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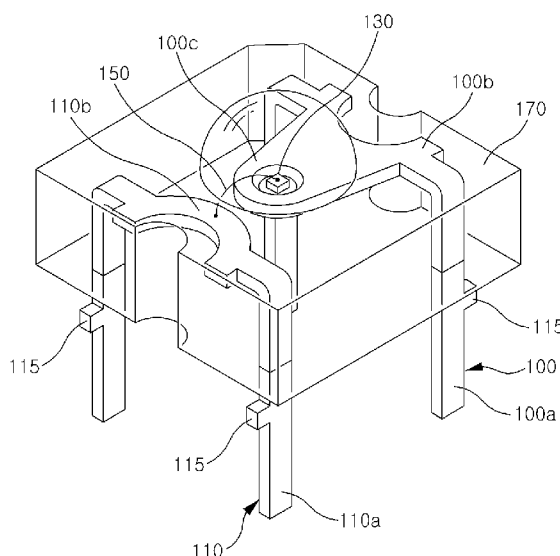
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(54) Title: LIGHT EMITTING ELEMENT



(57) Abstract: The present invention relates to a light emitting element, and more particularly, to a heat radiation structure of a light emitting element, which has leads, each lead having a plurality of leg sections, and a light emitting chip mounted on any one of the leads. The present invention can provide a high-efficiency light emitting element, in which a thermal load is reduced by widening a connecting section through which a lead and a chip seating section of the light emitting element are connected, and the heat generated from a heat source can be more rapidly radiated to the outside. Further, the present invention can also provide a high-efficiency light emitting element, in which heat radiation fins are formed between a stopper and a molding portion of a lead of the light emitting element so that natural convection can occur between the heat radiation fins, and an area in which heat radiation can occur is widened to maximize a heat radiation effect.

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Description

LIGHT EMITTING ELEMENT

Technical Field

- [1] The present invention relates to a light emitting element, and more particularly, to a heat radiation structure of a light emitting element, which has leads, each lead having a plurality of leg sections, and a light emitting chip mounted on any one of the leads.

Background Art

- [2] Fig. 1 is a perspective view of a light emitting element according to a prior art.
- [3] As shown in Fig. 1, a conventional light emitting element includes first and second leads 10 and 20; a light emitting chip 30 mounted on the first lead 10; a wire 40 connecting the light emitting chip 30 and the second lead 20; and a molding portion 50 encapsulating portions of the first and second leads 10 and 20 and the light emitting chip 30. At this time, each of the first and second leads 10 and 20 has two leg sections, which are connected to each other through a connecting section 10a at top portions of the leg sections. Particularly, the first lead 10 further includes a chip seating section 10b formed to extend from the connecting section toward a connecting section of the second lead 20, and the light emitting chip 30 is mounted on the chip seating section 10b.
- [4] In the aforementioned structure of the light emitting element according to the prior art, electric energy moves from the connecting section, as an electrical connecting section, to the chip seating section. Further, heat generated from the light emitting chip 20 also moves through the same path. However, since an existing lead is designed such that the connecting section 10a is narrower than the chip seating section 10b in order to reduce a material as shown in Fig. 1, a thermal load is concentrated therebetween, which results in a problem such as exfoliation. Moreover, since the area of a path through which heat flows is small, a relatively large amount of heat is not radiated. Therefore, there is a problem in a heat radiation effect.
- [5] Further, since the conventional light emitting element having the aforementioned configuration includes the leads, which protrude to the outside of the molding portion 50 only to receive external input without any additional structure, a surface area for heat radiation is limited. Accordingly, since convection naturally occurring due to a temperature difference is limited and thus heat radiation through the convection does not occur, so there is a problem in that the temperature of the entire light emitting element rises, and it is difficult to provide a high-efficiency light emitting element since the heat in the interior of the light emitting element is not rapidly radiated to the outside and thus a temperature difference between the interior and exterior of the light

emitting element is large.

Disclosure of Invention

Technical Problem

- [6] Accordingly, the present invention is conceived to solve the aforementioned problems in the prior art. An object of the present invention is to provide a high-efficiency light emitting element by improving a heat radiation structure thereof.

Technical Solution

- [7] In order to achieve the object, the present invention provides a light emitting element with a lead installed thereto, the lead including a plurality of leg sections branched to be spaced apart from each other, a connecting section for connecting the leg sections, and a chip seating section connected to the connecting section, wherein the minimum width of the connecting section is identical with or larger than the width of the chip seating section.
- [8] At least one of the leg sections may comprise a heat radiation fin extending toward another of the leg sections. Preferably, a stopper is formed to protrude on a central portion of the leg section, and the heat radiation fin is formed above the stopper. The leg section may comprise a lower leg portion and an upper leg portion having a width larger than the lower leg portion. The entire shape of the chip seating section and the connecting section may be a rectangle. However, the shape is not limited thereto. The chip seating section and the connecting section may be shaped so that the width of the entire shape thereof becomes narrow from the connecting section to a distal end of the chip seating section.
- [9] Further, the present invention provides a light emitting element with a lead installed thereto, the lead including a plurality of leg sections branched to be spaced apart from each other, wherein at least one of the leg sections comprises a heat radiation fin extending toward another of the leg sections.
- [10] Preferably, a stopper is formed to protrude on a central portion of the leg section, and the heat radiation fin is formed above the stopper. Further, it is preferred that the two leg sections be formed in parallel with each other. At this time, an upper portion of the leg section may be wider than a lower portion thereof.
- [11] In addition, the present invention provides a light emitting element with a lead installed thereto, the lead including leg sections branched to be spaced apart from each other, wherein at least one of the leg sections comprises a heat radiation fin extending opposite to another of the leg sections.
- [12] At this time, the light emitting element may further comprise a dummy lead branched to extend from an end of the heat radiation fin.
- [13] Further, preferably, the light emitting element comprises a molding portion en-

capsulating an end of the lead, and at least a portion of an end of the branched dummy lead is encapsulated by the molding portion.

Advantageous Effects

[14] As described above, the present invention can provide a high-efficiency light emitting element, in which a thermal load is reduced by widening a connecting section through which a lead and a chip seating section of the light emitting element are connected, and the heat generated from a heat source can be more rapidly radiated to the outside.

[15] Further, the present invention can also provide a high-efficiency light emitting element, in which heat radiation fins are formed between a stopper and a molding portion of a lead of the light emitting element so that natural convection can occur between the heat radiation fins, and an area in which heat radiation can occur is widened to maximize a heat radiation effect.

Brief Description of the Drawings

[16] Fig. 1 is a perspective view of a light emitting element according to a prior art;

[17] Fig. 2 is a perspective view of a light emitting element according to a first embodiment of the present invention;

[18] Fig. 3 is a perspective view of a light emitting element according to a modification of the first embodiment of the present invention;

[19] Fig. 4 is a perspective view of a light emitting element according to another modification of the first embodiment of the present invention;

[20] Fig. 5 is a perspective view of a light emitting element according to a second embodiment of the present invention;

[21] Fig. 6 is a perspective view of a light emitting element according to a modification of the second embodiment of the present invention;

[22] Fig. 7 is a perspective view of a light emitting element according to a third embodiment of the present invention; and

[23] Fig. 8 is a sectional view of a light emitting element according to a fourth embodiment of the present invention.

Best Mode for Carrying Out the Invention

[24] Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[25] However, the present invention is not limited to the embodiments but may be embodied into different forms. These embodiments are provided only for illustrative purposes and for full understanding of the scope of the present invention by those skilled in the art. Throughout the drawings, like elements are designated by like reference numerals.

- [26] Fig. 2 is a perspective view of a light emitting element according to a first embodiment of the present invention, Fig. 3 is a perspective view of a light emitting element according to a modification of the first embodiment of the present invention, and Fig. 4 is a perspective view of a light emitting element according to another modification of the first embodiment of the present invention.
- [27] As shown in Fig. 2, the light emitting element according to the first embodiment of the present invention includes first and second leads 100 and 110 having two pairs of leg sections 100a and 110a connected by connecting sections 100b and 110b, respectively; a chip seating section 100c formed to extend from the first connecting section 100b of the first lead 100 toward the second connecting section 110b of the second lead 110; a light emitting chip 130 mounted on the chip seating section 100c; a wire 150 connecting the light emitting chip 130 and the second lead 110; and a molding portion 170 encapsulating portions of the first and second leads 100 and 110, the light emitting chip 130 and the wire 150. At this time, each of the first and second leads 100 and 110 has two leg sections 100a or 110a, and each pair of the leg sections 100a and 110a are connected by the connecting section 100b or 110b at top portions of the leg sections.
- [28] Each of the first and second leads 100 and 110 is manufactured through a predetermined molding process, and comprises a pair of leg sections 100a and 110a and stoppers 115 formed at central portions of the leg sections 100a and 110a. The stoppers 115 are formed to protrude at the central portions of the leg sections 100a and 110a so that when the light emitting element is mounted on an element mounting member such as a substrate, only predetermined portions of the leg sections 100a and 110a are inserted into and supported on the element mounting member.
- [29] At this time, each of the leg sections 100a and 110a may have an upper leg portion 101a wider than a portion beneath the stopper 115 as shown in Figs. 3 and 4. That is, the portion inserted into a slot of an element mounting member such as a standardized or ready-made substrate may be formed to have the same dimension as the prior art, while the portion exposed above the element mounting member can be wider. In this case, since the width of the upper leg portion above the stopper 115 is larger than the size of a hole of the element mounting member through which a light emitting element will be mounted, the stopper 115 need not be formed.
- [30] The light emitting chip 130 is a vertical type light emitting chip and is mounted on a concave portion of the chip seating section 100c. At this time, the light emitting chip 130 may be a horizontal type light emitting chip of which first and second electrodes formed on the surfaces facing the same direction. In this case, an insulation may be formed between the horizontal type light emitting chip and the chip seating section 100c.

- [31] The wire 150 is used to connect the second electrode of the light emitting chip 130 and the second lead 110, and is generally formed of Au or Al. At this time, if the light emitting chip 130 is a horizontal type, the light emitting element may further include an additional metal wire for connecting the first electrode and the first lead 100.
- [32] The molding portion 170, which protects the light emitting chip 130 and wire 150, and fixes the first and second leads 100 and 110 to be spaced apart from each other at a predetermined interval, is formed of epoxy or silicone resin using a mold such as an additional mold cup. Further, a convex lens may be formed on a top of the molding portion 170. As shown in the figures, a light-gathering effect can be obtained by forming the convex lens on the top of the molding portion 170. The present invention is not limited thereto, it will be readily understood by those skilled in the art that various modifications and changes can be made thereto.
- [33] Further, a predetermined phosphor for obtaining the light emission with a desired color may be further included over the light emitting chip 130. For example, an inner molding portion heated and cured for a predetermined time may be formed in the interior of the chip seating section 100c by applying epoxy resin containing a phosphor thereto, and an outer molding portion of transparent epoxy resin may be formed around leading ends of the leads such that the transmittance of light emitted from the light emitting chip can be enhanced.
- [34] The chip seating section 100c on which the light emitting chip is mounted, is connected to the leg sections 100a through the first connecting section 100b. The light emitting chip 130 is mounted on the chip seating section 100c, and is formed in the shape of a concave portion so as to reflect light emitted from the light emitting chip 130 upward. Heat generated from the light emitting chip 130 when operating the light emitting element is conducted to the first leg sections 100a through the chip seating section 100c and the first connecting section, and the transmitted heat is radiated to the outside through distal ends of the leg sections 100a. At this time, electric energy moves from the first connecting section 100b, which is an electrical connecting section, to the chip seating section 100c. Further, the heat generated from the light emitting chip 130 also moves through the same path. Thus, in a case where the first connecting section 100b is narrow, a thermal load is concentrated thereat, thereby causing a problem such as exfoliation. Moreover, since the area of the path through which the heat flows is small, a large amount of heat does not escape, which results in a problem in a heat radiation effect. Accordingly, if the first connecting section 100b is widened compared with the chip seating section 100c as shown in Fig. 3, the heat conducted from the chip seating section 100c can be rapidly radiated to the outside without a bottle-neck phenomenon between the chip seating section 100c and the first connecting section 100b. Further, if the widths of the chip seating section 100c and the first connecting

section 100b are increased together and thus the chip seating section 100c is in the shape of a rectangle as shown in Fig. 4, the heat can be conducted more rapidly compared with the first connecting section 100b having the width gradually increased. That is, the first connecting section 100b is designed in various shapes to have the minimum width identical with or larger than the width of the chip seating section 100c, so that the heat generated from the light emitting chip 130 can be rapidly radiated to the outside without the bottle-neck phenomenon between the chip seating section 100c and the first connecting section 100b.

[35] The comparison of heat radiation effects depending on the widths of the first connecting section 100b and the chip seating section 100c will be described with reference to the following table.

[36] The following Table 1 is to compare the temperature of the light emitting elements according to the prior art and the first embodiment of the present invention. The maximum temperature is measured from the light emitting chip 130, the minimum temperature is measured from an outer surface of the light emitting element. The temperature difference is a difference value between the maximum and minimum temperatures. According to the following Table 1, in a case where the first connecting section 100b is wider than the chip seating section 100c, each of the maximum and minimum temperatures of the light emitting element according to the present invention is lower by about 1°C than that of the prior art. Further, in a case where the widths of the first connecting section 100b and the chip seating section 100c are increased together to be in the shape of a rectangle as shown in Fig. 4, it can be seen that each of the maximum and minimum temperatures of the light emitting element according to the present invention is lower by about 5°C than that of the prior art, and the temperature differences of the present light emitting element are also lowered. Comparing values of the following Table 1, it can be understood that a heat radiation effect is superior when the widths of the first connecting section 100b and the chip seating section 100c are increased together to that when only the width of the first connecting section 100b is increased.

[37] Table 1

	Max. Temp.[°C]	Min. Temp. [°C]	Temp. Diff. [°C]
Prior art	60.6	50.7	9.9
Increased width of connecting section	59.7	50.1	9.6
Increased widths of connecting section and chip seating section	55.3	46.8	8.5

[38] Hereinafter, a process of manufacturing the light emitting element according to the first embodiment of the present invention will be briefly described.

[39] Referring to Fig. 2, first, through a predetermined molding process, there are provided the first lead 100 having the pair of first leg sections 100a and the chip seating section 100c connected to the first leg sections 100a through the first connecting section 100b, and the second lead 110 having the pair of second leg sections 110a connected through the second connecting section 110b.

[40] Thereafter, the light emitting chip 130 is mounted on the concave portion of the chip seating section 100c of the first lead 100. The light emitting chip 130 is a vertical type light emitting chip, and an adhesive agent (not shown) is interposed between the light emitting chip 130 and the chip seating section 100c. At this time, the light emitting chip 130 may be a horizontal type light emitting chip of which the first and second electrodes are formed on the surfaces facing the same direction. In this case, an insulation may be formed between the horizontal type light emitting chip and the chip seating section 100c.

[41] Next, the wire 150 for connecting the light emitting chip 130 and the second lead 110 is formed through a wire bonding process.

[42] Thereafter, the molding portion 170 encapsulating the light emitting chip 130 and the wire 150 is formed by injecting a certain amount of liquid epoxy or silicone resin into a prepared mold cup and then dipping the lead with the light emitting chip 130 mounted thereon within the mold cup for a predetermined time at a certain temperature.

[43] After the molding portion 170 is cured, the mold cup is removed and unnecessary portions except the first and second leads 100 and 110 are trimmed, thereby completing the light emitting element according to the first embodiment of the present invention.

[44] Next, a light emitting element according to a second embodiment of the present invention will be described with reference to the drawings. Descriptions overlapping with the aforementioned descriptions of the light emitting element according to the first embodiment of the present invention will be omitted or briefly described herein. At this time, all the descriptions of the first embodiment can be applied to the following embodiments, and the descriptions of the following embodiments can also be applied to the first embodiment.

[45] Fig. 5 is a perspective view of a light emitting element according to a second embodiment of the present invention, and Fig. 6 is a perspective view of a light emitting element according to a modification of the second embodiment of the present invention.

[46] As shown in Fig. 5, the light emitting element according to the second embodiment

of the present invention includes first and second leads 100 and 110 having two pairs of leg sections connected through first and second heat radiation fins 100d and 110c; a light emitting chip 130 mounted on the first lead 100; a wire 150 connecting the light emitting chip 130 and the second lead 110; and a molding portion 170 encapsulating portions of the first and second leads 100 and 110, the light emitting chip 130 and the wire 150. At this time, each of the first and second lead 100 and 110 has two leg sections, and the leg sections are connected through a connecting section at top portions thereof. Particularly, the first lead 100 further includes a chip seating section 100c formed to extend from the connecting section toward a connecting section of the second lead 110, and the light emitting chip 130 is mounted on the chip seating section 100c.

[47] Each of the first and second leads 100 and 110 is manufactured through a predetermined molding process, and comprises a pair of leg sections and stoppers 115 formed at central portions of the leg sections. The light emitting chip 130 is mounted on the chip seating section 100c of the first lead 100, and the chip seating section 100c is formed in the shape of a concave portion to reflect light emitted from the light emitting chip 130 upward. When the light emitting element is mounted on an element mounting member such as a substrate, the stoppers 115 cause only predetermined portions of the leg sections to be inserted into and supported on the element mounting member. The first and second heat radiation fins 100d and 110c are formed on regions between the stoppers 115 and the molding portion 170. The two leg sections of the first lead 100 are connected to each other through the first heat radiation fin 100d, and the two leg sections of the second lead 110 are also connected to each other through the second heat radiation fin 110c.

[48] At this time, each of the leg sections may have an upper leg portion wider than a portion beneath the stopper 115 as shown in Fig. 6. That is, the portion inserted into a slot of an element mounting member such as a standardized or ready-made substrate may be formed to have the same dimension as the prior art, while the portion exposed above the element mounting member can be wider. In this case, since the width of the upper leg portion above the stopper 115 is larger than the size of a hole of the element mounting member through which a light emitting element will be mounted, the stopper 115 need not be formed. As described above, since the first and second heat radiation fins 100d and 110c are formed between the leg sections of the leads, the light emitting element according to this embodiment has a heat radiation area wider than the light emitting element according to the prior art. Thus, according to the present invention, there is an advantage in that a high-efficiency light emitting element can be manufactured.

[49] The first and second heat radiation fins 100d and 110c, which are to rapidly radiate

the heat generated from the light emitting chip 130 to the outside when operating the light emitting element, are made of the same material as the first and second leads 100 and 110. The first heat radiation fin 100d is formed such that the two leg sections of the first lead 100 are connected to each other. Further, the two leg sections of the second lead 110 are also connected to each other through the second heat radiation fin 110c. However, the present invention is not limited thereto. That is, the leg sections of each of the first and second leads 100 and 110 may not be connected to each other by the heat radiation fin, and the heat radiation fin may be formed on only one of the leg sections. Further, the shape of the first and second heat radiation fins 100d and 110c is not limited to a bar shown in Figs. 5 and 6, but may be varied depending on the heat radiation performance and usage of the light emitting element. Preferably, the aforementioned first and second heat radiation fins 100d and 110c may be formed on the leg section between the stopper 115 and the molding portion 170 such that the heat radiation fins do not affect the mount of the light emitting element on the element mounting member such as a substrate. Further, since when two or more heat radiation fins are formed, a convection phenomenon occurs between the heat radiation fins, a high heat radiation effect can be expected as compared with when only one heat radiation fin is formed.

[50] Meanwhile, if the surface of the element mounting member, to which the leg sections of the light emitting element are mounted, is made of an insulation or a corresponding electrode pattern is formed, the stoppers 115 can be removed and the lowermost positioned first and second heat radiation fins 100d and 110c can serve as the stoppers 115.

[51] The following Table 2 is to compare the temperature of the light emitting elements according to the prior art and the second embodiment of the present invention. The maximum temperature is measured from the light emitting chip 130, the minimum temperature is measured from an outer surface of the light emitting element. The temperature difference is a difference value between the maximum and minimum temperatures. According to the following Table 2, it can be seen that both maximum and minimum temperatures of the light emitting element of the present invention are lower by about 10°C than those of the light emitting element according to the prior art, and the temperature difference between the maximum and minimum temperatures is also small in the present invention. Accordingly, since the light emitting element according to the present invention radiates internal heat more rapidly than the light emitting element according to the prior art, a high-efficiency light emitting element can be provided.

[52] Table 2

	Max. Temp. [°C]	Min. Temp. [°C]	Temp. Diff. [°C]
Prior art	60.6	50.7	9.9
Present Invention	51.3	43.8	7.5

- [53] Hereinafter, a process of manufacturing the light emitting element according to the second embodiment of the present invention will be briefly described.
- [54] Referring to Figs. 5 and 6, first, through a predetermined molding process, there are provided the first lead 100 having the pair of leg sections and the stoppers 115 and first heat radiation fin 100d formed on the leg sections, and the second lead 110 having the second heat radiation fin 110c formed thereon. At this time, the first and second heat radiation fins 100d and 100c can be formed after the first and second leads 100 and 110 are manufactured.
- [55] Thereafter, the light emitting chip 130 is mounted on the concave portion of the chip seating section 100c of the first lead 100. The light emitting chip 130 is a vertical type light emitting chip, and an adhesive agent (not shown) is interposed between the light emitting chip 130 and the chip seating section 100c. The wire 150 for connecting the light emitting chip 130 and the second lead 110 is formed through a wire bonding process.
- [56] Thereafter, the molding portion 170 encapsulating the light emitting chip 130 and the wire 150 is formed by injecting a certain amount of liquid epoxy or silicone resin into a prepared mold cup and then dipping the lead with the light emitting chip 130 mounted thereon within the mold cup for a predetermined time at a certain temperature.
- [57] After the molding portion 170 is cured, the mold cup is removed and unnecessary portions except the first and second heat radiation fins 100d and 110c and the first and second leads 100 and 110 are trimmed, thereby completing the light emitting element according to the second embodiment of the present invention.
- [58] Next, a light emitting element according to a third embodiment of the present invention will be described with reference to the drawings. Descriptions overlapping with the aforementioned embodiments will be omitted or briefly described herein.
- [59] Fig. 7 is a perspective view of a light emitting element according to a third embodiment of the present invention.
- [60] As shown in Fig. 7, the light emitting element according to the third embodiment of the present invention includes first and second leads 100 and 110 having two pairs of leg sections 100a and 110a connected by connecting sections 100b and 110b, respectively; a chip seating section 100c formed to extend from the first connecting section 100b of the first lead 100 toward the second connecting section 110b of the

second lead 110; a light emitting chip 130 mounted on the chip seating section 100c; a wire 150 connecting the light emitting chip 130 and the second lead 110; and a molding portion 170 encapsulating portions of the first and second leads 100 and 110, the light emitting chip 130 and the wire 150. At this time, each of the first and second leads 100 and 110 has two leg sections 100a or 110a, and each pair of the leg sections 100a and 110a are connected by the connecting section 100b or 110b at top portions of the leg sections.

[61] The chip seating section 100c on which the light emitting chip is mounted, is connected to the leg sections 100a through the first connecting section 100b. The light emitting chip 130 is mounted on the chip seating section 100c, and is formed in the shape of a concave portion so as to reflect light emitted from the light emitting chip 130 upward. Heat generated from the light emitting chip 130 when operating the light emitting element is conducted to the first leg sections 100a through the chip seating section 100c and the first connecting section, and the transmitted heat is radiated to the outside through distal ends of the leg sections 100a.

[62] As described above, if the first connecting section 100b is widened compared with the chip seating section 100c, the heat conducted from the chip seating section 100c can be rapidly radiated to the outside without a bottle-neck phenomenon between the chip seating section 100c and the first connecting section 100b. That is, the first connecting section 100b is designed in various shapes to have the minimum width identical with or larger than the width of the chip seating section 100c, so that the heat generated from the light emitting chip 130 can be rapidly radiated to the outside without the bottle-neck phenomenon between the chip seating section 100c and the first connecting section 100b.

[63] The first and second heat radiation fins 100d and 110c, which are to rapidly radiate the heat generated from the light emitting chip 130 to the outside when operating the light emitting element, are made of the same material as the first and second leads 100 and 110. The first heat radiation fin 100d is formed such that the two leg sections of the first lead 100 are connected to each other. Further, the two leg sections of the second lead 110 are also connected to each other through the second heat radiation fin 110c. However, the present invention is not limited thereto. That is, the leg sections of each of the first and second leads 100 and 110 may not be connected to each other by the heat radiation fin, and the heat radiation fin may be formed on only one of the leg sections. Further, the shape of the first and second heat radiation fins 100d and 110c is not limited to a bar shown in Figs. 5 and 6, but may be varied depending on the heat radiation performance and usage of the light emitting element. Preferably, the aforementioned first and second heat radiation fins 100d and 110c may be formed on the leg section between the stopper 115 and the molding portion 170 such that the heat

radiation fins do not affect the mount of the light emitting element on the element mounting member such as a substrate. Further, since when two or more heat radiation fins are formed, a convection phenomenon occurs between the heat radiation fins, a high heat radiation effect can be expected as compared with when only one heat radiation fin is formed.

[64] Meanwhile, in the light emitting elements according to this embodiment, a heat radiation effect can be more enhanced by making an upper portion of the leg section wider than a lower portion beneath the stopper 115 as in the previous embodiments.

[65] As described above, the light emitting element according to this embodiment may have the combination of the aforementioned advantages of the first and second embodiments of the present invention, so that superior heat radiation performance can be expected.

[66] Next, a light emitting element in which heat radiation fins are applied to a lamp type light emitting element, as a fourth embodiment of the present invention, will be described. Descriptions overlapping with the aforementioned embodiments will be omitted or briefly described herein.

[67] Fig. 8 is a sectional view of a light emitting element according to a fourth embodiment of the present invention.

[68] As shown in Fig. 8, the light emitting element according to the fourth embodiment of the present invention includes first and second leads 100 and 110 having dummy leads formed thereon; a light emitting chip 130 mounted on the first lead 100; a wire 150 connecting the light emitting chip 130 and the second lead 110; and a molding portion 170 encapsulating the light emitting chip and the wire 150.

[69] The first and second leads 100 and 110 are formed of a metal such as Cu or Al through a predetermined pressing process. The first and second leads 100 and 110 are formed with the dummy leads 116. One of the dummy leads 116 and the first lead 100 are connected through a first heat radiation fin 100d, and the other of the dummy leads 116 and the second lead 110 are connected through a second heat radiation fin 110c. Further, it is preferred that at least a portion of each dummy lead 116 be encapsulated by the molding portion 170 such that the dummy leads 116 are stably supported and the heat radiation performance is enhanced. At this time, the dummy lead 116 may be formed at any one of the first and second leads 100 and 110, and the number and shape of the dummy leads may be changed depending on the performance and usage of the light emitting element. Each of the first and second leads 100 and 110 further includes a stopper 115, which allows a certain portion of the lead to be inserted into an element mounting member. However, the dummy lead 116 may be used as the stopper 115 by adjusting the position of the dummy lead 116. In this case, the stopper 115 need not be formed. Further, the dummy leads 116 also function as heat radiation fins, and radiate

more heat to the outside as compared with when only the first and second heat radiation fins 100d and 110c are formed. Accordingly, there is an advantage in that it is easy to provide a high-efficiency light emitting element.

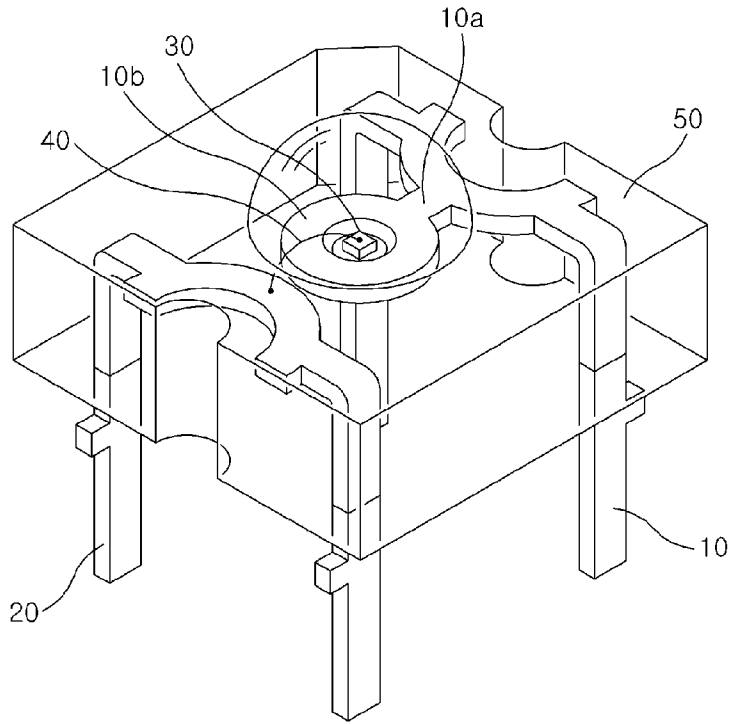
[70] Although the present invention has been described with reference to the accompanying drawings and embodiments, it will be understood by those skilled in the art that various changes and modifications can be made thereto without departing from the technical spirit and scope of the present invention.

Claims

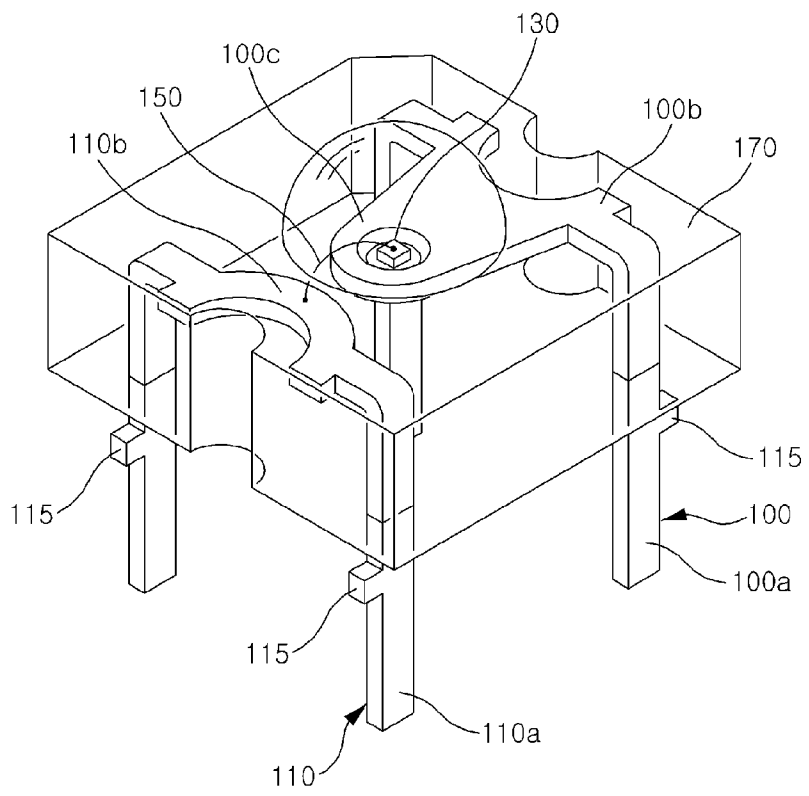
- [1] A light emitting element with a lead installed thereto, the lead including a plurality of leg sections branched to be spaced apart from each other, a connecting section for connecting the leg sections, and a chip seating section connected to the connecting section, wherein the minimum width of the connecting section is identical with or larger than the width of the chip seating section.
- [2] The light emitting element as claimed in claim 1, wherein at least one of the leg sections comprises a heat radiation fin extending toward another of the leg sections.
- [3] The light emitting element as claimed in claim 2, wherein a stopper is formed to protrude on a central portion of the leg section, and the heat radiation fin is formed above the stopper.
- [4] The light emitting element as claimed in any one of claims 1 to 3, wherein the leg section comprises a lower leg portion and an upper leg portion having a width larger than the lower leg portion.
- [5] The light emitting element as claimed in any one of claims 1 to 3, wherein the chip seating section and the connecting section are shaped so that the width of the entire shape thereof becomes narrow from the connecting section to a distal end of the chip seating section.
- [6] A light emitting element with a lead installed thereto, the lead including a plurality of leg sections branched to be spaced apart from each other, wherein at least one of the leg sections comprises a heat radiation fin extending toward another of the leg sections.
- [7] The light emitting element as claimed in claim 6, wherein a stopper is formed to protrude on a central portion of the leg section, and the heat radiation fin is formed above the stopper.
- [8] The light emitting element as claimed in claim 7, wherein the leg section comprises a lower leg portion and an upper leg portion having a width larger than the lower leg portion.
- [9] A light emitting element with a lead installed thereto, the lead including leg sections branched to be spaced apart from each other, wherein at least one of the leg sections comprises a heat radiation fin extending opposite to another of the leg sections.
- [10] The light emitting element as claimed in claim 9, further comprising a dummy lead branched to extend from an end of the heat radiation fin.
- [11] The light emitting element as claimed in claim 10, wherein the light emitting

element comprises a molding portion encapsulating an end of the lead, and at least a portion of an end of the branched dummy lead is encapsulated by the molding portion.

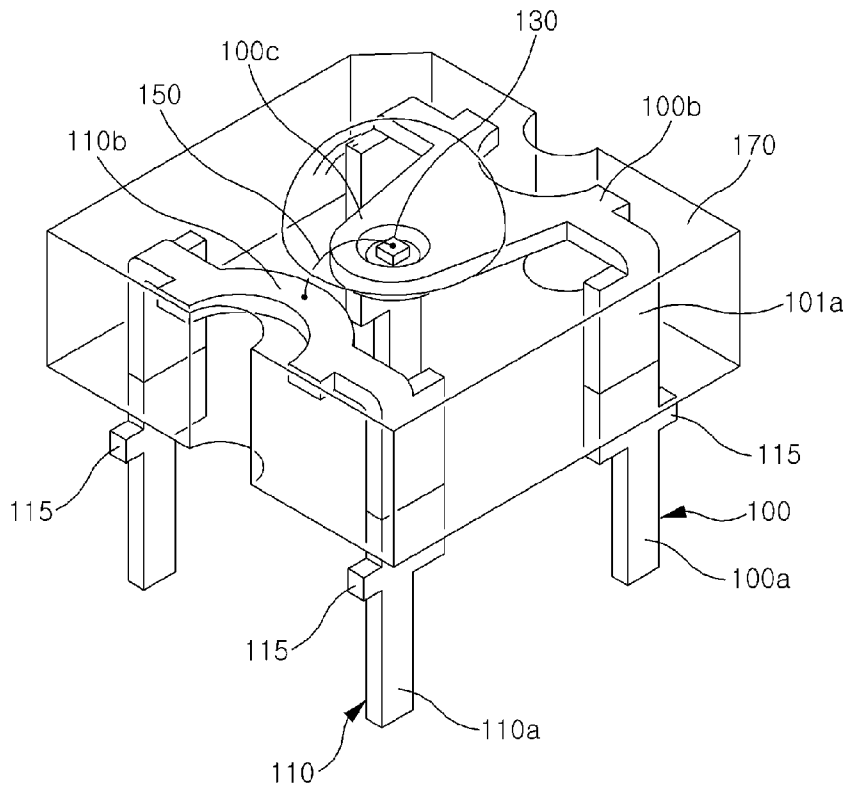
[Fig. 1]



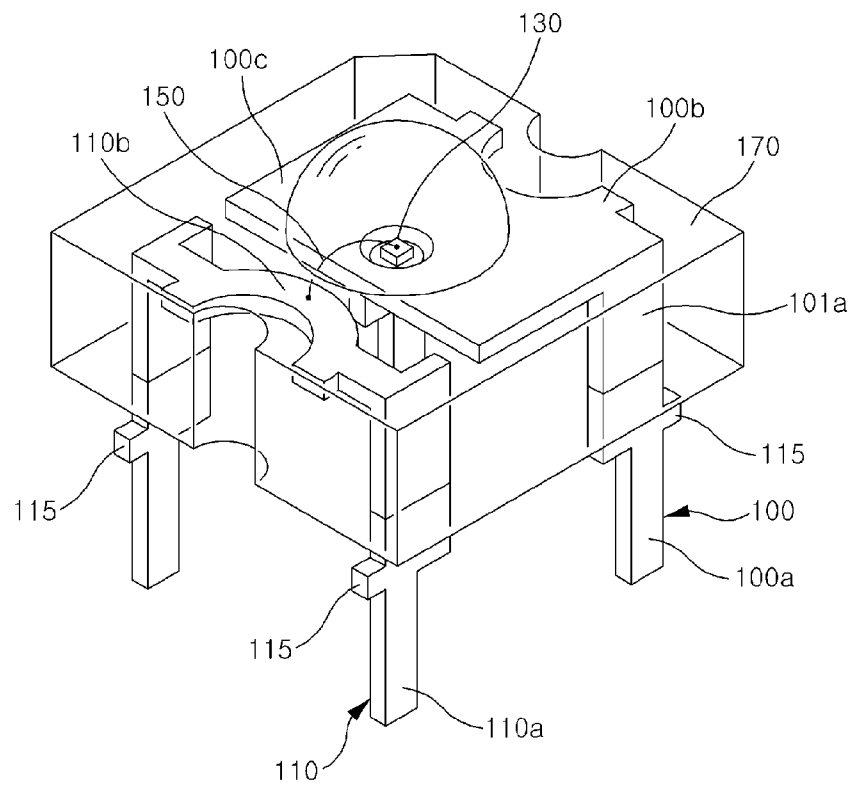
[Fig. 2]



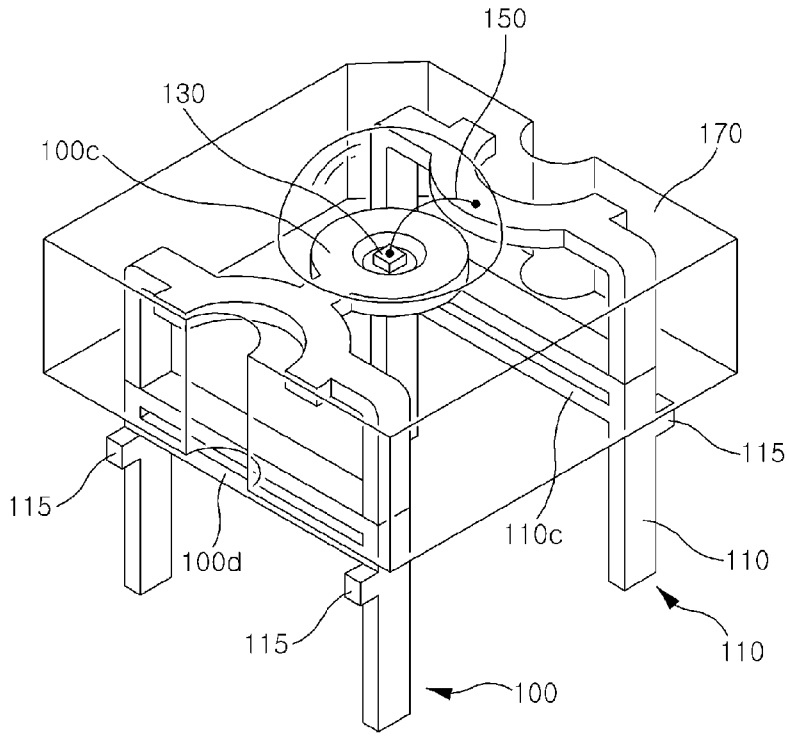
[Fig. 3]



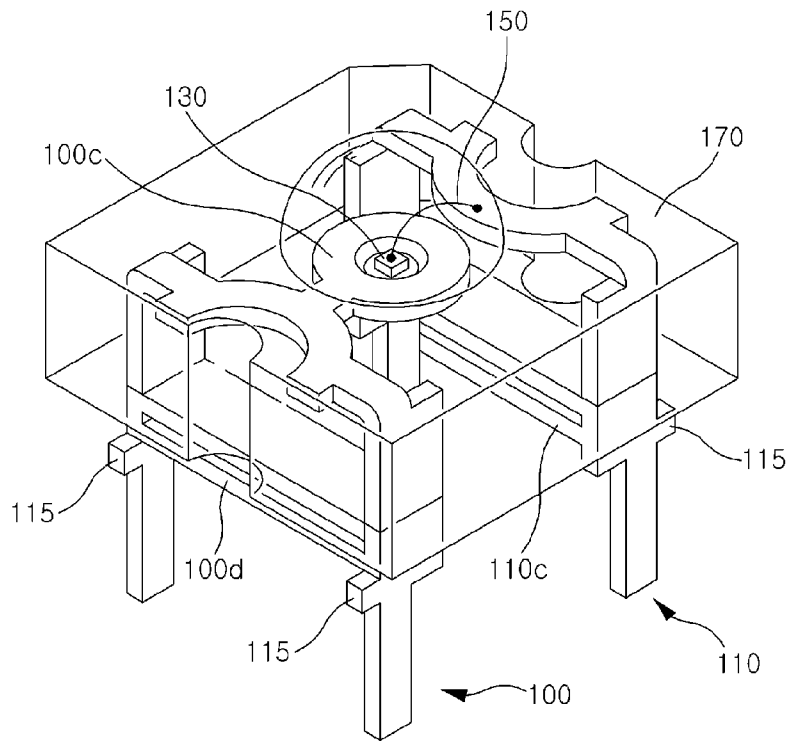
[Fig. 4]



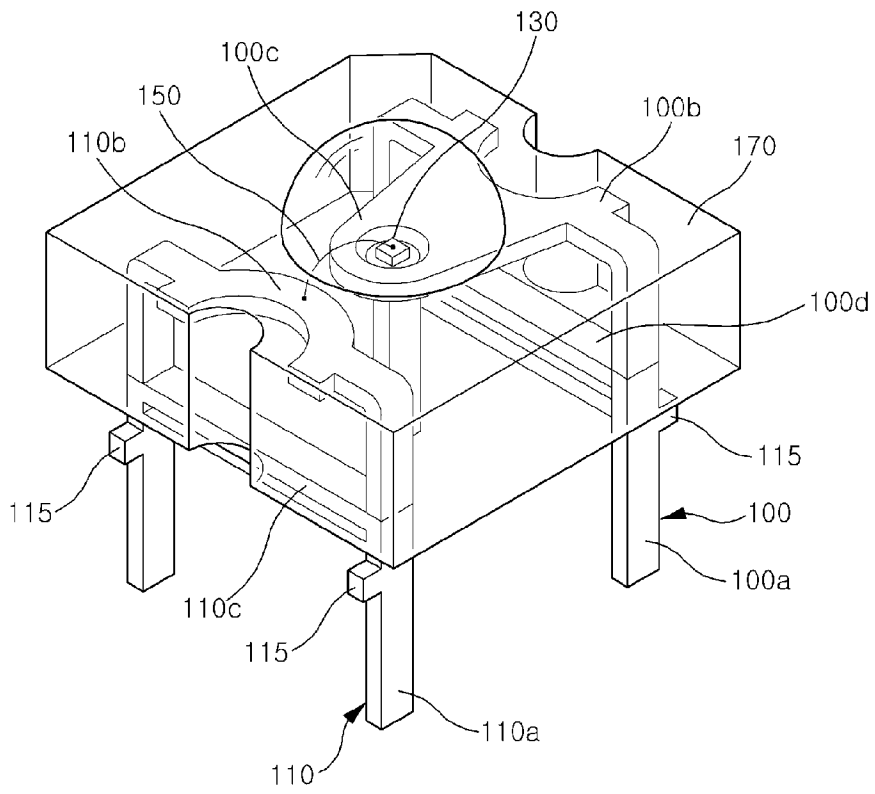
[Fig. 5]



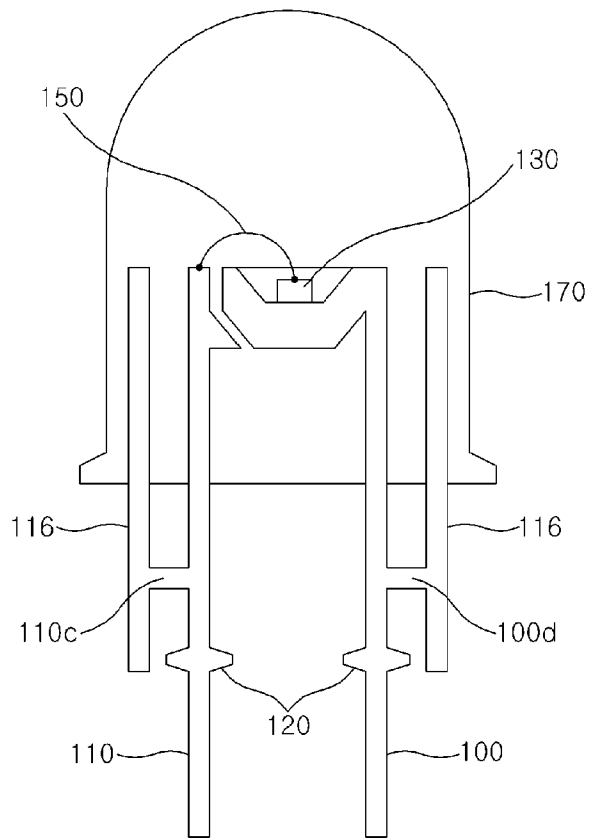
[Fig. 6]



[Fig. 7]



[Fig. 8]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2006/004898**A. CLASSIFICATION OF SUBJECT MATTER***H01L 33/00(2006.01)i*

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC8: H01L 33/00 BF21V7/04 G02F1/00 H01L23/495 H04B10/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR, JP: classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

JPA, NPS, ESPACENET, USPTO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 06494597 2002/12/17 Yu, San-Hua see the whole document, especially claim 1, fig. 1	1-11
A	US 06483623 2002/11/19 Dowa Mining Co., Ltd. see the whole document, especially fig. 1-5	1-11
A	US 05557115 1996/09/17 Rohm Co. Ltd. see the whole document, especially fig. 12	1-11
A	JP 03109781 1991/05/09 MATSUSHITA ELECTRIC WORKS LTD see the whole document, especially fig. 3, 4	1-11

 Further documents are listed in the continuation of Box C. See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

15 FEBRUARY 2007 (15.02.2007)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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