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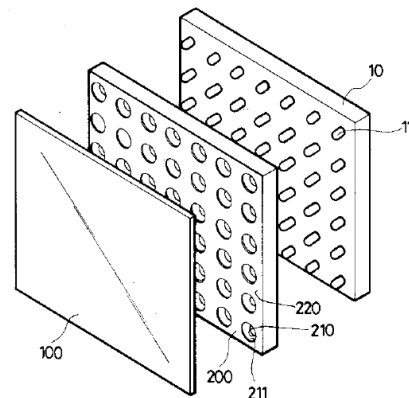
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(54) ELECTRONIC DISPLAY BOARD FOR INDICATION EQUIPMENT

(57) Abstract

The present invention relate to an electronic display board, and more particularly, to an electronic display board for indication equipment, which allows viewers to identify advertising copies even from the side or front of the electronic display board, which is installed in subways, buses, banks, hospitals, public offices, etc. and displays words, numbers, symbols, etc. by using light emitting diode (LED) lamps to provide a variety of information or locations and procedures, and prevents viewers from feeling eye strain while viewing for a long time. The electronic display board for the indication equipment includes: a light collection panel which has a plurality of insertion holes to be installed on a front surface of an LED substrate on which a plurality of LED lamps are installed at predetermined intervals; a coating layer which is coated to prevent light of the LED lamps, which are instead into the plurality of insertion holes and emit light, from being distributed to other surfaces of the light collection panel; and a screen which is installed on a front surface of the light collection panel to sharply and clearly display light of the LED lamps that is collected through the light collection panel. It is possible to install and use the light collection panel and the screen without modifying an existing electronic display board, and when a new electronic display board is manufactured and used, the manufacturing process can be simplified and the manufacturing cost can be reduced, and advertising copies of advertisements displayed through the electronic display board can be identified even from the front and the side.

Main Figure-FIG. 1



Keywords: light collection panel, screen, LED lamp, advertisement

Claims

1. An electronic display board for indication equipment provided with a light emitting diode (LED) substrate having a plurality of LED lamps mounted thereon, the electronic display board for the indication equipment comprising:

a light collection panel which has a plurality of insertion holes to be installed on a front surface of the LED substrate on which the plurality of LED lamps are installed at predetermined intervals;

a coating layer which is coated to prevent light of the LED lamps, which are instead into the plurality of insertion holes and emit light, from being distributed to other surfaces of the light collection panel; and

a screen which is installed on a front surface of the light collection panel to sharply and clearly display light of the LED lamps that is collected through the light collection panel.

2. The electronic display board for the indication equipment of claim 1, wherein a coating layer is formed on an inner surface of the insertion hole of the light collection panel to allow the light of the LED lamp to be reflected and collected.

3. The electronic display board for the indication equipment of claim 1, wherein the same number of the light collection panels as the number of LED lamps installed on the LED substrate are formed to allow the LED lamps to be inserted thereinto.

4. The electronic display board for the indication equipment of claim 1, wherein the insertion hole formed in the light collection panel is formed in such a shape that the insertion hole becomes gradually narrower toward a lower side, and comprises: an inclined surface formed with a predetermined angle from a lower end toward an upper end; a first vertical surface formed downward from one side of the inclined surface; and a second vertical surface formed upward from one side of the inclined surface.

5. The electronic display board for the indication equipment of claim 1, wherein the insertion hole formed in the light collection panel is formed to have the same angle as a look angle of the LED lamp.

6. The electronic display board for the indication equipment of claim 1, wherein the insertion hole of the light collection panel is formed in such a shape that the insertion hole becomes gradually narrower toward a lower side, and has a predetermined angle from the lower end of the light collection panel to the upper end and is formed in an inverted cone shape.

7. The electronic display board for the indication equipment of claim 1, wherein the insertion hole of the light collection panel is formed to have an upper portion and a lower portion which have the same size, and has a coating layer formed along an inner surface thereof.

8. The electronic display board for the indication equipment of claim 1, wherein the screen is formed to be opaque by processing a surface of the screen by using sandpaper, and forming an unevenness that is not identified by naked eyes on an upper end surface by coating the processed surface with a lusterless solution, and the screen is configured to prevent light from spreading when light is emitted from the LED lamp.

Specification

Title of the Invention

ELECTRONIC DISPLAY BOARD FOR INDICATION EQUIPMENT

Brief Description of the Drawings

[0001] FIG. 1 is an exploded perspective view illustrating an electronic display board for indication equipment according to the present invention.

[0002] FIG. 2 is a combined cross-sectional view of the electronic display board for the indication equipment according to the present invention.

[0003] FIG. 3 is a cross-sectional view illustrating radiation angles of light emitting diode (LED) light according to the present invention.

[0004] FIG. 4 is an enlarged cross-sectional view of main parts of a light collection panel according to the present invention.

[0005] FIGS. 5A, 5B, 5C are views showing photos for comparison to show an application example of the present invention.

[0006] FIG. 6 is an exploded perspective view illustrating an example of a module for a related-art electronic display board.

[0007] FIG. 7 is a cross-sectional view illustrating radiation angles of light of LEDs installed in a related-art electronic display board.

[0008] *Explanation of Signs for Main Parts in the Drawings

[0009] 100: screen 110: unevenness

[0010] 200: light collection panel 210: insertion hole

[0011] 211: inclined surface 212: first vertical surface

[0012] 213: second vertical surface 220, 230: coating layer

Detailed Descriptions of the Invention

[0013] The present invention relates to an electronic display board, and more particularly, to an electronic display board for indication equipment, which allows viewers to identify advertising copies even from the side or front of an electronic display board, which is installed in subways, buses, banks, hospitals, public offices, etc. and displays words, numbers, symbols, etc. by using light emitting diode (LED) lamps to provide a variety of information or locations and procedures, and prevents viewers from feeling eye strain while viewing for a long time.

[0014] Typically, light emitting diode (LED) lamps are used to express letters, characters, numbers, etc. to convey advertisements, slogans, news, and

monochromatic LEDs may be regularly arranged or LED lamps of three colors (red, green, blue) may be used to express various colors.

- [0015]** A related-art electronic display board which has monochromatic LEDs regularly arranged therein to express various characters, numbers, or letters may be configured as shown in the drawing, and FIG. 6 is an exploded perspective view showing an example of a module for a related-art electronic display board, and FIG. 7 is a cross-sectional view illustrating look angles of light of LED lamps installed in the related-art electronic display board.
- [0016]** As shown in FIG. 6, the module for the related-art electronic display board may include an LED substrate 10 which has a plurality of LED lamps 11 regularly arranged on the front surface thereof, a case 30 which accommodates and supports the LED substrate 10, a sun screen 20 of a grid shape which is coupled to the front surface of the case 30 with an insulating resin (not shown) to prevent light from being projected onto the LED lamps 11, and a driver substrate 40 which is attachable to or detachable from the LED substrate 10 on the rear surface of the case 30, and controls operations of the LED lamps 11.
- [0017]** The related-art electronic display board configured as described above may use only straightness of light, which is one of the characteristics of the LED lamps 11, to express words, letters, numbers, etc. However, contents may be exactly identified only from the front due to light emitted through the LED lamps 11, and, when a viewer views the electronic display board from the side, there is a problem that the viewer cannot identify words, letters, numbers, etc. of the electronic display board because light of the LED lamps 11 having angles as shown in FIG. 7 has strong straightness.
- [0018]** If a viewer views from the front for a predetermined time, the viewer may not continue to view the electronic display board due to the light of the LED lamps 11 having strong straightness of light. This is because the strong straightness of light makes the viewer feel eye strain and have difficulty in continuing to view. Accordingly, there is another problem that the advertising effect is degraded.
- [0019]** The present invention has been developed to solve the above-described problems, and an object of the present invention is to provide an electronic display board for indication equipment which is installed in subways, buses, banks, hospitals, public offices, etc. and displays words, numbers, symbols, etc. by using light emitting diode (LED) lamps to provide a variety of information or locations and procedures, and which prevents viewers from feeling eye strain even when viewing the electronic display board from the side or front for a long time.
- [0020]** Another object of the present invention is to provide an electronic display board which can achieve more efficient effects than a related-art electronic display

board by using a small number of LED lamps, and can achieve effects of cost reduction, simplified production process through a shortened workflow.

- [0021]** Still another object of the present invention is to provide an electronic display board which can prevent a viewer from feeling eye strain by collecting light of LED lamps without modifying a configuration of a related-art electronic display board, and can transmit luminous light.
- [0022]** To achieve the above-described object, there is provided an electronic display board for indication equipment provided with a light emitting diode (LED) substrate having a plurality of LED lamps mounted thereon, the electronic display board for the indication equipment including:
- [0023]** a light collection panel which has a plurality of insertion holes to be installed on a front surface of the LED substrate on which the plurality of LED lamps are installed at predetermined intervals; a coating layer which is coated to prevent light of the LED lamps, which are instead into the plurality of insertion holes and emit light, from being distributed to other surfaces of the light collection panel; and a screen which is installed on a front surface of the light collection panel to sharply and clearly display light of the LED lamps that is collected through the light collection panel.
- [0024]** In addition, according to the present invention, a coating layer may be formed on an inner surface of the insertion hole of the light collection panel to allow the light of the LED lamp to be reflected and collected.
- [0025]** In addition, according to the present invention, the same number of the light collection panels as the number of LED lamps installed on the LED substrate may be formed to allow the LED lamps to be inserted thereinto.
- [0026]** In addition, according to the present invention, the insertion hole formed in the light collection panel may be formed in such a shape that the insertion hole becomes gradually narrower toward a lower side, and may include: an inclined surface formed with a predetermined angle from a lower end toward an upper end; a first vertical surface formed downward from one side of the inclined surface; and a second vertical surface formed upward from one side of the inclined surface.
- [0027]** In addition, according to the present invention, the insertion hole formed in the light collection panel may be formed to have the same angle as a look angle of the LED lamp.
- [0028]** In addition, according to the present invention, the insertion hole of the light collection panel may be formed in such a shape that the insertion hole becomes gradually narrower toward a lower side, and may have a predetermined angle from the lower end of the light collection panel to the upper end and may be formed in an inverted cone shape.

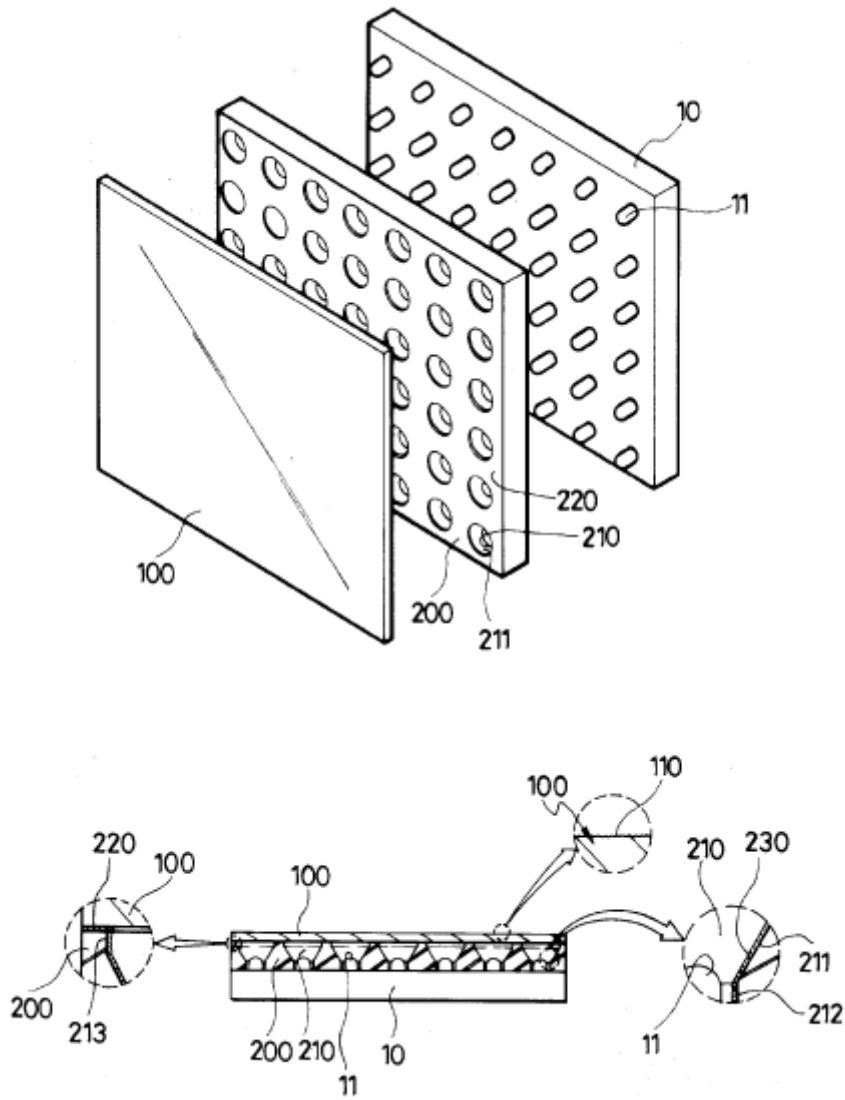
- [0029]** In addition, according to the present invention, the insertion hole of the light collection panel may be formed to have an upper portion and a lower portion which have the same size, and may have a coating layer formed along an inner surface thereof.
- [0030]** In addition, according to the present invention, the screen may be formed to be opaque by processing a surface of the screen by using sandpaper, and forming an unevenness that is not identified by naked eyes on an upper end surface by coating the processed surface with a lusterless solution, and the screen may prevent light from spreading when light is emitted from the LED lamp.
- [0031]** Hereinafter, a configuration of an electronic display board for indication equipment according to the present invention will be described in detail with reference to the accompanying drawings. In the drawings, the same reference numerals may be used for the same elements as those of the related-art electronic display board.
- [0032]** FIG. 1 is an exploded perspective view illustrating a structure of an electronic display board for indication equipment, FIG. 2 is a combined cross-sectional view of the electronic display board for the indication equipment according to the present invention, FIG. 3 is a cross-sectional view illustrating radiation angles of LED light according to the present invention, and FIG. 4 is an enlarged cross-sectional view of main parts of a light collection panel according to the present invention.
- [0033]** As shown in FIGS. 1 to 4, the electronic display board for the indication equipment according to the present invention includes an LED substrate 10 having a plurality of LED lamps 11 mounted thereon.
- [0034]** The LED substrate 10 on which the plurality of LED lamps 11 are installed at predetermined intervals is provided, and a light collection panel 200 is installed on the front surface of the LED substrate 10. The light collection panel 200 has the same number of insertion holes 210 as the number of LED lamps 11.
- [0035]** The insertion hole 210 is formed in such a shape that it becomes gradually narrower toward a lower side, and has an inclined surface 211 which has a predetermined angle from a lower portion toward an upper portion of the light collection panel 200, a first vertical surface 212 which is formed from one side of the inclined surface 211 toward a lower end of the light collection panel 200, and a second vertical surface 213 which is formed from one side of the inclined surface 211 toward an upper end of the light collection panel 200.
- [0036]** In addition, the inclined surface 211 formed on the insertion hole 210 of the light collection panel 200 is formed with the same angle as the look angle of the LED lamp 11, and the LED lamp 11 having a plurality of look angles may

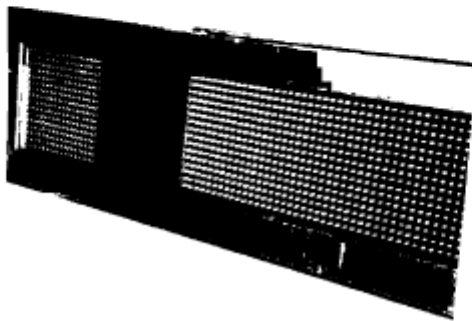
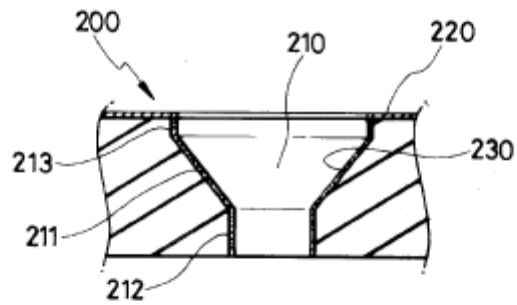
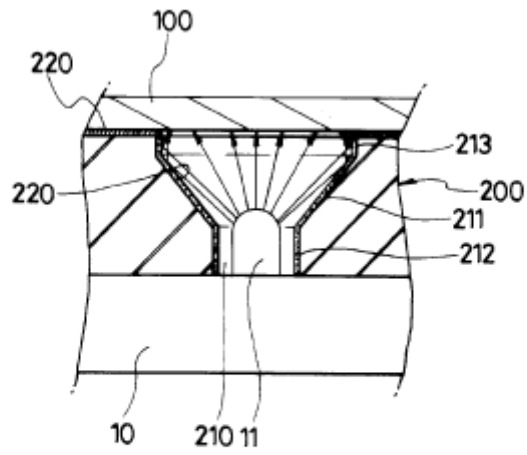
be used, but typically, the LED lamp 11 having a look angle from 15 degrees to 35 degrees may be used.

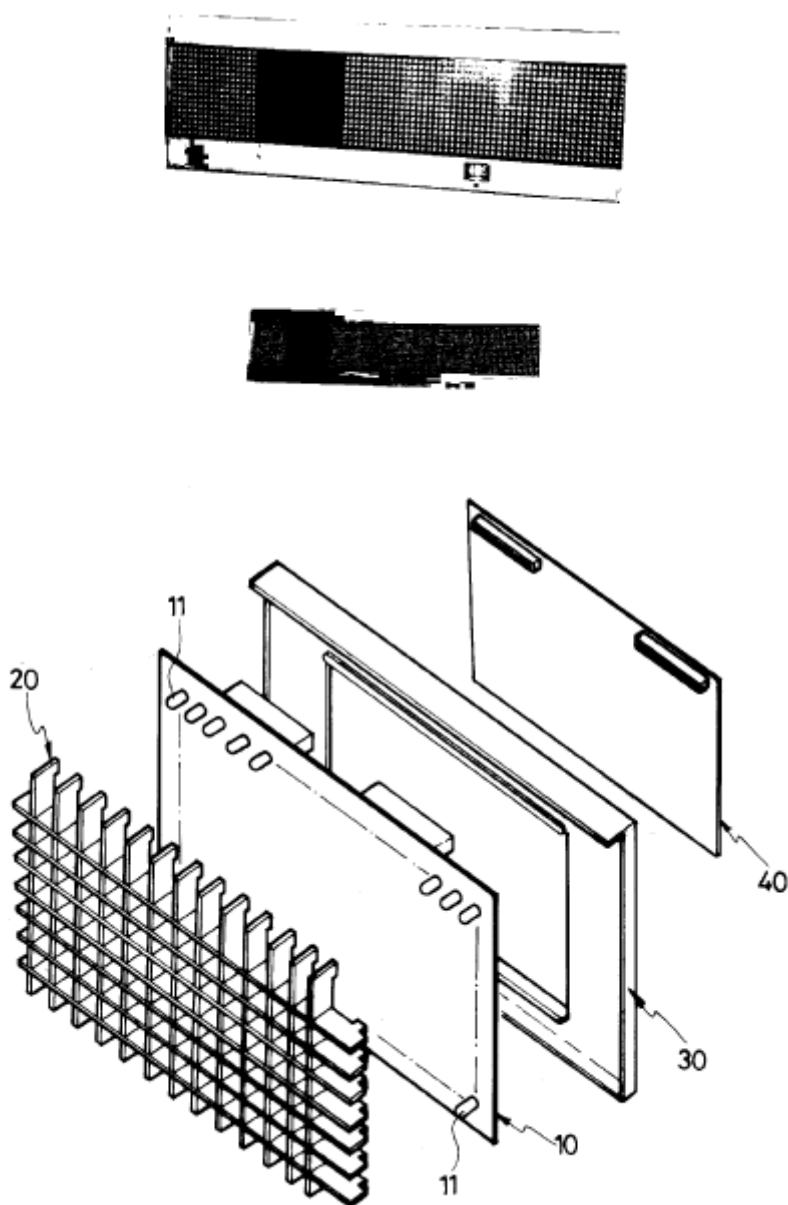
- [0037]** A coating layer 230 is formed on an inner surface of the insertion hole 210 to allow light of the LED lamp 11 installed on the LED substrate 10 to be smoothly reflected.
- [0038]** In addition, a coating layer 220 is formed on the upper end of the light collection panel 200 to prevent of light of the LED lamp 11, which is inserted into the insertion hole 210 to emit light, from spreading.
- [0039]** A translucent screen 100 is installed on the front surface of the light collection panel 200 to prevent light emitted from the LED lamp 11 from spreading.
- [0040]** The upper end of the screen 100 is coated with a lusterless solution to prevent spreading of light of the LED lamp 11 while maintaining the translucent state of the screen 100, and a fine unevenness 110 which is formed in an opaque state by the lusterless solution and is not identified by naked eyes because it is processed by sandpaper before being coated with the lusterless solution is formed to prevent light of the LED lamp 110 from spreading.
- [0041]** Operating effects of the electronic display board for the indication equipment configured above according to the present invention will be described.
- [0042]** First, the workflow of the electronic display board for indication equipment according to the present invention involves installing the plurality of LED lamps 11 on the LED substrate 10 at predetermined intervals. The light collection panel 200 having the same size as the LED substrate 10 on which the LED lamps 11 are installed is provided, and the coating layer 230 is coated over the surface of the upper end to prevent light of the LED lamp 11 from spreading to other parts.
- [0043]** The same number of insertion holes 210 as the number of LED lamps 11 installed on the LED substrate 10 are formed on the light collection panel 200 at the same intervals.
- [0044]** When the insertion holes 210 are formed, the second vertical surface 212 is formed to form a predetermined depth on the bottom of the light collection panel 200, and the inclined surface 211 extending from the second vertical surface 212 is formed. In this case, the inclined surface is formed to have the same angle as the look angle of the LED lamp 11.
- [0045]** When the look angle of the LED lamp 11 is 20 degrees, the inclined surface 211 may be formed to have a slope of 20 degrees, and, when the look angle of the LED lamp 11 is 30 degrees, the inclined surface 211 may be formed to maintain the angle of 30 degrees.

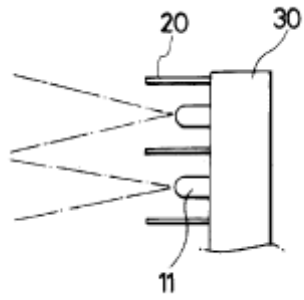
- [0046]** The second vertical surface 213 extending from the inclined surface 211 in the upward direction of the light collection panel 200 is formed to collect light emitted from the LED lamp 11.
- [0047]** The screen 100 which is installed on the front surface of the light collection panel 200 after the insertion holes 210 are formed on the light collection panel 200 is formed to be opaque by processing an acrylic transparent surface by using fine sandpaper, and forming the fine unevenness 110 that is not identified by naked eyes on the surface by coating the processed surface with the lusterless solution, so that light of the LED lamp 11 shines clearly on the surface of the screen 100.
- [0048]** As shown in the photos for comparison represented in FIGS. 5A, 5B, 5C, light shines on the screen when viewed from the front or side, so that viewers can clearly identify advertising copies, letters, symbols of advertisements even when viewing the electronic display board from the side, and may feel less eye strain, and simultaneously, the electronic display board more softly expresses the advertising copies, letters, symbols of the advertisements compared to a related-art electronic display board, and the effect of the advertisement can be maximized.
- [0049]** As described above, light of the LED lamps 11 installed on the LED substrate 10 is collected, so that the number of LED lamps 11 can be reduced to about 1/2 to 3/5 of the number of LED lamps 11 installed in the prior art, and there is an advantage that an advertisement that is only identified when it is viewed from the front of an electronic display board can be identified even when viewed from the side.
- [0050]** In addition, the light collection panel 200 and the screen 100 may be installed in an existing LED electronic display board without having to manufacture a separate case, so that the burden of additional costs can be reduced.
- [0051]** A newly produced and used electronic display board may have the number of LED lamps 11 reduced to about 1/2 to 3/5 of those of an existing electronic display board, so that the manufacturing cost can be remarkably reduced compared to other electronic display boards, and there are advantages that the configuration of the driver substrate 40 can be simplified due to the reduced number of LED lamps 11, and that, even if there is a break down during use, it is easy to repair due to the simplified configuration of the driver substrate 40.
- [0052]** Reviewing the effects of the electronic display board for the indication equipment according to the present invention, it is possible to install and use the light collection panel and the screen without modifying an existing electronic display board, and when a new electronic display board is manufactured and used, the manufacturing process can be simplified and the manufacturing cost can be reduced, and advertising copies of advertisements

displayed through the electronic display board can be identified even from the front and the side.











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