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(54) Light emitting diode street lamp having auxiliary lamp

(57) A light emitting diode (LED) street lamp (100) having an auxiliary lamp comprises a lamp body (102) for road illumination and an auxiliary light source (104) for showing drivers or passerby a current status of an upcoming traffic signal. In an embodiment, the auxiliary light source synchronizes indication with a traffic light. The auxiliary light source (104) comprises a first LED module disposed on the lamp body.

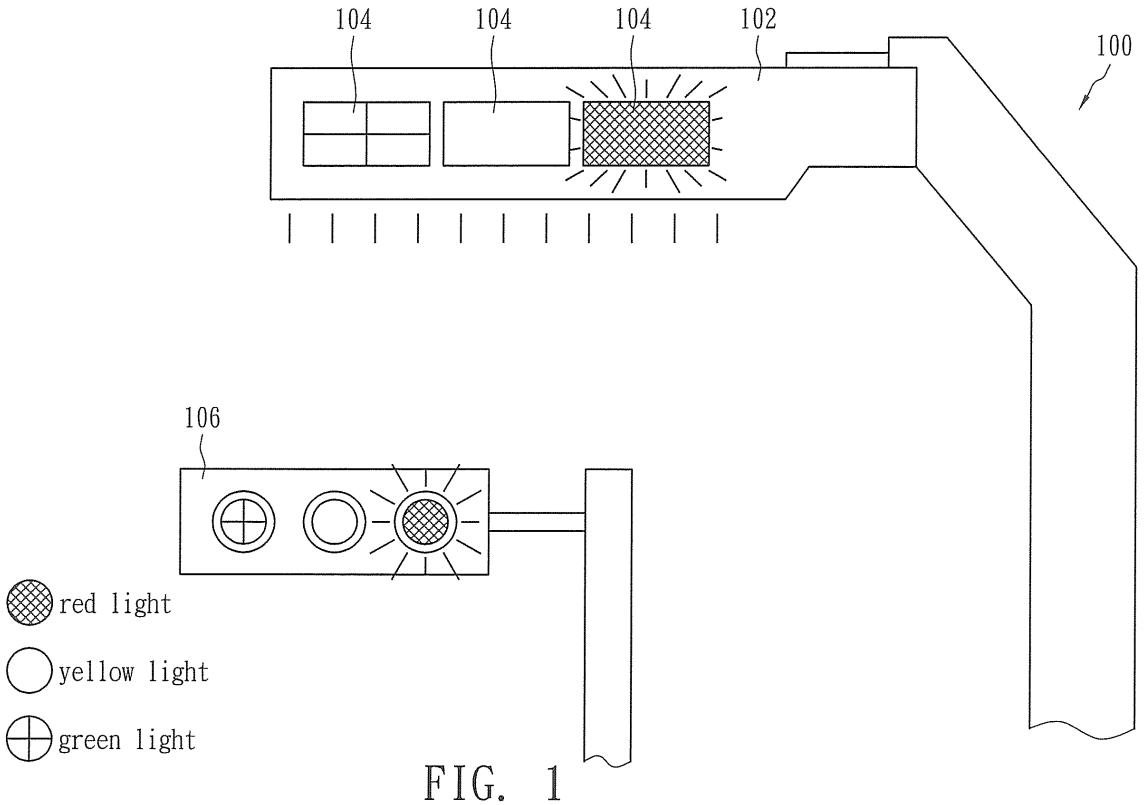

FIG. 1

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a street lamp, and relates more particularly to an LED (light emitting diode) street lamp having an auxiliary lamp.

2. Description of the Related Art

[0002] An LED lamp can reduce electrical energy consumption by 40 percent compared to a conventional incandescent lamp having the same brightness. In view of this, many countries have energy-saving policies to introduce LED devices into various lighting fields. There is a current trend in many places to convert street lamps to the LED devices.

[0003] Compared with conventional street lamps such as metal halide lamps, incandescent lamps, and high pressure sodium lamps, the LED street lamps not only save energy but also have advantages of long working life and being mercury-free. The main activity relating to road lighting equipment will be to replace the conventional street lamps with the LED street lamps in the future.

[0004] In addition to the aforesaid advantages, the brightness of an LED device can be further controlled by using a digital control circuit. Such a brightness-controllable application can improve the efficiency of the electrical energy, and the LED device can be adjusted to emit extra bright light when needed, for example at times of rain or fog. In addition, the small size and flat package of the LED device allows the LED to be applied to a wider variety of lighting apparatuses compared to the conventional lamps. The colored lights of different-colored LED devices are easily recognized, and hence, are suitable for use with traffic-control lights.

[0005] A familiar street lamp comprises a lighting source and a protective shield. Such a simple combination cannot have any additional functions, and the purpose of the street lamp is simple. Furthermore, the current LED street lamp still follows the design of the conventional street lamp, and does not sufficiently develop the advantages of the LED devices. Therefore, the current LED street lamp cannot have more additional functions to promote its purposes and results.

SUMMARY OF THE INVENTION

[0006] The present invention provides a street lamp comprising a lamp body and a first LED module. The lamp body has a lighting source for road illumination. The first LED module is disposed on the lamp body and acts as an indicator for drivers to be given an early notice of an upcoming traffic light.

[0007] The present invention provides a street lamp comprising a lamp body and at least one first LED module. The first LED module is disposed on the lamp body and is directed toward oncoming traffic.

[0008] The present invention provides an LED street lamp with an indication synchronized with a nearby traffic light. The street lamp comprises a lamp body and a plurality of first LED modules. The lamp body has a lighting source for road illumination. The plurality of first LED modules corresponds to the traffic light and is disposed on the lamp body. The plurality of first LED modules is directed toward oncoming traffic.

[0009] In an embodiment, the lighting source for road illumination is a second LED module. The second LED module comprises a plurality of white LEDs or a plurality of LEDs with complementary colors to generate white light.

[0010] The aforesaid descriptions are the brief technical summary of the present invention. To provide a better understanding of the features of the present invention, the following descriptions further explain the features in view of several embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The invention will be described according to the appended drawings in which:

FIG. 1 illustrates a schematic diagram of an LED street lamp in accordance with an embodiment of the present invention;

FIG. 2 illustrates a schematic diagram of a lamp body of an LED street lamp in accordance with an embodiment of the present invention;

FIGs. 3 and 4 illustrate a schematic diagram of a first LED module in accordance with an embodiment of the present invention;

FIG. 5 illustrates a schematic diagram of a first LED module in accordance with another embodiment of the present invention; and

FIGs. 6 and 7 illustrate a lamp body of an LED street lamp in accordance with two additional embodiments of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0012] FIG. 1 illustrates a schematic diagram of an LED street lamp 100 in accordance with an embodiment of the present invention. The street lamp 100 of the present invention comprises a lamp body 102 which includes at least one auxiliary light source 104. The auxiliary light sources 104 are disposed on a side surface of the lamp body 102 for showing the indication of the traffic light. In this embodiment, a plurality of auxiliary light sources 104 corresponding to the traffic light 106 is disposed on a side surface of the lamp body 102. The plu-

rality of auxiliary light sources 104 is directed toward oncoming traffic so that drivers or passerby can observe the indication of the upcoming traffic light. The auxiliary light sources 104 can emit red light, yellow light and green light, so as to indicate the signal of an upcoming traffic light 106. The lamp body 102 can be placed where the traffic light 106 is shielded from view, e.g. near a curve in the road or a hill. Therefore, drivers or passerby can be alerted to the indication of the traffic light 106 before coming into view of the traffic light, and can therefore prepare for the according driving action. Accordingly, sudden reaction to an unexpected signal is avoided, and the driving safety is improved. Using the techniques of the present invention can improve the functions and results of the street lamp 100, and can reduce the need for additional traffic lights.

[0013] The auxiliary light sources 104 can act not only as indicators synchronized with traffic lights 106, but also as a display for the traffic control center to show the information of traffic accidents, road construction, and weather. Furthermore, the auxiliary light sources 104 with colorful light can be used as decorative light for celebrating festivals or holiday activities.

[0014] FIG. 2 illustrates a schematic diagram of a lamp body 102 of an LED street lamp in accordance with an embodiment of the present invention. The lamp body 102 comprises a second LED module 208 for road illumination. A heat dissipation partition 206 and a heat dissipation module 204 are disposed on the surface in back of the lighting surface. The heat dissipation module 204 comprises a plurality of heat dissipation fins. Through the heat dissipation module 204, the heat generated from the second LED module 208 which emits light is transferred to the surrounding air. An external cover 202 contains the auxiliary light sources 104, the heat dissipation module 204, the heat dissipation partition 206, and a second LED module 208. The external cover 202 comprises a lighting window 210 and a heat dissipation opening 212. The light emitted from the second LED module 208 passes through the lighting window 210 and illuminates the road surface. The heat dissipation opening 212 allows the heat dissipation module 204 to conduct the heat to the exterior of the lamp body 102. The lighting window 210 of the external cover 202 can be shielded by a housing 218. The housing 218 can be a lens so that the light will be convergent rather than divergent.

[0015] The second LED module 208 comprises a plurality of white LEDs or a plurality of LEDs with complementary colors to generate white light. Each of the auxiliary light sources 104 comprises a first LED module 214 serving as a light source.

[0016] FIGs. 3 and 4 illustrate a schematic diagram of a first LED module in accordance with an embodiment of the present invention. In this embodiment, the auxiliary light sources 104 act as the application of the traffic light, but the applications of the present invention are not limited by these embodiments. The auxiliary light sources 104 comprise a first LED module 214 serving as a light source. The first LED module 214 can be a red LED module 214a, a yellow LED module 214b and a green LED module 214c. The red LED module 214a comprises a plurality of red LEDs 302a capable of emitting red light; the yellow LED module 214b comprises a plurality of yellow LEDs 302b capable of emitting yellow light; the green LED module 214c comprises a plurality of green LEDs 302c capable of emitting green light. The color emitted by the first LED module 214 changes according to the display of the traffic light. That is, the red LED module 214a synchronously emits red light when the traffic light is red.

[0017] As shown in FIG. 4, a first LED module 214d, a first LED module 214e and a first LED module 214f are disposed on the lamp body 102, and each of the LED modules comprises a plurality of red LEDs 302a, a plurality of yellow LEDs 302b and a plurality of green LEDs 302c. These LEDs 302a-302c can be arranged in a staggered manner, as shown in this figure. Different arrangements are also applicable. When the traffic light is red, each red LED 302a of the first LED modules 214d-214f simultaneously emits red light. When the traffic light changes from red to green, the green LEDs 302c simultaneously emit green light.

[0018] When different-colored lights emitted from the LEDs are mixed, just one of the first LED modules 214d-214f is sufficient for indication of a different color light.

[0019] FIG. 5 illustrates a schematic diagram of a first LED module in accordance with another embodiment of the present invention. A first LED module 214g further comprises an LED character display to show text information. The traffic control center can utilize the LED display to communicate the information of current traffic status to drivers.

[0020] FIGs. 6 and 7 show a lamp body 102' of an LED street lamp in accordance with two additional embodiments of the present invention. The lamp body 102' comprises an auxiliary light source 104 and an image sensor 602 on a side of the auxiliary light source 104. The image sensor 602 can inspect the road status. The image sensor 602 is a CCD image sensor or CMOS image sensor.

[0021] As shown in FIG. 7, in addition to the image sensor 602, the lamp body 102" further comprises a specific gas detector 702 on the other side of the auxiliary light sources 104. The specific gas detector 702 is used to detect the air quality of the road, and can detect specific gas such as carbon dioxide or carbon monoxide.

[0022] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which fall within the meaning and range of equivalency of the claims are to be embraced within their scope.

Claims

1. An LED street lamp having an auxiliary light source, comprising:

   a lamp body including a lighting source for road illumination; and
   a first LED module disposed on a side surface of the lamp body for showing drivers or passerby a current traffic signal.

2. The LED street lamp of Claim 1, wherein the lighting source for road illumination is a second LED module.

3. The LED street lamp of Claim 2, wherein the lamp body comprises a heat dissipation module disposed on a surface opposite the lighting surface of the second LED module for dissipating the heat of the second LED module.

4. The LED street lamp of Claim 3, wherein the lamp body comprises an external cover including a containing space, a lighting window and a heat dissipation opening, wherein the second LED module and the heat dissipation module are disposed in the containing space and the lamp body comprises a housing or lens on the lighting window.

5. The LED street lamp of Claim 4, wherein the lamp body further comprises a CCD image sensor or CMOS image on the external cover.

6. The LED street lamp of Claim 4, wherein the lamp body further comprises a specific gas detector on the external cover.

7. The LED street lamp of Claim 4, wherein the specific gas is carbon dioxide or carbon monoxide.

8. The LED street lamp of Claim 1, wherein the first LED module is a character display.

9. An LED street lamp having an auxiliary light source, synchronizing indication with a traffic light, comprising:

   a lamp body including a lighting source for road illumination; and
   at least one first LED module disposed on the lamp body;

   wherein the at least one first LED module faces toward oncoming traffic of a street.

10. The LED street lamp of Claim 9, wherein the lighting source for road illumination is a second LED module.

11. The LED street lamp of Claim 10, wherein the lamp body comprises a heat dissipation module disposed on a surface opposite the lighting surface of the second LED module for dissipating the heat of the second LED module.

12. The LED street lamp of Claim 11, wherein the lamp body comprises an external cover including a containing space, a lighting window and a heat dissipation opening, wherein the second LED module and the heat dissipation module are disposed in the containing space and the lamp body comprises a housing or lens on the lighting window.

13. The LED street lamp of Claim 9, wherein the first LED module comprises a plurality of LEDs emitting a plurality of light colors corresponding to color of light emitted by the traffic light.

14. The LED street lamp of Claim 13, wherein the plurality of LEDs emitting the plurality of light colors is arranged in a staggered manner.

15. The LED street lamp of Claim 9, wherein the LED street lamp comprises a plurality of first LED modules each emitting a color of light corresponding to the color of the light emitted by the traffic light.

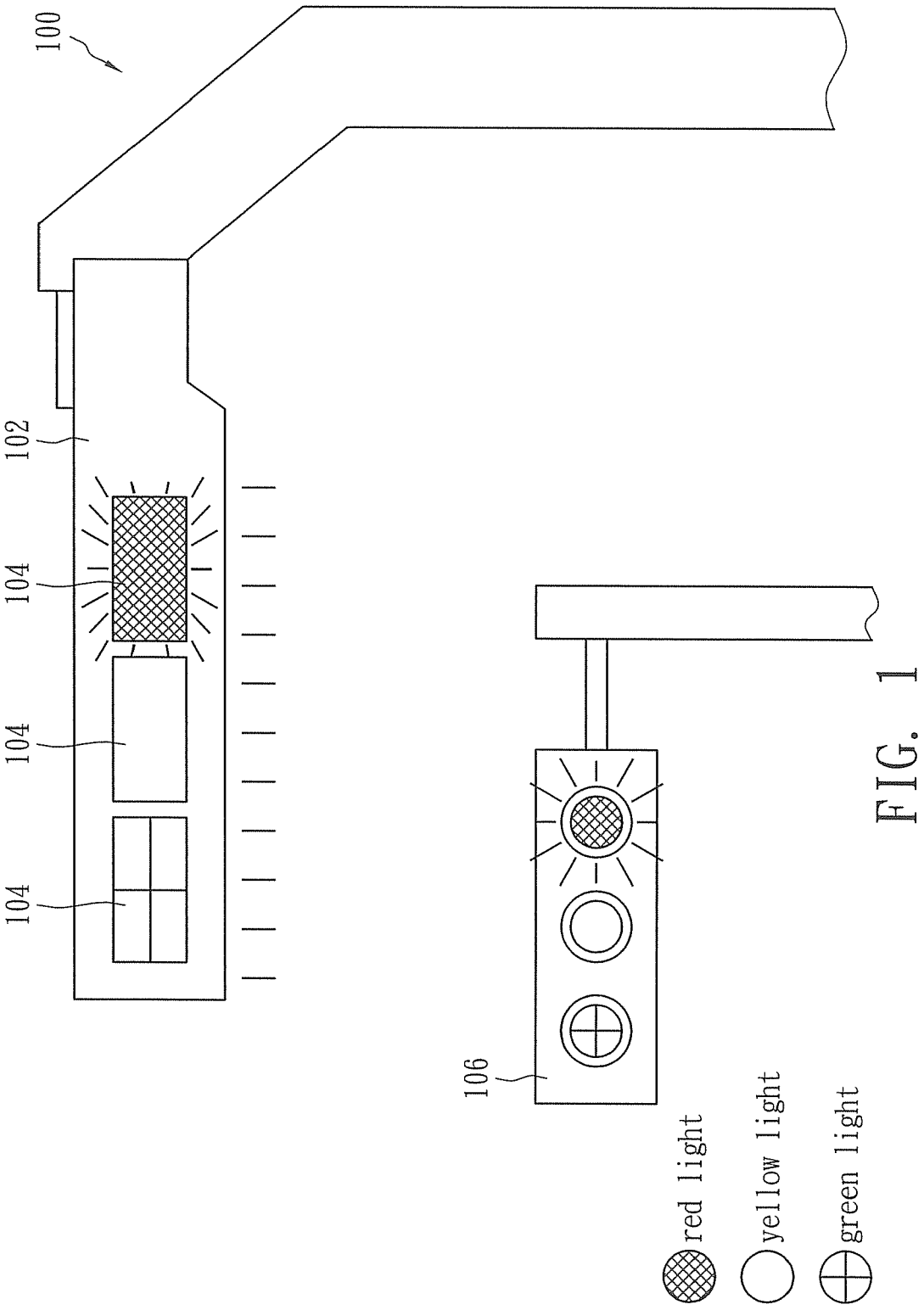

FIG. 1

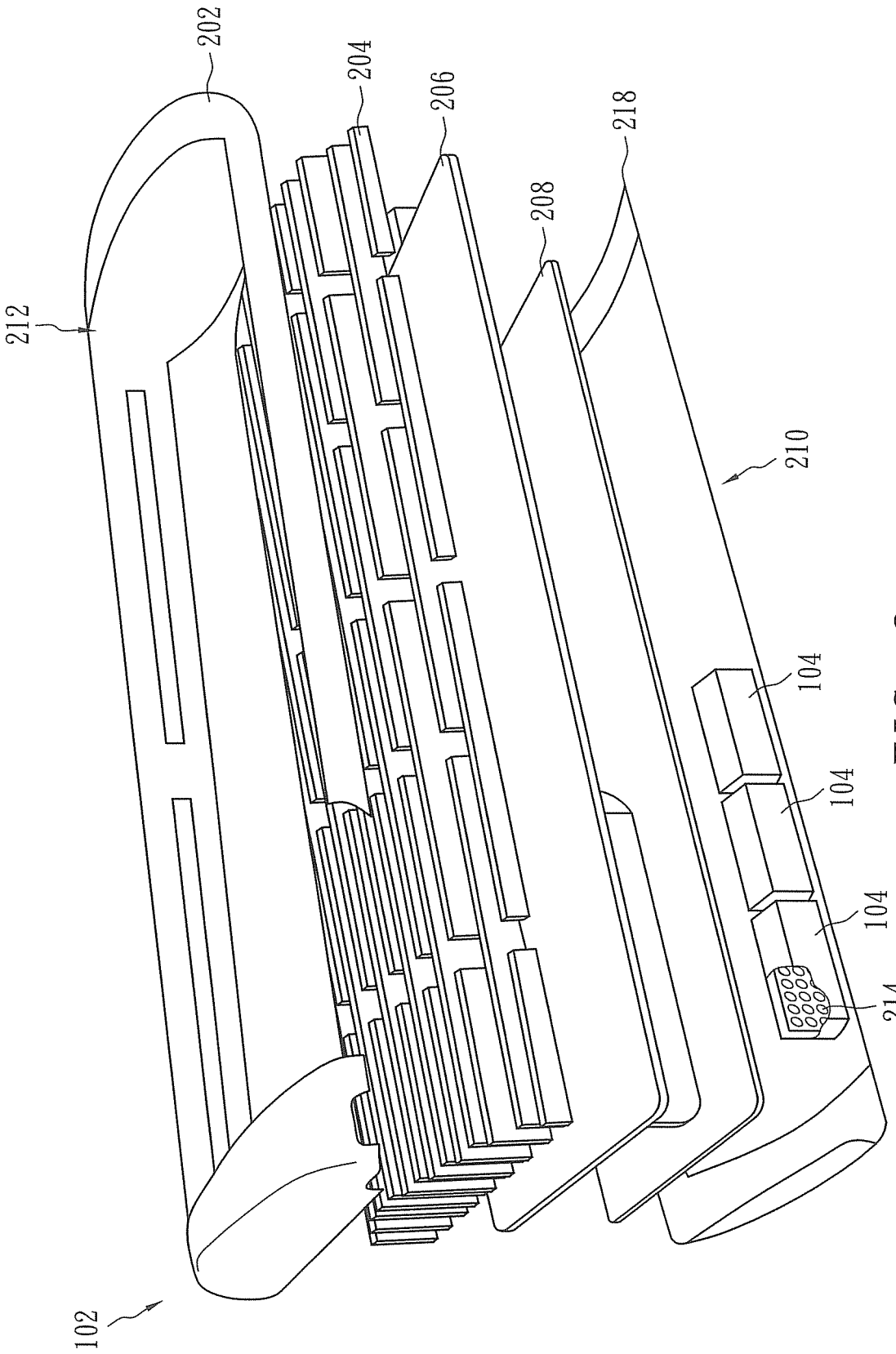

FIG. 2

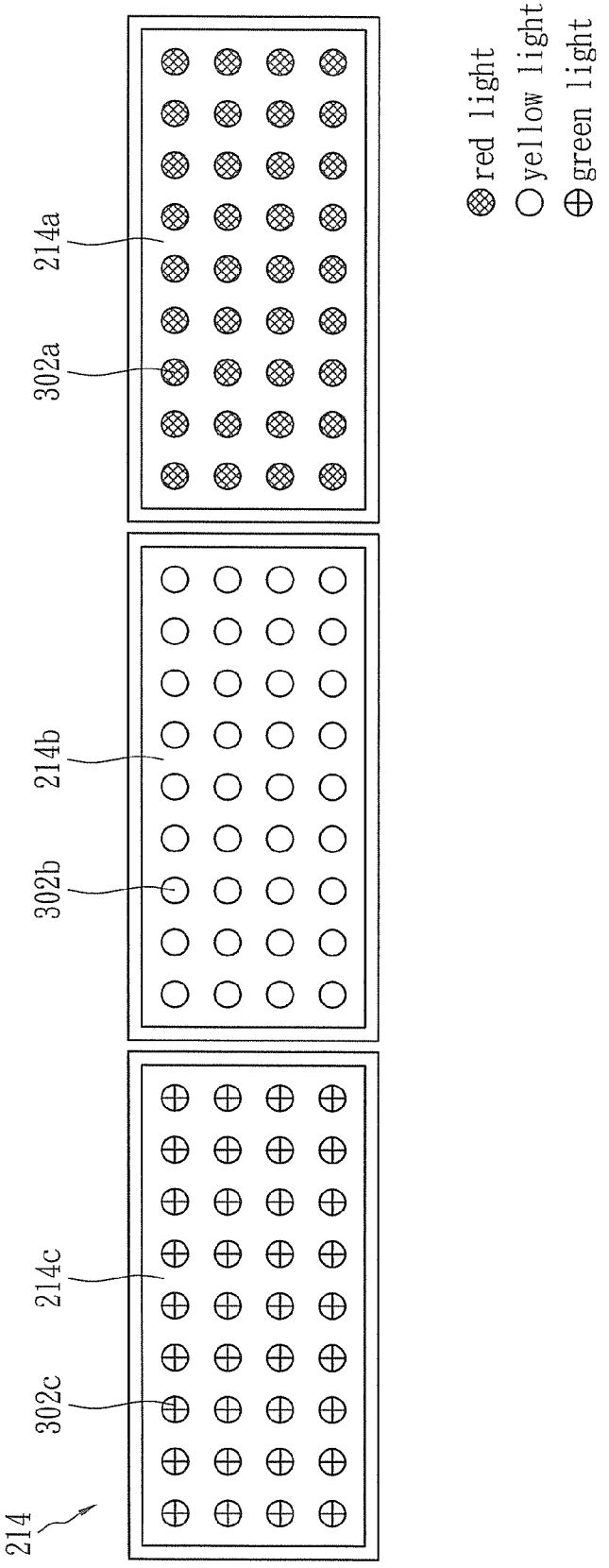
214
302c
214c
302b
214b
302a
214a
red light
yellow light
green light

FIG. 3

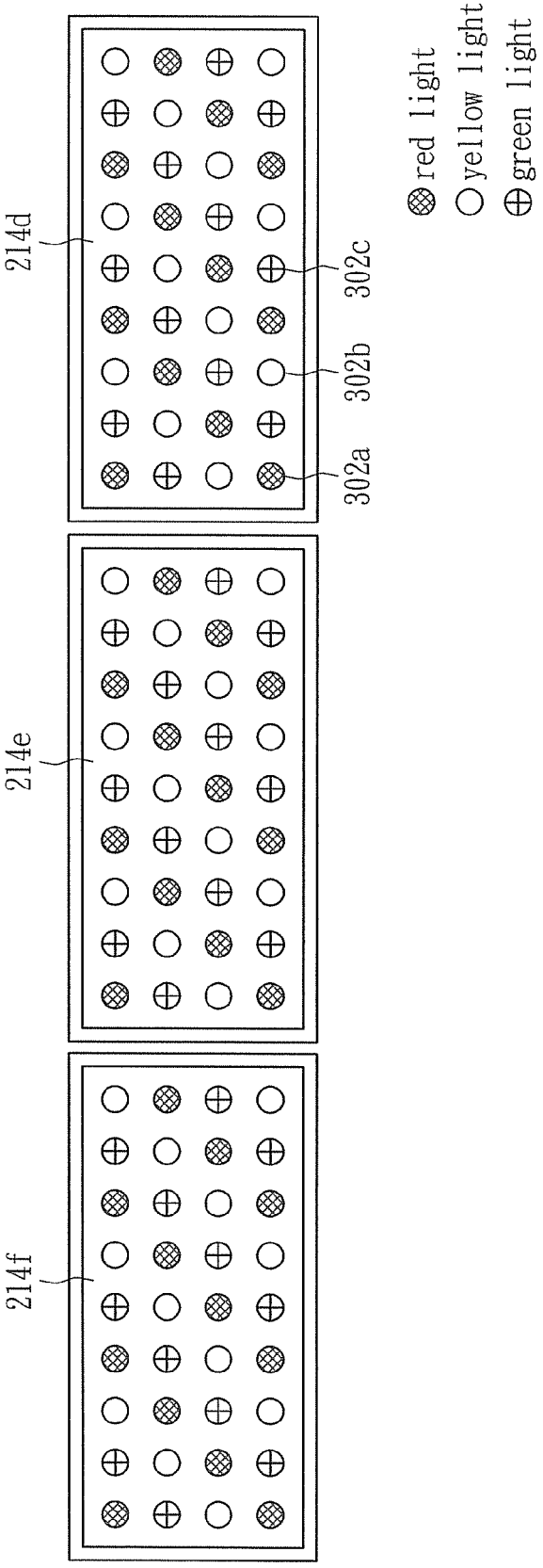
214d
214e
214f
302a
302b
302c
red light
yellow light
green light

FIG. 4

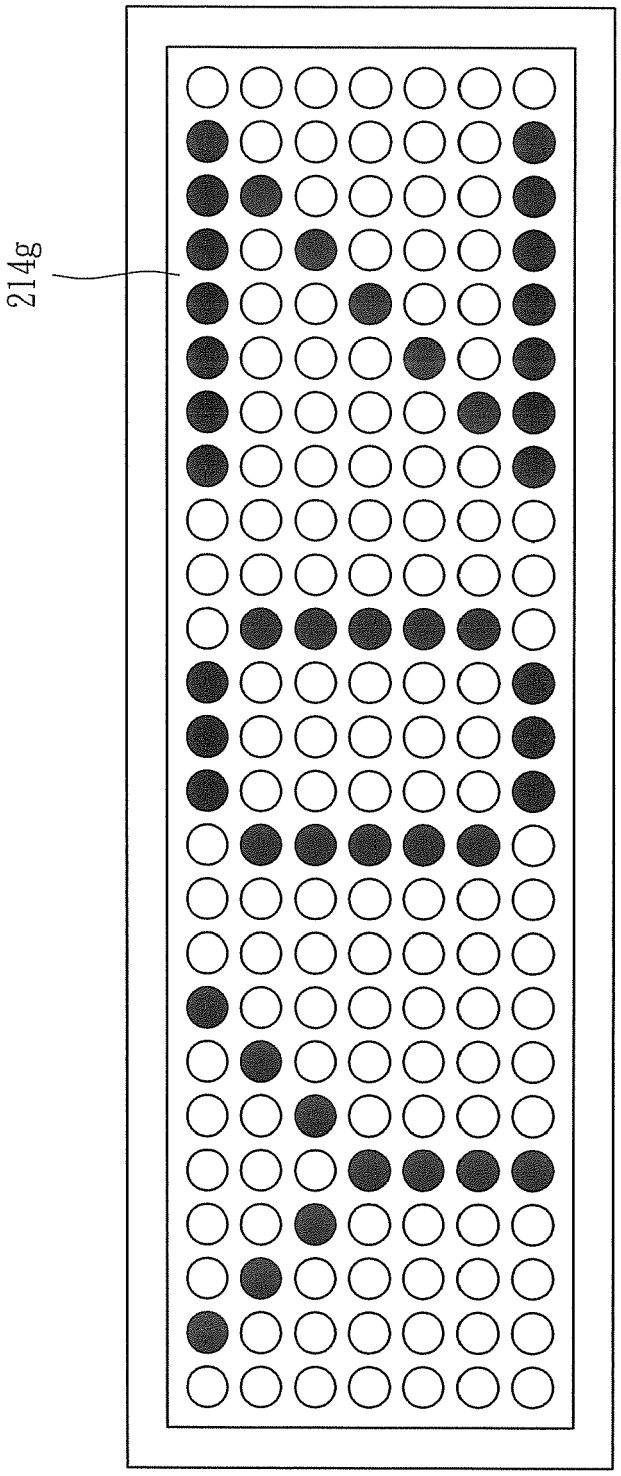

FIG. 5

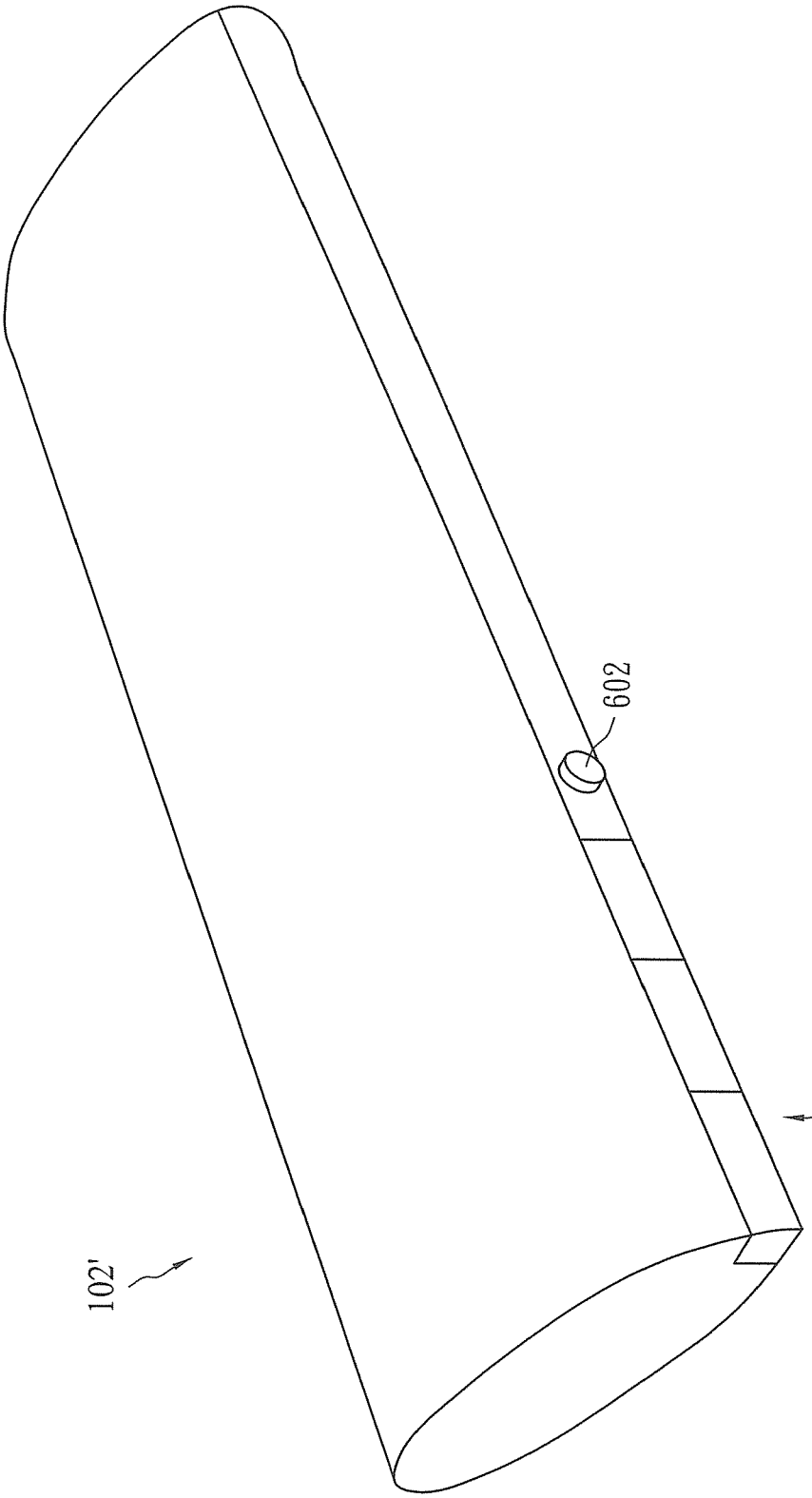

FIG. 6

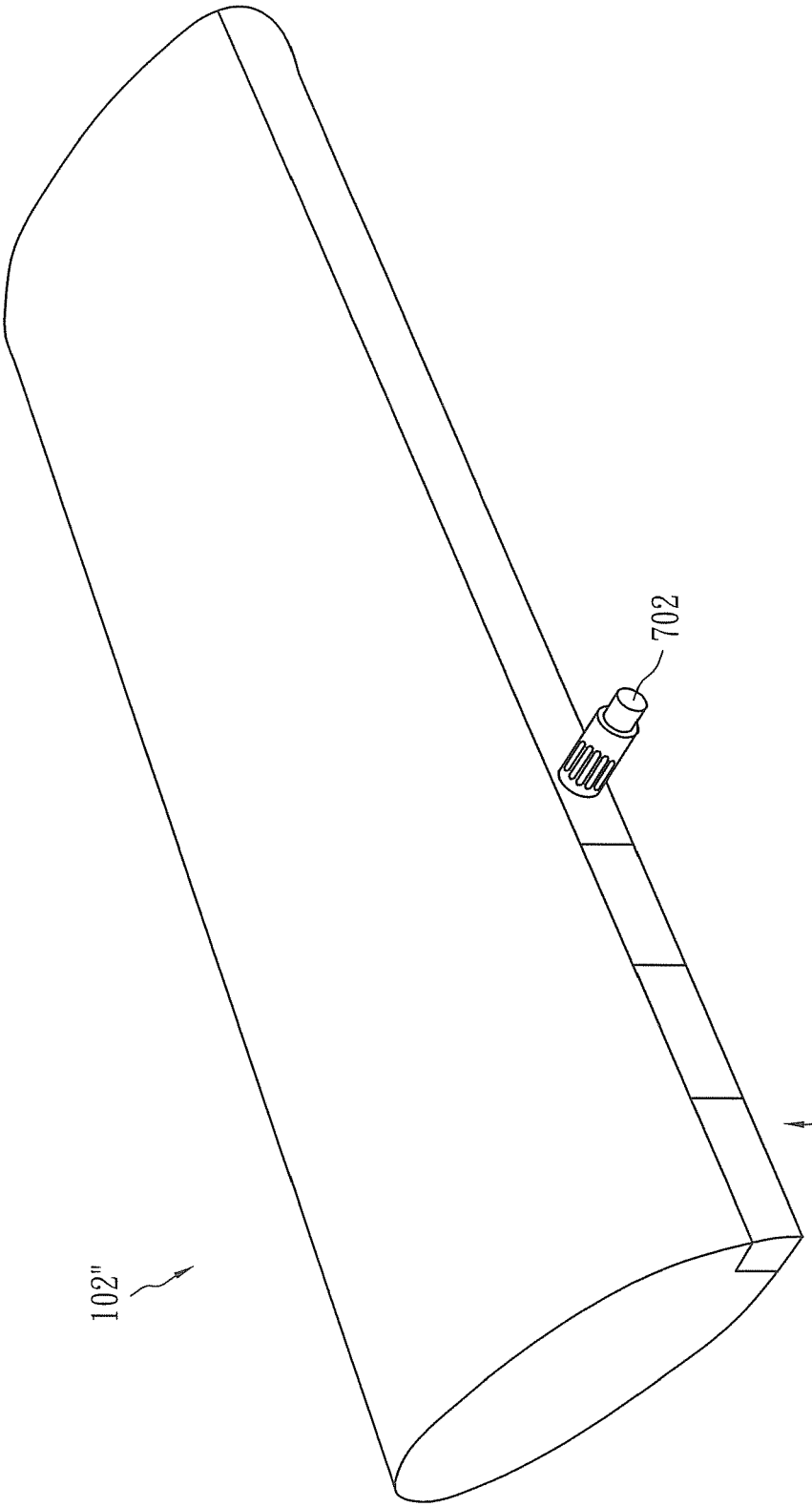

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 09 16 0434

DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	* page 1, line 16 - line 22 * * page 2, line 3 - line 92 * * figures 1-3 *	3-8, 11-15	F21S8/08 G08G1/095
	-----		ADD.
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A	* abstract * * figure 1 *	1	

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A	* paragraph [0007] *	1,9	

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A	* abstract * * column 8, line 59 - column 9, line 43 *	1,9	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 August 2009	Cosnard, Denis

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 16 0434

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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10-08-2009

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