APPEAL DECISION

Appeal No. 2016-6100

China
Appellant TPK TOUCH SOLUTIONS (XIAMEN) INC.

Kanagawa, Japan
Patent Attorney IEIRI, Takeshi

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2014-541523, entitled "Touch Sensing Panel" (international publication dated June 6, 2013, International Publication No. WO2013/078944; national publication of the translated version dated January 19, 2015, National Publication of International Patent Application No. 2015-501979) has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

1. History of the procedures

The application was originally filed on November 10, 2012 as an international filing date (priority claim under the Paris Convention, November 29, 2011, China) and an examiner's decision of refusal was issued on February 15, 2016 (dispatch date: 23rd of the same month). Against this, a request for appeal was filed on April 25, 2016 and a written amendment was submitted at the same time. Then, reasons for refusal (hereinafter, referred to as "reasons for refusal by the body") were notified by the body on September 27, 2016, and a written amendment was submitted on December 19, 2016 and in conjunction with this, a written opinion was submitted.

2. The Invention

The invention relating to Claim 1 of the present application (hereinafter referred to as "the Invention") is acknowledged as follows, as described in the scope of claims of the written amendment dated December 19, 2016.

"[Claim 1]

A touch sensing panel comprising:

a sensing pattern layer including at least a plurality of sensing pads along an identical direction; and
a plurality of bridging wires for electrically connecting the sensing pads, wherein
each bridging wire has a top surface with low reflectivity,
each bridging wire includes at least a conductive layer and an anti-reflective layer disposed on the conductive layer,
the anti-reflective layer is a conductive material layer,
the reflectivity of the anti-reflective layer is lower than that of the conductive layer,
the material of the anti-reflective layer is metal, and
the metal is nickel, tungsten, or an alloy of these."

3. Regarding Cited Document and Cited Invention

International Publication No. WO 2011/013279 (hereinafter, referred to as "the Cited Document") that was cited in the reasons for refusal by the body and published before the priority date of the application includes the following description with drawings (especially FIG. 1, FIG. 2, and FIG. 5). (The underlines indicate parts on which attention is especially focused. The same shall apply hereinafter.)

(1) Paragraphs [0026] to [0032]
"[0026] [Embodiment 1]

The following description discusses, with reference to FIGS. 1 through 10, an embodiment of an electrode substrate in accordance with the present invention. It should be noted that the electrode substrate of the present embodiment is a capacitance-type touch panel.

[0027] [Touch panel]

(Overall configuration of touch panel)

FIG. 1 is a plan view schematically illustrating partly a configuration of an input region of the electrode substrate (hereinafter referred to as a touch panel) of the present embodiment. For convenience of description, FIG. 1 does not illustrate a transparent substrate which is a constituent of the touch panel.

[0028] As illustrated in FIG. 1, a touch panel 10 is configured such that, in its input region, first electrode patterns 30 in lines and second electrode patterns 20 in lines are provided on a transparent substrate 40 (see FIG. 2). In a frame region (frame section) which is outside the input region, wires (frame section metal wires) electrically

connected to the respective first electrode patterns 30 and wires (frame section metal wires) electrically connected to the respective second electrode patterns 20 are provided. It should be noted that the input region in the present embodiment is a region, in the touch panel 10, which is occupied by the first electrode patterns 30 and the second electrode patterns 20 and which is touched by a user with a finger, etc. so that the user can carry out input operations. Further, since configurations of the frame region are the same as those of a well-known touch panel, their descriptions are omitted in this specification.

[0029] As illustrated in FIG. 1, the first electrode patterns 30 extend in a first direction which is indicated by the arrow x, and the second electrode patterns 20 extend in a second direction which intersects the first direction and is indicated by the arrow y.

[0030] According to the touch panel 10 thus configured, voltages are sequentially applied to the first electrode patterns 30 and the second electrode patterns 20 so that these electrode patterns are charged. Under this condition, when a finger or a pen or the like; i.e., an electric conductor, makes contact with some part of the touch panel 10, a capacitor is formed also between the first electrode patterns 30 and second electrode patterns 20 and the finger or the like. As a result, a reduction in capacitance occurs. This makes it possible to detect which part is touched by the finger or the like.

[0031] (Configurations of electrode patterns) Each of the first electrode patterns 30 is constituted by transparent electrodes 31 and conductive connecting sections 32 via which the transparent electrodes 31 are connected to one another so as to resemble a string of beads. According to the present embodiment, the transparent electrodes 31 and the connecting sections 32 are made of ITO (Indium Tin Oxide) and are integral with one another.

[0032] On the other hand, each of the second electrode patterns 20 is constituted by transparent electrodes 21 made of ITO and metal wires 22 via which the transparent electrodes 21 are connected to one another so as to resemble a string of beads. That is, the metal wires 22 serve as conductive connecting sections via which transparent electrodes are electrically connected with one another."

(2) Paragraphs [0040] to [0042]

"[0040] As illustrated in FIGS. 1 and 2, the transparent electrodes 21 are formed on a

surface of the transparent substrate 40 and in a layer in which the transparent electrodes 31 and the connecting sections 32 are provided. The transparent electrodes 21 and the first electrode patterns 30 are covered by a transparent insulation layer 41 formed of, for example, SiO_x, SiN_x, and Ta_xO_x.

[0041] In the insulation layer 41, there is a contact hole 45 on a transparent electrode 21 in a position close to a connecting section 32.

[0042] Transparent electrodes 21 adjacent to each other in the second direction, between which the connecting section 32 is provided, are electrically connected to each other via a metal wire 22 which is provided on the insulation layer 41 and inside the contact hole 45. This forms a second electrode pattern 20."

(3) Paragraphs [0055] to [0058]
"[0055] (Material for metal wire)

The following description discusses metal from which the metal wires 22 are made.

[0056] According to the touch panel 10, reduced resistance of the second electrode patterns 20 is achieved by electrically connecting the transparent electrodes 21 via the metal wires 22 having high conductivity. In view of this, no particular limitation is imposed on metal used for the metal wires 22, provided that the metal has an electric resistivity lower than that of an electrode material (ITO in the present embodiment) from which the transparent electrodes 21 are made. Note however that, in particular, metal having an electric resistivity of not more than $10^{-7}\Omega m$ makes it possible to more efficiently reduce the resistivity. It is known that, in the production process of a liquid crystal display panel, ITO has a sheet resistance of 50 to 1000 times that of metal (e.g., Al, Cu, Ag or W).

[0057] Each of the metal wires 22 may be made of one type of metal. Alternatively, each of the metal wires 22 may be made of an alloy of two or more types of metal, provided that the electric resistivity satisfies the foregoing conditions.

[0058] As described above, no particular limitation is imposed on metal from which the metal wires 22 are made. Note however that, in view of production and stability, it is preferable to use metal that has been conventionally used in a wire in a liquid crystal

display or in a touch panel, etc. Examples of such metal include Ag, Cu, Al, W, Ta, Ti, Mo, and Cr."

(4) Paragraphs [0067] to [0070]

"[0067] (External configuration of metal wire)

According to the present embodiment, each of the metal wires 22 consists of a single layer. That is, each of the metal wires 22 is made of one type of metal. Note, however, that each of the metal wires 22 may consist of a plurality of layers. In this case, an outermost layer can be made of metal having a reflectivity lower than that of metal from which the other layer(s) is/are made. This makes it possible to suppress light reflection at the surfaces of the metal wires 22, thereby making the metal wires 22 less visible.

[0068] FIG. 5 is a cross-sectional view illustrating an intersection 11 in the touch panel 10 in which a metal wire 22 consists of a plurality of layers.

[0069] As illustrated in FIG. 5, according to this touch panel 10, the metal wire 22 has a double-layered structure constituted by a first layer 22c and a second layer 22d. The first layer 22c is on the insulation layer 41 side, and the second layer 22d is a layer above the first layer 22c and is an outermost layer (i.e., an outermost layer located on a side opposite to a side that faces the transparent substrate 40). For example, the first layer 22c of the metal wire 22 can be made of Ag, Cu, and/or Al, etc., and the second layer 22d of the metal wire 22 can be made of Ti, Ta, or Mo, etc. which has a reflectivity lower than that of metal from which the first layer 22c is made. This makes it possible to suppress light reflection at the surfaces of the metal wires 22 as compared to a case where the metal wires 22 are made only of Ag, Cu, and/or Al. This makes it possible to make the metal wires 22 less visible.

[0070] Although FIG. 5 illustrates the metal wire 22 having a double-layered structure, the metal wire 22 may consist of three or more layers. This configuration also makes it possible to suppress light reflection at the surfaces of the metal wires 22 to thereby make the metal wires 22 less visible, by employing, as the outermost layer, metal that has a lower reflectivity."

(5) [Claim 1] to [Claim 5] of the scope of claims

"[Claim 1] An electrode substrate comprising: first electrode patterns provided on a

surface of a transparent substrate and extending in a first direction; and second electrode patterns provided on the surface of the transparent substrate and extending in a second direction that intersects the first direction,

each of the first electrode patterns being constituted by transparent electrodes and conductive connecting sections via which the transparent electrodes are connected to each other so as to resemble a string of beads, and each of the second electrode patterns being constituted by transparent electrodes and conductive connecting sections via which the transparent electrodes are connected to each other so as to resemble a string of beads,

each of the second electrode patterns intersecting each of the first electrode patterns via an insulation layer at the respective conductive connecting sections of said each of the second electrode patterns, and

in at least one of the second electrode patterns, at least one of the conductive connecting sections of said at least one of the second electrode patterns being a metal wire.

[Claim 2] The electrode substrate according to claim 1, wherein, in each of the second electrode patterns, at least one of the conductive connecting sections of said each of the second electrode patterns is a metal wire.

[Claim 3] The electrode substrate according to claim 1 or 2, wherein the metal wire is made of metal having an electric resistivity of not more than 10^{-7} Ωm.

[Claim 4] The electrode substrate according to any one of claims 1 to 3, wherein a projected area of the metal wire in a direction normal to the transparent substrate is smaller than 0.03 mm^2.

[Claim 5] The electrode substrate according to any one of claims 1 to 4, wherein: the metal wire includes a plurality of layers; and an outermost layer of the plurality of layers, which is on a side opposite to a side that faces the transparent substrate, is made of metal having a reflectivity lower than that of metal from which the other(s) of the plurality of layers is/are made."

Accordingly, by considering related drawings and technical common sense for the aforementioned matters and by paying attention on the underlined parts, it can be said that the following invention (hereinafter, referred to as the "Cited Invention") is described in the cited document.

"A touch panel 10 which is configured such that, in its input region, first electrode patterns 30 in lines and second electrode patterns 20 in lines are provided on a transparent substrate 40, wherein:

the first electrode patterns 30 extend in a first direction and the second electrode patterns 20 extend in a second direction which intersects the first direction;

each of the first electrode patterns 30 is constituted by transparent electrodes 31 and conductive connecting sections 32 via which the transparent electrodes 31 are connected to one another so as to resemble a string of beads,

each of the second electrode patterns 20 is constituted by transparent electrodes 21 made of ITO and metal wires 22 via which the transparent electrodes 21 are connected to one another so as to resemble a string of beads, that is, the metal wires 22 are conductive connecting sections for electrically connecting the transparent electrodes with one another;

each of the second electrode patterns intersects each of the first electrode patterns via an insulation layer at the respective conductive connecting sections of said each of the second electrode patterns;

no particular limitation is imposed on metal used for the metal wires 22, provided that the metal has an electric resistivity lower than that of an electrode material from which the transparent electrodes 21 are made;

no particular limitation is imposed on metal from which the metal wires 22 are made as described above, and note, however, that, in view of production and stability, it is preferable to use metal that has been conventionally used in a wire in a liquid crystal display or in a touch panel, etc., and examples of such metal include Ag, Cu, Al, W, Ta, Ti, Mo, and Cr;

each of the metal wires 22 may consist of a plurality of layers, and in this case, an outermost layer can be made of metal having a reflectivity lower than that of metal from which the other layer(s) is/are made, which makes it possible to suppress light reflection at the surfaces of the metal wires 22, thereby making the metal wires 22 less visible;

the metal wire 22 has a double-layered structure constituted by a first layer 22c on the insulation layer 41 side and a second layer 22d which is a layer above the first layer 22c and is an outermost layer (i.e., an outermost layer located on a side opposite to a side that faces the transparent substrate 40), for example, the first layer 22c of the metal wire 22 can be made of Ag, Cu and/or Al, etc., and the second layer 22d of the metal wire 22 can be made of Ti, Ta, or Mo, etc. which has a reflectivity lower than that

of metal from which the first layer 22c is made, making it possible to suppress light reflection at the surfaces of the metal wires 22 as compared to a case where the metal wires 22 are made only of Ag, Cu, and/or Al and thereby making it possible to make the metal wires 22 less visible; and

the metal wire 22 may consist of three or more layers and also in this case, by employing, as the outermost layer, metal that has a lower reflectivity, light reflection at the surfaces of the metal wires 22 can be suppressed, thereby making the metal wires 22 less visible."

4. Comparison

The invention relating to Claim 1 (hereinafter referred to as the "Invention") and the Cited Invention are compared.

(1) The "transparent electrodes 21" constituting second electrode patterns 20 in lines in the input region of the touch panel 10 of the Cited Invention correspond to "a plurality of sensing pads" of the Invention.

The "second electrode patterns 20 in lines" of the Cited invention are "constituted by transparent electrodes 21 ... metal wires 22 via which the transparent electrodes 21 are connected to one another so as to resemble a string of beads" and "the second electrode patterns 20 extend in a second direction which intersects the first direction." Therefore, the "second electrode patterns" correspond to "a sensing pattern layer including at least a plurality of sensing pads along an identical direction."

(2) The "metal wires 22" of the Cited Invention are those "via which the transparent electrodes 21 are connected to one another so as to resemble a string of beads, that is, the metal wires 22 are conductive connecting sections for electrically connecting the transparent electrodes with one another" and "... intersect each of the first electrode patterns via an insulation layer." Therefore, the "metal wires 22" correspond to "a plurality of bridging wires for electrically connecting the sensing pads" of the Invention.

(3) The feature of "metal wires 22" of the Cited Invention in which "each of the metal wires 22 may consist of a plurality of layers, and in this case, an outermost layer can be made of metal having a reflectivity lower than that of metal from which the other layer(s) is/are made, which makes it possible to suppress light reflection at the surfaces of the metal wires 22, thereby making the metal wires 22 less visible" corresponds to the feature of the Invention in which "each bridging wire having a top surface with low

reflectivity."

(4) As for the feature of the Cited Invention in which "the metal wire 22 has a double-layered structure constituted by a first layer 22c on the insulation layer 41 side and a second layer 22d which is a layer above the first layer 22c and is an outermost layer (i.e., an outermost layer located on a side opposite to a side that faces the transparent substrate 40), for example, the first layer 22c of the metal wire 22 can be made of Ag, Cu and/or Al, etc., and the second layer 22d of the metal wire 22 can be made of Ti, Ta, or Mo, etc. which has a reflectivity lower than that of metal from which the first layer 22c is made, making it possible to suppress light reflection at the surfaces of the metal wires 22 as compared to a case where the metal wires 22 are made only of Ag, Cu, and/or Al, and thereby making it possible to make the metal wires 22 less visible," "the first layer 22c of the metal wire 22" corresponds to "the conductive layer" of the Invention and "the second layer 22d of the metal wire 22" corresponds to "an anti-reflective layer disposed on the conductive layer" of the Invention, and therefore, the feature corresponds to "each bridging wire including at least a conductive layer and an anti-reflective layer disposed on the conductive layer" in the Invention.

(5) The "second layer 22d of the metal wire 22 can be made of Ti, Ta, or Mo, etc. which has a reflectivity lower than that of metal from which the first layer 22c is made" in the Cited Invention corresponds to "the anti-reflective layer being a conductive material layer," "the reflectivity of the anti-reflective layer being lower than that of the conductive layer," and "the materials of the anti-reflective layer being metal" in the Invention.

(6) The "touch panel 10" of the Cited Invention corresponds to the "touch sensing panel" of the Invention.

Therefore, the corresponding features and different feature between the Invention and the Cited Invention are as follows:

[Corresponding features]

They correspond to each other in terms of being:

"a touch sensing panel comprising:

a sensing pattern layer including at least a plurality of sensing pads along an identical direction; and

a plurality of bridging wires for electrically connecting the sensing pads, wherein each bridging wire has a top surface with low reflectivity,
each bridging wire includes at least a conductive layer and an anti-reflective layer disposed on the conductive layer,
the anti-reflective layer is a conductive material layer,
the reflectivity of the anti-reflective layer is lower than that of the conductive layer, and the material of the anti-reflective layer is metal."

[Different feature]

The metal as material of the anti-reflective layer is such that "the metal is nickel, tungsten, or an alloy of these" in the Invention; whereas in the Cited Invention, although "the second layer 22d of the metal wire 22 can be made of Ti, Ta, or Mo, etc. which has a reflectivity lower than that of metal from which the first layer 22c is made, "nickel, tungsten, or an alloy of these" is not specified.

5. Judgment by the body

Regarding [Different feature]

As materials used for the metal wire, any of "nickel, tungsten, or an alloy of these" is a well-known material without mentioning literature.

In general, it is clear that the light reflectivity on a metal surface changes its value according to the surface condition of a metal, the wavelength of incident light, etc. in addition to materials of the metal.

In addition, when compared with another metal, for example, aluminum, the fact that the light reflectivity of "nickel, tungsten, or an alloy of these" generally tends to be relatively low is well-known, as described in, for example, <Well-known example A> Japanese Unexamined Patent Application Publication No. 2002-221916, which is newly cited if necessary, (paragraph [0029] "... Such a black matrix is formed by, for example, a resin material obtained by dispersing black pigments, a laminated film having a predetermined reflected light attenuation structure, or further, a metal film having low reflectivity such as tungsten (W), molybdenum (Mo), nickel (Ni), or chromium (Cr), with respective thicknesses to obtain a desired optical density."), and <Well-known example B> Japanese Unexamined Patent Application Publication No. 2000-321753, which is newly cited, (paragraphs [0044]-[0045] "When calculating the reflectivity of ultraviolet light by these metal thin films using the known optical constant, the following are obtained: 93% at a wavelength of 157 nm and 93% at a wavelength of 193 nm (85 to 90% as actual measured values) for aluminum; 54% at a wavelength of 157

nm and 64% at a wavelength of 193 nm for molybdenum; 69% at a wavelength of 157 nm and 69% at a wavelength of 193 nm for silicon; and 52% at a wavelength of 157 nm and 64% at a wavelength of 193 nm for tungsten. ... In addition, for example, the similarly calculated reflectivity for gold (Au) is 20% at a wavelength of 157 nm and 21% at a wavelength of 193 nm, and that for nickel (Ni) is 25% at a wavelength of 157 nm and 35% at a wavelength of 193 nm. Thus, those are more excellent values than that for chromium; and using those metal materials allows a certain degree of effect to be expected."

On the other hand, in the Cited Invention exemplifying the fact that "the first layer 22c of the metal wire 22 can be made of Ag, Cu, and/or Al, etc.," concretely selecting metal and the materials used for the metal as metal forming "the second layer 22d" "which has a reflectivity lower than that of metal from which the first layer 22c is made" is recognized to be a matter of design variation that should be suitably selected by a person skilled in the art in consideration of the reflectivity, costs, etc.

Further, considering that Al and Ag which are exemplified as metals forming the first layer 22c in the Cited Invention are known as metals having high reflectivity, it could be easily conceived by a person skilled in the art to obtain the configuration relating to the different feature in which the metal as material of the anti-reflective layer is such that "the metal is nickel, tungsten, or an alloy of these" by selecting, as metal forming "the second layer 22d" in the Cited Invention, "nickel, tungsten, or an alloy of these" which is well-known as a material used for a metal wire and also well-known as tending to have relatively low light reflectivity.

In addition, the effect of the Invention falls within a scope that can be predicted by a person skilled in the art based on the Cited Invention and well-known matters.

6. Closing

The Invention could be easily made by a person skilled in the art based on the Cited Invention and the well-known matters; thus, the appellant should not be granted a patent for the Invention in accordance with the provisions of Article 29(2) of the Patent Act.

Accordingly, the present application should be rejected without examining other claims.

Therefore, the appeal decision shall be made as described in the conclusion.

February 20, 2017

Chief administrative judge: WADA, Shiro
Administrative judge: INABA, Kazuo
Administrative judge: YAMADA, Masafumi