layer **186***a* is determined. Thus, the outer touch sensor layer **186***a* and the capacitive touch screen controller **192** act to detect proximity, detecting a finger or conductive object proximal the surface of the cover layer **190**.

[0028] The signals represent the respective X and Y touch location values. It will be appreciated that other attributes of the user's touch on the capacitive touch-sensitive overlay **180** can be determined. For example, the size, the shape, and/or the direction of the touch on the capacitive touch-sensitive overlay **180** can be determined in addition to the location (e.g., X and Y values) based on the signals received at the controller from the touch sensor layers.

[0029] It will be appreciated that, in some example embodiments, a user's touch on the capacitive touch-sensitive overlay is determined by determining the X and Y touch location and user-selected input is determined based on the X and Y touch location and the application executed by the processor. This determination is carried out by the processor using one or more software modules, including the specific application being executed.

[0030] Touch inputs include gesture inputs, such as point or tap gesture inputs, or vector or directional gesture inputs. By "directional gesture input" is meant a vector or directional touch input, in which the touch input has a beginning point and a different ending point, the touch input being continuous between the beginning and ending points. The directional gesture input is directional, in that a gesture input having a given trajectory between given beginning and ending points is distinct from another gesture input with reversed beginning and ending points along the same trajectory. For example, a directional gesture input is sensed as a continuous input or as a series of point inputs within a predetermined threshold. For example, two sensed point inputs that occur within 1 mm of each other within 0.1 s are considered to be part of a single directional gesture input.

[0031] As well, it is understood that the input device **142** can include any other input mechanism, including one or more physical keys. For example, and referring to FIG. **3**C, the input device **142**, instead of a touch-sensitive overlay, such as the capacitive touch-sensitive overlay **180**, can include one or more physical keys **1422***a*, **1424***a*, **1426***a*, **1428***a*. A respective function icon window S**02** corresponds to each one of the physical keys **1422***a*, **1424***a*, **1426***a*, **1428***a*. A gesture input is effected by selecting and touching one of the one or more physical keys. In this case, one gesture input is differentiated from a different gesture input by the selection of different physical keys or combination of physical keys. In another example, the input device **142** includes a combination of one or more physical keys and a touch sensing component. Other such configurations are possible.

[0032] While an example of an input device having a touch sensing component is a touch screen display, the touch sensing component need not include any display aspect. Where the touch sensing component includes a display aspect, in some examples the display is completely or partially disabled at certain times or in certain modes of operation to conserve power.

[0033] Where the input device **142** does not include any display aspect, in some examples, the electronic apparatus **102** includes a display, such as an electronic display (not shown). The display can be completely or partially disabled at certain times or in certain modes of operation to conserve power. Alternatively or in addition, in some examples the electronic apparatus **102** cooperates with a separate display apparatus, for example a separate electronic display screen, such as through wired or wireless communication. The display apparatus responds to input received through the electronic apparatus **102**. In some examples, the electronic apparatus **102** does not include any display component or electronic display and does not cooperate with any other display apparatus.

[0034] Reference is next made to FIGS. **2**, **3**A and **3**B, illustrating an example embodiment of an input assembly **300** of the electronic apparatus **102**. FIG. **2** shows the input assembly **300** in an exploded view. FIG. **3**A shows the input assembly **300** in a front view. FIG. **3**B shows the input assembly **300** in a side cutaway view.

[0035] As mentioned above, the input assembly **300** includes the graphic display layer **302**, the masking layer **304** and the input device **142**. The input device **142** is touch sensitive and in some example embodiments is provided over the masking layer **304**. The input device **142** is typically designed to allowing viewing of at least a portion of the masking layer **304** and/or the graphic display layer **302**, in

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some examples the input device **142**, or at least a portion of the input device **142**, is transparent or translucent. Although the input assembly **300** is shown in a circular shape, other configurations are possible.

[0036] Reference is now made to FIG. **4**A, showing a front view of the graphic display layer **302** according to an example embodiment. In this example, the graphic display layer **302** is disc-shaped, and includes an icon face **406** and a bezel **408**. The graphic display layer **302** provides, or is configured to provide, a plurality of function icons **402**.

[0037] In some example embodiments, the graphic display layer **302** also provides, or is configured to provide, application icons **404**, each of which is associated with an application on the electronic apparatus **102**. Each application icon **404** is positionally related, on the graphic display layer **302**, with associated function icons **402**, and each one of the associated function icons **402** correspond with a respective function of the application icon **404** with which they are associated. By "positionally related," it is meant that the application icon **404** is in a position on the graphic display layer **302** relative to the associated function icons **402**, such that the application icon **404** and each of the associated function icons **402** are displayable together through the masking layer **304**, as will be described below. In this example, the function icons **402** and any application icon **404** are provided on the icon face **406**. The bezel **408** effects rotatable coupling of the graphic display layer **302** to both of the masking layer **304** and the input device **142**, such that the graphic display layer **302** is rotatable relative to both of the masking layer **304** and the input device **142**.

[0038] FIG. **4**B illustrates examples of function icons **402** and application icons **404** provided by the graphic display layer **302**. In this example, the function icons **402** and application icons **404** are arranged to fit a disc-shaped graphic display layer **302**, and are arranged in concentric circles, which are shown separated for ease of visualization. The example function icons **402** are each associated with a function of an application, such as a message application, a media application, a calendar application, a task application, and a call log application. The function icons **402** are associated with different functions of different applications, for example, depending on the applications stored in the electronic apparatus **102** and the capabilities of the electronic apparatus **102**. The example application icons **404** are each associated with a message application (e.g., an email manager), a media application (e.g., a music player), a calendar application, a task application, and a call log application. The application icons **404** are typically associated with different applications, for example, depending on the applications stored in the electronic apparatus **102** and the capabilities of the electronic apparatus **102**. When arranged together on the graphic display layer **302**, the application icons **404** are positionally related to the function icons **402**, as will be described further below.

[0039] FIG. **5** shows a front view of the masking layer **304** in an example embodiment. The masking layer **304** includes function icon windows **502** through which function icons **402** associated with a particular application can be displayed. The masking layer **304** is configured to allow function icons **402** associated with a particular application to be displayed through the function icon windows **502** while obscuring the other function icons **402**. The graphic display layer **302** is moveable relative to the masking layer **304** , and cooperates with the masking layer **304** such that the function icons **402** are selectively positionable relative to the masking layer **304**, so as to display the function icons **402** associated with a particular application through the function icon windows **502** while obscuring the other function icons **402**. In this example, the masking layer **304** and the graphic display layer **302** are both circular, and the graphic display layer **302** is rotatable relative to the masking layer **304** about a common centre. Other relative movement, such as sliding (see below), is possible, depending on the configurations of the masking layer **304** and the graphic display layer **302**.

[0040] In some examples, the masking layer **304** also includes an application icon window **504** through which an application icon **404** can be displayed. In this respect, application icons **404** are provided on the graphic display layer **302**, as described above. The graphic display layer **302** cooperates with the masking layer **304** such that the application icons **404** are selectively positionable relative to the masking layer **304**, so as to display an application icon **404** through the application icon window **504**, and also to display its associated function icons **402** through the function icon windows **502**. If the application display window **504** is provided, the application icon window **504** and the function icon windows **502** are arranged according to the positional relationship between the application icons **404** and its respective associated function icons **402**, such that when the application icon **404** is displayed through the application icon window **504**, the respective associated function icons **402** are also displayed through respective function icon windows **502** while the masking layer **304** obscures the other function icons **402** that are not associated with the displayed application icon **404**.

[0041] Reference is now made to FIG. **3**A. In this example, the masking layer **304** is disc-shaped and provides four function icon windows **502**, and an application icon window **504**. As the graphic display layer **302**is rotated relative to the masking layer **304**, different application icons **404**, and their respective positionally related function icons **402**, are displayed through the respective application icon window **504** and the function icon windows **502**. In this example, each application icon **404** is positionally related to four related function icons **402**. When the graphic display layer **302** is positioned to display one of the application icons **404**, each one of the four positionally related function icons **402** is displayed through a respective function icon window **502**, and the other function icons **402** are obscured by the masking layer **304**.

[0042] Referring still to FIG. **3**A, in this example, the input device **142** (not shown) is disposed over the masking layer **304**. In some embodiments, the input device **142** is typically configured to match the configuration of the masking layer **304**. In this example, it is disc-shaped and sized to match the disc-shaped masking layer **304**. The input device **142** in this example is static relative to the masking layer **304**. The input device **142** is designed to allow viewing of a displayed function icon **402** through the respective function icon window **502** and, where applicable, a displayed application icon **404** through the application icon window **504**. In this example, the input device **142** is transparent. As described above, the input device **142** receives touch input through capacitive coupling. In particular, the input device **142** receives gesture input. A received gesture input invokes the function associated with a displayed function icon **402**. For example, when a gesture input is received at the input device **142**, a signal is transmitted to the microprocessor **140** indicating the received input.

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The microprocessor **140** then processes the signal and causes the function to be invoked. The input device **142** includes a plurality of input device sections **1422**, **1424**, **1426**, **1428**, each configured for receiving a gesture input. The input device sections, in some examples, are capacitive sections each having capacitive coupling as described above. Each capacitive section, in some examples, is a single capacitor in the capacitive touch-sensitive overlay **180**, as described above, and separate from another capacitor for another respective capacitive section. In other examples, each capacitive section includes two or more capacitors in the capacitive touch-sensitive overlay **180**, and a touch input sensed by any one of the capacitors belonging to a capacitive section is processed as being sensed in that capacitive section. In some examples, each input device section cooperates with a respective function icon window **502** so that the receiving of a gesture input by a given input device section invokes the function associated with the function icon being displayed through the function icon window respective to that given input device section.

[0043] For example, when a gesture input is received by an input device section, the signal transmitted to the microprocessor **140** indicates the sensed input as well as the input device section at which the input was sensed. The microprocessor **140** then processes the signal, based on which input device section sensed the gesture input, and causes the appropriate function to be invoked. Where there are multiple function icons **402** displayed through respective function icon windows **502**, the associated function of each function icon **402** is invokable by a gesture input received by an input device section corresponding to the function icon window **502** through which the function icon **402** is being displayed. For example, each one of the gesture inputs which invokes a function associated with a respective one of the displayed function icons **402** is a gesture input received by an input device section which is generally aligned with or positionally related to the respective one of the function icon windows **502** which displays the respective function icon **402**. Where the input device includes physical keys, gesture input which invokes function associated with a respective one of the displayed function icons **402** is a gesture input received by a physical key which is generally aligned with or positionally related to the respective one of the function icon windows displaying the respective function icon **402**.

[0044] For example, where the masking layer **304** includes four function icon windows **502**, there are four gestures for invoking the function associated with the function icons **402** displayed through the function icon windows **502**. Each one of the four gesture inputs is a gesture input received by an input device section which is aligned with a respective one of the four function icon windows **502** displaying a respective function icon **402**. The input device **142** is correspondingly divided into four capacitive input device sections (in this case, "quadrants" **1422**, **1424**, **1426**, **1428**, such as indicated with dotted lines in FIG. **3**A), each capacitive quadrant aligned with a function icon window **502** which is displaying a function icon **402**. Using this configuration, any touch input received in a given capacitive quadrant **1422**, **1424**, **1426**, **1428** of the input device **142** is associated with the function icon **402** being displayed through the function icon window **502** which is aligned with the capacitive quadrant of the input device **142** receiving the touch input. In some examples, a gesture input is received by the input device **142** as an input that travels between two or more input device sections, such as two or more capacitive quadrants **1422**, **1424**, **1426**, **1428**. For example, if the input device **142** receives a touch input at a first capacitive quadrant and a subsequent touch input at a second adjacent capacitive quadrant within a time period of about 0.1 s, this is considered a single gesture input directed from the first capacitive quadrant to the second capacitive quadrant.

[0045] When a gesture input is received by the input device **142**, a signal is transmitted to invoke the function associated with the function icon **402** that is being displayed through the function icon window **502**. In some examples, this involves the input device **142** receiving the gesture input, transmitting a signal representing the gesture input to the microprocessor **140**, and the microprocessor **140** invoking the appropriate associated function according to the gesture input and the position of the masking layer **304** relative to the graphic display layer **302**. In this respect, the input assembly **300** informs the user as to the gesture input needed to invoke a desired function, based on the position of the function icon window **502** through which the function icon **402** is being displayed.

[0046] FIGS. **6**A-**6**E illustrate an example operation of the input assembly **300** according to an example embodiment.

[0047] FIG. **6**A shows the input assembly **300** configured to accept gesture inputs for invoking function associated with a message application (e.g., an email manager). The application icon **404** associated with the message application is displayed through the application icon window **504** and the positionally related function icons **402** associated with functions of the message application (e.g., open message, delete message, reply, etc.) are displayed through respective function icon windows **502**. The input assembly **300** thus informs the user of the gesture input for invoking each function associated with each respective function icon **402** being displayed. For example, a gesture input across the input device **142** from left to right or, alternatively, a touch input in the right-hand capacitive quadrant **1422**, invokes a "reply" function associated with the function icon **402** displayed through the respective right-hand positioned function icon window **502**. A gesture input across the input device **142** from right to left or, alternatively, a touch input in the left-hand capacitive quadrant **1424**, invokes a "delete" function associated with the function icon **402** displayed through the respective left-hand positioned function icon window **502**. A gesture input from the bottom to top or, alternatively, a touch input in the upper capacitive quadrant **1426**, invokes the "in-box" function associated with the function icon **402** displayed through the respective upper positioned function icon window **502**. A gesture input from the top to bottom or, alternatively, a touch input in the lower capacitive quadrant **1428**, invokes the "sent mail" function associated with the function icon **402** displayed through the respective lower positioned function icon window **502**.

[0048] In some examples, a gesture input has a beginning point in a first capacitive section and an ending point in a second different capacitive section, either directly opposite the first capacitive section or not, in order to invoke a function associated with the function icon **402** displayed in the second capacitive section. In other examples, a gesture input is confined to one capacitive section, and a direction of the gesture input is sensed within that one capacitive section in order to invoke the desired function. For example, although operation of the input assembly **300** has been described, with respect to FIG. **6**A, using the input device **142** having four capacitive

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quadrants **1422**, **1424**, **1426**, **1428**, the input device **142** can have more or less capacitive sections. In some examples, more than one capacitive section is aligned with and associated with a single function icon window **502**, such that an input sensed in any one of the capacitive sections aligned with that single function icon window **502** will invoke the function of the function icon **402** displayed in that function icon window **502**.

[0049] FIG. **6**B shows the input assembly **300** configured to accept gesture inputs for invoking a function associated with a media application (e.g., a music player). The input assembly **300** is brought into this configuration by selectively positioning the graphic display layer **302** relative to the masking layer **304** (e.g., by rotating the graphic display layer **302** while the masking layer **304** is fixed about a common axis of rotation **602**, or vice versa) so that the application icon **404** associated with the media application is displayed through the application icon window **504** and the positionally related function icons **402** associated with functions of the media application (e.g., play, skip forward, skip backward, etc.) are displayed through respective function icon windows **502**. In this example, as indicated by the arrow, a clockwise rotation of the graphic display layer **302** brings the input assembly **300** from the configuration of FIG. **6**A to the configuration of FIG. **6**B. For example, the graphic display layer **302** and the masking layer **304** share a common center and the common axis of rotation **602** (shown only in FIG. **6**B, for simplicity), and this rotation is facilitated by a user gripping the bezel **408** of the graphic display layer **302** to rotate the graphic display layer **302** about the common axis **602** while the masking layer **304** is fixed relative to the common axis **602**. As described above with respect to FIG. **6**A, the input assembly **300**, in the configuration of FIG. **6**B, thus informs the user of the gesture input for invoking each function associated with each respective function icon **402** displayed, in this case pertaining to the media application. For example, a gesture input across the input device **142** from left to right or, alternatively, a touch input in the right-hand capacitive quadrant **1422**, invokes a "skip forward" function associated with the function icon **402** displayed through the respective right-hand positioned function icon window **502**. A gesture input across the input device **142** from right to left or, alternatively, a touch input in the left-hand capacitive quadrant **1424**, invokes a "skip backward" function associated with the function icon **402** displayed through the respective left-hand positioned function icon window **502**.

[0050] FIG. **6**C shows the input assembly **300** configured to accept gesture inputs for invoking a function associated with a calendar application (e.g., a virtual calendar). The input assembly **300** is brought into this configuration similar to the manner described above with respect to FIG. **6**B. In this example, as indicated by the arrow, a clockwise rotation of the graphic display layer **302** about the common axis **602** brings the input assembly **300** from the configuration of FIG. **6**B to the configuration of FIG. **6**C. As described above with regards to FIG. **6**A, the input assembly **300**, in the configuration of FIG. **6**C, thus informs the user of the gesture input for invoking each function associated with each respective function icon **402** displayed, in this case pertaining to the calendar application. For example, a gesture input across the input device **142** from left to right or, alternatively, a touch input in the right-hand capacitive quadrant **1422**, invokes a "next week" function associated with the function icon **402** displayed through the respective right-hand positioned function icon window **502**. A gesture input across the input device **142** from right to left or, alternatively, a touch input in the left-hand capacitive quadrant **1424**, invokes a "set alarm" function associated with the function icon **402** displayed through the respective left-hand positioned function icon window **502**.

[0051] FIG. **6**D shows the input assembly **300** configured to accept gesture inputs for invoking a function associated with a task application (e.g., a task manager). The input assembly **300** is brought into this configuration similar to the manner described above with respect to FIG. **6**B. In this example, as indicated by the arrow, a clockwise rotation of the graphic display layer **302** about the common axis **602** brings the input assembly **300** from the configuration of FIG. **6**C to the configuration of FIG. **6**D. As described above with regards to FIG. **6**A, the input assembly **300**, in the configuration of FIG. **6**D, thus informs the user of the gesture input for invoking each function associated with each respective function icon **402** displayed, in this case pertaining to the task application. For example, a gesture input across the input device **142** from left to right or, alternatively, a touch input in the right-hand capacitive quadrant **1422**, invokes a "next task" function associated with the function icon **402** displayed through the respective right-hand positioned function icon window **502**. A gesture input across the input device **142** from right to left or, alternatively, a touch input in the left-hand capacitive quadrant **1424** invokes a "task complete" function associated with the function icon **402** displayed through the respective left-hand positioned function icon window **502**.

[0052] FIG. **6**E shows the input assembly **300** configured to accept gesture inputs for invoking a function associated with a call log application (e.g., a voicemail manager). The input assembly **300** is brought into this configuration similar to the manner described above with respect to FIG. **6**B. In this example, as indicated by the arrow, a clockwise rotation of the graphic display layer **302** about the common axis **602** brings the input assembly **300** from the configuration of FIG. **6**D to the configuration of FIG. **6**E. As described above with regards to FIG. **6**A, the input assembly **300**, in the configuration of FIG. **6**E, thus informs the user of the gesture input for invoking each function associated with each respective function icon **402** displayed, in this case pertaining to the call log application. For example, a gesture input across the input device **142** from left to right or, alternatively, a touch input in the right-hand capacitive quadrant **1422**, invokes a "return call" function associated with the function icon **402** displayed through the respective right-hand positioned function icon window **502**. A gesture input across the input device **142** from right to left or, alternatively, a touch input in the left-hand capacitive quadrant **1424**, invokes a "delete record" function associated with the function icon **402** displayed through the respective left-hand positioned function icon window **502**.

[0053] It is understood that, for at least some of the above-described applications and associated functions, a display is necessarily provided in order to carry out the gestural interaction. For example, when the user is invoking the "delete" function with a gesture input while in the "inbox" application, a display is provided to inform the user which items are available for deletion.

[0054] In this respect, for example, as explained above, the input device **142** could include a display aspect. Alternatively, or in addition, the electronic apparatus **102** includes a display, such as an electronic display (not shown). As a further alternative, or in addition, in some examples the electronic apparatus **102** cooperates with a separate display apparatus, for

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example a separate electronic display screen, such as through wired or wireless communication. The display apparatus responds to input received through the electronic apparatus **102**.

[0055] Thus, FIGS. **6**A-**6**E illustrate examples of the input assembly **300** in different configurations, each having the graphic display layer **302** in a different position relative to the masking layer **304** . The invocation of the function in response to sensing the gesture input is based on the positioning of the graphic display layer **302** relative to the masking layer **304**. That is, when the graphic display layer **302** is in a first position relative to the masking layer **304** (e.g., as in FIG. **6**A), a first set of functions is invokable (e.g., functions associated with the message application); while when the graphic display layer **302** is in a second position relative to the masking layer **304** (e.g., as in FIG. **6**B), a second set of functions is invokable (e.g., functions associated with the media application).

[0056] Although the graphic display layer **302** and the masking layer **304** have been described as being positionable relative to each other via a rotational movement, in other example embodiments, other movements are suitable, including sliding or flipping movements, and typically are dependent on the shape and/or arrangement of the input assembly **300**. Although the rotational movement is shown only in the clockwise direction, rotational movement in a counter-clockwise direction is also possible. In other examples, the masking layer **304** has more or less (but at least one) function icon windows **502** than shown in the examples, and more or less or none application icon windows **504** than shown in the examples. Although operation of the input assembly **300** has been described with respect to four input device sections, specifically four capacitive quadrants **1422**, **1424**, **1426**, **1428**, in the input device **142**, in some examples the input device **142** has more or less capacitive sections, and these are sectioned in any suitable manner, for example to align with the function icon windows **502** on the masking layer **304**. In some examples, the graphic display layer **302** is rotatable about the common axis **602** while the masking layer **304** is fixed relative to the common axis **602**. In other examples, the masking layer **304** is rotatable about the common axis **602** while the graphic display layer **302** is fixed relative to the common axis **602**. In yet other examples, both the masking layer **304** and the graphic display layer **302** are rotatable about the common axis **602**, independent of each other. In some examples, the graphic display layer **302** also includes markings or indications, for example on the bezel **408**, for indicating how to position the graphic display layer **302** relative to the masking layer **304** in order to display a desired function through the function object display window **502**.

[0057] Reference is now made to FIG. **7**, which is a flowchart illustrating an example method **750** of configuring an electronic apparatus to invoke a desired function based on a gesture input.

[0058] At **752**, the input assembly **300** is provided, for example having the graphic display layer **302** in a first position relative to the masking layer **304**. For example, in the first position, one or more function icons **402** are displayed through respective one or more function icon windows **502** on the masking layer **304** (for example, see FIG. **6**A).

[0059] At **754**, the graphic display layer **302** is moved relative to the masking layer **304**. The movement causes the graphic display layer **302** to be positioned relative to the masking layer **304** such that a selected application icon **404** associated with a desired application having the desired function is displayed through the application icon window **504** and each one of the respective one or more related function icons **402** is respectively displayed through one of the one or more function icon windows **502**. The desired function is associated with a selected function icon **402** displayed. In some examples, movement of the graphic display layer **302** relative to the masking layer **304** is sensed through a position or movement sensor, and processed by the microprocessor **140**.

[0060] In some examples, the method **750** further includes receiving a gesture input by the input device **142**. For example, this is done via the capacitive coupling described above. Typically, a signal representing the sensed gesture input is transmitted to the microprocessor **140**.

[0061] In some examples, the method **750** also includes invoking the desired function based on: (i) the received gesture input, and (ii) the position of the graphic display layer **302** relative to the masking layer **304**. Typically, the microprocessor **140** causes the desired function to be invoked, based on the transmitted signal representing the sensed gesture input and based on the position of the graphic display layer **302** relative to the masking layer **304**. For example, the graphic display layer **302** is positioned relative to the masking layer **304** such that the selected application icon **404** is displayed through the application icon window **504** and each one of the respective one or more related function icons **402** is displayed through one of the function icon windows **502**. The desired function is associated with a selected function icon **402** being displayed.

[0062] In some examples, there are gesture inputs, such as where there is a plurality of input device sections each aligned with a respective function icon window **502**, and a gesture input received at each input device section is one which is aligned with the function icon **402** being displayed through the respective function icon window **502**. In other examples, gesture inputs are different directional gesture inputs, typically aligned with the direction of a respective function icon window **502** (e.g., a gesture input directed towards a given function icon window **502** is a gesture input invoking the function associated with the function icon **402** displayed through that given function icon window **502**). Where there are gesture inputs, this information is also received at the input device **142** (e.g., based on which input device section sensed the gesture input) and the signal transmitted to the microprocessor **140** representing the received gesture input also includes this information. The microprocessor **140** then causes the desired function to be invoked based on the gesture input and the position of the masking layer **304** relative to the graphic display layer **302**.

[0063] The invoked function is typically associated with an application, and invoking the function typically involves invoking the associated application. As described above, in some examples, the function invoked is at least partly determined by the position of the graphic display layer **302** relative to the masking layer **304**. In some examples, the position of the graphic display layer **302** relative to the masking layer **304** is detected or sensed (e.g., by a position sensor) and this information is provided to the microprocessor **140** to thus invoke the appropriate function based on the position of the graphic display layer **302** relative to the masking layer **304**. In some examples, the input assembly **300** includes a position sensor (not shown) for sensing the position of the graphic display layer **302** relative to the masking layer **304**. The position sensor, in some examples, is a magnetic position

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sensor. One or more components of the magnetic positions sensor are positioned on the masking layer **304** in order to trigger sensing by one or more complementary components of the magnetic position sensor positioned on the graphic display layer **302**, through the Hall effect. In other examples, the position sensor is a variable resistance mechanism, such as a potentiometer, positioned between the masking layer **304** and the graphic display layer **302**, in which the resistance of the position sensor varies detectably according to the position of the graphic display layer **302** relative to the masking layer **304**. In other examples, the position sensor is an optical encoder that optically senses the position of the graphic display layer **302** relative to the masking layer **304**.

[0064] Although the input assembly **300** has been described with respect to certain example embodiments, these are for the purpose of illustration only and are not intended to be limiting. For example, FIGS. **8**A and **8**B illustrate an example input assembly **800** in which the masking layer **302** cooperates with the graphic display layer **304** in a relative sliding movement (e.g., side-to-side sliding). FIG. **8**A shows the input assembly **800** in a first position effecting the display of a first set of function icon **402** and application icon **404**, and FIG. **8**B shows the input assembly **800** in a second position effecting the display of a second set of function icon **402** and application icon **404**, the second position obtained by moving the masking layer **302** in a sideways sliding movement (indicated by an arrow) relative to the graphic display layer **304**.

[0065] In another example, FIGS. **9**A and **9**B illustrate an example input assembly **900** in which there is no application icon window **504**, but rather the application associated with the one or more function icons **402** displayed through the one or more function icon windows **502** is indicated via an indication provided on the graphic display layer **302**, for example on the bezel **408**, and the desired application is selected, for example by positioning the graphic display layer **302** relative to the masking layer **304** to align an arrow with the indicia representing the desired application. Other such variations are possible. FIG. **9**A shows the input assembly **900** in a first position effecting the display of a first set of function icons **402**, and FIG. **9**B shows the input assembly **900** in a second position effecting the display of a second set of function icons **402**, the second position obtained by moving the graphic display layer **302** in a rotating movement (indicated by an arrow) relative to the masking layer **304**. In this respect, the indicia provided on the bezel, as well as the combination of the application icons **404** and the application icon window **504**, are examples of an application identifier configured to identify the particular application with which the displayed function icons are associated.

[0066] Reference is now made to FIG. **10**, which shows an isometric exploded view of an example input assembly **1050**, which in this case is suitable for an electronic apparatus such as a watch. In this example, the input assembly **1050** also includes a base **1000**, a support **1002** and a bezel **1004**, which, in this example, are each formed of plastic, although other materials with similar properties may also be suitable. The input assembly **1050** further includes the graphic display layer **302** and the masking layer **304**, which, in this example, are also formed of plastic, although other suitable materials can be used. The bezel **1004** and the graphic display layer **302** are coupled together such that they are fixed relative to each other. For example, the graphic display layer **302** is press-fitted into a groove within the bezel **1004**.

[0067] The support **1002** supports the masking layer **304** and the input device **142** and is sandwiched between the graphic display layer **302** and the bezel **1004**. In this example, the support **1002** includes a ridge **1006** that cooperates with a complementary groove **1008** defined in the bezel **1004**, to limit the movement of the bezel **1004** relative to the support **1002**. The support **1002** is freely rotatable relative to the graphic display layer **302** and the bezel **1004**, about a common center. The support **1002** is coupled to the base **1000** such that they are fixed relative to each other. For example, the support **1002** and the base **1000** define corresponding apertures **1010** for coupling the support **1002** and the base **1000** using screws.

[0068] The masking layer **304** and the input device **142** are coupled to the support **1002** such that they are fixed relative to each other. For example, each one of the masking layer **304** and the input device **142** is press-fitted and/or glued into the support **1002**. In this example, the masking layer **304**, the support **1002** and the base **1000** each define a corresponding center aperture **1012** allowing the attachment of watch hands, such as where the electronic apparatus **102** is a watch. Thus, the base **1000**, the support **1002**, the masking layer **304** and the input device **142** are all fixed relative to each other. The graphic display layer **302** and the bezel **1004** are also fixed relative to each other. The graphic display layer **302** and the bezel **1004** are moveable relative to the input device **142**, the masking layer **304**, the support **1002** and the base **1000**. In this case, the graphic display layer **302** and the bezel **1004** share a common center and a common axis with the input device **142**, the masking layer **304**, the support **1002** and the base **1000**. In other words, the graphic display layer **302** and the bezel **1004** are rotatable about the common axis while the input device **142**, the masking layer **304**, the support **1002** and the base **1000** are fixed relative to the common axis. Alternatively, the bezel **1004** and the masking layer **304** are fixed relative to one another, and the input device **142**, the graphic display layer **302**, the support **1002** and the base **1080** are fixed relative to one another, wherein the masking layer **304** rotates with the bezel **1004** about the common axis, whereas the input device **142**, the graphic display layer **302**, the support **1002** and one base **1000** are fixed relative to the common axis. Other configurations are possible, such as the configurations described above.

[0069] For example, the bezel **1004** and the graphic display layer **302** can be coupled together via a gear mechanism (not shown), such that the bezel **1004** and the graphic display layer **302** are rotatable about a common center. In this example, rotational movement of the bezel **1004** results in corresponding rotational movement of the graphic display layer **302** to a lesser or greater degree, depending on the gear ratio of the gear mechanism. This is useful where precise movement of the graphic display layer **302** is desired (e.g., where icons **402**, **404** are closely spaced on the graphic display layer **302**), since gross movement of the bezel **1004** translates into minute movement of the graphic display layer **302**, using the appropriate gear ratio.

[0070] Reference is now made to FIG. **11**, which shows a block diagram illustrating an electronic apparatus **102** in accordance with an embodiment of the present disclosure. It will be understood that references to an electronic apparatus in this disclosure also includes a touchscreen device, a wireless device, or a wireless communication device.

[0071] The electronic apparatus **102** typically includes a battery interface **136** for receiving one or more rechargeable

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batteries **138**. The battery **138** provides electrical power to at least some of the electrical circuitry in the electronic apparatus **102**, and the battery interface **136** provides a mechanical and electrical connection for the battery **138**. The battery interface **136** is typically coupled to a regulator (not shown) which provides power V+ to the circuitry of the electronic apparatus **102**.

[0072] The electronic apparatus **102** includes a microprocessor **140** which controls the overall operation of the electronic apparatus **102**. The microprocessor **140** typically interacts with device subsystems such as the input device **142**, a flash memory **144**, a random access memory (RAM) **146**, a read-only memory (ROM) **148**, and any other device subsystems generally designated as **164**. Examples of other device subsystems include a display, auxiliary input/output (I/O) subsystems, a data port such as serial port, a keyboard or keypad, a speaker or audio port for connecting to, for example a set of headphones or an earpiece, and a microphone.

[0073] Operating system software used by the microprocessor **140** is typically stored in a persistent store, for example the flash memory **144**, the ROM **148** or other similar storage element. Those skilled in the art will appreciate that the operating system, specific device applications, or parts thereof, can be temporarily loaded into a volatile store such as the RAM **146**.

[0074] The microprocessor **140**, in addition to its operating system functions, enables execution of software applications on the electronic apparatus **102**. A predetermined set of applications that control basic device operations, including media applications, are typically installed on the electronic apparatus **102** during or after manufacture. The electronic apparatus **102** typically includes a personal information manager (PIM) application having the ability to organize and manage data items relating to a user such as, but not limited to, instant messaging, email, calendar events, voice mails, appointments, and task items. One or more memory stores are typically available on the electronic apparatus **102** to facilitate storage of information, such as the flash memory **144**, the RAM **146**, the ROM **148**, the memory module **130**, or other types of memory storage devices or FLASH memory cards represented by the other device subsystems **164**, such as Secure Digital (SD) cards or mini SD cards, etc.

[0075] In some examples, in a voice communication mode, a received data signal representing a voice transmission is output to a speaker or audio port and signals for transmission are generated by a transducer such as a microphone. In some examples, alternative voice or audio I/O subsystems, such as a voice message recording subsystem, are also implemented on the electronic apparatus **102**. Although a voice or audio signal output is typically accomplished primarily through a speaker or audio port, in some examples, other output are also provided through a display, for example an indication of the identity of a calling party, duration of a voice call, or other voice call related information. In some examples, stereo headphones or an earpiece are used in place of the speaker.

[0076] The electronic apparatus **102** includes a memory, which typically has various software components for controlling the electronic apparatus **102** and typically includes, for example, the flash memory **144**, the RAM **146**, the ROM **148**, the memory module **130** and/or the other device subsystems **164**. To provide a user-friendly environment to control the operation of the electronic apparatus **102**, an operating system (OS) resident on the electronic apparatus **102** typically provides a basic set of operations for supporting various applications typically operable through a user interface, such as that presented by the input device **142**.

[0077] In some example embodiments, the memory also includes an email and calendar client, which are combined in, for example, a PIM application having email-based calendaring and scheduling functions. Typically, the PIM is installed as one of the software modules. Thus, the electronic apparatus **102** includes computer executable programmed instructions for directing the electronic apparatus **102** to implement various applications. For example, the programmed instructions are tangibly embodied in the one or more software modules resident in the memory of the electronic apparatus **102**. Alternatively, in another example, the programmed instructions are tangibly embodied on a computer readable medium (such as a DVD, CD, floppy disk or other storage media) having computer executable instructions tangibly recorded thereon, which are used for transporting the programmed instructions to the memory of the electronic apparatus **102**.

[0078] While the present disclosure includes description of a method, a person of ordinary skill in the art will understand that the present disclosure is also directed to an apparatus for carrying out the disclosed method and including apparatus parts for performing each described method step, be it by way of hardware components, a computer programmed by appropriate software to enable the practice of the disclosed method, by any combination of the two, or in any other manner. Moreover, in some embodiments, an article of manufacture for use with the apparatus, such as a pre-recorded storage device or other similar computer readable medium having program instructions tangibly recorded thereon, or a computer data signal carrying computer readable program instructions directs an apparatus to facilitate the practice of the disclosed method. It is understood that such apparatus, articles of manufacture, and computer data signals also come within the scope of the present disclosure.

[0079] The embodiments of the present disclosure described above are intended to be examples only. Those of skill in the art may effect alterations, modifications and variations to the particular embodiments without departing from the intended scope of the present disclosure. In particular, selected features from one or more of the above-described embodiments may be combined to create alternative embodiments not explicitly described, features suitable for such combinations being readily apparent to persons skilled in the art. The subject matter described herein in the recited claims intends to cover and embrace all suitable changes in technology.

1. An input assembly comprising:

a graphic display layer providing, or configured to provide a plurality of function icons;

a masking layer including a plurality of function icon windows for displaying functions icons associated with a particular application, each of the displayed function icons corresponding to a function of the particular application; and

an input device including a plurality of input device sections each configured for receiving a gesture input;

wherein the graphic display layer is moveable relative to the masking layer such that, based on the relative positioning between the graphic display layer and the masking layer, function icons associated with a particular application are displayed through the function icon windows and the other function icons are at least obscured by the masking layer;

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and wherein the receiving of the gesture input by a one of the plurality of input device sections which corresponds to a one of the displayed function icons invokes the function corresponding to the one of the displayed function icons.

2. The input assembly of claim **1**,

wherein, when the graphic display layer is disposed at a first position relative to the masking layer, the display of function icons associated with a first application is effected and visibility of each of the other function icons is at least obscured by the masking layer;

and wherein, when the graphic display layer is disposed at a second position relative to the masking layer, the display of function icons associated with a second application is effected and visibility of each of the other function icons is at least obscured by the masking layer.

3. The input assembly of claim **1**, wherein the respective function associated with each one of the displayed function icons is invokable by the gesture input received by a one of the plurality of input device sections which is aligned with the function icon window through which the display of the function icon is effected.

4. The input assembly of claim **1**, wherein the input device includes a touch sensitive input device.

5. The input assembly of claim **1**, wherein the graphic display layer is rotatable relative to the masking layer.

6. The input assembly of claim **1**, further comprising:

an application identifier configured to identify the particular application with which the displayed function icons are associated.

7. The input assembly as claimed in claim **6**,

wherein the application identifier includes:

a plurality of application icons provided on the graphics display layer, each one of the application icons corresponding to an application associated with respective ones of the function icons; and

an application display window provided on the masking layer for displaying one of the plurality of application icons provided by the graphic display layer;

wherein the identification of the particular application with which the displayed function icons are associated is effected by displaying the corresponding application icon.

8. The input assembly of claim **7**,

wherein the masking layer at least obscures the other application icons which do not correspond to the particular application with which the displayed function icons are associated.

9. An electronic apparatus comprising:

a graphic display layer providing, or configured to provide a plurality of function icons;

a masking layer including a plurality of function icon windows for displaying functions icons associated with a particular application, each of the displayed function icons corresponding to a function of the particular application; and

an input device including a plurality of input device sections for receiving a gesture input;

wherein the graphic display layer is moveable relative to the masking layer such that, based on the relative positioning between the graphic display layer and the masking layer, function icons associated with a particular application are displayed through the function icon windows and the other function icons are at least obscured by the masking layer;

and wherein the receiving of the gesture input by a one of the plurality of input device sections which corresponds to a one of the displayed function icons invokes the function corresponding to the one of the displayed function icons.

10. The electronic apparatus of claim **9**,

wherein, when the graphic display layer is disposed at a first position relative to the masking layer, the display of function icons associated with a first application is effected and visibility of the other function icons are at least obscured by the masking layer;

and wherein, when the graphic display layer is disposed at a second position relative to the masking layer, the display of function icons associated with a second application is effected and visibility of the other function icons are at least obscured by the masking layer.

11. The electronic apparatus of claim **9**, wherein the respective function associated with each one of the displayed function icons is invokable by a gesture input received by an input device section which is aligned with the function icon window through which the icon of the function icon is effected.

12. The electronic apparatus of claim **9**, wherein the input device includes a touch sensitive input device.

13. The electronic apparatus of claim **9**, wherein the input device includes a touch screen.

14. The electronic apparatus of claim **9**, wherein the graphic display layer is rotatable relative to the masking layer.

15. The electronic apparatus of claim **9**, further comprising:

an application identifier configured to identify the particular application with which the displayed function icons are associated.

16. The electronic apparatus as claimed in claim **15**,

wherein the application identifier includes:

a plurality of application icons provided on the graphics display layer, each one of the application icons corresponding to an application associated with respective ones of the function icons; and

an application display window provided on the masking layer for displaying one of the plurality of application icons provided by the graphic display layer;

wherein the identification of the particular application with which the displayed function icons are associated is effected by displaying the corresponding application icon.

17. The electronic apparatus of claim **16**,

wherein the masking layer at least obscures the other application icons which do not correspond to the particular application with which the displayed function icons are associated.

18. A method of invoking a function of an electronic apparatus comprising:

providing the electronic apparatus, wherein the electronic apparatus includes:

a graphic display layer including a plurality of function icons;

a masking layer including a plurality of function icon windows for displaying functions icons associated

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with a particular application, each of the displayed function icons corresponding to a function of the particular application; and

an input device including a plurality of input device sections for receiving a gesture input;

wherein the graphic display layer is moveable relative to the masking layer such that, based on the relative positioning between the graphic display layer and the masking layer, function icons associated with a particular application are displayed through the function icon windows and the other function icons are at least obscured by the masking layer;

effecting movement of the graphic display layer relative to the masking layer so as to effect a change in the displayed function icons such that displayed function icons are associated with a different application than the application with which previously displayed function icons were associated before the movement; and

upon the receiving of the gesture input by a one of the plurality of input device sections which corresponds to a one of the displayed function icons, invoking the function corresponding to the one of the displayed function icons.

19. The method as claimed in claim **18**, wherein effecting movement comprises rotating the graphic display layer relative to the masking layer.

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