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katelyn.mulroy@philips.com
marianne.fox@philips.com
patti.demichele@Philips.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte FETZE PIJLMAN, OSCAR HENDRIKUS WILLEMSSEN,
LIEVEN RAF ROGER DESMET, MAARTEN SLUIJTER,
SIEBE TJERK DE ZWART and
MARCELLINUS PETRUS CAROLUS MICHAEL KRIJN

Appeal 2019-000097
Application 15/233,084
Technology Center 2800

Before ROMULO H. DELMENDO, LILEN REN, and JANE E. INGLESE,
Administrative Patent Judges.

INGLESE, *Administrative Patent Judge.*

DECISION ON APPEAL

Appellant¹ requests our review under 35 U.S.C. § 134(a) of the Examiner’s decision to finally reject claims 2–21.² We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42 and as identified in the Application Data Sheet filed August 10, 2016. Appellant, Koninklijke Philips Electronics N. V., is also the real party in interest. Appeal Brief filed June 28, 2018 (“Appeal Br.”) 2.

² Final Office Action entered January 25, 2018 (“Final Act.”) 1.

CLAIMED SUBJECT MATTER

Appellant's invention relates to a device and method for providing multiple views within a field of view of a display device. Spec. 1, ll. 11–14; Appeal Br. 3–6. Independent claim 2 illustrates the subject matter on appeal, and is reproduced below with contested language italicized:

2. A multi-view device comprising:
 - a display panel comprising a plurality of pixels;
 - a backlight comprising a plurality of light sources;
 - an array of lenses; and
 - a controller that controls the display panel and the backlight;
 - wherein the display panel, the backlight, and the array of lenses are arranged such that light emitted from the plurality of light sources travels through the display panel to the array of lenses to form a single viewing cone comprising at least three different views;
 - wherein the controller provides video information to the plurality of pixels to simultaneously provide the at least three different views through the array of lenses when the backlight emits the light,
 - wherein the backlight simultaneously enables all of the light sources of the plurality of light sources that provide the viewing cone,
 - wherein each light source of the plurality of light sources illuminates a corresponding set of pixels of the plurality of pixels, wherein each set of pixels comprises fewer pixels than the plurality of pixels;
 - wherein *a location of the plurality of light sources relative to the display panel is adjustable*, and
 - wherein *the controller adjusts the location of the plurality of light sources relative to the display panel to direct the viewing cone in a first direction of the viewing cone relative to the display panel.*

Appeal Br. 17 (Claims App.) (emphasis added).

REJECTIONS

The Examiner maintains the following rejections in the Examiner's Answer entered July 26, 2018 ("Ans."):

I. Claims 2, 6–11, 13–16, 18, 20, and 21 under 35 U.S.C. § 103(a) as unpatentable over Ezra³ in view of Woodgate;⁴

II. Claims 3–5, 17, and 19 under 35 U.S.C. § 103(a) as unpatentable over Ezra in view of Woodgate and Woodgate II;⁵ and

III. Claim 12 under 35 U.S.C. § 103(a) as unpatentable over Ezra in view of Woodgate and Rogers.⁶

FACTUAL FINDINGS AND ANALYSIS

Upon consideration of the evidence relied upon in this appeal and each of Appellant's contentions, we affirm the Examiner's rejections of claims 2–21 under 35 U.S.C. § 103(a) for the reasons set forth in the Final Action, the Answer, and below.

We review appealed rejections for reversible error based on the arguments and evidence the appellant provides for each issue the appellant identifies. 37 C.F.R. § 41.37(c)(1)(iv); *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (cited with approval in *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (Explaining that even if the Examiner had failed to make a prima facie case, "it has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections.")).

³ Ezra, US 5,392,140, issued February 21, 1995.

⁴ Woodgate, US 5,991,073, issued November 23, 1999.

⁵ Woodgate, US 6,014,164, issued January 11, 2000.

⁶ Rogers, US 3,213,753, issued October 26, 1965.

Rejection I: claims 2, 6–11, 13–16, 18, 20, and 21 under 35 U.S.C. § 103(a)
as unpatentable over Ezra in view of Woodgate

Claims 2, 6–8, 10, 11, 13–16, 18, and 21

Appellant argues claims 2, 6–8, 10, 11, 13–16, 18, and 21 as a group on the basis of independent claims 2 and 18, which Appellant argues together. Appeal Br. 9–14. We accordingly select claim 2 as representative, and decide the appeal as to claims 2, 6–8, 10, 11, 13–16, 18, and 21 based on claim 2 alone. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds that Ezra discloses a three dimensional display device having all the features of the multi-view device recited in claim 2, except that Ezra discloses simultaneously providing two different views that form a single viewing cone, rather than generating a single viewing cone comprising at least three different views, as recited in claim 2. Final Act. 2–3 (citing Ezra col. 4, ll. 29–44; Figs. 1 and 4). The Examiner finds, however, that Woodgate discloses producing a single viewing cone including at least three different views, which allows multiple views to be directed to specific viewing locations. Final Act. 3–4 (citing Woodgate Fig. 14); Ans. 11–12. The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of Appellant’s invention to apply Woodgate’s teachings to Ezra’s three dimensional display device to provide more than three different views in a single viewing cone, so that multiple observers, or observers that change location, can view a displayed image. Final Act. 4; Ans. 12.

Appellant argues that Ezra does not disclose that the location of a plurality of light sources that produce a viewing cone, relative to a display panel, is adjustable. Appeal Br. 9–10. Appellant argues that Ezra also does

not disclose adjusting a location of a plurality of light sources relative to a display panel to direct a viewing cone produced by the plurality of light sources in a first direction of the viewing cone relative to the display panel. Appeal Br. 10–11. Appellant argues that Ezra discloses a device that includes eight light sources, and discloses illuminating each of the eight light source sequentially, which produces two views per light source, and results in a single viewing cone comprised of sixteen views. Reply Br. 3–5. Appellant argues that the location of the eight (plurality) light sources that produce the single viewing cone with sixteen views is, therefore, fixed relative to the display panel. Appeal Br. 10; Reply Br. 3–5. Appellant argues that the direction of the single viewing cone produced by sequential activation of each of the eight light sources in Ezra’s device also does not change, but, instead, the direction of the views that together form the single viewing cone changes. Appeal Br. 10–11; Reply Br. 7–8.

Appellant’s arguments are unpersuasive of reversible error in the Examiner’s rejection, however, for reasons that follow.

Ezra discloses a direct view display device for providing a three-dimensional display. Col. 1, ll. 7–11; col. 2, l. 53; Fig. 1. Ezra discloses that the device includes spatial light modulator 13 (display panel) comprising a linear array of picture elements, a linear array of light sources connected to control circuit 9, and lenticular screen 16 formed of a plurality of contiguous lens elements. Col. 2, ll. 53–57; col. 3, ll. 4–7, 21–26, 31–34. Fig. 1. Ezra discloses that control circuit 9 provides two views of an image, taken from different directions during image capture, to the picture elements of spatial light modulator 13, and control circuit 9 then causes each light source in the linear array to be sequentially illuminated. Col. 2, ll. 57–59;

col. 3, ll. 51–54.

Ezra exemplifies illuminating light source 5, which Ezra discloses causes light to pass through the two views on spatial light modulator 13 to screen 16. Col. 3, ll. 45–63; Figs. 1 and 2. Ezra discloses that screen 16 outputs ray bundles from the display device, resulting in the two views represented on spatial light modulator 13 being visible to viewers from different angles, which correspond to the angles of the object from which the views were taken during image capture. Col. 3, ll. 57–66; col. 4, ll. 2–9; Figs. 1 and 2. Ezra discloses that control circuit 9 deactivates light source 5 after a predetermined time, spatial light modulator 13 displays the next pair of views, control circuit 9 activates the next light source, such as light source 4, and screen 16 outputs ray bundles, which are directed at different angles from those output when light source 5 was activated, due to the difference in positions of light sources 4 and 5 relative to spatial light modulator 13. Col. 4, ll. 13–28; Figs. 2 and 3. Ezra discloses that the process “continues until each of the light sources of the linear array has been illuminated in turn.” Col. 4, ll. 29–31.

Figure 4 of Ezra illustrates an embodiment in which the display device includes two linear arrays 20, 21 of eight light sources, and shows light source 5 illuminated in both arrays, which Ezra discloses “provide[s] greater illumination by increasing the number of individual light sources simultaneously illuminated.” Col. 4, ll. 44–56; Fig. 4.

Ezra thus discloses that during each period of time when a light source from both linear arrays 20, 21 is activated, two views are generated, and when the next light source in each linear array 20, 21 is activated, two new views are generated whose locations differ from those produced by

activation of the previous set of corresponding light sources. The Examiner finds that the two views produced during each time period when corresponding light sources are activated generate a single viewing cone comprised of two views. Ans. 3–4. Although Appellant argues that sequential activation of each of the eight light sources in Ezra’s linear array generates a single viewing cone comprised of sixteen views, rather than generating eight separate viewing cones comprised of two views each, Appellant does not direct us to a definition of “viewing cone,” or any description of “viewing cone” in Appellant’s Specification, which would exclude a viewing cone comprised of two views produced as disclosed in Ezra when a pair of corresponding light sources from linear arrays 20, 21 are activated. Appeal Br. 7–14; Reply Br. 2–6. Accordingly, the area in which the two views are visible reasonably corresponds to a “single viewing cone” as recited in claim 2.

Furthermore, as discussed above, Ezra explains that the ray bundles output by screen 16 when light source 4 is activated are directed at different angles from those output when light source 5 is activated, producing two views when light source 4 is activated whose locations differ from the two views produced when light source 5 is activated. The direction of the “viewing cone” comprised of two views produced by Ezra’s device thus changes each time a new pair of corresponding light sources in linear arrays 20, 21 is activated. Activating a new pair of corresponding light sources in linear arrays 20, 21 also changes—or adjusts—the location of the light sources that produce the viewing cone relative to the location of spatial light modulator 13, due to the difference in the positions of each pair of light sources relative to spatial light modulator 13.

Appellant argues that “[t]he Examiner states that in view of Woodgate, Ezra’s design could be modified to produce all of the views at one time interval.” Reply Br. 9. Appellant argues that the “combination of Ezra and Woodgate as proposed by the Examiner will render the combination unsuitable for its intended purpose” because “if all of the light sources that produce the viewing cone [in Ezra] are enabled simultaneously, as proposed by the Examiner, the device will not produce the 3-D image.” Appeal Br. 13; Reply Br. 10.

As discussed above, however, Ezra discloses simultaneously activating (or enabling) a light source from each of arrays 20, 21 to produce two views that form a single viewing cone. As also discussed above, the Examiner relies on Woodgate’s disclosure that including at least three different views in a single viewing cone allows multiple views to be directed to specific viewing locations, which the Examiner finds would have suggested modifying Ezra’s device to provide at least three different views in a single viewing cone, so that multiple observers, or observers that change location, can view a displayed image. Final Act. 3–4 (citing Woodgate Fig. 14); Ans. 11–12. Contrary to Appellant’s arguments, modifying Ezra’s device as proposed by the Examiner would result in production of a three-dimensional image because, as the Examiner explains, each of the at least three views produced by the modified device would be directed to different spatial locations, producing stereo-related views (including left eye perspective image and right eye perspective image) that create a stereoscopic or three-dimensional illusion. Ans. 12–13.

We, accordingly, sustain the Examiner’s rejection of claims 2, 6–8, 10, 11, 13–16, 18, and 21 under 35 U.S.C. § 103(a) as unpatentable over

Ezra in view of Woodgate.

Claims 9 and 20

Appellant argues claims 9 and 20 together. Appeal Br. 14. We accordingly select claim 9 as representative, and decide the appeal as to claims 9 and 20 based on claim 9 alone. 37 C.F.R. § 41.37(c)(1)(iv).

Claim 9 depends from claim 2 and recites that the controller further adjusts the location of the plurality of light sources relative to the display panel to direct the viewing cone in a second direction of the viewing cone relative to the display panel, wherein the second direction of the viewing cone is different than the first direction of the viewing cone.

Appellant argues that “Ezra’s sequential illumination of each light source of the plurality of light sources that produce the cone of view produces a single cone of view that is projected in a particular direction,” and, Appellant asserts, “[t]here is no way in Ezra to change this particular direction because it is based on fixed location of light sources (‘linear array of light sources 20, 21’) relative to display panel.” Appeal Br. 14.

As discussed above, however, the two views produced during each time period when corresponding light sources are activated in Ezra’s device generate an area of visibility—or a “single viewing cone”—comprised of the two views. As also discussed above, the direction of this “viewing cone” changes each time a new pair of corresponding light sources in linear arrays 20, 21 is activated in Ezra’s device, because the rays output by the device are directed at different angles when a new pair of light sources is activated, relative to the direction of the rays output when the previous pair of light sources was activated.

Appellant’s arguments are, therefore, unpersuasive of the Examiner’s

rejection of claim 9. We, accordingly, sustain the rejection of claims 9 and 20 under 35 U.S.C. § 103(a).

Rejection II: claims 3–5, 17, and 19 over Ezra, Woodgate, and Woodgate II
and Rejection III: claim 12 over Ezra, Woodgate, and Rogers

To address these rejections, Appellant argues that the dependent claims subject to these rejections are “patentable for at least the same reasons discussed above with respect to each independent claim from which they depend.” Appeal Br. 15.

Because we are unpersuaded of reversible error in the Examiner’s rejection of claim 1 for the reasons discussed above, Appellant’s position as to these rejections is also unpersuasive of reversible error. We, accordingly, sustain the rejections of claims 3–5, 12, 17, and 19 under 35 U.S.C. § 103(a).

CONCLUSION

Claims Rejected	Basis	Affirmed	Reversed
2, 6–11, 13–16, 18, 20, and 21	§ 103(a) Ezra, Woodgate	2, 6–11, 13–16, 18, 20, and 21	
3–5, 17, and 19	§ 103(a) Ezra, Woodgate, Woodgate II	3–5, 17, and 19	
12	Ezra, Woodgate, Rogers	12	
Overall Outcome		2–21	

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED