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(54) **WATERPROOF PLUG CONNECTOR, DC PLUG AND LAMP**

(57) The invention discloses a waterproof plug connector, which comprises a DC plug and a first DC socket, the DC plug is provided with an outer cylinder with enlarged diameter; a first elastic sealing member is provided between the DC plug and the first DC socket; and a movable connecting piece is arranged between the DC plug and the first DC socket. The invention also discloses a DC plug and a lamp. The DC plug adopted is in compliance with safety regulations. After assembly the plug connector can effectively prevent problems caused by poor electrical conductivity or even loosening of the component during use; and meanwhile it can carry out a more reliable and effective waterproof function.

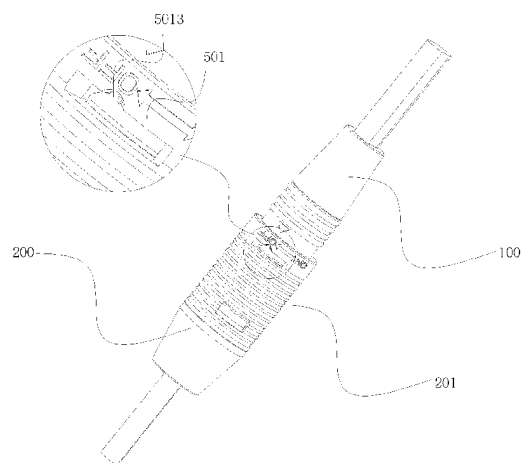


FIG.1

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EUROPEAN SEARCH REPORT

Application Number

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| DOCUMENTS CONSIDERED TO BE RELEVANT  |   |   |   |
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| Category   | Citation of document with indication, where appropriate, of relevant passages   | Relevant to claim   | CLASSIFICATION OF THE APPLICATION (IPC)   |
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| The present search report has been drawn up for all claims   |   |   |   |
| Place of search<br><b>The Hague</b>  |   | Date of completion of the search<br><b>9 February 2024</b>  | Examiner<br><b>Georgiadis, Ioannis</b>  |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |   | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |   |

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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing claims for which payment was due.

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Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

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No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

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**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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**see sheet B**

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All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

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As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

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Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

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None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

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The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION  
SHEET B**

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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**1. claims: 1-10**

Claim 1 disclosing a waterproof plug connector, comprising a DC plug, a first DC socket with an outer cylinder, a first elastic sealing member and a movable connecting piece between the DC plug and the first DC socket.

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Claim 10 with a DC plug with an outer cylinder and a radial raised portion

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**2. claims: 11-14**

Claim 11 disclosing a lamp, comprising a lamp body (1000) and a lamp cap (2000) with an end cover (2001) sealing the mounting opening of the lamp body (1000), a second DC socket (2002) electrically connected to the lamp body (1000), and a second elastic sealing member (2003) disposed between the second DC socket (2002) and the lamp body (1000); the end cover (2001) is provided with a jack (2011) aligned with the second DC socket (2002), the inner wall of the jack (2011) is provided with a second locking portion (2021), and the second locking portion (2021) comprises an inlet (2031) extending to the port along the plugging direction and a clamping block (2041) extending circumferentially from the end of the inlet (2031).

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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09-02-2024

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82