(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 022 304**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **80200654.4**

(22) Date of filing: **07.07.80**

(51) Int. Cl.³: **H 01 K 1/32**
H 01 K 1/28

(30) Priority: **10.07.79 NL 7905367**

(43) Date of publication of application:
14.01.81 Bulletin 81/2

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

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(54) Electric lamp having a partly mirrored lamp envelope.

(57) Electric lamps having a lamp envelope which is partly mirrored with aluminium, chromium or silver have a cold look, which is not the case with lamps having a gold or imitation gold mirror.

However, gold has a poor adhesion to glass, while imitation gold mirrors have to be built up from several pairs of copper and aluminium layers, which involves a high cost price.

In lamps according to the invention the lamp envelope (30) is transparent smoke-coloured at least at the area of the silver coloured mirror (32), by means of a lacquer layer (36), an enamel layer, or the use of smoke-coloured glass for the lamp envelope.

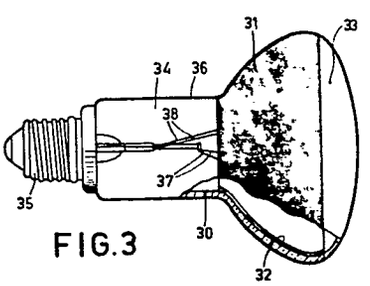

FIG.3

EP 0 022 304 A1

"Electric lamp having a partly mirrored lamp envelope".

The invention relates to an electric lamp having a sealed vacuum-tight glass lamp envelope through the wall of which current supply conductors to an electric element accommodated in the lamp envelope pass to the exterior where they are attached to a lamp cap connected to the lamp envelope, the wall of said lamp envelope being provided with a metal reflecting layer over a part of its inner surface.

Such lamps are generally known, inter alia from United States Patent Specification 2,070,700 and are commercially available. Usually the lamps are incandescent lamps in which either the part of the lamp envelope opposite to the lamp cap or a part of the lamp envelope situated near the lamp cap is mirrored. In the former case we have bowl-mirrored lamps in which a spherical or substantially spherical part of the lamp envelope is mirrored and which are used in a reflector to obtain a narrow light beam; in the latter case we have mirrored lamps which produce a comparatively narrow light beam without further optical auxiliary means. Among these latter lamps are ring mirror lamps having a blown lamp envelope the mirrored part of which is usually curved paraboloidally, and lamps from pressed glass the lamp envelope of which consists of a paraboloidal cup which is closed with a cover glass.

For mirroring a part of a lamp envelope, aluminium or silver is frequently used due to the high coefficient of reflection of said metals, or chromium is used. Since much wood and leather is used in the present-day interiors, lamps having silver coloured, aluminium, silver, or chromium, mirrors are out of keeping in such interiors. Bowl mirrored lamps are nearly always mounted so as to be visible, while ring mirror lamps and pressed glass lamps

are frequently used in luminaires only surrounding the lamp cap of the lamps.

In order to remove the optically cold impression of mirrored lamps, such lamps are therefore provided with a gold coloured mirror. However, the disadvantage of the use of gold is a high cost price and a poor adhesion of said metal to glass, so that after a small number of hours in operation a crackled effect is already obtained which adversely influences the concentrating effect of the mirror.

Other commercially available lamps having a gold coloured mirror have been manufactured by vapour-depositing alternately copper and silver or aluminium. For the benefit of a good adhesion said materials must be vapour-deposited in very thin layers which are each not completely dense, that is they do not have a uniform optical density throughout their surface so that several layer pairs must be provided so as to obtain the desired effect. This makes the manufacture of the lamps time-consuming and expensive.

It is the object of the invention to provide mirror lamps in which on the one hand the disadvantage of silver-coloured mirrors is avoided and on the other hand the disadvantages of the use of gold or imitation gold mirrors are avoided.

In electric lamps of the kind described in the opening paragraph this object is achieved in that the metal layer is silver coloured and that at least that part of the lamp envelope which is provided with the metal layer has a transparent smoke-colour.

In an embodiment of a lamp in accordance with the invention this has been realised by manufacturing the lamp envelope entirely or partly from smoke-coloured glass.

In another embodiment, however, the inner surface, the outer surface or the inner and outer surface of the lamp envelope has a transparent, smoke-coloured layer. When only the inner surface has such a layer, the

mirror layer, of course, is present on the colour layer. A smoke-coloured layer on the outer surface of the lamp envelope has the advantage that only one type of lamp need be manufactured of which a number may be provided with a coloured layer, as required, at the end of the production process, whereas the remaining lamps can be sold as silvered lamps.

The colour layer may consist of a smoke-coloured enamel or of a smoke-coloured lacquer. As a lacquer are to be considered in particular silicone lacquers due to their stability at higher temperatures. They can easily be provided by spraying or dipping while diluted with solvents or be provided in an electrostatic coating process.

In bowl mirrored lamps in which the part of the lamp envelope situated opposite to the lamp cap is mirrored, it will nearly always suffice to colour the mirrored wall portion, for example, by providing a colour layer on the outside of the lamp envelope. When placed in a luminaire, bowl mirrored lamps hardly ever give the occasion of observing the inside of the mirror. Such a lamp gives the impression of having a gold mirror. Lamps having a gold mirror give light of a warmer tinge than lamps having a silver-coloured mirror. If it is desired for lamps according to the invention also to emit light of a warmer tinge, the window of the lamp envelope through which the light emanates is also provided with a smoke-coloured layer.

In lamps in which a part of the lamp envelope which is situated closer to the lamp cap is mirrored, it will also suffice to colour the mirrored wall part. However, these lamps may also be used so that the inside of the metal mirror can also be observed. Therefore, in this type of lamps the window of the lamp envelope is preferably also coloured so as to give them a universal application as imitation gold mirror lamps.

In order to make a silver-coloured, silver, aluminium or chromium, mirror gold coloured, a slightly coloured coating layer or a slightly coloured glass is sufficient. A small series of tests will enable the expert

to determine the desired colour and colour intensity.

The measure used in lamps according to the invention is particularly suitable for incandescent lamps in which the electric element is a filament but is also suitable for discharge lamps in which the electric element is a pair of electrodes in an ionisable gas, usually enveloped by a discharge vessel.

Embodiments of lamps according to the invention are shown in the drawing. In the drawing

Fig. 1 is an elevation, partly broken away, of a bowl mirrored incandescent lamps;

Fig. 2 is an elevation partly broken away of a pressed glass discharge lamp;

Fig. 3 is an elevation partly broken away of a ring mirror incandescent lamp.

In Fig. 1, the lamp envelope 1 is provided with a silver layer 4 over its part 2 situated opposite to the lamp cap 3. Part 2 is coated on its outside with a transparent smoke-coloured iron oxide-containing enamel layer 5. A filament 6 is accommodated between current supply conductors 7 and 8 which are connected to the lamp cap 3. Between its ends the filament 6 is supported by wires 9.

The lamp in Fig. 2 has a bipartite lamp envelope 20, 21 of pressed glass. The paraboloidal part 20 is covered with an aluminium layer 22 and is made of smoke-coloured glass. The cover glass 21 is of colourless pressed glass. Connected to the lamp envelope is a lamp cap 23 from which current supply conductors 24 and 25 extend to a high pressure sodium vapour discharge vessel 26.

The lamp envelope 30 in Fig. 3 has a paraboloidally curved lamp envelope part 31 which is covered with an aluminium layer 32. Lamp envelope part 31, like window 33 and the neck-shaped part 34 of the lamp envelope, to which a lamp cap 35 is secured, is covered with a smoke-coloured lacquer layer 36. A filament which is hidden from view by the mirror 32 is supported by wires 37 and provided with current by current supply conductors 38 which are connected to the lamp cap 35.

EXAMPLE.

Lamps as shown in Fig. 3 having a lamp envelope with a largest diameter of 63 mm had an aluminium mirror vapour-deposited in a vacuum. The lamp envelope was dipped in a bath of

68 g of silicone resin
2.1 g of orange dye solution
8 g of black dye solution
16.2 ml of xylene
3.2 ml of diacetone alcohol
2.1 ml of ethyl glycol acetate.

The lacquer was then dried at approximately 40°C for 5 minutes and baked at 300°C for 3 minutes.
In a particular case the orange dye solution used was:

500 g of zapon echt orange G
4.4 l of ethanol
6.4 l of ethyl glycol acetate

and as a black dye solution:

500 g of Neozapon black R.E.
4.4 l of ethanol
6.4 l of ethyl glycol acetate.

The lacquer provided the lamp with a brown-grey to yellow-grey colour.

The lamps were tested for life. A very good colour stability was found. The lamps consumed a power of 40 W at 220 V.

"Zapon echt" and "Neozapon" are registered trade marks of BASF: They denote azodyes with complex bound chromium, copper and cobalt.

CLAIMS

1. An electric lamp having a sealed vacuum-tight glass lamp envelope through the wall of which current supply conductors to an electric element accommodated in the lamp envelope pass to the exterior where they are connected to a lamp cap secured to the lamp envelope, the wall of said lamp envelope being provided with a metal reflecting layer over a part of its inner surface, characterized in that the metal layer is silver coloured and that at least that part of the lamp envelope which is provided with the metal layer has a transparent smoke-colour.

2. An electric lamp as claimed in Claim 1, characterized in that the smoke-colour is provided by a transparent smoke-coloured layer on the envelope.

3. An electric lamp as claimed in Claim 2, characterized in that the smoke-coloured layer is a lacquer layer.

4. An electric lamp as claimed in Claim 2 or 3, characterized in that the layer is provided on the outer surface of the lamp envelope.

5. An electric lamp as claimed in any of the preceding Claims, characterized in that the whole lamp envelope has a transparent smoke-colour.

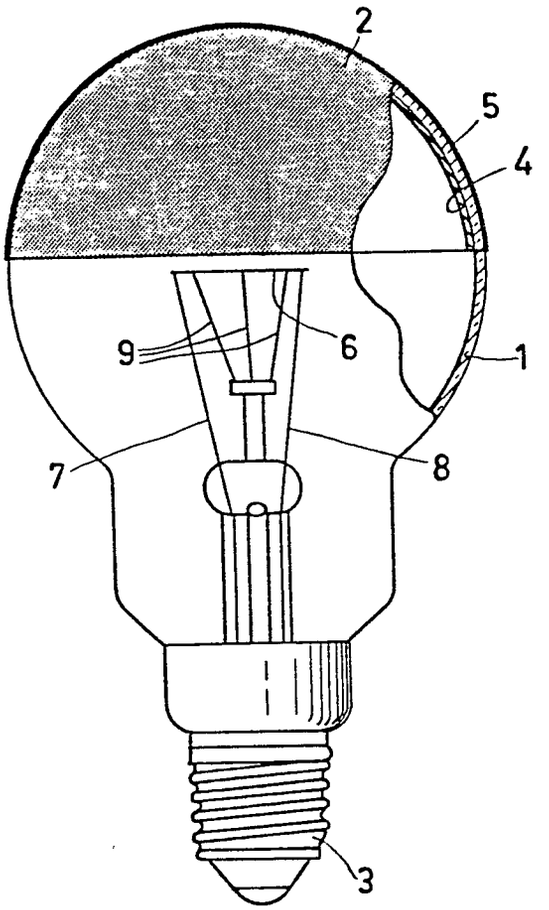

FIG.1

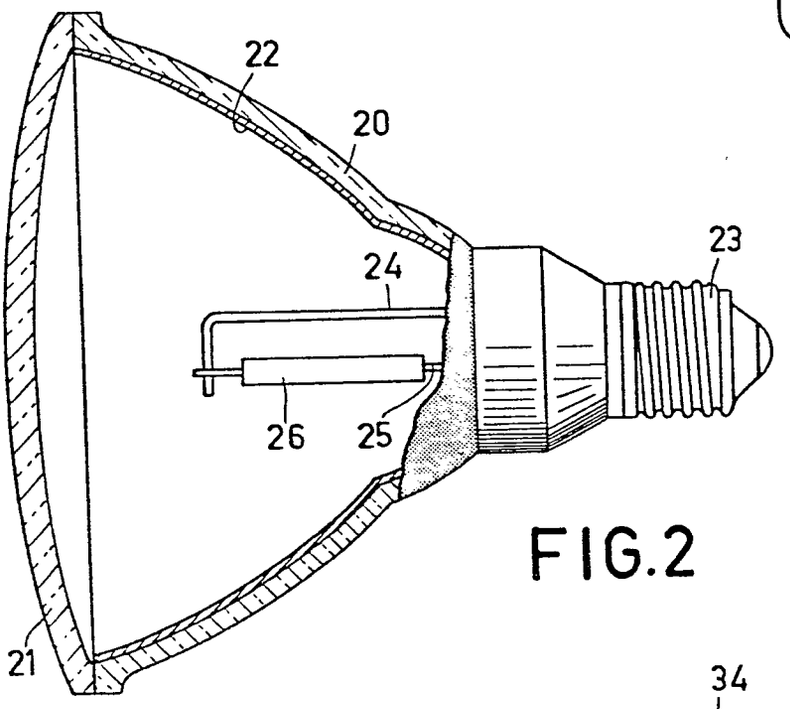

FIG.2

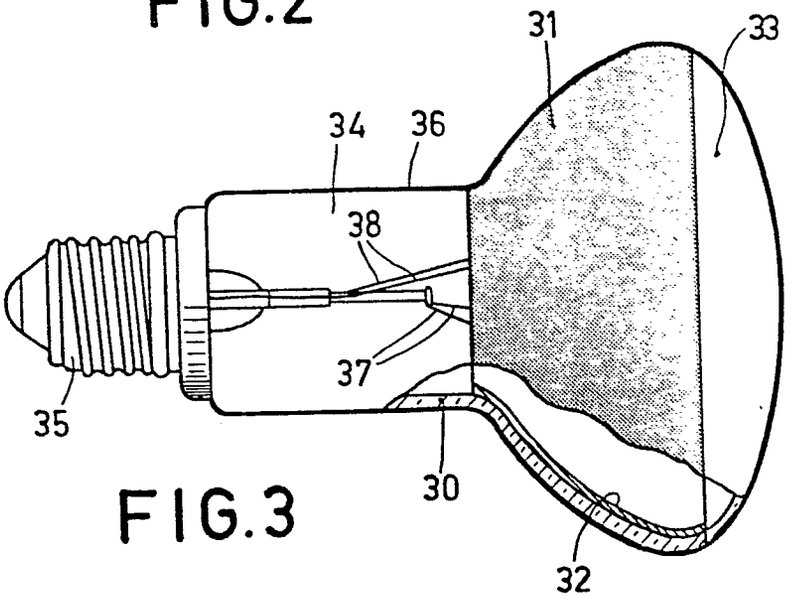

FIG.3

European Patent Office

EUROPEAN SEARCH REPORT

0022304

Application number

EP 80 20 0654

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	FR - A - 2 256 531 (FABRIQUES REUNIES DE LAMPES ELECTRIQUES) * Page 2, lines 5-27 *	1
A	US - A - 2 901 655 (E.A. LINSDAY et al.) * Column 2, lines 12-19 *	1

CLASSIFICATION OF THE APPLICATION (Int Cl ³)

H 01 K 1/32
1/28

TECHNICAL FIELDS SEARCHED (Int.Cl. ³)

H 01 K 1/32
1/28

CATEGORY OF CITED DOCUMENTS

X particularly relevant
A technological background
O non-written disclosure
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T theory or principle underlying the invention
E conflicting application
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& member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16-09-1980	TREVETIN

EPO Form 1503.1 06.78