

Title (en)
Ceramic heater device and method for manufacturing the device

Title (de)
Keramikheizer und Herstellungsverfahren

Title (fr)
Dispositif chauffant céramique, et méthode de fabrication

Publication
EP 1239222 B2 20130116 (EN)

Application
EP 02251651 A 20020308

Priority
JP 2001066049 A 20010309

Abstract (en)
[origin: EP1239222A2] A ceramic heater 2 is arranged in a metallic cylinder member 3 by forming a convergent taper portion 2t at the leading end 2a of the ceramic heater 2 and by positioning the leading end 3a of the metallic cylinder member 3 on the leading end side of a taper starting point P1 of the taper portion 2t. Solder is applied in the clearance between the inner circumference 3d of the metallic cylinder member 3 and the outer circumference 2b of the heater 2. A solder layer 10 applied is made to exist on the leading end side of the taper starting point P1 of the taper portion 2t, too. The thick solder layer 10 existing on the leading end side performs the action of preventing a cut or broken off portion of the ceramic heater from separating or sliding out.

IPC 8 full level
F23Q 7/00 (2006.01); **F23Q 7/22** (2006.01); **H05B 3/14** (2006.01); **H05B 3/44** (2006.01)

CPC (source: EP)
F23Q 7/001 (2013.01); **H05B 3/141** (2013.01); **F23Q 2007/004** (2013.01); **H05B 2203/027** (2013.01)

Citation (opposition)
Opponent :

- GB 2106181 A 19830407 - LUCAS IND PLC [GB]
- US 5880432 A 19990309 - RADMACHER STEPHEN J [CA]
- US 6084212 A 20000704 - LEIGH PETER [CA]
- JP H049517 A 19920114 - NGK SPARK PLUG CO
- DE 3003522 A1 19800814 - LUCAS INDUSTRIES LTD
- JP S57192726 A 19821126 - NIPPON DENSO CO
- JP S5822 A 19830105 - NGK SPARK PLUG CO
- US 4475029 A 19841002 - YOSHIDA HITOSHI [JP], et al
- DE 612533 C 19350427 - SIEMENS AG
- Schott Technical Glasses, Physical and technical properties, October 2007, pages 28 to 29 "Solder Glasses"

Cited by
DE102010055119A1; DE102009056057B4; EP2701459A4; DE102006016566A1; DE102006016566B4; DE102010055119B4;
DE102013112806B4; EP2257119A4; DE102009056057A1; WO2007033824A1; US8916800B2; DE102013112806A1; US9506651B2;
US10072844B2

Designated contracting state (EPC)
DE FR

DOCDB simple family (publication)
EP 1239222 A2 20020911; EP 1239222 A3 20060823; EP 1239222 B1 20080227; EP 1239222 B2 20130116; DE 60225200 D1 20080410;
DE 60225200 T2 20090326; DE 60225200 T3 20130328; JP 2002270349 A 20020920; JP 4632565 B2 201110216

DOCDB simple family (application)
EP 02251651 A 20020308; DE 60225200 T 20020308; JP 2001066049 A 20010309