Appeal decision

Appeal No. 2009-22198

Osaka, Japan

Appellant SEKISUI CHEMICAL CO. LTD.

Osaka, Japan

Patent Attorney MIYAZAKI AND METSUJI PATENT FIRM

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2000-124470 entitled "INTERLAYER MEMBRANE FOR LAMINATED GLASS AND LAMINATED GLASS" (the application published on October 31, 2001, Japanese Unexamined Patent Application Publication No. 2001-302288) has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

1. History of the procedures

The present application is an application filed on April 25, 2000. A reason for refusal dated February 16, 2009 was notified, and a written argument and a written amendment were submitted on April 20, 2009. Then, an examiner's decision of refusal dated August 11, 2009 was issued. An appeal against the examiner's decision of refusal was filed on November 13, 2009 with a written amendment dated the same day. Thereafter, a questioning dated September 20, 2011 citing a report under Article 164(3) of the Patent Act was notified. A response letter was submitted on November 18, 2011. Subsequently, by the body a decision to dismiss the amendment dated November 13, 2009 was made on July 25, 2012, and a reason for refusal was issued at the same time. A written argument and a written amendment were submitted on October 1, 2012.

2. The Invention

The inventions according to Claims 1 to 3 of the present application should be specified in the matters recited in Claims 1 to 3 of the Claims in view of the claims to which an amendment was made on October 1, 2012. The invention according to Claim 1 (hereinafter referred to as "the Invention") is set forth below:

"[Claim 1]

An interlayer membrane for laminated glass consisting of plasticized poly(vinyl acetal) resin,

wherein said plasticized polyvinyl acetal resin is obtained by plasticizing a polyvinyl acetal resin with a plasticizer of triethyleneglycol di-2-ethylhexanoate,

and when a laminated glass is made, said laminated glass has a visible light transmittance Tv over a wavelength of 380 to 780 nm of 75% or more,

and a sunlight transmittance Ts over 340 to 1800 nm of 60% or less, a haze value H of 1.0% or less, and an electromagnetic wave shielding performance ΔdB of 10dB or less over 10 to 2000 MHz, and whitened distance from an edge of laminated glass of 7 mm or less when left for 2 weeks in a condition of a relative humidity of 95% at 80°C, and wherein said layer comprises a metal oxide particle with a function of heat-ray shielding and phosphoric acid ester."

3. Matters disclosed in cited Publication

(1) Japanese Unexamined Patent Application Publication No. H08-259279 (hereinafter referred to as "Publication 1"), which is a publication published before the present application and cited in a reason for refusal by the body, refers to the following matters with drawings:

(A) "[Claim 1] A laminated glass having an interlayer membrane between at least two transparent glasses, wherein a functional superfine particle with a particle diameter of 0.2 μm or less is dispersed into said interlayer membrane layer.

[Claim 2] The laminated glass of Claim 1, wherein said interlayer membrane is polyvinyl butyral-based resin film." (The claims, Claim 1 and Claim 2)

(B) "[Claim 7] The laminated glass of any one of Claims 1 to 6, wherein said functional superfine particle is any single substance of metals, oxides, nitrides, and sulfides of Sn, Ti, Si, Zn, Zr, Fe, Al, Cr, Co, Ce, In, Ni, Ag, Cu, Pt, Mn, Ta, W, V, or Mo, or a dopant of Sb or F, or a composite selected from at least two or more of the foregoing single substances, or a mixture further comprising an organic resin as well as said each single substance or composite, or a coated product where an organic resin is coated on said each single substance or composite." (The claims, Claim 7)

(C) "[Claim 9] The laminated glass of any one of Claims 1 to 8, wherein said laminated glass is a glass for architecture.

[Claim 10] The laminated glass of any one of Claims 1 to 8, wherein said laminated glass is a window glass for automobiles." (The claims, Claim 9 and Claim 10)

(D) "[Industrial Application Field]

The Invention relates to a laminated glass obtained by subjecting a resin interlayer membrane having as necessary various functional superfine particles, such as those for a coloring, heat-ray, or UV shielding membrane, or radio wave transmittance, to a lamination treatment, as well as a method for producing the same." (Paragraph [0001])

(E) "Further, the functional superfine particle is any single substance of metals, oxides, nitrides, and sulfides of Sn, Ti, Si, Zn, Zr, Fe, Al, Cr, Co, Ce, In, Ni, Ag, Cu, Pt, Mn, Ta, W, V, or Mo, or a dopant of Sb or F, or a composite selected from at least two or more of the foregoing single substances, or a mixture further comprising an organic resin as well as said each single substance or composite, or a coated product where an organic resin is coated on said each single substance or composite because each single substance or a composite, a mixture, or a coated product may develop heat insulation performance, UV shielding performance, coloring performance, and light shielding property as necessary to cause development of various functions and performances required for architecture and automobiles as a laminated glass.

Further, a functional superfine particle may include, for example: any of various metals such as Sn, Ti, Si, Zn, Zr, Fe, Al, Cr, Co, Ce, In, Ni, Ag, Cu, Pt, Mn, Ta, W, and V as well as Mo; various oxides such as SnO_2, TiO_2, SiO_2, ZrO_2, ZnO, Fe_2O_3, Al_2O_3, FeO, Cr_2O_3, Co_2O_3, CeO_2, In_2O_3, NiO, MnO, and CuO; nitrides such as TiN and AlN, or nitrogen oxides; sulfides such as ZnS; dopants such as 9 wt% Sb_2O_3-SnO_2 (ATO) (manufactured by Sumitomo Osaka Cement) and F-SnO_2; and further composites such as SnO_2-10wt% Sb_2O_3 and In_2O_3-5wt% SnO_2 (ITO) (manufactured by Mitsubishi Materials Corporation). Fluororesin, PTFE, LUBRON (DAIKIN Industries Ltd.), CEFRAL LUBE (Central Glass Co., Ltd.) and low-molecular weight TFE. Further, ATO and ITO are particularly preferable for the requirements of automobiles." (Paragraphs [0032] and [0033])

(F) "Furthermore, the plasticizers may include, for example, phthalic acid esters such as dioctyl phthalate (DOP), diisodecyl phthalate (DIDP), and ditridecyl phthalate (DTDP), butylbenzyl phthalate (BBP); phosphoric acid esters such as tricresyl phosphate (TCP) and trioctyl phosphate (TOP); further, fatty acid esters such as tributyl citrate and methyl acetyl ricinoleate (MAR); and polyether esters such as triethylene glycol di-2-ethylbutyrate (3GH) and tetraethyleneglycol dihexanol; and further a mixture thereof." (Paragraph [0047])

(G) "Example 1

To 10 g of DOP (dioctyl phthalate) dispersively comprising 20 wt% ATO (conductive antimony-containing tin oxide) superfine particles (with a particle diameter of 0.02 μm or less) and 130 g of normal DOP was added 485 g of PVB (polyvinyl butyral) resin, followed by kneading together with the other ultraviolet absorbers, etc. by a triple roll mill at about 70°C for about 15 minutes. The obtained raw material resin for the formation of film was formed into a film with a thickness of about 0.8 mm by an extruder at around 190°C and rolled up. Further, grain was formed to have uniform roughness on a film surface.

Subsequently, two clear glass substrates (FL2.3) with dimensions of about 300 mm by about 300 mm and a thickness of about 2.3 mm were prepared. Said film was cut out with the same dimensions as the substrate. The prepared interlayer membrane was sandwiched between two clear glass substrates to obtain a laminate.

Subsequently, the laminate was put into a vacuum bag made of rubber, and vacuumed inside the bag, and kept at about 80 to 110°C for about 20 to 30 minutes, and then temporarily cooled down to a room temperature. The laminate taken out from the bag was fed to an autoclave apparatus and heated for about 20 to 40 minutes at a temperature of about 110 to 140°C at a pressure of about 10 to 14 kg/cm^2 for glass lamination treatment.

The obtained laminated glass was measured and evaluated as follows:

[Optical properties] The transmittance over wavelengths of 340 to 1800 nm was measured by a spectral photometer (340 type, manufactured by Hitachi, Ltd.) and visible light transmittance Tv (380 to 780 nm), sunlight transmittance Ts (340 to 1800 nm), and stimulation purity (%), color tone etc. were calculated in compliance with JIS Z 8722, JIS R 3106, or JIS Z 8701.

[Haze] Haze value H was calculated in compliance with JIS K6714. Acceptable if 3% or less in architecture use, or 1% or less in automobile use.

[Radiowave transmittance] The reflection loss (dB) was compared in a radio wave range of 10 to 1000 MHz with a clear glass (FL3t) single plate having a normal plate thickness of 3 mm by the KEC method measurement (electric field shielding effect measurement device). Acceptable if an absolute value of the difference (ΔdB) falls within 2 dB.

[Adhesiveness] Left for 16±4 hours at a temperature of -18±0.6°C, and after adjustment, an extent of exposure of interlayer membrane was inspected by peeling a glass with a hammer. Acceptable if it is one with little exposure.

[Heat resistance] Subsequent to boiling for two hours in boiling water at 100°C, a 10 mm-circumference was removed. Acceptable if there was no abnormality such as bubble generation, haze, glass cracking, etc. in the remaining part.

[Moisture resistance] Left for two weeks in a condition of relative humidity of 95±4% and at 50±2°C. Acceptable if there was no abnormality such as bubble generation, haze, glass cracking, etc.

[Electrical properties] Measured by surface high resistance meter (HIRESTA HT-210) manufactured by Mitsubishi Oil and Chemicals Co., Ltd.

(Sheet resistivity) (M Ω/sq.). Acceptable if it is 10 M Ω/sq. or more.

[Additionally, in principle complying with JIS R 3212 etc. in the item of safety glass, in particular, laminated glass.]

As a result, the present invention allows us to provide a laminated glass equivalent to normal laminated glass having optical properties such as a visible light transmittance Tv of about 76.8%, a sunlight transmittance Ts of about 58.6%, a stimulating purity Pe of 0.7 % or so having light gray neutral color tone and no glare caused by reflection and a Haze value H of about 0.3% or so, as well as sufficiently excellent heat-ray shielding property, and particularly high surface resistivity usually equivalent to single plate glass, e.g. radiowave transmittance equivalent to single plate glass in a range of 80 MHz (FM radiowave band) and about 520 to 1630 kHz (AM radiowave band), and sufficiently stable excellent adhesiveness and heat resistance and moisture resistance, which are all acceptable.

The laminated glass provides comfortable dwellings as well as driver or passengers or environment-friendly space and a high level of safety as well as comfortable receipt of various radiowaves such as AM band. The laminated glass is also applicable to window glass for architecture as well as window glass for automobiles, in particular window glass for automobiles equipped with an antenna conductor, and thus sufficiently responds to expectations.

Further, various other properties such as weather proof (e.g. visible light transmittance is almost unchanged for about 1000 hours in sunshine weather meter) were also evaluated and all were found acceptable.

Example 2

To 10 g of 3GH (triethyleneglycol-di-2-ethylbutyrate) dispersively comprising 20 wt% ATO (conductive antimony-containing tin oxide) superfine particle (with a particle diameter of 0.02 μm or less) and 130 g of normal 3GH, there was added 485 g of PVB (polyvinyl butyral) resin, followed by addition of 5 g tospal 120 (manufactured by Toshiba Silicone) as an adhesive adjuster, followed by kneading together with the other ultraviolet absorbers etc. by a triple roll mill at about 70°C for about 15 minutes. The obtained raw material resin for the formation of film was formed into a film with a thickness of about 0.8 mm or so by an extruder at 190°C and rolled to obtain an interlayer membrane having a thickness of about 0.8 mm with uniform surface grains being disposed, similar to Example 1.

Subsequently, similar to Example 1, clear glass substrate (FL2) with dimensions of about 300 mm by about 300 mm and a thickness of about 2.0 mm was used to obtain a laminate. Subsequently, it was subjected to glass lamination treatment similar to that in Example 1.

The resultant laminated glass desirably had excellent optical properties similar to those of Example 1, with Tv of 76.5%, Ts of 58.5%, and H of 0.4% and showed a good balance of physical properties such as radiowave transmittance and quality." (Paragraphs [0054] and [0062])

(H) "[Effects of the Invention] As aforementioned, the Invention is a laminated glass dispersively comprising functional superfine particles with a particle diameter of 0.2 μm or less in an interlayer membrane layer, and a method for manufacturing the same, which allows us to provide functional properties such as heat insulation performance, ultraviolet shielding property, and radiowave transmittance performance without affecting the interlayer membrane layer for laminated glass conventionally used, and allows us to have good balance of color tone control from clear to coloring, extremely low Haze value, excellent transparency, and the prevention of reflection and glare so as to obtain quality equivalent to that of the conventional laminated glasses, and allows us to implement glass lamination treatment easily at low cost while maintaining the laminated glass production line currently used and further flexibly corresponding to a size or a shape of glass, and allows us to improve cooling and heating efficiency as well as interior comfort and provide environment- or human-friendliness and wide range of transparency, and allows us to ensure glass antenna performance in nature for television and radio in automobiles and mobile phones, etc. for radiowave transparent performance of AM radiowave, FM radiowave, and TV radiowave band equivalent to normal float glass so as to ensure a comfortable environment inside or outside buildings or automobiles and provide in particular radiowave transparent-type heat-ray/ultraviolet shielding glass usable for laminated glass in various color tones from colorless to colored with a wide variety of applications such as a window material for various architectural structures as well as, in particular, a window material for various automobiles, in particular, windshield glass, and further a window material for an airplane, and the other glass for industry, which may provide laminated glass with useful functions that may be best suited for recent needs, and a method for manufacturing the same." (Paragraph [0095])

(2) International Publication No. 00/18698 (hereinafter referred to as "Publication 2"), which is a publication published before the present application and cited in the reason for refusal by the body, discloses the following matters:

(K) "1. An interlayer membrane for laminated glass comprising a plasticized polyvinyl acetal resin film, wherein a weight loss is 3 weight% or less when said interlayer membrane for laminated glass is left for one hour at 150°C, and a whitened distance from an edge is 7 mm or less when said interlayer membrane for laminated glass is sandwiched between two glasses having a thickness of 2.0 to 4.0 mm to prepare a laminated glass, and then said laminated glass is left for two weeks in a condition of 80°C and relative humidity of 95%.

2. The interlayer membrane for laminated glass of Claim 1, wherein said plasticized polyvinyl acetal resin film comprises a total amount of 5 ppm or more of at least two salts selected from magnesium salt of C2-10 carboxylic acids and potassium salt of C2-100 carboxylic acids in a plasticized polyvinyl acetal consisting of 100 weight parts of polyvinyl acetal with an average degree of acetalization of 66 to 72 mol% and 30 to 50 weight parts of at least one plasticizer selected from the group consisting of triethyleneglycol di-2-ethylhexanoate, oligoethyleneglycol di-2-ethylhexanoate, and tetraethyleneglycol di-n-heptanoate." (The claims, Claim 1 and Claim 2)

(L) "A laminated glass, which has been obtained by sandwiching an interlayer membrane comprising plasticized polyvinyl acetal resin between at least two glass plates, has good transparency and weather proof property as well as basic performance required for laminated glass, including excellent penetration blocking property and resistance to scattering of glass pieces, and is widely used for laminated glass for automobiles and architecture." (The specification, page 1, lines 10 to 13)

(M) "... The object of the invention is to provide an interlayer membrane for laminated glass in which the problem of fire in autoclave or end cutting (trim cutting) has been solved, and a laminated glass using the same that has excellent properties such as transparency, weather proof ability, adhesiveness, and penetration resistance, and less frequently causes whitening at a circumferential part of the laminated glass even when left under a high humidity atmosphere." (The specification, page 2, lines 7 to 11)

(3) Japanese Unexamined Patent Application Publication No. H08-281860 (hereinafter referred to as "Publication 3"), which is a publication published before the present application and cited in the reason for refusal by the body, discloses the following matters:

(P) "[Claim 1] A heat-ray shielding film having a heat-ray shielding layer and an adhesive layer, at least one of which surface comprises the adhesive layer.

[Claim 2] The heat-ray shielding film of Claim 1, wherein said adhesive layer serves as the heat-ray shielding layer." (The claims, Claim 1 and Claim 2)

(Q) "[Claim 9] The heat-ray shielding film of any one of Claims 1 or 5, wherein said heat-ray shielding layer comprises a heat-ray shielding inorganic fine particle." (The claims, Claim 9)

(R) "[Claim 11] The heat-ray shielding film of Claim 9, wherein said heat-ray shielding inorganic fine particle is an antimony-containing tin oxide fine particle.

[Claim 12] The heat-ray shielding film of Claim 9, wherein said heat-ray shielding inorganic fine particle is an indium-containing tin oxide fine particle." (The claims, Claim 11 and Claim 12)

(S) "[Conventional Art] Proposed is a method for imparting the ability of heat-ray (infrared ray) reflection or absorption to these windows in order to reduce heat and ensure energy saving in a window of an architectural structure, a window of vehicles, or a window of a cold or freezing showcase. ..." (Paragraph [0002])

(T) "[Operation] The heat-ray shielding film of the Invention has a heat-ray shielding layer and an adhesive layer, one surface of the film being the adhesive layer. Therefore, it is suitable for the attachment to a window glass of an architectural structure or vehicle. Further, the attachment of heat-ray shielding film of the Invention may prevent the scattering of cracked glass pieces when a window glass is broken. ..." (Paragraph [0007])

(U) "The adhesive layer 3 used herein is formed with transparent resin adhesive. The layer may preferably be made from, for example, polymethyl methacrylate, polyvinyl ether, polyisobutyl, vinyl chloride-vinyl acetate copolymer, polyvinyl butyral, etc. The thickness of the adhesive layer 3 is preferably 5 to 30 μm. ..." (Paragraph [0010])

(V) "The heat-ray shielding inorganic fine particle used herein may include fine particles of a conductive substance such as antimony-containing tin oxide (ATO), indium-containing tin oxide (ITO), copper sulfide (CuS), as well as conductive oxides, conductive sulfides, conductive carbides, and conductive nitrides. ATO fine particle and ITO fine particle are particularly preferable. In Examples, a heat-ray shielding inorganic fine particle is uniformly dispersed into a resin liquid together with dispersant for use in forming the hard coat layer 1. The dispersant used herein may include: an anion-based surfactant such as carboxylate, sulfonate, sulfate, phosphate, or phosphonate; and nonionic-based surfactant such as poly(oxyethylene)alkyl ethers, poly(oxyethylene)alkyl phenol ethers, poly(oxyethylene)alkyl esters, sorbitan alkyl esters etc. The mixing amount of the dispersant is preferably 1 to 20 weight% on the basis of the heat-ray shielding inorganic fine particle." (Paragraph [0012])

4. Comparison and Judgment

(1) Invention described in Publication 1

A Publication 1 discloses in the described matter (A) with respect to Claim 1 that "A laminated glass having an interlayer membrane between at least two transparent glasses, wherein a functional superfine particle ... is dispersed into said interlayer membrane layer." Therefore, the above interlayer membrane is obviously "for laminated glass." Further, according to the described matter (A) with respect to Claim 2, the above interlayer membrane is "polyvinyl butyral-based resin."

B Further, it can be seen from the described matter (B) of "the functional superfine particle is any single substance of metals, oxides, ... of Sn, Ti, Si, Zn, Zr, Fe, Al, Cr, Co, Ce, In, Ni, Ag, Cu, Pt, Mn, Ta, W, V, or Mo, or a dopant of Sb or F, or a composite selected from at least two or more of the foregoing single substances" and the described matter (E) of "a functional superfine particle may include, for example: various metals such as Sn, Ti, Si, Zn, Zr, Fe, Al, Cr, Co, Ce, In, Ni, Ag, Cu, Pt, Mn, Ta, W, and V as well as Mo; various oxides such as SnO_2, TiO_2, SiO_2, ZrO_2, ZnO, Fe_2O_3, Al_2O_3, FeO, Cr_2O_3, Co_2O_3, CeO_2, In_2O_3, NiO, MnO, and CuO; dopants such as 9 wt% Sb_2O_3-SnO_2 (ATO) (manufactured by

Sumitomo Osaka Cement) and F-SnO_2; and further composites such as SnO_2-10wt% Sb_2O_3 and In_2O_3-5wt% SnO_2 (ITO) (manufactured by Mitsubishi Materials Corporation). ... Further, ATO or ITO is particularly preferable for the requirement of automobiles" that the functional superfine particle specified by the above described matter (A) is "a functional superfine particle including any of various oxides such as SnO_2, TiO_2, SiO_2, ZrO_2, ZnO, Fe_2O_3, Al_2O_3, FeO, Cr_2O_3, Co_2O_3, CeO_2, In_2O_3, NiO, MnO, and CuO; or a composite such as 9 wt% Sb_2O_3-SnO_2 (ATO) or In_2O_3-5wt% SnO_2 (ITO)." In addition, it can be recognized from the described matter (E) of "any single substance or a composite, a mixture or a coated product may develop heat insulation performance, UV shielding performance, coloring performance, and light shielding property as necessary to cause development of various functions and performance required for architecture and automobiles as a laminated glass" that these functional superfine particles may develop heat insulation performance.

C Further, the described matter (G) discloses with respect to Example 1 that the transmittance over wavelengths of 340 to 1800 nm was measured, and the visible light transmittance Tv (380 to 780 nm) and the sunlight transmittance Ts (340 to 1800 nm) were calculated for [Optical properties] of laminated glass, and a Haze value H was calculated as [Haze] and an absolute value of the difference (ΔdB) in the reflection loss (dB) over 10 to 1000 MHz is acceptable if it is within 2dB for [Radiowave transmittance] by comparing the reflection loss (dB) with a clear glass (FL3t) single plate having a normal plate thickness of 3 mm by an electric field shielding effect measurement device, and with respect to Example 2 that the resultant laminated glass desirably has excellent optical properties with Tv of 76.5%, Ts of 58.5%, and H of 0.4% and shows a good balance of physical properties such as radiowave transmittance and quality. Here, Example 2 fails to describe any specific value of physical properties regarding radiowave transmittance; however, it is obvious in Example 2 that the measurement and assessment was performed in a similar manner to Example 1. Thus it is deduced from the description of having desired properties in terms of radiowave transmittance in Example 2 that ΔdB in a radiowave range of 10 to 1000 MHz falls within 2dB, similar to Example 1.

D Further, the above described matter (G) discloses with respect to Example 2 "adding to PVB (polyvinyl butyral) resin, ATO (conductive antimony-containing tin oxide) superfine particle-containing 3GH (triethylene glycol di-2-ethylhexanoate) and normal 3GH." Further, it can be seen from the described matter (F) "the plasticizers may include, ... polyether ester such as triethylene glycol di-2-ethylbutyrate (3GH) ..." that 3GH of the above described matter (G) is obviously a plasticizer.

E In addition, there is a description that a plasticizer in Publication 1 may be any of polyether esters.

Accordingly, Publication 1 discloses an invention of:

"An interlayer membrane for laminated glass consisting of a resin in which a plasticizer of polyether ester of 3GH is added to a polyvinyl butyral-based resin, wherein said laminated glass has a visible light transmittance Tv over a wavelength of 380 to 780 nm of 76.5%, a sunlight transmittance Ts over 340 to 1800 nm of 58.5%, a haze value H of 0.4%, and an absolute value of the difference (ΔdB) in the reflection loss (dB) within 2dB by comparing the reflection loss (dB) in a radiowave range of 10 to 1000 MHz with a clear glass (FL3t) single plate having a normal plate thickness of 3 mm by KEC method measurement (electric field shielding effect measurement device), and wherein said interlayer membrane causes disperses a functional superfine particle that develops heat insulation performance and includes any of various oxides such as SnO_2, TiO_2, SiO_2, ZrO_2, ZnO, Fe_2O_3, Al_2O_3, FeO, Cr_2O_3, Co_2O_3, CeO_2, In_2O_3, NiO, MnO, or CuO; or a composite such as 9 wt% Sb_2O_3-SnO_2 (ATO), or In_2O_3-5wt% SnO_2 (ITO), etc." (hereinafter referred to as the "Pub 1 invention.")

(2) Common features and Differences

A The Invention is compared to the Pub 1 invention.

B Regarding "Plasticized polyvinyl acetal resin" of the Invention, the specification of the present application discloses in paragraphs [0010] to [0011] that "an interlayer membrane for laminated glass of the Invention consists of plasticized polyvinyl acetal resin. ... For example, ... polyvinyl butyral, etc. is suitably used. Plasticized polyvinyl acetal resin used for interlayer membrane for laminated glass of the Invention is one where polyvinyl butyral resin is plasticized by a plasticizer. The above plasticizer may include, but is not limited to, for example, triethyleneglycol di-2-ethylbutyrate (3GH), etc." Thus, it can be said that the aforesaid "plasticized polyvinyl acetal resin" includes "polyvinyl acetal resin plasticized by 3GH." Here, it is obvious that 3GH is polyether ester, and polyvinyl butyral resin is polyvinyl butyral-based resin.

On the other hand, "a resin in which a plasticizer of polyether ester of 3GH is added to a polyvinyl butyral-based resin" of the Pub 1 invention may be restated as "polyvinyl butyral-based resin plasticized by a polyether ester of 3GH," and it is obvious that polyvinyl butyral-based resin is included in polyvinyl acetal resin.

Consequently, the Invention and the Pub 1 invention are common in the point that "plasticized polyvinyl butyral-based resin" is "polyvinyl butyral-based resin plasticized by a polyether ester."

C Since the "functional superfine particle consisting of any of various oxides such as SnO_2, TiO_2, SiO_2, ZrO_2, ZnO, Fe_2O_3, Al_2O_3, FeO, Cr_2O_3, Co_2O_3, CeO_2, In_2O_3, NiO, MnO, or CuO; or a composite such as 9 wt% Sb_2O_3-SnO_2 (ATO) or In_2O_3-5wt% SnO_2 (ITO)" of the Pub 1 invention may work as heat insulation, it has a heat-ray filter-out function. Further, the size of the "superfine particle" is undefined. Thus, it can be regarded as the "fine particle" of the Invention. Further, paragraph [0014] of the specification of the present application discloses that "Metal oxides fine particle having a heat-ray filter-out function used for an interlayer membrane for laminated glass of the Invention is preferably at least one metal oxide selected from the group consisting of tin-doped indium oxide, antimony-doped tin oxide, and aluminum-doped zinc oxide." In this paragraph, "tin-doped indium oxide" and "antimony-doped tin oxide" respectively have the same composition as "In_2O_3-5wt% SnO_2 (ITO)" and "9wt% Sb_2O_3-SnO_2(ATO)" of the Pub 1 invention. Therefore, the "functional superfine particle consisting of any of various oxides such as SnO_2, TiO_2, SiO_2, ZrO_2, ZnO, Fe_2O_3, Al_2O_3, FeO, Cr_2O_3, Co_2O_3, CeO_2, In_2O_3, NiO, MnO, or CuO; or a composite such as 9 wt% Sb_2O_3-SnO_2 (ATO) and In_2O_3-5wt% SnO_2 (ITO), which develops heat insulation performance" of the Pub 1 invention corresponds to "metal oxides fine particles having a heat-ray filter-out function" of the Invention.

D Further, the physical properties of "a visible light transmittance Tv over a wavelength of 380 to 780 nm of 76.5%, a sunlight transmittance Ts over 340 to 1800 nm of 58.5%, and a haze value H of 0.4%" in the Pub 1 invention satisfy the physical properties of "a visible light transmittance Tv over a wavelength of 380 to 780 nm of 75% or more, a sunlight transmittance Ts over 340 to 1800 nm of 60% or less, and a haze value H of 1.0% or less" of the Invention. Further, "electromagnetic wave shielding performance ΔdB of 2dB or less at 10 to 1000 MHz" of the Pub 1 invention and "an electromagnetic wave shielding performance ΔdB of 10dB or less over 10 to 2000 MHz" of the Invention are common in the point that they have radiowave transmittance.

E Consequently, the two inventions are common in the points that "an interlayer membrane for laminated glass comprising a metal oxide fine particle with radiowave transmittance and a heat-ray filter-out function, and a plasticized polyvinyl butyral-based resin, wherein said plasticized polyvinyl butyral-based resin is obtained by plasticizing a polyvinyl butyral-based resin with a plasticizer of polyether ester, and wherein said laminated glass has a visible light transmittance Tv over a wavelength of 380 to 780 nm of 76.5%, a sunlight transmittance Ts over 340 to 1800 nm of 58.5%, and a haze value H of 0.4%." but the Invention differs from the Pub 1 invention in the following points:

(a) Difference a: The Invention has "an electromagnetic wave shielding performance ΔdB of 10dB or less over 10 to 2000 MHz," whereas the Pub 1 invention has "an absolute value of the difference (ΔdB) in the reflection loss (dB) within 2dB by comparing the reflection loss (dB) in a radiowave range of 10 to 1000 MHz with a clear glass (FL3t) single plate having a normal plate thickness of 3 mm by the KEC method measurement (electric field shielding effect measurement device)."

(b) Difference b: The Invention specifies the physical properties of an interlayer membrane for laminated glass as "a whitened distance from an edge of a laminated glass is 7 mm or less when said laminated glass is left for two weeks in a condition of 80°C and relative humidity of 95%," whereas the Pub 1 invention fails to specify such physical properties.

(c) Difference c: The Invention specifies an interlayer membrane for laminated glass as "comprising phosphate," whereas the Pub 1 invention fails to specify that.

(d) Difference d: Regarding a plasticizer of "plasticized polyvinyl acetal resin," the Invention specifies "triethyleneglycol di-2-ethylhexanoate," whereas the Pub 1 invention specifies "polyether ester."

(3) Examination on Differences

A Regarding the difference a

In the Pub 1 invention, a laminated glass is accepted if it has "an absolute value of the difference (ΔdB) in the reflection loss (dB) falling within 2dB by comparing the reflection loss (dB) in a radiowave range of 10 to 1000 MHz with a clear glass (FL3t) single plate having a normal plate thickness of 3 mm by KEC method measurement (electric field shielding effect measurement device)." Here, "a clear glass (FL3t) single plate" has a notation of "FL3t." Therefore, it is obviously a single plate of float glass with a plate thickness of 3 mm.

On the other hand, paragraph [0039] of the specification of the present application discloses that "4) the reflection loss (dB) was measured in a radiowave range of 10 to 2000 MHz in compliance with radiowave transmittance KEC method measurement (electric field shielding effect test) and compared with that of a normal float glass single plate with a plate thickness of 3 mm, and the maximum value of the difference in the above frequency range was evaluated as ΔdBmax."

Consequently, the Invention and the Pub 1 invention are common in the point that a float glass single plate having a plate thickness of 3 mm is used and a radiowave transmittance is measured by KEC method measurement. What is measured in the Inventin is the reflection loss of "electric field" and "magnetic field," whereas that in the Pub 1 invention is only radiowave; i.e., "electric field." The target of measurement is not the same.

Subsequently, referring to the description of Publication 1, as is described in the described matter (G), the value of this ΔdB shows "radiowave transmittance equivalent to that of normal single plate glass at, e.g., 80 MHz (Fm radiowave band) and about 520 to 1630 kHz (AM radiowave band)" (paragraph [0058]). As is described in the described matter (H), the laminated glass using the interlayer membrane for laminated glass allows us to "develop glass antenna performance in nature for television and radio in automobiles and mobile phone, etc. for radiowave transparent performance of AM radiowave, FM radiowave, and TV radiowave bands equivalent to that of normal float glass." As is described in the described matter (C), it is used for "glass for architectural structures" or "window glass for automobiles." Therefore, it is apparently required that frequencies for mobile phones or car navigation systems (GPS) should be transmissive in the Pub 1 invention although Publication 1 does not explicitly explain.

Consequently, it is only natural that the upper limit of radiowave transmissive frequencies will be raised up to 2000 MHz, which are used for mobile phones or car navigation systems (GPS). On the other hand, it is well-known that smaller reflection loss of an electric field causes smaller reflection loss of a magnetic field and it causes more efficient transmission of an electromagnetic field. Therefore, it is a design matter for those skilled in the art to make "an electromagnetic wave shielding performance ΔdB of 10dB or less over 10 to 2000 MHz" on the basis of necessity.

B Regarding the difference b

According to the described matter (L), Publication 2 discloses an interlayer membrane for laminated glass "widely used for laminated glass of automobiles or architectural structures", which is the use similar to the Pub 1 invention, with the purpose of the improvement in "transparency" or "weather proof performance" According to the described matter (K), this glass interlayer membrane is "for laminated glass comprising a plasticized polyvinyl acetal resin film, ... wherein a whitened distance from an edge is 7 mm or less when said laminated glass is left for two weeks in a condition of 80°C and relative humidity of 95%." Consequently, according to the described matter (G) evaluates optical properties, haze, or moisture resistance, the improvement in transparency or weather proof performance is also required as a matter of course in the Pub 1 invention. Therefore, those skilled in the art could have easily conceived of making a laminated glass with the above-mentioned property of "a whitened distance from an edge is 7 mm or less when it is left for two weeks in a condition of 80°C and relative humidity of 95%" of Publication 2 for the use in laminated glass of automobiles and architectural structures.

C Regarding the difference c

The described matters (P) to (U) of Publication 3 disclose that "phosphate" is used as a dispersant for polyvinyl butyral resin that disperses heat-ray shielding inorganic fine particles such as "antimony-containing tin oxide (ATO)" or "indium-containing tin oxide (ITO)", which has the same structure of "a functional superfine particle made of a composite such as 9 wt% Sb_2O_3-SnO_2 (ATO) or In_2O_3-5wt% SnO_2 (ITO)" of the Pub 1 invention.

Further, according to the described matter (A) of Publication 1 that describes bringing functional superfine particles to being dispersed, a functional superfine particle in the Pub 1 invention is positively dispersed into a resin. It can be expected that the variation of dispersed form of functional superfine particle may naturally have an effect on variation of performance of the interlayer membrane regarding the performance of optical properties for interlayer membrane of laminated glass, haze or radiowave transmittance. Therefore, it is a natural requirement to bring the above functional superfine particle to being uniformly dispersed. Besides, Publication 1 shows no cause that prevents the Pub 1 invention from containing a dispersant.

Further, it is common to use a salt form of "phosphate" in using a dispersant in a liquid form. Therefore, those skilled in the art could have easily conceived of causing a dispersant of "phosphate" to be contained in the Pub 1 invention.

D the difference d

The described matter (K) of Publication 2 discloses the use of "at least one plasticizer selected from the group consisting of triethyleneglycol di-2-ethylhexanoate, oligoethyleneglycol di-2-ethylhexanoate, and tetraethyleneglycol di-n-heptanoate" as a plasticizer for plasticized polyvinyl acetal resin.

Here, "triethyleneglycol di-2-ethylhexanoate," "oligoethyleneglycol di-2-ethylhexanoate," and "tetraethyleneglycol di-n-heptanoate" in the described matter (K) of Publication 2 are all "polyether esters."

Consequently, those skilled in the art could easily conceive of using "triethyleneglycol di-2-ethylhexanoate" of Publication 2 in place of a plasticizer of Publication 1 as a "polyether ester" used for a plasticizer of plasticized polyvinyl acetal resin in the Pub 1 invention.

Further, referring to the description of the specification and the drawings, all the Examples and Comparative Examples use "triethyleneglycol di-2-ethylhexanoate" as a plasticizer and no other plasticizers are compared to the plasticizer. In view of this, it cannot be recognized that the use of "triethyleneglycol di-2-ethylhexanoate" as "a plasticizer of plasticized polyvinyl acetal resin" causes remarkable effects that those skilled in the art cannot expect.

5. Examination on Appellant's allegation

The Appellant argues in the written argument on October 1, 2012 that "there is no description or suggestion to conceive of both the configuration of the Invention to use 'triethyleneglycol di-2-ethylhexanoate as a plasticizer' and the configuration of the Invention to use a phosphate ester as a dispersant to cause dispersal of metal oxides fine particles having a heat-ray filter-out function."

However, the use of "triethyleneglycol di-2-ethylhexanoate" as a plasticizer is easily conceivable to those skilled in the art as discussed in the above 4. (3)D. The use of "phosphate ester" as a dispersant is easily conceivable to those skilled in the art as discussed in the above 4. (3)C.

Further, it cannot be recognized from the description of the specification and the drawings that the combination of "the use of triethyleneglycol di-2-ethylhexanoate as a plasticizer" and "the use of phosphate ester as a dispersant" may not result in the remarkable effects that are not expected by those skilled in the art.

Accordingly, the Appellant's argument is not acceptable.

6. Closing

For the above reasons, the Invention was easily conceivable a skilled person in the art on the basis of the descriptions of Publications 1 to 3, and thus it cannot be granted a patent in accordance with the provision of Article 29(2) of the Patent Act.

Accordingly, the present application should be rejected without making a determination of the inventions according to the other remaining claims.

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

December 25, 2012

Chief administrative judge: KIMURA, Koichi

Administrative judge: SAITO, Nobuto

Administrative judge: KUNIGATA, Kyoko