

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TIANMA MICROELECTRONICS CO. LTD.,
Petitioner,

v.

JAPAN DISPLAY INC.,
Patent Owner.

IPR2021-01029
Patent 9,310,654 B2

Before JO-ANNE M. KOKOSKI, KRISTINA M. KALAN, and
ELIZABETH M. ROESEL, *Administrative Patent Judges*.

KOKOSKI, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Tianma Microelectronics Co. Ltd. (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–7 and 12–14 (the “challenged claims”) of U.S. Patent No. 9,310,654 B2 (“the ’654 patent,” Ex. 1001). Paper 2 (“Pet.”). Japan Display Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). With Board authorization, Petitioner filed a Reply to the Preliminary Response (“Reply,” Paper 7), and Patent Owner filed a Sur-reply to Petitioner’s Reply (“Sur-reply,” Paper 9).

Institution of an *inter partes* review is authorized by statute when “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314 (2018); *see also* 37 C.F.R. § 42.4 (2021). Upon consideration of the Petition, the Preliminary Response, the Reply, the Sur-reply, and the evidence of record, we determine that Petitioner has established a reasonable likelihood of prevailing with respect to the unpatentability of at least one claim of the ’654 patent, and we decline to exercise our discretion to deny institution. Accordingly, for the reasons that follow, we institute an *inter partes* review of claims 1–7 and 12–14 of the ’654 patent.

A. *Real Parties-in-Interest*

Each party identifies itself as the real party-in-interest. Pet. 64; Paper 4, 3.

B. *Related Proceedings*

The parties indicate that, pursuant to the district court’s order (Ex. 1016), the ’654 patent is no longer at issue in *Japan Display Inc. v. Tianma Microelectronics Co. Ltd.*, No. 2:20-cv-00284 (E.D. Tex.) (the “District Court Action”). Paper 11, 1; Paper 13, 3; Ex. 1017.

C. The '654 Patent

The '654 patent, titled “Liquid Crystal Device and Electronic Apparatus,” is directed to “a liquid crystal device having a high pixel aperture ratio, a high display luminance and a wide viewing angle and an electronic apparatus using the liquid crystal device.” Ex. 1001, 2:48–51. The liquid crystal device includes: (1) a first substrate and a second substrate with a liquid crystal layer sandwiched in between; (2) a first electrode on the liquid crystal layer side of the first substrate; (3) an insulating layer on the liquid crystal layer side of the first electrode; and (4) a second electrode on the liquid crystal layer side of the insulating layer. *Id.* at 2:53–60. The first substrate has a plurality of intersecting data lines and scan lines formed thereon, with sub-pixels formed at regions surrounded by data lines and scan lines. *Id.* at 2:61–64. The second electrode has a plurality of linear electrodes disposed with a gap in between, each linear electrode extending in a long-axis direction of the sub-pixels, and has at least one bent portion. *Id.* at 2:64–67. The bent portion is shaped such “that both sides thereof are inclined in opposite directions with respect to the long-axis direction of the sub-pixels; and the data lines or scan lines are bent in an extending direction of the linear electrodes having the bent portion.” *Id.* at 2:67–3:5.

The '654 patent explains that, because

each of the linear electrodes constituting the second electrode is generally arranged to extend in the long-axis direction of the sub-pixels and includes at least one bent portion, and the bent portion has such a shape that both sides thereof are inclined in opposite directions with respect to the long-axis direction of the sub-pixels, a multi-domain structure is formed, and thus, it is possible to achieve a wide viewing angle. Moreover, since the data line is bent in the extending direction of the linear electrodes having the bent portion, it is possible to suppress dead spaces which do not contribute to display from generating

along the longer sides of the sub-pixel, and thus, a high aperture ratio can be maintained.

Id. at 3:10–23. The '654 patent also teaches that the first electrode may be a pixel electrode and the second electrode may be a common electrode, and because the insulating layer is formed on the pixel electrode and the common electrode is formed on the surface of the insulating layer so as to cover the entire sub-pixels, “it is possible to maximize the aperture ratio of the sub-pixels.” *Id.* at 3:24–32.

D. Illustrative Claim

Petitioner challenges claims 1–7 and 12–14 of the '654 patent. Pet. 19. Claims 1 and 14 are independent. Claim 1 is illustrative of the claimed subject matter, and is reproduced below.

1. A liquid crystal device, comprising:
 - [1.1] a first substrate and a second substrate that are disposed to face each other, the first substrate including a plurality of data lines and a plurality of scan lines which intersect each other;
 - [1.2] a liquid crystal layer that is sandwiched between the first substrate and the second substrate;
 - [1.3] a first electrode that is provided on a liquid crystal layer side of the first substrate;
 - [1.4] an insulating layer that is provided on the liquid crystal layer side of the first electrode;
 - [1.5] a second electrode that is provided on the liquid crystal layer side of the insulating layer; and
 - [1.6] a light shielding film configured to overlap with at least one of the scan lines which is at least bent in plan view, the light shielding film being provided on the second substrate

wherein:

- [1.7] sub-pixels are formed at regions surrounded by the data lines and the scan lines;
- [1.8] the second electrode has a plurality of linear electrodes that are disposed with gaps therebetween;
- [1.9] each of the plurality of linear electrodes extends in a long-axis direction of the sub-pixels, and at least one of the linear electrodes or at least one of the gaps has at least one bent portion, the bent portion provided in a central portion of the respective sub-pixels;
- [1.10] the bent portion has such a shape that both sides thereof are inclined in opposite directions with respect to the long-axis direction of the sub-pixels; and
- [1.11] the data lines or the scan lines are bent in an extending direction of the linear electrodes having the bent portion,
- [1.12] wherein the first and second electrodes are a combination of either
 - [1.12.a] a pixel electrode as the second electrode including the linear electrodes and gaps, and that is provided over a common electrode as the first electrode, or
 - [1.12.b] a common electrode as the second electrode including the linear electrodes and gaps, and that is provided over a pixel electrode as the first electrode, and
- [1.13] wherein the light shielding film is configured to overlap with the second electrode which is bent in plan view.

Ex. 1001, 15:36–16:10 (bracketed material added).

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