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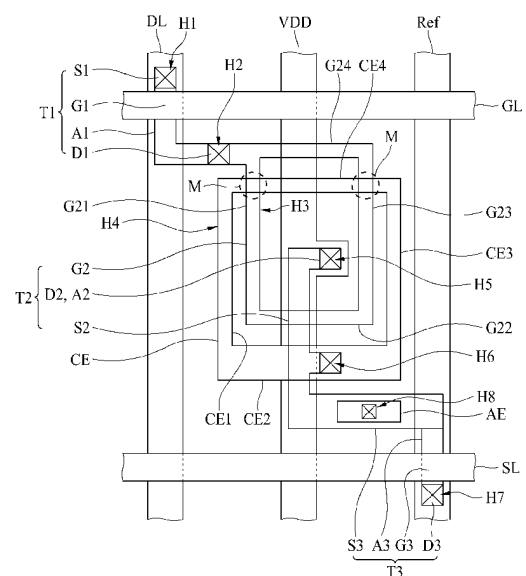
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(54) **ELECTROLUMINESCENT DISPLAY APPARATUS AND DISPLAY APPARATUS**

(57) Disclosed is an electroluminescent display apparatus. The electroluminescent display apparatus includes a substrate (100), a driving thin film transistor (TFT) provided on the substrate (100) and including a gate electrode (G2), a source electrode, a drain electrode, and an active region, a capacitor electrode (CE) facing the gate electrode (G2), a first electrode (300) electrically connected to the source electrode, a light emitting layer (500) on the first electrode (300), and a second electrode (600) on the light emitting layer (500). The gate electrode (G2) and the capacitor electrode (CE) extend in a vertical direction with respect to the substrate (100) surface.

FIG. 2



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EUROPEAN SEARCH REPORT

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| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|---|---|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
| X | US 2018/331129 A1 (GU PENGFEI [CN]) 15 November 2018 (2018-11-15) | 1,2 | INV. H01L27/32 |
| A | * paragraph [0035] - paragraph [0072]; figures 1-5 * | 3-11 | |
| A | ----- CN 106 125 436 A (BOE TECHNOLOGY GROUP CO LTD ET AL.) 16 November 2016 (2016-11-16) * figure 2 * & US 2018/366492 A1 (ZHOU JIDENG [CN]) 20 December 2018 (2018-12-20) * paragraph [0053] - paragraph [0076]; figure 2 * | 1-11 | |
| A | ----- CN 108 766 899 A (SHANGHAI HUALI INTEGRATED CIRCUIT MFG CO LTD) 6 November 2018 (2018-11-06) * figure 3 * | 1-11 | |
| | | | TECHNICAL FIELDS SEARCHED (IPC) |
| | | | H01L |
| -The present search report has been drawn up for all claims | | | |
| Place of search Munich | | Date of completion of the search 6 April 2020 | Examiner Bernabé Prieto, A |
| CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document | | | |

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

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Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

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No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

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LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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see sheet B

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All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

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As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

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Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

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None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

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1-11

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The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-11

An electroluminescent display apparatus comprising:
 a substrate (100);
 a driving thin film transistor (T2) on the substrate (100),
 the driving thin film transistor(T2) including a gate
 electrode (G2), a source electrode (S2), a drain electrode
 (D2), and an active region (A2);
 a capacitor electrode (CE) facing the gate electrode (G2);
 a first electrode (300) electrically connected to the source
 electrode (SI);
 a light emitting layer (500) on the first electrode (300);
 and
 a second electrode (600) on the light emitting layer (500),
 wherein the gate electrode (G2) and the capacitor electrode
 (CE) extend in a vertical direction with respect to the
 substrate (100) surface.

2. claims: 12-16

An electroluminescent display apparatus comprising:
 a substrate (100); and
 a thin film transistor (T2) including a gate electrode (G2),
 a source electrode (S2), a drain electrode (D2), and an
 active region (A2) each provided on the substrate (100),
 wherein
 the gate electrode (G2), the source electrode (S2), the
 drain electrode (D2), and the active region (A2) extends in
 a vertical direction with respect to the substrate (100)
 surface, and
 an upper surface of the drain electrode (D2) contacts a
 lower surface of the active region (A2), and a lower surface
 of the source electrode (S2) contacts an upper surface of
 the active region (A2).

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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06-04-2020

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|--|------------------|--|--|
| US 2018331129 A1 | 15-11-2018 | CN 107154406 A US 2018331129 A1 | 12-09-2017 15-11-2018 |
| ----- | ----- | ----- | ----- |
| CN 106125436 A | 16-11-2016 | CN 106125436 A US 2018366492 A1 WO 2018041081 A1 | 16-11-2016 20-12-2018 08-03-2018 |
| ----- | ----- | ----- | ----- |
| CN 108766899 A | 06-11-2018 | NONE | |
| ----- | ----- | ----- | ----- |

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82