

(19)



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(11)

EP 0 583 034 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

13.11.1996 Bulletin 1996/46

(51) Int Cl.⁶: **H01J 5/54**

(21) Application number: **93202333.6**

(22) Date of filing: **09.08.1993**

(54) **Electric lamp**

Elektrische Lampe

Lampe électrique

(84) Designated Contracting States:
BE DE ES FR GB IT NL

(30) Priority: **10.08.1992 EP 92202455**

(43) Date of publication of application:
16.02.1994 Bulletin 1994/07

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Description

The invention relates to an electric lamp comprising

- a light source provided with a discharge vessel which is sealed in a gastight manner and which transmits radiation,
- a lamp cap having a shell and a base,
- a housing connected to the light source and to the lamp cap,
- ballast means which are electrically connected to the light source for operating the light source and which are arranged at least partly in a space surrounded by the housing and the lamp cap, which ballast means comprise a circuit arrangement for generating a high-frequency lamp current from a supply voltage,
- the electric lamp further comprising contacts which are connected with electrical conduction with the ballast means at least during lamp operation, one of said contacts being provided on the base and a further one on the shell.

Such an electric lamp is known from European Patent Application 156439. The known lamp is designed for use in the same applications in which traditionally an incandescent lamp was used. A major advantage of the known lamp over an incandescent lamp is that the luminous efficacy of the known lamp is considerably higher than the luminous efficacy of an incandescent lamp. A disadvantage, however, is the fact that the length of the known lamp is greater than that of an incandescent lamp, so that the known lamp is less suitable as a replacement for an incandescent lamp in some applications. It is accordingly desirable to reduce the length of the known lamp in order to increase the range of application of this lamp. A further reduction in the length of the lamp, however, is often accompanied by a size reduction of the housing, whereby the capacitive coupling between the ballast means often present in the housing and the contacts on the lamp cap increases. This capacitive coupling increases even further when the ballast means are partly provided in the lamp cap in order to facilitate a further size reduction of the lamp. The ballast means may comprise a circuit arrangement for generating a high-frequency current from the mains voltage, with which the electric lamp is supplied, for operating the electric lamp. Consequently, there is a high-frequency lamp operation. The frequency of the high-frequency lamp current is often of the order of 10 kiloHerz. Owing to the increased capacitive coupling between the ballast means and the contacts of the lamp cap, the ballast means cause a comparatively high degree of interference in the supply voltage mains during lamp operation.

The invention has for its object *inter alia* to provide an electric lamp of a comparatively small length which causes a comparatively low degree of interference in the supply voltage mains during lamp operation.

According to the invention, this object is achieved in an electric lamp of the kind mentioned in the opening paragraph in that the further contact is formed by a band of conducting material around the lamp cap, which band directly adjoins the base at one side and adjoins a band of insulating material around the lamp cap at another side.

In the known electric lamp, the further contact extends over substantially the entire surface area of the lamp cap shell. Such a comparatively large surface area of the further contact causes a comparatively strong capacitive coupling between the further contact and the ballast means. In an electric lamp according to the invention, however, the size of the further contact is much smaller than in the known lamp. In addition, the further contact is arranged at a comparatively great distance from the space surrounded by the housing and from a major portion of the space surrounded by the lamp cap since this contact directly adjoins the base. This comparatively great distance and the considerably smaller size of the further contact have the result that the capacitive coupling between the ballast means and the further contact is much weaker. This leads to a considerable decrease of the interference in the supply voltage mains caused by the electric lamp during lamp operation. Especially when the ballast means comprise a circuit arrangement for generating a high-frequency current from the mains voltage, a comparatively strong decrease of the interference in the supply voltage mains was found.

The shell of the lamp cap of the known lamp is made from metal, so that the shell at the same time constitutes the further contact. Since the further contact of an electric lamp according to the invention, however, does not extend over substantially the entire external surface area of the lamp cap shell, but only over a comparatively small portion of the lamp cap, the idea suggests itself to manufacture the lamp cap from an insulating synthetic material and to provide the contact thereon. Since the housing of the electric lamp is also preferably manufactured from a synthetic material, it is possible to integrate the lamp cap and the housing of an electric lamp according to the invention into one component made of synthetic material. As a result, such a lamp comprises fewer components and the assembling costs of these lamp components are strongly reduced.

To increase the mechanical strength of the lamp cap of an electric lamp according to the invention, it is possible to form part of the surface of the shell from metal which is electrically insulated from the contacts.

Embodiments of the invention will be explained with reference to a drawing, in which

Fig. 1 shows two different embodiments of a lamp cap suitable for use in an electric lamp according to the invention;

Fig. 2 shows an electric lamp according to the invention in side elevation, partly in cross-section;

and

Fig. 3 shows a frequency spectrum of the intensity of the interference in the supply mains caused by an electric lamp according to the invention and a frequency spectrum of the intensity of the interference in the supply mains caused by an electric lamp provided with a lamp cap whose shell was completely formed from metal.

The lamp caps shown in Figs. 1a and 1b are both of the Edison type. The shell is threaded for fastening the lamp cap in a lampholder. Metal parts of the lamp cap are shown in black and synthetic-resin parts in white. In both Figures, 5 denotes the base of the lamp cap, 1 denotes the first contact and 2 the further contact. The boundary between base and shell is indicated with a broken line. In Fig. 1a, the lamp cap has a shell 3. In Fig. 1b the shell 3 is formed by the band of insulating material around the lamp cap and the component 4 formed from metal which is electrically insulated from the first contact 1 and the further contact 2. Component 3 in both cases forms a integral unit with the base of the lamp cap. The lamp cap shown in Fig. 1b has an enhanced mechanical strength compared with the lamp cap shown in Fig. 1a. Although there is a certain degree of capacitive coupling between contact 2 and component 4 in a lamp cap as shown in Fig. 1b, practically no difference in the interference caused in the supply mains at an operating frequency of the order of 10 kHz was found between electric lamps provided with a lamp cap as shown in Fig. 1a and electric lamps provided with a lamp cap as shown in Fig. 1b.

It is obviously possible to apply the invention to lamp caps other than those of the Edison type such as, for example, bayonet type lamp caps.

In Fig. 2, components corresponding to the components of the lamp caps shown in Fig. 1 have the same reference numerals as in Fig. 1. Reference numeral 6 denotes the wall of the housing and A and B are boundary planes, indicated with broken lines, between the shell and the base of the lamp cap and between the lamp cap and the housing, respectively. It can be seen that the housing and the lamp cap have been integrated into one unit formed from synthetic resin. 7 denotes the space surrounded by the housing and the lamp cap in which ballast means, for example comprising a circuit arrangement for generating a high-frequency current for operating the light source, are accommodated (not shown in Fig. 2), and 8 denotes a discharge vessel which forms part of the light source, which is sealed in a gastight manner and which transmits radiation.

Fig. 3 shows two frequency spectra of the interference caused by two compact low-pressure mercury lamps of a power rating of 11 W in the supply mains. The low-pressure mercury lamps were operated at a frequency of 45 kHz. The power of the interference caused is indicated on the vertical axis in decibels. The frequency is plotted on the horizontal axis in MHz. It is also

shown in both frequency spectra by means of the curve M how great the intensity of the interference caused is allowed to be at most according to the CISPR standard. The first lamp provided with a lamp cap of the Edison type whose shell was completely formed from metal yielded a frequency spectrum of the interference caused by the lamp in the supply mains as indicated in Fig. 3a. It is apparent that the maximum admissible interference is widely exceeded, especially in the frequency range from 300 kHz to 1 MHz. Fig. 3b shows the frequency spectrum of the interference generated in the supply mains by a lamp according to the invention. This second lamp was provided with a lamp cap as shown in Figs. 1a and 2. It is visible from Fig. 3b that the interference caused by a lamp according to the invention lies below the maximum admissible value throughout the entire frequency range.

20 Claims

1. An electric lamp comprising

- a light source provided with a discharge vessel (8) which is sealed in a gastight manner and which transmits radiation,
- a lamp cap having a shell (3) and a base (5),
- a housing connected to the light source and to the lamp cap,
- ballast means which are electrically connected to the light source for operating the light source and which are arranged at least partly in a space (7) surrounded by the housing and the lamp cap, which ballast means comprise a circuit arrangement for generating a high-frequency lamp current from a supply voltage,
- the electric lamp further comprising contacts (1, 2) which are connected with electrical conduction to the ballast means at least during lamp operation, one of said contacts (1) being provided on the base (5) and a further one (2) on the shell (3),

characterized in that the further contact (2) is formed by a band of conducting material around the lamp cap, which band directly adjoins the base (5) at one side and adjoins a band of insulating material around the lamp cap at another side.

2. An electric lamp claimed in Claim 1 or 2, characterized in that the lamp cap and the housing are integrated into one component formed from synthetic resin.

3. An electric lamp as claimed in Claim 1 or 2, characterized in that part (4) of the surface of the shell is made of metal which is electrically insulated from the contacts (1, 2).

Patentansprüche

1. Elektrische Lampe mit

- einer Lichtquelle, die mit einem gasdicht verschlossenen, strahlungsdurchlässigen Entladungsgefäß (8) versehen ist, 5
- einem Sockel mit einem Mantel (3) und einem Boden (5),
- einem mit der Lichtquelle und dem Sockel verbundenen Gehäuse, 10
- Vorschaltmitteln, die mit der Lichtquelle zum Betreiben der Lichtquelle elektrisch verbunden sind und die zumindest teilweise in einem von dem Gehäuse und dem Sockel umgebenden Raum (7) angeordnet sind, wobei die Vorschaltmittel eine Schaltungsanordnung zum Erzeugen eines hochfrequenten Lampenstroms aus einer Versorgungsspannung umfassen, 15
- wobei die elektrische Lampe weiterhin Kontakte (1, 2) umfaßt, die mit den Vorschaltmitteln zumindest während des Lampenbetriebs elektrisch leitend verbunden sind, wobei einer der genannten Kontakte auf dem Boden und ein weiterer auf dem Mantel (3) vorgesehen ist, 20

dadurch gekennzeichnet, daß der weitere Kontakt (2) von einem sich um den Sockel herum befindenden Band aus leitendem Material gebildet wird, wobei das Band an einer Seite direkt an den Boden (5) grenzt und an einer anderen Seite an ein sich um den Sockel herum befindendes Band aus isolierendem Material grenzt. 25

2. Elektrische Lampe nach Anspruch 1, dadurch gekennzeichnet, daß der Sockel und das Gehäuse in einer einzigen aus Kunststoff gebildeten Komponente integriert sind. 30

3. Elektrische Lampe nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß ein Teil (4) der Oberfläche des Mantels aus Metall hergestellt ist, das von den Kontakten (1, 2) elektrisch isoliert ist. 35

Revendications

1. Lampe électrique comportant

- une source lumineuse munie d'un récipient à décharge (8) qui est scellé d'une manière étanche au gaz et qui transmet le rayonnement, 40
- un culot de lampe présentant un manchon (3) et une base (5), 45
- un boîtier relié à la source lumineuse et au culot de lampe,
- des moyens de ballast qui sont reliés électri-

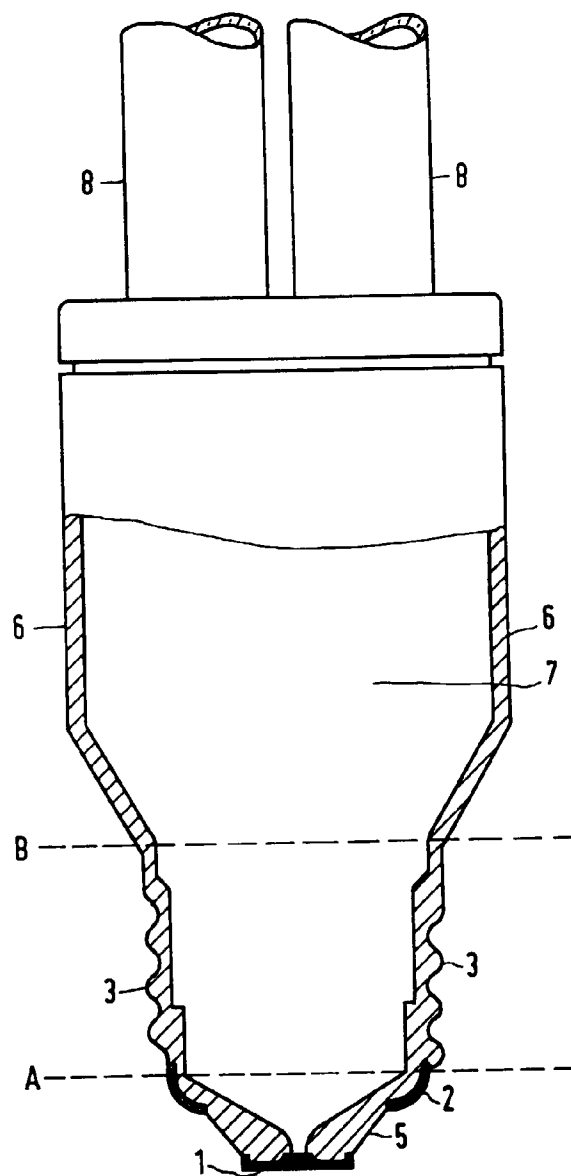
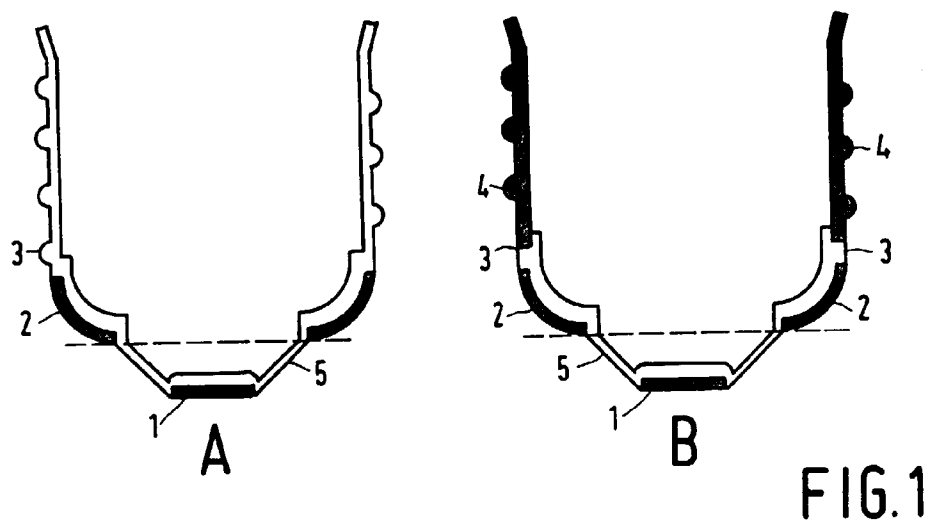
quement à la source lumineuse pour faire fonctionner la source lumineuse et qui sont disposés au moins partiellement dans un espace (7) entouré du boîtier et du culot de lampe, lesdits moyens de ballast comportent un circuit de commutation pour engendrer à partir d'une tension d'alimentation un courant de lampe haute fréquence,

- la lampe électrique comportant encore des contacts (1, 2) qui sont reliés d'une manière électriquement conductrice aux moyens de ballast au moins pendant le fonctionnement de lampe, l'un desdits contacts (1) étant disposé sur la base (5) et un autre (2) sur le manchon (3),

caractérisée en ce que l'autre contact (2) est formé par une bande constituée de matériau conducteur entourant le culot de lampe, ladite bande est directement contiguë d'un côté à la base (5) et d'un autre côté contiguë à une bande constituée de matériau d'isolation entourant le culot de lampe.

2. Lampe électrique selon la revendication 1 ou 2, caractérisée en ce que le culot de lampe et le boîtier sont intégrés jusqu'à un composant formé à partir de résine synthétique.

3. Lampe électrique selon la revendication 1 ou 2, caractérisée en ce qu'une partie (4) de la surface du manchon est fabriquée à partir de métal qui est isolé électriquement des contacts (1, 2).



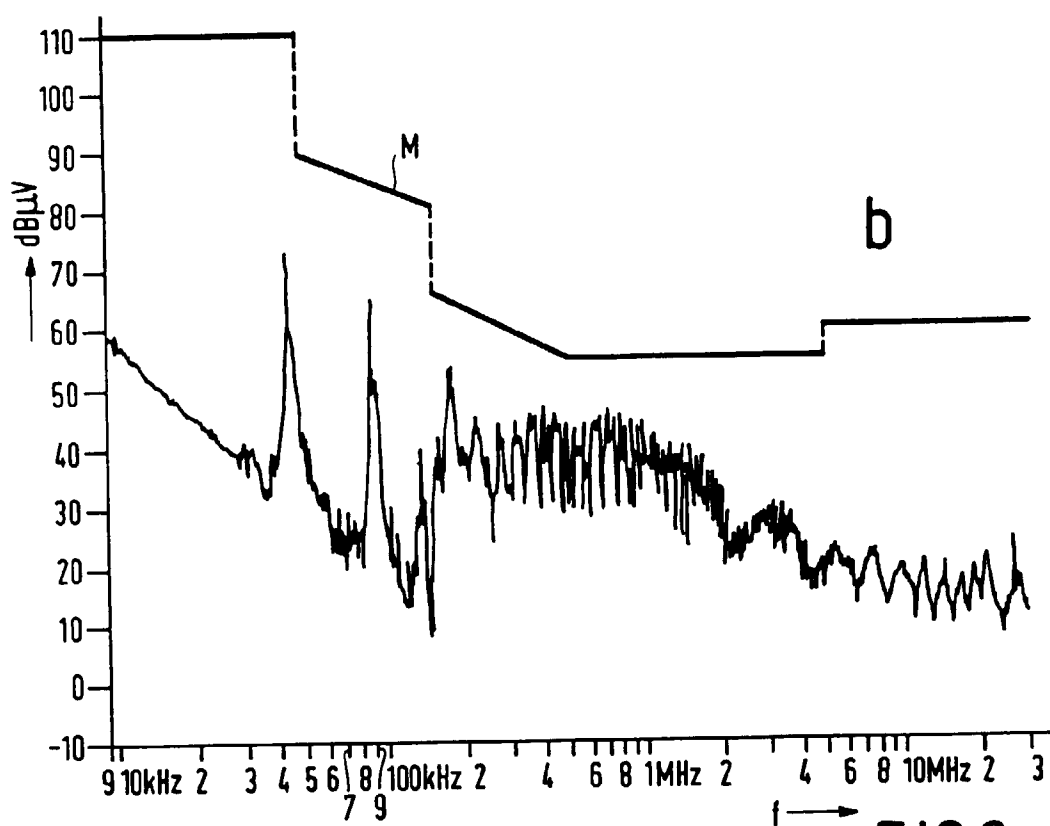
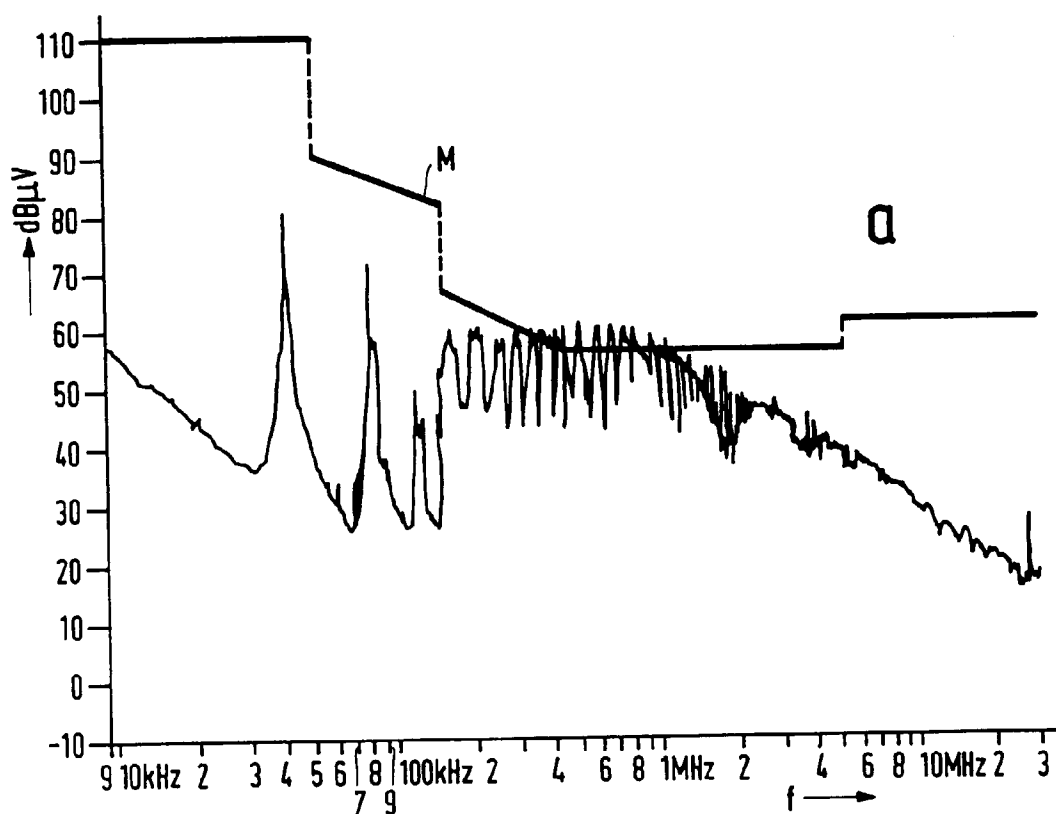


FIG.3