

# Patent: 2002-348622 (20021129)

|                                                                                                                                             |                                                                                                 |                                                               |
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| Domestic priority (later)                                                                                                                   |                                                                                                 |                                                               |

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|------------------------------------------|-------------------------------------------------------------|
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| [Display of Fee]                         |                                                             |
| [Deposit account number]                 | 013044                                                      |
| [Payment Amount]                         | 21,000 yen                                                  |
| [List of submitted documents]            |                                                             |
| [Document Name]                          | Specification 1                                             |
| [Document Name]                          | Drawings 1                                                  |
| [Document Name]                          | Abstract 1                                                  |
| [Comprehensive Power of Attorney Number] | 0109826                                                     |
| [Necessity of proof]                     | Yes                                                         |

## **SPECIFICATION**

### **ELECTRO-OPTICAL DEVICE, ACTIVE MATRIX SUBSTRATE, AND ELECTRONIC APPARATUS**

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#### **DETAILED DESCRIPTION OF THE INVENTION**

##### **[0001] TECHNOLOGICAL FIELD OF THE INVENTION**

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The present invention relates to an electro-optical device, an active matrix substrate, and an electronic apparatus.

##### **[0002] CONVENTIONAL TECHNOLOGY**

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An active matrix driving system is one driving system for a display provided with a liquid crystal element, an organic EL element, an electrophoretic element, an electron-emitting element, and the like. In an active matrix driven display, a plurality of pixels are arranged in a matrix on a display panel thereof.

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Each of the plurality of pixels includes a pixel circuit including an electro-optical element and a driving transistor for supplying driving power to the electro-optical element. Each of the plurality of pixel circuits is arranged corresponding to an intersection of a data line and a scanning line. (For example, see Patent Document 1).

25

[0003] Patent Document 1

International Publication No. WO98/36407

30

[0004] Problem to be Solved by the Invention

The pixel circuit is arranged in a column direction (data line direction) and a row direction (scan line direction) of the display panel unit [text cropped]

## Claims

1. An electro-optical device, comprising:
  - a plurality of effective optical regions in which electro-optical elements
  - 5 are provided above a substrate; and
  - a wiring region provided on the substrate, having wiring for supplying electric power or an electric signal to the electro-optical elements; wherein
  - at least three effective optical regions, among the plurality of effective optical regions, are in contact directly or through a portion of the wiring region
  - 10 with a non-effective optical region where the electro-optical elements are not provided.
2. The electro-optical device according to claim 1, wherein the plurality of effective optical regions include:
  - 15 a plurality of first effective optical regions provided with a first electro-optical element; and
  - a plurality of second effective optical regions provided with a second electro-optical element; and
  - the non-effective optical region is interposed between two of the first effective optical regions among the plurality of first effective optical regions,
  - 20 and simultaneously interposed between two of the second effective optical regions among the plurality of second effective optical regions.
3. An electro-optical device, comprising:
  - 25 a plurality of first effective optical regions provided with a first electro-optical element;
  - a plurality of second effective optical regions provided with a second electro-optical element; and
  - a plurality of non-effective optical regions in which electro-optical
  - 30 elements are not provided; wherein
  - each of the plurality of non-effective optical regions is interposed between two first effective optical regions of the plurality of first effective optical

regions and simultaneously interposed between two second effective optical regions of the plurality of second effective optical regions.

4. The electro-optical device according to claim 2 or claim 3, wherein  
5 the first effective optical regions or the second effective optical regions are not arranged to be mutually adjacent.

5. The electro-optical device according to any one of claims 2 to 4, wherein  
10 the first effective optical region and the second effective optical region have the same shape.

6. The electro-optical device according to any one of claims 2 to 5, wherein an anti-reflection member is formed in the non-effective optical region.

15 7. The electro-optical device according to any one of claims 2 to 6, wherein both the plurality of first effective optical regions and the plurality of second effective optical regions have an electronic circuit for driving the electro-optical elements formed in the first effective optical region and the second effective optical region.

20 8. The electro-optical device according to any one of claims 2 to 6, wherein of the plurality of first effective optical regions and second effective optical regions, at least one of the first effective optical regions and the second effective optical regions has an electronic circuit for driving the electro-optical  
25 elements provided on the other of the first effective optical regions and the second effective optical regions.

9. The electro-optical device according to any one of claims 2 to 6, wherein  
30 the non-effective optical region has an electronic circuit for driving the electro-optical elements formed on at least one of the first effective optical regions and the second effective optical regions, of the first effective optical regions and the second effective optical regions.

10. The electro-optical device according to any one of claims 7 to 9, wherein at least one effective optical region among the plurality of effective optical regions is in contact with a non-effective optical region where the electronic circuit is not provided below an electrode thereof or the electrode is not provided above the electronic circuit.
11. The electro-optical device according to any one of claims 7 to 10, wherein
- each pixel is arranged and formed corresponding to an intersection of a plurality of scanning lines and a plurality of data lines; and
- the electronic circuit drives the electro-optical elements based on a scanning signal from the scanning lines and a data signal from the data lines.
12. The electro-optical device according to claim 11, the electronic circuit comprising:
- a first transistor that conducts and supplies a data signal;
- a capacitor element that holds the data signal supplied via the first transistor, as a charge; and
- a second transistor where a conduction state is controlled based on the amount of charge held in the capacitor element, and which supplies an amount of current corresponding to the conduction state to the electro-optical element.
13. The electro-optical device according to any one of claims 2 to 12, wherein
- the first electro-optical element and the second electro-optical element are two electro-optical elements selected from electro-optical elements that emit green light, blue light, and red light, respectively.
14. The electro-optical device according to any one of claims 2 to 13, wherein

each of the first electro-optical elements and the second electro-optical elements is an EL element.

15. The electro-optical device according to claim 14, wherein  
5 a light-emitting layer of the EL element is composed of an organic material.
16. An electro-optical device, comprising on a substrate:  
a plurality of first light emitting regions on which a first light emitting film  
10 is formed;  
a plurality of second light emitting regions on which a second light emitting film is formed; and  
a plurality of non-light-emitting regions on which the light-emitting film is not formed; wherein  
15 each of the plurality of non-light-emitting regions is interposed between two first light-emitting regions of the plurality of first light-emitting regions, and simultaneously interposed between two second light-emitting regions of the plurality of second light-emitting regions.
- 20 17. The electro-optical device according to claim 16, wherein the first light-emitting films or the second light-emitting films are provided so as to be mutually adjacent.
18. The electro-optical device according to claim 16 or 17, wherein  
25 the first light-emitting region and the second light-emitting region have the same shape.
19. The electro-optical device according to any one of claims 16 to 18, wherein  
30 an anti-reflection member is formed in the non-light-emitting region.

20. The electro-optical device according to any one of claims 16 to 19,  
wherein  
an electronic circuit that controls light emission of the first light-emitting  
film and the second light-emitting film is formed in each of the first light-emitting  
5 regions and the second light-emitting regions.
21. The electro-optical device according to any one of claims 16 to 19,  
wherein  
of the first light-emitting regions or second light emitting regions, at least  
10 one of the first light-emitting regions and the second light-emitting regions is  
provided with an electronic circuit for controlling light emission of the first light-  
emitting film or the second light-emitting film formed on the other of the first  
light-emitting region and the second light-emitting region.
- 15 22. The electro-optical device according to any one of claims 16 to 19,  
wherein  
the non-light-emitting region includes an electronic circuit that controls  
light emission in the first light-emitting film and second light-emitting film  
formed in at least one first light-emitting region and second light-emitting  
20 region, of the first and second light emitting regions.
23. The electro-optical device according to any one of claims 16 to 22,  
wherein  
each pixel is arranged and formed corresponding to an intersection of  
25 a plurality of scanning lines and a plurality of data lines; and  
the electronic circuit of each pixel controls the light emission of the first  
light emitting film or the second light emitting film based on a scanning signal  
from the scanning lines and a data signal from the data lines.
- 30 24. The electro-optical device according to any one of claims 16 to 23,  
wherein

the first light emitting film and the second light emitting film are two light emitting films selected from light emitting films that emit green light, blue light, and red light, respectively.

5     25.    The electro-optical device according to any one of claims 16 to 24, wherein

        both of the first light-emitting films and the second light-emitting films are made of an organic material.

10    26.    An active matrix substrate, comprising:

        a plurality of element forming regions provided with electrodes for connecting to electronic elements on a substrate; and

        a wiring region provided with wiring for supplying various electric signals to the electronic elements via the electrode; wherein

15          at least three element forming regions among the plurality of element forming regions are in contact directly or through a part of the wiring region with a non-element forming region in which electronic elements are not formed.

27.    An active matrix substrate, comprising on a substrate:

20          a plurality of first element forming regions where the first electro-optic elements are formed;

        a plurality of second element forming regions where the second electro-optic elements are formed; and

25          a plurality of non-element forming regions in which electro-optical elements are not formed; wherein

        each of the plurality of non-element forming regions is interposed between two first element forming regions of the plurality of first element forming regions, and simultaneously interposed between two second element forming regions, of the plurality of second element forming regions.

30

28.    The active matrix substrate according to claim 26 or 27, wherein

        an anti-reflection member is formed in the non-element forming region.

29. The active matrix substrate according to claim 27 or 28, wherein  
an electronic circuit that drives the first electro-optical elements and the  
second electro-optical elements formed on each of the first element forming  
5 regions and the second element forming regions is formed in each of the first  
element forming regions and the second element forming regions.
30. The active matrix substrate according to claim 27 or 28, wherein  
an electronic circuit for driving the electro-optical elements formed in  
10 the other of the first element forming region and the second element forming  
region is formed in at least one of the first element forming regions and the  
second element forming regions, of the first element forming regions and the  
second element forming regions.
- 15 31. The active matrix substrate according to claim 27 or 28, wherein  
an electronic circuit that drives the electro-optical elements formed on  
at least one of the first element forming regions and the second element  
forming region of the first element forming regions and second element forming  
region is formed on the non-element-forming region.  
20
32. An electronic apparatus, comprising: the electro-optical device  
according to any one of claims 1 to 25.
33. An electronic apparatus, achieved by mounting the active matrix  
25 substrate according to any one of Claims 26 to 31.

## Search report

### Bibliographic items

|                                       |                                        |
|---------------------------------------|----------------------------------------|
| Registered research organization name | Industrial Property Cooperative Center |
| Registered search organization code   | 001                                    |

|                                |                                             |                                                                                            |      |
|--------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------|------|
| Supervisor's Name              | HARIYA Masato                               | Supervisor's code                                                                          | L106 |
| Searcher's name                | OBITSU Kohei                                | Searcher's code                                                                            | KN11 |
| Record type                    | 161                                         |                                                                                            |      |
| Theme code                     | 5C094                                       |                                                                                            |      |
| Patent application number      | Japanese Patent Application No. 2002-348622 |                                                                                            |      |
| Outsource control number       | 2006117049                                  |                                                                                            |      |
| Delivery type                  | 1                                           | 1: Delivered product 2: Interactive type (domestic) 3 : Interactive type (foreign country) |      |
| Interaction date               |                                             |                                                                                            |      |
| Initial evaluation designation | 1                                           | 1: Normal 2: Initial evaluation                                                            |      |
| Search date                    | Jan. 26, 2007                               |                                                                                            |      |
| Search report creation date    | Jan. 29, 2007                               |                                                                                            |      |
| Summary type                   | None                                        |                                                                                            |      |

### 1. FEATURES OF THE INVENTION

Figure number showing features of the present invention: 3 Figure

#### Features of Present Invention

#### Configuration

- See the Appendix, Claims of the specification of the present application.

#### Effects

- Anisotropy of visibility occurring in the column direction and the row direction of the display panel unit can be reduced, so distortion of an image can be suppressed.
- Occurrence of color unevenness in the column direction and the row direction can be suppressed. Therefore, the display quality of the display device can be improved.

## 2. Search logic expression

Year / month range: Year / month / day to November 29, 2002

| No. | Claim No. | Theme Code   | Search Logical Expression                                                                                                                                                                                                                    | Number of Cases |
|-----|-----------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1   | 1-33      | 5C094        | [G09F9 / 30390 @ C + CA20] * BA27                                                                                                                                                                                                            | 168             |
| 2   | 1-33      | 5C094        | [G09F9 / 30390 @ C + CA20] * Dummy / TX - ¥ 01                                                                                                                                                                                               | 13              |
| 3   | 1-33      | 5C094        | (Dummy pixel + pseudo pixel) / TX - ¥ 01 - ¥ 02                                                                                                                                                                                              | 95              |
| 4   | 1-33      | 5C094        | [G09F9 / 30390 @ C + CA20] * AA03 - ¥ 01 - ¥ 02 - ¥ 03                                                                                                                                                                                       | 88              |
| 5   | 1-33      | 5C094        | [G09F9 / 30390 @ C + CA20] * AA08 - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04                                                                                                                                                                                | 141             |
| 6   | 1-33      | 5C094        | [G09F9 / 30390 @ C + CA20] * AA06 - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05                                                                                                                                                                         | 63              |
| 7   | 1-33      | 5C094        | [G09F9 / 30390 @ C + CA20] * (disabled + hidden) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06                                                                                                                                              | 16              |
| 8   | 1-33      | 5C094        | [G09F9 / 30390 @ C + CA20] * (horizontal + vertical) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07                                                                                                                                   | 143             |
| 9   | 1-33      | 5C094        | EA04 * BA27 * (dummy + pseudo) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08                                                                                                                                                  | 83              |
| 10  | 1-33      | 5C094        | EA04 * BA27 * (dummy + pseudo) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09                                                                                                                                           | 245             |
| 11  | 1-33      | 5C094        | EA04 * BA27 * (disabled + hidden) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10                                                                                                                                 | 60              |
| 12  | 1-33      | 5C094        | EA04 * AA03 * ([disabled + hidden] * [arrangement + array]) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11                                                                                                | 38              |
| 13  | 1-33      | 5C094        | EA04 * ([disabled + hidden] * [arrangement + array]) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12                                                                                                | 187             |
| 14  | 1-33      | 5C094        | [BA12 + CA24] * ([disabled + hidden] * [arrangement + array]) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13                                                                                | 132             |
| 15  | 1-33      | 5C094        | BA03 * BA27 * [BA12 + CA24] * DB01 * ([arrangement + array]) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14                                                                          | 148             |
| 16  | 1-33      | 5C094        | BA03 * BA27 * [BA12 + CA24] * DB01 - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15                                                                                                  | 29              |
| 17  | 1-33      | 5C094        | BA03 * BA27 * [BA12 + CA24] * Sanyo Electric / AP                                                                                                                                                                                            | 44              |
| 18  | 1-33      | 5C094        | ([disable + hidden] * [arrangement + array] * [pixel + picture element]) / TX * [AA03 03 + AA08 + AA06] - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15 - ¥ 16 - ¥ 17               | 58              |
| 19  | 1-33      | 5C094        | ([disable + hidden] * [arrangement + array] * [pixel + picture element]) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15 - ¥ 16 - ¥ 17 - ¥ 18                                  | 174             |
| 20  | 1-33      | 3X007, 3K107 | (Dummy, 5C, Pixel + Pseudo, 5C, Pixel) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15 - ¥ 16 - ¥ 17 - ¥ 18 - ¥ 19                                                             | 40              |
| 21  | 1-33      | 3X007, 3K107 | ([disable + hidden] * [arrangement + array] * [pixel + picture element]) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15 - ¥ 16 - ¥ 17 - ¥ 18 - ¥ 19 - ¥ 20                    | 137             |
| 22  | 1-33      | 3X007, 3K107 | BA06 * AB17 * ([dummy + pseudo] * [arrangement + array] * [pixel + picture element]) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15 - ¥ 16 - ¥ 17 - ¥ 18 - ¥ 19 - ¥ 20 - ¥ 21 | 96              |
| 23  | 1-33      | 3X007, 3K107 | BA06 * ([dummy + pseudo] * [arrangement + array] * [pixel + picture element]) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15 - ¥ 16 - ¥ 17 - ¥ 18 - ¥ 19 - ¥ 20 - ¥ 21 - ¥ 22 | 205             |
| 24  | 1-33      | 3X007, 3K107 | ([dummy + pseudo] * [arrangement + array] * [pixel + picture element]) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15 - ¥ 16 - ¥ 17 - ¥ 18 - ¥ 19 - ¥ 20 - ¥ 21 - ¥ 22 - ¥ 23 | 79              |
| 25  | 1-33      | 3X007, 3K107 | AB17 * ([arrangement + array] * [pixel + picture element]) / AB - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15 - ¥ 16 - ¥ 17 - ¥ 18 - ¥ 19 - ¥ 20 - ¥ 21 - ¥ 22 - ¥ 23 - ¥ 24      | 136             |

|    |      |       |                                                                                                                                                                                                                                  |    |
|----|------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 26 | 1-33 | 2H092 | [AA14 + GA20] * ((dummy + disable + hidden)) / TX - ¥ 01 - ¥ 02 - ¥ 03 - ¥ 04 - ¥ 05 - ¥ 06 - ¥ 07 - ¥ 08 - ¥ 09 - ¥ 10 - ¥ 11 - ¥ 12 - ¥ 13 - ¥ 14 - ¥ 15 - ¥ 16 - ¥ 17 - ¥ 18 - ¥ 19 - ¥ 20 - ¥ 21 - ¥ 22 - ¥ 23 - ¥ 24 - ¥ 25 | 79 |
|----|------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|

Total number of screenings: 2697

### 3. Result of screening search (display for each presented document)

| No. | Type of Submitted Document | Type of Interactive Additional Document | Presentation Document                              | Representative Category | Formula No. |
|-----|----------------------------|-----------------------------------------|----------------------------------------------------|-------------------------|-------------|
| 1   | Patent Document            |                                         | Japanese Unexamined Patent Application H11-185654  | X                       | 12          |
| 2   | Patent Document            |                                         | Japanese Unexamined Patent Application H02-077785  | A                       | 4           |
| 3   | Patent Document            |                                         | Japanese Unexamined Patent Application 2001-109399 | A                       | 17          |

[0005] [Number of presented documents]: 3

### 4. Results of screening search (format by claim)

| Claim No. | Document No.          | Category | Related Part          | Differences from the Invention of the Present Application and Undiscovered Configurations |
|-----------|-----------------------|----------|-----------------------|-------------------------------------------------------------------------------------------|
| 1         | Present application   |          |                       | a1, a2, a3, a4, a5                                                                        |
|           | 1                     | A        | D29, 36, F1-5         | *, *, a3', *, *<br>a3': not described                                                     |
| 2         | Present application   |          |                       | cl1', b1, b2, b3, b4                                                                      |
|           | 1                     | A        | D29, 36, F1-5         | cl1', *, *, *                                                                             |
| 3         | Present application   |          |                       | c1, c2, c3, c4, c5, c6                                                                    |
|           | 1                     | X        | D29, 36, F1-5         | *, *, *, *, *                                                                             |
| 4         | Present application   |          |                       | cl2 + cl3, d                                                                              |
|           | 1                     | X        | D29, 36, F1-5         | cl2'+*, *                                                                                 |
| 5         | Present application   |          |                       | cl2/cl4, e                                                                                |
|           | 1                     | X        | D29, 36, F1-5         | cl2'/*, *                                                                                 |
| 6         | Present Application 2 | A        | P2, F1                | cl2/cl5, f<br>cl2' / cl5', *                                                              |
| 7         | Present application   |          |                       | cl2/cl6, g                                                                                |
|           | 3                     | A        | D5 – 6, 32 - 33, F1-5 | cl2' / cl6', *                                                                            |
| 8         | Present application   |          |                       | cl2/cl6, h<br>Could not be found.                                                         |
| 9         | Present application   |          |                       | cl2/cl6, i<br>Could not be found.                                                         |
| 10        | Present application   |          |                       | cl7/cl9, j1, j2<br>Could not be found.                                                    |
| 11        | Present application   |          |                       | cl7/cl10, k1, k2                                                                          |
|           | 3                     | A        | D5 – 6, 32 - 33, F1-5 | cl7' / cl10', *, *                                                                        |
| 12        | Present application   |          |                       | cl11, l1, l2, l3                                                                          |
|           | 3                     | A        | D5 – 6, 32 - 33, F1-5 | cl11', *, *, *                                                                            |
| 13        | Present application   |          |                       | cl2/cl12, m                                                                               |
|           | 3                     | A        | D5 – 6, 32 - 33, F1-5 | cl2' / cl12', *                                                                           |
| 14        | Present application   |          |                       | cl2/cl13, n                                                                               |
|           | 3                     | A        | D5 – 6, 32 - 33, F1-5 | cl2' / cl13', *                                                                           |
| 15        | Present application   |          |                       | cl14, o                                                                                   |
|           | 3                     | A        | D5 – 6, 32 - 33, F1-5 | cl14', *                                                                                  |
| 16        | Present application   |          |                       | p1, p2, p3, p4, p5, p6                                                                    |
|           | 1                     | Y        | D29, 36, F1-5         | *, *, p3', *, *, *<br>p3': not described                                                  |
| 17        | Present application   |          |                       | cl16, q                                                                                   |

|    |                       |   |                          |                                               |
|----|-----------------------|---|--------------------------|-----------------------------------------------|
|    | 1                     | Y | D29, 36, F1-5            | cl16', *                                      |
| 18 | Present application   |   |                          | cl16 + cl17, r                                |
|    | 1                     | Y | D29, 36, F1-5            | cl16' + cl17', *                              |
| 19 | Present Application 2 | A | P2, F1                   | cl16/cl18, s<br>cl16' / cl18', *              |
| 20 | Present Application 3 | A | D5 – 6, 32 -<br>33, F1-5 | cl16/cl19, t<br>cl16' / cl19', *              |
| 21 | Present application   |   |                          | cl16/cl19, u<br>Could not be found.           |
| 22 | Present application   |   |                          | cl16/cl19, v<br>Could not be found.           |
| 23 | Present Application 3 | A | D5 – 6, 32 -<br>33, F1-5 | cl16/cl22, w1, w2<br>cl16' / cl22', *, *      |
| 24 | Present Application 3 | A | D5 – 6, 32 -<br>33, F1-5 | cl16 / cl23, A<br>cl16' / cl23', *            |
| 25 | Present Application 3 | A | D5 – 6, 32 -<br>33, F1-5 | cl16/cl24, B<br>cl16' / cl24', *              |
| 26 | Present application   |   |                          | C1, C2, C3, C4, C5<br>Could not be found.     |
| 27 | Present application   |   |                          | D1, D2, D3, D4, D5, D6<br>Could not be found. |
| 28 | Present Application 2 | A | F2, F1                   | cl26/cl27, E<br>cl26' / cl27', *              |
| 29 | Present Application 3 | A | D5 – 6, 32 -<br>33, F1-5 | cl27/cl28, F<br>cl27' / cl28', *              |
| 30 | Present application   |   |                          | cl27/cl28, G<br>Could not be found.           |
| 31 | Present application   |   |                          | cl27/cl28, H<br>Could not be found.           |
| 32 | Present application   |   |                          | cl1/cl25, I<br>Design matters                 |
| 33 | Present application   |   |                          | cl26/cl31, J<br>Design matters                |

5. Remarks (for searcher)

## TRANSLATOR CERTIFICATION

Date: February 8, 2023

To whom it may concern:

I, Dwaine Palmer, a translator fluent in the Japanese and English languages, on behalf of Morningside Translations, do solemnly and sincerely declare that the following is, to the best of my knowledge and belief, a true and correct translation of the document(s) listed below in a form that best reflects the intention and meaning of the original text.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

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Signature

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