Title (en)
Drum lining for ball mills

Title (de)
Auskleidung für die Trommeln von Kugelmühlen

Title (fr)
Revêtement pour tambours de broyeurs à billes

Publication
EP 0693317 B1 20010502 (DE)

Application
EP 95111378 A 19950720

Priority
DE 4426211 A 19940723

Abstract (en)
[origin: EP0693317A1] The rotating drum (1) of the ball mill has an inner cladding made up of a number of stones assembled into a continuous layer and with inward facing faces profiled to provide an inner cladding surface which pulls the balls and charges up and allows them to fall back to the bottom of the drum. The stones are pressed and sintered aluminium oxide or zirconium oxide, with a large resistance to wear. The separate stones have sloping outer surfaces which when placed next to other shaped stones provide a regular surface pattern. This drags the charge and balls upwards and drops them for milling. The surface profiling has a repeated saw toothed pattern or a sinusoidal pattern, with the wave pitch similar to the ball diameter.

IPC 1-7 (main, further and additional classification)
B02C 17/22

IPC 8 full level (invention and additional information)
B02C 17/22 (2006.01)

CPC (invention and additional information)
B02C 17/22 (2013.01)

Cited by
DE102008012180B3

Designated contracting state (EPC)
DE ES GB IT

EPO simple patent family
EP 0693317 A1 19960124; EP 0693317 B1 20010502; DE 4426211 A1 19960125; DE 4426211 C2 19971106; ES 2158017 T3 20010901

INPADOC legal status

2009-10-30 [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 : 20080721

2009-09-28 [REG ES FD2A] ANNOUNCEMENT OF LAPSE IN SPAIN
- Effective date : 20080721

2009-08-31 [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 : 20080720

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 : 20080720

2009-04-30 [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 : 20090203

2009-03-25 [GBPC] GB: EUROPEAN PATENT CEASED THROUGH NON-PAYMENT OF RENEWAL FEE
- Effective date : 20080720

2008-01-31 [PGFP IT] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : IT
- Payment date : 20070726
- Year of fee payment : 13

2008-01-02 [PGFP GB] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE

- Ref Country Code : GB
- Payment date : 20070730
- Year of fee payment : 13

2007-07-31 [PGFP DE] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : DE
- Payment date : 20070731
- Year of fee payment : 13

2007-07-25 [PGFP ES] POSTGRANT: ANNUAL FEES PAID TO NATIONAL OFFICE
- Ref Country Code : ES
- Payment date : 20070725
- Year of fee payment : 13

2002-04-24 [26N] NO OPPOSITION FILED

2002-01-01 [REG GB IF02] EUROPEAN PATENT IN FORCE AS OF 2002-01-01

2001-09-01 [REG ES FG2A] DEFINITIVE PROTECTION
- Document : ES 2158017 T3

2001-08-22 [GBT] GB: TRANSLATION OF EP PATENT FILED (GB SECTION 77(6)(A)/1977)
- Effective date : 20010731

2001-07-31 [ITF] IT: TRANSLATION FOR A EP PATENT FILED
- Owner name : STUDIO JAUMANN P. & C. S.N.C.

2001-06-07 [REF] CORRESPONDS TO:
- Document : DE 59509226 20010607

2001-05-02 [AK] DESIGNATED CONTRACTING STATES:
- Kind Code of Ref Document : B1
- Designated State(s) : DE ES GB IT

2000-03-08 [17Q] FIRST EXAMINATION REPORT
- Effective date : 20000119

1996-09-11 [17P] REQUEST FOR EXAMINATION FILED
- Effective date : 19960717

1996-01-24 [AK] DESIGNATED CONTRACTING STATES:
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- Designated State(s) : DE ES GB IT