UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SAMSUNG DISPLAY CO., LTD.,
Petitioner,

v.

SOLAS OLED LTD.,
Patent Owner.

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IPR2020-00320
Patent 7,446,338 B2

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Before SALLY C. MEDLEY, JESSICA C. KAISER, and JULIA HEANEY,
Administrative Patent Judges.

KAISER, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I.   INTRODUCTION

On December 18, 2019, Samsung Display Co. Ltd. ("Petitioner")[1] filed a Petition requesting an *inter partes* review of claims 1–3 and 5–13 of U.S. Patent No. 7,446,338 B2, issued on November 4, 2008 (Ex. 1001, "the '338 patent"). Paper 1 ("Pet."). Solas OLED Ltd. ("Patent Owner") filed a Preliminary Response. Paper 6. Taking into account the arguments presented in Patent Owner's Preliminary Response, we determined the information presented in the Petition established that there was a reasonable likelihood that Petitioner would prevail in challenging at least one of claims 1–3 and 5–13 of the '338 patent, and we instituted this *inter partes* review, as to all challenged claims, on June 23, 2020. Paper 9 ("Dec. on Inst.").

During the course of the trial, Patent Owner filed a Patent Owner Response (Paper 18, "PO Resp."); Petitioner filed a Reply to the Patent Owner Response (Paper 23, "Pet. Reply"); and Patent Owner filed a Sur-reply (Paper 25, "PO Sur-reply"). An oral hearing was held on March 25, 2021, and a transcript of the hearing is included in the record. Paper 35 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of claims 1–3 and 5–13 of the '338 patent. For the reasons discussed below, we hold that Petitioner has demonstrated by a preponderance of the evidence that claims 1–3 and 5–13 are unpatentable.

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[1] Apple Inc. filed a petition in IPR2020-01275, and was joined as a petitioner in this proceeding. Paper 24. Subsequently, we granted a joint motion to terminate Apple Inc. as a petitioner in this proceeding, leaving Samsung as the sole remaining petitioner. Paper 31.

II. BACKGROUND

A. The '338 Patent (Ex. 1001)

The '338 patent describes a display panel comprised of pixels, the pixels having a particular arrangement of transistors driving the pixels' light-emitting elements. Ex. 1001, 2:34–41, code (57). Figure 1 of the '338 patent is reproduced below.
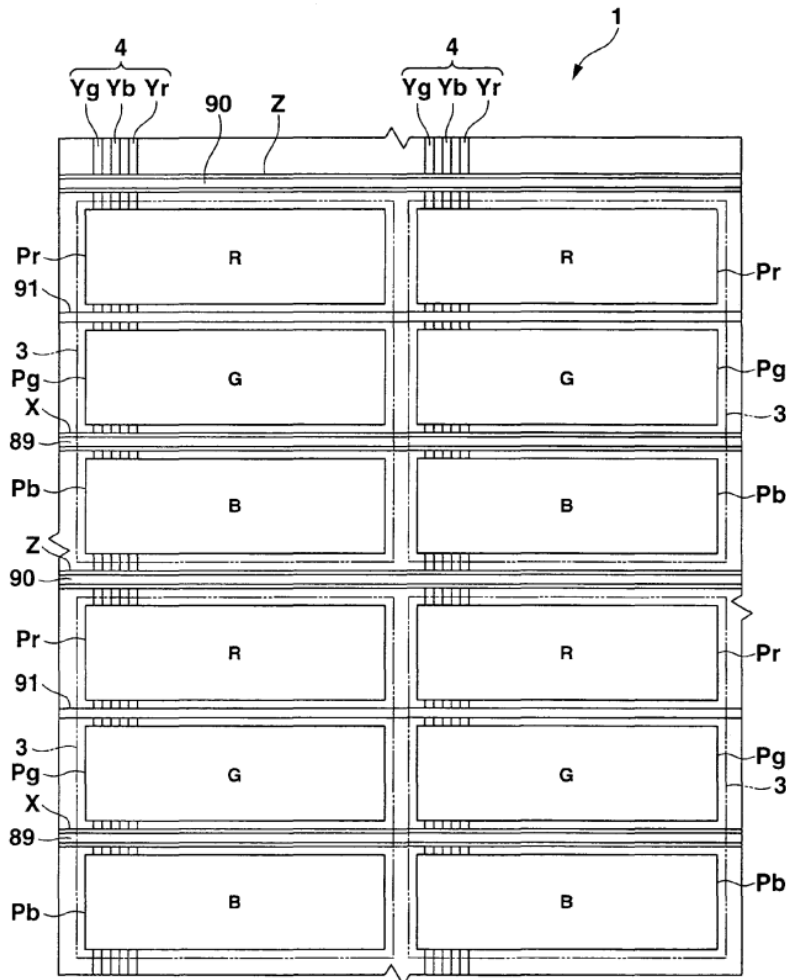

FIG.1

Figure 1 shows four adjacent pixels in display panel 1. Display panel 1 is comprised of pixels 3; in particular, the figure shows four adjacent pixels arranged in a 2-by-2 configuration, i.e., the pixels are arranged in an array.

Id. at 4:53–55, 4:65–66. Each pixel 3 is comprised of red sub-pixel Pr, green sub-pixel Pg, and blue sub-pixel Pb. *Id.* at 4:63–65. Each sub-pixel Pr, Pg, Pb is connected to corresponding signal line Yr, Yb, Yg, respectively. *Id.* at 5:12–15. Further, each sub-pixel is connected to select interconnection 89, feed interconnection 90, and common interconnection 91. *Id.* at 5:23–40; *see id.* at 6:47–48. Still further, each sub-pixel Pr, Pg, Pb have a similar circuit arrangement. *Id.* at 6:47–48.
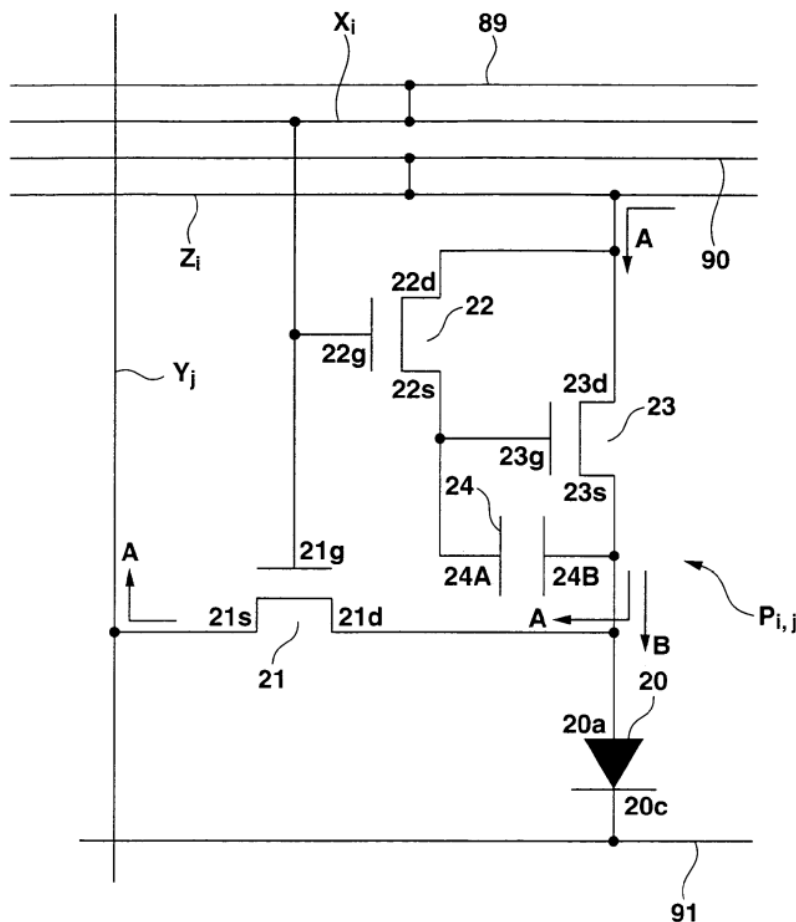
Figure 2 is reproduced below.

FIG.2

Figure 2 shows the sub-pixel circuit arrangement, which includes organic electroluminescence (EL) element 20, switch transistor 21, holding transistor

22, driving transistor 23, and capacitor 24. *Id.* at 6:48–55. Further, scan line Xi is electrically connected to select interconnection 89, switch transistor 21, and holding transistor 22; signal line Yj is electrically connected to switch transistor 21; and supply line Zi is electrically connected to feed interconnection 90 and driving transistor 23. *Id.* at 6:61–62, 6:65–67, 7:3–6, 7:11–13, 14:47–50.

The '338 patent describes two operating periods for the pixel circuit: a "selection period" and a subsequent "light emission period." *Id.* at 15:28, 15:58–61. During the selection period, a "feed driver applies a write feed voltage VL to supply a write current to the driving transistors 23 connected to" supply line Zi. *Id.* at 14:46–50; *see id.* at Fig. 7. The "write current (pull-out current) . . . flows from the feed interconnection 90 and supply line Zi through the drain-to-source path of the driving transistor 23 and the drain-to-source path of the switch transistor 21" and to signal line Yj. *Id.* at 15:34–41. Notably, "the switch transistor 21 functions to turn on (selection period) and off (light emission period) of the current between the signal line Yj and the source 23s of the driving transistor 23." *Id.* at 17:26–29. That is, switch transistor 21 controls whether the write current flows through driving transistor 23, depending on whether the switch transistor is respectively turned on or off. *See id.*; *see id.* at 15:58–61. In the "subsequent light emission period," switch transistor 21 is "turned off." *Id.* at 15:58–61.

Furthermore, the '338 patent describes that such pixel circuit arrangements for a display are formed "by stacking various kinds of layers on [an] insulating substrate." *Id.* at 8:21–22. Figure 6, reproduced below, is a cross-sectional view of a pixel showing such stacked layers.

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