

Title (en)  
Sheated heater, glow plug

Title (de)  
Heizung mit Mantel, Glühkerze

Title (fr)  
Chauffage gainé, bougie de préchauffage

Publication  
**EP 2899286 A3 20160217 (EN)**

Application  
**EP 15151035 A 20150114**

Priority  
• JP 2014004904 A 20140115  
• JP 2014262488 A 20141225

Abstract (en)  
[origin: EP2899286A2] [Objective] To improve durability of a sheath heater. [Means for Solution] A sheath heater includes a sheath tube, a heating unit, and a magnesium oxide. The sheath tube is a tubular member whose one end is closed. The heating unit generates heat by transmission of electricity and is arranged inside the sheath tube. The magnesium oxide is arranged between the sheath tube and the heating unit and filled directly in contact with the sheath tube. The sheath tube is not thermally contracted when a temperature is increased from 20°C to 1200°C. In the sheath tube, an average thermal expansion rate is equal to or more than  $13 \times 10^{-6} /K$  and equal to or less than  $18 \times 10^{-6} /K$  when the temperature is increased from 20°C to 1200°C.

IPC 8 full level  
**C22C 19/05** (2006.01); **C22C 38/06** (2006.01); **C22C 38/18** (2006.01); **F23Q 7/00** (2006.01); **F23Q 7/22** (2006.01); **H05B 3/00** (2006.01); **H05B 3/48** (2006.01); **H05B 3/50** (2006.01)

CPC (source: EP)  
**C22C 19/05** (2013.01); **C22C 19/055** (2013.01); **C22C 19/058** (2013.01); **C22C 38/06** (2013.01); **C22C 38/18** (2013.01); **F23Q 7/001** (2013.01); **H05B 3/48** (2013.01); **H05B 2203/027** (2013.01)

Citation (search report)  
• [X] DE 102011077893 A1 20121227 - BOSCH GMBH ROBERT [DE]  
• [X] EP 2587156 A1 20130501 - NGK SPARK PLUG CO [JP]  
• [X] EP 2410243 A2 20120125 - NGK SPARK PLUG CO [JP]  
• [X] JP 2003056848 A 20030226 - NGK SPARK PLUG CO  
• [A] US 2013323113 A1 20131205 - HATTENDORF HEIKE [DE], et al  
• [A] EP 0836094 A2 19980415 - NGK SPARK PLUG CO [JP]  
• [A] US 8482188 B1 20130709 - MA SHUWEI [US]  
• [A] US 5217545 A 19930608 - SMITH GAYLORD D [US], et al  
• [A] US 5118921 A 19920602 - AOTA TAKASHI [JP], et al  
• [A] THYSSENKRUPP VDM: "Cronifer 40B Material Data Sheet No. 4051", 5 March 2011 (2011-03-05), DE, XP002741724, Retrieved from the Internet <URL:http://www.vdm-metals.com/fileadmin/user\_upload/Downloads/Datenblaetter\_-\_Data\_Sheets/Data\_Sheet\_VDM\_Alloy\_40\_B.pdf> [retrieved on 20150702]

Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)  
BA ME

DOCDB simple family (publication)  
**EP 2899286 A2 20150729; EP 2899286 A3 20160217; JP 2015155790 A 20150827**

DOCDB simple family (application)  
**EP 15151035 A 20150114; JP 2014262488 A 20141225**