

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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IPR2020-00140  
Patent 6,072,450

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

HEANEY, *Administrative Patent Judge*.

JUDGMENT  
Final Written Decision  
Determining All Challenged Claims Unpatentable  
*37 C.F.R. § 318(a)*

I. INTRODUCTION

Samsung Display Co., Ltd. (“Petitioner”)<sup>1</sup> filed a Petition to institute an *inter partes* review of claims 1–9, 11–13, and 15–18 of U.S. Patent

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<sup>1</sup> This proceeding has been terminated with respect to one of the original petitioners, Dell Inc., and a petitioner by joinder, Apple Inc. See Paper 46.

No. 6,072,450 (Ex. 1001, “the ’450 patent”). Paper 1 (“Petition” or “Pet.”). Solas OLED Ltd. (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). 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 1–9, 11–13, and 15–18 of the ’450 patent, and we instituted this *inter partes* review as to all challenged claims. Paper 9 (“Dec. on Inst.”).

During the course of trial, Patent Owner filed a Patent Owner Response (Paper 20, “PO Resp.”); Petitioner filed a Reply to the Patent Owner Response (Paper 26, “Pet. Reply”); Patent Owner filed a Sur-reply (Paper 28, “PO Sur-reply”). An oral hearing was held on February 9, 2021, and a transcript of the hearing is included in the record. Paper 43 (“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 1–9, 11–13, and 15–18 of the ’450 patent. For the reasons discussed below, we hold that Petitioner has demonstrated by a preponderance of the evidence that claims 1–9, 11–13, and 15–18 are unpatentable under § 103.

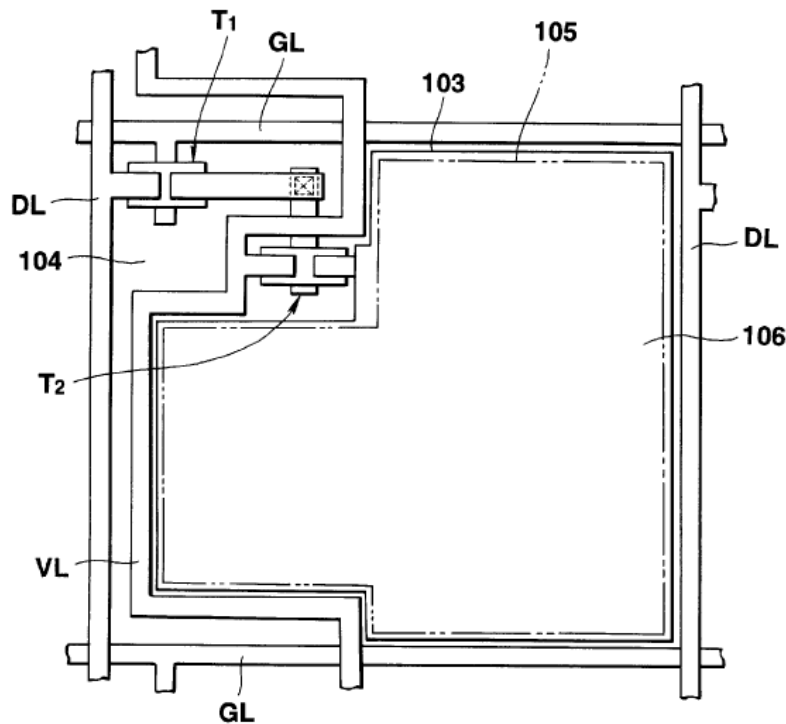
## II. BACKGROUND

### A. *The ’450 Patent (Ex. 1001)*

The ’450 patent, titled “Display Apparatus,” describes a passive matrix type electroluminescent (“EL”) display apparatus including parallel cathode lines, parallel anode lines perpendicular to the cathode lines, and an organic electroluminescent layer between the cathode lines and anode lines. Ex. 1001, [54], 1:6–7, 1:14–20. Applying a positive voltage to the cathode lines drives the organic electroluminescent layer, and the display apparatus

displays an image corresponding to the applied voltage. *Id.* at 1:20–24. The '450 patent explains that the organic electroluminescent layer “can emit light at a high instantaneous luminance by applying a high voltage to the organic EL layer” but, due to this, “the organic EL layer can easily deteriorate.” *Id.* at 1:38–41. The '450 patent further explains that the larger the number of anode lines and cathode lines, the greater the possibility of crosstalk in a passive matrix type electroluminescent display apparatus, which makes it difficult to display a highly precise image. *Id.* at 1:42–46.

The '450 patent describes a conventional active matrix type display apparatus to address the above problems. *Id.* at 1:47–49. The display apparatus is depicted in Figure 22 of the '450 patent, reproduced below.



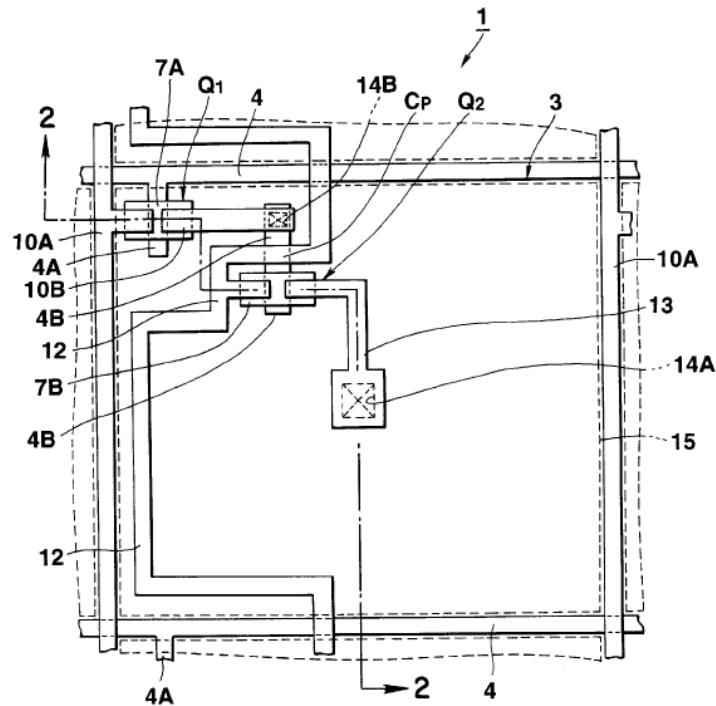
**FIG.22**

Figure 22 “is a plan view of a display apparatus according to the related art.” *Id.* at 5:12–13. The display apparatus includes pairs of thin film transistors

that include selection transistor T1 and drive transistor T2 and confer a voltage storing capability on pixels. *Id.* at 1:49–51. The '450 patent states that transistors T1, T2 can be thin film transistors. *Id.* at 1:58–59.

The display apparatus further includes an organic EL layer 106 that is arranged to not overlap transistors T1 and T2 so that light emitted by the EL layer 106 is prevented from entering thin film transistors T1, T2. *Id.* at 2:23–27. The '450 patent explains that “[i]f the emitted light entered the thin film transistors T1 and T2, unnecessary photoelectromotive force would be generated in the channel regions of the thin film transistors T1 and T2, which entails the possibility of the thin film transistors T1 and T2 malfunctioning.” *Id.* at 2:27–32.

An object of the '450 patent is “to provide a display apparatus which has a light emitting area enlarged so as to emit light at a satisfactorily high luminescence even though a voltage applied to an EL layer is low, and which has a long luminance life.” *Id.* at 2:66–3:3. Another object of the '450 patent is “to provide a display apparatus which prevents light from entering active elements such as transistors, to thereby avoid the malfunction of the active elements.” *Id.* at 3:4–7. An embodiment of such a display apparatus is shown in Figure 1, which is reproduced below.



**FIG. 1**

Figure 1 “is a plan view of an [sic] display apparatus according to one embodiment of the present invention.” *Id.* at 4:28–29.

The '450 patent states that display apparatus 1 includes “a substrate 2, an n-channel transistor Q1, an n-channel transistor Q2, [and] an organic EL element 3.” *Id.* at 5:25–33. According to the '450 patent, “[i]n the entire display area, an organic EL layer 16 is formed on the cathode electrodes 15 and the interlayer insulation film 14, and a transparent anode electrode 17.” *Id.* at 6:39–41. The '450 patent further explains that “each EL element 3 emits light over the entirety of one pixel area” and “cathode electrodes 15 are formed of MgIn which reflects light.” *Id.* at 7:66–8:47, 8:49–50. Thus, “light emitted by the organic EL layer 16 when a voltage is applied between the anode electrode 17 and the cathode electrodes 15 comes out through the anode electrode 17 without leaking downward” and “the light does not enter

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