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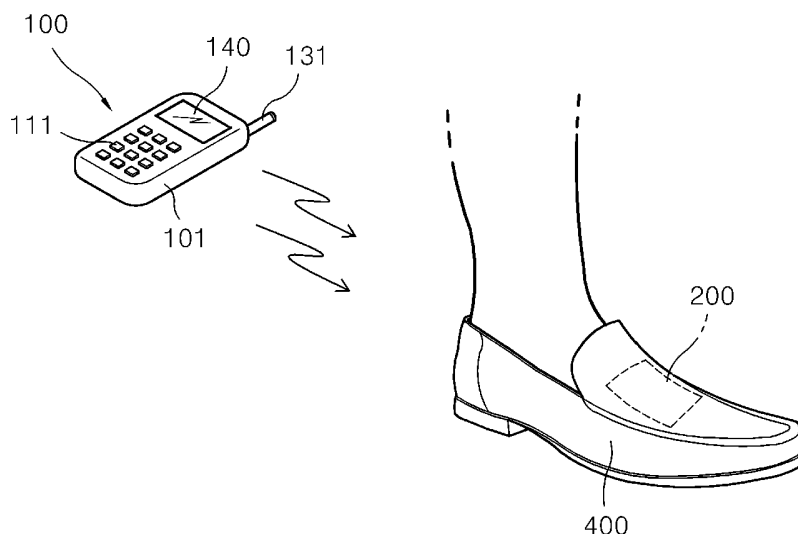
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(54) Title: NOTIFICATION APPARATUS AND METHOD OF RECEIVED INFORMATION USING VIBRATORS AND SYSTEM EMPLOYING THE SAME



(57) Abstract: Provided are an apparatus and method of notifying received information using vibrators and a system employing the same. The apparatus includes a wireless receiving unit receiving a signal transmitted in a wireless manner through an antenna, a vibrator array unit in which a plurality of vibrators are disposed in a matrix arrangement and spaced apart from each other on a substrate, a driving unit independently driving the plurality of vibrators, and a control unit controlling the driving unit so that the plurality of vibrators can be selectively driven according to received vibrating pattern information if the vibrating pattern information corresponding to selective driving of the plurality of vibrators is

received from the wireless receiving unit. According to the apparatus and method for notifying received information using vibrators and the system employing the same, various types of information can be expressed so that they can be recognized using a tactile sense by selectively driving the plurality of vibrators.



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

# **Description**

## **NOTIFICATION APPARATUS AND METHOD OF RECEIVED INFORMATION USING VIBRATORS AND SYSTEM EMPLOYING THE SAME**

### **Technical Field**

- [1] The present invention relates to an apparatus and method of notifying received information using vibrators and a system employing the same, and more particularly, to an apparatus and method of notifying received information using vibrators in which a plurality of vibrators are selectively driven and received information is notified using a tactile sense and a system employing the same.

### **Background Art**

- [2] As a device-based information notification method, a method in which information can be recognized through the senses of sight and hearing has been widely used.
- [3] In such a method, however, since received information can be recognized through the sense of sight or the sense of hearing, the sense of sight should be concentrated on an information notifying medium, and noise pollution may be caused. An information recognition rate may vary depending on the use environment of a device. Thus, when it is necessary to notify a device user of confidential information, a tactile sense rather than the sense of sight or the sense of hearing, should be used in the information notifying method.
- [4] Generally, a mobile phone is configured to notify a user of whether or not a ring signal is received by vibration or sound through a vibrator or speaker installed in its main body.
- [5] Thus, the user should selectively set the mobile phone in a sound mode and a vibration mode according to the environment of the mobile phone, to well recognize a received signal without disturbing persons other than the user.
- [6] In a severely noisy environment, however, a received ring signal cannot easily invite user's attention even in a vibration mode when the mobile phone is put into a user's bag.
- [7] To address the problem, Korean Patent Laid-open Publication No. 2001-0053997 discloses a received informing device for a mobile phone which can inform a user of whether or not a ring signal is received by vibration derived from a vibrator installed on the received informing device according to the received wireless signal transmitted from the mobile phone when the ring signal is received. However, the received informing device can simply inform the user of whether or not a signal is received and does not provide information about a caller.

- [8] One among attempts to extend an information expression range is to use symbols in notifying specific information by varying intermittently (ON/OFF) driving periods for a single vibrator. However, it is not easy to communicate a received text message, which is not in a common way of text expression.

### **Disclosure of Invention**

#### **Technical Problem**

- [9] To solve the above problems, it is an objective of the present invention to provide an apparatus and method of notifying received information using vibrators in which information is generated in a variety of vibrating patterns and a user can recognize the generated information using a tactile sense and a system employing the same.

#### **Technical Solution**

- [10] To accomplish the above object of the present invention, there is provided a received information notifying apparatus using vibrators, the apparatus comprising: a wireless receiving unit that receives a signal transmitted in a wireless manner through an antenna; a vibrator array unit in which a plurality of spaced-apart vibrators are disposed on a substrate in a matrix arrangement; a driving unit that independently drives the plurality of vibrators; and a control unit that controls the driving unit so that the plurality of vibrators can be selectively driven according to received vibrating pattern information when the vibrating pattern information corresponding to selective driving of the plurality of vibrators is received from the wireless receiving unit.
- [11] Preferably, the plurality of vibrators are installed to be vibrated in a direction perpendicular to the substrate.
- [12] In an embodiment of present invention, the wireless receiving unit may have a built-in Bluetooth module.
- [13] In addition, if incoming call notifying information including the vibrating pattern information corresponding to the selective driving of the plurality of vibrators is received through the wireless receiving unit from a mobile phone, the control unit controls the driving unit to selectively drive the plurality of vibrators according to the received vibrating pattern information.
- [14] To achieve the object of the present invention, there is also provided a system for notifying received information comprising: an apparatus for notifying received information, the apparatus comprising a plurality of vibrators arranged on a substrate in a matrix arrangement to be independently vibrated and, if vibrating pattern information corresponding to selective driving of the plurality of vibrators is received through a wireless receiving unit, the apparatus selectively driving the plurality of vibrators according to the vibrating pattern information; and a transmission terminal generating the vibrating pattern information and transmitting the generated vibrating pattern in-

formation to the wireless receiving unit.

- [15] In an embodiment of present invention, the transmission terminal may be a mobile phone being configured to set an external vibration notifying mode for transmitting incoming call notifying information to the received information apparatus by manipulating a key input unit when a ring signal is received, if a caller's telephone number included in the received ring signal is registered in a storage unit, the mobile phone generating vibrating pattern information according to external vibration identification information preset corresponding to the registered telephone number and transmitting the incoming call notifying information including the generated vibrating pattern information to the received information notifying apparatus in a wireless manner, and wherein the received information notifying apparatus selectively drives the plurality of vibrators according to the vibrating pattern information when the incoming call notifying information is received from the mobile phone through the wireless receiving unit.
- [16] Preferably, the mobile phone is configured to register the external vibration identification information corresponding to the registered telephone number by manipulating the key input unit.
- [17] In addition, if the caller's telephone number included in the received ring signal is registered in the storage unit of the mobile phone, the mobile phone transmits a category name written corresponding to the registered telephone number to be included in the incoming call notifying information as the external vibration identification information, and wherein the received information notifying apparatus drives the vibrators corresponding to the category name so that the category name included in the incoming call notifying information transmitted from the mobile phone can be recognized by a user's tactile sense.
- [18] According to still another aspect of the present invention, there is provided a method of notifying received information using a plurality of vibrators in a received information notifying apparatus comprising a wireless receiving unit that receives a signal transmitted in a wireless manner through an antenna, a vibrator array unit in which a plurality of spaced-apart vibrators are disposed on a substrate in a matrix arrangement, a driving unit that independently drives the plurality of vibrators, and a control unit that controls the driving unit so that the plurality of vibrators can be selectively driven according to received vibrating pattern information when the vibrating pattern information corresponding to selective driving of the plurality of vibrators is received from the wireless receiving unit, the method comprising determining letters to be sent which are included in the vibrating pattern information; determining letters to be expressed which are included in the vibrating pattern information; determining a degree of driving operations according to the writing sequences of the vibrators cor-

responding to the writing sequences preset in the letters to be expressed; and sequentially driving the vibrators in the determined degree of driving operations while simultaneously driving the vibrator that is currently being written and the vibrator that is to be written next in each degree of driving operations.

### **Brief Description of the Drawings**

- [19] FIG. 1 is a schematic perspective view of a system for notifying received information using vibrators according to an embodiment of the present invention;
- [20] FIG. 2 is an exemplary perspective view illustrating a plurality of vibrators arranged in a received information notifying apparatus using vibrators shown in FIG. 1;
- [21] FIG. 3 is a block diagram of the system for notifying received information shown in FIG. 1;
- [22] FIG. 4 illustrates symbols assigned to each of the vibrators for explaining a method of expressing information using the received information notifying apparatus shown in FIG. 2;
- [23] FIG. 5 illustrates an example of a writing sequence of the letter "H" using the vibrators shown in FIG. 4;
- [24] FIGS. 6 through 10 illustrate vibrators driven according to degree of driving operations according to the determined writing sequences when the number "1" is expressed using the vibrators shown in FIG. 4 for explaining a method of driving vibrators according to the present invention;
- [25] FIG. 11 illustrates a degree of driving operation according to writing sequences indicated in a cardioid pattern using the vibrators shown in FIG. 4;
- [26] FIG. 12 illustrates a system for notifying received information using vibrators according to another embodiment of the present invention;
- [27] FIG. 13 is a block diagram of a mobile phone and a received information notifying apparatus using vibrators shown in FIG. 12;
- [28] FIG. 14 shows an example of a screen display for explaining a process of registering external vibration identification information when a telephone book is registered by manipulating a key input unit of the mobile phone shown in FIG. 12; and
- [29] FIG. 15 illustrates an example of a data structure of incoming call notifying information transmitted to the received information notifying vibration apparatus when a ring signal is received in a case where the mobile phone shown in FIG. 12 is set in an external vibration notifying mode.

### **Best Mode for Carrying Out the Invention**

- [30] The present invention will now be described more fully with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown.

FIG. 1 is a schematic perspective view of a system for notifying received information using vibrators according to an embodiment of the present invention, FIG. 2 is an exemplary perspective view illustrating a plurality of vibrators are arranged in a received information notifying apparatus using vibrators shown in FIG. 1, and FIG. 3 is a block diagram of the system for notifying received information using vibrators shown in FIG. 1.

[31] Referring to FIGS. 1 through 3, a system for notifying received information using vibrators includes a transmission terminal 100 and an apparatus 200 for notifying received information using vibrators, which is to be referred to as the received information notifying apparatus 200 hereinafter.

[32] The transmission terminal 100 includes an input unit 110, a storage unit 120, a transmitting unit 130, a display unit 140, and a control unit 180.

[33] The input unit 110 includes a plurality of keys 111 disposed on a main body 101 to support a variety of functions including inputting and transmitting instructions of letters or patterns to be sent to the received information notifying apparatus 200.

[34] A variety of methods including a method of inputting information written by a user using a keypad or touch screen for supporting inputting of general letters, numbers, and special characters can be applied to the input unit 110.

[35] The transmitting unit 130 transmits vibrating pattern information to be transmitted through an antenna 131.

[36] The display unit 140 is controlled by the control unit 180 and displays display information on a display window.

[37] The control unit 180 processes a signal inputted through the input unit 110 and the vibrating pattern information to be transmitted through the transmitting unit 130.

[38] The received information notifying apparatus 200 includes a wireless receiving unit 210, a control unit 220, a driving unit 230, a storage unit 240, and a vibrator array unit 250. Although not shown, the received information notifying apparatus 200 may use a battery as a driving power supply.

[39] In the vibrator array unit 250 as an example shown in FIG. 2, a plurality of spaced apart vibrators 253 are arranged on a substrate 251 in a matrix arrangement.

[40] In the example shown in FIG. 2, the vibrator array unit 250 has a 5 x 5 matrix arrangement in which 25 vibrators 253 are provided.

[41] In the vibrator array unit 250, the arrangement pattern, the gap between each of the spaced apart vibrators, and the number of vibrators may be appropriately adjusted according to types of information to be provided for. For example, assuming that information about direction is to be provided for, to achieve a high tactile sense recognizing efficiency with respect to the right- and left-hand sides, the vibrators are preferably spaced a sufficient gap apart from one another.

- [42] To provide for text information, the vibrators are preferably arranged on a sensitive body part at which the user's sense of touch is particularly high.
- [43] A variety of devices that can be independently driven, for example, small vibration motors, may be used as the vibrators 253.
- [44] In addition, the vibration motors may be stood on the substrate 251 so that they can be vibrated in a direction perpendicular to the substrate 251 to enhance the tactile sense recognizing efficiency when the vibrators 253 are driven.
- [45] Here, the substrate 251 may be a flexible substrate.
- [46] The substrate 251 further includes the wireless receiving unit 210, the control unit 220, the driving unit 230, and the storage unit 240.
- [47] The driving unit 230 is controlled by the control unit 220 and is electrically connected to the respective vibrators 253 to drive the respective vibrators 253 independently.
- [48] The wireless receiving unit 210 processes a signal received in a wireless manner through the antenna 211 and provides the processed signal to the control unit 220. The wireless receiving unit 210 receives a wireless signal from the transmitting terminal 100. Alternatively, the wireless receiving unit 210 may have a built-in Bluetooth module, which is a local wireless communication.
- [49] The storage unit 240 may store information about driving patterns of the vibrators 253 to be selectively driven and a sequence of driving operations thereof so as to correspond to patterns or letters to be expressed.
- [50] The driving patterns and sequence driving operations for the letters or patterns stored in the storage unit 240 will now be described by assigning unique matrix address numbers to each of 25 vibrators 253 arranged in the 5 x 5 matrix structure, like in FIG. 4.
- [51] First, writing sequences for respective letters are determined. Here, an explanation of the writing sequences with regard to the letter "H" by way of example. Referring to FIG. 5, the writing sequences of the letter "H" may be determined as being in a sequential order; a11, a21, a31, a41, a51, a15, a25, a35, a45, a55, a31, a32, a33, a34, and a35. Alternatively, the writing sequences may be determined as being in a matrix number order; a11, a21, a31, a41, a51, a31, a32, a33, a34, a35, a15, a25, a35, a45, and a55. The letter expression type and the corresponding writing sequences may be appropriately determined to enhance the tactile sense recognizing efficiency according to letters or patterns to be expressed.
- [52] Once the writing sequence of a letter is determined, a wide variety of driving patterns can be employed to the letter. For example, the respective vibrators 253 can be sequentially driven one by one according to the writing sequences.
- [53] In a preferred embodiment, the driving patterns may be determined in such that a

corresponding degree of driving operations is determined according to the writing sequences of the vibrators corresponding to the writing sequences preset in letters to be expressed, and the vibrators are sequentially driven in the determined degree of driving operations while simultaneously driving the vibrator that is currently being written and the vibrator that is to be written next in each degree of driving operations.

[54] That is, in order to avoid complexity of explanation, when the writing sequence of the number "1" is set to a11, a21, a31, a41, and a51, the degree of driving operations is determined as being 5. In the first driving operation, as shown in FIG. 6, a vibrator a11 of a writing sequence 1 and a vibrator a21 of the next sequence, labelled D1, are driven together for a predetermined period of time. In the second driving operation, as shown in FIG. 7, a vibrator a21 of a writing sequence 2 and a vibrator a31 of the next sequence, labelled D2, are driven together for a predetermined period of time. In third and fourth driving operations, as shown in FIGS. 8 and 9, the vibrators labelled D3 and D4 are driven in similar manners. After the number "1" is driven in the fifth driving operation, there is no further next writing sequence. Accordingly, only a vibrator a51 of a current writing sequence 5, labelled D5, is driven in the fifth driving operation, as shown in FIG. 10.

[55] A predetermined idle time can be applied between each of the respective degree of driving operations.

[56] Experiments have been carried out to investigate effective tactile sense recognition through a comparison between the above-described driving method and a sequential driving method by the following method.

[57] Under the condition that a horizontal interval between each of the vibrators 253 was 0.75 cm, a vertical interval between each of the vibrators 253 was 0.5 cm, a driving time in each degree of driving operations was 300 ms, an idle time of 100 ms was applied in each degree of driving operations, and a segment interval between each of letters was 500 ms. In addition, 24 to 30 year old 10 men participated in the experiment to test their tactile sense recognition capability with respect to 26 alphabets. As a result, it was confirmed that the simultaneously driving method had much higher text recognition efficiency than the conventional sequential driving method.

[58] With regard to pattern recognition, when vibrating pattern information is given as a cardioid (♥) pattern, the writing sequences preset with respect to the vibrators 253 are preset in the storage unit 240, as indicated by a hatched portion as shown in FIG. 11. Then, the driving patterns can correspond to the cardioid patterns, the vibrators 253 are driven by the above-described driving method. That is, if the writing sequences are sequentially determined as being in the order of a23, a12, a21, a31, a42, a53, a44, a35, a25, a14, and a23, the degree of driving operations is 11. In the first driving operation, vibrators a23 and a12 are simultaneously driven. In the second driving operation,

vibrators a12 and a21 are simultaneously driven. In the tenth driving operation, vibrators a14 and a23 are simultaneously driven. In the eleventh driving operation, a vibrator a23 is driven.

[59] The received information notifying apparatus 200 expresses various types of information, such as information about direction or alert, information other than texts, i.e., using a predetermined expression method based on functions by selectively driving the vibrators 253.

[60] Of course, the received information notifying apparatus 200 may be adaptively formed according to body portions to which the received information notifying apparatus 200 is attached. That is, as shown in FIG. 1, the received information notifying apparatus 200 can be used in such a manner that the substrate 251 is attached to an inner surface of a shoe 400, the inner surface of the shoe 400 being a portion in contact with the top of a user's foot. Alternatively, as shown in FIG. 12, the received information notifying apparatus 200 can be mounted on used by coating itself with an outer cover 410 conforming to the shape of the insole of the shoe 400 and by mounting itself on the inner surface shoe 400. Alternatively, the received information notifying apparatus 200 can be formed in a variety of shapes including a sheet-like shape so that it can be put into a wallet.

[61] In the following description, the present invention will be described with regard to the received information notifying apparatus 200 used to notify a user of a mobile phone that there is a received incoming call.

[62] FIG. 12 illustrates a system for notifying received information using vibrators according to another embodiment of the present invention, and FIG. 13 is a block diagram of a mobile phone and a received information notifying apparatus using vibrators shown in FIG. 12. The elements having substantially the same or similar functions for describing the embodiments shown in the previous drawings are identified by the same reference numerals.

[63] Referring to FIGS. 12 and 13, the system for notifying received information using vibrators includes a mobile phone 300 and a received information notifying apparatus 200.

[64] The mobile phone 300 is an example of a transmission terminal and includes a key input unit 310, a storage unit 320, a transmitting/receiving unit 330, a display unit 340, a microphone 350, a speaker 360, a vibrator 370, and a control unit 380.

[65] The key input unit 310 includes a plurality of keys 311 disposed on a main body 301 to support a variety of functions including voice communication, leaving a text message, and registering a telephone book.

[66] The key input unit 310 may also include menu items for setting an external vibration notifying mode, which will be described later, by a key or a combination of a

plurality of keys or by selecting one menu item from a menu list provided through a display window 340a of the display unit 340 by manipulating a menu key 311a of the key input unit 310.

[67] The storage unit 320 is controlled by the control unit 380 and has various elements of data including a telephone book registered by the user and melodies, etc. stored therein.

[68] The transmitting/receiving unit 330 receives a signal transmitted through a base station from a caller's terminal through an antenna 331 and transmits a signal to be transmitted through the antenna 331.

[69] Alternatively, a wireless transmitting unit dedicated to transmit a signal to the received information notifying apparatus 200 may also be separately provided.

[70] The display unit 340 is controlled by the control unit 380 and displays display information through the display window 340a.

[71] The control unit 380 processes signals input through the key input unit 310 and controls various elements according to a predetermined notifying mode if a ring signal for call connection from the caller's terminal is received from the transmitting/receiving unit 330 via the base station.

[72] The control unit 380 may select at least one notifying mode among an internal vibration notifying mode, an external vibration notifying mode, a sound notifying mode, and an internal vibration/sound notifying mode, by using the menu list provided through the display unit 340 or by manipulating the key of the key input unit 310.

[73] The internal vibration notifying mode is a mode in which the vibrators 370 mounted in the main body 301 are driven and which notifies the user of whether or not a ring signal is received. The sound notifying mode is a mode in which a melody is output through the speaker 360 mounted in the main body 301 and which notifies the user of whether or not the ring signal is received. In addition, the internal vibration/sound notifying mode is a mode in which internal vibration and melody output are performed sequentially or reversely. That is, in the internal vibration/sound notifying mode, when a ring signal is received, the internal vibrators 370 are driven for a predetermined period of time and melody output is then performed. Alternatively, melody output may first be performed for a predetermined period of time and the internal vibrators 370 may then be driven.

[74] The external vibration notifying mode is a mode in which incoming call notifying information is transmitted to the received information notifying apparatus 200 to selectively vibrate a plurality of vibrators and notify the user of whether or not the ring signal and information related to a caller are received.

[75] If a caller's telephone number included in the received ring signal is registered in a telephone book of the storage unit 320, the control unit 380 preferably generates

vibrating pattern information according to external vibration identification information preset corresponding to the registered telephone number and transmits incoming call notifying information including the generated vibrating pattern information in a wireless manner through the transmitting/receiving unit 330.

[76] In the mobile phone 300, the control unit 380 may be configured such that external vibration identification information is also registered as vibrating pattern information, which is to be provided when the external vibration notifying mode is performed, at the time of the user registering telephone numbers in the telephone book by manipulating the key of the key input unit 310. At this time, to identify a telephone number and information associated therewith, the user usually registers real names related to telephone numbers, nicknames, or category names by which the user can easily identify necessary information.

[77] That is, referring to FIG. 14 which illustrates an example of a telephone number registration input window provided on the display window 340a of the display unit 340 using the control unit 380 when the menu item for registering the telephone number is selected, the input window provides various input menu items including name, home phone number, mobile phone number, office/school telephone number, melody, and external vibration identification information. For example, a melody input menu item supports a melody to be output in a case where a sound notifying mode is set by the user. An external vibration identification information input menu item supports a user to set information to be expressed by selectively driving the vibrators 253 of the received information notifying apparatus 200 in the external vibration notifying mode.

[78] Thus, in order for a user to register a telephone book, the user has only to manipulate the key input unit 310 to make an entry of category names such as real names, nicknames, or, other appropriate names in the name input menu item by which the user can easily identify necessary information in his/her own recognizable way, and to make an entry of details of additionally desired items among other input menu items.

[79] In the case of the external vibration identification information input menu item, the control unit 380 supports a letter entry selection window 345 provided on a lower portion of the display window 340a to make an entry of Korean letters, small and capital letters in English, or special characters by manipulating the key input unit 310. In the illustrated embodiment, the user selects a cardioid pattern using a menu item specifying special characters.

[80] Meanwhile, if the user does not separately register the external vibration identification information at the time of registering telephone numbers in the telephone book, the external vibration identification information may be set as a category name, that is, as the information that the user has registered as the name input menu item,

e.g., Hong Kildong in the illustrated example, to then be transmitted as vibrating pattern information. Alternatively, the information registered as a category name may be generated as vibrating pattern information for transmission, rather than providing the external vibration identification information input menu item on the menu item for registering a telephone book. If the caller's telephone number is not registered in the telephone book, letters or patterns set as default data can be transmitted as vibrating pattern information.

[81] In the above-described mobile phone 300, in a state in which the mobile phone 300 is set in an external vibration received information mode, it determines whether or not the caller's number included in the received ring signal is registered in the telephone book of the storage unit 320. Incoming call notifying information including vibrating pattern information is generated in the above-described manner depending on whether the caller's number included in the received ring signal is the registered number or not. Then, the generated received information is transmitted to the received information notifying apparatus 200 in a wireless manner. Here, the incoming call notifying information is transmitted to the received information notifying apparatus 200 in a data packet format composed of several fields, i.e., a called party information (ID) field 391 and a vibrating pattern information field 392, as shown in FIG. 15.

[82] If the control unit 380 receives a manipulating signal for call connection after the ring signal is received, the control unit 380 transmits the control signal to the received information notifying apparatus 200 to control the received information notifying apparatus 200 to stop operating.

[83] In the above-described received information notifying apparatus, the control unit 220 analyzes the incoming call notifying information received through the wireless receiving unit 210. If it is determined that the ID field 391 included in the received incoming call notifying information belongs to the received information notifying apparatus itself, the control unit 220 controls the driving unit 230 to selectively drive the vibrators 253 of the vibrator array unit 250 according to the vibrating pattern information field 392.

[84] That is, when the vibrating pattern information included in the incoming call notifying information transmitted from the mobile phone 300 is a cardioid (♥) pattern, the received information notifying apparatus 200 drives the vibrators 253 by the driving method shown in FIG. 11 according to the driving pattern preset in the storage unit 240 in view of writing sequences and degree of driving operations.

### **Industrial Applicability**

[85] As described above, in the apparatus and method for notifying received information using vibrators and the system employing the same according to the present invention,

a wide variety of types of information that can be recognized by a user's tactile sense are expressed by selectively driving the vibrators.

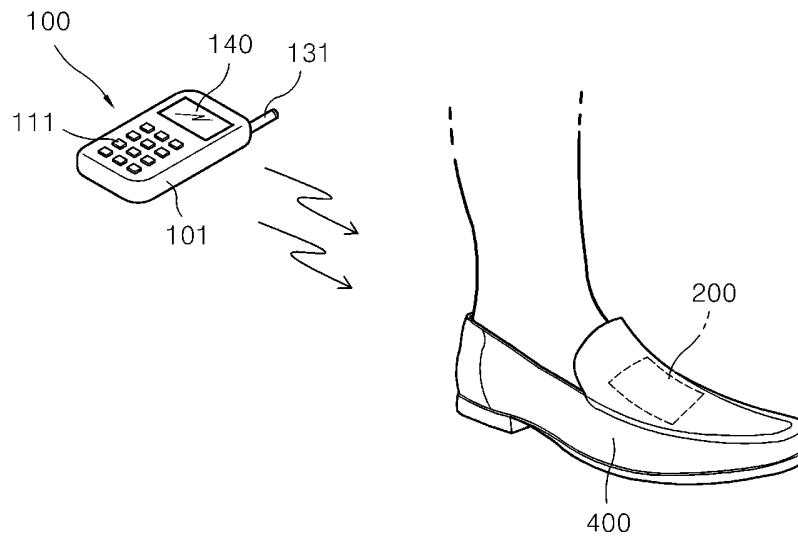
## Claims

- [1] A received information notifying apparatus using vibrators, the apparatus comprising:  
a wireless receiving unit that receives a signal transmitted in a wireless manner through an antenna;  
a vibrator array unit in which a plurality of spaced-apart vibrators are disposed on a substrate in a matrix arrangement;  
a driving unit that independently drives the plurality of vibrators; and  
a control unit that controls the driving unit so that the plurality of vibrators can be selectively driven according to received vibrating pattern information when the vibrating pattern information corresponding to selective driving of the plurality of vibrators is received from the wireless receiving unit.
- [2] The apparatus of claim 1, wherein the plurality of vibrators are installed to be vibrated in a direction perpendicular to the substrate.
- [3] The apparatus of claim 1, wherein the wireless receiving unit has a built-in Bluetooth module.
- [4] The apparatus of claim 1, wherein, if incoming call notifying information including the vibrating pattern information corresponding to the selective driving of the plurality of vibrators is received through the wireless receiving unit from a mobile phone, the control unit controls the driving unit to selectively drive the plurality of vibrators according to the received vibrating pattern information.
- [5] A system for notifying received information comprising:  
a received information notifying apparatus which comprising a plurality of vibrators arranged on a substrate in a matrix arrangement to be independently vibrated and, if vibrating pattern information corresponding to selective driving of the plurality of vibrators is received through a wireless receiving unit, the apparatus selectively driving the plurality of vibrators according to the vibrating pattern information; and  
a transmission terminal generating the vibrating pattern information and transmitting the generated vibrating pattern information to the wireless receiving unit.
- [6] The system of claim 5, wherein the transmission terminal is a mobile phone being configured to set an external vibration notifying mode for transmitting incoming call notifying information to the received information notifying apparatus by manipulating a key input unit when a ring signal is received, if a caller's telephone number included in the received ring signal is registered in a storage unit, the mobile phone generating vibrating pattern information

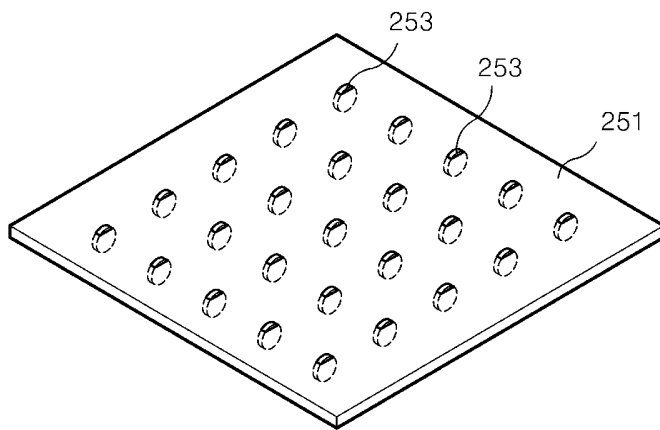
according to external vibration identification information preset corresponding to the registered telephone number and transmitting the incoming call notifying information including the generated vibrating pattern information to the received information notifying apparatus in a wireless manner, and wherein the received information notifying apparatus selectively drives the plurality of vibrators according to the vibrating pattern information when the incoming call notifying information is received from the mobile phone through the wireless receiving unit.

- [7] The system of claim 6, wherein the mobile phone is configured to register the external vibration identification information corresponding to the registered telephone number by manipulating the key input unit.
- [8] The system of claim 6, wherein, if the caller's telephone number included in the received ring signal is registered in the storage unit of the mobile phone, the mobile phone transmits a category name written corresponding to the registered telephone number to be included in the incoming call notifying information as the external vibration identification information, and wherein the received information notifying apparatus drives the vibrators corresponding to the category name so that the category name included in the incoming call notifying information transmitted from the mobile phone can be recognized by a user's tactile sense.
- [9] A method of notifying received information using a plurality of vibrators in a received information notifying apparatus comprising a wireless receiving unit that receives a signal transmitted in a wireless manner through an antenna, a vibrator array unit in which a plurality of spaced-apart vibrators are disposed on a substrate in a matrix arrangement, a driving unit that independently drives the plurality of vibrators, and a control unit that controls the driving unit so that the plurality of vibrators can be selectively driven according to received vibrating pattern information when the vibrating pattern information corresponding to selective driving of the plurality of vibrators is received from the wireless receiving unit, the method comprising:  
determining letters to be expressed which are included in the vibrating pattern information;  
determining a degree of driving operations according to the writing sequences of the vibrators corresponding to the writing sequences preset in the letters to be expressed; and  
sequentially driving the vibrators in the determined degree of driving operations while simultaneously driving the vibrator that is currently being written and the vibrator that is to be written next in each degree of driving operations.

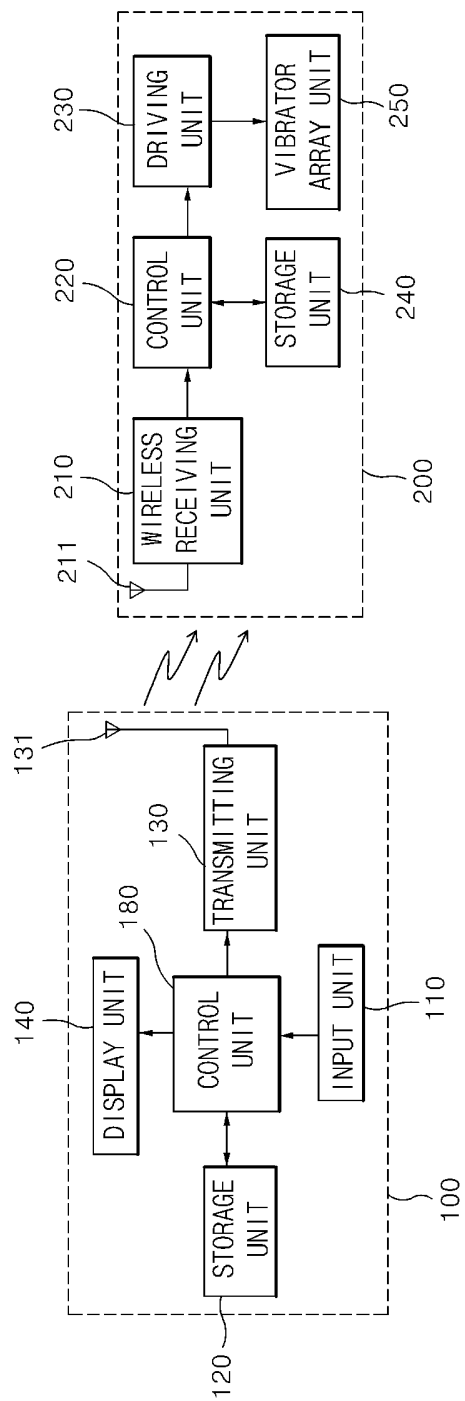
[Fig. 1]



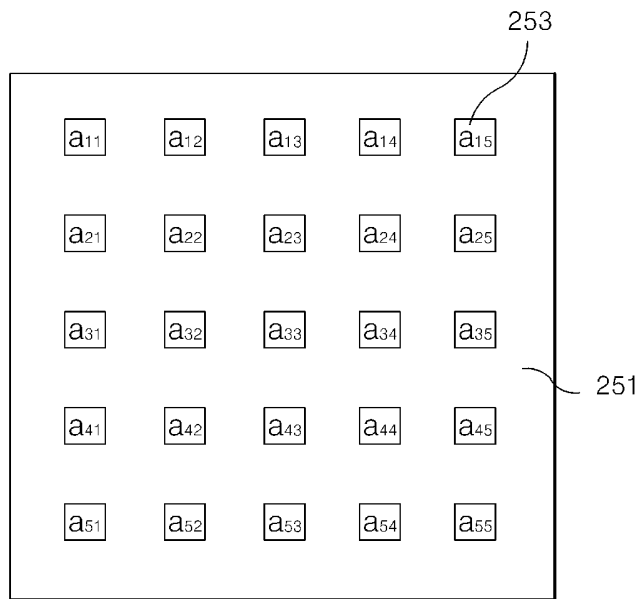
[Fig. 2]



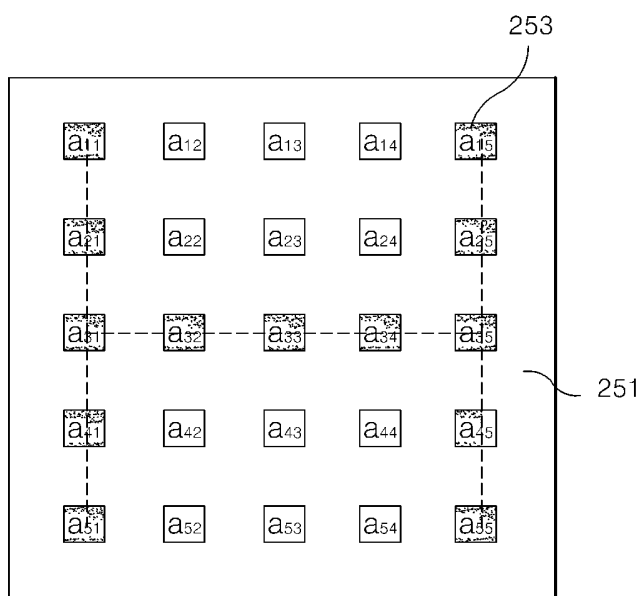
[Fig. 3]



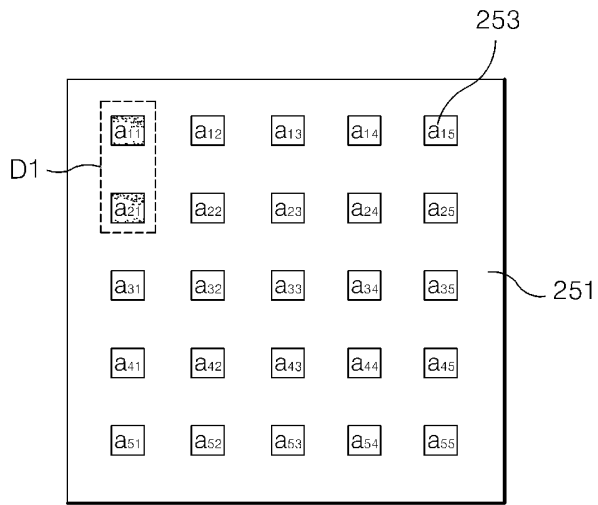
[Fig. 4]



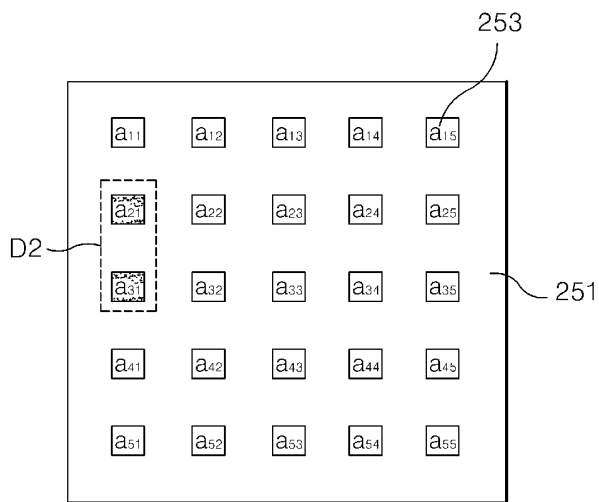
[Fig. 5]



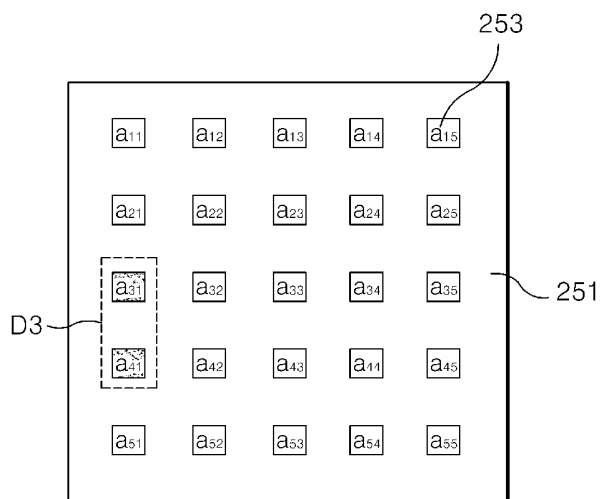
[Fig. 6]



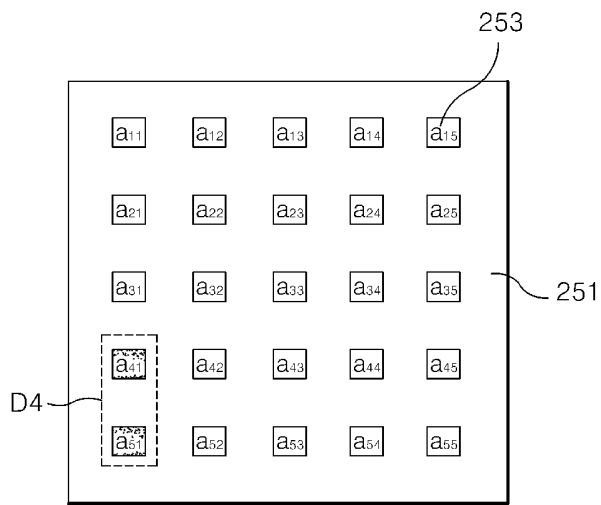
[Fig. 7]



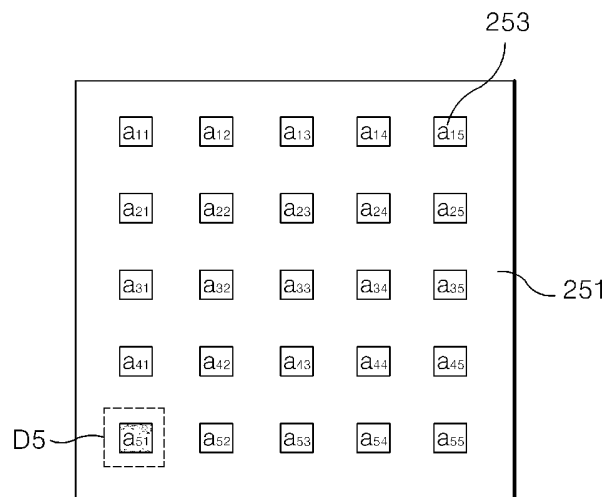
[Fig. 8]



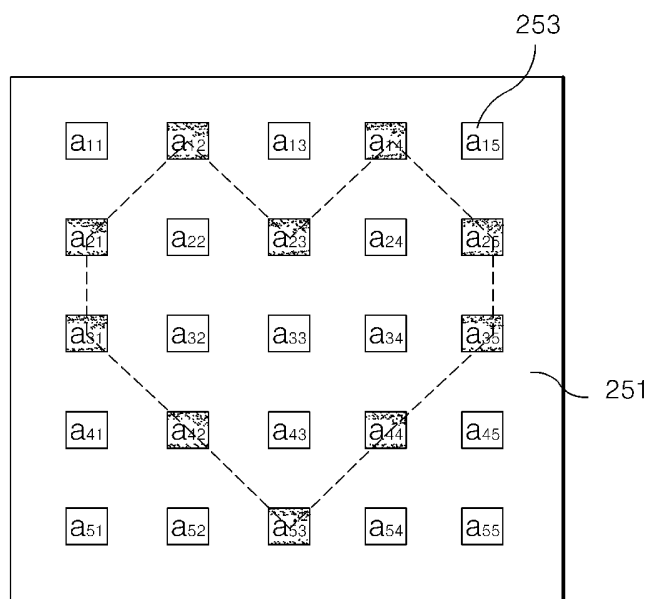
[Fig. 9]



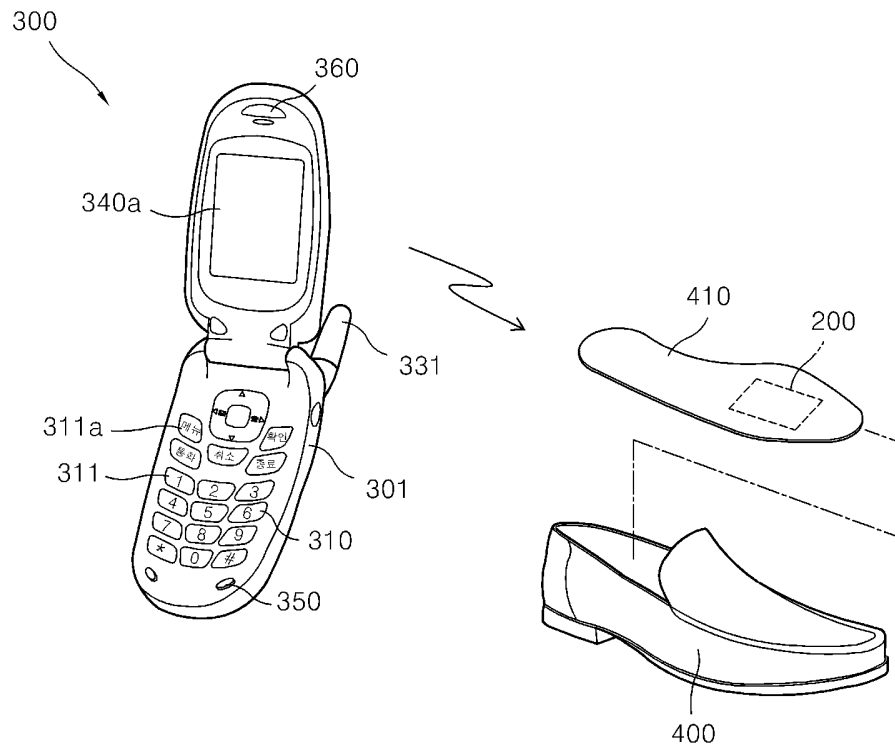
[Fig. 10]



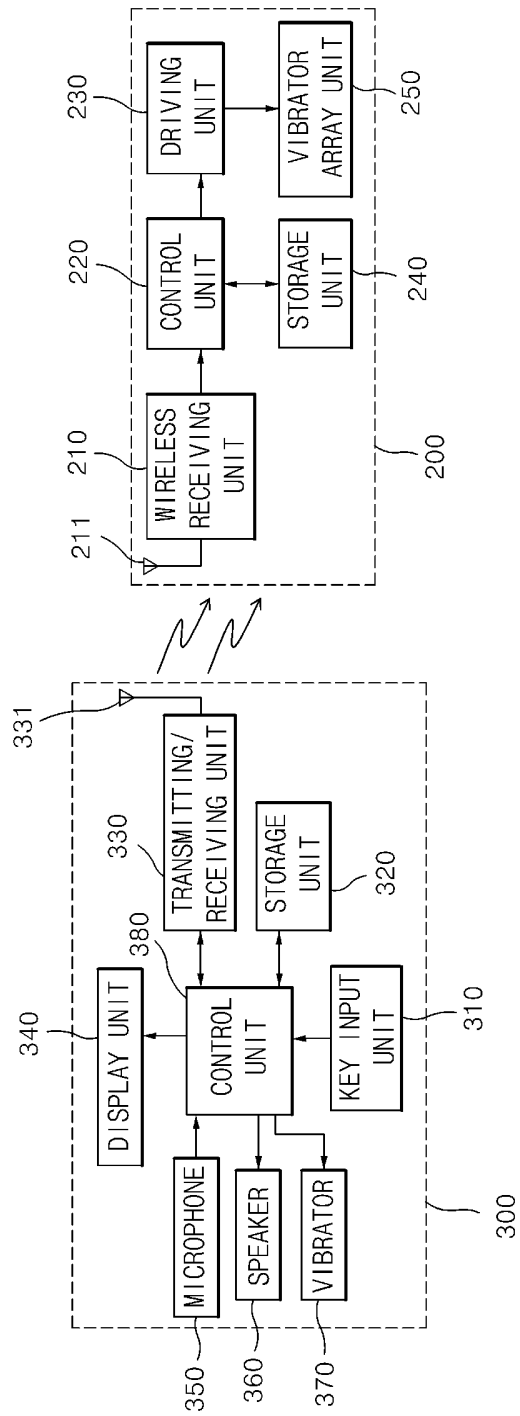
[Fig. 11]



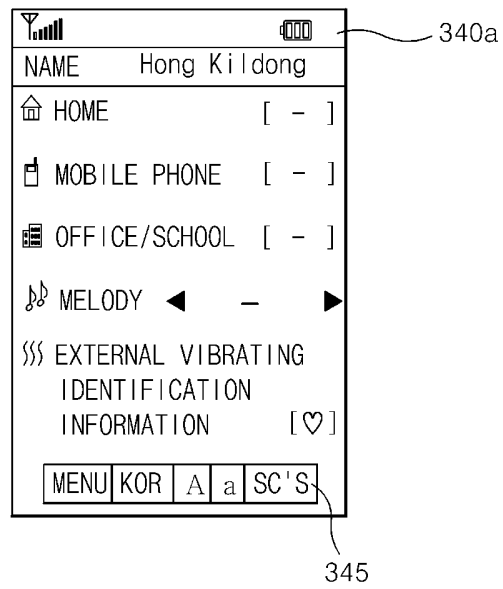
[Fig. 12]



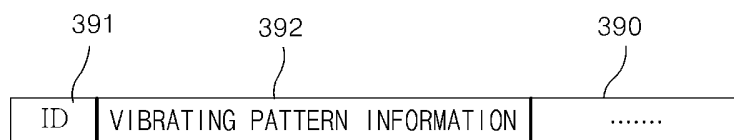
[Fig. 13]



[Fig. 14]



[Fig. 15]



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR2006/000618**A. CLASSIFICATION OF SUBJECT MATTER****H04B 1/40(2006.01)i**

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)

IPC8 : H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and application for invention since 1975

Utility models and application for Utility Models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKAIPASS (KIPO internet) " WIRELESS, VIBRATION, MOBILE, PHONE, REMOTE"

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                             | Relevant to claim No. |
|-----------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | KR 1020030008622 A (CHO, YANG RAE) 29 Jan 2003<br>See abstract; Fig 1&2; Page(s) 11, line 1 ~ Page(s) 3 line 16;               | 1-9                   |
| A         | KR 1019990037736 A (CHO, SUNG JAE) 25 May 1999<br>See abstract; Fig 1,7,8; Page(s) 2, Line 1~Page(s) 4 Line 57                 | 1-9                   |
| A         | KR 2020000004686 U (SAMSUNG ELECTRONICS CO. LTD.) 15 March 2000<br>See abstract; Fig 1; Page(s) 2, Line 4 - Page(s) 3, Line 24 | 1-9                   |



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See patent family annex.

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Date of the actual completion of the international search

27 JUNE 2006 (27.06.2006)

Date of mailing of the international search report

**27 JUNE 2006 (27.06.2006)**

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

PCT/KR2006/000618

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cited in search reportPublication  
datePatent family  
member(s)Publication  
date

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