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(54) **Gyorsindítás kisnyomású higany amalgám lámpákhoz**

QUICK-START FOR LOW-PRESSURE MERCURY AMALGAM LAMPS

DESCRIPTION

The invention relates to a method for operating an amalgam lamp, wherein the warm-up time is reduced.

Amalgam lamps are extremely durable high-performance low-pressure lamps. Same achieve up to ten times the UV output density of classical mercury low-pressure lamps and can be used at higher ambient temperatures. In addition, amalgam lamps are insensitive to temperature fluctuations.

Typical fields of application for amalgam lamps are, among others, drinking water disinfection and process water treatment in industry, water disinfection in fish farming, but also disinfection of air in air-conditioning and cooling systems and surface disinfection.

However, such lamps require several minutes in order to reach full output as mercury is normally bonded in solid amalgam before and shortly after lighting. Initially, the heating by the noble gas discharge brings the mercury into the gaseous phase so that an appreciable burn voltage and hence lamp output ensue.

As a result, such lamps require several minutes before same take full effect.

In order to achieve a quick start with the mercury low-pressure amalgam lamps, it is not enough to only significantly increase the discharge current in relation to the operating current. In the case of said lamps, most of the mercury is bonded in the amalgam in the cold state. It is thus necessary to heat the amalgam reservoir in a targeted manner so that in this way an appreciable mercury vapour pressure can build up inside the lamp.

DE 102 01 617 B4 discloses a heating element which is applied to the lamp and is in the form of a PTC or an ohm resistor for influencing the temperature of the amalgam. The heat transfer through the quartz to the amalgam is, however, quite slow.

Furthermore, the heating element is provided here for controlling the amalgam temperature during operation and not for achieving a short burn-in period.

The patent document US-A-5 095 336 discloses a method according to the introductory part of claim 1.

The aim of the invention is thus to provide a method for operating an amalgam lamp in which the warm-up time is significantly reduced and the lamp already takes full effect after several seconds, and an amalgam lamp suitable for the method.

The aim of the invention is already achieved with the features of the independent claims. The dependent claims form advantageous embodiments of the invention.

The method, according to the invention, for operating an amalgam lamp, wherein the amalgam lamp has at least one amalgam reservoir, involves the reservoir being heated by means of an external energy source. Said heating has the effect that the amalgam is liquefied within a second so that an appreciable mercury vapour pressure builds up quickly and the lamp quickly comes to full output after lighting. The burn-in phase is consequently reduced to several seconds. It has been shown that said quick-start characteristics have great significance especially in the case of technical processes in which discontinuous operation is desirable and burn-in phases of less than 10 seconds are desirable.

In an advantageous embodiment, the invention envisages an infrared lamp being used as the energy source. The infrared lamp has a gold-plated reflector.

The infrared lamp is similar to a commercially available halogen reflector lamp for general lighting. The filament is projected on a focal spot of a few millimetres in diameter. The infrared reflector lamp is arranged over the amalgam lamp such that the focal spot is aligned with the amalgam reservoir. In this way, the amalgam is liquefied within 1 second after the infrared reflector lamp is switched on and the desired mercury vapour pressure builds up so that the lamp can quickly deliver full output.

The amalgam lamp, according to the invention, provides a lamp tube filled with noble gas, said lamp tube comprising two electrodes arranged in the lamp tube, wherein at least one amalgam reservoir is arranged on an inner side of the lamp tube.
A bonding agent layer, for example, made of a precious metal, can be applied between the quartz tube and the amalgam reservoir. The bonding agent layer is used advantageously as a carrier layer for amalgam.
The invention is expounded in more detail below by means of a preferred embodiment and with reference to the appended figures. The figures provide schematic representation of the following:
Figure 1 — a mercury low-pressure amalgam lamp comprising an external energy source, according to the invention.
Figure 2 — the running-in characteristics of a conventional mercury low-pressure amalgam lamp.

Figure 3 — the running-in characteristics of a mercury low-pressure amalgam lamp, according to the invention.

Figure 1 depicts a mercury low-pressure amalgam lamp 1, which has a lamp tube 10 comprising two electrodes 12 arranged in the lamp tube 10. The interior 14 of the lamp 1 is filled with a noble gas or noble gas mixture. The lamp tube 12 seals the interior 14 with respect to the surroundings. On the inner side of the lamp tube 10 is a bonding agent layer 16, which in this case is formed from gold or a gold alloy. Said bonding agent layer 16 is used as a carrier for the amalgam reservoir 18. An external infrared lamp 20 comprising a reflector 22 is arranged next to the amalgam reservoir 18 so that the infrared radiation 26
is focused on the amalgam reservoir 16. Before the lamp 1 is lighted, the amalgam reservoir 18 is now heated and as a result mercury vapour is released. Same is already available for discharge during lighting so that an appreciable UV output ensues immediately.
Figure 2 depicts the running-in characteristics of a conventional mercury low-pressure amalgam lamp without amalgam heating. In this regard, as shown in figure 1, for example, the electrodes are pre-heated by a heating current, and the lamp is lighted after approximately 5 seconds by time point A. It is clear that the UV output is very low initially and rises only slowly. Only after approximately 70 seconds has the lamp reached about 50% of the UV output and it takes approximately 140 seconds before the mercury low-pressure amalgam lamp reaches its full UV output.
Figure 3 shows the running-in characteristics of a mercury low-pressure amalgam lamp, according to the invention. In this regard, as in the case of conventional lamps, the electrodes are pre-heated for 5 seconds, but the amalgam reservoir is also simultaneously pre-heated for the same time up to time point B. It is clear that the mercury low-pressure amalgam lamp reaches about 50% of UV output within approximately 10 seconds and full UV output after approximately 30 seconds.
Reference list

Amalgam lamp	1
Lamp tube	10
Electrode	12
Interior	14
Bonding agent layer	16
Amalgam reservoir	18
Infrared lamp	20
Reflector	22
Infrared radiation	26

EP2311069

GYORSINDÍTÁS KISNYOMÁSÚ HIGANY AMALGÁM LÁMPÁKHOZ

SZABADALMI IGÉNYPONTOK

1. Eljárás amalgám lámpa (1) működtetéséhez a felmelegedési idő (warm-up time) csökkentésére, ahol az amalgám lámpa (1) tartalmaz egy nemesgázzal töltött kibocsátó csövet (emitter tube) (10), ahol az amalgám a kibocsátó csőben (10) fel van melegítve egy külső energiaforrás (20) segítségével, **azzal jellemezve, hogy** energiaforrásként (20) egy aranyal bevont (gold-plated) tükörrel rendelkező infravörös lámpát alkalmazunk.

2. Az 1. igénypont szerinti eljárás amalgám lámpa (1) működtetéséhez, **azzal jellemezve, hogy** a külső energiaforrás (20) be van kapcsolva, mielőtt az amalgám melegítve lenne.

3. Az 1. igénypont szerinti eljárás amalgám lámpa (1) működtetéséhez, **azzal jellemezve, hogy** a külső energiaforrás (20) ki van kapcsolva, miután az amalgám fel lett melegítve.

4. Amalgám lámpa (1) működtetéshez az 1-3. igénypontok bármelyike szerinti eljárás szerint.

5. A 4. igénypont szerinti amalgám lámpa (1), **azzal jellemezve, hogy** az amalgám lámpa (1) tartalmaz egy amalgám tartályt (reservoir) (18).

6. A 4. vagy 5. igénypont szerinti amalgám lámpa (1), **azzal jellemezve, hogy** az amalgám lámpa (1) tartalmaz egy kötőanyagot (bonding agent) (16) a lámpacső (lamp tube) (10) belsején.

7. A 4-6. igénypontok bármelyike szerinti amalgám lámpa (1), **azzal jellemezve, hogy** az amalgám tartály (18) a kötőanyag rétegen van elrendezve.

8. A 4-7. igénypontok bármelyike szerinti amalgám lámpa (1), **azzal jellemezve, hogy** a kötőanyag (16) tartalmaz egy nemesfémet (precious metal).

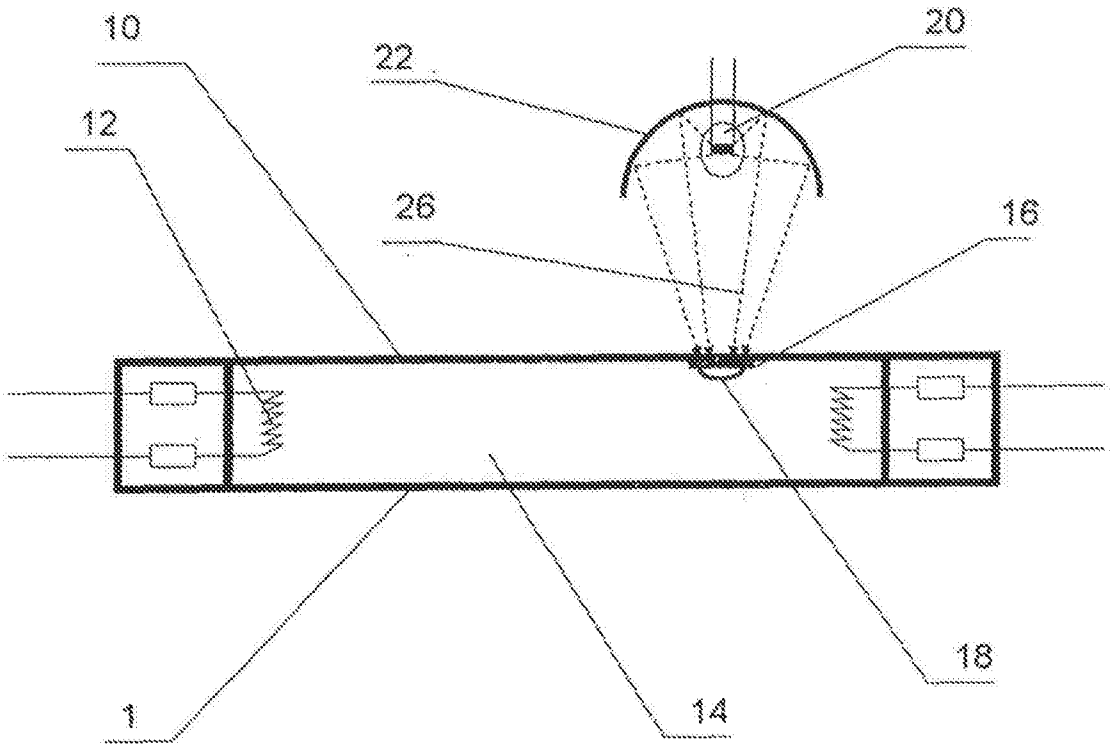

Fig. 1

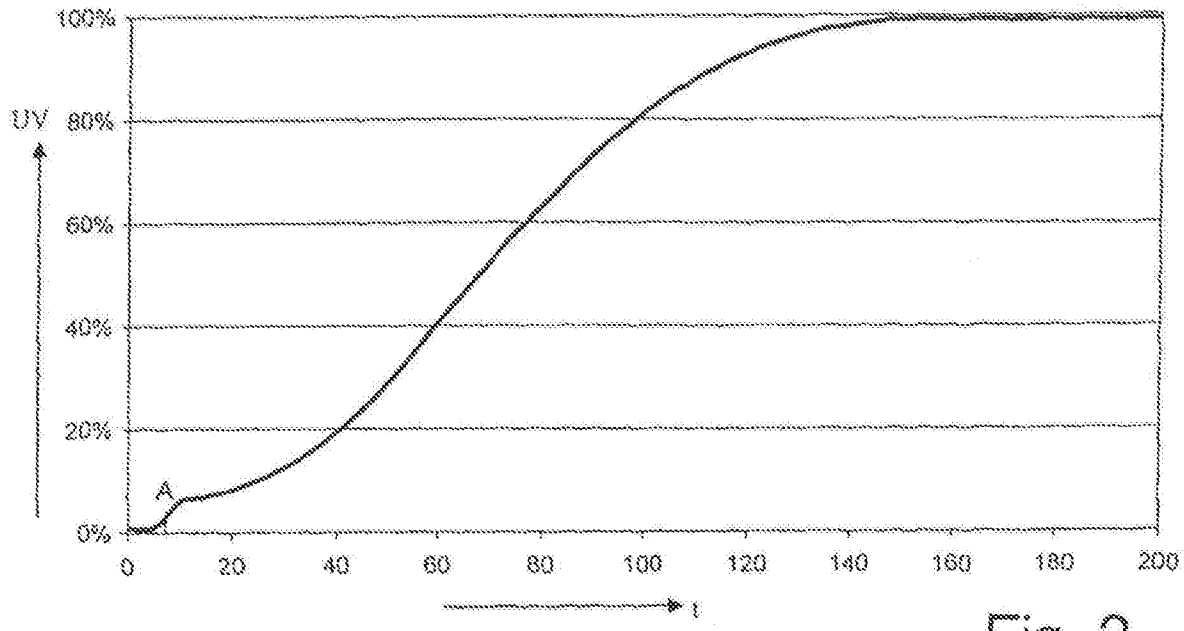
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Fig. 2

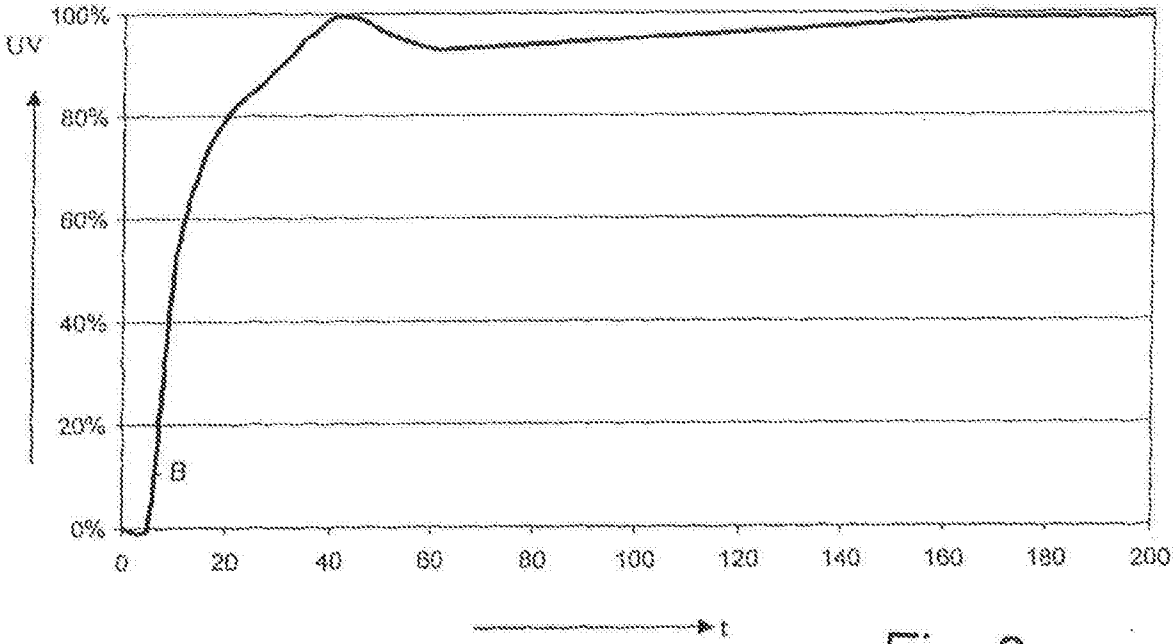
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Fig. 3