Title (en)
Method of manufacturing a nozzle for a fuel injection valve

Title (de)
Verfahren zur Bearbeitung eines Düsenelementes für Einspritzventile

Title (fr)
Procédé de traitement d'une buse pour une soupape d'injection

Publication
EP 1145801 B1 20030611 (DE)

Application
EP 01107396 A 20010326

Priority
DE 10015875 A 20000330

Abstract (en)
[origin: EP1145801A1] The method involves using a nozzle element (12) with at least one nozzle channel (16) that is narrower than a target diameter and conducting an abrasive medium through the channel to abrade material and enlarge the channel. The abrasive medium is a mixture of either a support fluid with a mineral oil base and an organophilic clay mineral or a support fluid with a water base and a hydrophilic clay material. The components of the mixture are selected, so that they have the same rheological qualities as the fuel to be injected by the valve.

IPC 1-7 (main, further and additional classification)
B24B 31/116

IPC 8 full level (invention and additional information)
B24B 31/116 (2006.01); **F02M 61/16** (2006.01)

CPC (invention and additional information)
B24B 31/116 (2013.01); **F02M 61/168** (2013.01)

Designated contracting state (EPC)
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

EPO simple patent family
EP 1145801 A1 20011017; EP 1145801 A9 20020227; EP 1145801 B1 20030611; AT 242682 T 20030615; DE 10015875 A1 20011018; DE 10015875 C2 20020207

INPADOC legal status

2017-02-28 [PG25 IT] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : IT
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20160326

2017-01-31 [PG25 GB] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : GB
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20160326

2016-11-23 [GBPC] GB: EUROPEAN PATENT CEASED THROUGH NON-PAYMENT OF RENEWAL FEE
- Effective date : 20160326

2015-05-29 [PGFP GB] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : GB
- Payment date : 20150313
- Year of fee payment : 15

2015-04-30 [PGFP IT] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : IT
- Payment date : 20150320
- Year of fee payment : 15

2010-01-29 [PG25 DE] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : DE
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20091001

2009-10-30 [PG25 AT] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : AT
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20090326

2008-07-31 [PG25 FR] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO

- Ref Country Code : FR
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20070402

2008-07-31 [PGFP DE] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : DE
- Payment date : 20080328
- Year of fee payment : 8

2008-06-30 [PGFP AT] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : AT
- Payment date : 20080328
- Year of fee payment : 8

2008-01-04 [REG FR ST] NOTIFICATION OF LAPSE
- Effective date : 20071130

2006-03-31 [PGFP FR] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : FR
- Payment date : 20060331
- Year of fee payment : 6

2005-11-15 [REG CH PL] PATENT CEASED

2005-03-31 [PG25 CH] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : CH
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20050331

2005-03-31 [PG25 LI] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : LI
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20050331

2004-09-30 [BERE] BE: LAPSED
- Owner name : *SONPLAS G.M.B.H.
- Effective date : 20040331

2004-06-02 [26N] NO OPPOSITION FILED
- Effective date : 20040312

2004-04-23 [ET] FR: TRANSLATION FILED

2004-03-31 [PG25 BE] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : BE
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20040331

2004-03-31 [PG25 MC] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : MC
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20040331

2004-03-26 [PG25 LU] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : LU
- Free text : LAPSE BECAUSE OF NON-PAYMENT OF DUE FEES
- Effective date : 20040326

2004-01-28 [REG IE FD4D] EUROPEAN PATENTS DESIGNATING IRELAND TREATED AS ALWAYS HAVING BEEN VOID

2003-11-12 [GBT] GB: TRANSLATION OF EP PATENT FILED (GB SECTION 77(6)(A)/1977)
- Effective date : 20031020

2003-11-03 [NLV1] NL: LAPSED OR ANNULLED DUE TO FAILURE TO FULFILL THE REQUIREMENTS OF ART. 29P AND 29M OF THE PATENTS ACT

2003-09-22 [PG25 ES] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : ES

- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030922

2003-09-11 [PG25 DK] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : DK
- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030911

2003-09-11 [PG25 GR] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : GR
- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030911

2003-09-11 [PG25 PT] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : PT
- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030911

2003-09-11 [PG25 SE] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : SE
- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030911

2003-07-17 [REF] CORRESPONDS TO:
- Document : DE 50100302 P 20030717

2003-07-09 [REG IE FG4D] EUROPEAN PATENTS GRANTED DESIGNATING IRELAND
- Free text : GERMAN

2003-06-13 [REG CH EP] ENTRY IN THE NATIONAL PHASE

2003-06-11 [AK] DESIGNATED CONTRACTING STATES:
- Designated State(s) : AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

2003-06-11 [REG GB FG4D] EUROPEAN PATENT GRANTED
- Free text : NOT ENGLISH

2003-06-11 [PG25 CY] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : CY
- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030611

2003-06-11 [PG25 FI] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : FI
- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030611

2003-06-11 [PG25 IE] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : IE
- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030611

2003-06-11 [PG25 NL] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO
- Ref Country Code : NL
- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030611

2003-06-11 [PG25 TR] LAPSED IN A CONTRACTING STATE ANNOUNCED VIA POSTGRANT INFORM. FROM NAT. OFFICE TO EPO

- Ref Country Code : TR
- Free text : LAPSE BECAUSE OF FAILURE TO SUBMIT A TRANSLATION OF THE DESCRIPTION OR TO PAY THE FEE WITHIN THE PRESCRIBED TIME-LIMIT
- Effective date : 20030611

2002-07-03 [AKX] PAYMENT OF DESIGNATION FEES
- Free text : AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

2002-02-06 [17Q] FIRST EXAMINATION REPORT
- Effective date : 20011220

2001-12-05 [17P] REQUEST FOR EXAMINATION FILED
- Effective date : 20011008

2001-10-17 [AK] DESIGNATED CONTRACTING STATES:
- Kind Code of Ref Document : A1
- Designated State(s) : AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

2001-10-17 [AX] REQUEST FOR EXTENSION OF THE EUROPEAN PATENT TO:
- Free text : AL;LT;LV;MK;RO;SI