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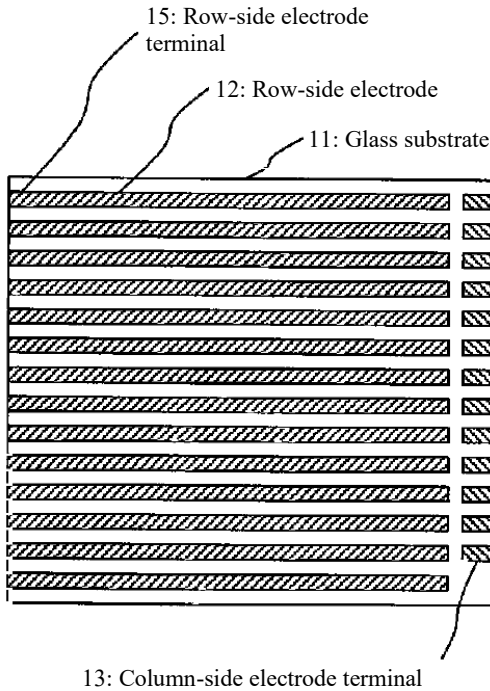
(51) Int.Cl. ⁷	Identification Code		FI		Theme (Reference)		Codes
H05B	33/06		H05B	33/06		3K007	
G09F	9/30	330	G09F	9/30	330Z	5C094	
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		348			348A		
		365			365Z		
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(21) Application Number	P2002-122436		(71) Applicant	000116024			
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(54) [Title of the Invention] Organic EL Display Element and Manufacturing Method Thereof

(57) [Abstract]

[Problem] The present invention aims to arrange the row-side lead-out wiring and the column-side lead-out wiring of an organic EL display element in opposing directions or in the same direction. Additionally, it aims to increase the proportion of the display portion relative to the housing of an information display terminal.

[Solution] An organic EL display element according to the present invention comprises a row-side electrode, an organic EL film, a column-side electrode, and an insulating film laminated on a transparent substrate, wherein one of the electrode terminals disposed on opposing edges of the transparent substrate surface is connected to the row-side electrode, and the other electrode terminal is connected to the column-side electrode via wiring on the insulating film.



[Scope of Claims]

[Claim 1] An organic EL display element comprising a row-side electrode, an organic EL film, a column-side electrode, and an insulating film laminated on a transparent substrate, wherein one of the electrode terminals disposed on opposing edges of the transparent substrate surface is connected to the row-side electrode, and the other electrode terminal is connected to the column-side electrode via wiring on the insulating film. [Claim 2] An organic EL display element comprising a row-side electrode, an organic EL film, a column-side electrode, and an insulating film laminated on a transparent substrate, wherein an electrode terminal disposed on one edge of the transparent substrate surface is connected to the row-side electrode, and an electrode terminal disposed on the same edge is connected to the column-side electrode via wiring on the insulating film.

[Claim 3] The organic EL display element according to claim 1 or 2, wherein the insulating film forms a gradual edge, and the wiring on the insulating film is connected to the electrode terminal or the electrode along the gradual edge. [Claim 4] A method for manufacturing an organic EL display element with electrodes arranged in a matrix, comprising: forming a layer on the same surface of a transparent substrate, the layer including a column-side electrode terminal, a row-side electrode, and a row-side electrode terminal electrically connected to the row-side electrode; laminating an organic EL film on the layer, excluding at least the electrode terminal portions; laminating a column-side electrode on the organic EL film; forming an insulating film on the column-side electrode, excluding at least the electrode terminal portions and an end of the column-side electrode; and forming wiring on the insulating film to connect the end of the column-side electrode to the column-side electrode terminal. [Claim 5] An information display terminal comprising an organic EL display element according to any one of claims 1 to 3 or an organic EL display element manufactured by the method according to claim 4.

[Detailed Description of the Invention]

[0001]

[Technical Field] The present invention relates to an organic EL display element and a method for manufacturing the same.

[0002]

[Prior Art] In conventional organic EL

(electroluminescence) display elements, electrodes are arranged in a matrix, and lead-out wirings are attached to each electrode. Consequently, conventional organic EL display elements require a wide so-called bezel portion for electrode arrangement on both the row and column sides. The structure of a conventional organic EL display element is shown in FIGS. 16 to 19. In FIGS. 16 to 19, reference numeral 81 denotes a glass substrate, 82 denotes a row-side electrode, 84 denotes an organic EL film, 85 denotes a row-side electrode terminal, 86 denotes a column-side electrode, 88 denotes a column-side electrode terminal, 90 denotes a row-side lead-out wiring, and 91 denotes a column-side lead-out wiring. Generally, an organic EL display element includes a row-side electrode 82, an organic EL film 84, and

a column-side electrode 86 laminated on the upper surface of a glass substrate 81. To extract luminescent light from the glass substrate 81 side, the row-side electrode 82 formed on the upper surface of the glass substrate 81 is a transparent electrode, such as indium tin oxide (ITO) (FIG. 16). The organic EL film 84 is laminated on the row-side electrode 82, leaving the row-side electrode terminal 85 exposed (FIG. 17). The column-side electrode 86 is laminated on the upper surface of the organic EL film 84, with an end of the column-side electrode 86 serving as the column-side electrode terminal 88 (FIG. 18).

[0003] The row-side electrode terminal 85 and the column-side electrode terminal 88 are connected to the row-side lead-out wiring 90 and the column-side lead-out wiring 91, respectively (FIG. 19). Since the row-side electrode terminal 85 and the column-side electrode terminal 88 require not only electrical contact but also mechanical strength, the so-called bezel portion of the glass substrate 81 must be made wide. This results in wasted space relative to the display area of the organic EL display element.

[0004] The external appearance of a portable terminal incorporating an organic EL display element as shown in FIG. 18 is depicted in FIG. 20. In FIG. 20, reference numeral 81 denotes a glass substrate, 85 denotes a row-side electrode terminal, 88 denotes a column-side electrode terminal, 90 denotes a row-side lead-out wiring, 91 denotes a column-side lead-out wiring, 92 denotes a display portion, and 93 denotes a portable terminal. The glass substrate 81, row-side electrode terminal 85, column-side electrode terminal 88, row-side lead-out wiring 90, and column-side lead-out wiring 91 are internal structures of the portable terminal 93 and are not visible from the outside. As shown in FIG. 20, since the row-side electrode terminal 85 and row-side lead-out wiring 90, as well as the column-side electrode terminal 88 and column-side lead-out wiring 91, must be arranged in downward and leftward directions, respectively, the size of the display portion 92 is limited in a portable terminal of a given size.

[0005]

[Problem to be Solved by the Invention] To address these issues, the present invention aims to arrange the row-side lead-out wiring and the column-side lead-out wiring of an organic EL display element in opposing directions or in the same direction. Additionally, it aims to increase the proportion of the display portion relative to the housing of an information display terminal.

[0006]

[Means for Solving the Problem] To achieve the above objectives, the present invention arranges the electrode terminals for attaching the lead-out wiring of an organic EL display element in opposing directions or in the same direction on a transparent substrate. The first invention of the present application is an organic EL display element comprising a row-side electrode, an organic EL film, a column-side electrode, and an insulating film laminated on a transparent substrate, wherein one of the electrode terminals disposed on opposing edges of the transparent substrate

surface is connected to the row-side electrode, and the other electrode terminal is connected to the column-side electrode via wiring on the insulating film. This invention enables the electrode terminals for attaching the lead-out wiring of the organic EL display element to be arranged in opposing directions on the transparent substrate.

[0007] The second invention of the present application is an organic EL display element comprising a row-side electrode, an organic EL film, a column-side electrode, and an insulating film laminated on a transparent substrate, wherein an electrode terminal disposed on one edge of the transparent substrate surface is connected to the row-side electrode, and an electrode terminal disposed on the same edge is connected to the column-side electrode via wiring on the insulating film. This invention enables the electrode terminals for attaching the lead-out wiring of the organic EL display element to be arranged in the same direction on the transparent substrate.

[0008] The third invention of the present application is an organic EL display element according to the first or second invention, wherein the insulating film forms a gradual edge, and the wiring on the insulating film is connected to the electrode terminal or the electrode along the gradual edge. This invention facilitates the manufacture of the organic EL display element of the first or second invention.

[0009] The fourth invention of the present application is a method for manufacturing an organic EL display element with electrodes arranged in a matrix, comprising: forming a layer on the same surface of a transparent substrate, the layer including a column-side electrode terminal, a row-side electrode, and a row-side electrode terminal electrically connected to the row-side electrode; laminating an organic EL film on the layer, excluding at least the electrode terminal portions; laminating a column-side electrode on the organic EL film; forming an insulating film on the column-side electrode, excluding at least the electrode terminal portions and an end of the column-side electrode; and forming wiring on the insulating film to connect the end of the column-side electrode to the column-side electrode terminal. This invention enables the production of an organic EL display element in which electrode terminals for attaching lead-out wiring can be arranged in any direction on a transparent substrate. [0010] The fifth invention of the present application is an information display terminal comprising an organic EL display element according to any one of the first to third inventions or an organic EL display element manufactured by the method according to the fourth invention. Information display terminals include portable terminals with a display portion, such as mobile phones and PDAs (Personal Digital Assistants), as well as displays for computers and the like. This invention enables the enlargement of the display portion of an information display terminal.

[0011]

[Embodiments of the Invention] The embodiments of the present invention will be described below with reference to the accompanying drawings.

(Embodiment 1) This embodiment aims to arrange the row-

side lead-out wiring and the column-side lead-out wiring in opposing directions.

[0012] The structure of the organic EL display element of this embodiment is shown in FIGS. 1 to 6. In FIGS. 1 to 6, reference numeral 11 denotes a glass substrate as a transparent substrate, which includes transparent materials such as transparent resin, flexible substrates, or substrates with color filters or color conversion materials formed thereon. Reference numeral 12 denotes a row-side electrode, 13 denotes a column-side electrode terminal, 14 denotes an organic EL film, 15 denotes a row-side electrode terminal, 16 denotes a column-side electrode, 17 denotes an insulating film, 18 denotes an end of the column-side electrode, 19 denotes electrode wiring on the insulating film, 20 denotes a row-side lead-out wiring, and 21 denotes a column-side lead-out wiring. The distinction between row-side and column-side is made for convenience, and the reverse configuration is also applicable. The row-side electrode terminal and the column-side electrode terminal may be made of the same material as the row-side electrode and the column-side electrode, respectively, or different materials. It is preferable that the materials have low resistance and are stable in atmospheric conditions.

[0013] In this embodiment, the organic EL display element comprises a row-side electrode 12, a row-side electrode terminal 15, a column-side electrode terminal 13, an organic EL film 14, a column-side electrode 16, an insulating film 17, and electrode wiring 19 laminated on the upper surface of a glass substrate 11. In FIG. 1, to extract luminescent light from the glass substrate 11 side, the row-side electrode 12 formed on the upper surface of the glass substrate 11 is a transparent electrode, such as indium tin oxide (ITO), indium zinc oxide, or tin oxide. The row-side electrode terminal 15 may be formed as part of the row-side electrode 12. That is, an end of the row-side electrode 12 may be used as the row-side electrode terminal 15. Alternatively, the row-side electrode terminal 15 and the row-side electrode 12 may be formed separately and structured to be electrically connected. The column-side electrode terminal 13 is formed at an edge of the glass substrate 11 surface, opposite the edge where the row-side electrode terminal 15 is located. Materials for the column-side electrode may include Al, Li, Mg, Au, Ag, or alloys thereof.

[0014] In FIG. 2, the organic EL film 14 is laminated on the row-side electrode 12. The laminated organic EL film excludes the portions of the row-side electrode terminal 15 and the column-side electrode terminal 13. In FIG. 3, the column-side electrode 16 is laminated on the upper surface of the organic EL film 14. An end of the column-side electrode 16 is connected to electrode wiring on the insulating film, as described later. Accordingly, the end of the column-side electrode 16 may be formed separately from the column-side electrode and structured to be electrically connected. Alternatively, the end 18 of the column-side electrode may have the same structure as the column-side electrode 16 and may be formed as part of the column-side electrode.

[0015] In FIG. 4, the insulating film 17 is laminated on the column-side electrode 16. The laminated insulating film 17 excludes the portions of the column-side electrode terminal 13, the row-side electrode terminal 15, and the end 18 of the column-side electrode. Additional layers or films for other purposes may be laminated between the column-side electrode 16 and the insulating film 17. The insulating film 17 may also be laminated only in the area where the electrode wiring 19, described later, is formed. In FIG. 5, the column-side electrode terminal 13 is connected to the corresponding end 18 of the column-side electrode via the electrode wiring 19 on the insulating film. The wiring pattern of the electrode wiring 19 may be of any form, provided that it ensures electrical conduction between the end 18 of the column-side electrode and the column-side electrode terminal 13. The element shown in FIG. 5 becomes an organic EL display element capable of connecting external interface wiring to the row-side electrode terminal 15 and the column-side electrode terminal 13.

[0016] In FIG. 6, the row-side electrode terminal 15 and the column-side electrode terminal 13 are connected to the row-side lead-out wiring 20 and the column-side lead-out wiring 21, respectively. Both lead-out wirings are routed in opposite directions. As shown in FIG. 6, since the row-side lead-out wiring 20 and the column-side lead-out wiring 21 are attached to opposing edges of the glass substrate 11, the so-called bezel portion at the periphery of the glass substrate 11 without electrode terminals can be narrowed.

[0017] (Embodiment 2) This embodiment aims to arrange the row-side lead-out wiring and the column-side lead-out wiring in the same direction. The structure of the organic EL display element of this embodiment is shown in FIGS. 7 to 12. In FIGS. 7 to 12, reference numeral 31 denotes a glass substrate as a transparent substrate, which includes transparent materials such as transparent resin, flexible substrates, or substrates with color filters or color conversion materials formed thereon. Reference numeral 32 denotes a row-side electrode, 33 denotes a column-side electrode terminal, 34 denotes an organic EL film, 35 denotes a row-side electrode terminal, 36 denotes a column-side electrode, 37 denotes an insulating film, 38 denotes an end of the column-side electrode, 39 denotes electrode wiring on the insulating film, 40 denotes a row-side lead-out wiring, and 41 denotes a column-side lead-out wiring. The distinction between row-side and column-side is made for convenience, and the reverse configuration is also applicable.

[0018] In this embodiment, the organic EL display element comprises a row-side electrode 32, a row-side electrode terminal 35, a column-side electrode terminal 33, an organic EL film 34, a column-side electrode 36, an insulating film 37, and electrode wiring 39 laminated on the upper surface of a glass substrate 31. In FIG. 7, to extract luminescent light from the glass substrate 31 side, the row-side electrode 32 formed on the upper surface of the glass substrate 31 is a transparent electrode, such as indium tin oxide (ITO), indium zinc oxide, or tin oxide. The row-side electrode terminal 35 may be formed as part of the row-side electrode 32. That is,

an end of the row-side electrode 32 may be used as the row-side electrode terminal 35. In this case, the column-side electrode terminal 33 is formed between the row-side electrode terminals 35. Alternatively, the row-side electrode terminal 35 and the row-side electrode 32 may be formed separately and structured to be electrically connected. In this case, as shown in FIG. 7, the column-side electrode terminal 33 can be formed at an edge of the glass substrate 31 surface, either between the row-side electrode terminals 35 or at the same edge. Materials for the column-side electrode may include Al, Li, Mg, Au, Ag, or alloys thereof.

[0019] In FIG. 8, the organic EL film 34 is laminated on the row-side electrode 32. The laminated organic EL film excludes the portions of the row-side electrode terminal 35 and the column-side electrode terminal 33. In FIG. 9, the column-side electrode 36 is laminated on the upper surface of the organic EL film 34. An end of the column-side electrode 36 is connected to electrode wiring on the insulating film, as described later. Accordingly, the end of the column-side electrode 36 may be formed separately from the column-side electrode and structured to be electrically connected. Alternatively, the end of the column-side electrode 36 may have the same structure as the column-side electrode 36 and may be formed as part of the column-side electrode.

[0020] In FIG. 10, the insulating film 37 is laminated on the column-side electrode 36. The laminated insulating film 37 excludes the portions of the column-side electrode terminal 33, the row-side electrode terminal 35, and the end 38 of the column-side electrode. Additional layers or films for other purposes may be laminated between the column-side electrode 36 and the insulating film 37. The insulating film 37 may also be laminated only in the area where the electrode wiring 39, described later, is formed. In FIG. 10, the insulating film 37 is laminated to cover only half of the column-side electrode 36. In FIG. 11, the column-side electrode terminal 33 is connected to the corresponding end 38 of the column-side electrode via the electrode wiring 39 on the insulating film. The wiring pattern of the electrode wiring 39 may be of any form, provided that it ensures electrical conduction between the end 38 of the column-side electrode and the column-side electrode terminal 33. The element shown in FIG. 11 becomes an organic EL display element capable of connecting external interface wiring to the row-side electrode terminal 35 and the column-side electrode terminal 33.

[0021] In FIG. 12, the row-side electrode terminal 35 and the column-side electrode terminal 33 are connected to the row-side lead-out wiring 40 and the column-side lead-out wiring 41, respectively. When the row-side electrode terminal 35 is formed between the column-side electrode terminals 33, the row-side lead-out wiring 40 and the column-side lead-out wiring 41 are bundled together. When the row-side electrode terminal 35 is formed adjacent to the column-side electrode terminal 33, the row-side lead-out wiring 40 and the column-side lead-out wiring 41 can be separate. In FIG. 12, the row-side electrode terminal 35 is formed adjacent to the column-

side electrode terminal 33, and the two lead-out wirings are bundled together. In either case, both lead-out wirings are routed in the same direction. As shown in FIG. 12, since the row-side lead-out wiring 40 and the column-side lead-out wiring 41 are attached to the same edge of the glass substrate 31, the so-called bezel portion at the periphery of the glass substrate 31 without electrode terminals can be narrowed.

[0022] (Embodiment 3) This embodiment aims to facilitate the connection of electrode wiring on the insulating film. FIG. 13 is a cross-sectional view of the organic EL display element. A row-side electrode 12, an organic EL film 14, a column-side electrode 16, and an insulating film 17 are laminated on the upper surface of a glass substrate 11. The row-side electrode 12 extends in the depth direction of the drawing, with electrodes arranged in the horizontal direction. The column-side electrode 16 extends in the horizontal direction of the drawing, with electrodes arranged in the depth direction.

[0023] The edge of the insulating film 17 forms a gradual slope. This gradual edge can be formed by utilizing diffraction or defocusing at the mask edge during the patterning of the insulating film with a mask. The electrode wiring 19 is connected to the column-side electrode 16 along this gradual edge of the insulating film 17. The same applies when connecting the electrode wiring 19 to the column-side electrode terminal 13. This configuration of electrode wiring facilitates the connection between the column-side electrode and the column-side electrode terminal.

[0024] (Embodiment 4) The external appearance of a portable terminal incorporating the organic EL display element as shown in FIG. 5 is depicted in FIG. 14, and the external appearance of a portable terminal incorporating the organic EL display element as shown in FIG. 11 is depicted in FIG. 15. In FIG. 14, reference numeral 11 denotes a glass substrate, 13 denotes a column-side electrode terminal, 15 denotes a row-side electrode terminal, 20 denotes a row-side lead-out wiring, 21 denotes a column-side lead-out wiring, 52 denotes a display portion, and 51 denotes a portable terminal. The glass substrate 11, column-side electrode terminal 13, row-side electrode terminal 15, row-side lead-out wiring 20, and column-side lead-out wiring 21 are internal structures of the portable terminal 51 and are not visible from the outside.

[0025] As shown in FIG. 14, the row-side electrode terminal 15 and row-side lead-out wiring 20, as well as the column-side electrode terminal 13 and column-side lead-out wiring 21 of the organic EL display element, can be arranged in the vertical direction of the portable terminal. Additionally, in the organic EL display element of FIG. 5, the so-called bezel portion at the periphery where no lead-out wiring is attached (corresponding to the left and right sides of the display portion in FIG. 14) can be narrowed, thereby allowing the display portion 52 to be enlarged in the horizontal direction. To enlarge the display portion of the portable terminal in the vertical direction, the lead-out wiring can be arranged in the horizontal direction of the portable terminal.

[0026] In FIG. 15, reference numeral 31 denotes a glass

substrate, 33 denotes a column-side electrode terminal, 35 denotes a row-side electrode terminal, 40 denotes a row-side lead-out wiring, 41 denotes a column-side lead-out wiring, 52 denotes a display portion, and 51 denotes a portable terminal. The glass substrate 31, column-side electrode terminal 33, row-side electrode terminal 35, row-side lead-out wiring 40, and column-side lead-out wiring 41 are internal structures of the portable terminal 51 and are not visible from the outside.

[0027] As shown in FIG. 15, the row-side electrode terminal 35 and row-side lead-out wiring 40, as well as the column-side electrode terminal 33 and column-side lead-out wiring 41, can each be arranged in the downward or upward direction. Additionally, in the organic EL display element of FIG. 11, the so-called bezel portion at the edge where no lead-out wiring is attached can be narrowed, thereby allowing the display portion 52 to be enlarged in both the horizontal and vertical directions. To enlarge the display portion of the portable terminal in the vertical direction, the lead-out wiring can be arranged in the left or right direction of the portable terminal. While this embodiment describes a portable terminal, the organic EL display element of the present invention can also be applied to general information display terminals, such as computer displays.

[0028]

[Effects of the Invention] As described above, according to the present invention, the connection connectors or wiring terminal connection portions of the organic EL display element can be consolidated in the vertical direction, horizontal direction, or a single direction. Furthermore, in an information display terminal incorporating the organic EL display element of the present invention, the proportion of the display portion relative to the housing of the information display terminal can be increased.

[Brief Description of Drawings]

[FIG. 1] A diagram illustrating the arrangement of electrode terminals in the organic EL display element according to the present invention.

[FIG. 2] A diagram illustrating the arrangement of the organic EL film in the organic EL display element according to the present invention.

[FIG. 3] A diagram illustrating the arrangement of electrodes in the organic EL display element according to the present invention.

[FIG. 4] A diagram illustrating the arrangement of the insulating film in the organic EL display element according to the present invention.

[FIG. 5] A diagram illustrating the connection of electrode wiring in the organic EL display element according to the present invention.

[FIG. 6] A diagram illustrating the arrangement of lead-out wiring in the organic EL display element according to the present invention.

[FIG. 7] A diagram illustrating the arrangement of electrode terminals in the organic EL display element according to the present invention.

[FIG. 8] A diagram illustrating the arrangement of the

organic EL film in the organic EL display element according to the present invention.

[FIG. 9] A diagram illustrating the arrangement of electrodes in the organic EL display element according to the present invention.

[FIG. 10] A diagram illustrating the arrangement of the insulating film in the organic EL display element according to the present invention.

[FIG. 11] A diagram illustrating the connection of electrode wiring in the organic EL display element according to the present invention.

[FIG. 12] A diagram illustrating the arrangement of lead-out wiring in the organic EL display element according to the present invention.

[FIG. 13] A diagram illustrating the connection form of electrode wiring in the organic EL display element according to the present invention.

[FIG. 14] An external view of a portable terminal incorporating the organic EL display element according to the present invention.

[FIG. 15] An external view of a portable terminal incorporating the organic EL display element according to the present invention.

[FIG. 16] A diagram illustrating the arrangement of electrode terminals in a conventional organic EL display element.

[FIG. 17] A diagram illustrating the arrangement of the organic EL film in a conventional organic EL display element.

[FIG. 18] A diagram illustrating the arrangement of electrodes in a conventional organic EL display element.

[FIG. 19] A diagram illustrating the arrangement of lead-out wiring in a conventional organic EL display element.

[FIG. 20] An external view of a portable terminal incorporating a conventional organic EL display element.

[Description of Reference Numerals]

[0105]

11, 31: Glass substrate

12, 32: Row-side electrode

13, 33: Column-side electrode terminal

14, 34: Organic EL film

15, 35: Row-side electrode terminal

16, 36: Column-side electrode

17, 37: Insulating film

18, 38: End of column-side electrode

19, 39: Electrode wiring

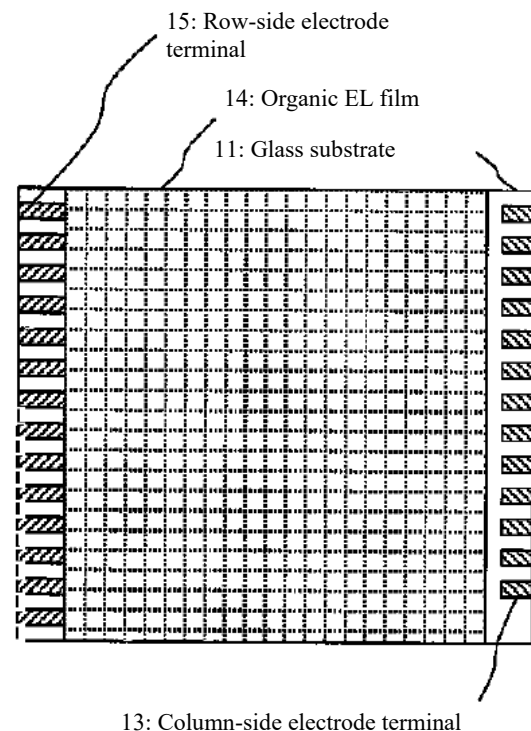
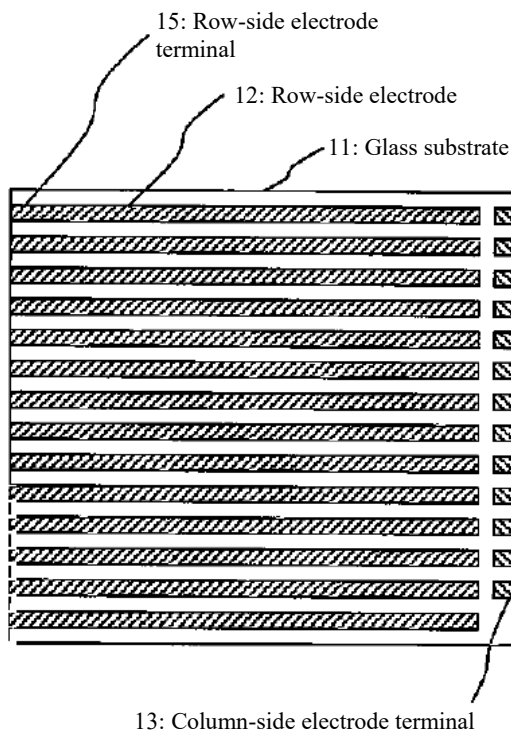
20, 40: Row-side lead-out wiring

21, 41: Column-side lead-out wiring

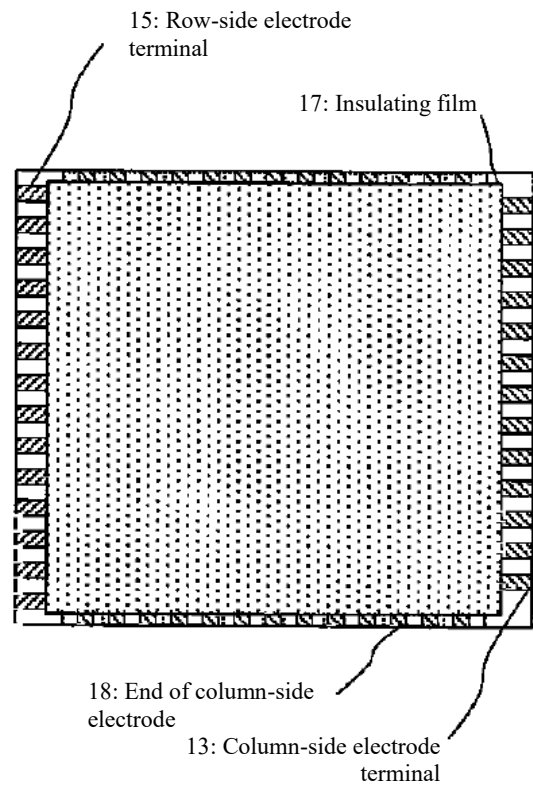
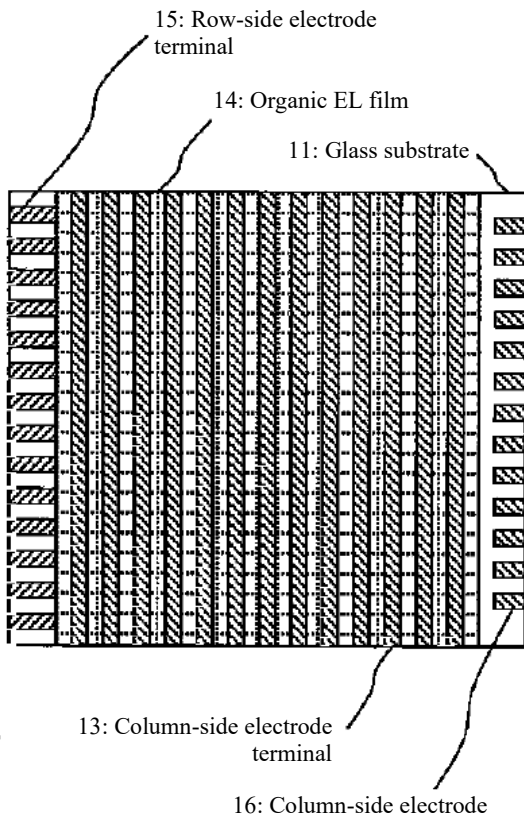
51: Portable terminal

52: Display portion of portable terminal

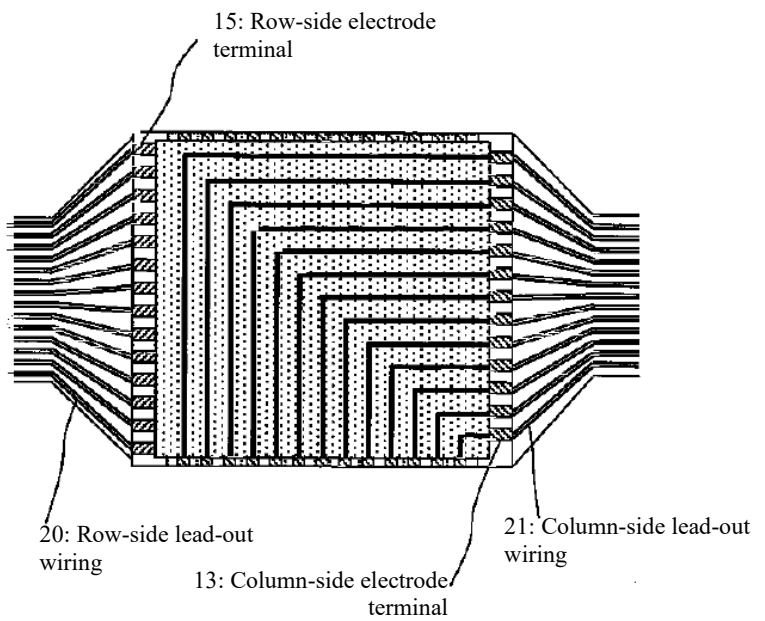
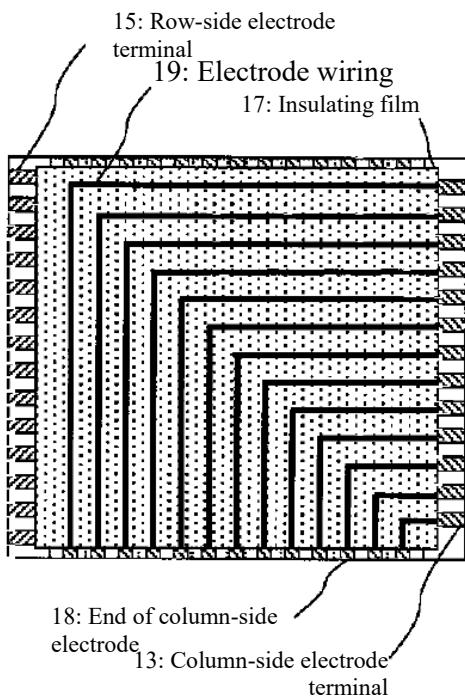
[FIG. 1] [FIG. 2]



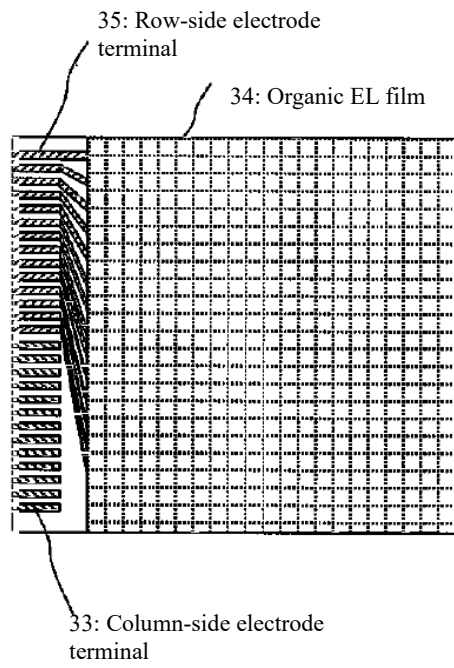
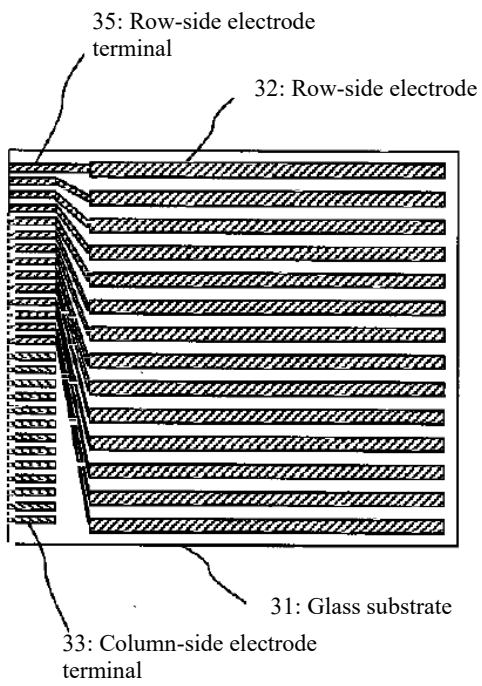
[FIG. 3] [FIG. 4]



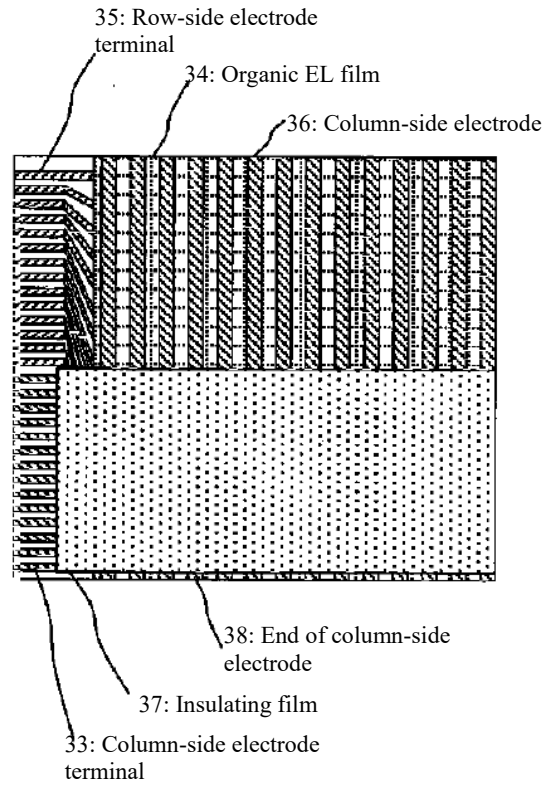
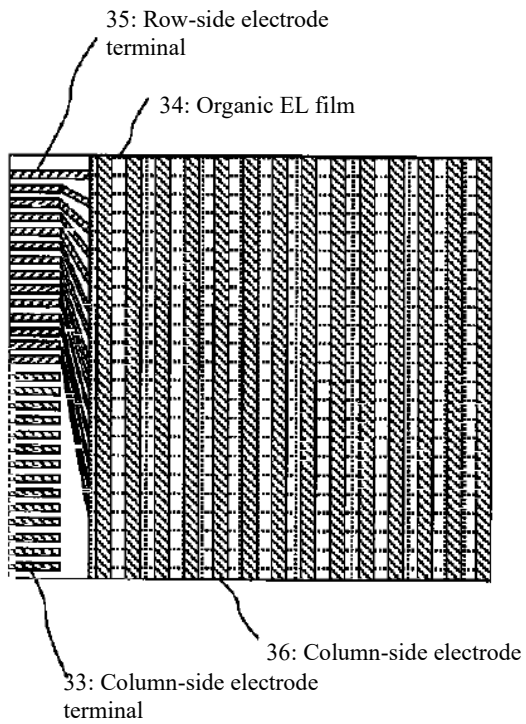
[FIG. 5] [FIG. 6]



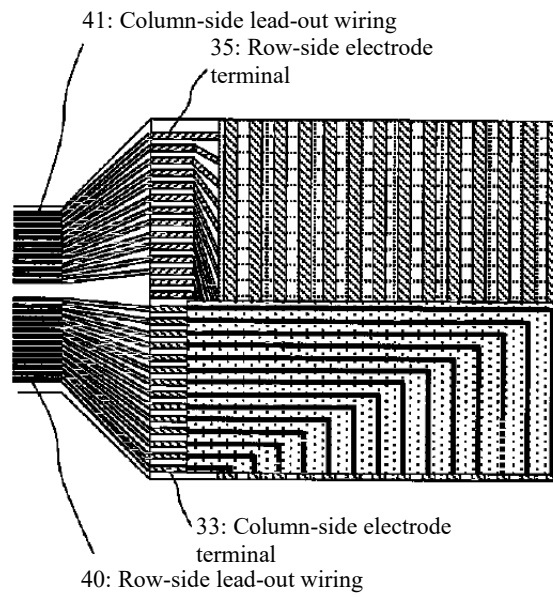
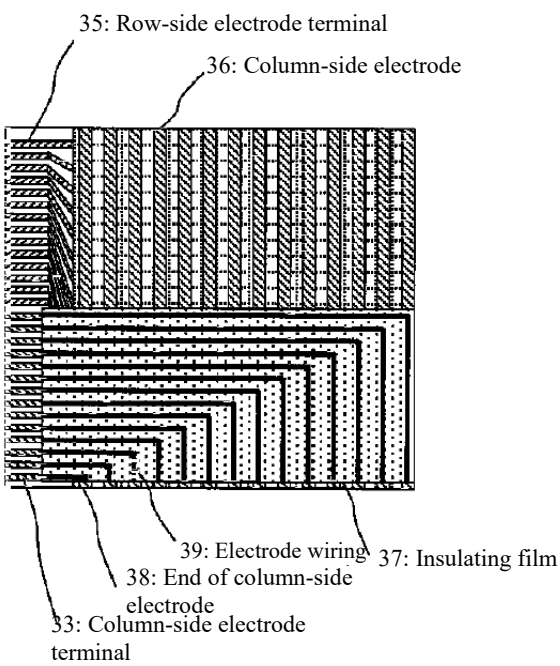
[FIG. 7] [FIG. 8]



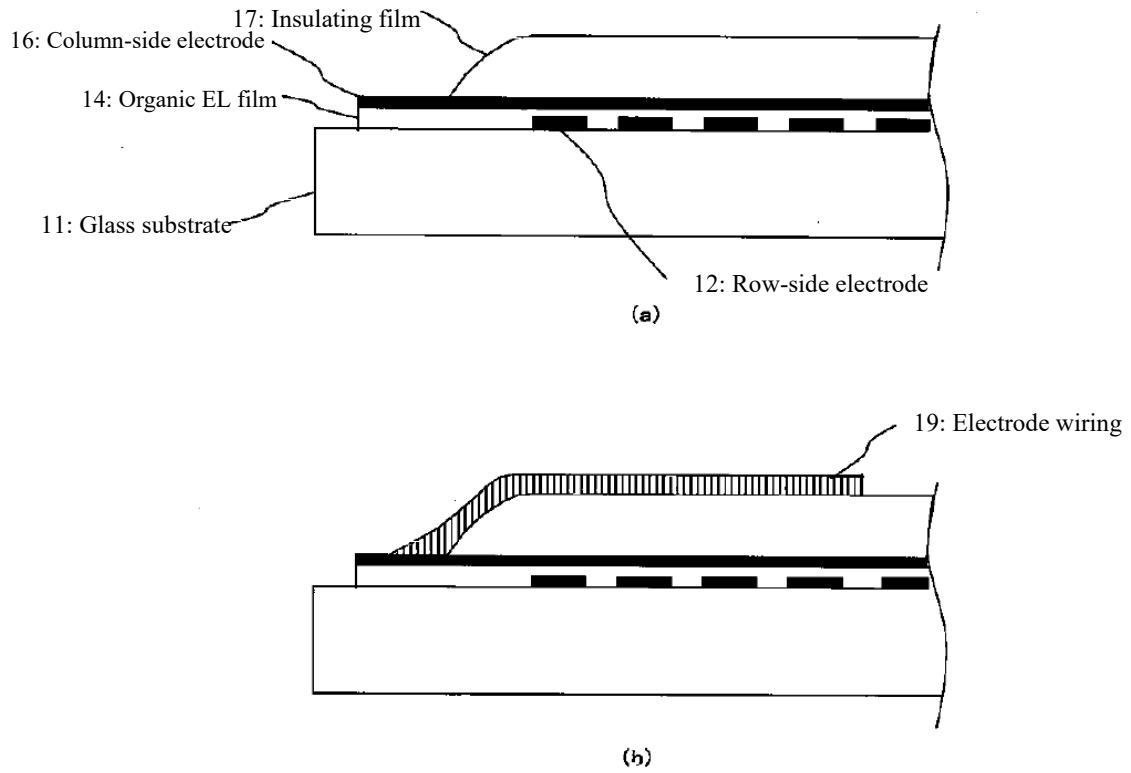
[FIG. 9] [FIG. 10]



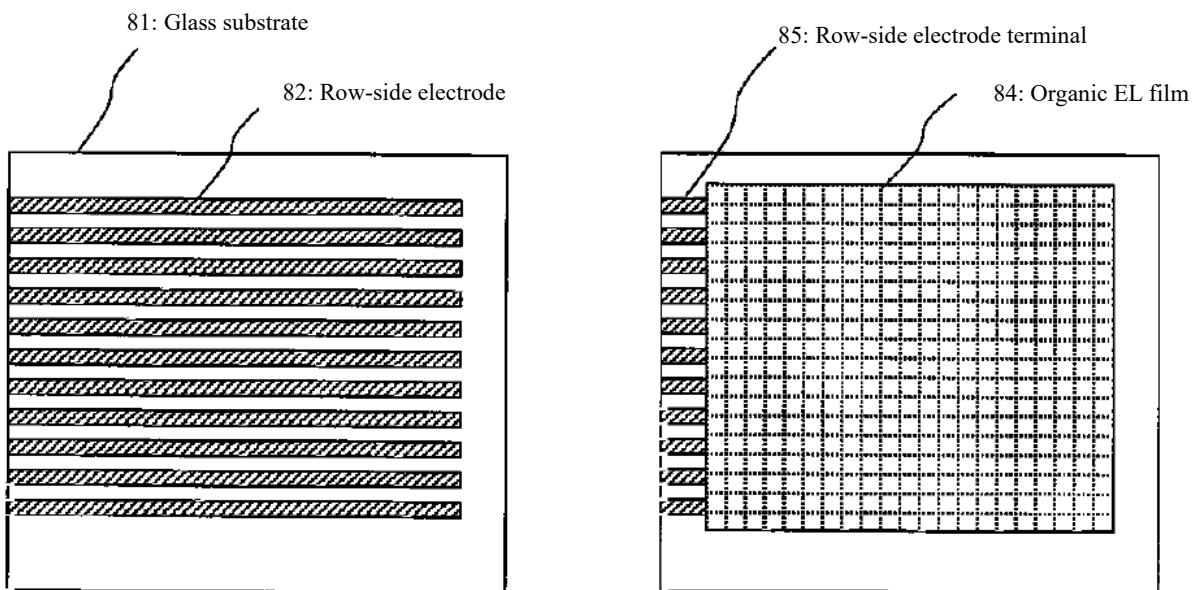
[FIG. 11] [FIG. 12]



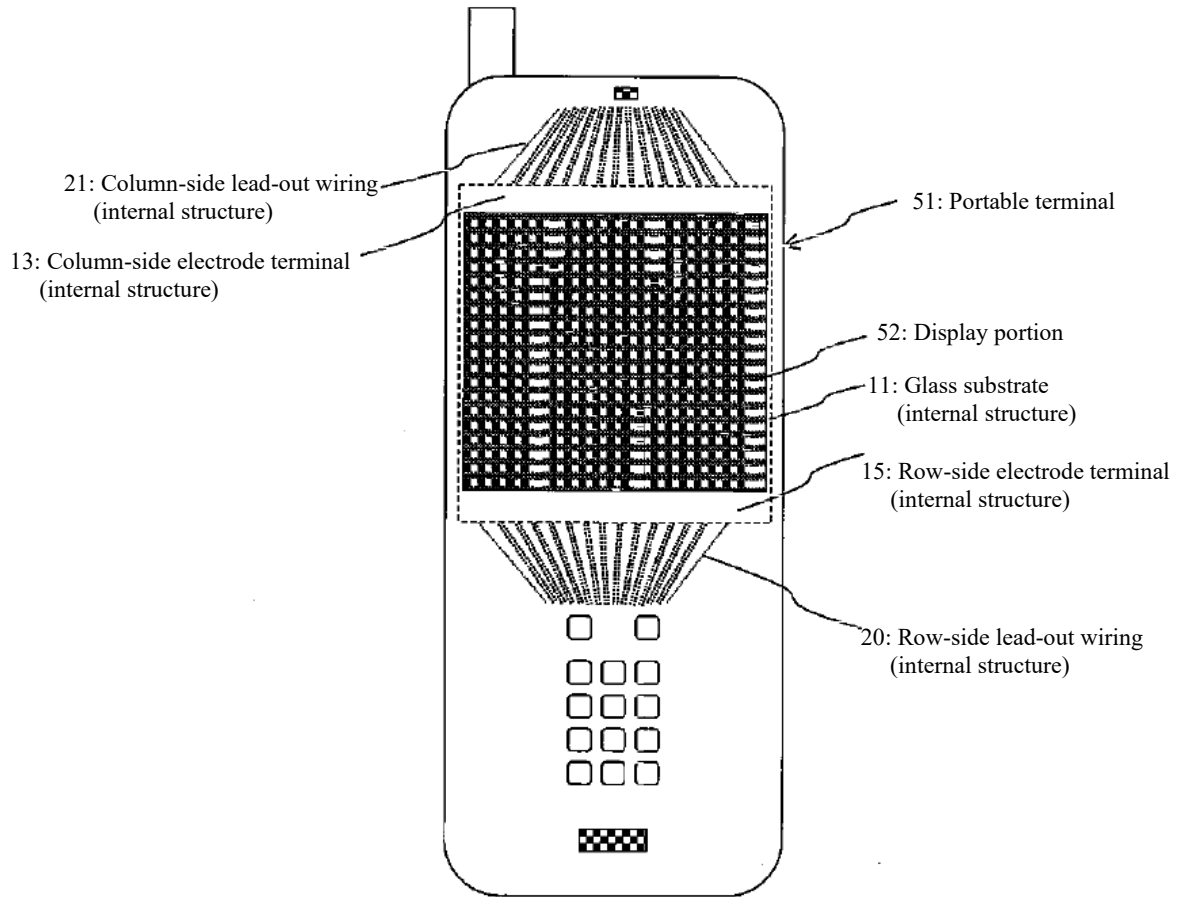
[FIG. 13]



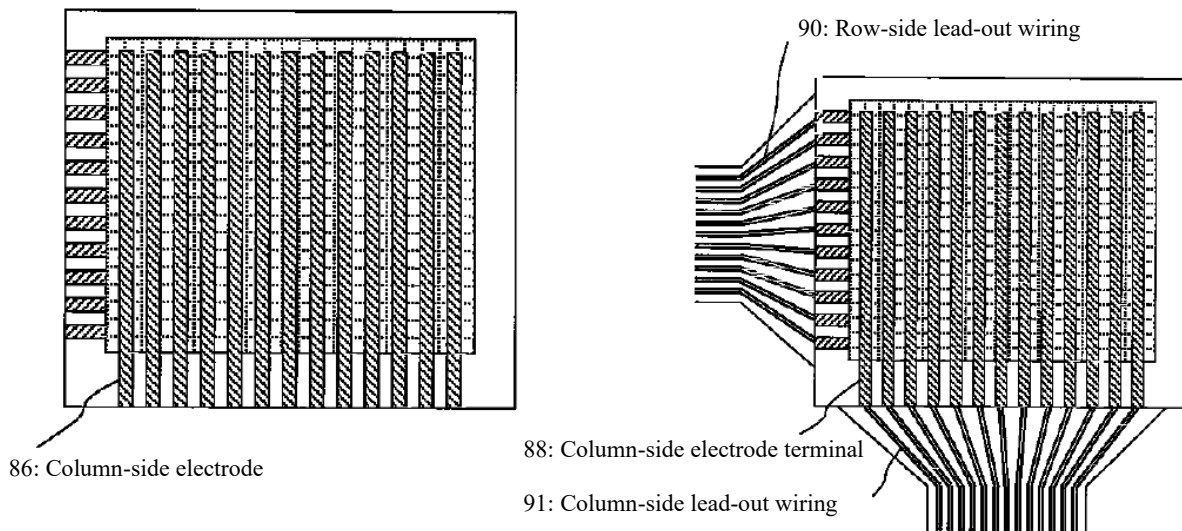
[FIG. 16] [FIG. 17]



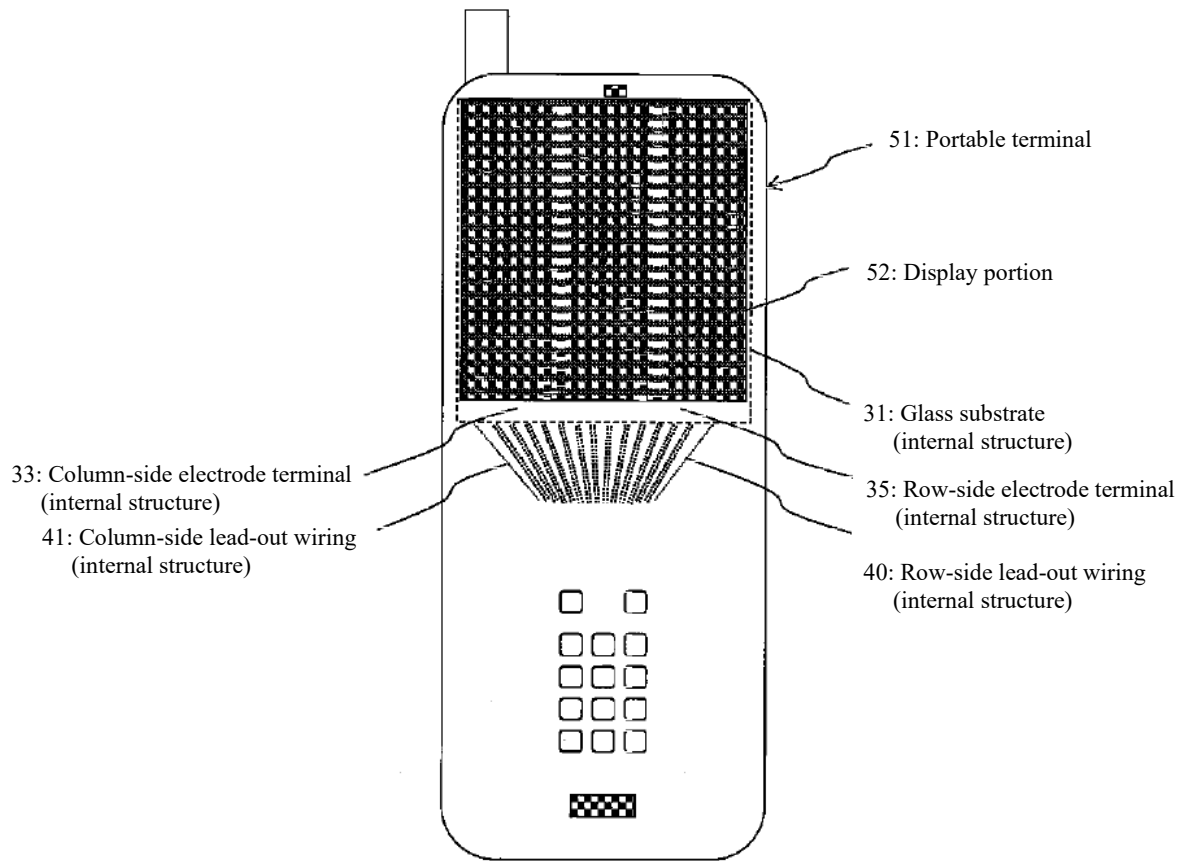
[FIG. 14]



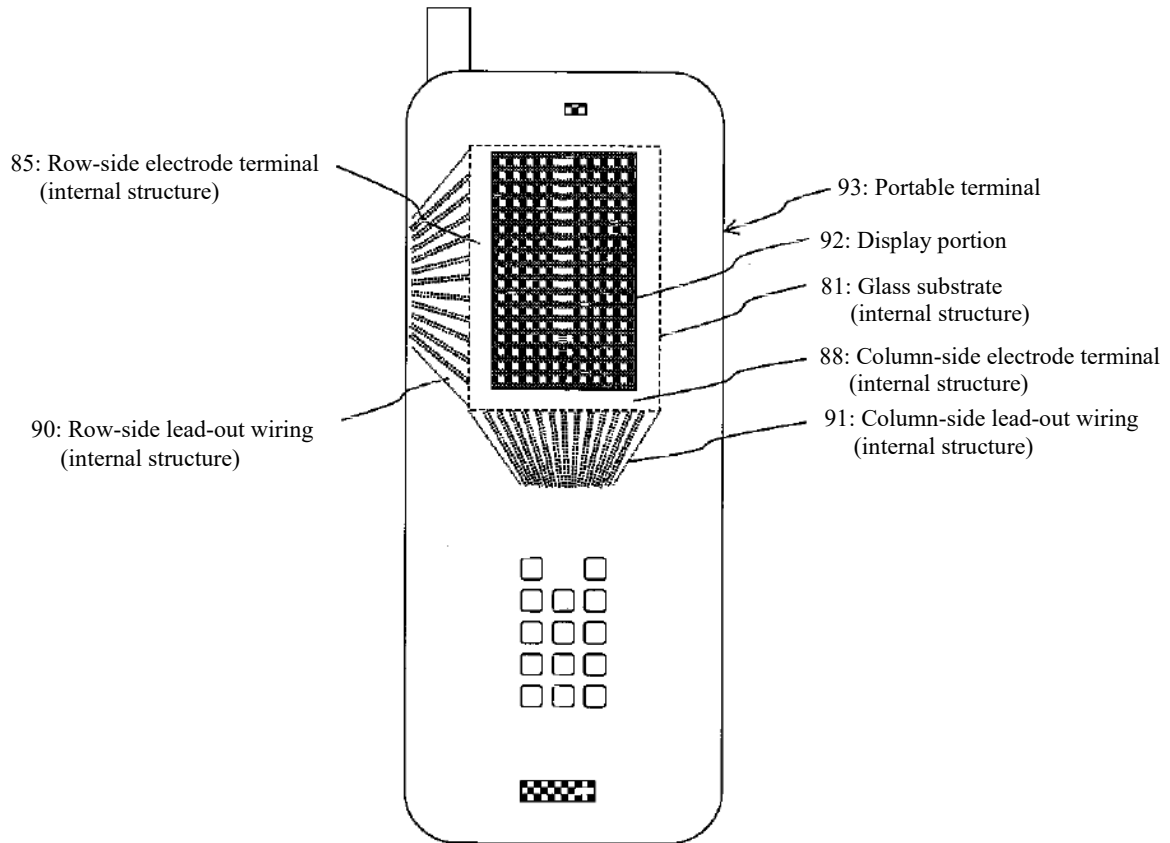
[FIG. 18] [FIG. 19]



[FIG. 15]



[FIG. 20]



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(51) Int.Cl. ⁷	Identification Code	FI	(Reference)
H05B	33/10	H05B	33/10
	33/14		33/14
			A

TRANSLATOR'S DECLARATION

Date: July 27, 2025

I, [Shenal S.], hereby declare:

That I possess advanced knowledge of the [Japanese] and English languages. The attached [Japanese] into English translation has been translated by me and to the best of my knowledge and belief, it is a true and accurate translation of: [JP_2003317943_A (1).pdf].

I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willfully false statements and the like are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code.

In signing this declaration, I understand that the translation and this declaration may be filed as evidence in a contested case. I acknowledge that I may be subject to cross-examination within the United States.



Signature

[Shenal S.]

Print