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Bezeichnung der Erfindung:
Title of invention: Spectral radiation sources of the hollow
Titre de l'invention: cathode type

ENTSCHEIDUNG / DECISION

vom / of / du 9 November 1983

Anmelder / Applicant / Demandeur: Westinghouse Electric Corporation

Stichwort / Headword / Référence:

EPO / EPC / CBE Articles 56 and 52 (1)
"Inventive step"

Leitsatz / Headnote / Sommaire

Summary of Facts and Submissions

(I) European patent application No. 80 301 777.1 entitled "Spectral radiation sources of the hollow cathode type", filed on 29 May 1980 and published on 10 December 1980 (publication No. 0 020 142) and claiming priority of 29 May 1979 from a previous application in the USA, was refused by decision of Examining Division 047 of the European Patent Office dated 22 October 1982 on the basis of claims 1 - 3 received on 8 July 1982. The ground for refusal was that a spectral radiation source according to the preamble of claim 1 was known from US-A-3 898 501 and that a person skilled in the art would gather from the same document that he could use an alloy of silver and the material generating spectral radiation. It was further pointed out that it was within the scope of the normal, non-inventive activity of a person skilled in the art to determine the optimal percentage of components of the alloy. Therefore, no inventive step was seen in the subject matter of claim 1.

(II) On 22 December 1982 the appellant lodged an appeal against the decision by telex and paid the appeal fee. A document reproducing the contents of the telex was filed on 29 December 1982. The appellant submitted a Statement of Grounds on 23 February 1983 and maintained the claims 1 - 3 received on 8 July 1982.

Claim 1 reads as follows:

A spectral radiation source of the hollow cathode type comprising an anode and cathode positioned within a gas filled envelope, with the operating discharge between

the anode and the cathode generating spectral radiation which is characteristic of the metal cathode, characterised in that the metal cathode consists of an alloy of silver which is chemically stable and readily sputtered, and calcium in an amount of up to 25 weight percent of the alloy.

The appellant has submitted the following arguments:

Neither US-A-3 898 501 nor US-A-3 183 393 (referred to in the description of the application and in a notification of the Examining Division) acknowledged technical deficiencies (long warm-up period and repeated processing and seasoning during the manufacturing process) associated with the use of a calcium-aluminium-alloy (US-A-3 183 393) as a cathode material for a hollow cathode spectral light source. According to US-A-3 898 501 silver is only utilised for alloying metals having a melting point of less than 500°C (zinc, bismuth, cadmium, tin, lead) but this is done to solve another problem, namely to raise the melting point of the alloy in order to avoid any deformation of the cathode due to the heating for sealing the glass envelope. There was no reason why the skilled man in the art would turn to silver (or silver and magnesium) as an alloy metal for calcium in order to get a stable operation of the light source after only a short warm-up period.

- (III) The appellant has requested the cancellation of the decision refusing the European patent application and the grant of a patent on the basis of the claims 1-3 filed on 8 July 1982.

Reasons for the Decision

- (1) The appeal complies with Articles 106 - 108 and Rule 64 EPC. It is therefore admissible.
- (2) There is no formal objection to the current claims, since they are supported by the original documents.
- (3) The preamble of claim 1 is based on spectral radiation sources of the hollow cathode type as described in US-A-3 183 and 3 898 501.

In the case of the US-A-3 183 393 the hollow cathode also consists of a calcium alloy in an amount of calcium up to 15 weight percent of the alloy (characterizing portion of the effective claim 1 in part). In contrast to the subject matter of the application the alloy metal is not silver but aluminium and magnesium. The hollow cathode of the radiation source according to US-A-3 898 501 is formed of an alloy composed of silver and at least one metal having a melting point equal to or lower than 500°C (zinc, bismuth, cadmium, tin, lead) whereas calcium has a melting point of 842°C (characterizing portion of the effective claim 1 in part). Therefore, the spectral radiation source according to claim 1 is new.

- (4) According to the first paragraph on page 2 of the description of the application, an aluminium-calcium-(magnesium)-hollow cathode (US-A-3 183 393) requires a long warm-up period to achieve a stable spectral output of less than 2% drift per 5 minute operation. In order to achieve this stability, it has also been necessary to repeatedly process and season such cathodes during

the manufacturing process. The appellant aims to overcome these deficiencies of the spectral radiation source described in US-A-3 183 393. When operating radiation sources according to US-A- 3 183 393, the manufacturer and user will undoubtedly discover the shortcomings mentioned above. It is a constant pre-occupation of manufacturers to improve their products. Therefore, the problem of the present application cannot be regarded as anything out of the ordinary.

The problem is solved by the characterizing features of claim 1. Because of its reactivity with air and moisture, metallic calcium is difficult to handle, so that a solution of the problem could be considered only on the basis of an alloy of calcium with metal other than aluminium.

Thus, a person skilled in the art could be expected to search the prior art for an appropriate alloy component instead of aluminium. US-A-3 898 501 discloses the use of silver as an alloy material for hollow cathodes of spectral radiation sources, and, additionally, provides the teaching that a silver alloy cathode has a comparatively short warming-up period, cf. col. 3, pages 25-28. It is true, as the appellant submits, that according to US-A-3 898 501 the purpose of forming a hollow cathode made of a silver alloy is to raise the melting point when the light emitting metal alone has a melting point lower than 500°C. However, it was immediately clear to the person skilled in the art that the quality of silver to form alloys with other metals for spectral radiation sources and the afore-mentioned quality of silver alloys, namely the comparatively

short warming-up period, was not connected with the condition that the melting point of the alloy component was below 500°C. It was, therefore, obvious to a person skilled in the art to take into consideration the use of silver as an alloy material for calcium. If he was still in doubt whether silver was an appropriate alloy material for calcium he could simply conduct an experiment and find out that it was the case.

For the foregoing reasons, US-A-3 898 501 could suggest the use of silver for the purpose in question.

It was also within the scope of the normal non-inventive activity of a person skilled in the art to find out the upper limit of percentage of calcium in the alloy.

Thus, the subject-matter of claim 1 does not involve an inventive step (Article 56 EPC).

Claim 1 is therefore not allowable under Article 52(1) EPC.

- (5) Claims 2 and 3 are formulated as dependent claims. They are not allowable since their existence is conditional on the allowability of claim 1. Furthermore, in view of the prior art (US-A-3 183 393: inclusion of magnesium as a third component in the alloy) the Board cannot find any patentable features in the sub-claims.

Order

For these reasons

it is decided that:

The appeal is dismissed

The Registrar:

J. Rückerl

The Chairman:

R. Kaiser