

Title (en)  
WAXLESS PRECISION CASTING PROCESS

Title (de)  
WACHSFREIES PRÄZISIONSGUSSVERFAHREN

Title (fr)  
PROCESSUS DE COULÉE DE PRÉCISION SANS CIRE

Publication  
**EP 3552732 A1 20191016 (EN)**

Application  
**EP 19172041 A 20101208**

Priority  
• US 26771709 P 20091208  
• US 96162110 A 20101207  
• EP 10793385 A 20101208  
• US 2010059377 W 20101208

Abstract (en)  
Alloy products are produced with a waxless casting process. A model of a ceramic casting vessel (34) defining a desired product shape is digitally divided into sections (10, 40, 42). Each section is translated into a soft alloy mater tool (14) including precision inserts (20) where needed for fine detail. A flexible mold (24) is cast from each master tool, and a section of the ceramic casting vessel is cast from the respective flexible mold. The vessel sections are assembled by aligning cooperating precision features (58, 60) cast directly into each section and the alloy part is cast therein. No wax or wax pattern tooling is needed to produce the cast alloy product. Engineered surface features (54) may be included on both the interior and exterior surfaces of the shell sections.

IPC 8 full level  
**B22C 9/02** (2006.01); **B22C 9/10** (2006.01); **B22C 9/24** (2006.01)

CPC (source: EP US)  
**B22C 7/06** (2013.01 - EP US); **B22C 9/02** (2013.01 - EP US); **B22C 9/04** (2013.01 - US); **B22C 9/10** (2013.01 - US);  
**B22C 9/103** (2013.01 - EP US); **B22C 9/22** (2013.01 - US); **B22C 9/24** (2013.01 - EP US)

Citation (applicant)  
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• US 7438527 B2 20081021 - ALBERT JASON E [US], et al  
• US 7141812 B2 20061128 - APPLEBY MICHAEL [US], et al  
• US 7410606 B2 20080812 - APPLEBY MICHAEL P [US], et al  
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• US 2009058220 W 20090924  
• US 7410806 B2 20080812 - NIJKAMP FRANCISCUS PETRUS [NL], et al

Citation (search report)  
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• [A] US 2003235272 A1 20031225 - APPLEBY MICHAEL [US], et al  
• [A] US 2006065383 A1 20060330 - ORTIZ MILTON [US], et al  
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• [A] ALTAN ET AL: "Manufacturing of Dies and Molds", CIRP ANNALS, ELSEVIER BV, NL, CH, FR, vol. 50, no. 2, 1 January 2001 (2001-01-01), pages 404 - 422, XP022144996, ISSN: 0007-8506, DOI: 10.1016/S0007-8506(07)62988-6  
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**US 2011132562 A1 20110609**; EP 2509727 A2 20121017; EP 2509727 B1 20190501; EP 3552732 A1 20191016; US 2014241938 A1 20140828; WO 2011071974 A2 20110616; WO 2011071974 A3 20110922

DOCDB simple family (application)  
**US 96162110 A 20101207**; EP 10793385 A 20101208; EP 19172041 A 20101208; US 2010059377 W 20101208; US 201414268391 A 20140502