

DESCRIPTION

Title of the Invention: ELECTRONIC APPARATUS

Technical Field

[0001] The present invention relates to an electronic apparatus that performs input by means of contact with a user's finger or the like.

Background Art

[0002] Electronic apparatuses that perform operation input by means of contact are described in Patent Document 1 and Patent Document 2. The electronic apparatus described in Patent Document 1 is an electrostatic switch. The electrostatic switch includes a base panel that transmits light from a light source and forms an operation surface, a light shielding layer having a light shielding property and an opening formed in a part for transmitting light from the light source, a diffuse transmission layer that diffuses light from the light source, and detection means for detecting an operation to the operation surface. In the electrostatic switch, the light source is disposed on the rear surface side of the base panel, the light shielding layer, and the detection means. Further, the light from the light source uniformly enters a light emission area disposed on the operation surface, and hence the operation surface is correctly displayed.

[0003] In addition, the electronic apparatus described in Patent Document 2 is a capacitive touch sensor. The capacitive touch sensor has an illumination function, and includes an LED (the light source), a light guide plate, and an FPC on which they are arranged. The FPC is provided with through holes for getting light from the light guide plate. Further, icons formed by printing or the like are arranged on the surface panel at positions corresponding to the through holes. The light guide plate is disposed to correspond to the through holes, and hence light emitted from the LED enters the light guide plate from a side surface thereof and exits from the front surface of the light guide plate. Therefore, as the LED, a side surface light emission type LED is used. Further, the light going out of the light guide plate passes through the through hole and illuminates the icon from the rear side. In this way, the user can accurately recognize the position of the icon on the surface panel and can accurately perform touch input.

List of Citations

Patent Literature

[0004] Patent Document 1: JP-A-2015-41223

Patent Document 2: JP-A-2013-65429

Summary of the Invention

Technical Problem

[0005] The electrostatic switch described in Patent Document 1 has the structure in which the light source is disposed on the rear surface side of the light emission area. In this structure in which the light source is disposed on the rear surface side of the light emission area, when the light source such as an LED having a narrow light irradiation region is used, it is necessary to set a long distance between the light source and the light emission area in order to irradiate the entire light emission area with sufficient light intensity. Therefore, it is difficult to downsize the electrostatic switch.

[0006] In addition, in the capacitive touch sensor described in Patent Document 2, because the light guide plate having a light receiving surface on a side surface is used, it is possible to avoid increase in thickness of the apparatus. However, in the capacitive touch sensor, in order to display information in general, it is necessary to use a rear surface light emission type LED and a side surface light emission type LED. In addition, in the side surface light emission type LED using a rear surface light emission type LED and a light guide plate, because of different distances to the surface panel, they are mounted on circuit boards disposed at different positions. In other words, two circuit boards are necessary for the LEDs. For this reason, the structure is complicated, and manufacturing cost is increased.

[0007] Therefore, it is an object of the present invention to provide an electronic apparatus with a simple structure capable of accurately detecting an operation input with an operating body.

Means for Solving the Problem

[0008] In order to achieve the above-mentioned object, the present invention provides an electronic apparatus in which an operation is performed to an operation area disposed

on a surface panel. The electronic apparatus includes a circuit board disposed on a rear surface side of the surface panel, a light source mounted on the circuit board, the light source including a light emitting portion that emits light to the surface panel, a capacitance detection unit mounted on the circuit board, so as to detect capacitance between itself and an operating body contacting with the surface panel, and a lens having a concave surface and a light output surface formed on the opposite side to the concave surface, in which the lens is disposed in such a manner that the concave surface faces the light emitting portion while the light output surface faces the surface panel.

[0009] With this structure, when irradiating the rear surface of the operation area with light for performing display so that a character, a figure, or the like emerges, even if an LED having high directivity is used as a light source, and even if a distance between the light source and the surface panel is short, it is possible to perform display in a wide operation area. In this way, the electronic apparatus can be downsized. In addition, because of the structure for detecting a change of capacitance, the distance between the operating body such as a finger and the capacitance detection unit can be shortened, and hence contact or separation of the operating body can be accurately detected.

[0010] In the structure described above, it is possible to adopt a structure in which a conductive member having a conductivity is disposed to contact with at least a part of the lens and the capacitance detection unit, and the conductive member is elastically deformable. With this structure, a substantial distance between the operating body such as a user's finger contacting with the surface panel and the capacitance detection unit can be decreased. In this way, contact or separation of the operating body can be accurately detected.

[0011] In the structure described above, it is possible to adopt a structure in which a fixing member for fixing the lens is disposed, the lens has a tapered surface whose diameter becomes larger as being closer to the operation area, the fixing member includes a support portion for housing the lens and contacting with at least a part of the tapered surface so as to support the lens, and the support portion is a reflection surface for reflecting light.

[0012] In the structure described above, the lens and the surface panel may contact tightly

with each other. With this structure, it is possible to prevent air having small dielectric constant from existing between the operating body such as a user's finger contacting with the surface panel and the capacitance detection unit. In this way, contact or separation of the operating body can be accurately detected.

[0013] In the structure described above, it is possible to adopt a structure in which the surface panel is provided with an informing area for informing information, the informing area having a smaller area than the operation area, the light source includes a first LED for emitting light to the operation area and a second LED for emitting light to the informing area, and both the first LED and the second LED are mounted on the circuit board. With this structure, it is possible to uniformly emit light to the operation area and the informing area having different sizes without differentiating the distance between the first LED and the surface panel from the distance between the second LED and the surface panel. In this way, it is not necessary to use a plurality of circuit boards so as to differentiate the distances or irradiation directions, and hence the structure can be simplified.

Advantageous Effects of the Invention

[0014] According to the present invention, it is possible to provide an electronic apparatus with a simple structure capable of accurately detecting an operation input with an operating body.

Brief Description of Drawings

[0015] Fig. 1 is a front view of an air cleaner as one example of an electronic apparatus according to the present invention.

Fig. 2 is a rear view of the air cleaner shown in Fig. 1.

Fig. 3 is a cross-sectional view cut in a middle part in an up-down direction of the air cleaner shown in Fig. 1.

Fig. 4 is a cross-sectional view cut in a middle part in a left-right direction of the air cleaner shown in Fig. 1.

Fig. 5 is a plan view of the air cleaner shown in Fig. 1.

Fig. 6 is a schematic view of an interface unit disposed on an upper surface of a

housing.

Fig. 7 is a diagram showing of a circuit board in a state where a surface cover is removed.

Fig. 8 is a cross-sectional view of an operation unit of the interface unit.

Fig. 9 is a cross-sectional view of an informing unit of the interface unit.

Fig. 10 is a cross-sectional view of another example of the operation unit of the interface unit used in the electronic apparatus according to the present invention.

Fig. 11 is a perspective view of a humidification air cleaner as another example of the electronic apparatus according to the present invention viewed from the front.

Fig. 12 is a cross-sectional view of the humidification air cleaner shown in Fig. 11.

Fig. 13 is a perspective view of a humidification unit.

Fig. 14 is a front view of a water supplier used in the humidification unit shown in Fig. 13.

Fig. 15 is an enlarged perspective view of a part of a filter.

Fig. 16 is a schematic view of an interface unit disposed on the upper surface of the housing.

Description of Embodiments

[0016] Hereinafter, embodiments of the present invention are described with reference to the drawings.

[0017] <First embodiment>

Fig. 1 is a front view of an air cleaner as one example of an electronic apparatus according to the present invention. Fig. 2 is a rear view of the air cleaner shown in Fig. 1. Fig. 3 is a cross-sectional view cut in a middle part in an up-down direction of the air cleaner shown in Fig. 1. Fig. 4 is a cross-sectional view cut in a middle part in a left-right direction of the air cleaner shown in Fig. 1.

[0018] Note that in the following description, otherwise noted, the up-down direction and the left-right direction are defined based on an air cleaner A shown in Fig. 1. In addition, a depth direction of the paper plane of Fig. 1 is a front-rear direction, and a front side of the paper plane is regarded as the front in the description of each unit.

[0019] The air cleaner A includes a housing 10, a dust collector 20 disposed in the housing 10, and an interface unit 30 disposed on an upper surface of the housing 10. The housing

- 10 is a rectangular box-shaped member constituting an exterior of the air cleaner A. The housing 10 has a suction opening 11, an air passage 12, and blow-out openings 13.
- [0020] As shown in Fig. 2, the suction opening 11 is formed on a rear surface of the housing 10. The suction opening 11 has a rectangular shape and is an opening for sucking external air into the housing 10. The air passage 12 is a space for generating a flow of air (airflow) when driving a blower 24 provided to the dust collector 20 as described later. The air passage 12 includes a branch part 121 and branch air passages 122. Each of the branch air passages 122 is formed on each of the left and right end sides in the housing 11. The branch part 121 connects the left and right branch air passages 122. The branch part 121 allows the air sucked from the suction opening 11 to branch into the left and right branch air passages 122.
- [0021] Each of the blow-out openings 13 is formed on each of the left and right sides of the front of the housing 10. The blow-out openings 13 are continuous from the branch air passage 122, and the air after passing through the branch air passages 122 is blown to the outside from the blow-out openings 13. Further, a grid-like grill 131 is attached to each of the left and right blow-out openings 13.
- [0022] In the air cleaner A, the suction opening 11, the air passage 12, and the blow-out opening 13 are communicated in this order. Further, the air sucked from the suction opening 11 into the housing 10 passes through the air passage 12 and is blown to the outside of the housing 10 from the blow-out opening 13.
- [0023] In the air cleaner A, the dust collector 20 is disposed inside the housing 10. The dust collector 20 includes a prefilter 21, dust collecting filters 22, a dust removing unit 23, and the blowers 24. Each of the blowers 24 is disposed in each of the left and right branch air passages 122. As shown in Fig. 3, the blower 24 is a centrifugal fan. However, without limiting to this, various fans capable of generating an airflow can be used. The blower 24 is connected to a motor (electric motor) that is not shown, and it is driven by the motor to generate the airflow.
- [0024] The prefilter 21 is disposed inside the housing 10 so as to face the suction opening 11. The prefilter 21 is constituted of a rectangular frame 211 made of synthetic resin such as ABS resin having windows arranged vertically and horizontally in a matrix and a mesh 212 made of polypropylene or the like welded to the frame 211. The mesh 212 collects dust contained in the air sucked from the suction opening 11. The dust

collected by the prefilter 21 is removed by the dust removing unit 23 (dust removal is performed).

[0025] The dust removing unit 23 is disposed in an upper space inside the housing 10. The dust removing unit 23 includes a rotation blush 231, a dust box 232, a guide frame 233, and a pinion 234. The dust removing unit 23 moves the prefilter 21 along the guide frame 233. The dust stuck to the prefilter 21 is removed by the rotation blush 231 and is collected into the dust box 232.

[0026] The pinion 234 is engaged with a rack (not shown) disposed on each edge of the prefilter 21 on the left and right sides. The pinion 234 is rotated by a motor that is not shown. When the pinion 234 rotates, the prefilter 21 moves in a reciprocating manner between a dust collecting position P1 facing the suction opening 11 and a retreat position P2 retreated to the dust removing unit 23. In this case, the prefilter 21 is guided by the guide frame 233.

[0027] The dust box 232 is disposed along the guide frame 233 and is detachable from and attachable to the housing 10. An opening 14 for putting in and out the dust box 232 is formed in the rear surface of the housing 10.

[0028] The rotation blush 231 is disposed inside the dust box 232. The rotation blush 231 is driven to rotate by a motor that is not shown. Note that the motor that drives the rotation blush 231 to rotate and the motor that drives the pinion 234 to rotate may be different motors or may be the same motor. The rotation blush 231 includes a rotation shaft and brush bristles disposed on the outer surface of the rotation shaft. The brush bristles are formed to stand radially on the outer surface of the rotation shaft. The rotation blush 231 is rotated so that the moving direction of brush bristle tips is opposite to the moving direction of the prefilter 21 when the prefilter 21 moves from the dust collecting position P1 to the retreat position P2. In this way, when the prefilter 21 moves from the dust collecting position P1 to the retreat position P2, the dust collected on the surface of the prefilter 21 is removed by the brush bristles. The dust removed from the prefilter 21 by the rotation blush 231 is stored in the dust box 232.

[0029] The dust removal from the prefilter 21 by the dust removing unit 23 may be performed regularly, for example, when an elapsed time of the air cleaning operation from the last dust removal reaches a predetermined time. In addition, a sensor may be

disposed so that the dust removal is performed when the prefilter 21 gets dirty to a certain degree. A method of detecting dirt of the prefilter 21 may be a method of directly checking the prefilter 21 or may be a method of detecting air quantity passing through the prefilter 21 so as to detect clogging of the prefilter 21. Note that when the dust removing unit 23 operates, the blowers 24 are stopped.

[0030] The dust collecting filters 22 are disposed in a boundary part between the branch part 121 of the air passage 12 and the branch air passages 122. In other words, the dust collecting filters 22 are disposed on the left and right sides so that the air flows entering into the left and right branch air passages 122 pass the dust collecting filters 22. As the dust collecting filter 22, there is a HEPA filter, for example, but this is not a limitation. The dust collecting filter 22 includes a filter material 221 and a frame material 222. The filter material 221 collects foreign matter such as dust in the passing air. The frame material 222 is made of resin, and the filter material 221 is fixed to the frame material 222 with hot melt. Note that it is preferred that the filter material 221 be folded like bellows (be pleated). In this way, filtration area of the filter material 221 can be increased.

[0031] The filter material 221 is finer than the mesh 212. In other words, the dust collecting filter 22 can collect foreign matter finer than the prefilter 21 (e.g. PM2.5 or micro particle matter). The dust collecting filter 22 is disposed on the upstream of an air sucking part of each of the left and right blowers 24. In the air cleaner A, large foreign matter is collected by the prefilter 21, and fine foreign matter that cannot be collected by the prefilter 21 is collected by the dust collecting filter 22.

[0032] A deodorizing filter (not shown) containing adsorbent such as activated carbon that absorbs odor components (particles) contained in the air may be disposed between the prefilter 21 and the dust collecting filter 22. In this way, odor components in the air are absorbed by the adsorbent, and the air can be deodorized.

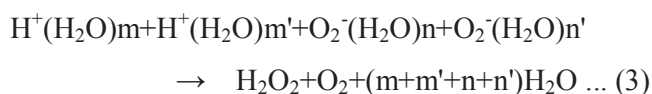
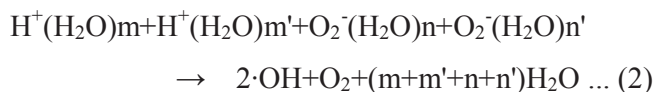
[0033] In addition, an ion generator 15 for supplying ions to the airflow is disposed in the air passage 12. The ion generator 15 has an electrode exposed to the inside of the branch air passage 122 in each of the branch air passages 122. In the ion generator 15, a voltage having an AC waveform or a pulse waveform is applied to the electrode so that positive ions and/or negative ions are generated.

[0034] For example, when a positive voltage is applied to the electrode, positive ions mainly

containing $H^+(H_2O)_m$ are generated. When a negative voltage is applied, negative ions mainly containing $O_2^-(H_2O)_n$ are generated. Here m and n are integers. $H^+(H_2O)_m$ and $O_2^-(H_2O)_n$ are condensed on surfaces of floating bacteria and odor components in the air and enclose them.

[0035] Further, as shown in formula (1) to (3), $[OH]$ (hydroxyl radical) and H_2O_2 (hydrogen peroxide) that are active species are condensed and generated by collision on surfaces of microorganisms or the like so that the floating bacteria and the like are killed. Here m' and n' are integers. Therefore the air cleaner A can remove germs and odors in a room by generating positive ions and negative ions and discharging them from the blow-out openings 13.

[0036] $H^+(H_2O)_m + O_2^-(H_2O)_n \rightarrow \cdot OH + 1/2 O_2 + (m+n) H_2O \dots (1)$



[0037] A dust sensor (not shown) and an odor sensor (not shown) are disposed in a vicinity of the dust collecting filter 22. The dust sensor is constituted of an optical sensor including a light emitting element and a light receiving element, and it detects concentration of dust in the air based on an output pulse width output from the light receiving element. In addition, it is possible to distinguish between PM2.5 and dust having particle sizes larger than PM2.5 based on the pulse waveform of the output voltage of the dust sensor. For example, the pulse waveform of PM2.5 has a gentle peak, while the pulse waveform of dust having a larger particle size has a steep peak. In this way, it is possible to extract concentration of PM2.5 in the air from the detection result by the dust sensor. The odor sensor detects concentration of odor components in the air.

[0038] The air cleaner A informs a user of information and receives an operation input by the user with the interface unit 30 disposed on the upper surface of the housing 10. Hereinafter, details of the interface unit 30 are described with reference to the drawings. Fig. 5 is a plan view of the air cleaner shown in Fig. 1, Fig. 6 is a schematic view of the interface unit disposed on the upper surface of the housing, and Fig. 7 is a diagram showing a circuit board in a state where a surface cover is removed.

Note that in Fig. 7, for convenience sake of description, buttons 31a to 31e and display units 32a to 32f are shown in schematic shapes.

[0039] As shown in Fig. 5, in the air cleaner A, the interface unit 30 is disposed on the upper surface of the housing 10. As shown in Fig. 6, the interface unit 30 includes an operation unit 301 for receiving an operation input by the user, and an informing unit 302 for notifying a status of the air cleaner A. Note that the operation unit 301 and the informing unit 302 of the interface unit 30 informs the user of positions and information by transmission of light emitted from first LEDs 331 or second LEDs 332 disposed inside. The interface unit 30 displays information with light emitted from the first LEDs 331 or the second LEDs 332 passing through openings 344 formed in a light shielding member 342 as described later. Details of this display will be described later.

[0040] The operation unit 301 includes a plurality of buttons 31a to 32f, and operation settings of the air cleaner A are made by user's operation. The buttons 31a to 32f are displayed to the user with related operations by figures (i.e. icons) or character strings. By operating the button 31a, a timer operation is set. For example, it is possible to set time to turn on/off a power supply or time period until turning on/off the power supply. By operating the button 31b, the dust removing unit 23 performs the dust removal of the prefilter 21. By operating the button 31c, airflow quantity of the blower 24 can be adjusted.

[0041] The button 31d notifies replacement timing of the dust collecting filter 22, and the notification of replacement timing of the dust collecting filter 22 is reset by operating the button 31d. The button 31e notifies necessity of disposal of foreign matter stored in the dust box 232, and the notification of disposal of foreign matter by the button 31e is reset by operating the button 31e. By operating the button 31f, power supply to the air cleaner A is started or stopped. The button 31f is a so-called power supply button.

[0042] Note that the buttons 31a to 31e have figures and characters that emerge with light passing through the openings 344 formed in the light shielding member 342 as described above. For this purpose, the first LEDs 331 are disposed behind the buttons 31a to 31e. In other words, the buttons 31a to 31e are not displayed when the power supply to the air cleaner A is turned off. On the other hand, because the

button 31f is the power supply button, it should be recognized by the user regardless of on/off of power supply to the air cleaner A. Therefore, the button 31f is formed on the surface panel 34 of the interface unit 30 as described later. The button 31f may be printed or may be a recess formed on the surface. In this description, it is printed.

[0043] The informing unit 302 includes the display units 32a to 32g and displays a current status of the air cleaner A or an operation being performed by the user. The display unit 32a is a so-called 7-segment display unit having seven segments that emit light. The display unit 32a displays a character such as a number or an alphabet by switching on/off of light emission of the seven segments. In this description, it is used for displaying time when the timer is used, current time, air temperature, or the like.

[0044] The display unit 32b displays either one of an "on timer" for turning on the power supply after a predetermined time elapses and an "off timer" for turning off the power supply. It is a so-called luminous character display. The display unit 32c notifies a state of the air around the air cleaner A. Three items of information including "odor", "dust", and "PM2.5" are notified, but these are not limitations. Further, adjacent to the character display, four indicators are provided to each of the displays. The indicators are turned on or off, and the state of each item is notified by the number of turned-on elements. In this description, characters of information "odor", "dust", and "PM2.5" to be notified are luminous, but may be printed.

[0045] The display unit 32d is turned on when the ion generator 15 is operating. In Fig. 6, there is a character display for which description is omitted. Unless particularly described, it may be a luminous character display or may be printed. If the luminous character display is used, when the power supply is turned off, display on the surface of the interface unit 30 can be turned off so that design thereof can be improved.

[0046] The display unit 32e notifies whether or not input operation of the button 31b is locked. When it is turned on, it notifies that the button 31b is locked. The display unit 32f notifies blowing intensity of the blower 24. For example, "automatic", "high", "medium" and "quiet" are set as the blowing intensity, but these are not limitations. For example, like the display unit 32c, the blowing intensity may be indicated by the number of turned-on indicators. The display unit 32f is a luminous

character display.

[0047] Next, details of the interface unit of the electronic apparatus according to the present invention are described. Fig. 8 is a cross-sectional view of the operation unit of the interface unit. Fig. 9 is a cross-sectional view of the informing unit of the interface unit. As described above, in the interface unit 30, the icon or the character string is displayed with light emission by transmitting light from the rear surface. As shown in Fig. 7, in the interface unit 30, the first LED 331 as a light source is disposed below each of the buttons 31a to 31e of the operation unit 301. In addition, the second LED 332 as a light source is disposed below each display body of the display units 32a to 32f of the informing unit 302 (e.g. each segment of the display unit 32a and each indicator of the display unit 32c).

[0048] As shown in Figs. 6 and 7, a range of displaying each of the buttons 31a to 31e of the operation unit 301 has a size different from that of a range displaying the display units 32a to 32f of the informing unit 302. Therefore, the operation unit 301 and the informing unit 302 have different structures. In the interface unit 30, the operation unit 301 and the informing unit 302 have a common part. First, the common part of the operation unit 301 and the informing unit 302 is described.

[0049] As shown in Figs. 8 and 9, the interface unit 30 includes a circuit board 33 and the surface panel 34. The circuit board 33 is a printed wiring board that is generally used. The surface panel 34 includes a diffusion member 341, the light shielding member 342, and a light transmitting member 343. The diffusion member 341 diffuses incident light so as to suppress deviation of luminance (luminance unevenness) of the transmitted light. The diffusion member 341 is conventionally well known, and hence detailed description thereof is omitted.

[0050] The light shielding member 342 shields light. The light shielding member 342 uses a black color, but this is not a limitation. In the surface panel 34, the light transmitting member 343 is disposed on the upper side of the light shielding member 342. Therefore, when viewing the surface panel 34 from outside, the light shielding member 342 is seen. In other words, the surface panel 34 is seen to have the color of the light shielding member 342 when viewing it from outside. In this description, because the light shielding member 342 has black color, the interface unit 30 is seen to have black color. In addition, because the light shielding member 342 has black

color, external light is shielded from entering inside of the interface unit 30. Therefore, when the power supply of the air cleaner A is turned off, the buttons 31a to 31e other than the button 31f and the display units 32a to 32f are not seen (are hidden) in the interface unit 30.

[0051] The openings 344 are formed in the light shielding member 342. In the light shielding member 342, the openings 344 transmit light, while other parts shield light. Therefore, the opening 344 has a shape of the icon or the character string of the operation unit 301, or the segment, the indicator, or the character string of the informing unit 302.

[0052] The light transmitting member 343 is made of material such as glass, acrylate resin, or polycarbonate resin, which has high light transmittance. The surface panel 34 has a structure in which the light shielding member 342 is sandwiched and fixed between the diffusion member 341 and the light transmitting member 343. Note that the diffusion member 341, the light shielding member 342, and the light transmitting member 343 are glued with adhesive having high light transmittance. In this way, because the openings 344 of the light shielding member 342 are filled with the adhesive, formation of air layer in the surface panel 34 can be suppressed. Furthermore, this structure of the diffusion member 341 and the light shielding member 342 is not a limitation, and it is possible to adopt a structure in which a light diffusing layer is printed on the surface of the light shielding member 342.

[0053] A structure of the informing unit 302 is described. The display units 32a to 32f of the informing unit 302 have the same structure except for different sizes, figures or character strings. Therefore, as a typical one for them, an informing area 32 of the display unit is described. In the informing unit 302, the second LEDs 332 are mounted on the circuit board 33. In addition, the openings 344 forming the segments, the indicators, or the character strings are arranged in the informing area 32 of the informing unit. Further, the light emitted from the second LED 332 passes through the opening 344. In this way, when the user views the informing area 32 from the surface side of the light transmitting member 343, the informing area 32, i.e., the segments, the indicators, or the character strings are seen as if they emit light (emerges).

[0054] In order to uniformly display the segments, the indicators, or the character strings, the

second LED 332 irradiates the corresponding opening 344 with uniform or substantially uniform light. In general, an LED has narrow light distribution, and a distance between the light output surface of the second LED 332 and the surface panel 34 is L. In other words, the distance L between the circuit board 33 and the surface panel 34 is determined by a light distribution angle of the second LED 332 and a size of the opening 344 positioned in the informing area 32. Note that though not shown, a light shielding member covering the LED 332 and the opening 344 is disposed between the second LED 332 and the surface panel 34, and thus leakage of light from the LED 332 through an unintended opening can be prevented.

[0055] Next, a structure of the operation unit 301 is described. First, the button 31f for which luminous display is not performed is described. The button 31f is the power supply button, and luminous display is not performed but the icon is printed for it. The icon may be printed on the surface of the light transmitting member 343 or may be printed on a surface of the light transmitting member 343 facing the light shielding member 342. By printing it on the surface of the light transmitting member 343 facing the light shielding member 342, the user can correctly view and recognize it, and the icon can be prevented from being worn by use. In addition, an electrostatic sensor 35 described later is disposed on the circuit board 33 below the button 31f, and a conductive member 36 described later is disposed between the electrostatic sensor 35 and the surface panel 34 so as to contact with each of them. The conductive member 36 disposed at the button 31f may have a solid cylindrical shape.

[0056] The operation unit 301 performs luminous display for each of the buttons 31a to 31e. The luminous displays of the buttons 31a to 31e have the same structure except for different sizes, figures and character strings. Therefore, they are typically described as an operation area 31.

[0057] The first LED 331, the electrostatic sensor 35 (capacitance detection unit), the conductive member 36, a lens 37, and a fixing member 38 are disposed below the operation area 31. Note that the circuit board 33 and the surface panel 34 (except for a shape of the opening 344 of the light shielding member 342) have the same structure as those of the informing unit 302. The first LED 331 is mounted on the circuit board 33 at the center of the part corresponding to the operation area 31. The part at which the first LED 331 is mounted on the circuit board 33 is provided with a

reflection surface that reflects light. Note that the reflection surface may be a surface having white color, but this is not a limitation.

[0058] The electrostatic sensor 35 is a sensor that detects accumulated charge. The electrostatic sensor 35 forms a capacitor between itself and an operating body such as a finger of the user contacting with the surface panel 34, and it detects charge accumulated according to charge of the operating body. In other words, it detects a variation in capacitance of the capacitor formed between itself and the operating body. Further, in accordance with a result of the detection, contact or separation of the operating body to or from the surface panel 34 is detected. The electrostatic sensor 35 is mounted on the circuit board 33 and has the same or substantially the same outer periphery shape as the operation area 31. The first LED 331 is mounted on the circuit board 33 at the center of the part corresponding to the operation area 31. Therefore, the electrostatic sensor 35 has an annular shape (see Fig. 7). Note that the electrostatic sensor 35 is sufficient to have a size such that the charge can be detected when the operating body touches the surface panel 34.

[0059] The lens 37 is disposed above the first LED 331. The lens 37 is a so-called concave lens that increases an irradiation range of the light emitted from the first LED 331. The lens 37 includes a concave surface 371, an enlarged part 372, and a light output surface 373. The concave surface 371 and the light output surface 373 of the lens 37 are formed to face opposite directions. The enlarged part 372 has a conical shape whose area becomes larger as being closer to the light output surface 373. The light output surface 373 is formed at the largest part of the enlarged part 372. The light output surface 373 is formed to have a size equal to or larger than that of the operation area 31. In other words, in a plan view, the light output surface 373 has a size in which the openings 344 are included.

[0060] The lens 37 is fixed to the fixing member 38. The fixing member 38 has a cone-shaped through hole 381 and holds the lens 37 in such a manner that the enlarged part 372 of the lens 37 abuts a tapered surface 382 of the through hole 381. Further, when the fixing member 38 is fixed to the surface panel 34, the lens 37 is also fixed. The fixing member 38 may be fixed to the surface panel 34 or may be fixed to the circuit board 33 so as to be pressed to the surface panel 34 and be substantially fixed. In addition, it is preferred to tightly contact the lens 37 and the surface panel 34 so that

no air layer exists therebetween. In this way, sensitivity (accuracy) of operation detection by the electrostatic sensor 35 can be improved.

[0061] The tapered surface 382 of the through hole 381 has a light reflecting structure (e.g. a structure having a white color surface). In this way, even if the light entering from the concave surface 371 leaks from the enlarged part 372 to the outside, the light is reflected by the tapered surface 382 and returns to the lens 37. In this way, the light emitted from the first LED 331 can be used without waste. In order that the light leaked from the enlarged part 372 securely returns to the lens 37, the surface of the enlarged part 372 and the tapered surface 382 contact tightly with each other. In other words, it is preferred that there should be no air layer between them. In particular, when the lens 37 and the fixing member 38 are molded integrally, there is no air layer between them.

[0062] There is a gap between the lens 37 or the fixing member 38 and the electrostatic sensor 35, and if there is air that has a small dielectric constant in this part, the charge accumulated in the electrostatic sensor 35 is decreased, and charge detection accuracy is decreased. In other words, it is difficult to detect contact or separation of the operating body to or from the surface panel 34. In other words, in order that the electrostatic sensor 35 accurately detects that the operating body (finger) has contacted to the surface panel 34, it is preferred that there should be no air between the surface panel 34 and the electrostatic sensor 35.

[0063] Therefore, the conductive member 36 is disposed between the electrostatic sensor 35 and the lens 37 as well as the fixing member 38. The conductive member 36 contacts with both the electrostatic sensor 35 and the lens 37. In addition, the conductive member 36 contacts with both the electrostatic sensor 35 and the fixing member 38. The conductive member 36 is an elastically deformable member, i.e. a conductive cushion. Because the conductive member 36 contacts with the electrostatic sensor 35, the capacitor formed between the operating body and the electrostatic sensor 35 is replaced with a capacitor formed between the operating body and the upper surface of the conductive member 36. The surface panel 34, the lens 37, and the fixing member 38 are disposed between the conductive member 36 and the operating body, and there is no air therebetween. Further, because the distance between the operating body and the conductive member 36 is decreased, the

electrostatic sensor 35 can store a lot of charge. Thus, the electrostatic sensor 35 can accurately detect the contact or separation of the operating body.

[0064] In this way, using the lens 37, the distance L between the circuit board 33 and the surface panel 34 can be set according to the informing area 32 having a small range irradiated with light, and the operation area 31 having a large range irradiated with light and the same distance L can be irradiated with light with little luminance unevenness. In addition, by commonizing the distance L between the circuit board 33 and the surface panel 34 is commonized between the operation area 31 and the informing area 32, the circuit board 33 can be commonized.

[0065] In addition, by using the lens 37 and the conductive member 36, the icons and the character strings in the operation area 31 can be uniformly displayed, and the operation input can be correctly performed with the electrostatic sensor 35.

[0066] Note that it is preferred that the concave surface 371 of the lens 37 should receive the entire light emitted from the first LED 331, i.e. it should be disposed to cover the entire spreading range of the first LED 331. The conductive member 36 has conductivity and an elastically deformable structure, and has black color or a color close to black that is apt to absorb light, in many cases. Therefore, by restricting the entire spreading light emitted from the first LED 331 within the concave surface 371, it is possible to suppress the light emitted from the first LED 331 from being absorbed by the conductive member 36. Note that the concave surface 371 is formed in a part of the middle part of the lens 37 facing the circuit board 33, but without limiting to this, the entire surface of the lens 37 facing the circuit board 33 may be formed to be the concave surface.

[0067] Because the conductive member 36 is elastically deformable, the buttons 31a to 31e of this embodiment disperses the force applied when the user operates the buttons 31a to 31e. In this way, the force acting on the first LED 331, the electrostatic sensor 35, the circuit board 33, or the like can be eliminated or reduced. In this way, it is possible to suppress a malfunction such as breakage or breakdown due to operation of the buttons 31a to 31e. Note that the force applied when the user operates the buttons 31a to 31e is also dispersed by deformation of the surface panel 34 or the fixing member 38, too.

[0068] <Second embodiment>

Another example of the electronic apparatus according to the present invention is described with reference to the drawings. Fig. 10 is a cross-sectional view of another example of the operation unit of the interface unit used in the electronic apparatus according to the present invention. The structure of a part below an operation area 39 shown in Fig. 10 is the same as the structure below the operation area 31 shown in Fig. 8 except that a shape of the lens 37 is different and that the conductive member 36 is eliminated. Therefore, in the structure below the operation area 39, substantially the same part as the structure below the operation area 31 is denoted by the same numeral, and detailed description of the same part is omitted.

[0069] As shown in Fig. 10, a lens 391 is disposed below the operation area 39. The lens 391 includes a concave surface 392, a light output surface 393, and a contact surface 394. The concave surface 392 is a light receiving part that receives the light emitted from the first LED 331 in the same manner as the concave surface 371 of the lens 37. In addition, the light output surface 393 is a surface from which light is emitted in the same manner as the light output surface 373 of the lens 37 and contacts tightly with the diffusion member 341 of the surface panel 34.

[0070] The contact surface 394 is a flat surface formed on the opposite side to the light output surface 393. The concave surface 392 is adjacent to a center part of the contact surface 394. In other words, the contact surface 394 is a flat surface surrounding the concave surface 392. The lens 39 has an enlarged part 395, and a part of the enlarged part 395 is held by the fixing member 38. The fixing member 38 holds the lens 39 and is fixed to the surface panel 34. Thus, the light output surface 393 of the lens 39 contacts tightly with the diffusion member 341 of the surface panel 34, and the contact surface 394 contacts tightly with the electrostatic sensor 35.

[0071] In other words, the surface panel 34 and the lens 391 exist between the operating body such as a finger contacting with the surface panel 34 and the electrostatic sensor 35, and no air layer exists between them. In this way, even if the conductive member is eliminated, sufficient charge can be stored in the electrostatic sensor 35. The electrostatic sensor 35 can accurately detect contact of the operating body to the surface panel 34. Note that conductive grease or the like may be applied between the contact surface 394 of the lens 39 and the electrostatic sensor 35 so that no air layer is generated.

[0072] Because a conductive member is not necessary in the structure below the operation area 39, it is possible to reduce structural members. Note that although the lens 391 is fixed using the fixing member 38 in this variation, the fixing member 38 may be eliminated by adopting a structure in which the lens 39 is glued to the surface panel 34 and the electrostatic sensor 35 so that the lens 391 can be prevented from being shifted. In addition, the lens 391 has a shape whose area increases toward the light output surface 393 in this variation, but this is not a limitation. For example, viewing from an axial direction perpendicular to the light output surface 393 of the lens 391, the light output surface 393 may have the same outer shape as that of the contact surface 394.

[0073] In the embodiment described above, the lenses 37 and 391 have circular light output surfaces 373 and 393, and cross sections thereof cut in a plane perpendicular to the axes perpendicular to the light output surfaces 373 and 393 are circles. However, this is not a limitation. For example, if the button has a rectangular shape, a lens corresponding to the shape may be used. In this case, the electrostatic sensor may also have a shape corresponding to the button. Various lenses having a shape corresponding to the shape of the button may be used. In addition, even if the button has a shape other than a circle, the lens may have a circular shape viewed from the axial direction. In this case, the light output surface of the lens may have a circular shape enclosing the shape of the button viewed from the axial direction. Because the light output surface is larger than the icon indicating the shape of the button, the opening can be irradiated with uniform or substantially uniform light, and hence the icon can be displayed without unevenness or with little unevenness.

[0074] In addition, the electrostatic sensor may also have a circular shape in the same manner. The electrostatic sensor is opposed to the button in the axial direction to form a capacitor with the operating body and should have a shape and a size that can store sufficient charge to be detected.

[0075] <Third embodiment>

Another example of the electronic apparatus the present invention is described with reference to the drawings. Fig. 11 is a perspective view of a humidification air cleaner as another example of the electronic apparatus according to the present invention viewed from the front, and Fig. 12 is a cross-sectional view of the

humidification air cleaner shown in Fig. 11. In the following description, when referring to up and down, left and right, or front and rear, it is based on the state shown in Fig. 11. In other words, the left side in Fig. 11 corresponds to the front side (fore side). Further, facing the front, the left-right direction, the up-down direction, and the front-rear direction are defined.

[0076] A humidification air cleaner B shown in Fig. 11 includes a housing 40, a filter unit 50, a humidification unit 60, a blowing unit 70, and an interface unit 80. The housing 40 includes a suction opening 41, an air passage 42, a first blow-out opening 43, a second blow-out opening 44, a first louver 45, a second louver 46, and a damper 47.

[0077] The suction opening 41 is an opening disposed on a rear surface of the housing 40. When the blowing unit 70 is driven, external air is sucked from the suction opening 41 into the housing 40. The filter unit 50 is attached to the inner side of the suction opening 41 so as to cover the suction opening 41. The air sucked from the suction opening 41 passes through the filter unit 50. The air passage 42 is an air passage in which the air sucked from the suction opening 41 passes. As shown in Fig. 12, the air sucked from the suction opening 41 moves to the front side and moves upward.

[0078] The air passage 42 branches on the middle, and one is connected to the first blow-out opening 43 formed in the upper surface, while the other is connected to the second blow-out opening 44 formed in the front surface. The first blow-out opening 43 and the second blow-out opening 44 are openings for blowing the air flowing in the air passage 42 to the outside. The first louver 45 opens and closes the first blow-out opening 43. The first louver 45 can be stopped in the state opened at a predetermined angle from a position closing the first blow-out opening 43. By stopping the first louver 45, the direction of the air blown out from the first blow-out opening 43 can be changed (adjusted). The second louver 46 is constituted in the same manner as the first louver 45. The second louver 46 opens and closes the second blow-out opening 44. The second louver 46 can change (adjust) the direction of the air blown out from the second blow-out opening 44.

[0079] The damper 47 divides the airflow quantity of the air flowing in the air passage 42 at a predetermined ratio with respect to the first blow-out opening 43 or the second blow-out opening 44. By adjusting open and close of the first louver 45, the second louver 46, and the damper 47, the flow quantities of the airflows blown out from the first

blow-out opening 43 and the second blow-out opening 44 are adjusted.

[0080] An ion generator 48 is disposed in a vicinity of the first blow-out opening 43 of the air passage 42. The ion generator 48 has an ion generating electrode exposed to the air passage 42. Note that details of the ion generator 48 is the same as the ion generator 15 provided to the air cleaner A, and hence detailed description thereof is omitted. Note that the ion generator 48 is disposed between the damper 47 and the first blow-out opening 43 in this embodiment so that the ions are supplied to the air blown out from the first blow-out opening 43. However, without limiting to this, the ion generator 48 may be disposed so that the ion generating electrode is exposed on the upstream side of the damper 47 in the air passage 42. With this arrangement, air containing ions can be blow out from both the first blow-out opening 43 and the second blow-out opening 44.

[0081] The filter unit 50, the humidification unit 60, and the blowing unit 70 are disposed in the air passage 42 in this order from the upstream in the airflow direction. Further, an odor sensor 49 for detecting odor components in the air is disposed on the downstream of the humidification unit 60 in the airflow direction in the air passage 42.

[0082] The odor sensor 49 detects odor components contained in the air after passing through the humidification unit 60. Further, the odor sensor 49 transmits a result of the detection to a control unit that is not shown, and the control unit detects that odor is generated from a water supplier 63 described later of the humidification unit 60 based on the detection result by the odor sensor 49. Further, the control unit performs notification to a user by using an informing unit 802 described later of the interface unit 80. In this way, because the odor sensor 49 is provided, it is sufficient to perform maintenance of the water supplier 63, which was regularly performed before, at a necessary timing, i.e., when odor is generated from the water supplier 63. Thus, the maintenance of the water supplier 63 can be efficiently performed.

[0083] The filter unit 50 includes a prefilter, a deodorizing filter, and a dust collecting filter (that are not shown) disposed in order from the air suction side in a frame 51. A filter pressing member (not shown) is disposed between the prefilter and the deodorizing filter. The prefilter, the deodorizing filter, and the dust collecting filter have the same structures as those of the air cleaner A, and hence detailed description thereof is omitted.

- [0084] The blowing unit 70 includes a fan 71 and a motor 72. The fan 71 is a centrifugal fan in this description, but without limiting to this, it is possible to use various fans that can generate airflow quantity assumed on design. The fan 71 is fixed to a drive shaft of the motor 72, and the motor 72 drives the fan 71 to rotate. The motor 72 is fixed to the housing 40.
- [0085] Details of the humidification unit 60 are described with reference to the drawings. Fig. 13 is a perspective view of the humidification unit. Fig. 14 is a front view of the water supplier used in the humidification unit shown in Fig. 13. As shown in Figs. 13 and 14, the humidification unit 60 includes a water supply tank 61, a humidification tray 62, the water supplier 63, a frame 64, and a filter 65. In the humidification unit 60, a lower part of the filter 65 is dipped in water in the humidification tray 62 so that the water spreads to the whole filter 65. Further, when the airflow passes through the filter 65, the air is humidified. In this way, the humidified air is blown out from the first blow-out opening 43 and the second blow-out opening 44.
- [0086] The humidification tray 62 is attached to the housing 40 in a detachable/attachable manner, and the water supply tank 61 and the water supplier 63 are attached to the humidification tray 62 in a detachable/attachable manner. In this way, cleaning, maintenance and the like of the humidification unit 60 can be easily performed.
- [0087] The water supply tank 61 is constituted of a cylindrical container and is formed by blow molding or the like of synthetic resin material such as polyethylene terephthalate (PET) or polypropylene (PP). On one end surface of the water supply tank 61, an opening (not shown) is formed, and a valve mechanism (not shown) is disposed. Because the valve mechanism is provided, water inside the water supply tank 61 does not leak when it becomes upside down. In addition, when water stored in the humidification tray 62 becomes a predetermined amount or less, the valve mechanism is controlled so that the water in the tank 61 is supplied to the humidification tray 62.
- [0088] The humidification tray 62 has a substantially box shape having an opened upper surface and is formed by resin molding. The humidification tray 62 includes a water supplier housing portion 621 that houses the water supplier 63, and a tank housing portion 622 formed adjacent to the water supplier housing portion 621 so as to house the water supply tank 61.

- [0089] A partition plate 623 is disposed between the water supplier housing portion 621 and the tank housing portion 622. The water supplier housing portion 621 and the tank housing portion 622 communicate to each other via a communicating opening 624 formed in the partition plate 623.
- [0090] The water supplier 63 includes the frame 64 and the filter 65. The frame 64 has a cylindrical shape with flat end surfaces in the axial direction. The frame 64 supports the filter 65 by radial pressing portions 641 disposed on the end surfaces in the axial direction. The pressing portions 641 have openings 642 through which the airflow passes, and the filter 65 is exposed to the openings 642. The frame 64 is provided with a bow-shaped shield portion 643 formed in a part of each end surface in the axial direction. A rack 644 is formed on the circumferential surface of the frame 64. The rack 644 is engaged with a not shown pinion attached to a not shown motor. The pinion is rotated by the motor. In this way, the water supplier 63 can rotate within a vertical plane.
- [0091] When the water supplier 63 rotates within a vertical plane, a part of the filter 65 held by the frame 64 is dipped in water stored in the water supplier housing portion 621. When a part of the filter 65 is dipped in water, the water is sucked up by capillary action so that the water spreads to the whole filter 65. In this state, when the airflow passes through the openings 642, moisture is supplied to the airflow so that humidification is performed. Further, by intermittently rotating the water supplier 63, the state where water spreads to the whole filter 65 is maintained. In this way, the airflow can be stably humidified. In this way, so-called humidification cleaning operation is performed, in which the air after filtering dust by the filter unit 50 is humidified and blown to the outside.
- [0092] In addition, by stopping rotation of the water supplier 63 in the state where the shield portion 643 of the frame 64 is positioned at the lower end, the filter 65 is shielded by the shield portion 643 from water stored in the water supplier housing portion 621. In this state, when the airflow passes through the filter 65 via the openings 642 for a predetermined time, the filter 65 is dried. After that, by generating the airflow in the state where the rotation of the water supplier 63 is stopped, so-called air cleaning operation is performed, in which only the dust collecting operation by the filter unit 50 is performed.

- [0093] The filter 65 is described with reference to the drawings. Fig. 15 is an enlarged perspective view of a part of the filter. The filter 65 is made of a nonwoven fabric and the like having air permeability and water absorbing property. The filter 65 is folded like a bellows (is pleated), and fixing members 651 are disposed in a bead shape. The fixing member 651 is made of elastically deformable material. The fixing member 651 maintains the filter 65 in a pleated state.
- [0094] The fixing member 651 is a porous body having numberless pores inside. The fixing member 651 is manufactured by mixing gas (e.g. nitrogen gas) and melted resin (hot melt adhesive, e.g. polyolefin resin) and curing the mixture before the gas goes out so that pores are formed inside.
- [0095] As to the filter 65, gas and hot melt adhesive are mixed and linearly applied to the sheet constituting the filter 65. Then, before the hot melt adhesive is cured, the sheet is folded in the direction along the hot melt adhesive. In this way, the hot melt adhesive is adhered to itself. Then, the hot melt adhesive in which gas is mixed is cured, and hence parts occupied by the gas become pores in the fixing member 651.
- [0096] The filter 65 formed in a pleated state by the fixing member 651 has a width in the axial direction that is larger than that of the frame 64. Thus, when the filter 65 is attached to the frame 64 the filter 65 is pressed to contact with the pressing portions 641 of the frame 64 so that the filter 65 is hardly bent or warped. Note that the fixing member 651 may contact with the pressing portions 641. The fixing member 651 is elastically deformable, and the fixing member 651 can be securely held by the pressing portions 641.
- [0097] Fig. 16 is a schematic view of the interface unit disposed on the upper surface of the housing. As shown in Fig. 16, the interface unit 80 includes an operation unit 801 and the informing unit 802. The operation unit 801 includes buttons 81a to 81j. The buttons 81a to 81j are respectively associated with operations of the humidification air cleaner B, and each operation is made by pressing the buttons 81a to 81j. The buttons 81a to 81j have the same structure as the buttons 31a to 31e though they are associated with different operations. Therefore, detailed description thereof is omitted.
- [0098] The informing unit 802 includes display units 82a to 82h. Each of the display units 82a to 82h displays information of the humidification air cleaner B. The display

units 82a to 82h have the same structure as the display units 32a to 32f though they inform different contents. Therefore, detailed description thereof is omitted.

[0099] In the embodiments described above, the air cleaner and the humidification air cleaner are exemplified as the electronic apparatus. Other than them, however, there are a refrigerator, a washing machine, a heating cooker, an audio apparatus, and the like, for example. In addition, the electronic apparatus is not limited to the apparatuses described above. There are electronic apparatuses equipped with an interface unit including an operation unit that performs operation input when an operating body such as a user's finger contacts with the same and displays a shape indicating an operation area and characters or figures (icons) associated with operations by illumination, and an informing unit that informs information by illumination.

List of Reference Signs

[0100] A air cleaner

10 housing

11 suction opening

12 air passage

121 branch part

122 branch air passage

13 blow-out opening

131 grill

14 opening

15 ion generator

20 dust collector

21 prefilter

211 frame

212 mesh

22 dust collecting filter

221 filter material

222 frame material

23 dust removing unit

231 rotation brush

232 dust box
233 guide frame
234 pinion
24 blower
30 interface unit
301 operation unit
302 informing unit
31 operation area
31a to 31f button
32 informing area
32a to 32f display unit
33 circuit board
331 first LED
332 second LED
34 surface panel
341 diffusion member
342 light shielding member
343 light transmitting member
344 opening
35 electrostatic sensor
36 conductive member
37 lens
371 concave surface
372 enlarged part
373 light output surface
38 fixing member
381 through hole
382 tapered surface
39 operation area
391 lens
392 concave surface
393 light output surface

394 contact surface
395 enlarged part
B humidification air cleaner
40 housing
41 suction opening
42 air passage
43 first blow-out opening
44 second blow-out opening
45 first louver
46 second louver
47 damper
48 ion generator
49 odor sensor
50 filter unit
51 frame
60 humidification unit
61 water supply tank
62 humidification tray
621 water supplier housing portion
622 tank housing portion
623 partition plate
624 communicating opening
63 water supplier
64 frame
641 pressing portion
642 opening
643 shield portion
644 rack
65 filter
651 fixing member
70 blowing unit
71 fan

72 motor

80 interface unit

801 operation unit

802 informing unit

81a to 81j button

82a to 82h display unit

CLAIMS

1. An electronic apparatus in which an operation is performed to an operation area disposed on a surface panel, the electronic apparatus comprising:
 - a circuit board disposed on a rear surface side of the surface panel;
 - a light source mounted on the circuit board, the light source including a light emitting portion that emits light to the surface panel;
 - a capacitance detection unit mounted on the circuit board, so as to detect capacitance between itself and an operating body contacting with the surface panel; and
 - a lens having a concave surface and a light output surface formed on the opposite side to the concave surface, wherein the lens is disposed in such a manner that the concave surface faces the light emitting portion while the light output surface faces the surface panel.
2. The electronic apparatus according to claim 1, wherein a conductive member having a conductivity is disposed to contact with at least a part of the lens and the capacitance detection unit, and the conductive member is elastically deformable.
3. The electronic apparatus according to claim 1 or 2, wherein
 - a fixing member for fixing the lens is disposed,
 - the lens has a tapered surface whose diameter becomes larger as being closer to the operation area,
 - the fixing member includes a support portion for housing the lens and contacting with at least a part of the tapered surface so as to support the lens, and
 - the support portion is a reflection surface for reflecting light.
4. The electronic apparatus according to any one of claims 1 to 3, wherein the lens and the surface panel contact tightly with each other.
5. The electronic apparatus according to any one of claims 1 to 4, wherein
 - the surface panel is provided with an informing area for informing information, the informing area having a smaller area than the operation area,
 - the light source includes a first LED for emitting light to the operation area and a second LED for emitting light to the informing area, and

both the first LED and the second LED are mounted on the circuit board.