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Mori

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[54] **HEAT RADIATING DEVICE FOR ILLUMINATING APPARATUS**

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Mar. 21, 1972 Japan 47/27398

[52] **U.S. Cl.** **240/47**

[51] **Int. Cl.** **F21v 29/00**

[58] **Field of Search** 240/47

[56] **References Cited**

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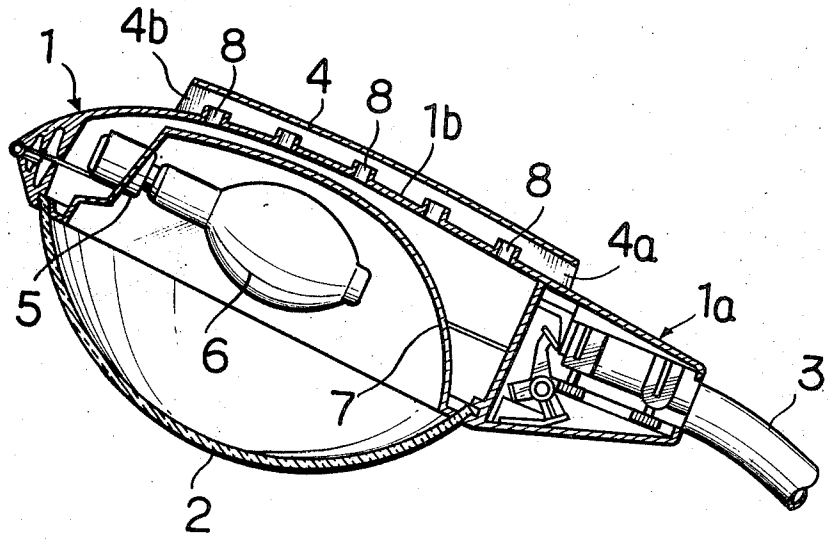
[57] **ABSTRACT**

A heat radiating device for use in an illuminating apparatus comprising a heat radiating member secured to a wall of a body of said apparatus and formed with end openings at the opposite ends thereof. Air vent means adapted to establish air communication between the inside of said body and the atmosphere pass through the inside of the heat radiating member. As a result the temperature rise of the apparatus which is caused by a lamp bulb therein can be kept below a certain value and the life of the bulb can be increased. Additionally, stainless steel which has not been used in the past in the construction of the apparatus because of its relatively low heat conductivity may now be used so that the painting process applied to said body may be eliminated and the durability of said body may be increased.

6 Claims, 4 Drawing Figures



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SHEET 1 OF 2

Fig. 1

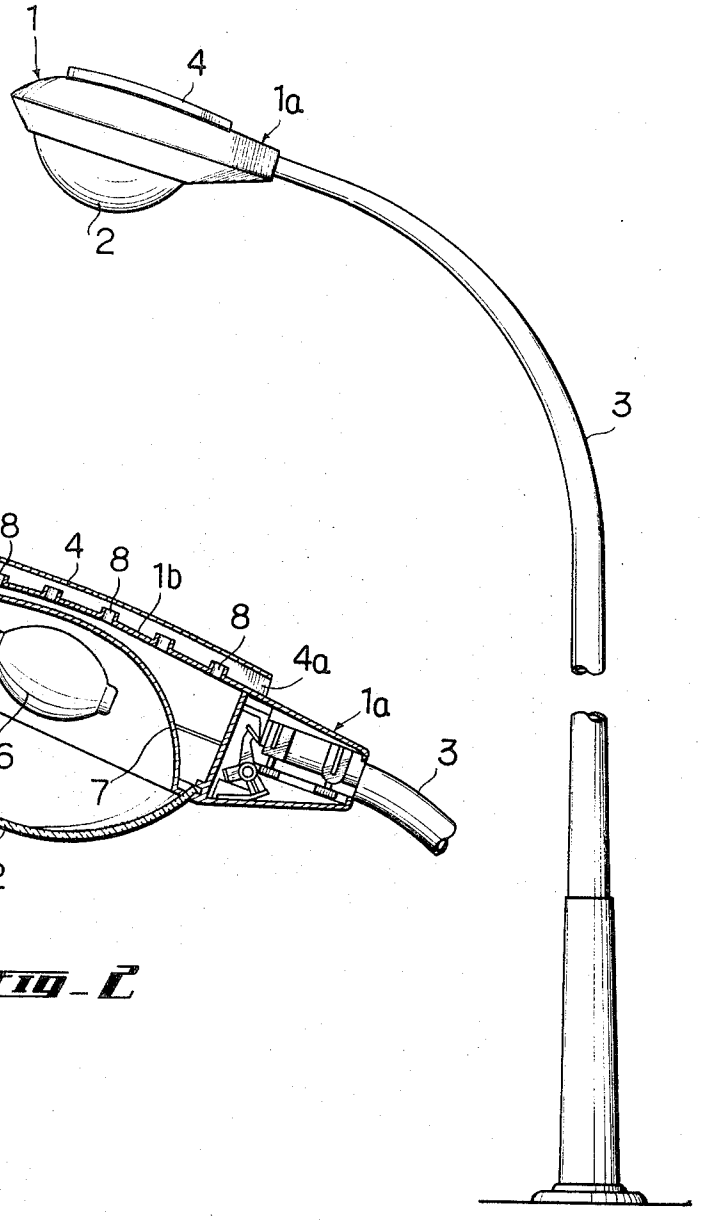


Fig. 2

Fig - 3

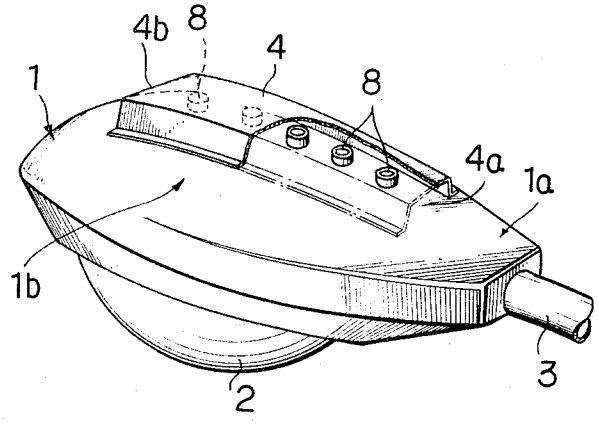
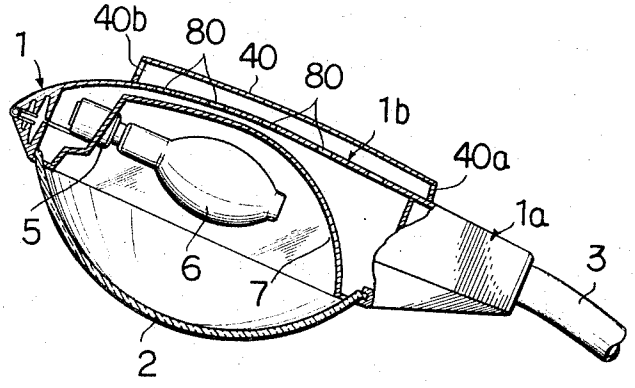


Fig - 4



HEAT RADIATING DEVICE FOR ILLUMINATING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a heat radiating device for use in an illuminating apparatus, particularly in an apparatus such as a street lamp which has a high power electric bulb therein and which adapted to be installed in the open air.

2. Description of the Prior Art

A street lamp is normally installed at the tip of a supporting post and positioned at a distance of about 6 to 8 meters above the ground. Since a high power electric bulb of about 400 to 700 watt is turned on in a body of such apparatus a very high temperature is created around said bulb. For example when a 700 watt bulb is used a temperature of 300°C or more has been experienced.

Since a street lamp is normally used in the open air, it is necessary to make the body of the lamp air tight and water proof.

In the prior art an effective heat radiating means on the body of the illuminating apparatus has not been provided in spite of the high temperatures caused by the heat of the electric bulb, and the life of the bulb has thus been very short.

Further, since the supporting post for the apparatus extends to a high position above the ground as mentioned before, the repainting and the periodic inspections and maintenance for such apparatus requires much labor and time. In addition on a highway where many vehicles continuously run at high speeds much risk accompanies such work. Thus, it has been proposed, prior to this application, to make the body of an illuminating apparatus such as a street lamp of stainless steel that needs no painting. However, since stainless steel has a relatively low heat conductivity, the inside of the body has readily overheated and this results in an extremely shortening the life of the electric bulb.

From this view point, it can be appreciated that if the surrounding temperature of the electric bulb is effectively lowered below a certain value by providing a heat radiating device in the illuminating apparatus, the life of the bulb would be made much longer. Thus the work needed to replace the burned out bulb with a new one would be decreased compared with the prior art. This is the primary advantageous feature of the present invention.

Additionally, it has in the past been proposed to provide venting openings or heat radiating plates in prior art illuminating apparatus for radiating the heat therefrom. However, it has been impossible to obtain an effective heat radiating performance by such conventional means, because such means have not been designed to function as a forcible cooling means but only to function as a mere auxiliary heat radiating means.

SUMMARY OF THE INVENTION

The present invention provides a heat radiating device for an illuminating apparatus comprising a heat radiating member secured to a wall of a body of said apparatus and formed with openings at the opposite ends thereof, and an air vent means adapted to establish air communication between the inside of said body and the atmosphere passing through the inside of said heat radiating member.

The main object of the present invention is to provide a heat radiating device for use in an illuminating apparatus which is adapted to forcibly radiate into the open atmosphere heat generated in said apparatus so as to increase the life of the electric bulb inside said apparatus.

Another object of the present invention is to provide a heat radiating device which is adapted to prevent the temperature rise of said apparatus itself so that the safety of the lamp means disposed therein may be highly increased.

A further object of the present invention is to provide a heat radiating device for use in an illuminating apparatus which is adapted to make the life of the electric bulb longer by virture of the heat radiation obtained by the device of the present invention so that the cost required for substituting an electric bulb may be effectively reduced.

A further object of the present invention is to reduce the frequency the dangeous work of changing an electric bulb in an apparatus such as a street lamp which is secured to the top of a supporting post at a large height above the ground by increasing the life of the electric bulb as a result of the heat radiating effect obtained by the present invention.

A still further object of the present invention is to provide a heat radiating device for use in an illuminating apparatus wherein a body of said apparatus can be made of stainless steel which has a relatively low heat conductivity as compared with other metals usually employed in the prior art for the reason that, by virtue of providing the heat radiating device of the present invention on the apparatus, the temperature of the body of the apparatus may be kept in a lower range than the conventional body of the apparatus made of other metal such as ordinary steel or an aluminum alloy plate.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view showing an illuminating apparatus provided with a heat radiating device of the present inveniton and secured at a distance above the ground to the tip of a supporting post.

FIG. 2 is an enlarged sectional view of the illuminating apparatus shown in FIG. 1.

FIG. 3 is an enlarged perspective view of the illuminating apparatus shown in FIG. 1, and

FIG. 4 is a sectional view of an illuminating apparatus provided with another embodiment of a heat radiating device of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1, there is shown a street lamp comprising an illuminating apparatus of the present invention, wherein the reference numeral 1 indicates a body housing of the apparatus made of a metal material, and at the lower portion of the body there is provided a globe 2 made of a hardened glass material. At one end of the body 1 there is formed a fitting portion 1*a* to which the tip of a supporting post 3 is fitted. The reference numeral 4 indicates a heat radiating member which will be described in detail hereinafter.

As with a conventional apparatus, the inside the body 1 is provided with a socket 5 to which is connected an electric wire (not shown) leading through the inside of the post 3, and in the socket 5 is mounted an electric bulb 6 in engagement therewith. The reference nu-

meral 7 indicates a reflector arranged to surround the upper side of the bulb 6.

The heat radiating member 4 is secured to the upper wall 1*b* of the body 1 such that the longitudinally extending opposite sides of the member 4 are adhesively fixed to the exterior surface of the upper wall of the body 1. This can be done by any conventional means such as by welding, soldering or the like. At the opposite ends of the member 4, are formed end openings 4*a* and 4*b* respectively.

This heat radiating member 4 may be provided with a suitable transverse section such as a rectangular shape, a semicircular shape, a tubular shape or the like and in any of such shapes the opposite ends thereof are open.

At the sectional area of the upper wall of the body 1 corresponding to the inside of the heat radiating member 4, there are provided a plurality of conduit pipes 8 arranged in a certain spaced relation to each other.

The body 1 is fixed to the supporting post 3 so as to be angularly positioned with respect thereto so that the tip of the body is higher than the fitting portion 1*a*.

While the electric bulb 6 is on, the inside of the body 1 is gradually heated to a high temperature by the heat of the bulb. The heated air inside the body goes out through the conduit pipes 8 into the inside of the heat radiating member 4 secured to the exterior surface 1*b* of the body 1. Since the heat radiating member 4 is also angularly positioned with the body 1, one end opening 4*b* of the member is higher than the other end opening 4*a*.

Therefore, when the heated air inside the body sequentially comes to the inside of the heat radiating member 4, such heated air is directed upwardly to the atmosphere through higher opening 4*b*. Simultaneously cool fresh air is introduced upwardly through the lower opening 4*a* and passes through the inside of the heat radiating member 4 to the open atmosphere through the opening 4*b*. By such windtunnel effect of the heat radiating member 4, there can be obtained a continuous supply of cool fresh air through the lower opening 4*a*, and thus the heated body 1 is subjected to the air-cooling effect of such forcibly induced flow of fresh and cool air, so that the temperature rise of the body can be restricted below a certain value.

It is true that, when the body 1 is fixed to the supporting post 3 in an angular position as shown in FIG. 1, the induced flow of the cooling air through the inside of the member 4 is directed upwardly from the lower opening 4*a* to the upper opening 4*b*. However, such angular position of the body 1 with the heat radiating member 4 is not necessarily an essential feature of the present invention. This is true since even when the upper wall 1*b* of the body 1 is positioned in a substantially horizontal direction, the subject illuminating apparatus is normally located high above the ground on the tip of the supporting post 3 and is most often installed in the open air. The heated air which has been introduced to the inside of the heat radiating member 4 may be discharged to the atmosphere through either one of the opposite openings 4*a* or 4*b* so that the induced flow of the cooling air may be produced in either direction through the member 4 thus effectively cooling the heated body 1.

Additionally, since the conduit pipes 8 for establishing the air communication between the inside of the body 1 and the atmosphere passing through the inside of member 4 are arranged to protrude over the exterior surface of the upper wall 1*b* of the body 1, the introduction of rainwater into the inside of the body is effectively prevented so that the various functional parts disposed within the body 1 are prevented from being damaged.

Another embodiment of a heat radiating device of the present invention will be described hereinafter with reference to FIG. 4.

The general illuminating apparatus provided with this heat radiating device is also adapted to be similarly fixed to the tip of the supporting post 3 as previously shown in FIG. 1 and the same reference numerals as those in FIG. 1 indicate the equivalent parts of the apparatus, and, therefore, the description concerning such equivalent parts is omitted.

This embodiemnt of FIG. 4 differs from the previous one of FIG. 1 only in the arrangements of the end openings of the heat radiating member 40 and of the air vent means establishing the air communication between the inside of the body and the atmosphere.

At the sectional area on the upper wall 1*b* of the body 1 corresponding to the inside of the heat radiating member, there are provided openings 80 for establishing air-communication between the inside of the body 1 and the atmosphere passing through the inside of the heat radiating member 40. The opposite end openings of the member 40 are arranged at a certain distance above the exterior surface of the upper wall of the body 1, as indicated by the reference numerals 40*a* and 40*b* in FIG. 4.

In the embodiment shown in FIG. 4, the introduction of rainwater into the inside of the body 1 is effectively prevented by such arrangement of the opposite end openings 40*a* and 40*b*. The functions and the effect of the heat radiation obtainable from this embodiment of FIG. 4 are substantially equal to those obtained from the apparatus of FIG. 1.

As described hereinbefore, the present invention is directed to a heat radiating device for use in an illuminating apparatus having a high power bulb therein, as in a street lamp, and is characterized in that, while the high power bulb is turned on, the temperature inside the body 1 of the apparatus is held below a certain value which greatly increases the life of the bulb. Therefore, if the present invention is applied to an illuminating apparatus, the temperature rise of the body of the apparatus can be limited within a desiable range even in the case that the electric bulb mounted therein is a high power bulb such as 700 watt or more. Furthermore the body of the apparatus is made of stainless steel which has not been used in the past due to its relatively low heat conductivity. In addition, by employing stainless steel as the material for the body of the apparatus this eliminates need for painting the body and as a result the manufacturing cost thereof is substantially reduced.

I claim:

1. In an illuminating apparatus comprising a housing having a plurality of walls surrounding a space adapted to contain a lighting means, the improvement comprising a heat radiating device for removing the heat from the interior of said space, said heat radiating device comprising a box shaped heat radiating member secured to the outside of one of said walls and substantially enclosing a volume of space between said heat radiating device and said wall, said heat radiating mem-

ber having openings at opposite ends thereof and an unobstructed direct passage provided within said member leading from one of said opposite ends to the other of said opposite ends, thereby allowing a free flow of air from one of said ends through the inside of said heat radiating member to the other of said ends; and air vent means in said wall providing communication between the interior of said housing and the space surrounded by said heat radiating member.

2. The improvement of claim 1 wherein said air vent means comprises a plurality of spaced apart conduits, each of said conduits extending above the surface of said wall into the interior of said heat radiating member.

3. The improvement of claim 1 wherein the illuminating apparatus is mounted on a supporting post at a substantial distance above the ground, said apparatus being mounted so that one of said ends of said heat radiating member is positioned further above the ground than the other of said ends.

4. The improvement of claim 2 wherein the illuminating apparatus is mounted on a supporting post at a substantial distance above the ground, said apparatus being mounted so that one of said ends of said heat radiating member is positioned further above the ground than the other of said ends.

5. The improvement of claim 1 wherein each of said openings at said opposite ends of said heat radiating means is positioned at a distance above the surface of said wall and wherein said air vent means comprises a plurality of spaced apart openings in said wall.

6. The improvement of claim 5 wherein the illuminating apparatus is mounted on a supporting post at a substantial distance above the ground, said apparatus being mounted so that one of said ends of said heat radiating member is positioned further above the ground than the other of said ends.

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