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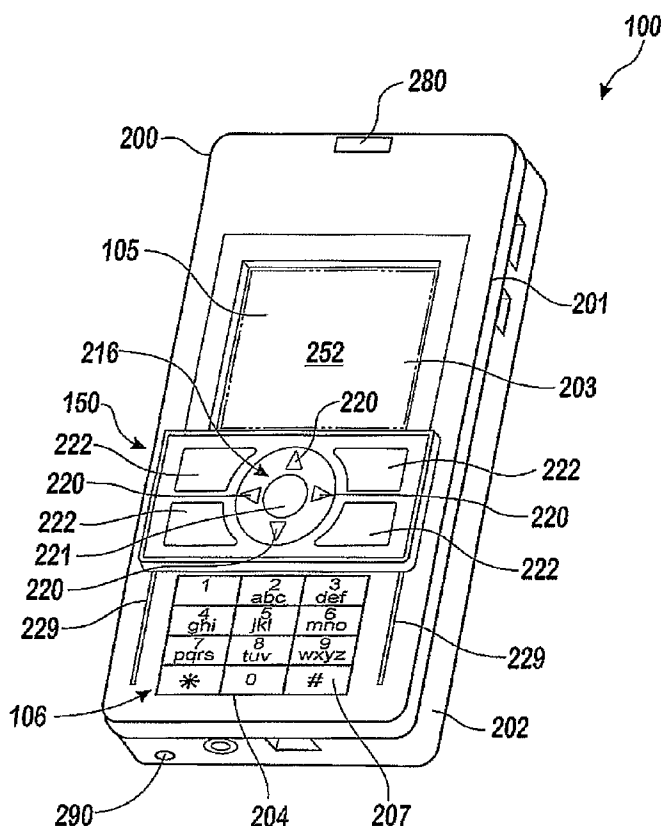
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(54) Title: MOVABLE USER INTERFACE FOR AN ELECTRONIC DEVICE



(57) Abstract: An electronic device (100) comprises a housing (200) and a screen (105) mounted to the housing. The screen has at least a user interface coverable display area (350) and another display area (252). The electronic device comprises a lower user interface (106) mounted to the housing and an upper user interface (150) slidably mounted to the housing, the upper user interface being moveable relative to the lower user interface between a screen covering position and a lower user interface covering position. When the upper user interface is in the screen covering position the coverable display area (350) is covered by the upper user interface and when the upper user interface is in the lower covering position, the upper user interface at least partially covers the lower user interface whilst revealing at least part of the coverable display area.



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MOVABLE USER INTERFACE FOR AN ELECTRONIC DEVICE

FIELD OF THE INVENTION

The invention relates generally to a moveable user interface for an electronic device. The invention is particularly useful for, but not necessarily limited to, varying the relative positions of user interfaces of an electronic device.

BACKGROUND OF THE INVENTION

Conventional electronic devices such as mobile telephones, hand held personal computers (PCs) and personal digital assistants (PDAs) with mobile telephone capabilities have multiple functionalities. Such functionalities include the ability to make and receive telephone calls, prepare, send and receive data, such as SMS, MMS, EMS messages and documents, play games, navigate menus, web pages and the like.

Users interface with such electronic devices via one or more user interfaces. One form of user interface is an alphanumeric keypad comprising keys representing the numbers 0-9, letters A-Z and function keys such as # and *, which effect operations other than inputting numbers and text. Another form of user interface is a navigation keypad, which typically comprises directional buttons, such as up, down, left and right, for moving a cursor or pointer or the like on a screen or for navigating through menus. The directional buttons may also be used to play games. The navigation keypad typically also comprises one or more additional buttons that enable the user to make selections, for example, from menus, or perform other

functions. Other forms of navigational controls for electronic devices are known, such as touch sensitive pads, joysticks and jog wheels, the latter usually being limited to allowing the user to scroll through menus and make selections therefrom.

Often both the alphanumeric keypad and the navigation keypad are provided in a single electronic device to enable the user to perform the various functionalities the device has to offer. Whilst the aforementioned user interfaces perform their functions satisfactorily, the provision of both types of user interface consumes surface area of the electronic device, thus reducing the surface area available for other functions. For example, providing both the alphanumeric keypad and the navigation keypad reduces the surface area of the device available for output, such as via a screen. Larger screens are desirable to display more information and/or enhance the experience of, for example, playing games.

Furthermore, often the user only requires one type of user interface at any one time. For example, when making a telephone call, the user typically only requires the alphanumeric keypad to dial a number or the navigation keypad to select a stored number from a menu and only a small display area of the screen is required to display the dialed number and/or the name corresponding to the number. As another example, if the user is playing a game on the electronic device, typically only the navigation pad is required and a larger display area of the screen is desirable to maximize the playing area.

In this specification, including the claims, the terms “comprises”, “comprising” or similar terms are intended to mean a non-exclusive inclusion, such

that a method or apparatus that comprises a list of elements does not include those elements solely, but may well include other elements not listed.

SUMMARY OF THE INVENTION

Accordingly, in one form the invention is an electronic device comprising:

a housing;

a screen mounted to the housing, the screen having at least a user interface coverable display area and another display area;

a lower user interface mounted to the housing; and

an upper user interface moveably mounted to the housing, the upper user interface being moveable relative to the lower user interface between a screen covering position and a lower user interface covering position;

wherein, when the upper user interface is in the screen covering position the coverable display area is covered by the upper user interface and when the upper user interface is in the lower covering position, the upper user interface at least partially covers the lower user interface whilst revealing at least part of the coverable display area.

Suitably, when the upper user interface is in the lower covering position, the upper user interface completely covers the lower user interface.

Suitably, when the upper user interface is in the screen covering position, both the lower user interface and the upper user interface are operable.

Optionally, when the upper user interface is in the lower covering position, the upper user interface is operable and the lower user interface is inoperable.

Suitably, when the upper user interface is in the screen covering position, the coverable display area is inoperable and the another display area is operable.

Suitably, when the upper user interface is in the lower covering position, both the coverable display area and the another display area are operable.

Suitably, the upper user interface is a screen controller, a cursor controller, a pointer controller, or a joystick.

Suitably, the lower user interface is a keypad module.

Optionally, the lower user interface is located in a fixed position.

Suitably, one or more applications of the device of a first category are enabled when the upper user interface is in the screen covering position and one or more applications of the device of a second category are enabled when the upper user interface is in the lower covering position.

Suitably, when the upper user interface is in the lower covering position the lower user interface is rendered inoperable by a user interface position sensor.

Suitably, the length of the electronic device remains constant irrespective of whether the upper user interface is in the screen covering position or the lower covering position.

Optionally, the electronic device further comprises:

a track supported by the housing; and

a carriage moveably mounted to the track, wherein the upper user interface is mounted on the carriage.

Suitably, the upper user interface is urged into either the screen covering position or the lower covering position by a biasing mechanism.

In another form, the invention is a moveable user interface mechanism for an electronic device comprising;

a housing;

a lower user interface mounted to the housing;

a carriage moveably mounted to the housing; and

an upper user interface mounted on the carriage;

wherein the carriage is moveable relative to the lower user interface between a screen covering position and a lower user interface covering position; and wherein, when the carriage is in the screen covering position a coverable display area of the screen is covered by the carriage and when the carriage is in the lower covering position, the carriage at least partially covers the lower user interface whilst revealing at least part of the coverable display area.

Suitably, when the carriage is in the lower covering position, the carriage completely covers the lower user interface.

Optionally, when the carriage is in the screen covering position, both the lower user interface and the upper user interface are operable.

Suitably, when the carriage is in the lower covering position, the upper user interface is operable and the lower user interface is inoperable.

Suitably, the carriage is urged into either the screen covering position or the lower covering position by a biasing mechanism.

Optionally, the moveable user interface mechanism further comprises a user interface position sensor to render the lower user interface inoperable when the carriage is in the lower covering position.

Further features of the invention will become apparent from the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be readily understood and put into practical effect, reference will now be made to exemplary embodiments as illustrated with reference to the accompanying drawings, wherein like reference numbers refer to like elements, in which:

FIG. 1 is a schematic diagram illustrating an embodiment of an electronic device according to an embodiment of the present invention;

FIG. 2 is a perspective view of the electronic device of FIG. 1 with an upper user interface in a screen covering position;

FIG. 3 is a perspective view of the electronic device of FIG. 1 with the upper user interface in a lower user interface covering position;

FIG. 4 is an exploded perspective view of part of the electronic device of FIG. 1;

FIG. 5 is a perspective cross-sectional view through 3-3 of FIG. 3;

FIG. 6 is a perspective view of a moveable user interface mechanism of the electronic device of FIG. 1; and

FIG. 7 is a perspective view of an alternative moveable user interface mechanism of the electronic device of FIG. 1.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

Referring to FIG. 1, there is a schematic diagram illustrating an electronic device 100 in the form of a mobile station or mobile telephone comprising a radio frequency communications unit 102 coupled to be in communication with a processor 103. The electronic device 100 also has a screen 105, a lower user interface 106 and an upper user interface 150. The screen 105, lower user interface 106 and upper user interface 150 are coupled to be in communication with the processor 103. In one embodiment, the screen 105 or an area thereof may be in the form of a touch screen 105.

The processor 103 includes an encoder/decoder 111 with an associated code Read Only Memory (ROM) 112 for storing data for encoding and decoding voice or other signals that may be transmitted or received by the mobile telephone 100. The processor 103 also includes a micro-processor 113 coupled, by a common data and address bus 117, to the encoder/decoder 111, a character Read Only Memory (ROM) 114, a Random Access Memory (RAM) 104, static programmable memory 116 and a Removable User Identity Module (RUIM) interface 118. The static programmable memory 116 and a RUIM card 119 (commonly referred to as a Subscriber Identity Module (SIM) card) operatively coupled to the RUIM interface 118 each can store, amongst other things, Preferred Roaming Lists (PRLs), subscriber authentication data, selected incoming text messages and a Telephone Number Database (TND phonebook) comprising a number field for telephone numbers and a name field for identifiers associated with one of the numbers in the name field. For instance, one entry in the Telephone Number Database may be

91999111111 (entered in the number field) with an associated identifier "Steven C! at work" in the name field. The RUIM card 119 and static memory 116 may also store passwords for allowing accessibility to password-protected functions on the mobile telephone 100.

The micro-processor 113 has ports for coupling to the lower user interface 106, the upper user interface 150, screen 105 and an alert 115 that typically contains an alert speaker, vibrator motor and associated drivers. Also, micro-processor 113 has ports for coupling to a microphone 135, communications speaker 140 and a camera 145.

The character Read Only Memory 114 stores code for decoding or encoding text messages that may be received by the communications unit 102. In this embodiment the character Read Only Memory 114, RUIM card 119, and static memory 116 may also store Operating Code (OC) for the micro-processor 113 and code for performing functions associated with the mobile telephone 100.

The radio frequency communications unit 102 is a combined receiver and transmitter having a common antenna 107. The communications unit 102 has a transceiver 108 coupled to the antenna 107 via a radio frequency amplifier 109. The transceiver 108 is also coupled to a combined modulator/demodulator 110 that couples the communications unit 102 to the processor 103.

The electronic device 100 can be any electronic device including a radio telephone, a conventional type telephone, a hand held PC, a PDA or an electronic gaming device with mobile telephone capabilities.

A user can select and use applications of the electronic device 100 by, for example, traversing menus and/or selecting icons displayed on the screen 105 using the lower user interface 106 and/or the upper user interface 150 and/or, according to one embodiment, the touch screen 105. Which of the upper and/or lower user interfaces 106, 150 and/or the touch screen 105 is used depends on, for example, the relative positions of the user interfaces 106, 150 of the electronic device 100. The present invention is particularly concerned with selectively varying the relative positions of the user interfaces 106, 150 of the electronic device 100 by virtue of the upper user interface 150, which is moveable between a screen covering position and a lower user interface covering position, thus varying the area of the screen 105 visible to the user.

Referring to FIG. 2, there is illustrated a perspective view of the electronic device 100 in accordance with an embodiment of the invention. The electronic device 100 comprises a housing 200 having an upper portion 201 and a lower portion 202. Speaker and microphone apertures 280, 290 are located in the housing 200 at suitable positions relative to the speaker 140 and microphone 135. The screen 105 is mounted to the housing 200 and is visible through an aperture 203 in the upper portion 201 of the housing 200. The screen 105 has two areas one of which is permanently uncovered in this embodiment and is referred to as another display area 252 and is illustrated in phantom. The screen 105 may be, for example, a Liquid Crystal Display (LCD), an active-matrix display, a passive-matrix display or an Organic Light-Emitting Diode (OLED) display. The electronic device 100 may also comprise a protective lens covering the screen 105 to provide additional

protection for the screen against scratches and the like and to provide a magnifying effect to increase the size of the displayed information. In the embodiment where the screen 105 or part thereof is a touch screen, the protective lens will be omitted.

The lower user interface 106 is mounted to the housing 200 and in one embodiment, the lower user interface 106 is a keypad module in the form of an alphanumeric keypad 204. The alphanumeric keypad 204 is a typical alphanumeric keypad comprising keys 207 representing the numbers 0-9, letters, and other function keys such as # and *, which effect operations other than inputting numbers and text, such as redialing a previously dialed number or signaling the end of a voicemail message.

The upper user interface 150 is moveably mounted to the housing 200 in the exemplary embodiments shown in FIGs 2-7 and moveable movement of the upper user interface 150 relative to the lower user interface 106 is guided, at least partially, from the screen covering position shown in FIG. 2, by guide slots 229 in the upper portion 201 of the housing 200. The upper user interface 150 may be a screen controller, a cursor controller or a pointer controller and according to one embodiment, the upper user interface 150 comprises a navigation pad 216. The navigation pad 216 typically comprises directional buttons 220 for moving a cursor or pointer or the like displayed on the screen 105 or for moving other forms of positional indicators, such as highlighting or borders. The directional buttons 220 may also be used, for example, to play games. The navigation pad 216 may also comprise a central button 221 and/or one or more peripheral buttons 222 to enable the user to make selections, for example, from menus, or perform other functions.

As will be apparent to a person skilled in the art, instead of the navigation pad 216 comprising directional buttons 220, the upper user interface 150 may comprise a joystick or touchpad, which can be used for navigation and selection purposes.

When the upper user interface 150 of the electronic device 100 is in the screen covering position, the another display area 252 of the screen is visible to the user and both the lower user interface 106 and the upper user interface 150 are operable. In one embodiment, in the screen covering position, a lower part of the upper user interface 150 may overlap a small, upper part of the lower user interface 106, but both the lower and upper user interfaces 106, 150 are fully operable.

Referring to FIG. 3, the other one of the two areas of the the screen 105 is called a user interface coverable display area 350, illustrated in phantom. As illustrated, the upper user interface 150 is in a lower user interface covering position such that all of the coverable display area 350 is revealed and the upper user interface 150 completely covers the lower user interface 106. In alternative embodiments, in the lower user interface covering position, the upper user interface 150 at least partially covers the lower user interface 106 whilst revealing at least part of the coverable display area 350.

In the embodiment shown, the coverable display area 350 of the screen 105 is a lower area of the screen 105 and extends the full visible width of the screen 105. In alternative embodiments, the coverable display area 350 may occupy a larger or smaller area of the screen 105, depending on, for example, the overall size of the screen 105, the size of the electronic device 100 and/or the size of the upper user interface 150.

According to one embodiment, in the lower covering position, the upper user interface 150 is operable and the covered, or at least partially covered, lower user interface 106 is inoperable. For example, in one embodiment, 75% of the lower user interface 106 may be covered by the upper user interface 150, but the lower user interface 106 is still rendered inoperable. In another embodiment, in the lower covering position, the lower user interface 106 is completely covered by the upper user interface 150 and therefore is inaccessible to a user, but the lower user interface 106 may not be deactivated. In the lower covering position, the area of the screen 105 visible to the user comprises the revealed area of the coverable display area 350 and the another display area 252. As shown, in the lower covering position, the area of the screen 105 visible to the user is the full area of the screen 105 comprising the coverable display area 350 and the another display area 252.

Typically, when the upper user interface 150 is in the screen covering position and the coverable display area 350 is covered by the upper user interface 150, the another display area 252 is operable and the coverable display area 350 is inoperable. Hence, when the coverable display area 350 is not visible to the user, in this embodiment the coverable display area 350 is not in use and therefore battery power is not wasted in driving and illuminating the coverable display area 350. According to one embodiment, when the upper user interface 150 is in the lower user interface covering position, the coverable display area 350 and another display area 252 are operable.

Suitably, when the upper user interface 150 is in the screen covering position one or more applications of the electronic device 100 of a first category are enabled. When the upper user interface 150 is in the lower covering position one or more

applications of the electronic device 100 of a second category are enabled. In one embodiment, when the upper user interface 150 covers the coverable display area 350 of the screen 105, the enabled applications of the electronic device 100 of the first category do not use the coverable display area 350 because the coverable display area 350 is not visible to the user, thus saving energy. However, when the upper user interface 150 is in the lower covering position and at least part of the coverable display area 350 of the screen 105 is not covered by the upper user interface 150, the enabled applications of the electronic device 100 of the second category use another display area 252 and the revealed area of the coverable display area 350. For example, it is envisaged that the applications of the first category that are enabled in the screen covering position include, but are not limited to, making and receiving telephone calls, creating, sending and receiving messages such as SMS, MMS and/or EMS messages and other applications that only require or utilize another display area 252 of the screen 105 that is visible.

It is also envisaged that the applications of the second category that are enabled in the lower covering position include, but are not limited to, playing games, browsing the internet, creating and/or editing documents, capturing, viewing and/or editing images and other applications that utilize, require and/or benefit from the larger area of the screen 105 comprising the revealed area of the coverable display area 350 and another display area 252 of the screen 105. It will be appreciated that at least some applications of the first category that are enabled in the screen covering position can also be performed with the larger area of the screen 105 when at least part of the coverable display area 350 is revealed. Therefore,

some applications of the electronic device 100 may appear in both the first category and the second category of applications.

It will be appreciated that the length of the electronic device 100 remains constant irrespective of whether the upper user interface 150 is in the screen covering position or the lower covering position. Therefore, the electronic device 100 maintains a compact size and does not become unwieldy or difficult to use when the relative positions of the user interfaces 106, 150 of the device 100 are changed.

Referring to FIG. 4, the alphanumeric keypad 204 is mounted on a flexible printed circuit board 406. Mounted on the printed circuit board 406 are aligned switches, typically in the form of poppel switches 460 that are often used in association with keypads. The alphanumeric keypad 204 and flexible printed circuit 406 are received in a recess 410 in the upper portion 201 of the housing 200. The keypad 204 and flexible printed circuit 406 are located in a fixed position such that an upper surface 412 of the alphanumeric keypad 204 is substantially coplanar with an upper surface 414 of the upper portion 201 of the housing 200.

The navigation pad 216 is mounted on a flexible printed circuit board 418 and the peripheral buttons 222, central button 221 and directional buttons 220 are aligned with respective poppel switches 490 mounted on the flexible printed circuit board 418. The navigation pad 216 and flexible printed circuit board 418 are both mounted on a carriage 424.

The electronic device 100 further comprises parallel tracks 430 supported by the housing 200 in any suitable manner known in the art. The tracks 430 typically

comprise elongate grooves in opposite sides of a frame 426 that is supported by the housing 200. However, it will be appreciated that in some alternative embodiments, the tracks 430 may be, for example, integrally moulded on the inside of the housing 200 or may be provided on the outside of the housing 200. Also, there is a biasing mechanism 495 coupling the carriage 424 to the frame 426.

The flexible printed circuit board 418 of the upper user interface 150 is coupled to a main printed circuit board 431 of the electronic device 100 by a ribbon connector 432 having a length thereof residing in a slot 435 in a side of the carriage 424. The ribbon connector 432 is mounted to an underside of elongate support 434, which is mounted to the side of the carriage 424 having the slot 435. Also, the ribbon connector 432 is suitably folded and configured to prevent it restricting movement of the upper user interface 150. In one embodiment, elongate support 434 is an inverted T-shape in cross section, shown most clearly in FIG. 5. The ribbon connector 432 is thus prevented from becoming entangled with any other part of the electronic device 100, particularly whilst the carriage 424 is moved between the screen covering position and the lower covering position of the upper user interface 150. The ribbon connector 432 maintains logical and power connection between the upper user interface 150 and the main printed circuit board 431.

The main printed circuit board 431 is also coupled to the printed circuit board 406 by an integral flexible ribbon connector 480 passing through an aperture 485 located in the recess 410.

With reference to FIG. 5, the carriage 424 is moveably mounted to the tracks 430 by virtue of inward projections 528 on the carriage 424, which slidably engage

the tracks 430. Hence, the carriage 424 supporting the upper user interface 150 comprising the flexible printed circuit board 418 and the navigation pad 216 is moveable (slidable) relative to the lower user interface 106 between the screen covering position and the lower user interface covering position with sliding movement of the carriage 424 being guided by the tracks 430 and by the guide slots 229 in the upper portion 201 of the housing 200.

Referring to FIG. 6, the upper user interface 150 mounted on the carriage 424 is urged into either the screen covering position or the lower covering position by the biasing mechanism 495. Typically, the biasing mechanism 495 is an over-centre latching mechanism that couples the carriage 424 to the frame 426. In one form, the over-centre latching mechanism comprises a coil spring 636 located in a recess or aperture 637 in the frame 426. A first end of the coil spring 636 is fixedly mounted to the frame 426 with a fastener 638. A second end of the coil spring 636 is pivotally coupled to a first end 639 of a rigid arm 640 and captively located in a slot 642 with a fastener 644. A second end 645 of rigid arm 640 is pivotally mounted, by a fastener 648, to a bracket 646 that extends inwardly from a side of the carriage 424. Fasteners 638, 644, 648 may be rivets or other suitable known fasteners.

The coil spring 636 biases or “latches” the carriage 424, and thus the upper user interface 150, via the rigid arm 640 in the screen covering position shown in FIG. 6. In this position, the second end of the coil spring coupled to the first end 639 of the rigid arm 640 is urged against a left hand side of slot 642. If the upper user interface 150 mounted on the carriage 424 is moved by a user toward the lower

covering position, then when the second end 645 of rigid arm 640 moves beyond approximately the centre or midpoint of its movement between the screen covering position and lower covering position, which substantially aligns with slot 642, the second end of the coil spring coupled to first end 639 of the rigid arm 640 is urged against a right hand side of slot 642 and the carriage 424 and the upper user interface 150 mounted thereon, is urged or “latched” into the lower covering position. If the upper user interface 150 is not moved beyond the centre or midpoint of its movement from the screen covering position to the lower covering position or from the lower covering position to the screen covering position, the over-centre latching mechanism will urge the upper user interface 150 back into the screen covering position or the lower covering position respectively. In this manner, the upper user interface 150 mounted on the carriage 424 can only reside in either the screen covering position or the lower covering position and not in any intermediate position.

It is envisaged that when the upper user interface 150 is in the lower covering position, the lower user interface 106 is rendered inoperable by use of a user interface position sensor 690. The user interface position sensor 690 is typically a Hall Effect sensor coupled to be in communication with the processor 103. The user interface position sensor detects the presence of the upper user interface 150 covering, or at least partially covering, the lower user interface 106 causing the output of a signal to the processor 103 to render the lower user interface 106 inoperable. It will be appreciated that other user interface position sensors may be employed for this purpose.

Referring to FIG. 7, in another form, the over-centre latching mechanism comprises a pair of rigid arms 740, 741 pivotally coupled together at adjacent first ends 742, 743 of each arm and captively located in a slot 760 with a fastener 761. The second end 744 of rigid arm 740 is pivotally mounted to the frame 426 by a fastener 745 and the second end 746 of the rigid arm 741 is pivotally mounted to a bracket 747 of the carriage 424 by a fastener 748. A pair of helical springs 750, 751 are accommodated in a recess or aperture 749 in the frame 426 and have ends respectively coupled to the frame 426 and rigid arm 740 at about the midpoint of the arm 740. The helical springs 750, 751 urge the upper user interface 150 mounted on the carriage 424 into either the screen covering position or the lower user interface covering position using over-centre latching as will be apparent to a person skilled in the art..

It will be appreciated that other known biasing mechanisms may be employed to ensure that the upper user interface 150 mounted on the carriage 424 can only reside in either the screen covering position or the lower covering position and not in any intermediate position.

The present invention is therefore an electronic device 100 and a moveable user interface mechanism for an electronic device that enables the relative positions of the user interfaces 106, 150 of the electronic device to be selectively changed whilst simultaneously adapting the display area of the screen 105 to the selected relative positions of the user interfaces 106, 150.

This is achieved by providing a lower user interface 106 mounted to the housing 200 of the device and an upper user interface 150 moveably mounted to the housing 200. The upper user interface 150 is moveable (typically slidable) between

a screen covering position, in which the upper user interface 150 covers at least a coverable display area 350 of the screen 105 and a lower user interface covering position, in which the upper user interface 150 at least partially covers the lower user interface 106 and reveals at least part of the coverable display area 350 of the screen, thus exposing a larger display area of the screen 105.

In the screen covering position, both the lower user interface 106 and the upper user interface 150 are operable and another, smaller display area 252 of the screen 105 is visible. Applications of the device of a first category may be enabled that utilize the smaller display area and therefore save energy by not powering the covered, coverable display area 350 of the screen unnecessarily. In the lower covering position, the upper user interface 150 is operable and the lower user interface 106 is inoperable and the larger display area is visible comprising the revealed area of the coverable display area 350 and another display area 252. Applications of the device of a second category may be enabled that utilize the larger display area.

In the screen covering position, a user can use the lower user interface 106 and/or the upper user interface 150 and/or the touch screen 105 for applications that only require or utilize the smaller display area 252. Examples of such applications include, but are not limited to, making and receiving telephone calls, creating, sending and receiving messages, such as text messages, setting functions of the device such as a clock, alarm, calendar and the like. In the lower covering position, the lower user interface 106 is inoperable and the user can use the upper user interface 150 in conjunction with the larger display area for applications that benefit from or require a larger display area. Examples of such applications that are

enhanced by the larger display area include, but are not limited to, playing games, creating and editing documents, capturing, viewing and/or editing images, browsing the internet and the like.

Another advantage of the present invention is that selective changing of the relative positions of the user interfaces 106, 150 of the device and simultaneous adaptation of the display area to the relative positions is achieved whilst maintaining a constant length of the device. Therefore, the device does not become unwieldy, cumbersome or difficult to use when the relative positions of the user interfaces of the device are changed.

A further advantage is that the moveable user interface mechanism is concealed within the electronic device 100 in all positions of the user interfaces 106, 150 and is not exposed, thus reducing the opportunities for damage of, or tampering with, the mechanism.

The above detailed description provides exemplary embodiments only, and is not intended to limit the scope, applicability, or configuration of the present invention. Rather, the detailed description of the exemplary embodiments provide those skilled in the art with an enabling description for implementing the exemplary embodiments of the invention. It should be understood that various changes can be made in the function and arrangement of elements and steps without departing from the spirit and scope of the invention as set forth in the appended claims.

WE CLAIM:

1. An electronic device comprising:
 - a housing;
 - a screen mounted to the housing, the screen having at least a user interface coverable display area and another display area;
 - a lower user interface mounted to the housing; and
 - an upper user interface moveably mounted to the housing, the upper user interface being moveable relative to the lower user interface between a screen covering position and a lower user interface covering position;wherein, when the upper user interface is in the screen covering position the coverable display area is covered by the upper user interface and when the upper user interface is in the lower covering position, the upper user interface at least partially covers the lower user interface whilst revealing at least part of the coverable display area.
2. The electronic device of claim 1, wherein, when the upper user interface is in the lower covering position, the upper user interface completely covers the lower user interface.
3. The electronic device of claim 1, wherein, when the upper user interface is in the screen covering position, both the lower user interface and the upper user interface are operable.

4. The electronic device of claim 1, wherein, when the upper user interface is in the lower covering position, the upper user interface is operable and the lower user interface is inoperable.
5. The electronic device of claim 1, wherein, when the upper user interface is in the screen covering position, the coverable display area is inoperable and the another display area is operable.
6. The electronic device of claim 1, wherein, when the upper user interface is in the lower covering position, both the coverable display area and the another display area are operable.
7. The electronic device of claim 1, wherein the upper user interface is a screen controller.
8. The electronic device of claim 1, wherein the upper user interface is a cursor controller.
9. The electronic device of claim 1, wherein the upper user interface is a pointer controller.
10. The electronic device of claim 1, wherein the upper user interface is a joystick.

11. The electronic device of claim 1, wherein the lower user interface is a keypad module.
12. The electronic device of claim 1, wherein the lower user interface is located in a fixed position.
13. The electronic device of claim 1, wherein one or more applications of the device of a first category are enabled when the upper user interface is in the screen covering position and one or more applications of the device of a second category are enabled when the upper user interface is in the lower covering position.
14. The electronic device of claim 1, wherein, when the upper user interface is in the lower covering position the lower user interface is rendered inoperable by a user interface position sensor.
15. The electronic device of claim 1, wherein the length of the electronic device remains constant irrespective of whether the upper user interface is in the screen covering position or the lower covering position.
16. The electronic device of claim 1, further comprising:
a track supported by the housing; and
a carriage moveably mounted to the track, wherein the upper user interface is mounted on the carriage.

17. The electronic device of claim 1, wherein the upper user interface is urged into either the screen covering position or the lower covering position by a biasing mechanism.
18. A moveable user interface mechanism for an electronic device comprising:
a housing;
a lower user interface mounted to the housing;
a carriage moveably mounted to the housing; and
an upper user interface mounted on the carriage;
wherein the carriage is moveable relative to the lower user interface between a screen covering position and a lower user interface covering position; and
wherein, when the carriage is in the screen covering position a coverable display area of the screen is covered by the carriage and when the carriage is in the lower covering position, the carriage at least partially covers the lower user interface whilst revealing at least part of the coverable display area.
19. The moveable user interface mechanism of claim 18, wherein, when the carriage is in the lower covering position, the carriage completely covers the lower user interface.
20. The moveable user interface mechanism of claim 18, wherein, when the carriage is in the screen covering position, both the lower user interface and the upper user interface are operable.

21. The moveable user interface mechanism of claim 18, wherein, when the carriage is in the lower covering position, the upper user interface is operable and the lower user interface is inoperable.
22. The moveable user interface mechanism of claim 18, wherein the carriage is urged into either the screen covering position or the lower covering position by a biasing mechanism.
23. The moveable user interface mechanism of claim 18, further comprising a user interface position sensor to render the lower user interface inoperable when the carriage is in the lower covering position.

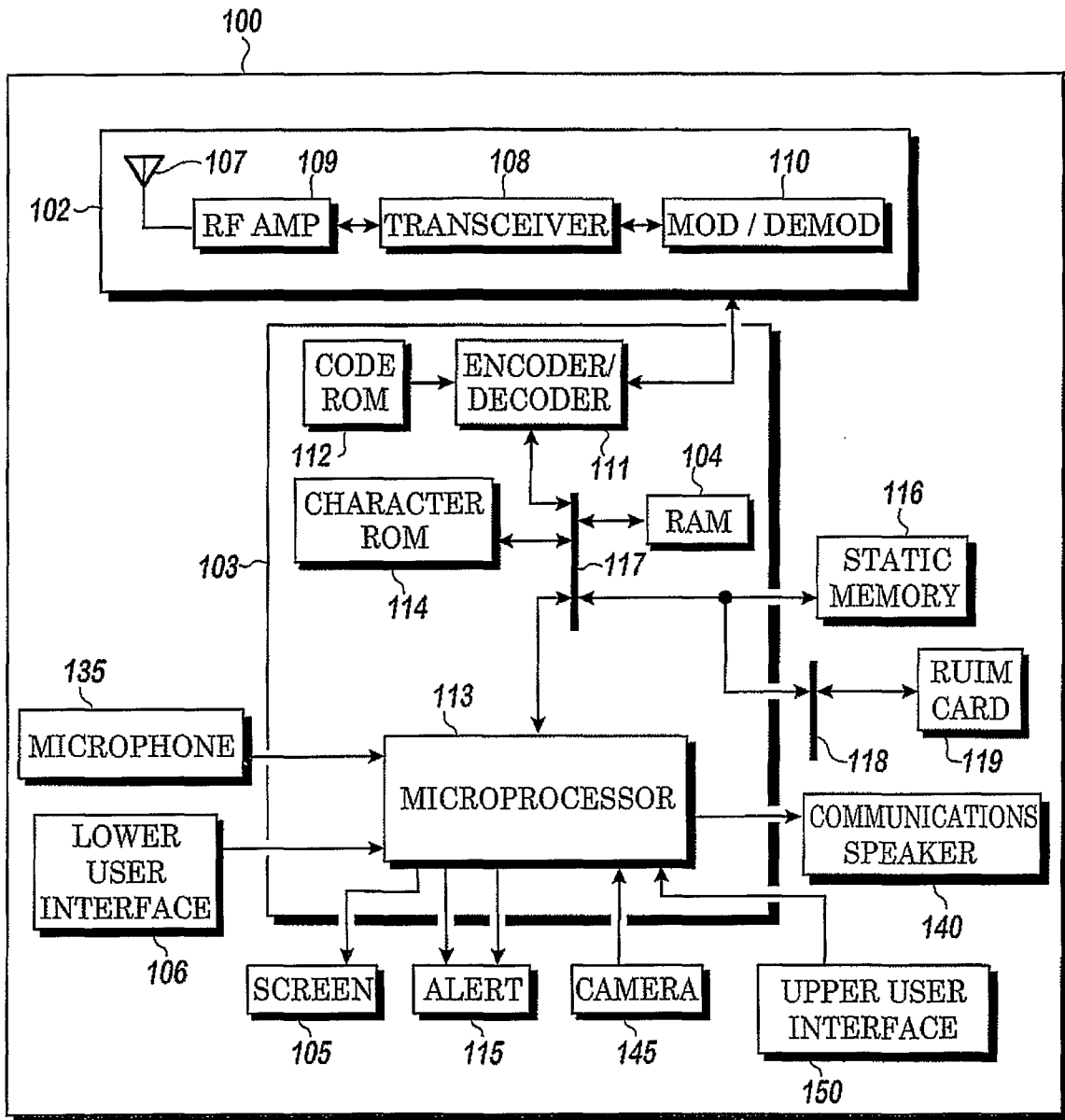


FIG. 1

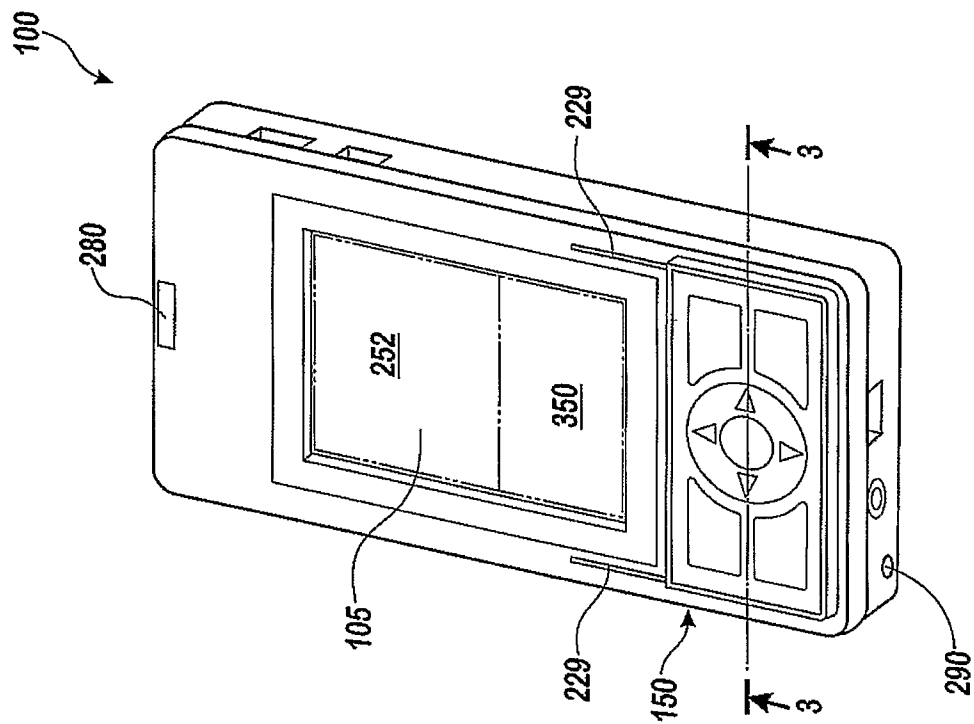


FIG. 3

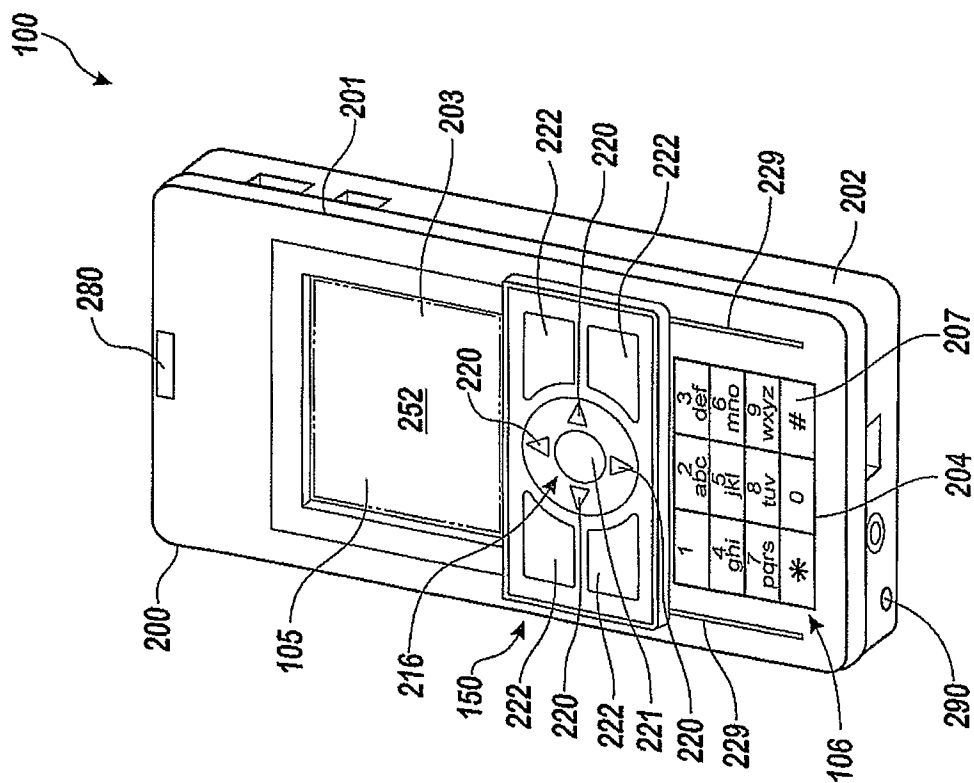


FIG. 2

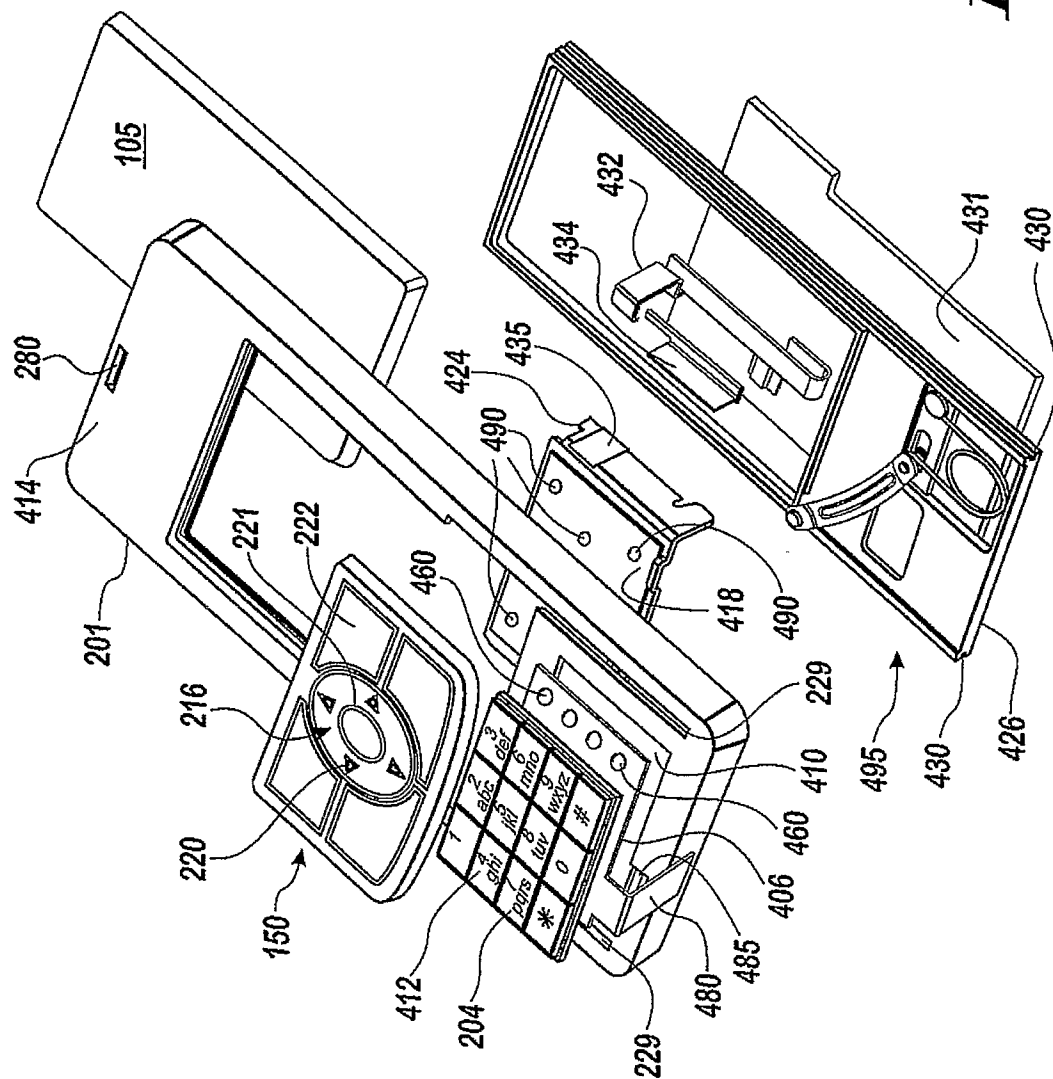


FIG. 4

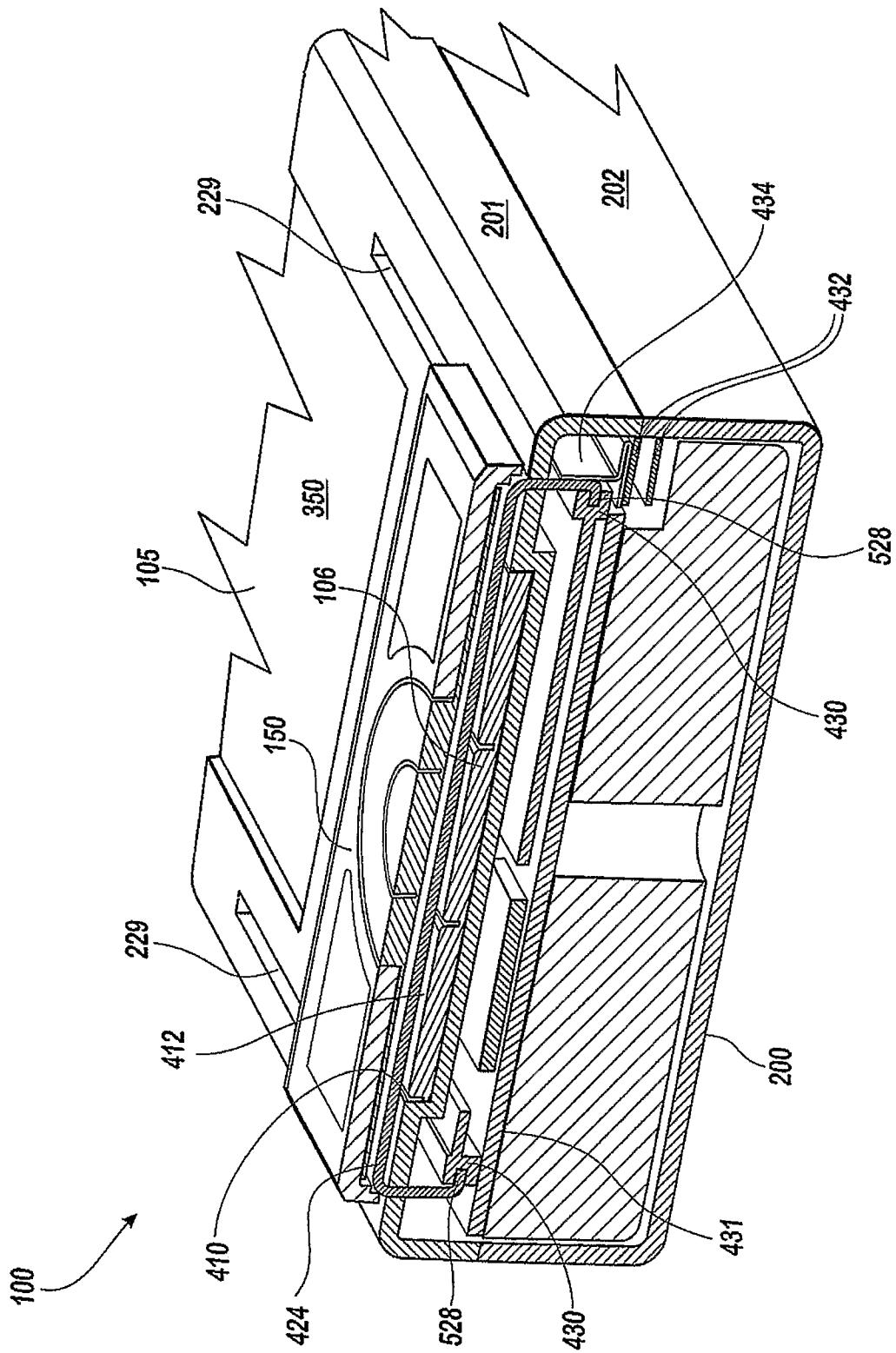
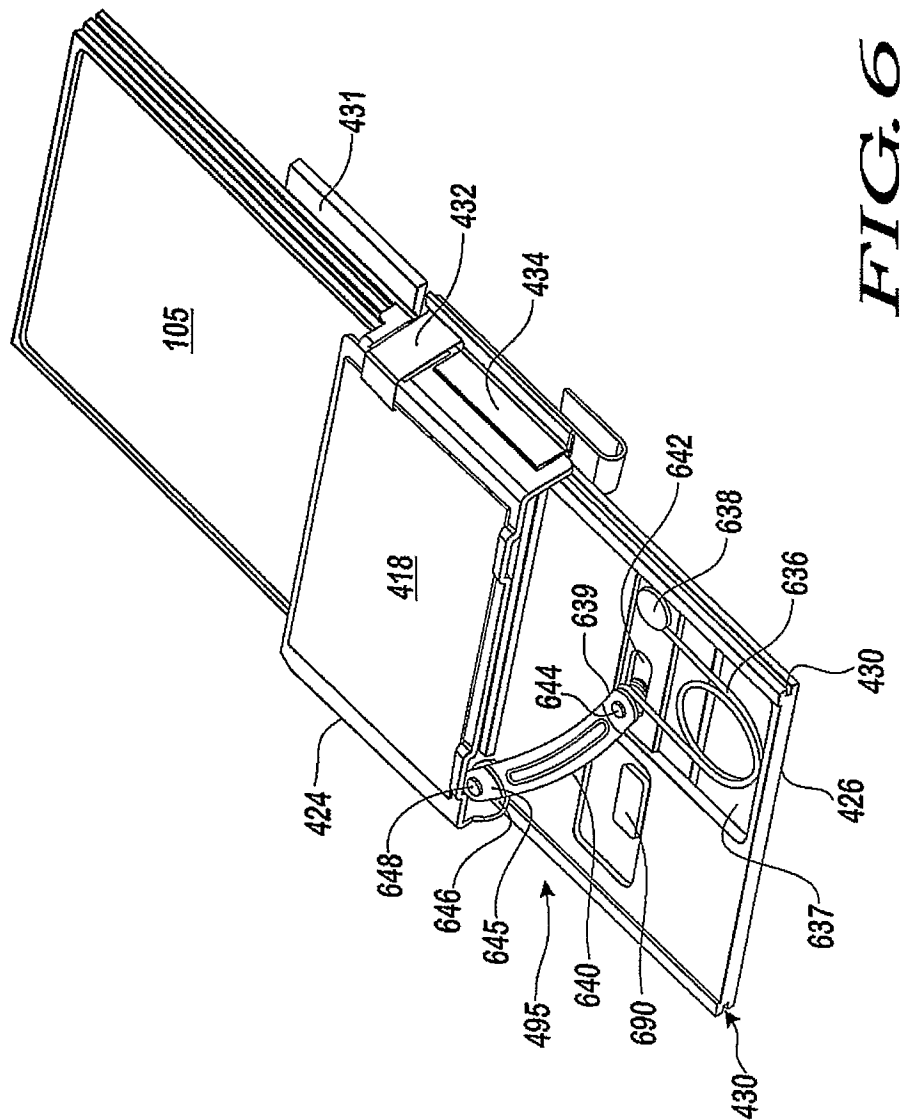


FIG. 5



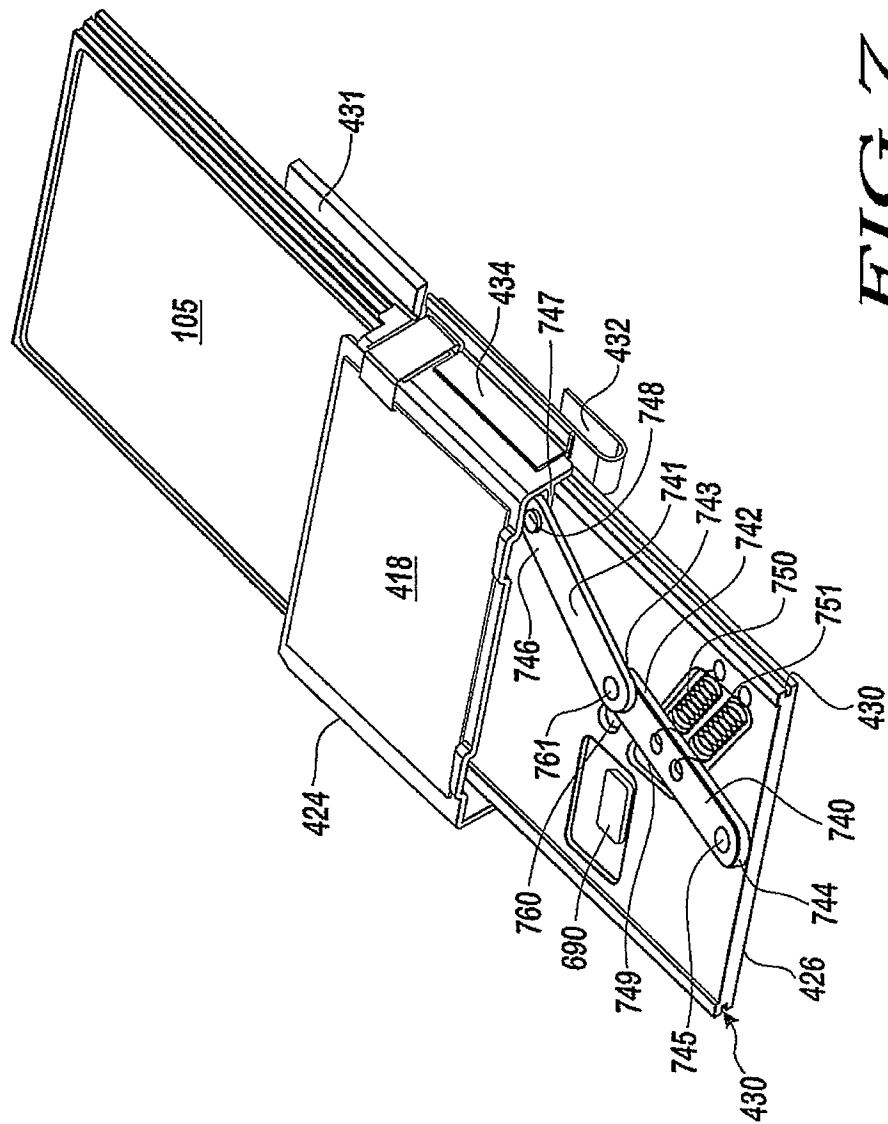


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/25335

A. CLASSIFICATION OF SUBJECT MATTER IPC: H05K 5/00(2006.01);G06F 3/00(2006.01),1/16(2006.01) USPC: 361/683,680,681,679;455/90.2,90.3,575.1 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 361/683,680,681,679 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---	US6,349,040 B2 (LEFORT) 19 February 2002 (19.02.2002), in its entirety.	1-15, 17-23
Y		16
Y ---	US 2002/0042853 A1 (SANTOH et al.) 11 April 2002 (11.04.2002), in its entirety.	16
A		1-15, 17-23
A	US 7,057,887 B2 (WEBB et al.) 06 June 2006 (06.06.2006), in its entirety.	1-23
Y ---	US 6,847,519 B2 (ARBISI et al.) 25 January 2005 (25.01.2005), in its entirety.	10
A		1-23
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:		
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 22 October 2006 (22.10.2006)	Date of mailing of the international search report 30 NOV 2006	
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Lisa Lea-Edmonds Telephone No. 571-272-2043	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US06/25335

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,898,073 B2 (LIN) 24 May 2005 (24.05.2005), in its entirety.	1-23
A	US 6,914,776 B2 (KIM) 05 July 2005 (05.07.2005), in its entirety.	1-23