Title (en)

Crank shaft for an internal combustion engine

Title (de)

Kurbelwelle eines Motors

Title (fr)

Vilebrequin pour un moteur à combustion interne

Publication

EP 1043486 A2 20001011 (DE)

Application

EP 00105797 A 20000318

Priority

DE 19915508 A 19990407

Abstract (en)

The engine crankshaft has at least two power takeoffs which are clamped to each other on a common sector of the shaft by mea of a basically axially directed clamping force. the crankshaft has a device (7) to convert the axially directed clamping force into clamping force with a radial component acting on at least one of the power takeoffs.

Abstract (de)

Bei einer Kurbelwelle eines Motors mit zumindest zwei Abtrieben, die auf einem gemeinsamen Wellenabschnitt mittels einer im wesentlichen axial gerichteten Spannkraft gegeneinander verspannt sind, werden Mittel vorgeschlagen, welche die axial gerichtete Spannkraft in eine Spannkraft mit einer radialen Komponente umlenken, die auf wenigstens einen Abtrieb wirkt. <IMAGE>

IPC 1-7 (main, further and additional classification)

F02B 67/06

IPC 8 full level (invention and additional information)

F16B 5/06 (2006.01); **F02B 67/06** (2006.01); **F16B 1/02** (2006.01); **F16B 9/02** (2006.01); **F16C 3/02** (2006.01); **H02K 7/075** (2006.01)

CPC (invention and additional information)

F02B 67/06 (2013.01); Y10T 74/2173 (2013.01); Y10T 403/7054 (2013.01)

Cited by

CN105465155A; CN104358794A; DE102008046167A1

Designated contracting state (EPC)

DE ES FR GB IT

EPO simple patent family

EP 1043486 A2 20001011; EP 1043486 A3 20011121; EP 1043486 B1 20050316; DE 19915508 A1 20001012; ES 2239952 T3 20051016; JP 2000316255 A 20001114; US 2002178860 A1 20021205; US 6439080 B1 20020827; US 6532844 B2 20030318

INPADOC legal status

2009-09-30 [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 : 20070318

2009-07-31 [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 NON-PAYMENT OF DUE FEES
- Effective date : 20080319

2009-06-30 [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 : 20080318

2009-05-28 [REG ES FD2A] ANNOUNCEMENT OF LAPSE IN SPAIN

- Effective date : 20080319

2009-04-30 [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 : 20080331

2009-01-30 [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 : 20081001

2008-12-19 [REG FR ST] NOTIFICATION OF LAPSE
- Effective date : 20081125

2008-11-26 [GBPC] GB: EUROPEAN PATENT CEASED THROUGH NON-PAYMENT OF RENEWAL FEE
- Effective date : 20080318

2008-04-30 [PGFP FR] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : FR
- Payment date : 20070322
- Year of fee payment : 8

2007-04-18 [PGFP DE] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : DE
- Payment date : 20070418
- Year of fee payment : 8

2007-03-16 [PGFP ES] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : ES
- Payment date : 20070316
- Year of fee payment : 8

2007-02-20 [PGFP GB] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : GB
- Payment date : 20070220
- Year of fee payment : 8

2006-03-31 [PGFP IT] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : IT
- Payment date : 20060331
- Year of fee payment : 7

2006-03-10 [ET] FR: TRANSLATION FILED

2006-03-08 [26N] NO OPPOSITION FILED
- Effective date : 20051219

2005-10-16 [REG ES FG2A] DEFINITIVE PROTECTION
- Document : ES 2239952 T3

2005-07-13 [GBT] GB: TRANSLATION OF EP PATENT FILED (GB SECTION 77(6)(A)/1977)
- Effective date : 20050616

2005-04-21 [REF] CORRESPONDS TO:
- Document : DE 50009753 P 20050421

2005-03-16 [AK] DESIGNATED CONTRACTING STATES:
- Kind Code of Ref Document : B1
- Designated State(s) : DE ES FR GB IT

2005-03-16 [REG GB FG4D] EUROPEAN PATENT GRANTED
- Free text : NOT ENGLISH

2004-02-11 [17Q] FIRST EXAMINATION REPORT
- Effective date : 20031230

2002-08-07 [AKX] PAYMENT OF DESIGNATION FEES
- Free text : DE ES FR GB IT

2002-06-26 [17P] REQUEST FOR EXAMINATION FILED
- Effective date : 20020423

2001-11-21 [AK] DESIGNATED CONTRACTING STATES:
- Kind Code of Ref Document : A3
- Designated State(s) : AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

2001-11-21 [AX] REQUEST FOR EXTENSION OF THE EUROPEAN PATENT TO:
- Free text : AL;LT;LV;MK;RO;SI

2001-11-21 [RIC1] CLASSIFICATION (CORRECTION)
- Free text : 7F 02B 67/06 A, 7F 16D 1/08 B

2000-10-11 [AK] DESIGNATED CONTRACTING STATES:
- Kind Code of Ref Document : A2
- Designated State(s) : DE ES FR GB IT

2000-10-11 [AK] DESIGNATED CONTRACTING STATES:
- Kind Code of Ref Document : A2
- Designated State(s) : AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

2000-10-11 [AX] REQUEST FOR EXTENSION OF THE EUROPEAN PATENT TO:
- Free text : AL;LT;LV;MK;RO;SI