Appeal decision

Appeal No. 2017-5035

Tokyo, Japan
Appellant SUMITOMO CHEMICAL CO., LTD.

Osaka, Japan
Patent Attorney FUKAMI PATENT OFFICE, P.C.

The case of appeal against the examiner's decision of refusal for Japanese Patent Application No. 2015-228498, titled "POLARIZING PLATE WITH PROTECTIVE FILM AND LAMINATE INCLUDING THE SAME" [Published on June 30, 2016 as Japanese Unexamined Patent Application Publication No. 2016-118771] has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The present application is an application with a filing date of November 24, 2015 (claiming a priority date of December 18, 2014), for which a notice of reasons for refusal was issued on August 15, 2016, and a written opinion and a written amendment were submitted on October 24, 2016, and an examiner's decision of refusal was issued on December 22, 2016. In response, a notice of appeal against the decision of reasons for refusal was filed on April 7, 2017, together with a written amendment.

Thereafter, the body notified a reason for refusal on January 26, 2018 (hereinafter referred to as "the body's reasons for refusal"), and a written amendment (hereinafter referred to as "the Amendment") was made together with the submission of a written opinion on April 27, 2018. Further, a written supplemental amendment was submitted on the same date.

No. 2 The Invention

The inventions according to Claims 1 to 7 of the present application is specified by the matters recited in Claims 1 to 7 of the scope of claims by the Amendment, and the invention according to the Claim 1 is specified as below:

"A polarizing plate with a protective film, comprising a polarizing plate with a thickness T1 (μm) comprising a polarizer and a protective film with a thickness T2 (μm) to be laid on one surface of the polarizing plate,

wherein said polarizing plate with said protective film is a square-shaped leaf-like body having a long side and a short side, wherein said long side is 221 mm or more, and said short side is 139 mm or more,

wherein said leaf-like body is an elongated cutout of a polarizing plate with a protective film,

wherein said polarizer is a film in which a dichroic pigment is subjected to an adsorption orientation in a stretched polyvinyl alcohol-based resin film,

wherein said polarizer has a thickness of 5 μm or more to 15 μm or less,

wherein another surface of said polarizing plate is made of a surface of a first adhesive layer,

wherein said protective film is composed of a second adhesive layer to be laid on said one surface, and a single-layer resin film to be laid thereon,

wherein said first adhesive layer and said second adhesive layer comprise a (meth)acrylic-based resin,

wherein said resin film consists of a polyester-based resin,

wherein said polarizing plate further comprises a protective film with a thickness of 30 μm or less,

wherein said protective film has a thickness T2 of 120 μm or less,

wherein a ratio of thickness T2/T1 falls within 0.8 to 1.4." (Hereinafter referred to as "the Invention")

No. 3 Reasons for refusal by the body

The summary of reasons for refusal notified for the inventions according to Claims 1 to 7 before the Amendment is set forth as below.

Reason 1 (Inventive Step)

The inventions according to Claims 1 to 7 of the present application were easily conceivable by a person skilled in the art who had ordinary knowledge in the field of art to which the invention belonged, on the basis of the invention described in Cited Documents 1 to 3 that had been distributed in Japan or a foreign country before the filing or available to public via telecommunication line. Thus these inventions are not patentable under the provision of Article 29(2) of the Patent Act.

Reason 2 (requirements for support)

The inventions according to Claims 1 to 7 go beyond the scope of the description in the Detailed Description of the Invention in which a person skilled in the art could recognize that the problem to be solved by the invention could be solved, and thus the inventions fail to conform to the requirement of Article 36(6)(i) of the Patent Act.

<List of Cited Documents, etc.>

Cited Document 1: Japanese Unexamined Patent Application Publication No. 2001-108830

Cited Document 2: Japanese Unexamined Patent Application Publication No. 2014-132313

Cited Document 3: International Publication No. WO 2014-054114

Cited Document 4: Japanese Patent No. 3368524

No. 4 Description of Cited document and Cited invention

1 Cited Document 1

(1) Matters described in Cited Document 1

Cited Document 1 (Japanese Unexamined Patent Application Publication No. 2001-108830), which is a publication distributed on April 20, 2001 before the priority date of the present application and cited in the reasons for refusal by the body, refers to the following matters together with drawings (the pointed described matters were

underlined by the body; the same shall apply hereinafter).

A "[Scope of Claims]
[Claim 1] An optical film, comprising: a polarizer film or a retarder film; a shape-retaining film for retaining a shape of the polarizer film or the retarder film in a planar state, wherein said shape-retaining film is laid on one side of both sides of the polarizer film or the retarder film; and a protective film peelably laid on a side opposite to a side of the polarizer film or the retarder film, wherein said protective film is designed to have a prescribed thickness so as to prevent a curve that makes a side of the polarizer film or the retarder film concave.
[Claim 2] The optical film of Claim 1, wherein said protective film is designed to have a prescribed thickness so as to prevent a curve that makes a side of the polarizer film or the retarder film convex.
[Claim 3] The optical film of Claim 1 or 2, wherein an adhesive layer is formed on a side of said polarizer film or said retarder film opposite to a side on which the shape-retaining film is laid, and a peelable film is adhered to a side of the adhesive layer opposite to a side on which said polarizer film or said retarder film is present."

B "[0001]
[Field of the Invention] The present invention relates to an optical film comprising a polarizer film and a retarder film.
[0002]
[Conventional Art] An optical film with a polarizer film is an optical element having functions of absorbing a polarized light having a vibration plane parallel to a direction of its absorption axis, and transmitting a polarized light having a vibration plane parallel to a direction orthogonal to the absorption axis (transmission axis), which is commonly used as one of optical elements constituting, e.g., a liquid crystal display device.

(Omitted)

[0008] Incidentally, a liquid crystal display device is widely spread to not only a screen of word processor and personal computer, but also accessories such as navigation systems for automobiles, cell phones, and calculators. To cope with recently increasing competition for downsizing, there is an increasing demand for making a thin and compact optical film to be adhered to glasses, etc. of liquid crystal display devices. An optical film only several dozen μm thinner can make a fairly thinner impression visually.

(Omitted)

[0012]
[Problem to be solved by the invention] However, there is a difference in hygroscopicity between a polarizer film and a TAC film (TAC film has a higher hygroscopicity). Therefore, an optical film with one-side TAC structure has a tendency to become deformed into a state where a side of the adhesive layer is concave and thus has the following problem:

(Omitted)

[0016] The object of the present invention is to accurately and effectively bond an optical film with a target to be bonded by preventing a curve that makes a side of the target to be bonded concave while adopting a one-side TAC structure in an attempt to make an optical film thin.
[0017]
[Means for solving the problem] [Constitution] The invention of Claim 1 is characterized in providing an optical film comprising: a polarizer film or a retarder film; a shape-retaining film for retaining a shape of the polarizer film or the retarder film in a planar state, wherein said shape-retaining film is laid on one side of both sides of the polarizer film or the retarder film; and a protective film peelably laid on a side opposite to a side of the polarizer film or the retarder film, wherein said protective film is designed to have a prescribed thickness so as to prevent a curve that makes a side of the polarizer film or the retarder film concave.
[0018] The invention of Claim 2 is characterized in that, in the optical film of Claim 1, said protective film is designed to have a prescribed thickness so as to prevent a curve that makes a side of the polarizer film or the retarder film convex.
[0019] The invention of Claim 3 is characterized in that, in the optical film of Claim 1 or 2, an adhesive layer is formed on a side of said polarizer film or said retarder film opposite to a side on which the shape-retaining film is laid, and a peelable film is adhered to a side of the adhesive layer opposite to a side on which said polarizer film or said retarder film is present.
[0020] [Operation] The invention of Claim 1 was made with a focus on the fact that a protective film is peeled and removed after bonding an optical film with a real machine such as liquid crystal display device. Claim 1 has a structure in which a shape-retaining film is laid on one side of both sides of the polarizer film or the retarder film (hereinafter abbreviated to "an optical film with one-side TAC structure"), whereas it has a relatively thicker protective film to increase its rigidity, thereby preventing a curve that makes a side of the polarizer film or the retarder film concave.

(Omitted)

[0025] In Claim 1, an optical film with a one-side TAC structure is configured to have a linear shape, or a curved shape that makes a side of the polarizer film or the retarder film convex, thereby preventing an optical film with one-side TAC structure from being bonded to glass, etc. from an edge, if a curve is made so as to make a side of the polarizer film or the retarder film convex. Thus, it might cause problems of difficulty in handling during transportation or storage and difficulty in the operation of initial insertion into a gap between the aforesaid pairs of pressing rolls.
[0026] Accordingly, in Claim 2, the thickness of the protective film is designed so as to prevent a curling that makes a side of polarization film or retarder film convex, thereby forming an optical film with one-side TAC structure into a flat linear shape or almost linear shape, which can overcome the above problems and make the optical film more suitable for the bonding operation to a target to be bonded or for a production process."

C "[0031]

[Embodiments of the invention] [First embodiment] FIG. 1 shows a first optical film A with a one-side TAC structure comprising a polarizer film 1.

[0032] This first optical film A with one-side TAC structure comprises a protective film (which is a PET film) 2 with an adhesive layer on one side, a TAC film 3 as a shape-retaining film, a polarizer film (PVA (polyvinyl alcohol film)) 1, an adhesive layer 4, and a peelable film 5, which are laid in this order (Specifically, the TAC film 3 is laid only on one side of both sides of the polarizer film 1).

[0033] One example of thickness of each layer of the first optical film A with this one-side TAC structure is the following:

Protective Film	125 μm
Adhesive layer	20 μm
TAC Film	50 μm
Polarization Film	20 μm
Adhesive layer	25 μm
Peelable Film	38 μm
Total	278 μm

.

[0034] The TAC film 3, polarizer film 1, and adhesive layer 4 are bonded together and the peelable film 5 is peelably bonded to adhesive layer 4. The protective film 2 is bonded to the TAC film 3 via an adhesive coated thereon, so as to be easily peelable, similarly to the peelable film 5.

[0035] A first optical film A with one-side TAC structure was cut out into rectangular samples with a size of 150 mm* 100 mm, from which curves of four corners were measured. Data are shown as the following.

[0036] As shown in FIG. 4, when a sample is laid on a horizontal plane 10 such as a press platen with the protection film 2 being positioned downward, the curves of four corners a to d from the horizontal plane 10 were measured. Data are shown in Table 1.

[0037] Samples 1) to 3) represent conventional optical films with one-side TAC structure, whereas samples 4) to 6) represent first optical films A with one-side TAC structure.

[0038]

[Table 1]

	角 a	角 b	角 c	角 d
サンプル1)	20	1	13	1
サンプル2)	17	1	15	0
サンプル3)	18	1	17	0
サンプル4)	3	1	3	3
サンプル5)	1	2	1	2
サンプル6)	2	3	2	3

Unit: mm

サンプル１）　Sample 1)
サンプル２）　Sample 2)
サンプル３）　Sample 3)
サンプル４）　Sample 4)
サンプル５）　Sample 5)
サンプル６）　Sample 6)
角　Corner

Thickness of Protective Films of Samples 1) to 3): 38 μm
Thickness of Protective Films of Samples 4) to 6): 125 μm

The thickness of the protective film 2 was increased from conventional 38 μm to 125 μm.

[0039] As seen from Table 1, a distinct curve was observed in the conventional products of samples 1) to 3), whereas an uplift was suppressed within 3 mm in the products of the present invention of samples 4) to 6), so as to retain their shapes in an almost flat state where curves are vanishingly small.

[0040] The thickness of adhesive layer disposed on one side of protective film 2 is normally within a range of 15 to 25 μm."

Body's note: FIG. 1 and FIG. 4 are as shown in the following:

FIG. 1

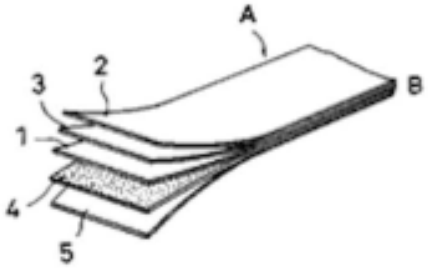
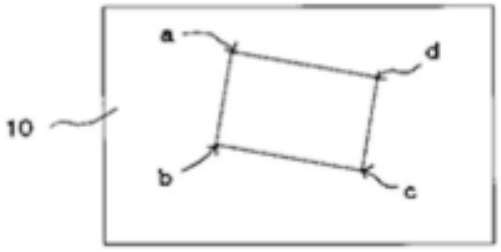


FIG. 4



(2) The invention described in Cited Document 1

On the basis of the above description, it is recognized that Cited Document 1 describes the following invention as a first embodiment:

"A first optical film A with one-side TAC structure comprises a protective film having an adhesive layer on one side (which is a PET film) 2, a TAC film 3 as a shape-retaining film, a polarizer film (PVA (polyvinyl alcohol film)) 1, an adhesive layer 4, and a peelable film 5, which are laid in this order (specifically, the TAC film 3 is laid only on one side of both sides of polarizer film 1.), the thickness of each layer is as follows:

Protective Film		125 μm
Adhesive layer		20 μm
TAC Film		50 μm
Polarization Film		20 μm
Adhesive layer		25 μm
Peelable Film		38 μm
	Total	278 μm

." (hereinafter referred to as "cited invention")

2 Cited Document 2

Cited Document 2 (Japanese Unexamined Patent Application Publication No. 2014 -132313), which is a publication distributed on July 17, 2014 before the priority date of the present application and cited in the reasons for refusal by the body, refers to the following matters:

(1) "[0012]
(Polarization Film)

A polarization film of the present invention is a polarization film consisting of polyvinyl alcohol-based resin. Polyvinyl alcohol-based resin is usually obtained by saponifying polyvinylacetate-based resin. Polyvinyl alcohol-based resin usually has a degree of saponification of about 85 mol% or more, preferably about 90 mol% or more, more preferably about 99 mol% to 100 mol%. Polyvinyl acetate-based resin may include polyvinyl acetate, which is a homopolymer of vinyl acetate, as well as a copolymer of vinyl acetate and another copolymerizable monomer. The other monomer copolymerizable with vinyl acetate may include, for example, unsaturated carboxylic acids, olefins, vinyl ethers, and unsaturated sulfonic acids. A specific example of copolymer of vinyl acetate and the other copolymerizable monomer may include ethylene-vinyl acetate copolymer. Polyvinyl alcohol-based resin usually has a degree of polymerization of about 1000 to 10000, preferably about 1500 to 5000.
[0013]

The polyvinyl alcohol-based resin may be modified; for example, aldehyde-modified polyvinyl formal, polyvinyl acetal, and polyvinyl butyral may be used. As a starting material in the manufacture of polarization film, unstretched polyvinyl alcohol-based resin film with a thickness of about 5 μm to 100 μm, preferably about 10 μm to 80 μm, may be used. Film width is practically about 1500 mm to 4000 mm from the industrial viewpoint, but is not limited to this range. This unstretched film is subjected to a swelling treatment, a dyeing treatment, a boric acid treatment, and a water washing treatment in this order, and subjected to uniaxial stretching in a process of boric acid treatment or prior processes, and finally subjected to drying to obtain a polyvinyl alcohol-based polarization film with a thickness of, e.g., about 1 μm to 40 μm.
[0014]

The method for manufacturing a polarization film of the present invention is not particularly limited, but may include, for example,
(i) a method of subjecting the above unstretched polyvinyl alcohol-based resin film to uniaxial stretching in air or inert gas, and then subjecting to a swelling treatment, a dyeing treatment with a dichroism pigment, a boric acid treatment, and a water washing treatment in this order, and finally drying, (ii) a method of subjecting the above unstretched polyvinyl alcohol-based resin film to a swelling treatment, a dyeing treatment with dichroism pigment, a boric acid treatment, and a water washing treatment in this order, and subjecting to a wet-type uniaxial stretching in a boric acid treatment process and/or earlier processes, and finally drying."

(2) "[0038]
(Protective Film)

The protective film of the present invention may be laid on and adhered to both surfaces of the aforesaid polarization film via an adhesive layer. The protective film may include a film commonly used in the field, including cycloolefin-based resin film; cellulose acetate-based resin film; polyester-based resin film such as polyethylene terephthalate, polyethylene naphthalate, and polybutylene terephthalate; polycarbonate-based resin film; acrylic-based resin film; and polypropylene-based resin film.

[0039]

Preferable cycloolefin-based resin may include commercially available products such as Topas (manufactured by Ticona Polymers, Inc.), ARTON (manufactured by JSR Corporation), ZEONOR (manufactured by Zeon Corporation), ZEONEX (manufactured by Zeon Corporation), and APEL (manufactured by Mitsui Chemicals, Inc.). In making a film from such a cycloolefin-based resin, a publicly-known method such as a solvent cast method and a melt extrusion method may be used as necessary. Further, there may be used commercially available film products made of cycloolefin-based resin preliminarily formed into a film such as Escena (manufactured by SEKISUI CHEMICAL CO., LTD.), SCA40 (manufactured by SEKISUI CHEMICAL CO., LTD.) and ZeonorFilm (manufactured by Optes Inc.).

[0040]

Cycloolefin-based resin film may be a uniaxially stretched or biaxially stretched film. Stretching may impart any phase shift value to a cycloolefin-based resin film. If the phase shift is provided, the cycloolefin-based resin film functions as a retarder that has an optical function to convert a polarized light into other specific polarized light. Stretching is usually conducted continuously while feeding a film roll, which is stretched in a traveling direction of roll, in a direction perpendicular to the traveling direction or in both directions in a heating furnace. The temperature of the heating furnace is usually within a range from a glass transition temperature of a cycloolefin-based resin to [the glass transition temperature + 100°C]. The draw ratio is usually 1.1 to 6 times, preferably 1.1 to 3.5 times.

[0041]

If a cycloolefin-based resin film is stretched, the drawing direction is not limited, but is generally 0 degree, 45 degrees, or 90 degrees against a feeding direction of a film. It is often the case that the phase-shift characteristics of a film with a drawing direction of 0 degree has complete uniaxiality. The phase-shift characteristics of a film in a drawing direction of 45 degrees or 90 degrees may often have a weak biaxiality. The characteristics may affect the viewing angle of a display device, but may be selected as necessary depending on a type of a liquid crystal display device for application or a type of a composite polarizing plate. $\lambda/4$ and $\lambda/2$ are commonly used for the phase shift value. It is often the case that the phase shift value falls within a range of 90 to 170 nm for $\lambda/4$ and 200 to 300 nm for $\lambda/2$.

[0042]

Further, cycloolefin-based resin film generally has poor surface activity. Thus, it is preferable to implement a surface treatment such as plasma treatment, corona treatment, ultraviolet light irradiation treatment, flame treatment, and saponification treatment on a surface to be adhered to a polarization film. In particular, plasma treatment and corona treatment are preferable, since these treatments are relatively easily feasible.

[0043]

Cellulose acetate-based resin usable for protective film is a partial or complete acetic acid ester of cellulose, which may include, for example, triacetylcellulose, diacetylcellulose and cellulose acetate propionate.

[0044]

Any commercially available products including, e.g., KC4UY (manufactured by Konica Minolta Opto Products Co., Ltd.) may be preferably used for a film of such cellulose ester-based resin.

[0045]

Further, cellulose acetate-based resin film with retardation characteristics may also be preferably used. Commercially available products of cellulose acetate-based resin film with such retardation characteristics may include WV BZ 438 (manufactured by FUJIFILM Corporation) and KC4FR-1 (manufactured by Konica Minolta Opto Products Co., Ltd.). Cellulose acetate is referred to as acetylcellulose or cellulose acetate.

[0046]

Cellulose-based resin film is subjected to a saponification treatment in an attempt to increase the adhesiveness with a polarization film, particularly in a case where the polarization film is bonded with water-based adhesives. Saponification treatment may include a method for immersing into an aqueous solution of alkalines such as sodium hydroxide and potassium hydroxide.

[0047]

The aforementioned protective film tends to cause blocking in a rolled state by bonding films together. Therefore, edge parts of a roll are usually subjected to emboss processing, or a ribbon is inserted into edge parts, or a protective film is bonded and subjected to rolling.

[0048]

The thickness of transparent protection film is preferably thin, but excessively thin film results in the decrease in strength and poor processability, which are overcome by the present invention. On the other hand, excessively thick film results in problems including the decrease in transparency and the long curing time necessary after lamination, which are opposed to clients' request for a thinner film. Therefore, an appropriate thickness of a transparent protection film is, for example, from 1 to 50 μm, preferably 5 to 40 μm, more preferably 10 to 30 μm."

(3) "[0049]

(Peelable film)

The peelable film of the present invention may be laid on and adhered to at least one of the aforementioned protective film to be bonded with both surfaces of the polarization film. The peel force between the protective film and peelable film is from 0.001 to 5 N/25mm, preferably 0.01 to 2 N/25mm, more preferably 0.01 to 0.5 N/25mm. If the peel force is less than 0.001 N/25mm, the peelable film might be partially peeled due to small adhesive force between the protective film and the peelable film in some cases. Further, the peel force exceeding 5 N/25mm is not preferable, since it becomes difficult to peel a film from a polarizing plate.

[0050]

The peelable film may include, for example, a self-adhesive resin film having adhesiveness by itself and a film with an adhesive material layer. In the case where an

adhesive layer is interposed, however, a residue of the adhesive layer may sometimes remain on a surface of a polarizing plate when peeling a peelable film from the polarizing plate. Therefore, it is preferable to lay a peelable film directly on a protective film by use of a self-adhesive peelable film.

(Omitted)

[0055]

A substrate film on which an adhesive layer is formed in a film having an adhesive material layer may include a film of polyethylene-based resin, polypropylene-based resin, polystyrene-based resin, and polyethylene terephthalate-based resin. In particular, due to availability at low cost, a film of polyethylene-based resin and polyethylene terephthalate-based resin is preferably used.

[0056]

When a film with an adhesive layer is a peelable film, the adhesive is not particularly limited as long as the peel force between the protective film and the peelable film is 0.001 to 5 N/25mm. Specific examples of adhesives may include acrylic-based resin, epoxy-based resin, urethane-based resin, and silicone-based resin as a base polymer. Adhesives may usually include a crosslinking agent as well as a base polymer. Commercially available adhesives are designed to have adjusted adhesiveness with a kind and a degree of polymerization of a base polymer and a combination with a crosslinking agent as necessary. Therefore, one can select ones having a peel force between a protective film in a polarizing plate and a base polymer from them. The thickness of the adhesive layer is not particularly limited, but may be, for example, 5 to 40 μm."

(4) "[0081]

(Optical member)

A polarizing plate may be used for an optical member in which an optical layer showing an optical function is laid on either one side or both sides of the polarizing plate.

[0082]

An optical layer to be laid on a polarizing plate for the purpose of forming an optical member is not particularly limited, but may include, for example, various layers to be used for the formation of a liquid crystal display device, etc., including a reflection layer, a semi-transparent reflection layer, a light diffusing layer, a retardation plate, a light collecting plate, and a brightness improving film."

(5) "[0102]

<Example 1>

Polyvinyl alcohol film with a thickness of 75 μm was subjected to dry-type uniaxial stretching and further immersed into pure water with maintained tension, and immersed into an aqueous solution of iodide/potassium iodide/water. Thereafter, it was immersed into an aqueous solution of potassium iodide/boric acid/water, and subsequent to washing with pure water, it was dried to obtain a polarization film in which iodide was subjected to an absorption orientation in a polyvinyl alcohol. The thickness of this polarization film was 28 μm.

[0103]

On one surface of the obtained polarization film there was bonded the one in which a peelable film 1 was preliminarily laid on the following protective film 1, and on the opposite surface the following protective film 2 was bonded respectively via a water-based polyvinyl alcohol-based resin adhesive by nip roll and dried with hot air to obtain a polarizing plate. The total thickness of the protective films 1,2 and the peelable film 1 was 72 μm, and the total thickness of the obtained polarizing plate was 100 μm. No problem was observed in appearance.

Protective film 1: 'ZEONOR ZF14-20' (manufactured by Zeon Corporation, thickness: 20 μm)

Peelable film 1: 'ForceField1035' consisting of polyethylene resin (manufactured by Tredegar Corporation, thickness: 30μm)

Protective film 2: Saponified Tacphan P920GL (manufactured by Lonza, thickness: 22 μm)

(Omitted)

[0108]

<Reference example 2>

Polyvinyl alcohol film with a thickness of 30 μm was subjected to wet-type stretching during immersion in pure water, followed by immersion in an aqueous solution of iodide/potassium iodide/water. Thereafter, it was immersed in an aqueous solution of potassium iodide/boric acid/water, and subsequent to washing with pure water, it was dried to obtain a polarization film in which iodide was subjected to an absorption orientation in a polyvinyl alcohol. The thickness of this polarization film was 11 μm."

3 Cited Document 3

Cited Document 3 (International Publication No. WO 2014-054114), which was distributed on April 10, 2014 before the priority date of the present application and cited in the reasons for refusal by the body, refers to the drawing following matters:

(1) "[0001] The present invention relates to a protective film of a polarizing plate.

Background of the Invention

[0002] A representative image display device of liquid crystal display device uses polarizing plates that are bonded on both sides of a liquid crystal cell due to its image formation type. The polarizing plate is configured to have a protective layer at least on one side of the polarizer having a polarizing performance, from a viewpoint of improving kinetic and optical resistance. The polarizing plate tends to cause curling due to the difference in linear expansion coefficient and heat shrinkage rate between a polarizer and a protective layer. Such a curve of the polarizing plate may be overcome by bonding with a liquid crystal cell, but becomes a cause of troubles in a manufacturing process (e.g. a process of laminating with the other optical members, a process of bonding with liquid crystal cell).

[0003] Incidentally, in the above manufacturing process, a protective film is usually bonded with a polarizing plate (including an intermediate of the polarizing plate) (See, e.g., Patent Document 1). What is proposed is to suppress a curve of the

aforementioned polarizing plate by such a bonding with a protective film, but it is insufficient to suppress a curve depending on the constitution of the polarizing plate."

(2) "[0010] A. Protective Film

FIG. 1 shows a schematic cross-sectional view of a protective film according to a preferable embodiment of the present invention. A protective film 10 comprises a first resin layer 11, an adhesive layer 13, and a second resin layer 12 in this order. The protective film 10 is a laminate 10' in which a first resin layer 11 and a second resin layer 12 are laminated via an adhesive layer 13. From a practical viewpoint, the protective film 10 has an adhesive layer 20 disposed on a side opposite to the adhesive layer 13 of the second resin layer 12. This adhesive layer 20 may bond the protective film with a polarizing plate. Further, a separator not shown is bonded with a surface of the adhesive layer 20 by bonding with the polarizing plate.

(Omitted)

[0039] A-4. Others

The above adhesive layer is formed of any appropriate adhesive. A (meth)acrylic pressure-sensitive adhesive is typically used as the pressure-sensitive adhesive. The thickness of the adhesive layer is preferably from 15 μm to 25 μm. The above separator may typically include a resin film (e.g. polyester-based resin film) on which a detachable layer is formed.

[0040] A-5. Bonding method

The protective film of the present invention is preferably bonded with a convex surface of a polarizing plate where a curve is generated. In addition, for example, when a protective layer is disposed only on one side of a polarizer, a convex curve tends to be generated at a side of the protective layer. In bonding a protective film, it is preferable to bond with a polarizing plate while applying a tension to a protective film. Because such an operation may generate a residual contraction stress in a protective film, it is preferable to apply a tension in a direction corresponding to a direction of absorption axis of a polarizer of a polarizing plate after bonding. The tension may be set as necessary according to the configuration of the protective film (e.g. thickness, formation materials, elastic modulus, tensile elongation, etc.)."

(3) "[0041] B. Polarizing Plate with Protective Film

FIG. 2 shows a schematic cross-sectional view of a polarizing plate with protective film according to a preferable embodiment of the present invention. A polarizing plate with protective film 100 has a polarizing plate 30 and a protective film 10 bonded to a surface of the polarizing plate 30 via an adhesive layer 20. The polarizing plate 30 comprises: a polarizer 31; a protective layer 32 and an optical member 33 disposed on one side of the polarizer 31; an optical member 34; and a separator 35 disposed on the other side of the polarizer 31. The protective film 10 is bonded with the polarizer 31 at a side where the protective layer 32 is disposed. The separator 35 is removed when in use (e.g. in bonding a polarizing plate with a protective film with a liquid crystal cell). Further, any appropriate adhesives may be used for the lamination of each layer constituting a polarizing plate.

[0042] The polarizing plate with a protective film of the present invention suppresses a

curve satisfactorily even if the configuration of the polarizing plate is changed. In a specific example, when a separator is removed from a polarizing plate with a protective film, a direction of a curve is sometimes converted (Particularly when bonding a protective film while applying a tension). According to the protective film of the present invention, such a curve may be satisfactorily suppressed. One possible factor is that the protective film of the present invention has a higher cross-sectional second-order moment, a lower elastic modulus, and a larger shrinkage after releasing a tension, as compared to a single resin layer.

[0043] The above polarizing plate has a polarizer and a protective layer disposed at least on one side of the polarizer. From a viewpoint of thinner and lighter weight of a polarizing plate, it is preferable to dispose a protective layer only on one side of a polarizer; however, the generation of curves might be significant in such an asymmetrical configuration against the polarizer.

[0044] The above polarizer may include, for example, one in which a dichroic substance such as iodide and dichroic dyes are subjected to an absorption orientation in a hydrophilic polymer film such as a polyvinyl alcohol-based film, a partially-formalized polyvinyl alcohol-based film, an ethylene-vinyl acetate copolymer-based partially saponified film, and a polyene-based orientation film such as a dehydrated product of polyvinyl alcohol and a dehydrochloric product of polyvinyl chloride. In particular, a polarizer in which a dichroism substance such as iodide is subjected to an absorption orientation in a polyvinyl alcohol-based film is particularly preferable, due to high polarization dichroic ratio.

[0045] The thickness of the polarizer is typically from about 1 μm to 80 μm, preferably from 5 μm to 40 μm.

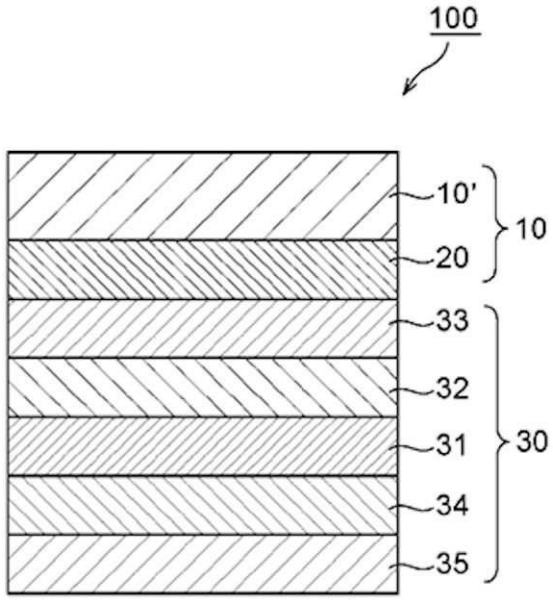
[0046] The above protective layer is made from any appropriate film usable for a protective layer of a polarizer. Specific examples of material that may become a major component of the film may include transparent resin including cellulose-based resin such as triacetyl cellulose (TAC), polyester-based, polyvinyl alcohol-based, polycarbonate-based, polyamide-based, polyimide-based, polyethersulfone-based, polysulfone-based, polystyrene-based, polynorbornene-based, polyolefin-based, (meth)acrylic-based, and acetate-based resin. Further, it may also include thermosetting resin or UV-curable-type resin such as (meth)acrylic-based, urethane-based, (meth)acrylicurethane-based, epoxy-based, or silicone-based resin. In addition, it may also include a glassy-based polymer such as a siloxane-based polymer. Further, a polymer film described in Japanese Unexamined Patent Application Publication No. 2001-343529 (WO01/37007) may also be used. Material of this film may include, for example, a resin composition comprising a thermoplastic resin having a substituted or non-substituted imide group at a side chain and a thermoplastic resin having a substituted or non-substituted phenyl group and a nitrile group at a side chain, which may include, for example, a resin composition comprising an alternating copolymer consisting of isobutene and N-methylmaleimide, and acrylonitrile-styrene copolymer. The polymer film may be, for example, an extrusion mold of the above resin composition.

[0047] The thickness of the protective layer is preferably from 5 μm to 200 μm, more preferably from 10 μm to 100 μm. In addition, the protective layer may also function as an optical compensation layer.

[0048] The above optical member may include, for example, an optical compensation

layer (retardation layer) and a brightness improving film. The separator is as set forth in item A-4."

Body's note: FIG. 2 is as shown in the following:



(4) "[0051] The above adhesive was coated on a polyester-based resin film (manufactured by Mitsubishi Plastics, Inc., Product name: T100F, thickness: 38 μm, elastic modulus: 4090 N/mm^2, tensile elongation: 59%), followed by heating at 90°C to form an adhesive layer with a thickness of 12 μm. The storage elastic modulus of the obtained adhesive layer at 23°C was 1.0*10^5 Pa.

Thereafter, on the adhesive layer there was laid a polyester-based resin film (manufactured by NITTO DENKO CORPORATION, Product name: RP301, thickness: 38 μm, elastic modulus: 4050 N/mm^2, tensile elongation: 58%) to obtain a protective film with a thickness of 88 μm. The elastic modulus of the resultant protective film was 3.6 kN/mm^2 and the tensile elongation was 91%.

(Omitted)

[0057] [Example 7]

In a similar manner to Example 1 except that a polyester-based resin film with a thickness of 25 μm (manufactured by Mitsubishi Plastics, Inc., Product name: T100-25B, elastic modulus: 3510 N/mm^2, tensile elongation: 101%) was used in place of a polyester-based resin film with a thickness of 38 μm (product name: T100F), a protective film was manufactured. The elastic modulus of the resultant protective film was 3.5 kN/mm^2 and the tensile elongation was 92%.

(Omitted)

[0061] (Comparative Example 1)

A polyester-based resin film (manufactured by NITTO DENKO CORPORATION, Product name: RP207F, thickness: 38 μm, elastic modulus: 4050 N/mm^2, tensile elongation: 58%) was used as a protective film.

[0062] (Comparative Example 2)

A polyester-based resin film (manufactured by FUJIMORI KOGYO CO., LTD., Product name: TC-815, thickness: 111 μm, elastic modulus: 4630 N/mm^2, tensile elongation: 102%) was used as a protective film."

(5) "[0064] (Production of polarizer)

A polymer film having a thickness of 60 μm and containing a polyvinyl alcohol-based resin as a main component (manufactured by KURARAY CO., LTD., product name: VF-PE-A NO. 6000) was immersed in five baths under the following conditions (1) to (5) while applying a tension in the lengthwise direction of the film to be stretched so that the final stretching ratio might become 6.2 times the original length of the film. This stretched film was dried in an air-circulating drying oven at 40°C for one minute to produce a polarizer with a thickness of 22 μm.

<Condition>

(1) Swelling bath: Pure water at 30°C.

(2) Dyeing bath: An aqueous solution at 30°C comprising 0.035 weight part of iodide on 100 weight parts water basis, and 0.2 weight part of potassium iodide on 100 weight parts water basis.

(3) First crosslinking bath: An aqueous solution at 40°C comprising 3 weight% potassium iodide and 3 weight% boric acid.

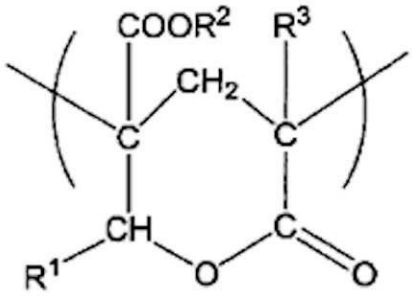
(4) Second crosslinking bath: An aqueous solution at 60°C comprising 5 weight% potassium iodide and 4 weight% boric acid.

(5) Water washing bath: An aqueous solution at 25°C comprising 3 weight% potassium iodide."

(6) "[0065] (Preparation of protective layer)

A pellet [A mixture of 90 weight parts of (meth)acrylic-based resin having a lactone ring structure where R^1 represents hydrogen atom and R^2 and R^3 are methyl groups in the following general formula (1) {copolymer monomer weight ratio = methyl methacrylate/2-(hydroxymethyl)methyl acrylate = 8/2, lactone ring-closed ratio about 100%, the content of the lactone ring structure of 19.4%, weight average molecular weight: 133000, melt flow rate: 6.5 g/10 minute (240°C, 10 kgf), Tg: 131°C} and 10 weight parts of acrylonitrile-styrene (AS) resin {TOYO AS AS20, manufactured by TOYO STYRENE Co., Ltd}; Tg: 127°C] was fed to biaxial extruder, and subjected to melt extrusion into a sheet at about 280°C to obtain a (meth)acrylic-based resin sheet having a lactone ring structure with a thickness of 40 μm. This unstretched sheet was stretched in a temperature condition of 160°C at a ratio of 2.0 times in its longitudinal direction and a ratio of 2.4 times in its lateral direction to obtain a protective layer having a thickness of 20 μm.

[0066] [Chemical Formula 1]



(1)

"

4 Cited Document 4

Cited Document 4 (Japanese Patent No. 3368524), which is a publication distributed on January 20, 2003 before the priority date of the present application and cited in the reasons for refusal by the body, refers to the following matters:

(1) "[0001]
[Field of the Invention] The present invention relates to a polarizing plate for a liquid crystal display device.
[0002]
[Conventional Art] A liquid crystal display device uses a pair of polarizing plates on both sides for the purpose of controlling a light oscillation direction to visualize a display pattern. The polarizing plate is commonly one in which a transparent resin film, in particular a film of cellulose acetate-based film, is laid on both sides of a polarization film. This is bonded with a liquid crystal display device via an adhesive and used.
[0003] Meanwhile, a liquid crystal display device is required to be thinner and save weight, as it is used for various parts. Thus a thin and lightweight polarizing plate is required for a liquid crystal display device.
[0004]
[Problem to be solved by the invention] However, conventional polarizing plate has limitations to seek for a thinner and lightweight plate. Intrinsically, a polyvinyl alcohol-based polarization film itself has a polarization performance, but due to its poor kinetic properties and optical durability, it is essential to provide a protective layer. It is very effective if one of the protective layers usually disposed on both sides of the polarization film is saved. However, a polarizing plate with a protective layer only on one side becomes asymmetrical between front and rear sides, which thus makes the curling in an orientation direction of a polarization film particularly large, and causes practically serious problems in bonding with a liquid crystal display device, etc.
[0005]
[Means for solving the problem] In view of the aforementioned situation, the object of the present invention is to provide a thinner, lightweight, and durable polarizing plate.
[0006] Specifically, the present invention is a polarizing plate in which on an adhesive surface of the synthetic resin film (1) having an adhesive layer coated at one side is a protective layer (2) consisting of a transparent synthetic resin film, and laid thereon via an adhesive layer (3) are a polyvinyl alcohol-based polarization film (4), an adhesive layer (5), and a peelable film (6) in this order. The present invention is hereinafter discussed in detail.

[0007]
[Embodiments of the invention] The present invention is illustrated as below on the basis of FIG. 1 and FIG. 2. FIG. 1 shows a cross-sectional view of a polarizing plate of the present invention. (1) denotes a synthetic resin film with one-side adhesive layer, (2) denotes a protective layer consisting of a transparent synthetic resin film, (3) denotes an adhesive layer, (4) denotes a polyvinyl alcohol-based polarization film, (5) denotes an adhesive layer, and (6) denotes a peelable film. The polarizing plate of the present invention is made by stacking these films and layers (1) to (6) in this order.
[0008] Synthetic resin constituting the synthetic resin film (1) with one-side adhesive layer is essential for the prevention of a curling of a polarizing film in an oriented direction of the polarization film toward a polarization film due to its asymmetry in a polarizing plate of the present invention as well as for an ordinary use in the polarizing plate; i.e., for the purpose of protecting the polarizing plate from a scratch of its surface in bonding the polarizing plate with a liquid crystal display device and being peeled off when in use.
[0009] Polyethylene-based one is the most common material. Materials suitable for use may include a film obtained by subjecting a polymer including vinyl acetate serving for copolymerization on a polyethylene base to impart stickiness or an acrylic-based adhesive layer to a single-layered or a multilayered extrusion or an inflation method. Other materials may include a film obtained by subjecting a polyester-based or a polyamide-based film to a sticking process. Adhesive force is commonly 1 gf/25mm or more for a polarizing plate."

(2) "[0011] To suppress curling of a polarizing plate, a certain level of residual shrinkage stress is necessary after bonding. For such a goal, it is required to use a film with a tensile strength of 500 gf/10mm or more and a tensile elongation of 100% or more, and apply a tension 0.01 to 0.5 times the tensile strength of the film in bonding the film with a protective layer of a polarization film so that a direction of the tension may become parallel to an orientation direction of the polarization film (4). If the tension is less than 0.01, it is insufficient to correct the original curling, whereas if the tension exceeds 0.5, the curling on a side of synthetic resin film (1) becomes larger.
FIG. 2 is a drawing showing a direction of a tension of synthetic resin film (1) with one-side adhesive layer and an orientation direction of a polarization film (4) in a bonding process."

(3) "[0015] The adhesive layer (5) is a layer for actually bonding with a liquid crystal display device. It is not particularly limited as long as it does not erode the polyvinyl alcohol-based polarization film (4) but floats when in use without delamination, etc. while maintaining a desired adhesive force and durability. Acrylic-based, silicone-based, rubber-based, urethane-based, and epoxy-based adhesives may be commonly used."

No. 5 Judgment
1 Reason 2 (requirements for support)
(1) Paragraph [0007] of the specification of the present application discloses that "Accordingly, the object of the present invention is to provide a polarizing plate with a protective film in which a curling is suppressed, and a laminate comprising the same."

In view of this, the problem to be solved by the Invention is to provide a polarizing plate with a protective film in which a curling is suppressed.

(2) Meanwhile, the Invention is as specified by the matter described in the aforesaid No. 2. It specifies that the thickness ratio T2/T1 of the thickness T2 of a protective film to the thickness T1 of a polarizing plate falls within a range of 0.8 to 1.4, and the protective film comprises a second adhesive layer to be laid on one surface and a single-layered resin film to be laid thereon, and the resin film consists of polyester-based resin, etc.

(3) Here, for example, in view of the description of the paragraph [0020] of the described matter B in the Cited Document 1 of "it has relatively thicker protective film to increase its rigidity, thereby preventing a curve that makes a side of the polarizer film or the retarder film concave," Cited Document 1 discloses that a thicker protective film increases rigidity and prevents the curling, whereas it is obvious to a person skilled in the art that the rigidity of the protective film depends on an elastic modulus of a film as well as a thickness thereof. Further, it can be said that it was known as a matter of common general technical knowledge that the curling occurs depending on stress, rigidity, and shrinkage rate of each layer constituting a laminate.

Regarding the thickness ratio of protective film to polarizing plate, however, the Detailed Description of the Invention of the present application only discloses in paragraph [0084] that "The thickness ratio T2/T1 of thickness T2 (μm) of protective film 60 to the thickness T1 (μm) of polarizing plate 100 is supposed to be within a range of 0.8 to 4. T2/T1 of 0.8 or more may significantly suppress curl as compared to the case of less than 0.8. T2/T1 is preferably 1 or more. T2/T1 beyond 4 is disadvantageous from a viewpoint of the thickness of a polarizing plate with a protective film and production cost." It fails to explain theoretically any mechanism of or any reason for significantly suppressing curl by specifying the thickness ratio as 0.8 or more, or within a range of 0.8 to 1.4.

In addition, the Invention specifies the material of resin film constituting protective film as "polyester-based resin." Taking into account the fact described in item (4) of Cited Document 3 that polyester-based resins show different elastic modulus ranging from 3510 N/mm^2 to 4630 N/mm^2, even if the thickness ratio T2/T1 of the thickness T2 (μm) of protective film to the thickness T1 (μm) of the polarizing plate should fall within a range of 0.8 to 4, it must be thought that the rigidity of polyester-based resin would vastly differ.

Therefore, no one can find any ground sufficient to find that it was obvious that the simple adjustment of the thickness ratio T2/T1 of that of a protective film to that of a polarizing plate to a range of 0.8 to 1.4 could solve the above problem within specific ranges of the thickness and materials of a polarizer, the materials of an adhesive layer, the thickness of a protective film and a protective film, and the materials of a resin film constituting a protective film.

(4) The Appellant discloses Experimental examples A to H in the written supplement submitted on April 27, 2018, and argues in a written opinion on the same date that "It can be seen from the example of the specification of the present application and the supplemental experimental examples of the certificate of experimental results that a

polarizing plate with a protective film according to Invention 1 (the invention according to Claim 1 of the present application after the Amendment) can suppress curling."

The protective films of the examples described in the specification of the present application and the experimental examples described in the certificate of experimental results are both made from a resin film consisting of polyethylene terephthalate, which is a polyester-based resin. Even if the material of the resin film were a polyester-based resin, the elastic modulus differs depending on the kinds. Thus it can be said that the rigidity largely differs. Further, it is obvious that a stress to be applied to a polarizing plate vastly differs depending on the draw ratio, the drawing direction, etc. Therefore, it cannot be said that it can be extended or generalized to the scope of the Invention that fails to limit the conditions such as elastic modulus and the draw ratio that affect the stress to be applied by a protective film to a polarizing plate or the rigidity on the basis of the examples and the experimental examples in which the protective film is made of a resin film consisting of polyethylene terephthalate.

(5) As described above, the Invention goes beyond the scope of the description in the Detailed Description of the Invention in which a person skilled in the art could recognize that the problem to be solved by the invention could be solved.

Therefore, the recitation of the scope of claims of the present application does not conform to the requirement of Article 36(6)(i) of the Patent Act.

2 Reason 1 (Inventive Step)

(1) Comparison

The Invention and cited invention are compared to each other.

A The laminate of "TAC film 3 as a shape-retaining film," "polarizer film (PVA (polyvinyl alcohol film)) 1," and "adhesive layer 4" of the cited invention corresponds to "a polarizing plate with a thickness T1 (μm) comprising a polarizer" of the Invention.

Further, the laminate of "TAC film 3 as a shape-retaining film," "polarizer film (PVA (polyvinyl alcohol film)) 1," and "adhesive layer 4" of the cited invention is configured so that the "adhesive layer 4" is located on a surface different from a surface on which "protective film (which is a PET film) 2" is laid. It can thus be said that the "adhesive layer 4" of the cited invention corresponds to the "first adhesive layer" of the Invention in view of the position in the laminated structure. Further, the laminate of "TAC film 3 as a shape-retaining film," "polarizer film (PVA (polyvinyl alcohol film)) 1," and "adhesive layer 4" of the cited invention satisfies the requirement of "another surface of said polarizing plate is composed of a surface of a first adhesive layer" of the Invention.

Further, "TAC film 3 as a shape-retaining film" of the cited invention corresponds to "protective film" of the Invention in view of their functions.

B "A protective film (which is a PET film) 2 with an adhesive layer on one side" of the cited invention corresponds to "a protective film with a thickness T2 (μm) to be laid on one surface of the polarizing plate" of the Invention, since it is laid on the TAC film 3 located on one surface of the above polarizing plate. Further, the above "adhesive layer 4" and the above "protective film (which is a PET film) 2" of the cited invention

correspond to "a second adhesive layer to be laid on one surface" and "a single-layered resin film to be laid thereon."

Furthermore, the "protective film" of the cited invention is a "PET film." PET is technically encompassed into a polyester-based resin. Therefore, the "protective film" of Cited Invention conforms to the requirement of "wherein said resin film consists of a polyester-based resin" of the Invention.

C The laminate of "first optical film A with one-side TAC structure" of the cited invention is made by laying on one surface of the laminated structure of "TAC film 3 as a shape-retaining film," "polarizer film (PVA (polyvinyl alcohol film)) 1," and "adhesive layer 4" of the cited invention, which corresponds to "a polarizing plate with a thickness T1 (μm) comprising a polarizer" of the Invention, "a protective film (which is a PET film) 2 with an adhesive layer on one side," which corresponds to "a protective film with a thickness T2 (μm) to be laid on one surface of the polarizing plate" of the Invention in the above item B. Therefore, the "first optical film A with one-side TAC structure" of the cited invention corresponds to "a polarizing plate with a protective film comprising a polarizing plate with a thickness T1 (μm) comprising a polarizer, and a protective film with a thickness T2 (μm) to be laid on one surface of the polarizing plate" of the Invention.

D "Polarizer film" of the cited invention is supposed to be "PVA (polyvinyl alcohol film)." Consequently, the "polarizer film" of the cited invention and the "polarizer" of the Invention have in common that they are both "polyvinyl alcohol-based resin films."

E As seen above, the Invention and the cited invention have in common that they are both

"A polarizing plate with a protective film comprising a polarizing plate with a thickness T1 (μm) comprising a polarizer, and a protective film with a thickness T2 (μm) to be laid on one surface of the polarizing plate,

wherein said polarizer is a polyvinyl alcohol-based resin film,

wherein another surface of said polarizing plate is composed of a surface of a first adhesive layer,

wherein said protective film is composed of a second adhesive layer to be laid on said one surface, and a single-layer resin film to be laid thereon,

wherein said resin film consists of a polyester-based resin,

wherein said polarizing plate further comprises a protective film," but they are different from each other in at least the following features:

[Different feature 1] A polarizing plate with a protective film is a square-shaped leaf-like body having a long side and a short side, wherein said long side is 221 mm or more, and said short length is 139 mm or more, and the leaf-like body is an elongated cutout of a polarizing plate with a protective film, whereas the cited invention is not a leaf-like body.

[Different feature 2] A polarizer is a film in which a dichroism pigment is subjected to an absorption orientation in a stretched polyvinyl alcohol-based resin film, and the thickness of the polarizer is from 5 μm or more to 15 μm or less for the Invention, whereas it is unknown in the cited invention as to whether a dichroism pigment is subjected to an absorption orientation in a stretched film, and the thickness is 20 μm.

[Different feature 3] The first adhesive layer and the second adhesive layer comprise (meth)acrylic-based resin in the Invention, whereas the cited invention fails to specify the material of adhesive layer.
[Different feature 4] The thickness of the protective film comprising a polarizing plate is 30 μm or less for the Invention, whereas 50 μm for the cited invention.
[Different feature 5] The thickness of the protective film T2 is 120 μm or less and the thickness ratio T2/T1 is within a range of 0.8 to 1.4 in the Invention, whereas in the cited invention, the thickness of protective film (which is a PET film) 2 comprising an adhesive layer on one side is 145 μm (= protective film 125 μm + adhesive layer 20 μm), and the thickness ratio T2/T1 is 1.5 (=145 μm/ 95 μm; the thickness of the polarizing plate 95 μm = TAC film 50 μm + polarizer film 20 μm + adhesive layer 25 μm).

(2) Judgment
A Regarding [Different feature 1]

It can be said from FIG. 1 that "first optical film A with one-side TAC structure" of the cited invention had an elongated shape. Further, as described in paragraph [0008] of the described matter B of the Cited Document 1: "a liquid crystal display device is widely spread to not only a screen of a word processor and personal computer, but also accessories such as a navigation system for automobiles, cell phones, and calculators. To cope with downsizing competition which recently increases intensely, there is increasing demand for making an optical film to be adhered to glasses, etc. of liquid crystal display devices thin and compact." as a conventional technique, a liquid crystal display device is used for various uses, and its size also varies. In using an optical film for a liquid crystal display device, it is a matter of common general technical knowledge to cut out a square-shaped leaf-like body from an elongated optical film. A person skilled in the art would have of course considered cutting out an optical film into a size in accordance with its application to conform to various uses. Further, a liquid crystal display device with a long side of 221 mm or more and a short side of 139 mm or more is well-known without raising an example.

Therefore, a person skilled in the art could have cut out the first optical film A with one-side TAC structure of the cited invention as necessary into an elongated cutout of a polarizing plate with a protective film with a size of a long side of 221 mm or more and a short side of 139 mm or more. The Appellant argues in a written opinion submitted on April 27, 2018 that "Further, Cited Document 1 does not at all recognize the effect of the size of the leaf-like body on curling." However, a person skilled in the art would consider cutting out an optical film according to the use to confirm the effect. Further, it cannot be seen from the description of the specification of the present application nor from the content of the certificate of experimental results disclosed in the written supplement that the size of the leaf-like body with a long side of 221 mm or more and a short side of 139 mm or more brings about effects unexpected by a person skilled in the art with respect to curling.

B Regarding [Different feature 2]

Cited Document 1 discloses in paragraph [0008] of the described matter B that "there is increasing demand for making an optical film to be adhered to glasses, etc. of liquid crystal display device thin and compact." In view of the description, it can be said

that Cited Document 1 describes the objective to thin an optical film. Further, for example, Cited Document 2 discloses in paragraph [0013] of the described matter (1) that "finally subjected to drying to obtain a polyvinyl alcohol-based polarization film with a thickness of, e.g., about 1 μm to 40 μm.," and in paragraph [0108] of the described matter (5): "The thickness of this polarization film was 11 μm.," and Cited Document 3 discloses in paragraph [0045] of the described matter (3) that "The thickness of the polarizer is typically from about 1 to 80 μm, preferably from 5 μm to 40 μm." In view of these descriptions, it can be said to be a well-known art to adjust a thickness of a polarizer to 5 μm or more to 15 μm or less.

Further, a film in which a dichroic pigment is subjected to an absorption orientation in a stretched polyvinyl alcohol-based resin film is well-known as a polarizer. For example, Cited Document 2 discloses in paragraph [0014] of the described matter (1) that "The method for manufacturing a polarization film of the present invention is not particularly limited, but may include, for example, (i) a method of subjecting the above unstretched polyvinyl alcohol-based resin film to uniaxial drawing in air or inert gas, and then subjecting to a swelling treatment, dyeing treatment by dichroism pigment, boric acid treatment, and a water washing treatment in this order, and finally drying ... etc." Cited Document 3 discloses in paragraph [0064] of the described matter (5) that "A polymer film having a thickness of 60 μm and containing a polyvinyl alcohol-based resin as a main component (manufactured by KURARAY CO., LTD., product name: VF-PE-A NO. 6000) was immersed in five baths under the following conditions (1) to (5) while applying a tension in the lengthwise direction of the film to be stretched so that the final stretching ratio might become 6.2 times the original length of the film. This stretched film was dried in an air-circulating drying oven at 40°C for one minute to produce a polarizer with a thickness of 22 μm."

Consequently, a person skilled in the art could have adjusted a thickness of a polarizer to 5 μm or more to 15 μm or less and adopted a film in which a dichroic pigment is subjected to an absorption orientation in a well-known stretched polyvinyl alcohol-based resin film as a polarizer in an attempt to thin an optical film.

C Regarding [Different feature 3]

The cited invention fails to specify the respective materials of the adhesive layer; however, a person skilled in the art should have selected as necessary the materials of the adhesives according to the physical properties of the objects to be bonded together. Further, for example, Cited Document 2 discloses in paragraph [0056] of the described matter (3) that "When a film with an adhesive layer is a peelable film, the adhesive is not particularly limited ... Specific examples of adhesives may include acrylic-based resin." Cited Document 3 discloses in paragraph [0039] of the described matter (2) that "The above adhesive layer is formed of any appropriate adhesive. A (meth)acrylic pressure-sensitive adhesive is typically used as the pressure-sensitive adhesive.". Cited Document 4 describes a synthetic resin with one-side adhesive layer in paragraph [0009] of the described matter (1) that "Materials suitable for use may include a film obtained by subjecting a polymer including vinyl acetate serving for copolymerization on a polyethylene base to impart stickiness or an acrylic-based adhesive layer to a single-layered or a multilayered extrusion or an inflation method." In view of the above description, it can be said as a well-known art that an adhesive layer commonly used for an optical film comprises (meth)acrylic-based resin.

Therefore, a person skilled in the art could have selected as necessary a well-known (meth)acrylic-based resin as respective materials of adhesives of the cited invention.

D Regarding [Different feature 4]

As described in the aforesaid item B, it can be said that Cited Document 1 describes the objective to thin an optical film. Further, for example, Cited Document 2 discloses in paragraph [0048] of the described matter (2) that "an appropriate thickness of transparent protection film is, for example, from 1 to 50 μm, preferably 5 to 40 μm, more preferably 10 to 30 μm." It also discloses in paragraph [0103] of the described matter (5) that "protective film 1: "ZEONOR ZF14-20" (manufactured by Zeon Corporation, thickness: 20 μm)," "Protective film 2: Saponified Tacphan P920GL (manufactured by Lonza, thickness: 22 μm)." Cited Document 3 discloses in paragraph [0047] of the described matter (3) that "The thickness of the protective layer is preferably from 5 μm to 200 μm, more preferably from 10 μm to 100 μm." and in paragraph [0065] of the described matter (6) that "This unstretched sheet was stretched in a temperature condition of 160°C at a ratio of 2.0 times in its longitudinal direction and a ratio of 2.4 times in its lateral direction to obtain a protective layer having a thickness of 20 μm." In view of these descriptions, it can be said as a well-known art to adjust a thickness of a protective film included in a polarizing plate to 30 μm or less.

Consequently, a person skilled in the art would have adjusted as necessary a thickness of a protective film included in a polarizing plate to 30 μm or less in an attempt to thin an optical film in the cited invention.

E Regarding [Different feature 5]

Cited Document 1 discloses in paragraph [0020] of the described matter B that "Claim 1 has a structure in which a shape-retaining film is laid on one side of both sides of the polarizer film or the retarder film (hereinafter abbreviated to 'an optical film with one-side TAC structure'), whereas it has relatively thicker protective film to increase its rigidity, thereby preventing a curve that makes a side of the polarizer film or the retarder film concave." In view of this, it can be said that the thickness of the protect film (protective film) of "125 μm" in the cited invention was designed to prevent the occurrence of curling that makes a side of the polarizer film or the retarder film concave, by increasing the rigidity of the protect film (protective film).

Meanwhile, Cited Document 1 discloses in paragraph [0025] of the described matter B that "In Claim 1, an optical film with one-side TAC structure is configured to have a flat shape, or a curved shape that makes a side of the polarizer film or the retarder film convex, thereby preventing an optical film with one-side TAC structure from being bonded to glass, etc. from an edge; however, if a curve is made so as to make a side of the polarizer film or the retarder film convex, it might cause problems of difficulty in handling during transportation or storage and difficulty in the operation of initial insertion between the aforesaid pairs of pressing rolls." and in paragraph [0026], it describes that "in Claim 2, the thickness of the protective film is designed so as to prevent a curling that makes a side of polarization film or retarder film convex, thereby making an optical film with one-side TAC structure flat linear shape or almost linear shape, which can overcome the above problems and make the optical film more suitable for the operation of bonding with a target to be bonded or production process."

It can be seen from these descriptions that the thickness of the protect film (protective film) is first designed to be thicker compared to the conventional one so that it can prevent curling that makes a side of a polarizer film concave; in other words, it can accept a curve that makes a side of a polarizer film convex, and the thickness of the protect film (protective film) is second designed to be thinner to the extent that does not make a side of the polarization film convex, so that an optical film with one-side TAC structure can form a flat linear shape.

Further, as is considered in the above items B and D, there is a strong need to thin an optical film. Thus in thinning a thickness of a polarizer and a protective film (TAC film) included in a polarizing plate, a person skilled in the art could have made a thickness of a protect film (protective film) thinner as necessary. Further, as described in the aforesaid item 1(3), the curling occurs as a result depending on the stress, rigidity, and shrinkage rate of each layer constituting the laminate, and further it is known that even protective films made of a polyester-based resin shows different elastic modulus depending on the difference in its material.

Consequently, in the cited invention, in thinning a thickness of a polarizer and a thickness of a protective film (TAC film) included in a polarizing plate, a person skilled in the art could have adjusted as necessary the total thickness of the protect film (protective film) and an adhesive layer to 120 μm or less and adjusted a thickness ratio T2/T1 defined in the Invention to a range of 0.8 to 1.4 by adjusting the thickness of the protective film to a range which prevents the occurrence of curling that makes a side of a polarizer film concave while preventing a side of the polarization film becoming convex in accordance with its physical properties.

Further, on the basis of Table 1 of paragraph [0114] of the specification of the present specification, even in example 2 with T2/T1 of 2.3 which did not conform to the requirement of the Invention in [Different feature 5], both the primary curl and secondary curl show an excellent value comparable to the other examples. Consequently, the thickness ratio of 0.8 to 1.4 as defined in the Invention would not cause particularly significant difference in the effects. Therefore, the effect of the Invention could be expected by a person skilled in the art, on the basis of the cited invention with a thickness ratio of 1.5.

(3) Conclusion

As described above, the Invention was easily conceivable by a person skilled in the art on the basis of the cited invention and the above well-known technique.

Thus the inventions are not patentable under the provision of Article 29(2) of the Patent Act.

No. 6 Conclusion

Therefore, the present application should be rejected for Reason 1 and Reason 2 for refusal notified by the body.

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

July 9, 2018

Chief administrative judge: NAKADA, Makoto
Administrative judge: MIYAZAWA, Hiroshi

Administrative judge: KAWAHARA, Tadashi