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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte FUMIHIRO ARAKAWA, TAKASHI KURODA,
and KOHEI KOMIZO

Appeal 2018-002772
Application 13/903,277
Technology Center 2800

Before ROMULO H. DELMENDO, JENNIFER R. GUPTA, and
MERRELL C. CASHION, JR., *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

The Applicant (“Appellant”)¹ appeals under 35 U.S.C. § 134(a) from the Primary Examiner’s final decision to reject claims 1–8 and 11.² We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ The Appellant is the Applicant, “Dai Nippon Printing Co., Ltd.,” which, according to the Brief, is the real party in interest (Appeal Brief filed September 20, 2017 (“Br.”), 2; Application Data Sheet filed May 28, 2013, 4).

² Br. 7–17; Final Office Action entered March 28, 2017 (“Final Act.”), 2–29; Examiner’s Answer entered November 21, 2017 (“Ans.”), 2–12.

I. BACKGROUND

The subject matter on appeal relates to a display device that switchably displays a two-dimensional image and a naked-eye visible three-dimensional image (Specification filed November 12, 2013 (“Spec.”) ¶ 2). Figure 1 (annotations added) is reproduced from the Drawings filed November 12, 2013 as follows:

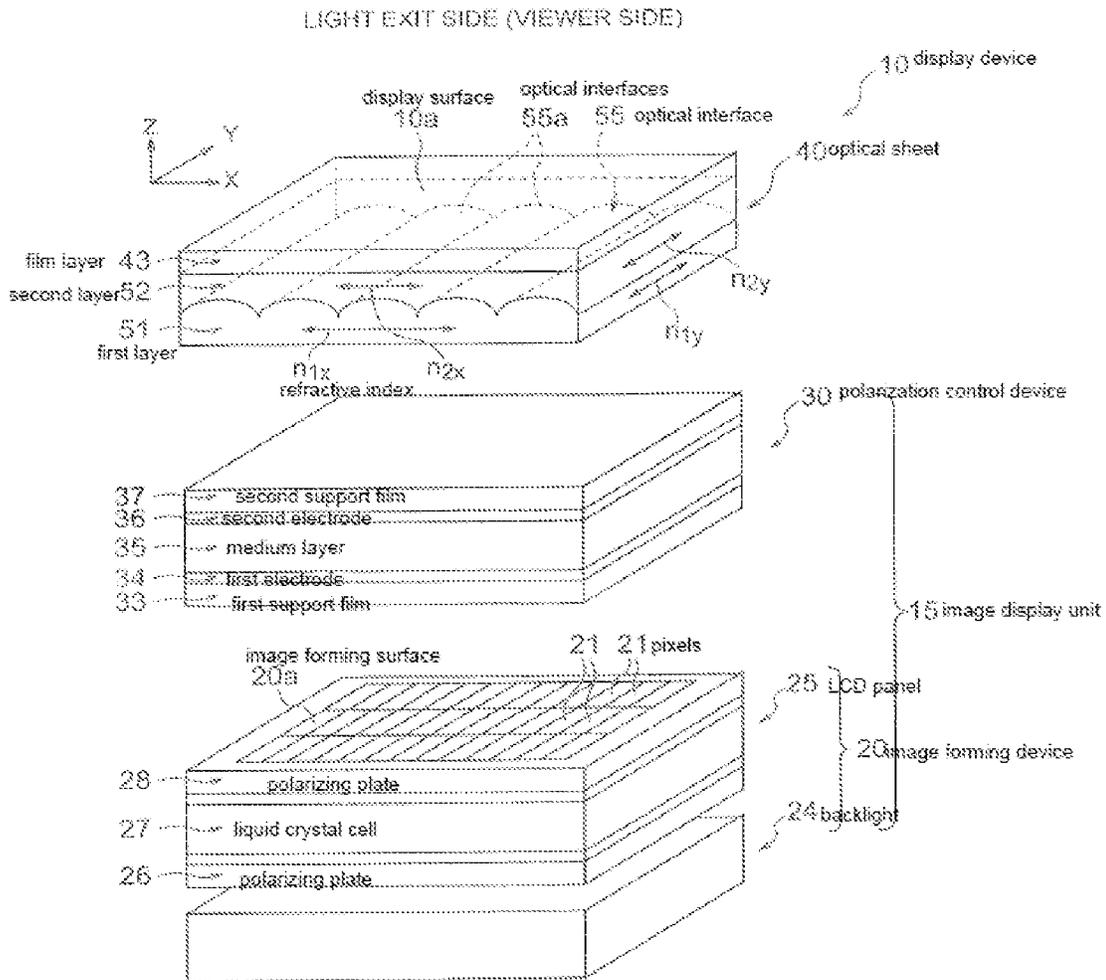


FIG. 1

Figure 1 above provides a perspective view of a preferred display device **10** according to the invention, wherein the display device **10** includes, *inter*

alia: an image display unit **15**, which includes an image forming device **20** and a polarization control device **30**; and an optical sheet **40** (*id.* ¶¶ 23, 26, 32). According to the Inventors, the image display unit **15** is configured to emit light of one linear polarization component for forming a three-dimensional image and light of the other linear polarization component for forming a two-dimensional image, while the optical sheet **40** controls the light's traveling direction depending on the polarization state (*id.* ¶ 26). The optical sheet **40** is described as including an optically anisotropic first layer **51**, which may be produced by stretching a resin film, and a second layer **52** formed on the first layer **51** (*id.* ¶¶ 50, 52; Fig. 5).

Representative claim 1 is reproduced from the Claims Appendix to the Appeal Brief, as follows:

1. A display device comprising:
 - an optical sheet comprising *a first layer including a thermoplastic resin*, the first layer being optically anisotropic, and a second layer, which is laminated to the first layer and which forms, between the second layer and the first layer, an optical interface *for changing a traveling direction of light of one polarization component by refraction*; and
 - an image display unit including a polarization control device that controls a polarization state of light, disposed to face the optical sheet and configured to be capable of emitting light of one polarization component for forming a three-dimensional image and light of a second polarization component for forming a two-dimensional image,
 - wherein light, emitted by the image display unit and having a polarization state controlled by the polarization control device, enters the optical sheet, and the optical sheet controls a traveling direction of the light depending on the polarization state of the light, and is used in the display device *for switchably displaying a two-dimensional image and a naked-eye visible three-dimensional image*, and

wherein the optical interface includes unit optical interfaces arranged in a first direction, and each of the unit optical interfaces extends in a second direction not parallel to the first direction, and has a convex lens-like contour convex toward one of the first layer and the second layer.

(Br. 18 (emphases added)).

II. REJECTIONS ON APPEAL

On appeal, the Examiner maintains several rejections under pre-AIA 35 U.S.C. § 103(a), as follows:

- A. Claims 1, 3–5, 7, 8, and 11 as unpatentable over Takagi et al.³ (“Takagi”) in view of Ikeda et al.⁴ (“Ikeda”);
- B. Claims 1, 3–5, 7, 8, and 11 as unpatentable over Takahashi⁵ in view of Ikeda; and
- C. Claims 2 and 6 as unpatentable over Takagi in view of Ikeda, as further evidenced by two additional non-patent literature documents; and
- D. Claims 2 and 6 as unpatentable over Takahashi in view of Ikeda, as further evidenced by the same two additional non-patent literature documents.

(Ans. 2–12; Final Act. 2–29.)

III. DISCUSSION

Rejection A and C. The Appellant’s arguments focus only on claims 1 and 11 (Br. 7–16). Therefore, we confine our discussion to these

³ US 8,174,465 B2, issued May 8, 2012.

⁴ US 2010/0045902 A1, published February 25, 2010.

⁵ US 7,053,865 B2, issued May 30, 2006.

two claims pursuant to 37 C.F.R. § 41.37(c)(1)(iv). As provided by this rule, all other claims stand or fall with claim 1.

Claim 1

The Examiner finds that Takagi describes a display device that includes most of the limitations recited in claim 1, including an anisotropic layer that corresponds to the specified “first layer including a thermoplastic resin” (Final Act. 2–5). Although the Examiner acknowledges that “Takagi fails to explicitly disclose that the first layer of the optical sheet includes a thermoplastic resin,” the Examiner finds that Takagi’s anisotropic layer is a drawn (i.e., stretched) film that may be produced from “ARTON (JSR Corporation) and polycarbonate (Nitto Denko Corporation)” (*id.* at 5 (quoting from Takagi col. 2, ll. 4–8)). In addition, the Examiner finds that Ikeda teaches an optical sheet including an optically anisotropic thermoplastic resin layer that provides several benefits (Final Act. 5–6). Based on these findings, the Examiner concludes that a person having ordinary skill in the art would have combined Takagi and Ikeda in the manner claimed by the Inventors in order to obtain the benefits disclosed in Ikeda (*id.* at 6–7). According to the Examiner, it would have been within the general ordinary skill level of the person skilled in the art to select a known material (i.e., a thermoplastic layer having anisotropic properties) based on its suitability for the intended use as a matter of design choice (*id.* at 7).

The Appellant contends that Takagi’s device is “functionally the same” as the device described in a prior art reference (WO 03/015424 A2, published February 20, 2003) identified in the Specification (Br. 7 (citing Spec. ¶¶ 4–6)). According to the Appellant, the prior art device’s birefringent lens has an optically anisotropic layer and an optically isotropic

layer that are disposed adjacent to each other and that “only light from the other linear polarization component changes its traveling direction at the interface between the optically anisotropic layer and the optically isotropic layer” (Br. 7–8). The Appellant alleges that “the presence of the liquid crystal material [in the prior art device] causes the birefringent lens to lack stability, in particular, thermal stability” (*id.* at 8). The Appellant also argues that “Takagi does not disclose or suggest the feature that a first layer of the optical sheet includes a thermoplastic resin” and that “one skilled in the art would not have had any logical reason to try to modify Takagi based on Ikeda in the asserted manner” (*id.* at 9 (bolding removed)). According to the Appellant, “in Ikeda, the polarizing element is located on the light-incident side of the lower polarization sheet of the liquid crystal display panel” (*id.* (citing Ikeda claim 17)). Further, the Appellant argues:

Takagi does not disclose or suggest the claimed feature that the optical sheet is located on the light emitting side of the image display unit, so that light that is emitted by the image display unit, and which has a polarization state that is controlled by the polarization control device, enters the optical sheet, and the optical sheet controls a traveling direction of the light depending on the polarization state of the light and is used in a display device for switchably displaying a two-dimensional image and a naked-eye visible three-dimensional image.

That is, in Takagi, the display device has a birefringent lens which exerts a lens function only on light from the other linear polarization component that forms a three-dimensional image.

(Br. 11).

The Appellant’s arguments fail to identify any reversible error in the Examiner’s rejection. *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011).

Takagi's Figure 1 (annotations added) is reproduced as follows:

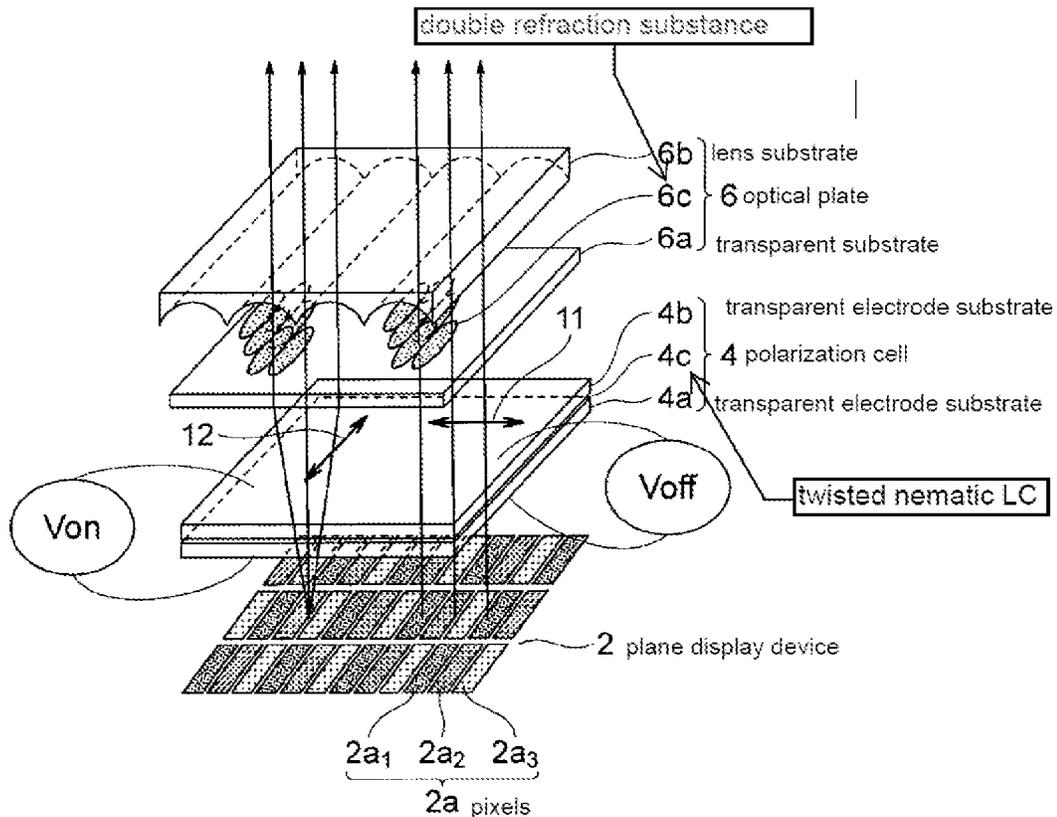


FIG. 1

Takagi's Figure 1 above depicts a stereoscopic image display apparatus including, *inter alia*: an optical plate 6 having a lens substrate 6b, a double refraction substance 6c, and a transparent substrate 6a; a polarization cell 4 that includes two transparent electrode substrates 4a and 4b and a twisted nematic liquid crystal 4c; and a plane display device 2 comprised of pixels 2a (Takagi col. 7, l. 7–col. 8, l. 33).

With respect to the “first layer including a thermoplastic resin” limitation recited in claim 1, the Appellant does not refute the Examiner’s finding that Takagi discloses thermoplastic resin materials for the anisotropic layer (i.e., layer 6c) (Ans. 4 (citing Takagi col. 2, ll. 4–8); Final Act. 5). Therefore, we discern no reversible error in that finding.

Moreover, we also agree with the Examiner (Final Act. 6–7) that Ikeda would have prompted a person having ordinary skill in the art to use a thermoplastic material such as a polycarbonate, consistent with Takagi’s disclosure, in order to provide, e.g., “polymer materials that easily exhibit optical anisotropy (birefringence) . . . in which the molecular chains show a high degree of orientation in response to stretching” (Ikeda ¶¶ 88–89) and, as a result, provide a polarizing element that “can improve the efficiency of using light, can be produced with relative ease, and is not problematic in terms of strength” as well as “maintain the intensity and the propagation direction of the light” (*id.* ¶ 24). Although the Appellant argues that Ikeda’s polarizing element is located on the light-incident side of the lower polarization sheet of the liquid crystal display panel (Br. 9 (citing Ikeda claim 17)), Ikeda’s figures (e.g., Figs. 1–4) are not inconsistent with either claim 1 or Takagi. In any event, “[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference” but, “[r]ather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.” *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

We find no persuasive merit in the Appellant’s arguments based on the notion that Takagi’s device is similar to the prior art device that is discussed in the Specification at paragraphs 2–4. These arguments fail at the outset because they do not reflect the actual language recited in claim 1. For example, nothing in claim 1 precludes the presence of Takagi’s nematic liquid crystal layer 4c, which, according to the Specification’s unsubstantiated allegation, would cause stability issues. Thus, as the Examiner explains, the “Appellant’s arguments amount to a general

allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references” (Ans. 3–4). *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998) (The “name of the game is the claim” and unclaimed features cannot impart patentability to claims).

We are also unpersuaded by the Appellant’s argument that “in Takagi, the display device has a birefringent lens which exerts a lens function only on light from the other linear polarization component that forms a three-dimensional image” (Br. 11). Takagi teaches a “changeover between a two-dimensional image and three-dimensional image” in which “light is not bent at an interface between the variable polarization cell 4 and the optical plate 6” in the two-dimensional image display mode and “the variable polarization cell 4 conducts an adjustment so as to cause a polarization direction . . . to coincide with the major axis direction of the double refraction substance 6c” in the three-dimensional image display mode (Takagi col. 7, l. 59–col. 8, l. 33). The Appellant does not explain with any reasonable degree of specificity what language in claim 1 serves to patentably distinguish the claimed invention over Takagi.

For these reasons, we find no basis to overturn the Examiner’s rejection as maintained against claim 1.

Claim 11

Claim 11 depends from claim 1 and recites:

11. The display device according to claim 1, wherein a refractive index n_{1x} of the first layer in the first direction, a refractive index n_{1y} of the first layer in the second direction, a refractive index n_{2x} of the second layer in the first direction, and a refractive index n_{2y} of the second layer in the second direction satisfy the following two conditions:

$$|n_{1x} - n_{2x}| > |n_{1y} - n_{2y}|; \text{ and}$$
$$0 < |n_{1y} - n_{2y}| \leq 0.02.$$

(Br. 19).

The Appellant argues:

[I]n view of the differing structures in Takagi and Ikeda and the functional differences of the respective devices, and absent the disclosure in the present invention, one skilled in the art would not have had any logical reason or reasonable expectation of successfully modifying Takagi to exhibit the otherwise undisclosed refractive index relationship.

(Br. 14).

We disagree. The Examiner's findings (Final act. 12–13) support an obviousness conclusion. Given Takagi's teachings regarding the relationships between the refractive indexes in layers 6a–6c, a person having ordinary skill in the art would have discovered—through nothing more than routine experimentation—suitable (i.e., optimum or workable) refractive indexes that would include situations that satisfy the conditions recited in claim 11. *In re Applied Materials, Inc.*, 692 F.3d 1289, 1295 (Fed. Cir. 2012) (“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” (quoting *In re Aller*, 220 F.2d 454, 456 (CCPA 1955))).

Because the Appellant does not direct us to any evidence of unexpected results for the specified refractive index relationships or otherwise offer a sufficient rebuttal against the prima facie case, we also sustain the rejection as maintained against claim 11.

Rejections B and D. The Appellant's principal contention is that Takahashi does not disclose or suggest a display device in which a naked-eye visible three-dimensional image is produced by one polarizing state of

light and a two-dimensional image is produced by another polarizing state of light (Br. 12–13). We agree.

The Examiner appears to rely on Takahashi's Figures 4 and 8 and column 4, lines 58–65 to account for the limitations in dispute (Final Act. 15–16). The Examiner, however, does not explain how these disclosures constitute a description of the disputed limitations when Takahashi's disclosure as a whole relates to a three-dimensional display device (Takahashi Abst.).

Accordingly, we cannot sustain Rejections B and D.

IV. SUMMARY

Rejections A and C are sustained. Rejections B and D are not sustained. Therefore, the Examiner's final decision to reject claims 1–8 and 11 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED