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(71)(72) Applicants and Inventors: CHOI, Lim [KR/KR]; 19–24, Shinsa–dong, Engpyong–gu, Seoul 122–080 (KR). BAE, Chang–Su [KR/KR]; 118–72, Ueungam1–dong, Enpyong–gu, Seoul 122–011 (KR).

(74) Agent: LIM, Byong–Chan; 823–48, Yoksam–dong, Gangnam–gu, Seoul 135–080 (KR).

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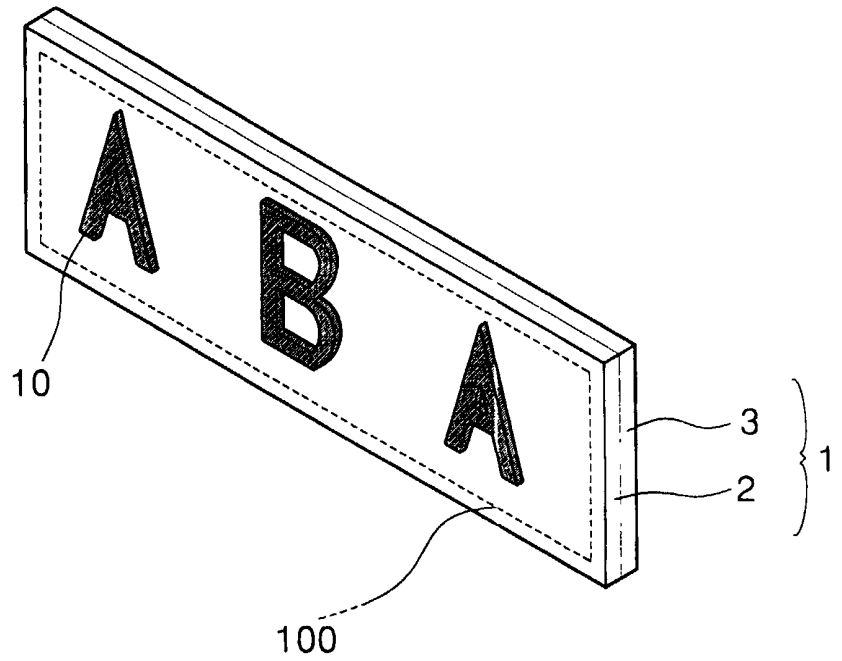
(54) Title: SIGNBOARD USING LIQUID CRYSTAL DISPLAY PANEL

(57) Abstract

A signboard includes at least one LCD panel with more than one non–designed segment electrode, and an advertising contents pattern defined on at least one of the surfaces of the LCD panel. The LCD panel is disposed in a case for containing the LCD panel. A light source is disposed for radiating light toward the LCD panel.



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SIGNBOARD USING LIQUID CRYSTAL DISPLAY PANEL

Technical Field

The present invention relates to a signboard and, more particularly, to a signboard using a liquid crystal display (LCD) panel which is designed having a predetermined advertising pattern attached on at least one surface of the LCD panel.

Background Art

There are two general types of signboards: those employing lights ("lighted signboard") and those in which no light emanates from the signboard ("lightless signboard"). The lightless signboard comprises an acrylic panel and a sheet of advertising pattern attached on a surface of the acrylic panel. The advertising pattern is made of an opaque or translucent color sheet. The lighted signboard comprises a box-shaped case, an acrylic panel attached on a front surface of the case, a sheet advertising pattern attached on a surface of the acrylic panel, and a light disposed within the case. The advertising pattern is also made of an opaque or translucent color sheet.

In the case of the lightless signboard, the effectiveness of the advertisement is significantly reduced at night. On the contrary, the lighted signboard is highly effective at night. However, such an effect can not be obtained during daylight hours because of the weak luminous intensity of the light.

Neon signboards, which can greatly enhance the ability to catch the attention of those within visibility range at night, are also widely used. However, such neon signboards are even less effective than the other two types of signboards during the day. Furthermore, since alterations to neon lights is not possible, the whole device must be replaced should the owner desire to make changes to the contents of the signboard.

In recent years, a signboard in which an LCD panel is used has been developed. Such a signboard has many advantages including that of enhancing the advertising effect. Fig. 9 shows a conventional signboard using an LCD panel.

As shown in the drawing, the signboard comprises an LCD panel 90 provided with ITO segment electrodes 91 which correspond to advertising contents (e.g., letters,

numbers and symbols), a rear polarizing panel 92 that is attached on a rear surface of the LCD panel, a reflecting panel 93 attached on the first polarizing panel 92, and a second polarizing panel 94 having a different polarizing direction from the first polarizing panel 92 and attached on a front surface of the LCD panel 90. When an electric field is applied to the segment electrodes, liquid crystal molecules corresponding to the segment electrodes change their phases to display appropriate letters, numbers, symbols, etc.

However, in the conventional signboard using such an LCD panel, the only way in which the advertising contents can be altered is to replace the old segment electrodes with new ones corresponding to the desired advertising contents. However, it is not possible to replace the old segment electrodes installed inside the LCD panel. Therefore, a completely new LCD panel having segment electrodes corresponding to the advertising contents must be manufactured. This is both costly and time-consuming. Even if it were possible to replace the old segment electrodes, since the specific segment electrodes cannot be mass-produced, the actual manufacturing costs incurred would be the same as when a new LCD panel is manufactured.

Disclosure of Invention

Therefore, the present invention has been made in an effort to solve the above described problems.

It is an objective of the present invention to provide a signboard using an LCD panel that is designed such that the advertising contents can be easily and inexpensively changed.

It is another objective of the present invention to provide a signboard using an LCD panel that can provide preferable advertising effects during daytime as well as at night.

It is still another objective of the present invention to provide a signboard using an LCD panel that is light in weight and which can be easily installed and removed.

It is still yet another objective of the present invention to provide a signboard using an LCD panel that can be applied to a conventional signboard, thereby enhancing the advertising effect.

To achieve the above objectives, the present invention provides a signboard

comprising at least one LCD panel with more than one non-designed segment electrode, and an advertising contents pattern defined on at least one of surfaces of the LCD panel.

The segment electrode is formed of a plate electrode or a plurality of dot electrodes formed on a front substrate of the LCD panel.

Preferably, the LCD panel is divided into a plurality of sections each with an independent segment electrode.

Further preferably, the advertising contents pattern is defined by attaching a polarizing or reflecting film on a front surface of the LCD panel.

Alternatively, the advertising contents pattern may be defined by printing or depositing paint on a front surface of the LCD panel.

The signboard may further comprise a front polarizing plate attached on a front surface of the LCD panel while covering the advertising contents pattern, a rear polarizing plate attached on a rear surface of the LCD panel, and a reflecting plate attached on the rear polarizing plate.

The signboard may further comprise a front polarizing plate disposed between a front surface of the LCD panel and the advertising contents pattern.

Preferably, the segment electrodes disposed within each of the sections are controlled by a control part. The LCD panel is driven by a solar battery cell.

Brief Description of Drawings

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate an embodiment of the invention, and, together with the description, serve to explain the principles of the invention:

Fig. 1 is a perspective view of a signboard using an LCD panel according to a first embodiment of the present invention;

Fig. 2 is an exploded perspective view of a signboard using an LCD panel according to a second embodiment of the present invention;

Fig. 3 is an exploded perspective view of a signboard using an LCD panel according to a third embodiment of the present invention;

Fig. 4 is a perspective view of a signboard using an LCD panel according to a fourth embodiment of the present invention;

Figs. 5a to 5c are example views illustrating conventional signboard assemblies

where a signboard using an LCD panel according to the present invention is employed;

Fig. 6a is an exploded perspective view of a signboard using an LCD panel according to a fifth embodiment of the present invention;

Fig. 6b is a sectional view taken along line I-I of Fig. 6a when the signboard is assembled;

Fig. 7 is a perspective, partly-broken view of a signboard using an LCD panel according to a sixth embodiment of the present invention;

Fig. 8 is a perspective, partly-broken view of a signboard using an LCD panel according to a sixth embodiment of the present invention; and

Fig. 9 is an exploded perspective view of a conventional signboard using an LCD.

Best Mode for Carrying out the Invention

Reference will now be made in detail to the present preferred embodiment of the invention, an example of which is illustrated in the accompanying drawing(s). Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

Fig. 1 shows a signboard using an LCD panel according to a first embodiment of the present invention.

As shown in the drawing, an LCD panel 1 comprises a pair of substrates 2 and 3 disposed opposing each other with liquid crystal injected therebetween. An advertising contents pattern 10 is formed on a front surface of the LCD panel 1. Disposed inside the LCD panel 1 is a segment electrode 100 designed to be driven when electric power is applied thereto to operate the liquid crystal panel 1 between a bright mode and a dark mode.

That is, the segment electrode 100 is not designed in a specific advertising pattern, but disposed through an entire screen surface of the LCD panel. Therefore, when electric power is applied to the segment electrode 100, all of the liquid crystal molecules change their phases to turn the LCD panel on, thereby resulting in the bright mode.

The segment electrode 100 may be made of a strip-shaped ITO electrode having a size corresponding to the screen size of the LCD panel or a plurality of

dot-shaped ITO electrodes dispersed throughout the entire screen of the LCD panel 1.

The advertising contents pattern 10 may be formed by a polarizing film or an opaque film which is designed corresponding to desired advertising contents and attached on the front screen of the LCD panel 1. Alternatively, the advertising contents pattern 10 may be formed by printing or depositing paint on the screen surface of the LCD panel to define a desired design corresponding to the advertising contents.

Therefore, the above described signboard displays the advertising contents when the advertising contents pattern 10 is differently displayed from the LCD screen by applying electric power to the segment electrode 100.

That is, when the electric power is applied to the segment electrode 100, the LCD panel 1 is driven in the dark mode, while the advertising contents pattern 10 is displayed in a bright mode by reflecting light radiated through the LCD panel 1, thereby clearly displaying the advertising contents.

Fig. 2 shows a signboard using an LCD panel according to a second embodiment of the present invention.

As shown in the drawing, attached on front and rear surfaces of an LCD panel 1 are front and rear polarizing plates 4 and 5, respectively. A reflecting plate 6 is attached on the rear plate 5.

Disposed inside the LCD panel 1 is a strip or dot-shaped segment electrode 100.

An advertising contents pattern 10 is formed on the front polarizing plate 4. The advertising contents pattern 10 may be formed of a polarizing film or an opaque film which is designed corresponding to a desired advertising contents and attached on the front polarizing plate 4. Alternatively, the advertising contents pattern 10 may be formed by printing or depositing paint on the front polarizing plate 4 to define a pattern corresponding to the advertising contents on the screen of the LCD panel.

Therefore, when the electric field is applied to the segment electrode 100, the LCD panel 1 is driven in the dark mode, while the advertising contents pattern 10 is displayed in a bright mode by reflecting light radiated through the LCD panel 1, thereby clearly displaying the advertising contents.

Fig. 3 shows a signboard using an LCD panel according to a third embodiment of the present invention.

As shown in the drawing, formed on a front surface of an LCD panel 1 is an advertising contents pattern 10. A front polarizing plate 4 is attached on the front surface of the LCD panel while covering the advertising contents pattern 10. Attached on a rear surface of the LCD panel is a rear polarizing plate 5.

Disposed inside the LCD panel 1 is a plate or dot-shaped segment electrode 100.

At this point, the advertising contents pattern 10 may be defined by polarizing, opaque, or oriented polypropylene. That is, any film which can reflect light may be used to define the advertising contents pattern 10.

Therefore, when the electric field is applied to the segment electrode 100, the LCD panel 1 is driven in the dark mode, while the advertising contents pattern 10 is displayed in a bright mode by reflecting light radiated through the LCD panel 1, thereby clearly displaying the advertising contents.

In the above described embodiments, a description of an electric circuit for applying power to the segment electrode is omitted.

Fig. 4 shows a signboard using an LCD panel according to a fourth embodiment of the present invention.

As shown in the drawing, an LCD panel 1 is divided into, for example, six sections by dividing lines 1a, 1b, 1c, 1d and 1e, and segment electrodes 100, 101, 102, 103, 104, 105 each defining an independent display screen are disposed inside the respective one of the sections of the LCD panel 1. As in the above described embodiments, each of the segment electrodes is not designed in a specific shape, but disposed through an entire screen surface of each section.

An advertising contents pattern 10 for defining advertising contents on each of the sections is formed on a front surface of the LCD panel. Solar battery cells 20 are mounted on one side wall of the LCD panel 1.

The solar battery cells 20 apply electric power to the segment electrodes 100, 101, 102, 103, 104 and 105 in sequence or at random in accordance with signals from a control part 30, thereby variably displaying the advertising contents defined by the advertising contents pattern 10. The electric source is not limited to the solar battery cells and it is possible to use other types of electric sources. However, the solar battery cell has the advantage of enabling the signboard to be used as a road signboard.

a road warning sign, or other such signs in which the supply of electricity is difficult or impossible.

As described above, since each of the segment electrodes 100, 101, 102, 103, 104 and 105 is independently controlled by the control part 30, it is possible to display the advertising contents in a motion picture image mode as well as a variable mode.

Preferably, a supporting member 40 is further formed on a rear surface of the LCD panel 1 so that the signboard can be removably mounted to any place.

Figs. 5a, 5b and 5c show examples when the signboards of the present invention is employed to a conventional signboard.

The signboard of the present invention may be employed on a conventional signboard 50 such that the advertising contents pattern 10 occupies a portion of a front surface of a conventional signboard 50 as shown in Fig. 5a or an entire front surface of the conventional signboard 50 as shown in Fig. 5b. As another example, more than two signboards of the present invention may be formed on portions of the front surface of a conventional signboard 50 such that the advertising contents patterns 10 of each signboard can be displayed in sequence.

Fig. 6a shows a signboard using an LCD panel according to a fifth embodiment of the present invention, and Fig. 6b shows an assembled state of the signboard depicted in Fig. 6a.

As shown in the drawings, an LCD panel 1 is divided into, for example, two sections by a dividing line 1a, and segment electrodes 100 and 101 are disposed inside the two sections, respectively. Front and rear advertising contents patterns 10 and 10a are defined on front and rear surfaces of the LCD panel 1, respectively. A color sheet 60, designed corresponding to the rear advertising contents pattern 10a, is correspondingly attached on the rear advertising contents pattern 10a.

Needless to say, the LCD panel may be divided into more than two sections according to the advertising contents to be displayed.

The advertising contents patterns 10 and 10a may be formed of a polarizing, reflecting or opaque film.

The signboard of this embodiment is installed into a signboard case 70 by a bracket (not shown).

The signboard case 70 is comprised of front, side and rear plates 71, 72 and 73

which may be preferably made of opaque or translucent film.

A floodlighting portion 74 having an identical shape to that of the advertising contents pattern 10 is defined on the front plate 71. The floodlighting part 74 is defined by cutting off a portion of the front plate 71 or forming a portion of the front plate 71 using a transparent material, such that the advertising contents appearing on the advertising contents pattern 10 can be displayed on the front plate 71.

In addition, a light 75 is installed on the rear plate 73 inside the case 70. Alternatively, the light may be installed on an upper side of the front plate outside the case. At this point, a translucent, opaque or reflecting film may be disposed on a rear side of the LCD panel 1.

Fig. 7 shows a signboard using an LCD panel according to a sixth embodiment of the present invention.

As shown in the drawing, an LCD panel 1 is installed on a front side of a signboard case 70, and an advertising contents pattern 10 is formed on the front surface of the LCD panel 1. The LCD panel 1 is divided into a plurality of sections 1a to 1k, and a plurality of segment electrodes 100 to 111 are disposed inside the sections 1a to 1k, respectively.

A rear polarizing plate 5 and a color sheet 60 are attached on a rear surface of the LCD panel in this order. A front polarizing plate 4 is attached on the LCD 1 while covering the advertising contents pattern 10.

Light radiated by the light source 75 is directed to the advertising contents pattern 10 through the color sheet 60, the rear polarizing plate 5, and the LCD panel 1, then reflected by the advertising contents pattern 10, thereby variably displaying the advertising contents at night. During daytime, the advertising contents appearing as a result of the advertising contents pattern 10 is clearly displayed.

Here, a plurality of LCD panels 1, each divided into a plurality of sections, can be used as one signboard by being coupled to each other. In this case, the a greater degree of variable advertising contents can be displayed.

Fig. 8 shows a signboard using an LCD panel according to a seventh embodiment of the present invention.

As shown in the drawing, openings 71a are formed on upper and lower sides of a front plate 71 of a signboard case 70, and an LCD panel 1 is mounted on an inner

surface of the front plate 71 such that it is exposed through the openings 71a. An advertising contents pattern 10 is formed on the front surface of the LCD panel 1, and a front polarizing plate 4 is attached on the advertising contents pattern 10 and the openings 71a of the front plate 71.

In addition, a rear polarizing plate 5 and a color sheet 60 are attached on the rear surface of the LCD panel in this order. An additional advertising pattern 10b is formed on the front plate 71 of the case 70.

Preferably, the color sheet 60 is made of a translucent material and selected from a variety of colors. The color of the advertising contents to be displayed depends on the color of the color sheet 60.

In the fifth to seventh embodiments, when electric power is not applied to the light source 75 and the LCD panel 1, the advertising effect is identical to that obtained from a conventional lightless signboard. However, when electric power is applied to the light source 75 and the LCD panel 1, a substantially enhanced advertising effect can be obtained by the light radiated from the light source 75.

Furthermore, when a solar battery cell 20 is installed inside the case 70, the LCD panel 1 can be driven at night by the solar battery cells 20 converting light radiated from the light source 75 into electric energy.

In addition, when a solar battery cell 20 is installed outside the case 70, the LCD panel 1 is driven during daytime by sunlight.

Industrial Applicability

Furthermore, the advertising contents can be easily changed by replacing only the advertising contents pattern with the new one corresponding to the new advertising contents.

While this invention has been described in connection with what is presently considered to be the most practical and preferred embodiment, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

WHAT IS CLAIMED IS:

1. A signboard comprising:

at least one LCD panel with more than one non-designed segment electrode; and

an advertising contents pattern defined on at least one of surfaces of the LCD panel.

2. A signboard of claim 1 wherein the segment electrode is formed of a plate electrode.

3. A signboard of claim 1 wherein the segment electrode is formed by a plurality of dot electrodes formed on a front substrate of the LCD panel.

4. A signboard of claim 1 wherein the LCD panel is divided into a plurality of sections each with an independent segment electrode.

5. A signboard of claim 1 wherein the advertising contents pattern is defined by attaching a polarizing film on a front surface of the LCD panel.

6. A signboard of claim 1 wherein the advertising contents pattern is defined by attaching a reflecting film on a front surface of the LCD panel.

7. A signboard of claim 1 wherein the advertising contents pattern is defined by printing or depositing paint on a front surface of the LCD panel.

8. A signboard of claim 1 wherein the advertising contents pattern is defined by attaching an opaque film on a front surface of the LCD panel.

9. A signboard of claim 1 further comprising a front polarizing plate attached on a front surface of the LCD panel while covering the advertising contents pattern, a rear polarizing plate attached on a rear surface of the LCD panel, and a reflecting plate attached on the rear polarizing plate.

10. A signboard of claim 1 further comprising a front polarizing plate disposed between a front surface of the LCD panel and the advertising contents pattern.

11. A signboard of claim 4 wherein the segment electrodes disposed within each of the sections are controlled by a control part.

12. A signboard of claim 1 wherein the LCD panel is driven by a solar battery cell.

13. A signboard comprising:

at least one LCD panel with more than one non-designed segment electrode: and

an advertising contents pattern defined on at least one of surfaces of the LCD panel;

a case for containing the LCD panel; and

a light source for radiating light toward the LCD panel.

14. A signboard of claim 13 wherein the advertising contents pattern is exposed through a front side of the case.

15. A signboard of claim 13 wherein the advertising contents pattern is partly exposed through a front side of the case and a front polarizing plate is attached on the exposed advertising contents pattern.

16. A signboard of claim 13 wherein the light source is installed outside the case.

Fig.1

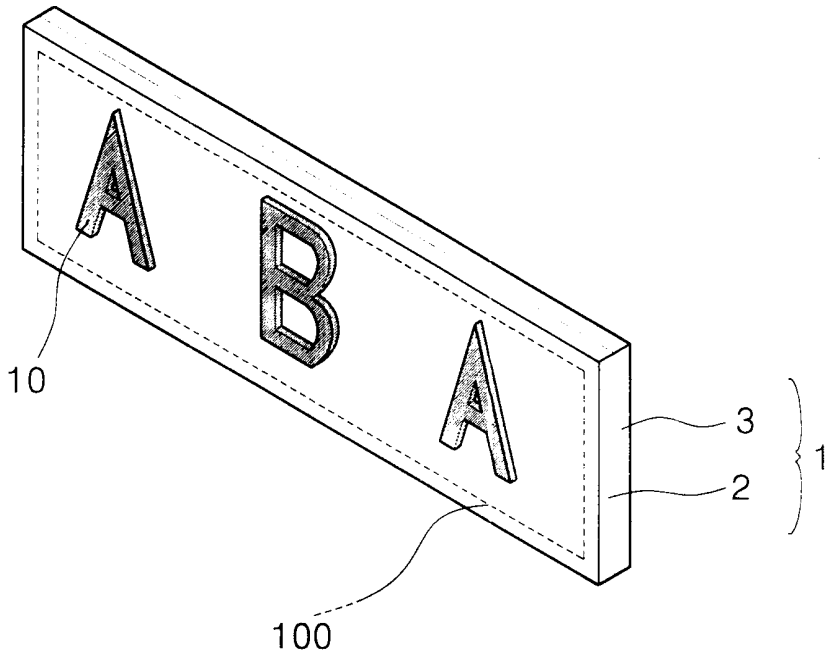

Fig.2

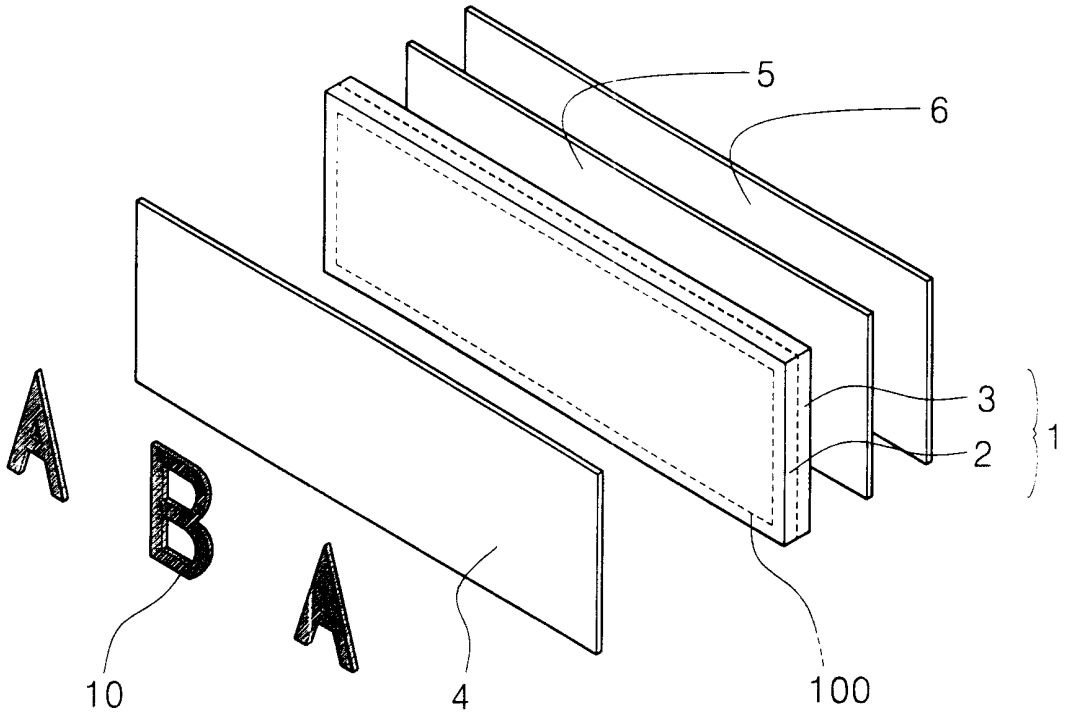

Fig.3

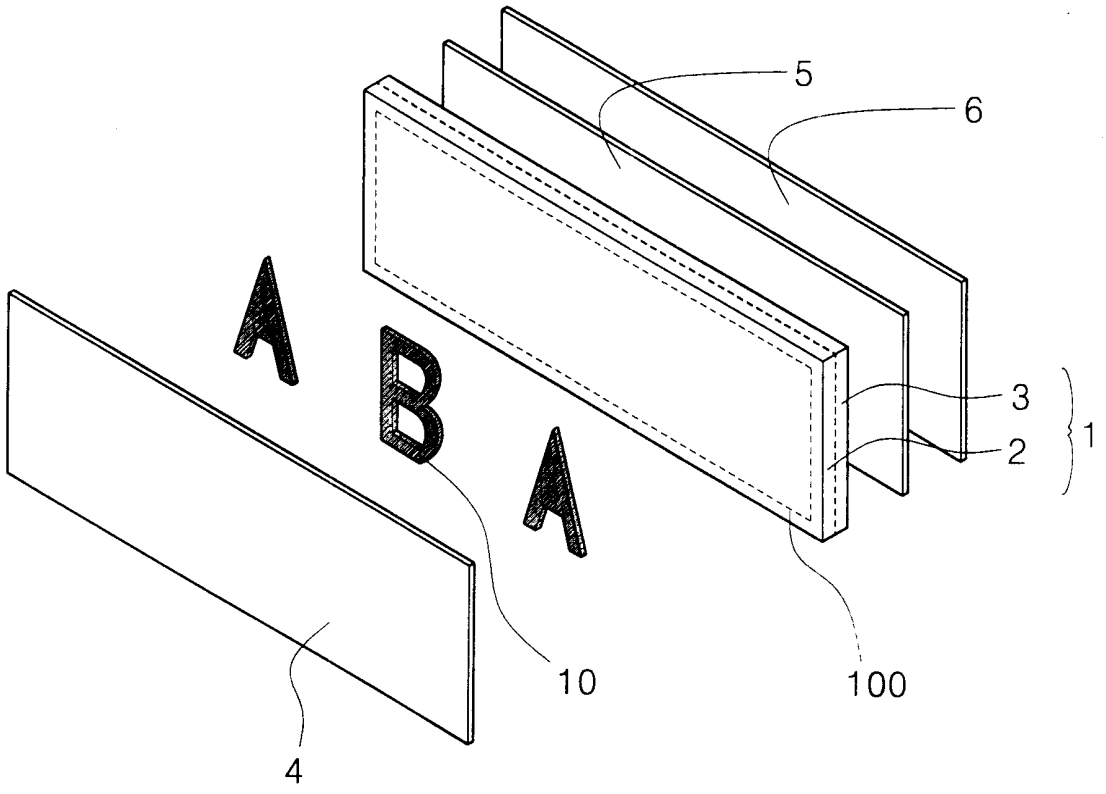

Fig.4

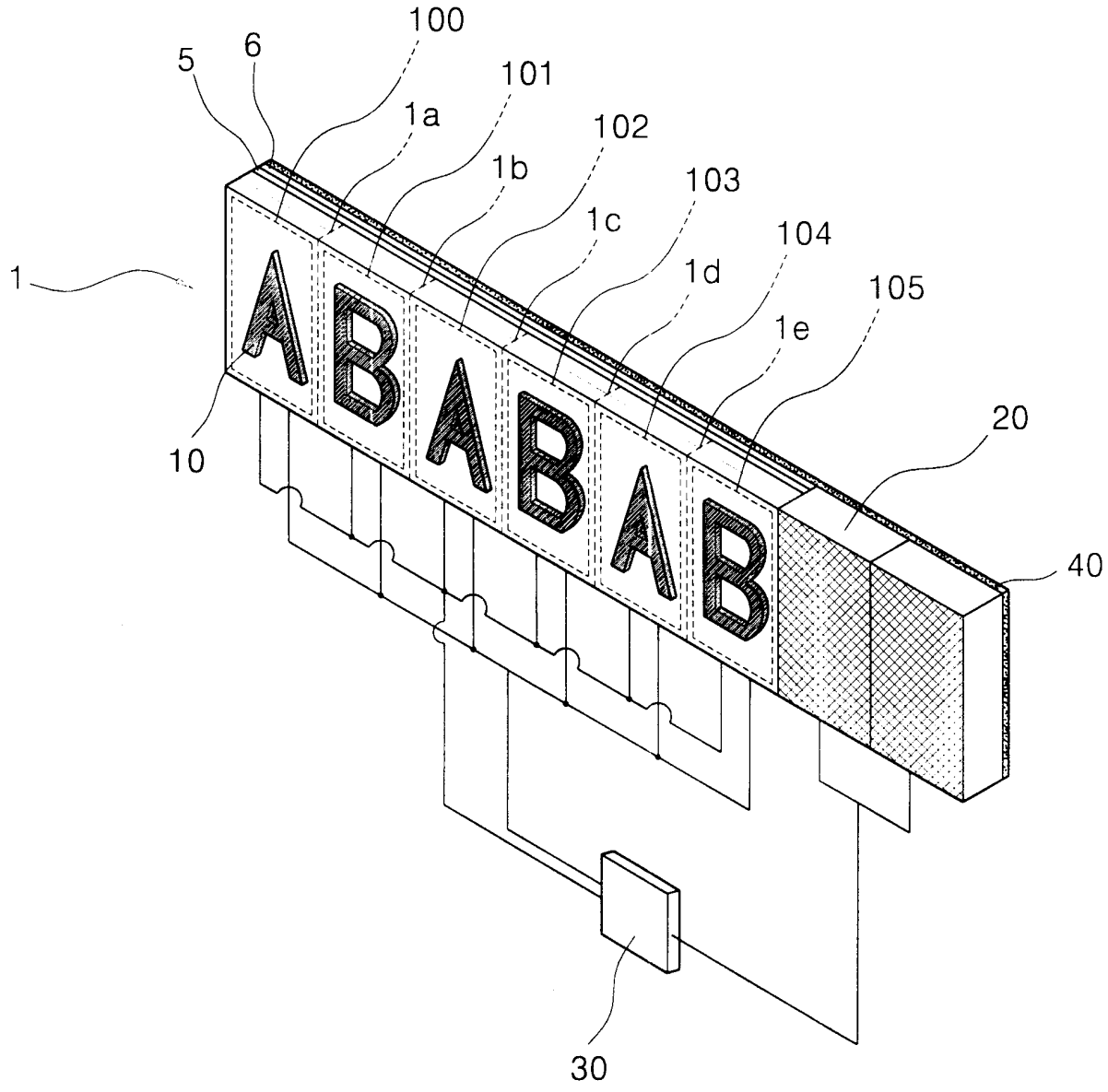

Fig.5a

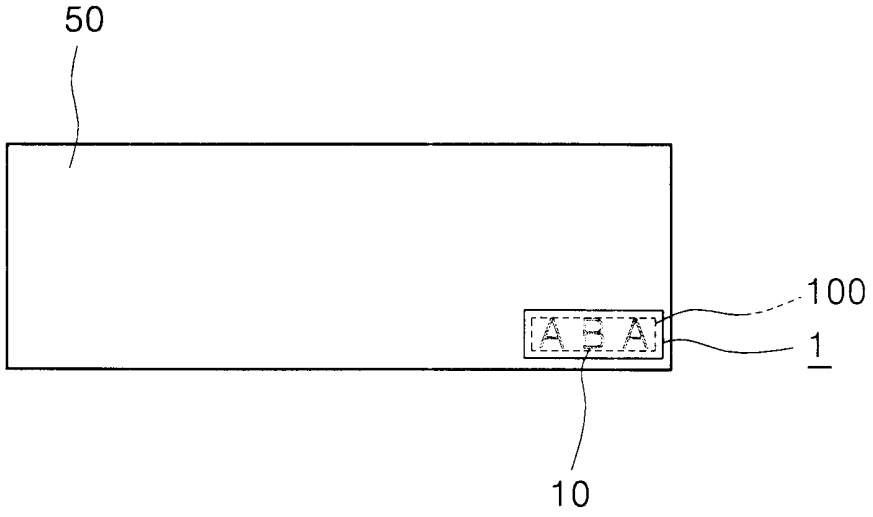

Fig.5b

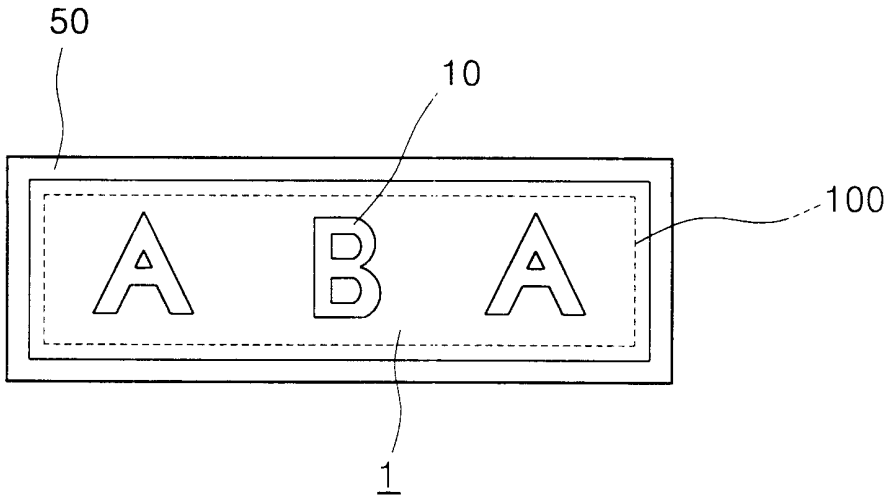

Fig.5c

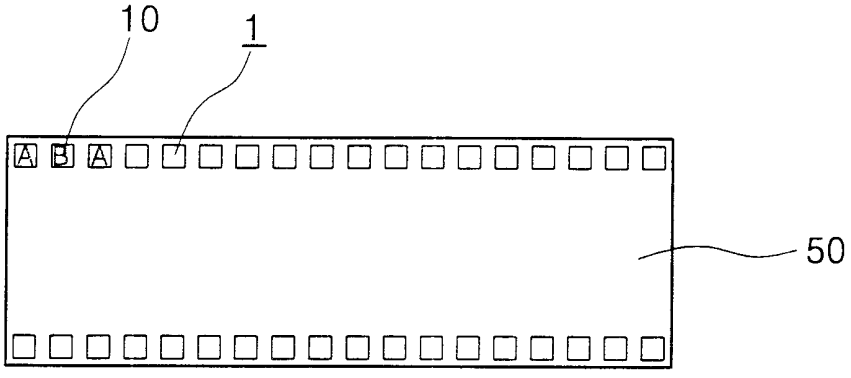

Fig.6a

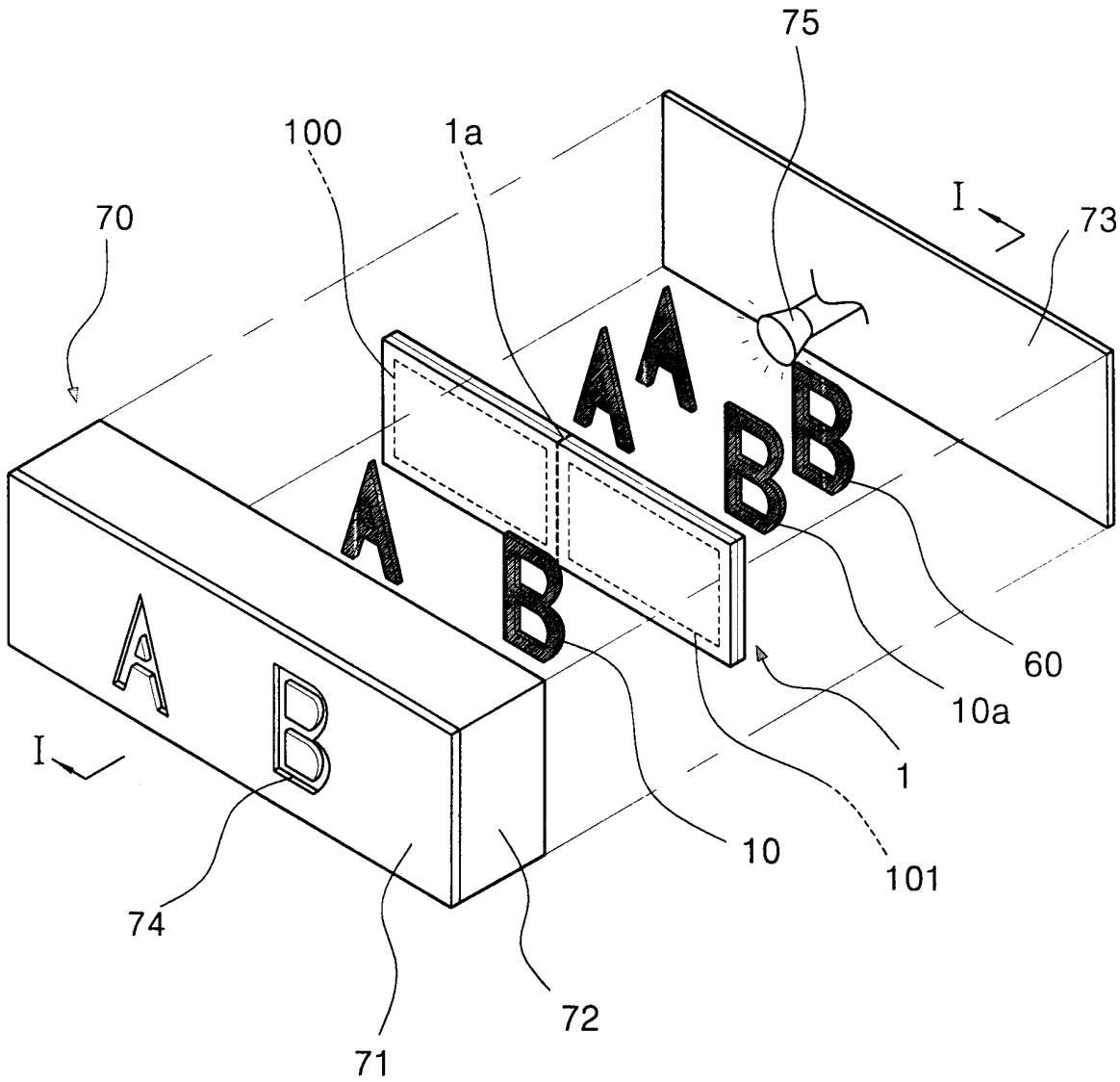

Fig.6b

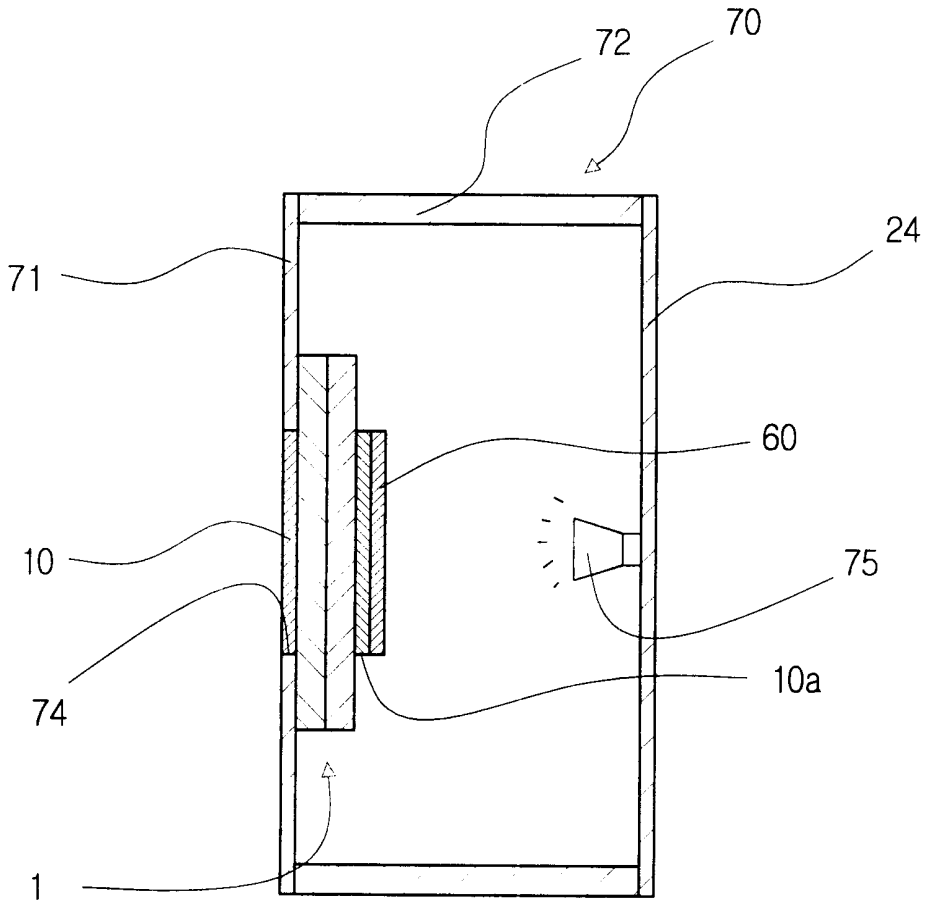

Fig.7

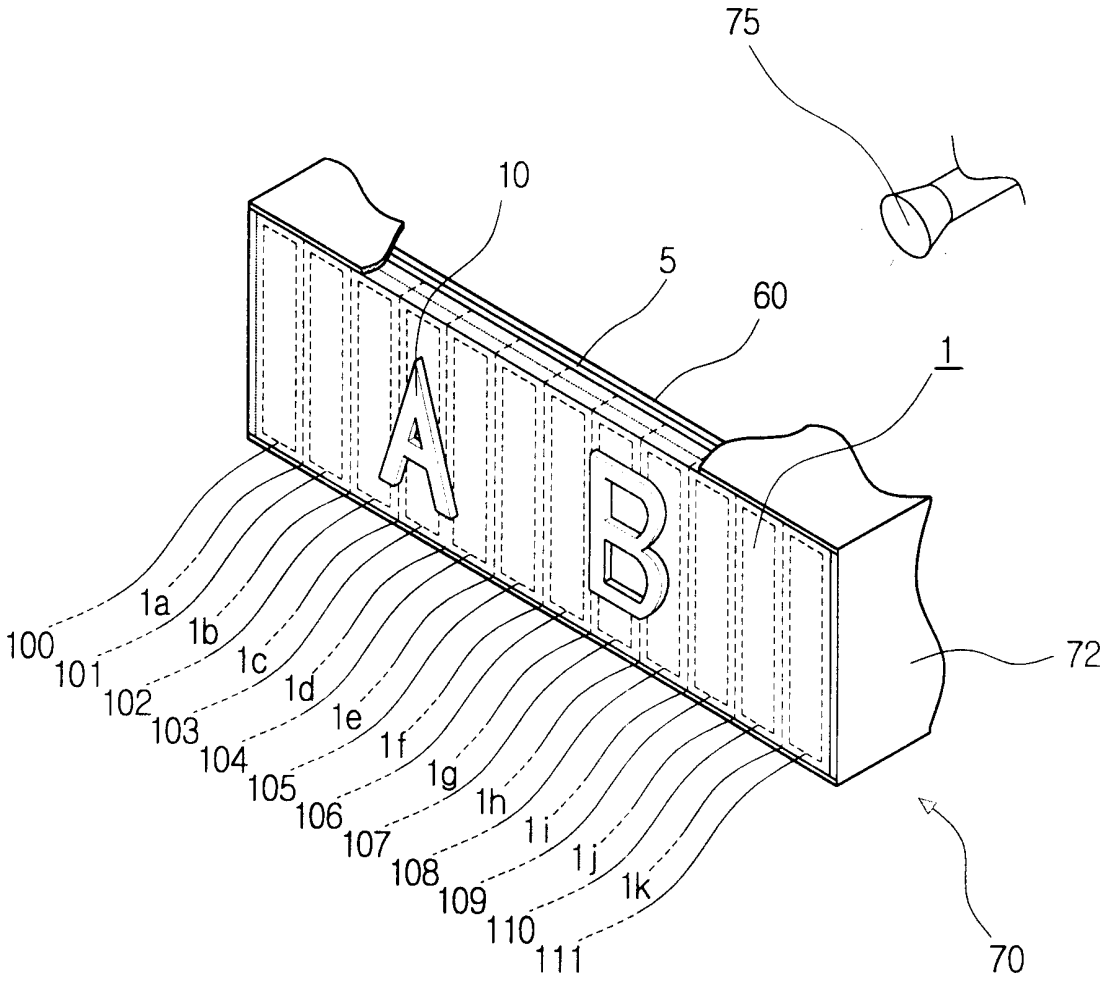
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Fig.8

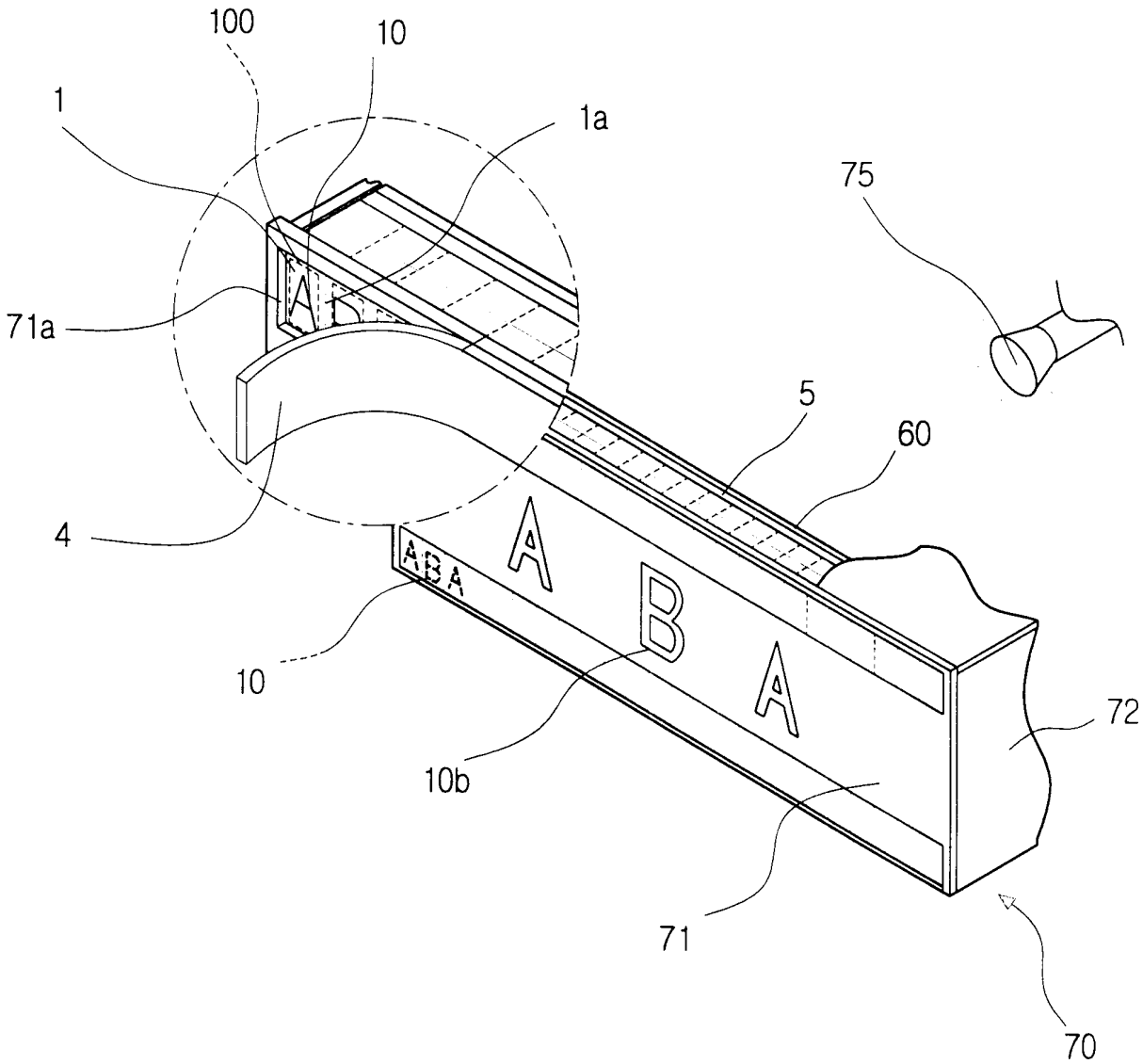

Fig.9